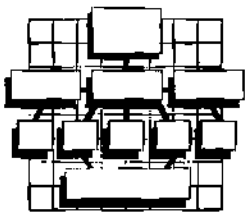


Dataquest Vendor Profile

Software

CAD/CAM/CAE/GIS Worldwide

IBM Corporation

Corporate Statistics

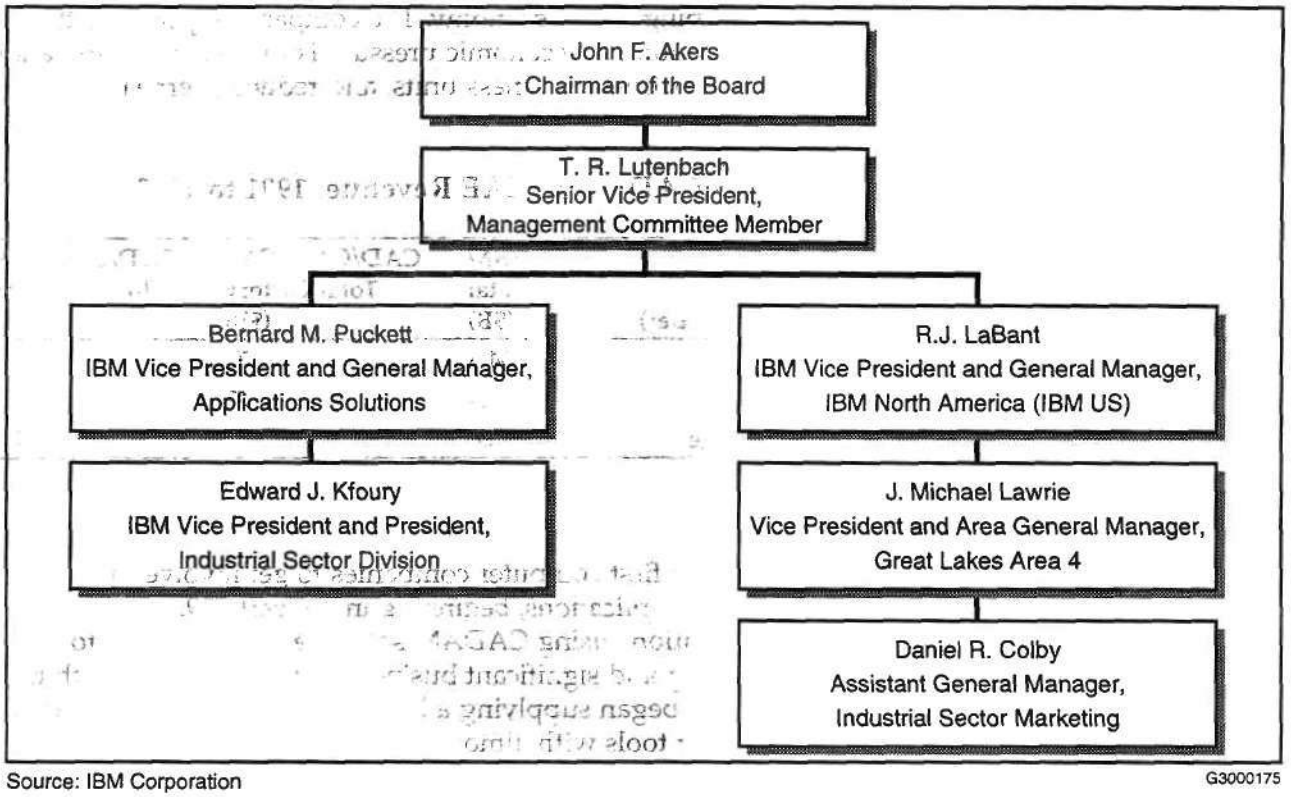
Location	Armonk, New York
CEO (acting), President, and Chairman	John F. Akers
Number of Employees	344,396
Number of IBM CAD/CAM/CAE Specialist and Marketing Personnel	More than 9,500 worldwide

The winds of change are blowing in Armonk at gale force 9. John F. Akers has resigned as CEO after seven years at the helm, and the hot seat is scheduled to be filled before the end of May. President Jack Kuehler and CFO Frank Metz also have stepped aside. More cuts in head count are expected, mostly targeted in the sales, general, and administrative areas. For the first time, hardware revenue has dropped below 50 percent of total revenue, with a decline in revenue growth of 10 percent. Fortunately, the nonhardware-related revenue is increasing and the growth rate is positive. The rate of change in this company is beyond imagination, but the company is weathering the storm and will evolve into a more agile and aggressive operation. The next six months will define the future of IBM as a world leader in the computer business.

The software component of IBM business is aimed at the full spectrum of business and technical applications. IBM's $15 billion operation, about five times the size of Microsoft in software sales, is difficult to characterize. The organizational chart (see Figure 1) illustrates some of the complexity and diverse nature of this business. The CAD/CAM/CAE portion of this business is estimated at just less than $2 billion in hardware, software, and services revenue in 1992. This is a strategic business area supporting other ventures in the shop floor, data processing, and enterprisewide computing services.

In a recent interview, Mr. Akers said, "Our financial results are not acceptable to us or to our shareholders." He then went on to add, "We are taking aggressive actions to improve our competitiveness and profitability by addressing the accelerating changes that are sweeping our industry, while adjusting for weakened business conditions throughout the world. These actions include reallocating resources to growth businesses, increasing the autonomy of our businesses, and reducing

Figure 1
IBM Corporation—Executive Management for Industrial Sector



Source: IBM Corporation G3000175

costs. Dataquest believes that the IBM strategy of investment in growth businesses will include CAD/CAM/CAE/GIS. This technology is a fundamental component of the reengineering taking place in the United States and around the world.

This vendor profile is focused on several primary issues. The result of massive organizational changes (still in progress) is shown with the impact on CAD/CAM/CAE business. Most of the significant changes in the CAD/CAM/CAE area appear to have been made. A complete analysis of the revenue profile in the CAD/CAM/CAE business is given with growth analysis. And finally, we provide a description of the partnership arrangements with strategic direction assessment in the major CAD/CAM/CAE application areas.

Corporate Overview

IBM is the world's largest supplier of information technology to business and government enterprises. IBM designs, manufacturers, sells, and supports a wide range of information processing systems, including mainframes, minicomputers, workstations, personal computers, operating systems and application software, display terminals, storage devices, communications systems, printers, typewriters, educational and training materials, and related supplies and services.

IBM's corporate revenue experienced a 0.6 percent decrease between 1991 and 1992, from $64.8 billion to $64.4 billion (see Table 1). In most areas of its businesses, IBM experienced tough competition and felt the impact of a slumping world economy. The company response to this increased competition and economic pressure is to streamline operations, reorganize into functional business units, and reduce overhead.

Table 1
IBM Total and CAD/CAM/CAE Revenue, 1991 to 1992

Fiscal Year (January to December)	IBM Total ($B)	CAD/CAM/CAE Total Factory ($B)	CAD/CAM/CAE Total Software ($M)
1991	64.8	1.71	379
1992	64.4	1.77	418
Percentage Change	-0.6	3.5	10.4

Source: IBM Corporation

IBM was one of the first computer companies to get involved with CAD/CAM/CAE applications, beginning in the early 1970s. The first mainframe installations using CADAM software have been the foundation of this growing and significant business activity for IBM. With this early success, IBM began supplying a large set of design, documentation, and manufacturing tools with almost every major manufacturing company.

IBM strengthened its position by first acquiring CADAM Inc., then selling a part of the company to dassault systemes (CADAM Host and Professional CADAM) in return for an equity position. This agreement has been further complemented by a key nonexclusive marketing arrangement with SDRC for the last 11 years.

Other business relationships have been made in the last several years to further strengthen the overall tool set available to users of the IBM, CATIA, and CADAM environment. Each of these products is bundled with interface and integration supplied by IBM, and each brings a world class component of software technology to assist the engineer or designer in everyday work problems.

The unbundled side of the business has developed relationships with many of the other leading software vendors to further expand the IBM hardware business opportunities. This has the benefit of bringing a larger set of software tools into the IBM camp and reducing the potential loss of hardware revenue due to customer preference for a software product other than CATIA or CADAM.

Corporate Organization

The CAD/CAM/CAE business activity is developed and marketed by two separate business entities. The development responsibility falls in

the Applications Solutions Business, which is one of nine worldwide manufacturing and development businesses. The marketing role is taken by IBM United States, which is one of five marketing and services companies. Both are led by the management committee comprised of four members, including Mr. Akers.

Figure 1 illustrates the highest levels of the corporate structure for the CAD/CAM/CAE business. Significant changes are taking place at all senior levels of management. Bernard Puckett is responsible for the Applications Solutions group, which manages worldwide market segments, including all industry market segments such as finance, insurance, manufacturing, and other selected segments such as image and technical computing. This group also develops offerings for those segments, including application software and specialized hardware; supports the development of new businesses, such as multimedia and consulting practices; and leads IBM's services businesses worldwide. The Industrial Sector division, led by Edward J. Kfoury, has development responsibility for all applications in the industrial sector.

The group responsible for marketing is led by R. J. LaBant. This organization includes Areas/Trading Areas, Federal Systems Co., National Distribution Division, Integrated Systems Solutions Corporation, Employment Solutions Corporation, and EduQuest. From a management standpoint, this organization is chartered with the sales and support activity for all IBM CAD/CAM/CAE customers. This group, which is centered in the Midwest, is close to the critical mass of CATIA and CADAM users in the United States and works closely with dassault systemes services to service the installed base.

Table 2 shows both the development and marketing organization for the Industrial Sector Division. The development group, led by Robert M. Williams, is responsible for all internal product development, for developing and maintaining all business relationships with outside software developers, Strategic Development Partners, and other potential partners.

The marketing group, led by Daniel R. Colby, is chartered with the task of strategic direction, implementation strategies, and bringing the message to the marketplace as the focal point for all IBM-driven CAD/CAM/CAE. This group works closely with other CIM marketing efforts to develop a working relationship of capability as more IBM users evolve into concurrent engineering operations. John D. Sarsgard has responsibility for all marketing activity for engineering applications including CAD/CAM/CAE, third-party marketing and business partner solutions. Besides providing the classic role of marketing, this group operates an extensive national pre- and postsales support organization. The customer support group is centered in Dallas, with experts located in other locations, depending upon customer or employee requirements. The primary sales support group is in Los Angeles. Hotline support is maintained with a question and answer online system.

Table 2
Industrial Sector Development and Marketing Organization

	Industrial Sector Development
Edward J. Kfoury	IBM Vice President and President, Industrial Sector Division
Tom Krywe	Vice President, Operations
John Klein	Vice President, Worldwide Market Selection and Market Development
Bjorn Andersen	AS Director, CIM Architecture and Integration
Jim Stifler	Vice President, Industrial Sector Consulting Services
Robert M. Williams	Vice President, Worldwide Development
P.J. (Patrick) O'Neil	Development Advisor
Don A. Nelson	Manager, Engineering Development
R.A. (Bob) Munro	Manager, Business Planning
Joe Kaddis	Manager, Development Operations
Dick Cook	Lab Director, CIM Development Atlanta/Houston
Jimmie Warren	Lab Director, Plant and Production Operations Development
Ken West	Program Manager, Support Delivery
Niel Horikoshi	Staff Counsel
Barbara Young	Manager, Product Assurance/Strategic Skills Assessment
John E. Sims	Manager, CATIA Product Management
Wesley E. Miga	Manager, CATIA Acceptance
Michael R. Zick	Manager, CATIA Application
R.A. (Rich) Arco	Manager, Engineering Development—Kingston
Mark Z. Solomon	Manager, AEC Application Development
Alan C. Larsen	Manager, CAEDS Development Support
E.I. (Beth) Sulander	Manager, Framework Development
T.A. (Tom) Gezo	Manager, VALISYS Development Support
Randy A. Tamura	Manager, Engineering Development—Santa Monica
Daniel P. Bell	Manager, Administration/IS Services
Timothy N. Teigler	Manager, CAD/CAM Vendor and Support
R. B. (Bob) Jones	Manager, CADAM Liaison
S. L. (Sherrie) Panozzo	Manager, Graphics Program Support
Richard A. Rizzo	Manager, Graphics Program Support
Hasan G. Erbay	Manager, Data Exchange Development
Frank G. Xiong	Manage, Graphics Department
S. R. (Robert) Chang	Manager, IGES Development
Ralph Rea	Manager, Numerical Control Development

(Continued)

Table 2 (Continued)
Industrial Sector Development and Marketing Organization

	Industrial Sector Marketing
Daniel R. Colby	Assistant General Manager, Industrial Sector Marketing
John D. Sarsgard	Director, Engineering Solutions Marketing
H. J. (Shen) Baxter	Manager, Business Partner Solutions
John D. Bennett	Manager, Marketing Support
(Open)	Manager, National Marketing Programs
Ed C. Riedinger	Manager, Marketing Support Services
J. M. (Mike) Robertson	Manager, Mechanical CAD/CAM Marketing
Lee W. Jorgenson	Manager, CAEDS/IBM CAD/Micro CAD Marketing
Chuck W. Masur	Manager, CAD/CAM Software Marketing
Chuck E. Page, Jr.	Manager, Valisys/Engineering Prods H/W Marketing
Ralph E. Springer	Manager, CATIA/CADAM Host and W/S Marketing
Michael A. Barney	Program Manager

Source: IBM Corporation

The key executives in this organization, who are fundamentally responsible for content and direction of the CAD/CAM/CAE business, include Mr. Kfoury, Bjorn Andersen, Mr. Williams, Mr. Colby, and Mr. Sarsgard.

Company Financials

The financial model in the CAD/CAM/CAE business area is very complex, with many strategic development relationships, distribution agreements, and joint marketing projects.

Table 3 shows the breakout of CAD/CAM/CAE-related revenue. These applications define the total CAD/CAM/CAE/GIS market. Total factory revenue is defined to be the amount of money received for goods, not including revenue for products sold to another company for resale (OEM). Software revenue comes from bundled or unbundled sales. The percent change from 1991 to 1992 is shown for both total factory revenue and software revenue.

Table 3
IBM's CAD/CAM/CAE/GIS Revenue (Millions of Dollars)

	1992 Total Factory	1992 Total Software	Percentage Change 1991 to 1992 Total Factory	Percentage Change 1991 to 1992 Total Software
Application				
Mechanical	1,472.5	387.0	6.6	8.3
AEC	182.2	40.5	0.9	7.8
GIS	93.8	15.7	-6.6	2.8
EDA	112.7	20.8	2.6	4.1
Total	1,861.2	464.0	5.0	7.9
Platform				
Host-Based	957.9	253.8	-1.9	-1.9
Workstation	341.8	85.8	40.0	40.1
Server	293.2	71.0	19.8	20.9
Personal Computer	268.3	53.4	-12.6	4.0
Region				
Europe	843.7	201.3	7.3	10.5
Asia	509.9	138.1	-5.7	-3.2
North America	481.4	120.6	14.9	18.6
Rest of World	26.3	4.1	-3.2	8.2

Source: Dataquest (February 1993)

Applications

The CAD/CAM/CAE business of IBM is dominated by the mechanical application area. At more than 83 percent of the total, mechanical applications are expected to continue to lead the product mix for the foreseeable future. CATIA is the keystone of this marketing effort. All add-on software from strategic development partners will enhance the basic CATIA functionality. CADAM is stepping out from under the IBM umbrella by porting its low-end products to other vendors' platforms. This provides an interesting mix of bundled products with enough overlap and synergy to meet the most discerning user. Many of the CAD/CAM/CAE software market leaders including AutoCAD, ESRI, MacNeal-Schwendler, and PDA Engineering have ported to one or more of the IBM platforms.

Platforms

Host-based systems still support 54 percent of the software business. This is expected to be the most vulnerable part of the business in the next few years. Massive interest in desktop solutions with lower cost per unit expectations will further erode the host-based solutions position. Technical workstation and server growth was very high, reaching more than 40 and 20 percent, respectively. Personal computers had negative

growth in revenue due to rapidly falling price pressure. The technical workstation is expected to lead revenue growth in the near future.

Regions

Europe is the largest regional market, followed by Asia, and then North America. The European and Asian markets have historically been large users of host-based systems, showing above-average revenue growth. The North American market gained some market share with a higher revenue growth for 1992. Fluctuation in currency valuation in the year tended to reduce the actual value of this growth. Growth in domestic and overseas markets will be determined by changing preferences in platform mix and evolution in local application requirements.

Business and Product Strategy

Mission

IBM's mission is to remain the dominant worldwide provider of CAD/CAM/CAE systems. To accomplish this, IBM has selected markets where it has a significant market share and is working to expand the base. This is being accomplished by systematic investments in mission-critical application software and value-added application software. This leverages the information generated to run the core business with ancillary business or technical applications.

Strategy

IBM is working to create complete product offerings that meet the varied needs of design and manufacturing customers. CATIA is used as the centerpiece or keystone product. CATIA's recognized strengths in 3-D applications are being leveraged by continued development of existing and new applications, and development of an open software architecture designed to support internal and external enhancement. This is intended to allow the existing customers to use their base of design expertise in new ways, rather than require them to start over from scratch. This is difficult to measure, but an important element of the strategy exists in the IBM operating system environment that is enhanced to provide leverage or competitive advantage for the software user and developer.

Industry Focus

The automotive and aerospace industries are strategic to the success of IBM's future CAD/CAM/CAE business. The large installed base in these industries has become a stepping stone of growth in two directions—protecting the existing installed base and pushing into new markets. Tremendous effort is directed toward protecting this installed base with directed customer support and needs analysis. The products developed to meet the needs of these complex and dynamic industries are then being used to push into other industrial markets. New strategic business partners may assist this growth into nontraditional industrial markets. The skills of industry-specific marketing business partners apply to large and small business opportunities.

Large Enterprise

A strategic business element focuses attention on key large customers by careful requirements analysis and the process of mutual business alliance. An extensive investment in IBM hardware, software, and service buys some influence over the strategic directions of hardware and software development. IBM uses these accounts to showcase the solutions offered and encourages these accounts to publicize their success. Companies such as Boeing, Honda, Chrysler, Black and Decker, Lockheed, Rockwell, and Snap-On Tools are often mentioned in this context. Extended enterprise relationships are used to grow the installed base by further penetration into supplier companies and industries.

Smaller Operations

It is risky to look only to the large account for direction and requirements specification. The lessons learned in a complex enterprise can be scaled to meet the needs of a small operation. IBM is using its smaller customers to help influence product content, packaging, usability, and terms and conditions. The level of success IBM attains with smaller operations will measure its ability to remain No. 1 in the mechanical CAD/CAM/CAE market. The competitive dynamics of this market are more tactical and less strategic than for larger companies. The solutions installed must operate effectively and quickly. These competitive pressures will force the ability to recognize and meet the needs of a quickly evolving market.

Strategic Development Partner Relationships

The IBM Strategic Development Partner relationships, in general, follow a simple strategy. A vendor will develop a product for IBM with minor customization to make the software product somewhat unique in an IBM environment. This might entail an enhanced user interface to operate efficiently in a VM or AIX environment. It might add features or develop a seamless interface with CATIA or CADAM for compatibility. In return for this, the vendor would receive an investment in the company, giving IBM a minority ownership position. IBM in turn would sell and provide all customer support services for installation, training, and follow-up. The developer receives a royalty payment for each transaction. Usually, the support, training, and follow-up services represent about the same revenue stream as the initial software purchase.

Table 4 shows the estimated revenue distribution of IBM software revenue for each major Strategic Development Partner. Clearly dassault systems is committed to this relationship with 100 percent reliance on IBM as the only sales channel. CADAM is doing almost half of its business through IBM, the rest in direct end-users sales. SDRC operates on all major platforms. As the developer of CAEDS, this OEM relationship contributes about 15 percent to SDRC's overall software business. This represents a solid and reliable business component but clearly positions SDRC differently from dassault and CADAM. The other SDP's represent a significant and growing share of the business. Each brings a unique or strategic application supporting the leading software offerings.

Table 4
Strategic Development Partners' Revenue Distribution in 1992

Company	Share of Total IBM Software Revenue (%)	Software Business Share with IBM (%)
dassault systemes	41	100
CADAM	45	48
SDRC	5	15
Others, including Accugraph, ICAD, PDA Engineering, Thomson Digital Image, and Valysis.	9	-

Source: Dataquest (February 1993)

Several other types of business relationships have been defined to provide varying amounts of support and development between IBM and the software vendor. The most relevant to this analysis of the CAD/CAM/CAE/GIS business environment are described and listed in Table 5. Hundreds of other software vendors have products that can be used on one or more IBM platforms, but they have not developed a Business Partner (contractual) relationship with IBM. Table 5 lists many of the leading Industry Remarketers, Application Specialists, Industry Application Specialists, and Cooperative Software Suppliers.

- The Industry Remarketers (IRs) are independent companies that buy designated products from IBM and add value with their own industry-specific offerings. These remarketers then market, install, and otherwise support the IBM product, including IBM software. IRs set their own prices and their own terms and conditions.
- The Application Specialists (ASs) are organizations that generally operate within a local area and have expertise in one or more industries. They are selective, contracted, assigned, and paid by local IBM branch offices to assist IBM marketing personnel in marketing and installing IBM hardware, along with either IBM or their own software. They may also engage in joint marketing activities with IBM personnel.
- The Industry Application Specialists (IASs) are regional or national organizations that combine marketing and installation capabilities with specific industry expertise and vertical application software. Some may support IBM application software. Still others may offer specific skills in such areas as system connectivity or competitive conversions. Once selected, IBM Industry Marketing works closely with the company to develop market exposure. The decision to use an Industry Application Specialist is made by the local IBM branch office, which also pays the fees.

Table 5
Industry-Sponsored Business Partners for CAM/CAM/CAE/GIS

Company	IBM Relationship
Accugraph Corp.	CSS
Advantage Computing	AS
Aerobotics	IR/IAS
Alias America Corp.	IR
Balrae Associates	IR
Bechtel Software Inc.	IR
Cadence Design Systems Inc.	IAS
Cadtronics	IR/AS
CGTech	AS
Cimage Corp.	AS
Cimlinc Inc.	AS
Cimplex Corp.	AS
Computer Design Inc.	CSS
Computer Design Services	IR/AS
Communication Technical Systems	IR
Computer Aided Design Software Inc.	AS
dassault systemes services	IAS
Dickens Data	IR/IAS
DSP Development Corp.	AS
Entre Computer Center	IR
ESRI Inc.	IAS
FAB Consulting	IA
FCI	IR
Formtek Inc.	CSS
GeoVision Systems Inc.	IAS
Grumman	IR/AS
Integrated Systems Development	IAS
Integrated Systems Technologies	IR/IAS
Les-Work Computer Aided Design	IR
Lexmark	IAS
The MacNeal-Schwendler Corp.	AS
MCS	AS
Mission Systems Technologies	IR/AS
Norwood & Williamson	IR/AS
Parametric Technology Corp.	AS
PDA Engineering	AS
SDRC	IAS
SEMCOR	IR/AS

(Continued)

Table 5 (Continued)
Industry-Sponsored Business Partners for CAM/CAM/CAE/GIS

Company	IBM Relationship
Stone and Webster	IAS
Swanson Analysis Systems Inc.	IAS
UES	AS
Valid Logic Systems Inc.	IAS
Valisys Corp.	AS
Viewlogic Systems Inc.	IAS

IR = Industry Remarketer
AS = Application Specialist
IAS = Industry Application Specialist
CSS = Cooperative Software Supplier
Source: IBM Corporation

- Cooperative Software Suppliers (CSSs) enter into contracts for IBM to sell their application solutions along with IBM hardware and software. The IBM marketing representatives can quote CSS prices, along with CSS terms and conditions, as well as take orders for the product without CSS direct involvement. These suppliers retain complete control over their products, providing IBM with the prices, terms and conditions, and product descriptions to be used during marketing activities.

Product Offerings

This section lists products and the corresponding strategic development partner, location of the partner, and a brief product description.

CATIA, dassault systemes, Suresnes, France

This is a general-purpose surfacing, solids, and wireframe program supporting a large set of applications for product design and manufacturing tasks. Basic subapplications include drafting, solids, advanced surfacing, kinematics, FEM, robotics, and numerical control part programming. AEC/mechanical applications include structures, building design, schematics, and piping and tubing. The cornerstone of IBM's CAD/CAM/CAE product offering, this program forms the base to be leveraged by other strategic development partners.

CADAM, CADAM, Burbank, California

This is a general-purpose 2-D and 3-D mechanical CAD/CAM program that is used to compete with PC and workstation-based drafting, documentation, design, and manufacturing products. CADAM is often used with CATIA as a design and documentation tool.

CAEDS, SDRC, Milford, Ohio

This is a general-purpose solid-modeling-based conceptual and functional design tool with extensive analysis and test features. This family of products is used to capture design intent and to verify the functional

performance of the design. It is used to complement CATIA and CADAM for advanced design verification.

CBDS, IBM, Milford, Ohio
This is a set of applications created to accelerate the design and manufacture of PCBs and thick-film HMCs. CBDS has a central component database and can pass completed design descriptions between modules.

CIEDS, IBM, Milford, Ohio
The Circuit Board Design System is an integrated system for design, physical layout, and manufacturing data generation of printed circuit boards and thick-film hybrid substrates.

MountainTop, Accugraph Corp., El Paso, Texas
This is a number of independent yet integrated modules to provide functions for facility management, civil engineering, information management, and architectural design.

The ICAD System (KBE), ICAD, Cambridge, Massachusetts
Knowledge-based engineering tool set that is integrated with CATIA for end-user creation of high-productivity rule-driven applications in design, analysis, and manufacturing. These tools have been proven to offer significant flexibility and dramatic return to the users who have implemented them.

Patran, PDA Engineering, Costa Mesa, California
This offers world class pre- and postprocessing for a wide variety of finite element analysis tools. Some of these tools are unique to PDA such as a materials library with thousands of material specifications to accurately define the material properties at the start of an analysis process.

TDImage, Thompson Digital Image, New York, New York
This is a fully integrated set of software for 3-D imagery. It has interactive tools for modeling, animation, material editing, rendering, and image editing.

Valisys, Valisys, Santa Clara, California
Valisys offers a step-by-step systematic way to validate that dimension and tolerance information is correctly specified in the design phase and adhered to during the manufacturing and quality assurance phases. This information can then be used to drive gauge design, interface coordinate measuring machines, and verify the actual component to the design file.

Something New

A major release of CATIA is scheduled for release in the first quarter of 1993. Version 4 (V4) is heralded as a major upgrade worthy of a new product designation. The V4 designation will probably prevail. A series of industry-specific application configurations will be packaged using the new set of V4 program modules. These modules are fully compatible with models built with the current V3 program.

New features will include parametric and variational user input. Flexibility in constraint management will allow users to add or modify the appropriate tangency, perpendicularly, or anchor point as needed. Feature-based modeling will be offered with the option of user-defined features. A top-down approach is supported for modeling complex assemblies where the designer can build a black box as a subassembly for later functional detailing. This enhances the design process by organizing the complete project, allowing for work to progress as the resources or design constraints are developed. Other enhancements in the product data management will support the overall system function to design and manufacture products of any complexity.

New features in tolerancing, analysis, and manufacturing applications are expected in a phased release of V4.

Other Items about the Company

Other items about the company are as follows:

- IBM is the largest user of CATIA. 10,000 seats are in current use in IBM design centers located around the world. These design center develop a wide variety of computer systems, subcomponents, display, and workstation products.
- CATIA has driven the sale of 15 percent of RS/6000 shipments. The installed base of CATIA includes 4,000 mainframes and 15,000 workstations.
- It is very common for CATIA or CADAM to be used together. In general, 60 percent of CATIA users are using CADAM. Also, 39 percent of all CADAM users have CATIA. The largest CATIA customer has a 7,000-seats installation.

Dataquest Perspective

IBM is likely to remain the largest supplier of CAD/CAM/CAE technology for the foreseeable future. Some niche markets such as mechanical CAD/CAM and document imaging are dominated by the suite of products offered by IBM. Most markets are getting some serious competition, but overall, the depth and breadth of IBM's offerings are difficult to match. This is particularly true if the combination of business and technical applications are considered. This fundamental strength of IBM in enterprisewide product coverage is difficult to evaluate. The largest customers certainly understand and have invested the future success of their company in a strategic alliance, betting on the continued success of the investment. IBM is not likely to lose this strategic position. The current midnight oil being burned by the senior management seems destined to refine a strategic direction that will ensure the safety of its strategic customers and profit from the streamlining and customer focus that is sure to result.

The general trend in manufacturing toward concurrent engineering and verification of design intent to meet market needs supports the core of

the IBM strategy. As the market awareness of the benefits of CAD/CAM/CAE are widely known and experienced, expect a rapid evolution in end users' expectations. The best of new point-solution applications will be quickly assimilated into a larger operation of integrated engineering design, manufacturing, and management tools. Any emerging world class software vendor should not be surprised to be invited to participate in the IBM environment as a strategic partner.

As positive as this sounds, IBM has its challenges. More than 54 percent of the mechanical CAD/CAM/CAE software revenue in 1992 was sold on the host-based platform. IBM's market share of the host-based market has been going up, but the growth of the overall market is elsewhere. The reputation of host-based solutions with high cost of ownership and limited performance options has crippled the general viability of this platform. The economic pressures to downsize computing resources are prevalent in all application areas. It is worth noting the real market pressure in downsizing is reducing the cost of ownership as more and more people get plugged into the system.

Another risk is based in the complexity of the situation. As users find procedures to get the job done, most are reluctant or do not make the time to try something new that may lead to a more productive overall process. The incremental improvements in system enhancements probably are often not compelling enough to force a significant change. Ironically, big operating budgets can support a small experimentation budget for anything new. This scenario will work to keep even the most dedicated IBM user up-to-date concerning the latest CAD/CAM/CAE or peripheral offerings. This awareness will keep pressure on the IBM Strategic Business Partners to provide a highly efficient solution set.

IBM has the enviable position of owning the most valuable installed base of CAD/CAM/CAE users. The intense price/performance competition in this market can turn this group into a battlefield if not well tended. CATIA V4 to be delivered in early 1993 is key to the continued success of this business.

For More Information...
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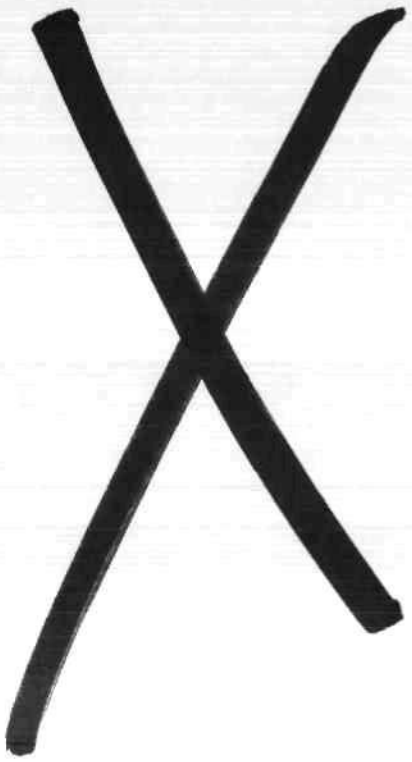

Dataquest®

Dataquest Perspective

Software

CAD/CAM/CAE/GIS Worldwide

In This Issue

CAD/CAM/CAE/GIS as Viewed by Operating Systems, Vendor Shipments, and Vertical Markets

Dataquest has completed its worldwide survey of CAD/CAM/CAE/GIS software companies, which asked software vendors to allocate their 1992 software revenue both to the operating systems on which it runs and by their customers standard industry classification (SIC) code. In addition to providing insight as to operating systems used by CAD/CAM/CAE/GIS users, the operating systems data, when juxtaposed against the market share database, provides refinement to vendor shipments of technical workstations.

This report highlights the following results from these special surveys:

- Software sales by operating system
- Refined vendor workstation shipments
- Software sales by buyer's industry

This report incorporates new information obtained after our September Market Share Update, providing greater accuracy. The results represent our best numbers for the 1992 CAD/CAM/CAE/GIS market.

By Linda Anderson

CAD/CAM/CAE/GIS as Viewed by Operating Systems, Vendor Shipments, and Vertical Markets

Sun's UNIX Continues to Be the Most Highly Invested Operating System

CAD/CAM/CAE/GIS software vendors were asked to distribute their software revenue by operating systems. The results show that in terms of software sales revenue, Sun continues its dominance as the most highly invested platform, with $1.198 billion in software revenue sales on Sun's UNIX, because of its leadership in the EDA market (see Table 1).

In terms of dollar growth in revenue from software sales, the HP's UNIX operating system triumphs as users have migrated from the Apollo AEGIS operating system. The top growing operating systems are as follows:

- HP's UNIX grew $202 million from $334 million in 1991
- Sun's UNIX grew $175 million from $1.023 billion in 1991
- DOS with Windows grew $157 million from $2 million in 1991
- IBM's UNIX grew $137 million from $274 million in 1991

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Program: CAD/CAM/CAE/GIS Worldwide
Product Code: CCAM-WW-DP-9304
Publication Date: December 27, 1993

Table 1
Software Sales on Each Operating System for Each Application, 1992

Operating System	All Applications			Mechanical			AEC			GIS/Mapping			EDA		
	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)
Sun-UNIX/OS	1,198.3	17.1	24.2	455.5	0.9	19.7	57.3	0.3	7.7	102.2	21.9	16.9	583.3	35.4	45.2
DOS	956.4	-3.6	19.3	391.9	-2.7	16.9	268.0	-2.8	36.0	119.8	4.1	19.8	166.7	-11.3	12.9
HP UX	535.4	60.6	10.8	280.1	59.5	12.1	53.0	22.1	7.1	29.1	23.3	4.8	173.2	90.6	13.4
IBM AIX	410.4	50.1	8.3	238.3	17.6	10.3	43.5	6.4	5.8	40.0	86.3	6.6	88.6	954.6	6.9
DEC ULTRIX	271.0	31.4	5.5	153.3	18.7	6.6	16.9	36.3	2.3	24.6	33.2	4.1	76.1	64.7	5.9
Intergraph UNIX	256.2	21.4	5.2	64.3	55.8	2.8	83.5	23.0	11.2	96.7	32.5	16.0	11.7	-59.5	0.9
SGI UNIX	179.5	57.5	3.6	160.8	57.9	7.0	6.0	52.0	0.8	6.5	64.8	1.1	6.1	47.4	0.5
DEC VMS	170.2	-34.9	3.4	75.0	-38.1	3.2	29.7	-29.4	4.0	52.4	40.7	8.7	13.2	-78.5	1.0
DOS with Windows	157.2	7,968.1	3.2	56.0	24,373.4	2.4	59.4	3,547.1	8.0	23.2	26,216.0	3.8	18.6	547,617.6	1.4
IBM VM/MVS	152.2	-27.1	3.1	132.6	-19.9	5.7	11.9	-41.4	1.6	4.0	-71.2	0.7	3.7	-59.7	0.3
DOMAIN/ Apollo UNIX	148.7	-28.8	3.0	40.9	-27.4	1.8	10.6	-31.4	1.4	51.9	0.1	8.6	45.4	-46.9	3.5
Sony NEWS-OS (UNIX)	74.3	-2.2	1.5	37.3	-7.6	1.6	10.5	-23.9	1.4	3.8	26.6	0.6	22.6	20.8	1.8
AT&T Systems V Derivatives	68.9	-15.7	1.4	39.0	7.0	1.7	5.3	-3.5	0.7	12.1	-63.9	2.0	12.4	102.1	1.0
Apollo AEGIS	44.4	-78.6	0.9	7.4	-70.8	0.3	5.8	-47.8	0.8	2.0	52.1	0.3	29.1	-82.8	2.3
Apple MacOS	32.3	-3.7	0.7	10.6	1.2	0.5	17.1	-2.8	2.3	3.1	59.2	0.5	1.5	-57.3	0.1
OS2	22.6	134.3	0.5	13.5	23,200.2	0.6	3.6	75.8	0.5	1.6	9,509.5	0.3	3.9	-48.4	0.3
Prime PRIMOS	13.4	-53.0	0.3	8.1	-63.4	0.4	5.0	-3.3	0.7	0.3	-77.5	0	0		0
CRAY UNIX	13.3	36.3	0.3	13.1	34.7	0.6	0	NA	0	0		0	0.2	1,241.3	0
Siemens-Host/ Proprietary	11.3	32.9	0.2	0	NA	0	2.6	NA	0.3	8.8	2.8	1.4	0		0
XENIX/SCO UNIX	10.8	1.7	0.2	4.2	2.6	0.2	3.3	-30.2	0.4	2.6	68.0	0.4	0.6	427.2	0

(Continued)

Table 1 (Continued)
Software Sales on Each Operating System for Each Application, 1992

Operating System	All Applications			Mechanical			AEC			GIS/Mapping			EDA		
	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)
CDC CYBER NOS/VE	10.2	-38.5	0.2	8.7	-46.2	0.4	0.3	104.2	0	1.2	317.7	0.2	0	-100.0	0
Apple AUX	2.3	77.1	0	0	NA	0	0.3	376.5	0	0.6	NA	0.1	1.3	9.0	0.1
Other UNIX	44.7	-61.7	0.9	12.7	-75.1	0.5	25.2	-19.7	3.4	4.4	-62.4	0.7	2.4	-89.5	0.2
Others	166.5	101.0	3.4	109.1	79.7	4.7	25.8	187.2	3.5	12.9	-1.6	2.1	28.7	415.1	2.2
Total UNIX	3,213.7	20.5	64.9	1,499.6	15.4	64.8	315.6	6.4	42.4	374.7	14.9	62.0	1,023.8	37.7	79.4
All Operating Systems	4,950.6	9.6	100.0	2,312.6	9.1	100.0	744.7	9.3	100.0	603.9	16.4	100.0	1,289.2	7.7	100.0

NA = Not available
Source: Dataquest (December 1993)

Operating system preferences vary by application segment, as follows:

- Mechanical software vendors continue to sell more, in terms of software revenue, to Sun's UNIX ($456 million), with DOS continuing at a close second ($402 million). However, the clear leader in dollar growth in software sales is the HP's UNIX operating system, which grew $105 million from $176 million in 1991, almost 60 percent growth.
- AEC software vendors sold 36 percent of their software on DOS, totaling $268 million, whereas DOS with Windows grew the most at $58 million, up from $2 million in 1991. Intergraph's UNIX is the No. 2 operating system preference, with more than 11 percent share and the second highest dollar growth of $16 million, up from $68 million in 1991.
- GIS/mapping software vendors sold $120 million on DOS, a growth of only $5 million from 1991. This represents 19 percent of the GIS/mapping software. The second and third place operating systems were too close to call:
  - Sun UNIX at $102 million, up $18 million from 1991, represents 16 percent share
  - Intergraph UNIX at $97 million, up $24 million from 1991, represents 16 percent share
- With EDA software vendors, Sun UNIX reigns supreme with 45 percent of the market. DOS slipped from the No. 2 operating system to No. 3, with $167 million in revenue, down $31 million from 1991. The big winners in terms of dollar growth are as follows:
  - Sun UNIX, with $583 million in revenue, up $153 million from 1991
  - HP UNIX, with $173 million in revenue, up $82 million from 1991
  - IBM UNIX, with $87 million in revenue, up $80 million from 1991
  - Digital Ultrix, with $76 million in revenue, up $30 million from 1991

Windows is the Fuel Driving PC Growth

As shown in Table 2, all of the growth in mechanical and AEC software for PCs is on the DOS with Windows and OS/2 operating systems. The production drafters, acutely aware of performance, prefer the more efficient DOS environment. Software sales to these early adopters is declining. However, the ease of use of the Windows environment is drawing the late adopters into the market, fueling the growth of the PC platform while neutralizing the appeal of the Macintosh.

Only with the GIS/mapping software does there appear to be growth for MacOS. Apple's future in the CAD market is dependent on the company's success in positioning its new PowerPC as a viable, open systems choice in the design automation environment.

Table 2
ISV Software Sales on Personal Computer Operating Systems, 1992

Operating System	All Applications 1991 Software Sales ($M)	All Applications 1992 Software Sales ($M)	Mechanical 1991 Software Sales ($M)	Mechanical 1992 Software Sales ($M)	AEC 1991 Software Sales ($M)	AEC 1992 Software Sales ($M)	GIS/Mapping 1991 Software Sales ($M)	GIS/Mapping 1992 Software Sales ($M)	EDA 1991 Software Sales ($M)	EDA 1992 Software Sales ($M)
DOS	991.8	956.4	402.9	391.9	275.7	268.0	115.1	119.8	188.0	166.7
WINDOWS	1.9	157.2	0.2	56.0	1.6	59.4	0.1	23.2	0	18.6
OS/2	9.6	22.6	0.1	13.5	2.1	3.6	0	1.6	7.5	3.9
MacOS	33.6	32.3	10.4	10.6	17.6	17.1	2.0	3.1	3.5	1.5
PC Total	1,044.5	1,177.1	417.8	475.7	300.6	352.9	126.0	151.0	200.2	197.5
Growth Rate (%)		12.7		13.9		17.4		19.8		-1.3

Source: Dataquest (December 1993)

This growth in software that runs on DOS with Windows is driven almost entirely by U.S. companies. Regionally, PC software is sold by the following:

- U.S. companies grew $115 to $831
- European companies grew $30 to $196
- Japanese companies declined $12 to $149

Software Vendors Are on the Front Lines, Driving the Charges for UNIX Dominance

Table 3 provides the casts in the battles for UNIX dominance: the software vendors for each platform in each application area. Sun's success can be seen in its cast list, dominated by large companies selling big in each application area. Computervision, ESRI, and Cadence sell more than 20 percent of the Sun UNIX in each application area. IBM's success is closely tied to its own software success, with more than 50 percent of its workstations sold with the software that IBM markets. Intergraph has only itself selling on its platform. At the other extreme, Digital has only one exclusive software vendor, Applicon, with many "also port" companies; that is, most of the software vendors selling on the Digital platform also port to 3 or 4 other workstations.

Operating Systems Survey Refines CAD/CAM/CAE/GIS Workstation Numbers

CAD/CAM/CAE/GIS software vendors, by supplying their software revenue by operating systems, provide refinement to our workstation numbers. This *Dataquest Perspective* concentrates on the main U.S. workstation vendors, for which our data is comprehensive. We have included Hitachi, NEC, Siemens Nixdorf, Solbourne, and Sony as "Others." Figure 1 shows vendor shipments for each application for 1991 and 1992.

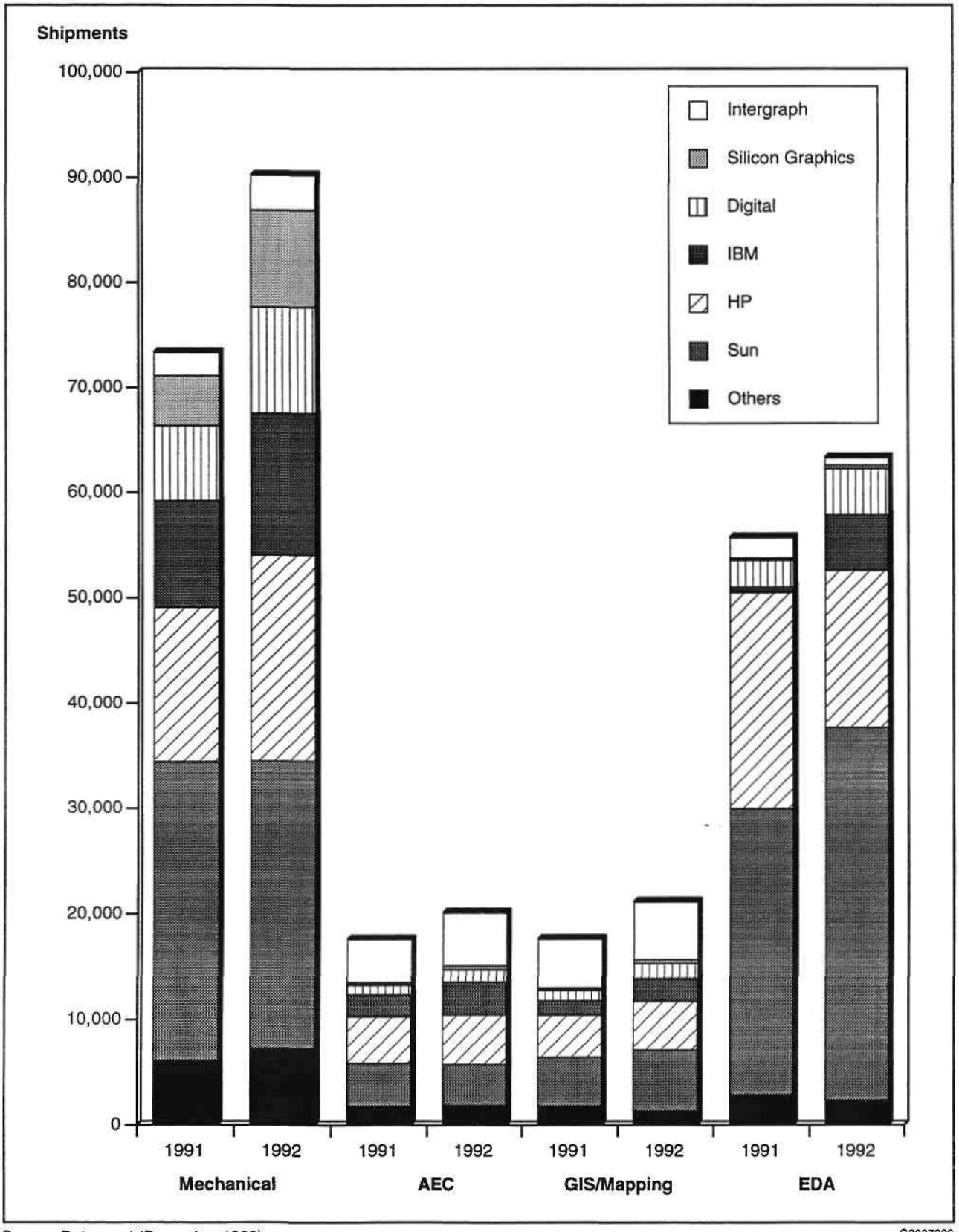
Dataquest publishes shipments for workstations in our regular Market Share tables. However, to avoid double counting, OEM shipments are removed, resulting in the underreporting of HP, Sun, and Digital shipments. The vendor shipments provided here are with the OEM added back.

Table 3
Software Vendors Selling UNIX Operating Systems, for Each Application, 1992

UNIX Operating System	Mechanical	ISV Software Sales ($M)	Share (%)	AEC	ISV Software Sales ($M)	Share (%)	GIS/Mapping	ISV Software Sales ($M)	Share (%)	EDA	ISV Software Sales ($M)	Share (%)
SUN	Computervision	198	43	Fujitsu (A)	15	24	ESRI	36	35	Cadence	237	41
UNIX	SDRC	25	5	Computer-vision	12	20	Computervision	7	7	Mentor	58	10
	EDS	19	4	ITALCAD (E)	4	7	ERDAS	5	5	Racal-Redac (E)	37	6
	Fujitsu (A)	19	4	Toshiba (A)	4	7	Fujitsu (A)	5	5	Synopsys	35	6
	Toshiba (A)	18	4	Moss Systems (E)	3	7	GeoQuest	5	5	Viewlogic	26	4
	All Companies	456	100	All Companies	60	100	All Companies	102	100	All Companies	583	100
HP	Hewlett-Packard	69	24	IEZ (E)	18	33	ESRI	8	27	Zuken (A)	48	28
UNIX	EDS	54	19	Star Informatic (E)	6	12	Landmark	5	16	Mentor	46	27
	Parametric	40	14	Accugraph	6	11	Star Informatic (E)	4	13	Cadence	24	14
	SDRC	31	11	Sener Sistemas (E)	4	7	Genasys II	3	12	Synopsys	5	3
	MATRA (E)	13	4	Han Dataport (E)	3	5	STI Straessle (E)	2	8	Harris EDA	5	3
	All Companies	280	100	All Companies	53	100	All Companies	29	100	All Companies	173	100
IBM	IBM	178	75	IBM	21	48	ESRI	12	30	Cadence	58	65
UNIX	SDRC	19	8	IEZ (E)	10	22	IBM	12	30	IBM	8	9
	EDS	5	2	CADCentre (E)	4	8	GeoVision Corp	4	11	Synopsys	5	6
	CAD.LAB (E)	3	1	Han Dataport (E)	3	6	Landmark	4	9	Mentor	1	2
	Parametric	3	1	Accugraph	1	3	Genasys II	2	4	Ascent Logic	1	1
	All Companies	238	100	All Companies	44	100	All Companies	40	100	All Companies	89	100
Digital	Applicon	39	26	Computervision	8	44	ESRI	6	24	COMPASS	11	15
UNIX	SDRC	28	19	Auto-Trol	2	14	Landmark	4	15	Cadence	10	13
	EDS	15	10	Autodesk	2	9	Synercom	3	11	Racal-Redac (E)	10	13
	MATRA (E)	13	8	Bechtel	1	8	Genasys II	2	8	Synopsys	5	7
	Parametric	12	8	Aspen	1	6	Laser Scan (E)	2	8	LSI Logic	5	7
	All Companies	153	100	All Companies	17	100	All Companies	25	100	All Companies	76	100
Silicon Graphics	Alias	27	17	CADCentre (E)	4.0	60	Dynamic	3.0	43	Anacad (E)	4	65
	SDRC	26	16	Autodesk	2.0	26	PCI Remote	1.0	19	CAD/CAM	1	8
UNIX	Control Data	20	13	Sigma Design	0	4	Genasys II	1.0	18	Sagantec (E)	0.3	6
	Cisigraph (E)	17	10	MATRA (E)	0.2	3	Autometric	1.0	14	Technische (E)	0.2	3
	Parametric	14	9	Hitachi Zosen (A)	0.2	3	Autodesk	0.4	6	Cimline	0.2	3
	All Companies	161	100	All Companies	6	100	All Companies	7	100	All Companies	6	100
Intergraph												
UNIX	Intergraph	64	100	Intergraph	84	100	Intergraph	97	100	Intergraph	12	100

Note: (E): European Company; (A): Asian Company
Note: Does not include software sold on Digital VMS or HP AEGIS/DOMAIN
Source: Dataquest (December 1993)

Figure 1
Workstation Vendor Shipments



Source: Dataquest (December 1993)

Tables 4 through 8 provide vendor workstation shipments juxtaposed to the software sales by independent software vendors (ISVs) for each workstation for 1991 and 1992, with growth and share of market for 1992 software sales. For Hewlett-Packard, all software sold on HP UNIX, AEGIS, and Domain was included. Digital software is underrepresented because no VMS revenue is included. We have not separated VMS for workstations from VMS for host systems.

Sun Losing Share in Mechanical Race

The huge mechanical workstation software market, which was almost $1.461 billion in 1992, continues to attract all workstation vendors in the battle for supremacy. Sun, the dominant vendor for 1991, lost 9 percentage points share of total units shipped (from 39 percent to 30 percent share of shipments), shipping almost 1,000 units less than in 1991, whereas healthy shipment growth was made by Hewlett-Packard (almost 5,000 units), Silicon Graphics (almost 4,600 units), IBM (almost 3,300 units), and Digital (almost 3,000 units).

Table 4
Mechanical ISV Software Sales by Workstation Vendor, 1991 to 1992

	Unit Shipments			Software Revenue			Share of Market	
Mechanical	1991	1992	Growth (%)	1991	1992	Growth (%)	1991	1992
Sun	28,302	27,225	-4	450.8	455.5	1	36	31
Hewlett-Packard	14,637	19,566	34	256.9	328.4	28	21	22
IBM	10,128	13,463	33	202.4	238.3	18	16	16
Digital	7,173	10,095	41	129.0	153.3	19	10	10
Silicon Graphics	4,786	9,300	94	101.7	160.8	58	8	11
Intergraph	2,188	3,303	51	41.2	64.3	56	3	4
Others	6,148	7,297	19	68.7	60.0	-13	5	4
All Companies	73,362	90,249	23	1,250.7	1,460.6	17	100	100

Source: Dataquest (December 1993)

Intergraph Is Being Challenged on Its Own Turf

The AEC workstation software market, with revenue of $323 million, was led in 1992 by Intergraph, selling 25 percent of the workstations (up from No. 3 player in 1991). Intergraph's shipment growth of about 1,000 units represents about 40 percent of the workstation growth. Hewlett-Packard and Sun slipped a position to No. 2 and No. 3, respectively, whereas IBM at No. 4 was responsible for another 40 percent of the growth in workstation shipments from 1991 to 1992.

Table 5
AEC ISV Software Sales by Workstation Vendor, 1991 to 1992

	Unit Shipments			Software Revenue			Share of Market	
AEC	1991	1992	Growth (%)	1991	1992	Growth (%)	1991	1992
Intergraph	4,057	5,043	24	67.9	83.5	23	22	26
Hewlett-Packard	4,413	4,707	7	70.0	69.4	-1	23	21
Sun	4,076	3,898	-4	57.2	57.3	0	19	18
IBM	2,082	3,107	49	40.9	43.5	6	13	13
Digital	920	1,145	24	12.4	16.9	36	4	5
Silicon Graphics	225	371	65	3.9	6.0	54	1	2
Others	1,824	1,881	3	51.0	46.6	-9	17	14
All Companies	17,597	20,152	15	303.3	323.2	7	100	100

Source: Dataquest (December 1993)

Sun, Intergraph, and HP In Tight Race for GIS/Mapping Workstation Leadership

The GIS/mapping workstation software market, with revenue of $370 million, has three workstation vendors battling for supremacy: Sun, Intergraph, and Hewlett-Packard. These three vendors shipped 75 percent of the workstations to this market. IBM's aggressive growth extends to this segment with 10 percent of the shipments, up from 8 percent in 1991.

Table 6
GIS/Mapping ISV Software Sales by Workstation Vendor, 1991 to 1992

	Unit Shipments			Software Revenue			Share of Market	
GIS/Mapping	1991	1992	Growth (%)	1991	1992	Growth (%)	1991	1992
Sun	4,660	5,747	23	83.8	102.2	22	28	28
Intergraph	4,602	5,495	19	73.0	96.7	32	25	26
Hewlett-Packard	4,001	4,630	16	76.9	83.1	8	26	22
IBM	1,353	2,149	59	21.5	40.0	86	7	11
Digital	1,004	1,410	40	18.5	24.6	33	6	7
Silicon Graphics	205	352	72	4.0	6.5	63	1	2
Others	1,805	1,371	-24	16.5	16.6	1	6	4
All Companies	17,630	21,154	20	294.2	369.7	26	100	100

Source: Dataquest (December 1993)

Sun Continues to Dominate the EDA Market

The EDA workstation software market, with revenue of $1.032 billion, continues to be dominated by Sun workstations, which represents 56 percent of the workstation shipments in 1992. Sun's growth is partly because of the growth in Cadence software, which ran primarily on Sun, and also because of HP's losses. Mentor sold significantly on the Apollo platform, either AEGIS or UNIX, in 1991. In 1992, because of delays in releasing Version 8 software, the existing Mentor client base on the Apollo/HP was not buying, whereas new Mentor customers favored Sun or IBM workstations. Hewlett-Packard sold about 5,500 fewer workstations in the EDA market in 1992 than 1991, whereas IBM enjoyed growth in workstation shipments of about 4,700 and Sun at about 8,000. The workstation shipment growth in the EDA market totaled about 7,600 shipments.

Table 7
EDA ISV Software Sales by Workstation Vendor, 1991 to 1992

	Unit Shipments			Software Revenue			Share of Market	
EDA	1991	1992	Growth (%)	1991	1992	Growth (%)	1991	1992
Sun	27,065	35,241	30	430.7	583.3	35	45	56
Hewlett-Packard	20,522	14,968	-27	344.0	247.6	-28	36	24
IBM	515	5,233	916	8.4	88.6	955	1	9
Digital	2,549	4,412	73	46.2	76.1	65	5	7
Intergraph	1,913	734	-62	28.9	11.7	-60	3	1
Silicon Graphics	242	320	32	4.2	6.1	45	0	1
Others	2,872	2,364	-18	84.6	25.9	-69	9	2
All Companies	55,678	63,272	14	947.0	1,039.3	10	100	100

Source: Dataquest (December 1993)

And the Winner Is: Sun Workstations

Adding together all of the above, Sun remains king of the workstation mountain, having sold more than 72,000 units. Hewlett-Packard's losses in the EDA market balanced its gains in the mechanical, AEC, and GIS markets, leaving its shipment growth essentially flat from 1991 to 1992. IBM is the big winner in terms of shipment growth of almost 10,000 units from 1991 to 1992, followed by Digital with workstation shipment growth of almost 5,500 units, Silicon Graphics at almost 5,000 units, and Intergraph with more than 2,000 units.

Table 8
All ISV Software Sales by Workstation Vendor, 1991 to 1992

	Unit Shipments			Software Revenue			Share of Market	
All Applications	1991	1992	Growth (%)	1991	1992	Growth (%)	1991	1992
Sun	64,103	72,111	12	1,022.5	1,198.3	17	37	38
Hewlett-Packard	43,573	43,871	1	747.8	728.5	-3	27	23
IBM	14,078	23,952	70	273.2	410.4	50	10	13
Digital	11,646	17,062	47	206.1	270.9	31	7	8
Intergraph	12,760	14,575	14	211.0	256.2	21	8	8
Silicon Graphics	5,458	10,343	90	113.8	179.4	58	4	6
Others	12,649	12,913	2	220.8	149.1	-32	8	5
All Companies	164,267	194,827	19	2,795.2	3,192.8	14	100	100

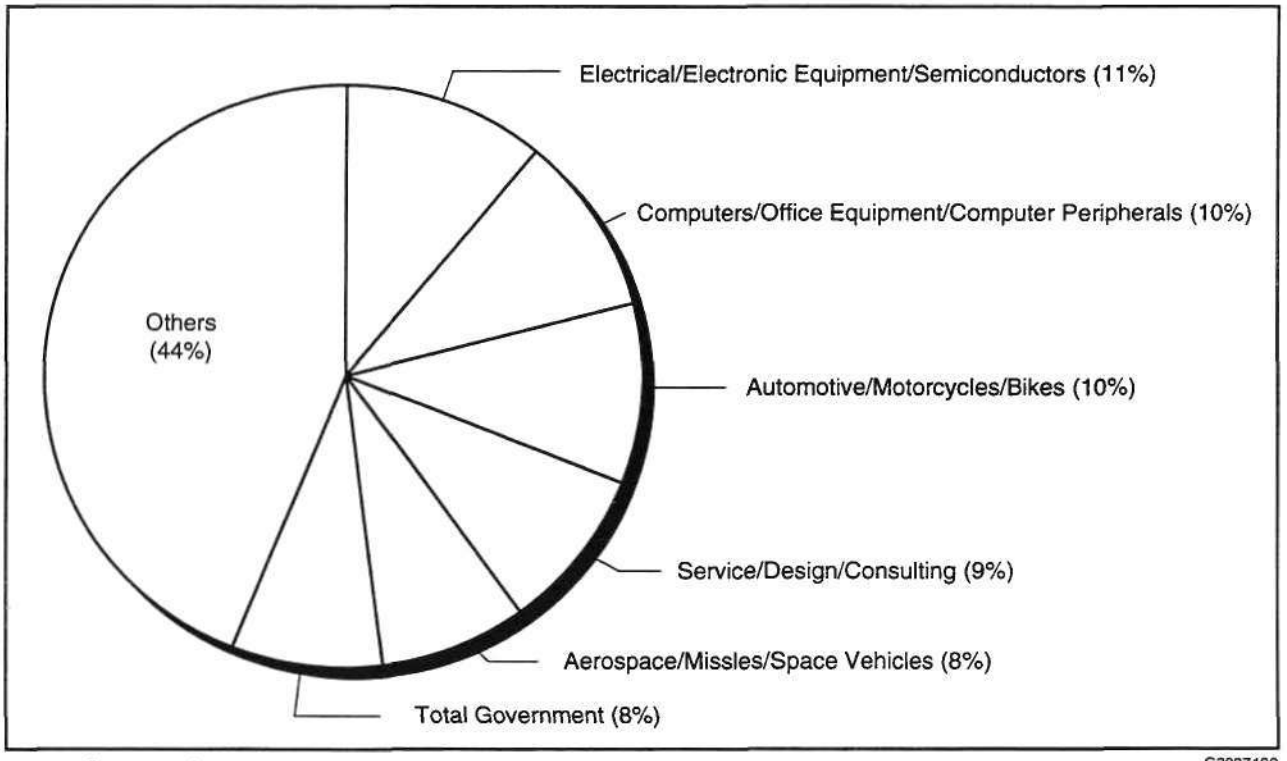
Source: Dataquest (December 1993)

Electrical/Electronic Equipment/Semiconductors Ranks No. 1 in CAD/CAM/CAE/GIS Market

CAD/CAM/CAE/GIS software vendors, when asked to allocate their 1992 software revenue to the buyer's standard industry classification (SIC) code, ranked the electrical/electronic equipment/semiconductors industry No. 1 (up from No. 2 in 1991) with more than $564 million in software revenue. Software sales into this industry grew 11 percent from 1991 to 1992. In terms of total dollar growth, computers/office equipment/computer peripherals leads the pack (with $95 million growth in software revenue from 1991 to 1992), followed by electrical/electronic equipment/semiconductors ($79 million growth) and total government ($74 million growth). These three industries account for more than half of the total growth of CAD/CAM/CAE/GIS software sales.

Figure 2 shows the top industries for CAD/CAM/CAE/GIS software sales for 1992, whereas Figure 3 shows top industries for each of the application segments. Table 9 provides the software vendor sales, growth rates, and market distribution by industry for each application area. Table 10 provides the top five software vendors for the top three industry segments for each application.

Figure 2
CAD/CAM/CAE/GIS Worldwide Software Market by Industry



Source: Dataquest (December 1993)

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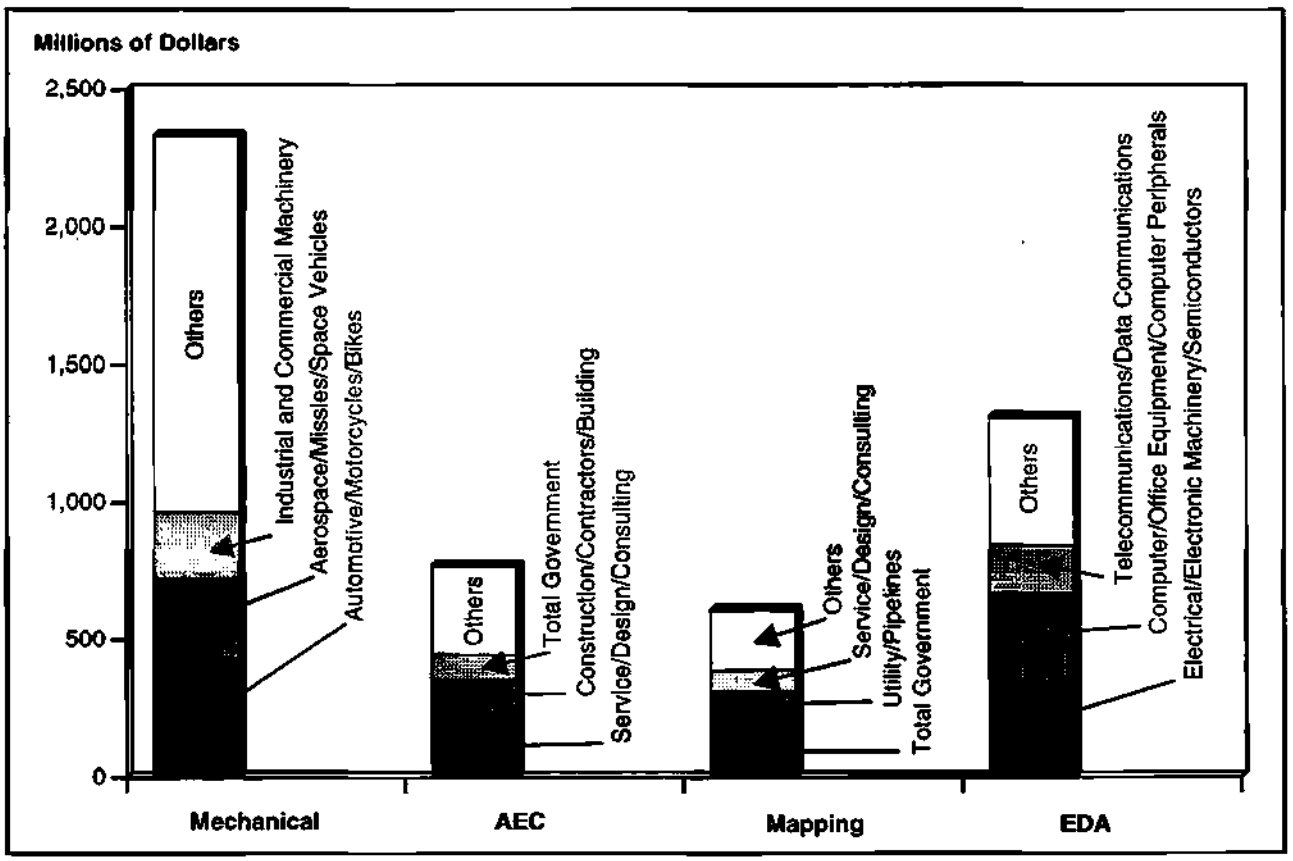
Mechanical Software

Automotive/motorcycles/bicycles continues to rank as the top industry for mechanical software sales ($431.3 million), whereas aerospace/missiles/space vehicles continues as the No. 2 industry ($293.3 million), and industrial and commercial machinery continues as the No. 3 industry ($240.6 million). However, the growth in total dollars of software sales into these industries totals less than 2 percent of the total growth of $193 million. Two of the top software vendors in these three industries are IBM and Computervision.

Figure 3
CAD/CAM/CAE/GIS Software Markets by Industry



Source: Dataquest (December 1993) G3007401

More than half the growth in mechanical software sales resides in the following three industries:

- Computers/office equipment/computer peripherals ($48 million growth),
- Electrical/electronic equipment/computer peripherals ($29 million growth)
- Consumer electronics ($28 million)

An additional 29 percent of the growth in mechanical software sales resides in the following three industries:

- Medical manufacturing ($22 million)
- Services/design/consulting ($17 million)
- Education ($17 million)

It is not surprising that Parametric Technology, Intergraph, SDRC, and Autodesk appear repeatedly in the top five mechanical software vendors to these industries.

Table 9
Software Vendor Sales by Industry for Each Application

	All Applications			Mechanical			AEC			GIS/Mapping			EDA		
	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)
Electrical/Electronic Machinery/Semiconductors															
	564.4	16.4	11.4	203.1	16.4	8.8	10.6	16.4	1.4	4.2	22.8	0.7	346.6	16.3	26.9
Computers/ Office Equipment/Computer Peripherals															
	516.7	22.6	10.4	179.7	36.6	7.8	9.1	-5.1	1.2	4.5	20.9	0.7	323.4	17.0	25.1
Automotive/Motorcycles/Bikes															
	500.4	4.2	10.1	431.3	2.4	18.6	18.5	19.0	2.5	3.0	66.7	0.5	47.6	1.2	4.5
Service/Design/Consulting															
	436.5	14.3	8.8	98.5	21.3	4.3	236.9	13.5	31.8	76.9	22.5	12.7	24.3	-16.8	1.9
Aerospace/Missiles/Space Vehicles															
	422.1	-1.1	8.5	293.3	-3.0	12.7	10.8	12.6	1.4	2.0	24.5	0.3	116.0	2.7	9.0
Total Government															
	414.7	21.7	8.4	72.7	23.5	3.1	90.1	24.4	12.1	222.5	22.2	36.8	29.4	7.4	2.3
Government: General/ Executive/ Public Order/Taxation															
	74.2	13.0	1.5	6.3	-31.5	0.3	7.7	31.0	1.0	59.6	20.8	9.9	0.6	-50.7	0
Government: Public Works/Engineering															
	150.1	26.7	3.0	12.0	54.8	0.5	60.3	25.8	8.1	76.0	24.9	12.6	1.8	-5.9	0.1
Government: Environment/Public Health															
	66.8	18.6	1.3	7.6	12.1	0.3	9.5	27.3	1.3	48.9	18.2	8.1	0.7	15.2	0.1
Government: National Security/Defense															
	123.5	23.1	2.5	46.7	33.4	2.0	12.6	13.3	1.7	38.0	24.3	6.3	26.3	11.1	2.0
Industrial and Commercial Machinery															
	279.4	3.0	5.6	240.6	1.5	10.4	12.1	61.9	1.6	6.2	26.0	1.0	20.6	-5.7	1.6
Telecommunications/Data Communications															
	252.0	17.0	5.1	40.6	65.5	1.8	9.5	17.9	1.3	28.9	31.1	4.8	173.0	7.7	13.4
Consumer Electronics															
	217.3	15.6	4.4	97.1	40.0	4.2	1.3	121.3	0.2	1.9	863.6	0.3	117.0	-0.7	9.1
Fabricated Metal Products/except Machinery and Transportation															
	198.9	5.4	4.0	164.5	2.6	7.1	21.8	7.5	2.9	7.5	94.4	1.2	5.1	19.4	0.4

(Continued)

Table 9 (Continued)
Software Vendor Sales by Industry for Each Application

	All Applications			Mechanical			AEC			GIS/Mapping			EDA		
	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)	Software Sales ($M)	1991-1992 Growth (%)	Share of 1992 Market (%)
Construction/Contractors/Building															
	184.9	1.5	3.7	50.7	2.6	2.2	119.1	1.2	16.0	11.4	-5.4	1.9	3.7	22.7	0.3
Manufacturing NEC (Textiles, Furniture, Foundries)															
	137.6	6.3	2.8	104.4	4.8	4.5	18.5	11.0	2.5	8.2	25.8	1.4	6.5	-2.8	0.5
Chemical/Allied/Petroleum															
	132.6	9.7	2.7	21.8	42.1	0.9	60.6	22.9	8.1	46.5	-9.9	7.7	3.7	-19.4	0.3
Utilities/Pipelines															
	123.2	13.7	2.5	11.4	15.5	0.5	20.7	-1.0	2.8	87.6	19.8	14.5	3.5	-21.8	0.3
Medical Manufacturing															
	112.9	31.5	2.3	75.6	40.3	3.3	7.9	18.7	1.1	2.0	49.1	0.3	27.4	14.3	2.1
Industrial Controls/ Robotics/AGVs															
	111.5	3.4	2.3	79.9	12.7	3.5	1.9	15.5	0.3	0	0	0	29.8	-15.8	2.3
Education															
	99.5	39.3	2.0	48.1	53.1	2.1	16.8	34.4	2.2	20.5	24.7	3.4	14.2	27.3	1.1
Shipbuilding and Repair/Offshore Rigs															
	88.8	21.8	1.8	45.6	45.4	2.0	42.9	4.0	5.8	0.2	2,933.3	0	0.2	-47.6	0
Transportation (Rail, Public Transit, Freight Transport)															
	69.4	6.7	1.4	14.6	16.2	0.6	14.3	69.5	1.9	29.7	-13.4	4.9	10.8	11.1	0.8
Finance/Insurance/Real Estate															
	12.0	21.0	0.2	0.8	83.6	0	4.8	1.5	0.6	6.5	34.3	1.1		NA	0
Mining															
	10.6	-1.8	0.2	0.8	8.2	0	0.5	12.1	0.1	9.3	-2.8	1.5	0.1	-34.5	0
Agricultural/Forestry/Fishing															
	9.4	40.2	0.2	2.3	324.2	0.1	0.3	14.1	0	6.7	15.2	1.1		10.0	0
All Industries															
	4,950.6	9.6	100.0	2,312.6	9.1	100.0	744.7	9.3	100.0	603.9	16.4	100.0	1,289.2	7.7	100.0

Source: Dataquest (November 1993)

Table 10
Top Software Vendors in Each Industry for Each Application, 1992

Mechanical	Software Sales ($M)	Share of Market (%)	AEC	Software Sales ($M)	Share of Market (%)	GIS/Mapping	Software Sales ($M)	Share of Market (%)	Electronic Design Automation	Software Sales ($M)	Share of Market (%)
Automotive/ Motorcycles/Bikes			**Service/Design/Consulting**			**Total Government**			**Electrical/Electronic Equipment/ Semiconductors**		
IBM	94	22	Autodesk	41	17	ESRI	57	26	Cadence	173	50
Computervision	70	16	Nemetschek	32	14	Intergraph	56	25	Mentor	36	11
EDS	30	7	Intergraph	32	13	EDS	10	4	Synopsys	13	4
SDRC	19	4	IBM	19	8	Genasys II	8	4	Seiko	12	3
MacNeal-Schwendler	18	4	EDS	10	4	Uchida Yoko	8	4	EEsof	11	3
All Companies	431	100	All Companies	237	100	All Companies	223	100	All Companies	347	100
Aerospace/Missiles/Space Vehicles			**Construction/Contractors/Builders**			**Utilities/Pipelines**			**Computer/Office Equipment/ Computer Peripherals**		
IBM	85	29	Autodesk	19	16	Intergraph	17	19	Cadence	83	26
EDS	38	13	Intergraph	14	12	ESRI	10	11	Synopsys	33	10
Computervision	29	10	IBM	7	6	IBM	8	9	Mentor	24	8
SDRC	19	7	Fujitsu	7	6	Smallworld Systems	6	7	Viewlogic Systems	16	5
MacNeal-Schwendler	16	5	IEZ	6	5	Siemens	4	5	COMPASS	15	5
All Companies	293	100	All Companies	119	100	All Companies	88	100	All Companies	323	100
Industrial and Commercial Machinery			**Total Government**			**Service/Design/ Consulting**			**Telecommunications/ Data Communications**		
Computervision	39	16	Intergraph	32	35	Siemens	21	28	Cadence	31	18
Applicon	20	8	Autodesk	16	18	Intergraph	12	15	Racal-Redac	26	15
IBM	14	6	IEZ	6	7	Autodesk	11	14	Mentor	23	13
STI Straessle	13	5	Moss Systems	6	6	ESRI	10	13	EEsof	11	6
Fujitsu	12	5	IBM	4	4	EDS	4	5	Viewlogic Systems	9	5
All Companies	241	100	All Companies	90	100	All Companies	77	100	All Companies	173	100

Source: Dataquest (December 1993)

AEC Software

The AEC market grew by 9.3 percent to almost $744.7 million in 1992. The highest ranking industries, accounting for 56 percent of the AEC revenue, accounted for 58 percent of the growth in the market. Their ranking order remains unchanged, as follows:

- Service/design/consulting grew $28 million to $236.9 million
- Construction/contractors/builders grew $1 million to $119.1 million
- Government grew $18 million to $90.1 million (mostly in public works/engineering)

An additional 13 percent of the growth in this market is attributable to the chemical/allied/petroleum industry, which grew $11.0 million to $60.6 million. Autodesk and Intergraph are large contributors to the growth in AEC software sales to these four industries.

GIS/Mapping Software

GIS/mapping software sales grew $87 million to $603.9 million in 1992 with the following three industries playing a dominant role:

- Government grew $40 million to $222.5 million
- Utilities/pipelines grew $14 million to $87.6 million
- Service/design/consulting grew $14 million to $76.9 million

The growth in GIS/mapping software sales in these industries represents 80 percent of the total growth. Intergraph and ESRI play the dominant role in the government and utilities/pipelines industries, whereas Siemens and Autodesk are nipping at their heels in the service/design/consulting industry.

Electronic Design Automation Software

In the EDA market, the big get bigger. EDA software sales of $1.2892 billion are similarly concentrated in three industries, with most of the $97 million in growth in the following areas:

- Electrical/electronic equipment/semiconductors grew $48 million to $347 million
- Computer/office equipment/computer peripherals grew $47 million to $323 million
- Telecommunications/data communications grew $12 million to $173 million

These three industries account for 64 percent of software sales and 97 percent of dollar growth in the EDA market. Not surprisingly, government: national security/defense and aerospace/missiles/space vehicles were flat from 1991 to 1992.

Dataquest Perspective

This operating system and industry data adds depth to Dataquest's already rich data set for the CAD/CAM/CAE/GIS market. Although this presentation sought to present as much information as possible by highlighting top numbers, there are even more numbers that tell additional stories below the surface. This set of data is available to inquire about by our CAD/CAM/CAE/GIS clients.

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Dataquest Perspective

Software

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In This Issue

CAD/CAM/CAE and GIS Software Market Expected to Grow 12.0 Percent in 1993, Revised Up from 9.6 Percent

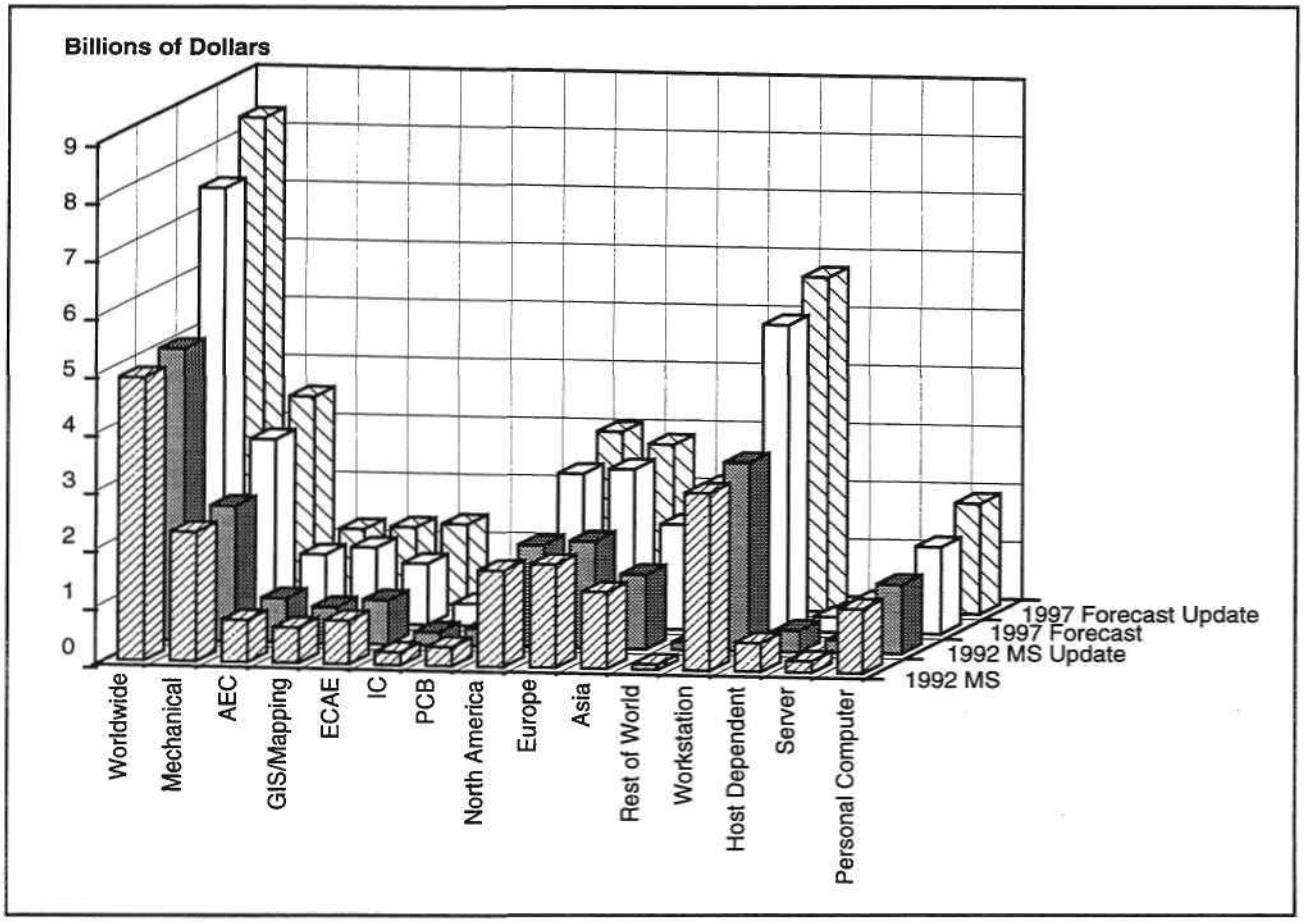
This forecast update uses the market share update as the basis of a new forecast, incorporating any new information since May, including currency changes since year-end 1992. Additionally, with greater focus on country level data during the market share update process, this forecast update provides forecasts by country in Europe and Asia.

Figure 1 shows change from the 1993 forecast to this update in growth of software revenue by application, region, platform, and the total market. Table 1 provides the corresponding revenue figures and growth rates. This additional growth is divided somewhat equally among the applications, is concentrated in Asia because of currency issues, and resides primarily in the personal computer platform.

Currency Changes

Worldwide revenue estimates include data from many countries, each of which has a different and fluctuating exchange rate. Estimates of non-U.S. revenue are based on the average exchange rate for a given year, calculated as the simple arithmetic mean of the 12 average monthly values. Dataquest does not forecast exchange rates per se; however, we do forecast with the best information available. Exchange rates, for the purposes

Figure 1
Software Forecast Update versus Forecast, 1992-1997



Source: Dataquest (September 1993)

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of forecasting, are calculated assuming the June 1993 exchange rate will apply throughout all future months of the year. Table 2 provides the resulting exchange rates for each European and Asian country.

Given the bleak economic climate, it is surprising that we are forecasting increased growth from our earlier forecast. The main source of this growth comes from the depreciation of the dollar against the yen of 12 percent. With 96 percent of the Asian revenue reported in Japan, the yen dominates that region's revenue figures. Table 3 shows dollar values with equivalent yen values of total factory revenue for Asia for 1992 and 1993, with growth rates, by application, using the exchange rates as shown in Table 2.

In contrast, the dollar has appreciated against all other European currencies. This forecasting has shown a corresponding decrease in the growth of the European CAD/CAM/CAE/GIS markets as compared to the earlier forecast.

Table 1
Software Revenue Forecast Update versus Forecast

	Forecast Update 1992-1993 Change (%)	Forecast Update 1992-1997 CAGR (%)	May Forecast 1992-1993 Change (%)	May Forecast 1992-1997 CAGR (%)	Market Share Update 1992 ($M)	Forecast Update 1993 ($M)	Forecast Update 1997 ($M)	Market Share 1992 ($M)	May Forecast 1993 ($M)	May Forecast 1997 ($M)
Worldwide	12.0	10.6	9.6	8.9	5,036	5,642	8,353	4,885	5,352	7,467
Applications:										
Mechanical	12.3	8.7	10.6	7.2	2,341	2,628	3,548	2,233	2,469	3,154
AEC	11.8	11.0	9.0	10.0	758	847	1,275	730	796	1,178
GIS/Mapping	14.7	16.0	13.8	16.4	629	721	1,323	616	700	1,317
ECAE	12.7	12.7	8.0	7.1	764	861	1,390	752	812	1,057
IC	9.2	11.3	7.8	10.9	233	254	398	225	243	378
PCB	5.8	6.0	0.7	3.1	312	331	418	330	332	383
Regions:										
North America	13.2	11.5	12.0	9.8	1,767	2,000	3,041	1,669	1,869	2,659
Europe	7.7	9.0	10.9	9.0	1,848	1,990	2,840	1,793	1,988	2,753
Asia	15.1	10.6	3.8	6.4	1,288	1,483	2,134	1,327	1,378	1,813
Rest of World	27.2	20.6	22.8	20.3	132	168	338	96	118	242
Platforms:										
Workstation	13.8	12.1	13.5	11.5	3,256	3,705	5,773	3,072	3,486	5,293
Host Dependent	-19.1	-11.8	-19.2	-12.1	369	299	196	500	404	262
Server	22.8	16.8	20.3	15.5	216	265	470	197	237	405
Personal Computer	14.8	9.9	9.7	6.2	1,195	1,373	1,914	1,117	1,225	1,508

Source: Dataquest (August 1993)

Table 2
Foreign Currency per U.S. Dollar

	Country	Currency	Actual 1992	Current 1993	Appreciation ($ U.S.)
Europe	United Kingdom	Pound	0.5686	0.6606	16.2
	France	Franc	5.2712	5.5192	4.7
	Germany	Mark	1.5554	1.6334	5.0
	Italy	Lira	1,227.75	1,517.07	23.6
	Spain	Peseta	101.90	123.38	21.1
	Denmark	Krone	6.0153	6.2751	4.3
	Finland	Markka	4.4507	5.5955	25.7
	Norway	Krone	6.1824	6.9298	12.1
	Sweden	Krona	5.8105	7.4584	28.4
	Belgium	Franc	32.02	33.59	4.9
	Netherlands	Guilder	1.7512	1.8073	3.2
	Austria	Schilling	10.95	11.49	4.9
	Switzerland	Franc	1.3976	1.4727	5.4
Asia	Japan	Yen	126.45	111.23	-12.0
	Hong Kong	Dollar	7.7401	7.7327	-0.1
	Korea	Won	782.63	799.43	2.1
	Singapore	Dollar	1.6285	1.6218	-0.4
	Taiwan	Dollar	24.93	25.91	3.9
	China	Renminbi	5.5082	5.7441	4.3

Source: Dataquest (August 1993)

Table 3
Total Factory Revenue in Asia, Dollars as Compared to Yen (1992 Exchange Rate of U.S.$1/¥126.45; 1993 Exchange Rate of U.S.$/¥111.23)

	1992 ($M)	1993 ($M)	Change (%)	1992 (¥M)	1993 (¥M)	Change (%)
Mechanical	2,180	2,384	9.4	275,647	265,178	-3.8
AEC	577	618	7.2	72,938	68,780	-5.7
GIS	332	375	12.8	42,016	41,683	-0.8
ECAE	508	585	15.2	64,213	65,096	1.4
IC Layout	194	208	7.5	24,491	23,154	-5.5
PCB	372	380	2.4	46,971	42,305	-9.9
All Applications	4,162	4,551	9.3	526,275	506,197	-3.8

Source: Dataquest (August 1993)

Database Changes

Dataquest intends to freeze the CAD/CAM/CAE/GIS database following the market share update. However, careful scrutiny of European numbers as part of the forecasting process uncovered some discrepancies at the country and application level. Adjustments were made to IBM, Hewlett-Packard, Digital, and Intergraph. In addition, Intergraph was underrepresented in the mechanical market to an alarming extent. Its data was fixed, with a corresponding decrease in service revenue and GIS/Mapping software revenue, moving Intergraph from No. 15 to No. 9 in mechanical software revenue. Finally, ESRI was updated to reflect higher total revenue, most of which was for service. The result is that Intergraph and ESRI are now separated by $8 million in software revenue in the GIS market. There will be no more changes to this database until we begin our survey of 1993 data.

Other Information

Implicit in any forecasting are the GDP/GNP growth rates (see Table 4). We also track quarterly revenue of public companies and corresponding growth rates from previous quarters for a general view of the health of the industries.

Table 4
GDP/GNP Growth Rate Percentages (Constant Prices and Exchange Rates, Local Currencies)

		1992	1993	1994	1995	1996
North America	Canada	0.7	3.1	3.8	3.5	3.0
	United States	2.1	2.6	2.9	2.3	2.5
Europe	United Kingdom	-0.5	1.7	2.7	3.2	3.0
	France	1.1	-1.0	1.3	3.1	3.3
	Germany*	1.4	-1.5	1.2	2.8	3.5
	Italy	0.9	0.3	1.5	1.9	2.3
	Spain	1.0	-0.7	1.7	2.9	3.6
	Denmark	1.2	0.6	2.1	2.3	3.5
	Finland	-3.6	-0.2	1.8	2.5	3.2
	Norway	2.9	1.5	2.4	2.6	2.7
	Sweden	-1.8	-1.6	1.4	2.0	2.5
	Belgium	0.8	-0.5	1.8	2.7	3.1
	Netherlands	1.5	-0.4	1.5	2.9	2.9
	Austria	1.5	-0.1	2.0	3.7	3.9
	Switzerland	-0.6	0.2	1.5	2.1	2.4
Asia	Japan	1.5	1.3	2.7	3.6	4.1
	Korea	4.8	6.0	7.0	7.0	7.0
	Taiwan	6.1	6.5	7.0	7.0	7.0
	Singapore	5.8	6.5	6.5	6.5	6.5
	Hong Kong	5.0	5.5	5.5	5.5	5.5
	China	11.5	10.0	12.5	11.5	10.8

*Germany includes the former East Germany
Source: The Dun & Bradstreet Corporation

Regional Forecast Assumptions

Table 5 provides the CAD/CAM/CAE/GIS forecast for total factory revenue, software revenue, and units. Following are the main worldwide forces driving this forecast.

Worldwide Forecast Drivers

The worldwide CAD/CAM/CAE/GIS market will maintain steady growth during the next five years. Figure 2 shows the forecast of hardware, software, and service revenue worldwide and by region and Figure 3 shows the worldwide forecast by platform.

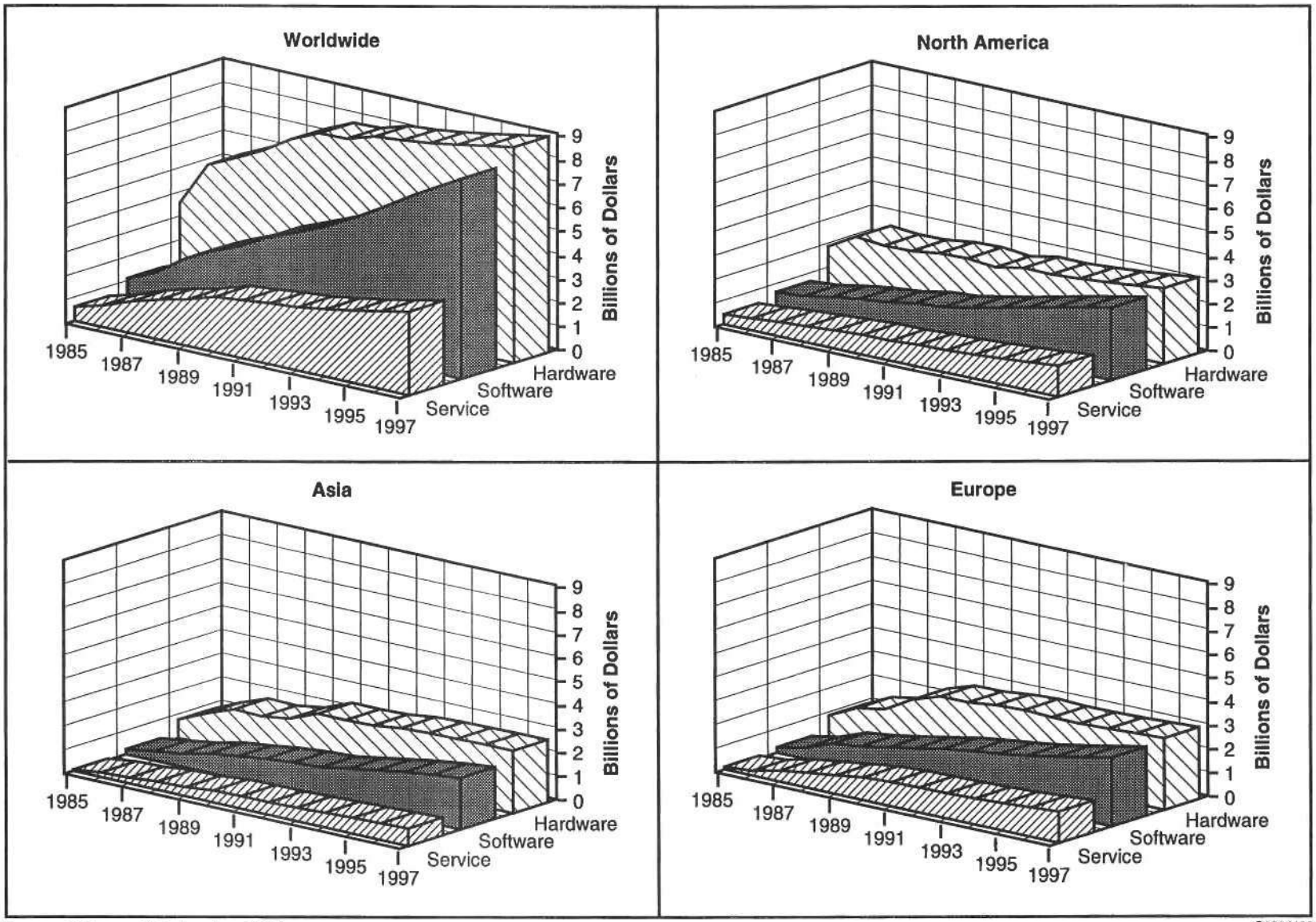
The main forces driving the CAD/CAM/CAE/GIS worldwide forecast are described in the following paragraphs.

Table 5
CAD/CAM/CAE/GIS Forecast by Region
(Revenue in Millions of Dollars; Actual Shipments)

	1992	1993	1994	1995	1996	1997	CAGR (%) 1992-1997
Worldwide							
Total Factory Revenue	15,723	16,530	17,500	18,640	19,770	20,860	5.8
Software Revenue	5,036	5,640	6,320	7,040	7,710	8,350	10.6
Unit Shipments	739,511	857,200	972,100	1,072,700	1,155,000	1,215,900	10.5
North America							
Total Factory Revenue	5,437	5,680	6,100	6,550	7,000	7,520	6.7
Software Revenue	1,767	2,000	2,270	2,540	2,790	3,040	11.5
Unit Shipments	291,743	336,300	381,800	420,700	456,600	487,100	10.8
Europe							
Total Factory Revenue	5,736	5,850	6,060	6,390	6,760	7,120	4.4
Software Revenue	1,848	1,990	2,160	2,380	2,610	2,840	9.0
Unit Shipments	245,054	271,900	304,600	337,000	359,700	374,800	8.9
Asia							
Total Factory Revenue	4,162	4,550	4,840	5,110	5,300	5,460	5.6
Software Revenue	1,288	1,480	1,680	1,870	2,020	2,130	10.6
Unit Shipments	182,151	224,000	255,300	277,900	294,800	303,500	10.7
Rest of World							
Total Factory Revenue	388	450	530	600	680	760	14.3
Software Revenue	132	170	210	250	290	340	20.6
Unit Shipments	20,563	25,000	30,400	37,200	43,900	50,600	19.7

Source: Dataquest (August 1993)

Figure 2
Worldwide and Regional Revenue Forecast, All Applications and All Platforms



Source: Dataquest (September 1993)

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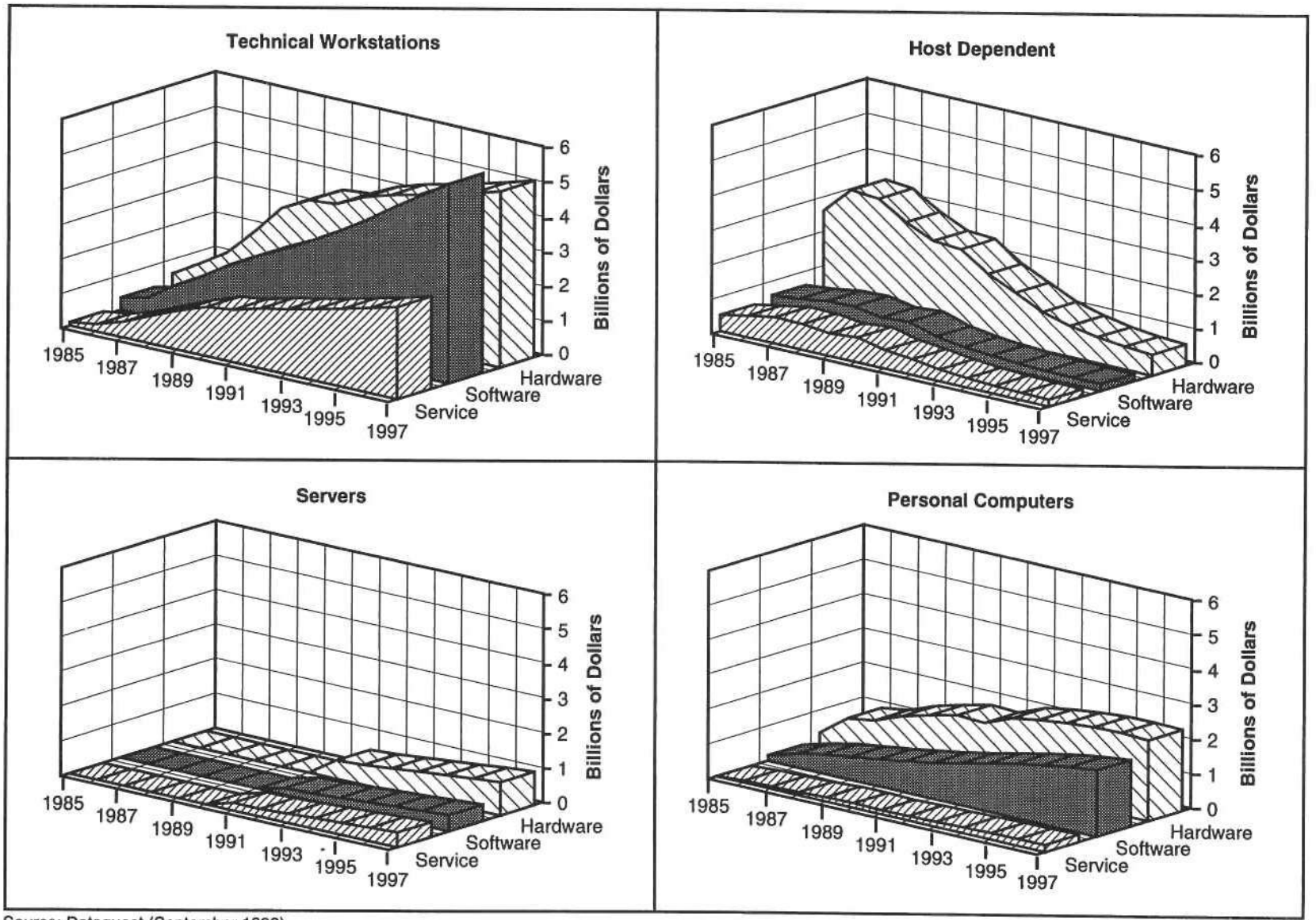
Figure 3
Worldwide Revenue Forecast, by Platform, All Applications



Source: Dataquest (September 1993)

Macroeconomy

The recovery, with its inherent renewed optimism after a worldwide recession and the resultant increased capital spending, will fuel growth gradually beginning in the North American, U.K., and Asian countries other than Japan.

Technology

Computing performance will continue to improve at an exponential rate in the foreseeable future. The Dataquest Technical Computing group has forecast the growth in millions of instructions per second (mips) shipments: the total mips shipped in history through 1992 will be matched by the shipments in 1993. In other words, the total mips shipped will double in 1993, almost double again in 1994, and double again in 1995. This enabling resource will fuel the next-generation software tools focused on integrated solutions at the enterprise level.

Indispensability

As the complexity of the design, the need to share information, and the need to store information electronically increase, the benefits of automation improve dramatically and the level of indispensability rises. This, coupled with market pressures to produce higher quality and to reduce production cycles, is making CAD/CAM/CAE/GIS a necessity.

Late Buyers

A significant pool of untapped users still exists in mechanical, AEC, and GIS applications, driving additional growth. These conservative buyers will favor market leaders and installed systems for compatibility. For vendors, therefore, the value of high market share and customer satisfaction will increase.

Desktop Dominance

The turf war for desktop dominance is building steam with the introduction of the Pentium chip and Windows NT, which will fight to take market share from the higher-priced, multiple UNIX operating systems with RISC technology. In addition, the decline of host-dependent systems is continuing with replacements going to networked, desktop systems. Vendors, whose business models depend upon high-priced workstations, are threatened by these powerful new PCs. At the same time, the replacement of host systems provides them with opportunity for growth.

Unbundling of Software

With software vendors porting to multiple platforms, software is no longer the hinge upon which hardware swings. The market is quickly moving from proprietary to open systems, resulting in a shift from bundled to unbundled software (see Table 6).

Replacement Market

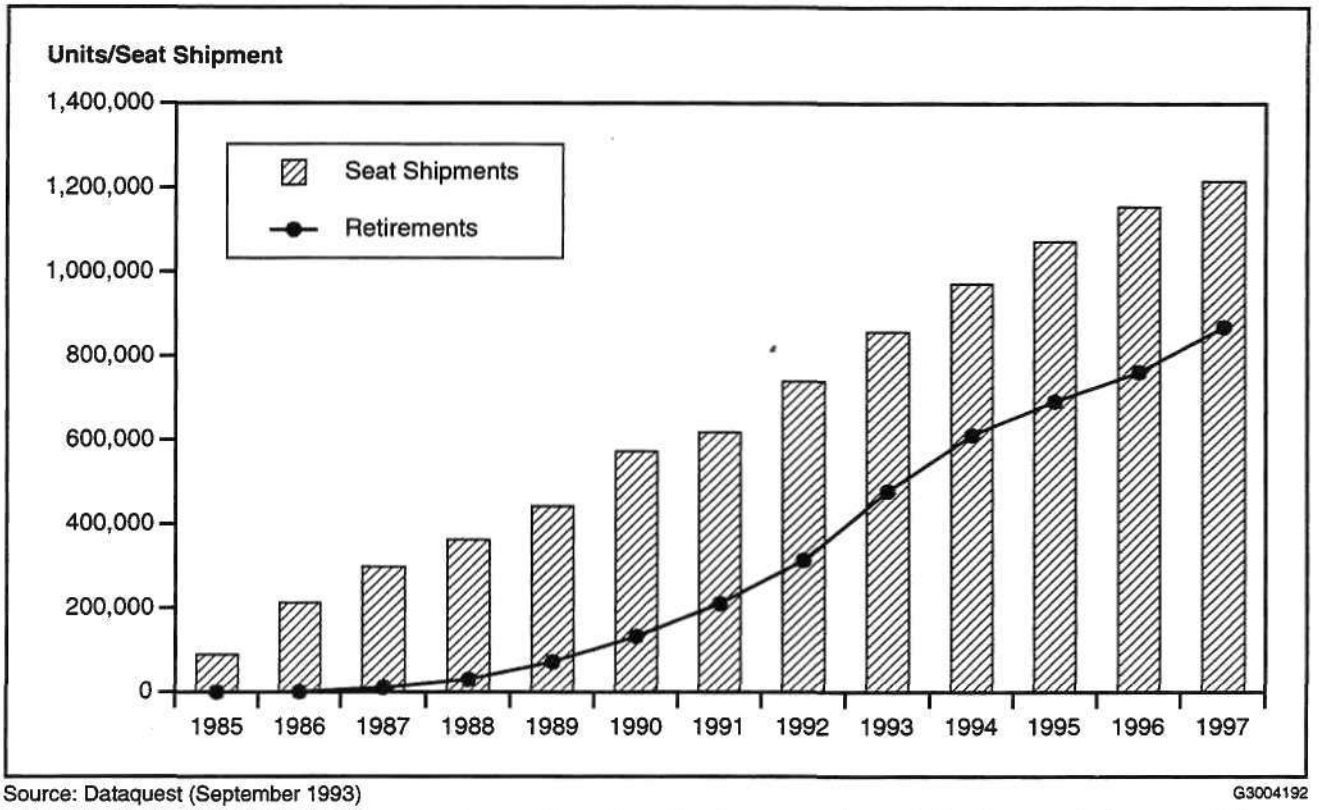
The replacement market is gaining importance as replacement seats exceed 50 percent of unit sales in 1993 (see Figure 4). This saturation implies that many parallel manual systems can be eliminated and new applications developed, knowing that everyone in a company needing

Table 6
CAD/CAM/CAE/GIS Software Revenue Forecast, by Application (Millions of Dollars)

	1992	1993	1994	1995	1996	1997	CAGR (%) 1992-1997
All Applications							
Software Revenue	5,036	5,640	6,320	7,040	7,710	8,350	10.6
Bundled Software Revenue	1,939	1,960	2,000	2,040	2,090	2,120	1.8
Unbundled Software Revenue	3,097	3,680	4,320	4,990	5,620	6,230	15.0
Mechanical							
Software Revenue	2,341	2,630	2,880	3,140	3,360	3,550	8.7
Bundled Software Revenue	1,127	1,180	1,200	1,230	1,250	1,260	2.2
Unbundled Software Revenue	1,214	1,450	1,680	1,910	2,110	2,290	13.6
AEC							
Software Revenue	758	850	950	1,050	1,160	1,280	11.0
Bundled Software Revenue	300	310	330	340	360	380	4.9
Unbundled Software Revenue	458	540	620	710	800	900	14.3
GIS/Mapping							
Software Revenue	629	720	840	980	1,150	1,320	16.0
Bundled Software Revenue	267	290	320	340	370	400	8.6
Unbundled Software Revenue	362	430	520	640	770	920	20.5
Electronic CAE							
Software Revenue	764	860	1,010	1,160	1,280	1,390	12.7
Bundled Software Revenue	109	90	80	70	60	50	-13.0
Unbundled Software Revenue	655	770	930	1,090	1,220	1,340	15.3
IC Layout							
Software Revenue	233	260	290	320	360	400	11.3
Bundled Software Revenue	32	20	10	10	10	5	-28.9
Unbundled Software Revenue	201	240	280	310	350	395	14.3
PCB/Hybrid/MCM							
Software Revenue	312	330	350	380	400	420	6.0
Bundled Software Revenue	105	80	50	40	30	20	-26.3
Unbundled Software Revenue	208	250	300	340	370	400	13.7

Source: Dataquest (August 1993)

Figure 4
Unit Shipments versus Retirements—History and Forecast



Source: Dataquest (September 1993) G3004192

access to the engineering database can have it in electronic format. The savings potential is tremendous. This also implies a growing sophistication in buyers who are more informed of the strategic importance of this technology.

Software

With technological advances, growing sophistication of users, and competitive pressures, the demand for software with greater ease of use, flexibility, and interoperability is growing. This demand is driving the growth in business alliances between small innovative software niche players and major software vendors with resources to sell to the new and replacement markets.

North American Forecast Drivers

North America CAD/CAM/CAE/GIS total revenue grew a robust 11.3 percent to $5.4 billion in 1992 and is forecast to grow at a 6.7 percent compound annual growth rate (CAGR) through 1997 to $7.5 billion. The following paragraphs describe the main factors driving the North American forecast.

Economy

According to The Dun & Bradstreet Corporation's August 1993 *Economic Overview,* the growth of the economy is led by capital spending and by trade, as the economies of U.S. trading partners bottom out. Information

technology growth for the first two quarters of 1993 is an annualized 13 percent, down from the 22 percent growth of the previous four quarters. The July 1993 survey of 1,000 manufacturers nationwide indicates that reduced output has resulted in a lowering of expectations, which should continue into the third quarter.

Cuts in Defense Spending

Cuts in defense spending will tend to soften the market. However, a focus on fewer, more sophisticated weapons systems will promote use of the latest design optimization and simulation capabilities.

European Forecast Drivers

The European market grew 3.6 percent to $5.7 billion in total revenue in 1992. This largest region is forecast to be the slowest growing at a mere 1.9 percent for 1993 to $5.8 billion, with a 1992 to 1997 CAGR of 4.4 percent. The major factor behind this slowing growth is the sluggish German economy, which accounts for 35 percent of the European market. A slowdown in Germany rippled through all other European industries. Table 7 provides the forecast software CAGR for 1992 to 1997 for each country for each application in Europe.

The following paragraphs describe the main factors driving the European forecast.

Economy

Hopes abound for a recovery in the second half of 1994, with the United Kingdom and the Netherlands already leading the way. Governments are struggling to contain mounting budget deficits, particularly in the U.K. and in Germany. Manufacturing industries are being affected by a decline in consumer spending because of high unemployment throughout Europe. Massive budget deficits will continue to influence government public spending.

Table 7
Compound Annual Growth Rate, 1992-1997, Software Revenue (Percent)

	Mechanical	AEC	GIS	ECAE	IC	PCB	All
United Kingdom	6.0	5.2	11.8	4.6	0.9	-0.7	6.5
France	6.3	8.4	18.5	3.5	4.6	0.0	7.0
Germany	7.3	10.5	17.0	5.0	3.9	2.7	8.7
Italy	9.6	7.5	10.4	6.4	1.9	3.2	9.0
Benelux	7.2	10.0	18.4	4.1	3.7	4.0	9.3
Scandinavia	9.0	8.9	14.3	4.8	7.1	1.5	9.1
Spain	6.5	9.1	15.5	5.1	3.7	-0.5	9.0
Rest of Europe	16.5	13.9	20.2	8.8	-1.7	0.3	14.7
Europe	8.4	9.8	15.6	5.1	2.7	1.4	9.0

Source: Dataquest (August 1993)

Growth

There are a few bright spots. The European railway industry is undergoing a renaissance. Major public works projects are planned in the Netherlands and Norway. Denmark is the beneficiary of the building in the eastern Germany area. Defense spending is refocusing from the personnel needs of the cold war to the equipment needs for desert warfare, urban terrorism, and rapid response capabilities. This, with the growth of the telecommunications industry, bodes well for EDA spending.

Currency

The appreciation of the dollar against the European currencies places additional pressure on dollar growth rates for the European community. Just as the dollar growth of the Asian market is strikingly higher than growth of the yen, the dollar growth of the European market is less than the growth in local currency. Additionally, this conversion ratio forces U.S. products to sell at reduced dollar prices to remain competitive with the European products, resulting in less revenue for U.S. vendors.

Asian Forecast Drivers

The Asian market grew 2.9 percent to $4.2 billion in total revenue for 1992. This represents a decrease of 4.3 percent on a yen basis. With the further depreciation of the dollar against the yen thus far in 1993, total revenue is forecast to grow 9.2 percent to $4.5 billion, which is a decrease of 3.9 percent on the yen. The following paragraphs describe the main factors driving the Asian forecast.

Economy

After a hopeful but false recovery during the first quarter of 1993, the Japanese economy has once again taken a nosedive. According to a MITI survey, Japanese industry plans to cut capital spending for a second straight fiscal year (*Nikkei Weekly*, June 7, 1993). The survey also indicated that capital spending growth should return during the first quarter of calendar 1994.

Currency

Just as the appreciation of the dollar against the ECU causes pricing pressure on U.S. goods in Europe, the even greater depreciation of the dollar against the yen causes pricing pressure on Japanese goods in the United States. This currency volatility creates a cauldron of price competitiveness in the Japanese markets, with U.S. software and hardware able to provide high profits at low prices relative to the Japanese competitors.

Competitive Model Change

Japanese CAD/CAM/CAE/GIS users are shifting from the large, general-purpose, computer systems to the smaller workstations and personal computers. In response, major Japanese computer manufacturers, no longer the one-stop shop, are joining forces with foreign computer companies to provide the multiple solutions that are being demanded, adding to the already complex relationships among Japanese companies.

Developing Asian Countries

Although the cheap labor of China, Vietnam, and other developing Asian countries is fueling enormous growth in manufacturing, the lack of experienced and highly educated engineers and managers prevents a corresponding growth in the CAD/CAM/CAE/GIS industries in these countries. The design function still resides in Japan, North America, and Europe.

Personal Computer

The Japanese PC platform has been a small part of the CAD/CAM/CAE/GIS market. The introduction of DOS/V and Windows NT will be generating interest in this low-cost solution, especially with the small, late buyers.

Virtual Reality

Japan is creating tools for virtual reality that will eventually lead to the development of new technology suitable to enhance CAD/CAM/CAE/GIS.

Application Forecast Assumptions

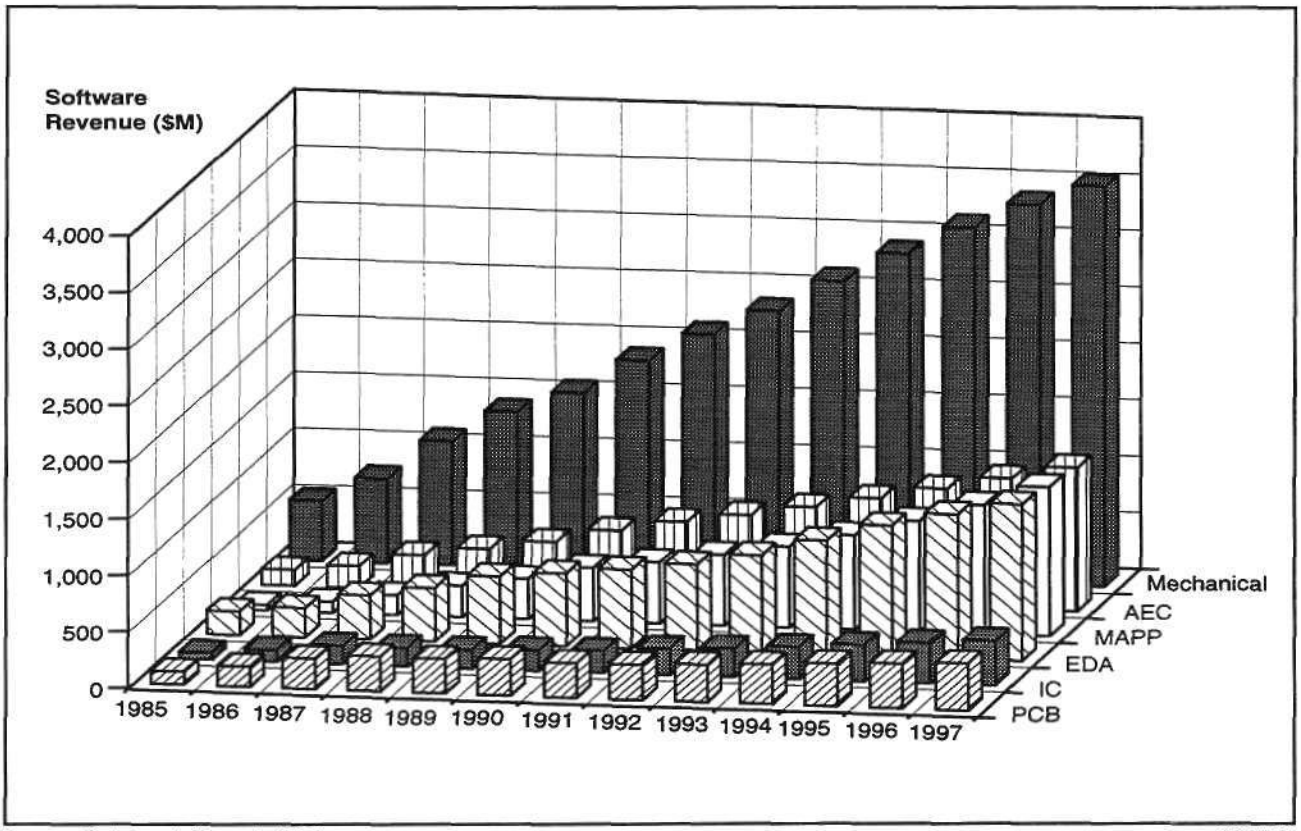
The expected growth in the next three or four years in AEC, GIS, ECAE, and IC applications is adding significantly to the total growth of the industry and is exceeding growth forecasts for mechanical and PCB applications. Market penetration, new application development, and shifting trends in average selling prices are all factors in this shift in total market application mix (see Figures 5 and 6).

Mechanical Forecast Assumptions

The mechanical application area is the largest of the CAD/CAM/CAE/GIS market with 46 percent share of software revenue, and a software revenue growth of 12.3 percent forecast for 1993. The main issues driving the mechanical forecast are as follows:

- Software price—Dataquest expects software prices to stabilize or increase slightly for leading products. The average value of software shipped per seat has increased slowly. In 1987, total software revenue divided by total number of seats shipped was $6,740. The average value has risen to $7,390 in 1992. Corresponding numbers in 1992 for technical workstation-based software are $19,338; $2,300 for the PC; and $11,544 for host-based seats. Leading vendors on all platforms have been raising prices directly or indirectly with new pricing structures for network licensing or site licensing. Microsoft's NT is also expected to affect software prices, with PC vendors trying to raise prices, and workstation vendors possibly lowering prices as applications are ported to NT.

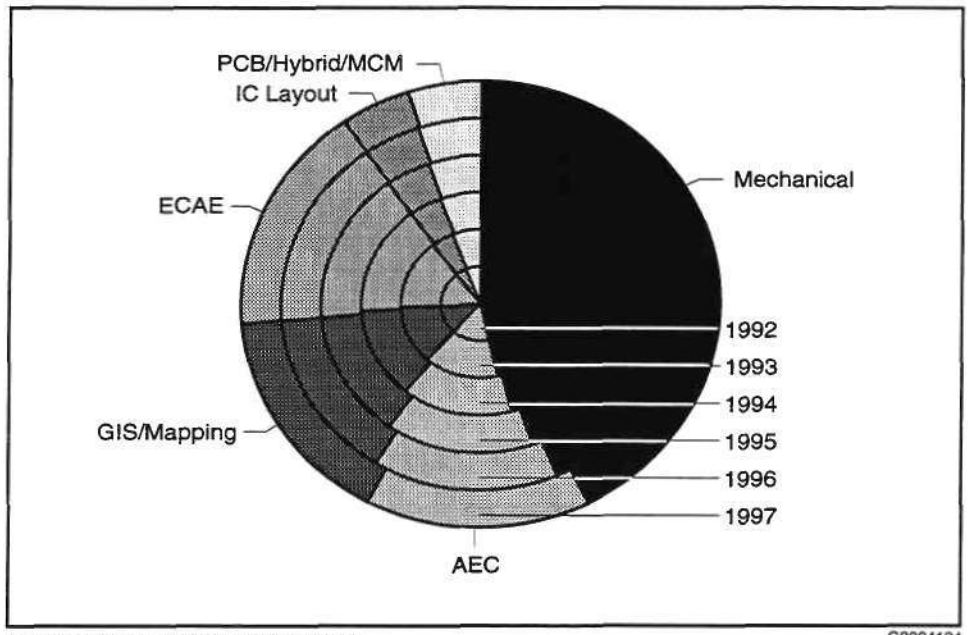
Figure 5
Worldwide Software Revenue Forecast by Application



Source: Dataquest (August 1993) G3004193

- Hardware price erosion—Dataquest expects hardware price erosion to continue at a slower rate as package complexity increases and accelerates demand for hardware purchases that provide more speed, memory, and storage. This trend can be expected on all platform configurations. Supercomputers are increasingly being used for high-end simulation and analysis applications while technical workstations range from very expensive, high-performance, real-time imaging systems to lower-cost, 2-D documentation systems. The need for integrated applications across platforms will cause significant upgrade and system replacements.
- Second-tier products—With a smaller installed base and less market share, second-tier vendors with stale technology are expected to fight forced price erosion. These second-tier vendors are struggling to build market share in an atmosphere of rampant price cutting, particularly on the PC platform. Building market share by cutting prices is becoming a more risky strategy.
- Hardware performance—With enabling technology providing increased mips, software vendors can redefine the concept of interactive design. In the future, designers will simulate the crash of one car into another and test to see if the doors still open. The value of this level of computing will change the nature of mechanical CAD/CAM/CAE.

Figure 6
Software Revenue Distribution Forecast by Application



Source: Dataquest (September 1993)

G3004194

The result will allow anyone in the design and manufacturing process to simulate real problems, to evaluate potential solutions, and to communicate the change instantly to all involved.

- Modeling technologies—Core modeling technologies will evolve slowly to support a product data structure growing in complexity. 3-D solutions are replacing 2-D solutions, which will be replaced by next-generation, integrated, solid-modeling-based solutions. The more complete data structure with improvements in performance is rapidly building strong interest with end users. The need to have this higher level of communication among departments is growing as well. Continued progress is being made in integration between the model and analysis applications, between model and documentation, and further into manufacturing applications.
- Technology dependence—The major mechanical applications have been defined: product conception, development, production, operation, and support will be necessary applications areas a hundred years from now. The dramatic changes taking place in the discrete manufacturing world because of competitive pressures are forcing shorter development cycles, localization and need for improved quality, resulting in a complexity that forces the users to be fully dependent upon this technology.
- Manufacturing industry—The growth opportunity in each country is dependent upon the success and health of the local manufacturing industries. Multinational corporations will fuel the growth in newly industrialized countries. Each country has a dominant industry or market segment that sets the tone for CAD/CAM/CAE use. The evolution

of these industries has had an important impact on the growth of the CAD/CAM/CAE market in each region and has directed the success of many vendors trying to serve these markets. As an example, the automotive industries in Japan, the United States, Germany, Italy, and France have a major influence on these local CAD/CAM/CAE markets. Aerospace, a major force in the U.S. market, is less of a force in Europe and a minor but growing interest in Japan. All of the other manufacturing industries, such as fabricated metal, machinery, and consumer products, have strongholds in various locations around the world. For example, the machinery industry represents a significant local CAD/CAM/CAE opportunity in Japan and Germany.

- Europe—The automotive and aerospace industries, which are the largest customers of mechanical CAD/CAM/CAE tools, are suffering during the ongoing recession in Europe, experiencing budget and staff cuts. On top of this, 34 percent of the European mechanical market is in Germany where the economy is in a deep recession and manufacturing output is down. Growth for mechanical CAD software in 1992 was 10.1 percent and is expected to be 7.1 percent in 1993 as the German economy is not expected to get out of the recession before mid-1994 at the earliest.

AEC Forecast Assumptions

The AEC application area had software revenue growth in 1992 of 11.4 percent. The five-year CAGR for software is forecast to be 11.0 percent. The main factors driving the AEC forecast are as follows:

- Untapped users—A significant pool of untapped users still exists. The current relatively low market penetration of AEC CAD systems should allow steady worldwide growth during the next five years, despite constant volatility in demand for the building and infrastructure products to be designed.
- Mandates for CAD—Electronic design data is increasingly required by the designer's client, from the federal government down to the small commercial developer. In addition, design firms are growing at the expense of smaller firms. These large end users will increasingly require their employees and suppliers to adopt automation tools in the design and construction process.
- Electronic partnering—Designers in the AEC industry are finding themselves in markets that are more regionally and globally competitive, markets that favor partnering across design disciplines. Smaller design firms will increasingly buy CAD systems or risk being dropped from consideration as a partner.
- Competitive advantage—CAD purchases are increasingly justified as a competitive advantage in sales and design reviews. The architect who cannot produce the fourth iteration of a proposed design before signing up a client will lose out to the group that can use changes in a proposal to ratchet a prospect toward closure gradually.

- Software leverage—AEC CAD vendors can fuel upgrade revenue among sophisticated users by leveraging software advances first developed in mechanical design, such as faster structural analysis tools or incorporation of design rules.
- New functionality—Data and database functions (versus graphics functions) will increase in importance in AEC design systems, creating opportunities to sell users significant and new functionality.
- Europe—AEC growth in Western Europe is tied to the construction industry and improvement of the infrastructure, manufacturing plants, and power stations in Eastern Europe. In particular, German and Danish construction companies are involved in projects in former East Germany and Central and Eastern Europe. The construction industry in other countries is rather bleak, given the overbuilding of the 1980s and high interest rates. The Netherlands and Norway have public works projects planned or in process.

Growth Inhibitors to the AEC Industry

Trends that will inhibit growth in the AEC industry are as follows:

- Low payoff to users—AEC's one-design-one-build structure means CAD provides fewer economic benefits to these users than does the one-design-build-many structure of manufacturing. Construction, which is essentially a prototype build, is fraught with uncertainties and delays that are hard to change using design systems as they exist today.
- Lack of interoperability—Designs are often split among several different companies representing different aspects of the design process. User companies often have different CAD systems that do not communicate well, and alliances and consolidations in user organizations will only highlight the issue.
- Low-cost solutions—Because most AEC design is still focused on drafting, which requires relatively little computing power, PC-based growth will be strong for the foreseeable future, and PC-based solutions will produce less revenue to the vendor than other platforms.
- Late adopters—Attitudes of potential users inhibit market growth. Many experienced architects resist change in the design and construction processes. As this self-destructive mode of operating erodes the viability of the profession, the CAD market is also impacted because many architects who were once prospects for CAD systems simply are now unemployed.

GIS/Mapping Forecast Assumptions

The GIS application area had software revenue growth in 1992 of 15.3 percent. The five-year CAGR for software revenue is forecast to be 16.0 percent. The assumptions behind the GIS forecast are built on an optimism that during the forecast period the world economy will gradually improve and on an expectation that global competition will increase. Assumptions used to build Dataquest's GIS market forecast are as follows:

- Low penetration—Bread-and-butter prospects in government and utilities are charged with maintaining information on land and assets in perpetuity. The large number of utilities and sovereign and local

governments all over the world still stuck with tabular data and paper maps, which will degrade, creates a plentiful supply of prospective buyers of the more readily changed and renewed computer maps, a first step to building a GIS system.

- New technologies—Faster, cheaper computers and developments in open, distributed systems open the door to an expanded user base. Advances in global positioning systems (GPSs) and aerial photography are making it possible to create GISs significantly more accurate and complete than existing paper maps, giving experienced users some compelling reasons to reinvest. Increasingly, portable computers, multimedia, cheaper storage, and better compression of satellite imagery will create opportunities to develop richer, more accurate, and more useful GIS systems. Although many markets will take advantage of these technologies, we can think of no other market as ready, willing, and able to put to work such a wide range of technology enhancements. Already in the last year or two, a number of users invested in image-oriented GIS systems, either supplementing or completely bypassing conversion of existing paper data that has helped provide a midlife kick to a market that has been slowed by troubled pilot projects.
- New applications in industries like retail and insurance will drive growth—Wherever there is competition for a limited prize—whether the prize is political or economic—GIS can create a competitive edge. Wherever assets or investments are geographically dispersed, GIS offers significant management capabilities. Revenue is growing more than 50 percent per year among new applications. However, we see a wide band of uncertainty surrounding future revenue opportunities. Several new applications in GIS are destined to become embedded as a relatively low revenue-producing feature in another software program (and market), rather than a standalone product in the GIS market.
- Easier and cheaper GIS—Inexpensive spatial data, public and private, is accumulating and can be passed on to new users. Successful multiparticipant projects are growing, creating larger data sets that can be profitably resold by government/industry consortia. Also, although we do not envision the technology miracle that will eliminate development costs, implementation of GIS in new sites will be easier and cheaper than it has been.
- Solutions filling a need—GIS addresses the information age's growing problem of information overload. Any product that addresses a visible problem is more certain to grow than solutions that are still looking for the problem.
- The U.S. government—GIS is one of the rare markets where relatively simple government actions can directly fuel industry growth. In fact, the GIS industry depends on government cooperation for base data development. Governments all over the world are cooperating by developing spatial data standards, more sophisticated mapping goals, and increased cooperation across federal and local governments. The U.S. federal government is in a particularly influential position—and all stars are favorably positioned. The Landsat program appears to be

headed in the direction of making satellite imagery more affordable. GPS satellites are proving extremely valuable outside of defense applications. Freedom of information remains a viable U.S. federal concept, creating opportunities to exploit low-cost, government-generated spatial data.

Growth Inhibitors to the GIS Industry

Trends that will inhibit growth in the GIS industry are as follows:

- High cost—Nothing important will emerge to create a low-cost, meaningful data set for traditional customers in government and utilities. Data conversion will remain costly, despite substantially lowerscanning costs and increasingly improved automated conversion products. The high cost will remain because, as existing paper records head toward computerization, widespread minor inaccuracies begin to be examined, often for the first time. The significant cost of correcting prior errors and omissions is inevitably bundled into the cost of conversion. At the same time, increasingly complex applications require increasingly accurate data, which also raises conversion costs.
- Stuck projects—The significant number of traditional GIS/mapping projects stuck in the pilot phase will reduce demand for new products, as users struggle to implement existing purchases. Even worse, the negative publicity created by these projects will chill the buying impulse among nonusers, reducing the ability of GIS projects to compete with other applications for capital equipment dollars.
- Price pressure—Computer prices will certainly drop, even in technical applications such as GIS where higher-performance hardware will command a premium price. Software prices are likely to come under increasing pressure, despite the industry's current ability to hold overall seat prices relatively even. Our current forecast is built on declining hardware and steady software prices, primarily because of opportunities to add significant software data and functionality content to new sales among core, noncommodity buyers. Any significant deviation from this model would affect the forecast.
- Europe—GIS data in Europe is prohibitively expensive and not readily available, slowing down the potential growth. In addition, the current state of the various European economies, the enormous budget deficits of some of the major economies such as Germany, Italy, and the United Kingdom, and major cuts in public spending are holding back the development of GIS. However, the railway industry is a source of growth in GIS in Europe.

EDA Forecast Assumptions

The year 1992 showed a glimmer of hope in the EDA industry, with software revenue year-to-year growth rates climbing back to 8.9 percent, driven by the continued strength of the IC layout software industry and a resurgence in the CAE market. Dataquest expects EDA software revenue growth to increase to 10.4 percent year-to-year for 1993. Printed circuit board (PCB) software in particular will remain stagnant until multichip

module (MCM) technologies begin to affect the market, which Dataquest anticipates will take effect in the 1994 to 1995 time frame. Factors that will help spur EDA software growth are as follows:

- New tool technologies—New tool technologies, including electronic system design automation (ESDA), signal integrity, and design automation, are becoming available, fueling growth.
- Analysis tools—Increasing clock frequencies require tighter design tolerances that require sophisticated analysis tools to ensure proper operation.
- Migration of IC layout—Migration of IC layout technologies to system designers in the form of floor planners may prove to be the vehicle to expand physical IC design into the larger ASIC design community.
- Europe—The EDA industry in Europe is now characterized by two or three big players jockeying for position. Furthermore, following the merger of Cadence Design Systems Inc. and Valid Logic Systems Inc., and several large end-user mergers, some strategic account changes have occurred and will continue. The total software revenue is unaffected, but market share is the prize for the winning EDA company.

Growth Inhibitors to the EDA Industry

Trends that will inhibit growth in the EDA industry are as follows:

- Short-term transitions and shifts—Product transition and strategy shifts will have a short-term downward effect. Difficulties at the No. 1 supplier of EDA software, Cadence, may cause a stall in the purchases of new tools as users ponder their options. Ongoing consolidations of key EDA technologies, including simulation and signal integrity, will also protract buying decisions.
- Financial results—Decreased revenue for all of EDA is readily evident in examining public company statements. As part of the forecasting process, Dataquest analyzes the short-term, company-specific issues. There are five publicly traded EDA software companies: Cadence, Mentor Graphics, Synopsys, Viewlogic, and Silvar-Lisco. These companies represent approximately 45 percent of the worldwide EDA software market. Comparing the first six months of 1992 versus the first six months of 1993, we find that the combined revenue of these companies was essentially flat. Cadence's troubles earlier in the year contributed heavily to this fact, but we anticipate that 1993 total EDA software revenue growth will suffer accordingly. Were it not for the stellar growth of such companies as Viewlogic and Synopsys, the EDA market would indeed be posting a poor 1993.
- Legal issues—Legal issues may induce fear, uncertainty, and doubt in buyers' minds. The recent spate of legal actions (for example, Synopsys versus Cadence, Analogy versus Anacad/Mentor Graphics, and stockholders versus Cadence) may divert the attention of the buying public and will definitely garner the attention of top management at the EDA vendors.

- Use of PC-based tools will drop significantly—Looking to EDA's future, Dataquest anticipates the use of what has classically been called PC-based tools to drop significantly. The Dataquest factors determining the differentiation of technical workstations from PCs are a virtual multitasking operating system (UNIX, VMS, and DOMAIN), the ability to run high-performance graphic applications in a multiuser environment, and the user's potential range of expansion on the platform. Windows NT on the Pentium chip will challenge this differentiation.

Dataquest anticipates that use of classical PCs as EDA platforms will begin to diminish significantly in 1995. At that time, classes of tools will be differentiated not upon hardware platform or operating system, but rather upon the features and functionality of the tools themselves. The emergence of Windows NT will have a minimal impact upon the overall revenue of the EDA software industry. However, its effect upon competing operating systems, average selling prices, distributing practices, and business and marketing practices will be far-reaching.

Dataquest Perspective

The CAD/CAM/CAE/GIS database has undergone enormous scrutiny through our market share, forecast, market share update, and finally forecast update. It has only slightly changed downward from the 1992 forecast. In fact, the forecast total factory revenue for 1993 of $16.5 billion is only 1.3 percent higher than last year's forecast of $16.3 billion. However, the longer-term sights have been lowered so that the current 1996 forecast total factory revenue of $19.8 billion is 6.1 percent lower than was forecast last year for 1996. By examining the numbers, we discovered the following lowered expectations:

- The biggest factor in this lowered forecast is in the more rapidly declining host-dependent business. This is supported by the market share update reporting a faster drop in the host-dependent platform than estimates from our earlier market share. The forecast total revenue for 1996 of $1.1 billion is 36.2 percent lower than the forecast last year for 1996.
- Regionally, the largest factor in this lowered forecast is Europe, where the 1996 forecast total factory revenue of $6.8 billion is 14.7 percent lower than the $7.9 billion forecast last year.
- As to applications, these lowered expectations apply to the AEC, GIS, IC, and PCB applications, while the mechanical and ECAE applications have been forecast to grow faster than reported in 1991.

Lowered expectations have become an economic reality, given that the recovery from this prolonged recession is not materializing as the past has taught us. However, a CAGR of 5.8 percent of this $15.7 billion industry is solid and continuing growth. The technologies provided by the CAD/CAM/CAE/GIS industry are no longer just nice ideas, but have become the ticket to compete globally. The technological improvements of

software, hardware, and the increasing involvement of vendors through services will continue to fuel the growth of this CAD/CAM/CAE/GIS market.

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Dataquest Perspective

Software

In This Issue

CAD/CAM/CAE and GIS Market Share Update

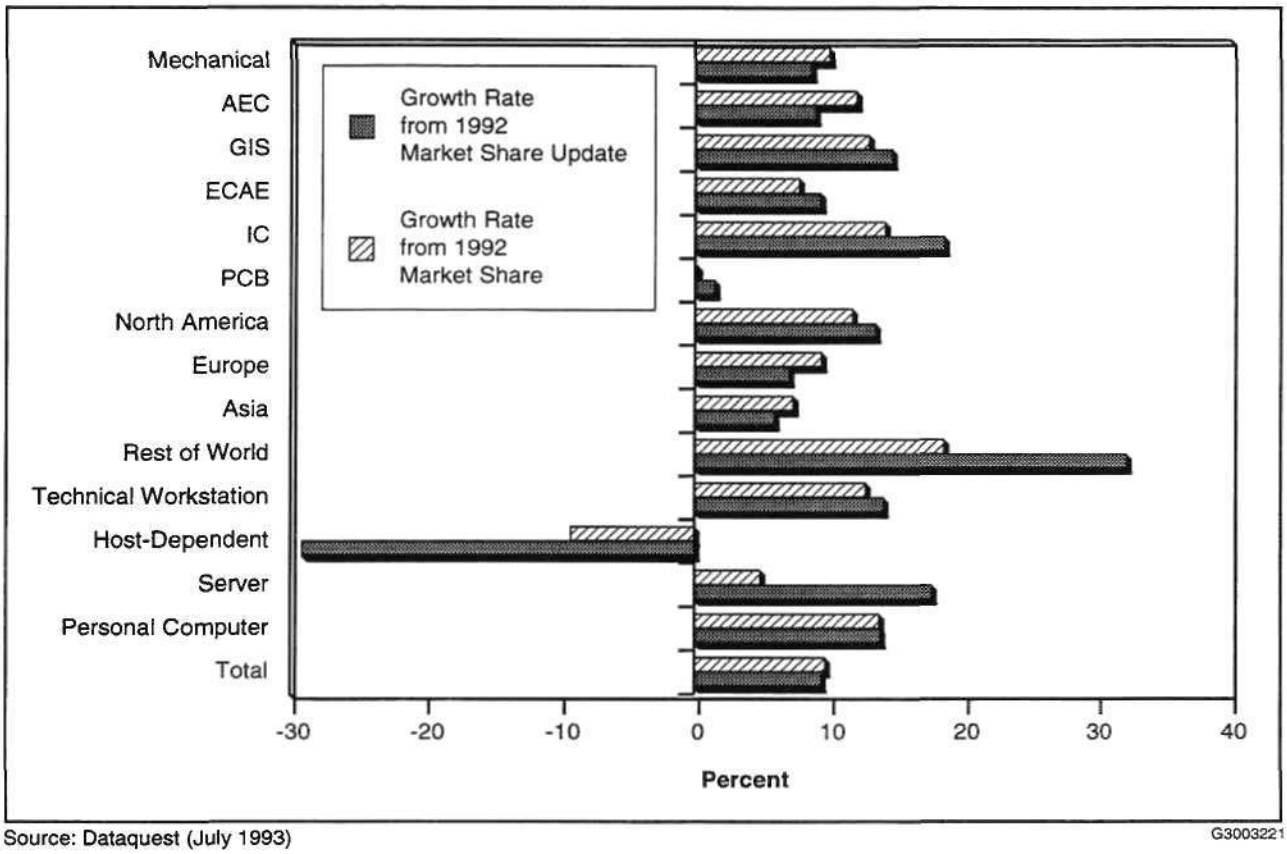
Software Market Grew 9.6 Percent in 1992, Revised Down from 9.7 Percent

This market share update essentially revisits the companies in our database, seeking refinement of the previously reported market share data. Whereas much of the data from the initial survey came from vendor projections and early, year-end results, the update represents actual 1992 year-end results. From a global perspective, the results indicate that the optimists balanced the pessimists. The view from segments is a little more interesting.

Figure 1 provides a view of growth rates in software revenue by application, by region, and by platform, as well as the total market. In the area of applications, geographic information system (GIS), electronic computer-aided engineering (ECAE), IC layout, and printed circuit board (PCB) were revised up while mechanical and AEC actually grew less than previously indicated, primarily because of overreporting of revenue for IBM in 1992 coupled with underreporting for 1991 in both areas. In the EDA arena, these revisions came about with more complete vendor input, readjusting some PCB revenue into ECAE and IC (see Table 1), and adding two companies to IC, two to ECAE, and deleting one from PCB, including past revenue.

Economic reality is confirmed by the regional picture with North America and Rest of World, previously reported with the greatest growth, now

Figure 1
1992 Software Revenue Growth: Market Share versus Market Share Update



Source: Dataquest (July 1993)

G3003221

Table 1
Comparison of 1991 and 1992 Software Revenue: Market Share versus Market Share Update

	1991 Software Revenue ($M)			1992 Software Revenue ($M)		
	Market Share	Market Share Update	% Change	Market Share	Market Share Update	% Change
Mechanical	2,033.0	2,117.0	4.1	2,235.3	2,299.1	2.9
AEC	666.1	680.2	2.1	746.1	740.8	-0.7
GIS/Mapping	555.8	545.3	-1.9	627.5	630.6	0.5
ECAE	691.2	699.8	1.2	744.1	765.8	2.9
IC	195.8	195.8	0	223.4	232.7	4.2
PCB/Hybrid/MCM	328.3	306.6	-6.6	329.1	311.4	-5.4
Total	4,470.2	4,544.4	1.7	4,905.5	4,980.3	1.5

Source: Dataquest (July 1993)

shown with greater growth, whereas Europe and Asia show less growth than our earlier view. From the view of platforms, the shift from host-dependent systems to client/server systems is occurring with greater speed than earlier indications.

Database Changes

Software

In viewing the actual market size for the above segments, looking at the earlier market share as compared with this updated version, the differences become considerable. We have continued to revise our company information with the best information available, even for past years. In addition to the growth rates changing as indicated above, the actual revenue figures have changed, as indicated in Table 1.

Expanded Definition for Service

In this survey, the service definition was expanded from maintenance to also include the following:

- Training and education
- Service bureau
- Application development
- Consulting
- Systems integration

In 1991, service revenue was $2,408.6 million and was $2,611.4 million in 1992. The resulting growth of 8.4 percent in service revenue reflects growth in service and our change in definition. This change had the largest impact on the IC layout market, and considerably added to the mechanical, ECAE, and PCB markets as well (see Table 2). In mechanical, SDRC was the big foot. The database was not revised backward to reflect this change. Forecasting, however, will now be expanded to include this area of growth.

Shift in Revenue Distribution

Reflecting this expansion of services definition and extreme pressure on hardware revenue is the redistribution of revenue by hardware, software, and services as shown in Table 3.

Company Changes

Table 4 provides a listing of the top 20 vendors and the changes in the total revenue figure from the market share previously reported. IBM revenue changes were made following the prior market share but before the subsequent forecasting. Intergraph's earlier reported revenue included document imaging and other graphics software, which does not belong in CAD/CAM. Digital previously did not report its hardware revenue, and neither did Autodesk with its software revenue, whereas SDRC now includes the expanded service.

Table 2
1992 Service as a Percentage of Total Revenue: Market Share versus Market Share Update

	Market Share	Market Share Update	% Change
Mechanical	16.5	17.1	3.4
AEC	14.1	14.0	-0.7
GIS/Mapping	18.0	17.6	-2.2
ECAE	16.6	17.4	4.8
IC Layout	19.0	21.0	10.5
PCB/Hybrid/MCM	18.5	19.0	2.7

Source: Dataquest (July 1993)

Table 3
Change in Distribution of 1992 Revenue: Market Share versus Market Share Update

	Revenue ($M)		% Distribution of Revenue	
	Market Share	Market Share Update	Market Share	Market Share Update
Hardware	8,093.8	7,765.5	52.0	50.5
Software	4,905.5	4,972.6	31.5	32.4
Services	2,578.0	2,624.2	16.5	17.1
Total	15,577.3	15,362.3		

Source: Dataquest (July 1993)

Analysis of Workstation Distribution

In addition to these changes, the CAD/CAM/CAE/GIS group significantly refined its database model for workstations. Using two years of software revenue distribution by operating system, collected by a survey of software vendors, we can estimate the distribution of workstations by hardware vendor in the various application segments (see Table 5). This analysis resulted in realignment of workstation shipments of Hewlett-Packard, Sun, and Silicon Graphics to the distribution of software revenue. (Note that these unit sales are expanded to include units sold through OEMs. They, therefore, will not match the unit sales in the market share tables where OEM is deleted to prevent double counting.)

Company Additions and Deletions

Finally, we added nine new companies to our database with a collective total revenue of $36.0 million for 1991; $46.5 for 1992 (see Table 6). We deleted LPKF and Simulation Science: upon re-evaluation, we realized that both companies are related to, but not included in the CAD/CAM/CAE/GIS market. IGC was purchased by IMSI, which was not previously in our database, so IMSI was added to include IGC for 1991 and 1992. However, we have not incorporated other company name changes (such as Cadam to Altium) or acquisitions (such as Quad Design by Viewlogic) that have occurred during 1993.

Table 4
1992 Top 20 CAD/CAM/CAE/GIS Vendors' Total Revenue: Market Share versus Market Share Update

	Total Revenue 1992 ($M)		Revenue	Final	Share
	Market Share	Market Share Update	Change ($M)	Market Share (%)	Difference (%)
IBM	1,861.2	1,756.9	-104.3	11.4	-0.5
Intergraph	1,171.7	1,126.6	-45.2	7.3	-0.2
Hewlett-Packard	922.4	919.9	-2.5	6.0	0.1
Digital	843.6	918.9	75.3	6.0	0.6
Sun Microsystems	876.8	869.5	-7.3	5.7	0.1
Computervision	781.7	777.3	-4.5	5.1	0.1
Fujitsu	442.0	442.0	0	2.9	0.1
Compaq	416.3	429.8	13.5	2.8	0.1
Cadence	425.6	425.4	-0.2	2.8	0.1
Autodesk	341.6	367.7	26.1	2.4	0.2
Mentor Graphics	350.8	349.4	-1.4	2.3	0
NEC	348.0	348.0	0	2.3	0.1
EDS-Unigraphics	302.9	310.1	7.2	2.0	0.1
Siemens Nixdorf Infosysteme	271.2	271.1	-0.1	1.8	0.1
Apple Computer	243.2	239.0	-4.2	1.6	0
Silicon Graphics	272.9	230.5	-42.4	1.5	-0.3
Nihon Unisys	228.3	228.3	0	1.5	0
Hitachi	174.0	174.0	0	1.1	0
Control Data	169.4	169.4	0	1.1	0
SDRC	123.3	149.8	26.5	1.0	0.2
Top 20 Companies	10,566.9	10,503.6	-63.3	68.3	0.5
All Companies	15,577.3	15,366.8	-210.5	100.0	0

Source: Dataquest (July 1993)

Table 5
Unit Sales of Technical Workstations by Application Segment, by Top U.S. Vendors for 1992 (Including Units Sold through OEMs)

	Mechanical	AEC	GIS	ECAE	IC	PCB	Total	Share of Market
Sun Microsystems	27,567	3,804	6,607	16,586	7,709	7,624	69,897	40.3
Hewlett-Packard	17,370	3,871	1,581	7,039	2,321	4,054	36,236	20.9
Digital	8,965	1,762	2,327	1,196	855	1,499	16,604	9.6
Intergraph	2,421	4,980	5,698	516	45	422	14,082	8.1
Silicon Graphics	8,574	461	478	117	0	0	9,630	5.6
IBM	6,065	717	213	0	0	244	7,239	4.2
Total Worldwide Units	77,471	22,559	20,453	26,385	11,347	15,264	173,479	100.0
Distribution (%)	44.7	13.0	11.8	15.2	6.5	8.8	100.0	

Source: Dataquest (July 1993)

Table 6
Changes in CAD/CAM/CAE/GIS Vendors with Total Revenue for 1991 and 1992

	1991 Total Revenue ($M)	1992 Total Revenue ($M)	Application Segment
Additions:			
CAMAX Systems	7.3	9.2	Mechanical
Chronologic Simulation	1.0	1.5	ECAE
CrossCheck Technology	4.5	6.8	ECAE
Enghouse Systems	5.4	8.3	GIS/Mapping
High-Level Design System	1.5	2.5	IC Layout
IMSI	1.7	2.2	PC-Design
PCI Remote Sensing	5.0	6.0	GIS/Mapping
PiE Design	6.0	6.0	ECAE
Softronics	3.6	4.0	Spain-Design
Total	36.0	46.5	
Deletions:			
IGC	0.7	0.7	PC-Design
LPKF	15.0	14.1	PCB
Simulation Science	1.2	1.2	AEC
Total	16.9	16.0	
Gross Change	19.1	30.5	

Source: Dataquest (July 1993)

Market Share Battles

An interesting view of the CAD/CAM/CAE/GIS market is at the level of market leaders in software revenue for each application. The tables that follow provide software revenue and share of market for 1991 and 1992 as they now appear in the database.

Mechanical

An army of well-equipped companies is on the march in the mechanical market, assaulting the two old guards, IBM and Computervision (see Table 7). IBM, showing decline in its mechanical software despite its partnerships with the market leaders, Dassault, SDRC, and CADAM, is struggling to survive the squeeze of moving from high-margin, host-dependent systems to the more competitive market of technical workstations and client/servers. With losses in its host dependent business as well as in Europe and Asia, IBM is outflanked by the hardy and nimble players in the workstation platform where there is real competition.

Computervision is heavily deployed in Europe where the dark cloud of recession continues to cast its gloom. This offshore presence has weakened the company on its home front, resulting in a decrease of 11 percent

Table 7
Top 10 Mechanical Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
IBM	370.4	17.5	359.8	15.6	-2.9
Computervision	232.4	11.0	206.9	9.0	-11.0
Autodesk	108.3	5.1	147.1	6.4	35.9
Dassault*	133.5	6.3	146.9	6.4	10.0
SDRC	101.1	4.8	129.2	5.6	27.7
EDS-Unigraphics	80.7	3.8	107.7	4.7	33.4
CADAM*	66.3	3.1	88.7	3.9	33.8
Parametric Technology	43.4	2.0	81.2	3.5	87.2
Hewlett-Packard	64.0	3.0	72.1	3.1	12.7
MacNeal-Schwendler	53.4	2.5	64.7	2.8	21.1
Top 10 Companies	1,253.4	59.2	1404.2	61.1	12.0
All Companies	2,117.0	100.0	2,299.1	100.0	8.6

*Includes distributor and/or supplier revenue

Source: Dataquest (July 1993)

in software revenue, which is a loss in market share of 2 percentage points, a big loss for a big player.

Despite the losses of these two market leaders, the eight attackers grew a collective 28.7 percent, gaining a whopping 5.7 percentage points in market share.

AEC

The AEC market is quite another story, with the market leaders, Autodesk and Intergraph, cementing their leadership by growing faster than the market, gaining a combined 2.6 percentage points share of market while three of the other eight top 10 competitors declined (see Table 8). The interesting part of this picture is right in the middle: two German companies, Nemetschek and IEZ, battling tooth-and-nail for leadership. The companies are growing in stark contrast to the economic climate of Europe's home front.

GIS/Mapping

The GIS market, with its amazing growth rate of 15.6 percent, is marked by a fight for the top. In 1991, Integraph led ESRI in share of market by 5.5 percentage points, whereas in 1992 Integraph's lead was reduced to 2.6 percentage points, giving ESRI a 2.9 percentage points annual gain on Integraph (see Table 9). In the meantime, the remaining top 10 companies mostly grew at impressive rates, although much of GeoVision's growth resulted from acquisition during 1992.

ECAE

The electronic computer-aided engineering (ECAE) market has been shaken up with mergers and acquisitions. Cadence merged with Valid

Table 8
Top 10 AEC Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
Autodesk	128.2	18.9	158.1	21.3	23.3
Intergraph	100.4	14.8	111.0	15.0	10.6
IBM	40.5	6.0	41.5	5.6	2.6
Fujitsu	37.1	5.5	35.6	4.8	-3.9
Nemetschek	24.7	3.6	32.5	4.4	31.7
IEZ	19.8	2.9	32.1	4.3	62.2
Computervision	23.2	3.4	25.1	3.4	8.1
ISICAD	19.4	2.9	17.2	2.3	-11.6
NEC	16.8	2.5	11.7	1.6	-30.2
Dassault*	10.1	1.5	11.1	1.5	9.9
Top 10 Companies	420.1	61.8	476.0	64.3	13.3
All Companies	680.2	100.0	740.8	100.0	6.2

*Includes distributor and/or supplier revenue

Source: Dataquest (July 1993)

Table 9
Top 10 GIS Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
Intergraph	107.2	19.7	114.4	18.1	6.7
ESRI	77.6	14.2	98.0	15.5	26.3
Siemens Nixdorf Infosysteme	49.7	9.1	53.2	8.4	7.0
Autodesk	28.5	5.2	40.5	6.4	42.0
EDS-Unigraphics	17.0	3.1	24.1	3.8	41.5
Landmark Graphics	23.2	4.3	18.8	3.0	-19.0
GeoVision Systems	8.5	1.6	14.0	2.2	64.6
Moss Systems	9.7	1.8	14.0	2.2	43.9
Genasys II	9.7	1.8	13.0	2.1	34.2
Fujitsu	13.2	2.4	12.6	2.0	-3.9
Top 10 Companies	344.3	63.1	402.6	63.8	16.9
All Companies	545.3	100.0	630.6	100.0	15.6

Source: Dataquest (July 1993)

and skipped over Mentor Graphics. Viewlogic bought Vantage, but was still passed by Synopsys. The European ECAE software market grew only 2.3 percent, providing a rough road for Racal-Redac. Wacom, with its emphasis on the personal computer platform in Japan, also had a rough year in this market (see Table 10).

IC Layout

The fastest-growing and smallest application segments have few players. The top 10 comprise almost 97 percent of the market, with Cadence continuing to dominate (see Table 11). The change in growth rates versus previous market share is because of changes reported by Cadence. Compass Design Automation appears to be a hard charger, driven by new library development tools.

Table 10
Top 10 ECAE Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
Cadence (Valid)	154.2	22.0	165.6	21.6	7.3
Mentor Graphics	73.2	10.5	77.3	10.1	5.6
Synopsys	30.1	4.3	51.3	6.7	70.6
Viewlogic (Vantage)	36.2	4.4	46.7	6.1	29.0
Racal-Redac	28.5	4.1	27.2	3.6	-4.3
Wacom	25.5	3.6	23.3	3.0	-8.7
EEsof	18.1	2.6	22.1	2.9	22.2
Intergraph	17.5	2.5	20.9	2.7	19.4
Marubeni Hytech*	16.5	2.4	19.7	2.6	19.3
Autodesk	17.1	2.4	18.4	2.4	7.5
Top 10 Companies	411.6	58.8	472.5	61.7	14.8
All Companies	699.8	100.0	765.8	100.0	9.5

*Includes distributor and/or supplier revenue
Source: Dataquest (July 1993)

Table 11
Top 10 IC Layout Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
Cadence (Valid)	114.0	56.9	136.3	58.6	19.5
Mentor Graphics	33.7	16.8	31.5	13.5	-6.4
Compass Design	11.7	5.9	17.3	7.4	47.4
Seiko*	13.7	6.8	14.5	6.2	5.9
Sagantec	3.6	1.8	6.7	2.9	86.9
Silvar-Lisco	5.2	2.6	5.8	2.5	9.7
Cascade Design	3.0	1.5	4.7	2.0	55.9
Fujitsu	0	0	3.5	1.5	N/A
Integrated Silicon Systems	2.5	1.2	3.0	1.3	21.0
Intergraph	1.6	0.8	1.9	0.8	22.2
Top 10 Companies	189.0	96.5	225.2	96.8	19.1
All Companies	195.8	100.0	232.7	100.0	18.8

*Includes distributor and/or supplier revenue
N/A = Not applicable
Source: Dataquest (July 1993)

PCB/Hybrid/MCM Layout

The PCB/hybrid/MCM layout market continues to stagnate, showing little growth in the past two years (see Table 12). This market is drawn along geographic lines: Zuken rules the Japanese market, whereas Racal-Redac's strength lies in Europe. Neither company has a strong presence in North America where Mentor Graphics and Cadence battle it out.

Market Analysis

The final view of all this activity is shown in Figure 2, which depicts the market size and market growth rate for each segment in the CAD/CAM/CAE/GIS software industry. In Figure 2, the heavy horizontal line indicates the industry average for software growth, the size of the bubbles reflects market share, and the bubbles are centered over their market size (y-axis) and market growth rate (x-axis) for 1992.

From this figure, the IC layout application segment and server platform are the two smallest and two fastest-growing segments. Workstations are the largest market segment with a higher than average growth rate of 14 percent. Notice that host-dependent platform segment is off the chart with a negative 29.1 percent growth rate.

Hardware Revenue Suffers

In contrast to the high growth rates of software, hardware took a beating with a total growth rate of negative 0.1 percent despite an increase of seats totaling 5.9 percent (see Table 13). The hardware market continues to be

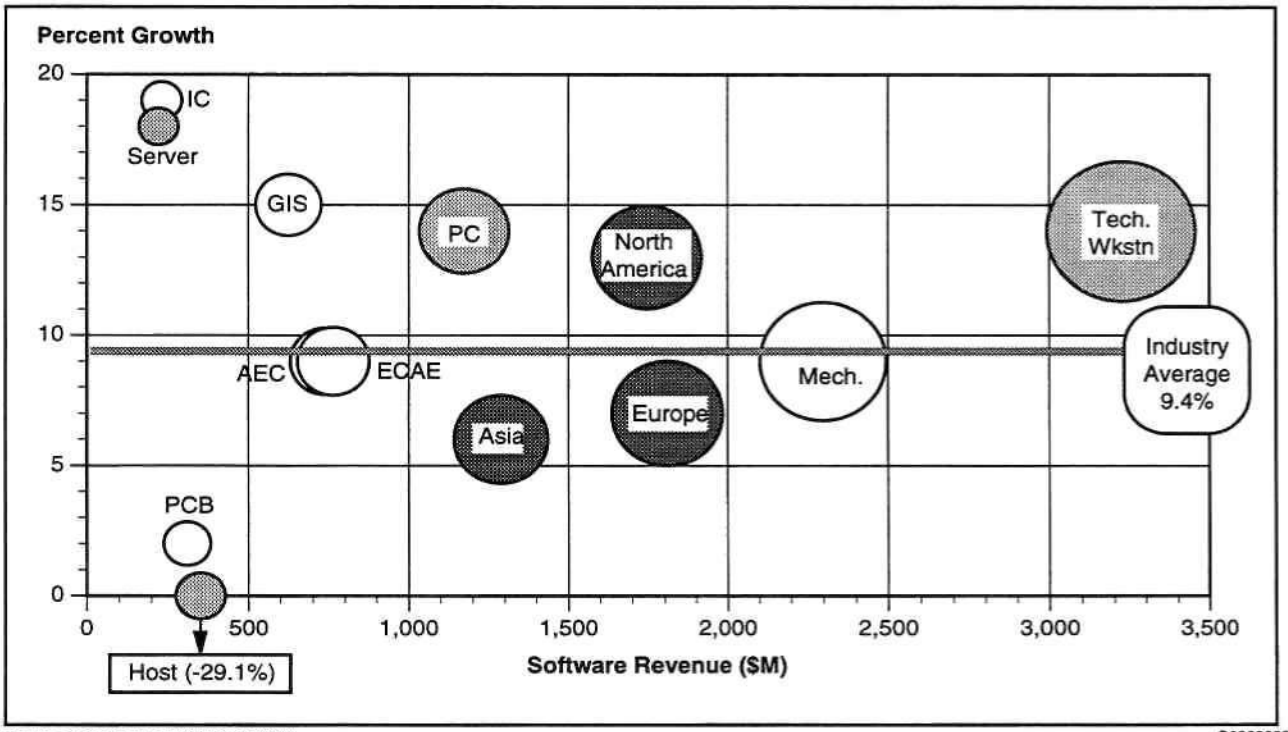
Table 12
Top 10 PCB/Hybrid/MCM Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
Racal-Redac	42.1	13.7	46.3	14.9	10.0
Mentor Graphics	39.5	12.9	43.0	13.8	8.7
Zuken	46.9	15.3	41.6	13.4	-11.3
Cadence (Valid)	31.5	10.3	36.5	11.7	15.8
IBM	16.3	5.3	17.1	5.5	4.7
Intergraph	12.7	4.1	16.0	5.1	25.5
Harris EDA	13.9	4.5	12.2	3.9	-11.8
CADIX	11.3	3.7	11.8	3.8	4.0
Sharp*	15.0	4.9	9.6	3.1	-35.8
Fujitsu	8.4	2.7	8.1	2.6	-3.8
Top 10 Companies	237.6	77.5	242.0	77.7	1.9
All Companies	306.6	100.0	311.4	100.0	1.6

*Includes distributor and/or supplier revenue

Source: Dataquest (July 1993)

Figure 2
CAD/CAM/CAE/GIS Market Portfolio for Software Revenue for 1992



Source: Dataquest (July 1993)

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Table 13
Hardware Seats, Revenue, and Average Selling Price for 1991 and 1992

	1991 Seats	1992 Seats	Growth (%)	1991 Hardware Revenue ($M)	1992 Hardware Revenue ($M)	Growth (%)	1991 Average Selling Price ($Th)	1992 Average Selling Price ($Th)	Growth (%)
Workstation	150,748	173,489	15.1	3,670.6	3,967.9	8.1	24.3	22.9	-6.0
Host-Dependent	39,897	31,771	-20.4	1,854.6	1,529.8	-17.5	46.5	48.2	3.6
Server	14,830	16,301	9.9	531.0	573.8	8.1	35.8	35.2	-1.7
Personal Computer	412,406	432,848	5.0	1,718.7	1,705.4	-0.8	4.2	3.9	-5.5
Total	617,881	654,408	5.9	7,774.8	7,776.8	0	12.5	11.9	-4.8

Source: Dataquest (July 1993)

pressured by decreasing margins and increasing competitiveness. Host-dependent systems are being replaced by networked, desktop systems, and distinctions between workstations and PCs are becoming increasingly blurred.

Dataquest Perspective

From the macro perspective, the overall market has changed very little from the market share reported in February; a micro view of the CAD/CAM/CAE and GIS market reveals considerable activity and change.

- Companies have adjusted their revenue and their distributions by region, platform, and application, from earlier estimates. Most companies cannot afford such a perspective until accounting procedures are completed in March or April. The database is then updated to reflect this new information, often resulting in a closer look at the previous year's performance as well. Our CAD/CAM/CAE and GIS database is open to historical changes in the first six months of the year to provide a clear view of the market. However, it is now frozen until we begin the market share for 1993, allowing for a fixed view of the market for our final forecasting.
- The addition of eight new companies to our database, along with two deletions, changes the size of segments, though the history of these companies is also included so that percent changes and forecasting are not distorted.
- Expansion of the definition of services has increased the importance of this segment, as well as its growth. Future growth of the market is expected to reside in services along with software.
- The host-dependent systems are finally dying a natural death, causing grief for companies that once enjoyed high margins and dependent customers. Emerging from the dust is the merger of personal computers and technical workstations.

The market dynamics of the total CAD/CAM/CAE and GIS market comprises many factors based on application-specific market needs, diverse geographical issues, the amazing growth of computing, and graphical resources. A more detailed analysis of each segment must be made to understand the forces driving the entire market thoroughly. Besides publishing the market statistics books, such as the *Market Share Update* in late July, Dataquest provides an in-depth analysis of CAD/CAM/CAE and GIS regional issues, technology trends, and vendor profiles in other publications.

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Dataquest Perspective

Software

In This Issue

CAD/CAM/CAE and GIS Forecast: 4.6 Percent CAGR Seen through 1997

Sluggish world economic activity in 1992 caused decelerating growth in the CAD/CAM/CAE and GIS market. Dataquest expects this decelerating trend to continue in 1993. A recent survey by The Dun & Bradstreet Corporation of more than 11,000 executives in 16 countries indicated that, on a worldwide basis, optimism for sales and profits holds steady. On a regional basis, however, executives in the United States and United Kingdom measured heightened optimism, offsetting the weaker optimism of continental Europe, particularly Germany and France, and the continued pessimism of Japan. High interest rates are aggravating optimism in the European community, while Japan is suffering from weaker domestic demand and increased competitive pressures.

Despite the economy, the CAD/CAM/CAE and GIS market grew an anticipated 3.2 percent to $15.5 billion, in part because of the devaluation of the yen and ECU against the U.S. dollar (see Table 1). On the basis of the yen, the Japanese market showed a decline of 5.9 percent. Dataquest is forecasting total revenue in the worldwide market to grow 2.7 percent in 1993, with a compound annual growth rate (CAGR) of 4.6 percent through 1997. We forecast worldwide software revenue to grow 9.5 percent in 1993, with a CAGR of 9.0 percent through 1997. This forecast is based on the market share information published in March (though changed slightly as new information became available) and will be updated in July, following an update to our market share in May. It should be noted that the forecast assumes stable currency exchange rates.

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Program: CAD/CAM/CAE/GIS Worldwide
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Table 1
CAD/CAM/CAE/GIS Forecast, by Region (Revenue in Millions of Dollars; Actual Shipments)

	1992	1993	1994	1995	1996	1997	CAGR (%) 1992-1997
Worldwide							
Total Factory Revenue	15,485	15,909	16,602	17,432	18,371	19,346	4.6
Software Revenue	4,885	5,350	5,860	6,390	6,920	7,470	8.9
Unit/Seat Shipments	647,716	708,400	777,500	841,800	892,800	939,100	7.7
North America							
Total Factory Revenue	5,224	5,443	5,737	6,081	6,441	6,816	5.5
Software Revenue	1,669	1,870	2,070	2,270	2,460	2,660	9.8
Unit/Seat Shipments	270,345	298,900	323,500	347,300	365,700	385,200	7.3
Europe							
Total Factory Revenue	5,862	6,078	6,389	6,702	7,060	7,386	4.7
Software Revenue	1,793	1,990	2,190	2,370	2,570	2,750	8.9
Unit/Seat Shipments	234,935	257,100	287,200	312,500	330,000	342,000	7.8
Asia							
Total Factory Revenue	4,104	4,055	4,086	4,195	4,341	4,531	2.0
Software Revenue	1,327	1,380	1,460	1,580	1,690	1,810	6.4
Unit/Seat Shipments	125,922	133,000	143,200	153,200	162,600	171,300	6.3
Rest of World							
Total Factory Revenue	296	332	390	454	528	614	15.7
Software Revenue	96	120	150	170	200	240	20.1
Unit/Seat Shipments	16,514	19,400	23,600	28,800	34,500	40,600	19.7

Source: Dataquest (May 1993)

This document contains Dataquest's detailed forecast information for the CAD/CAM/CAE and GIS industry. Included are the following:

- Five-year historical data
- Five-year forecast data

More detailed data is available through our client inquiry service, which can provide custom analysis of the multidimensional database.

Worldwide Forecast Assumptions

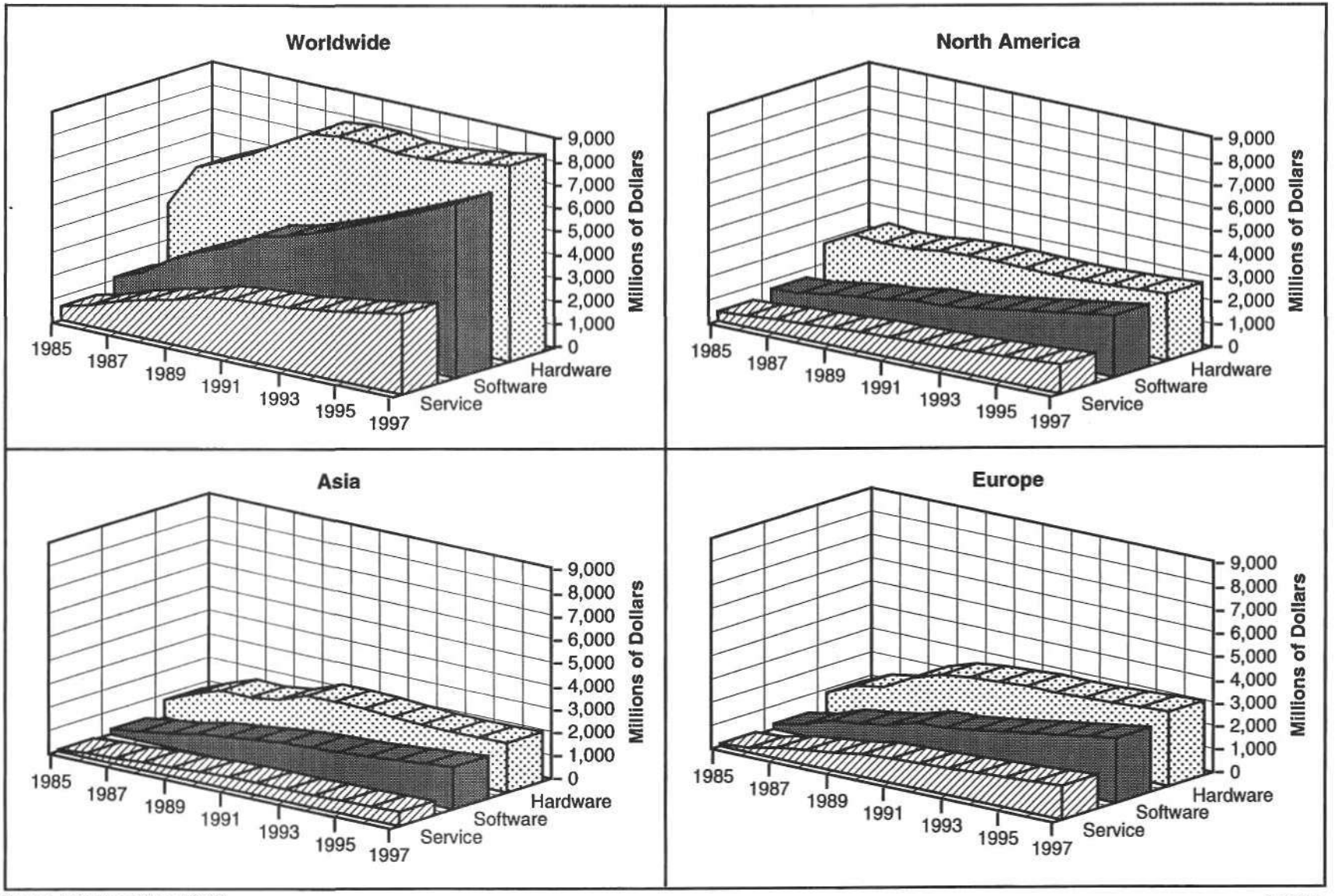
The following sections describe the main forces, worldwide, that drive the CAD/CAM/CAE and GIS forecast.

Worldwide Forecast Drivers

The worldwide CAD/CAM/CAE and GIS market will maintain consistent, steady growth during the next five years. Figure 1 shows the forecast of hardware, software, and service revenue worldwide and by region. Figure 2 shows the worldwide forecast by platform.

The following paragraphs describe the main forces driving the CAD/CAM/CAE and GIS worldwide forecast.

Figure 1
Worldwide and Regional Revenue Forecast, All Applications and All Platforms



Source: Dataquest (May 1993)

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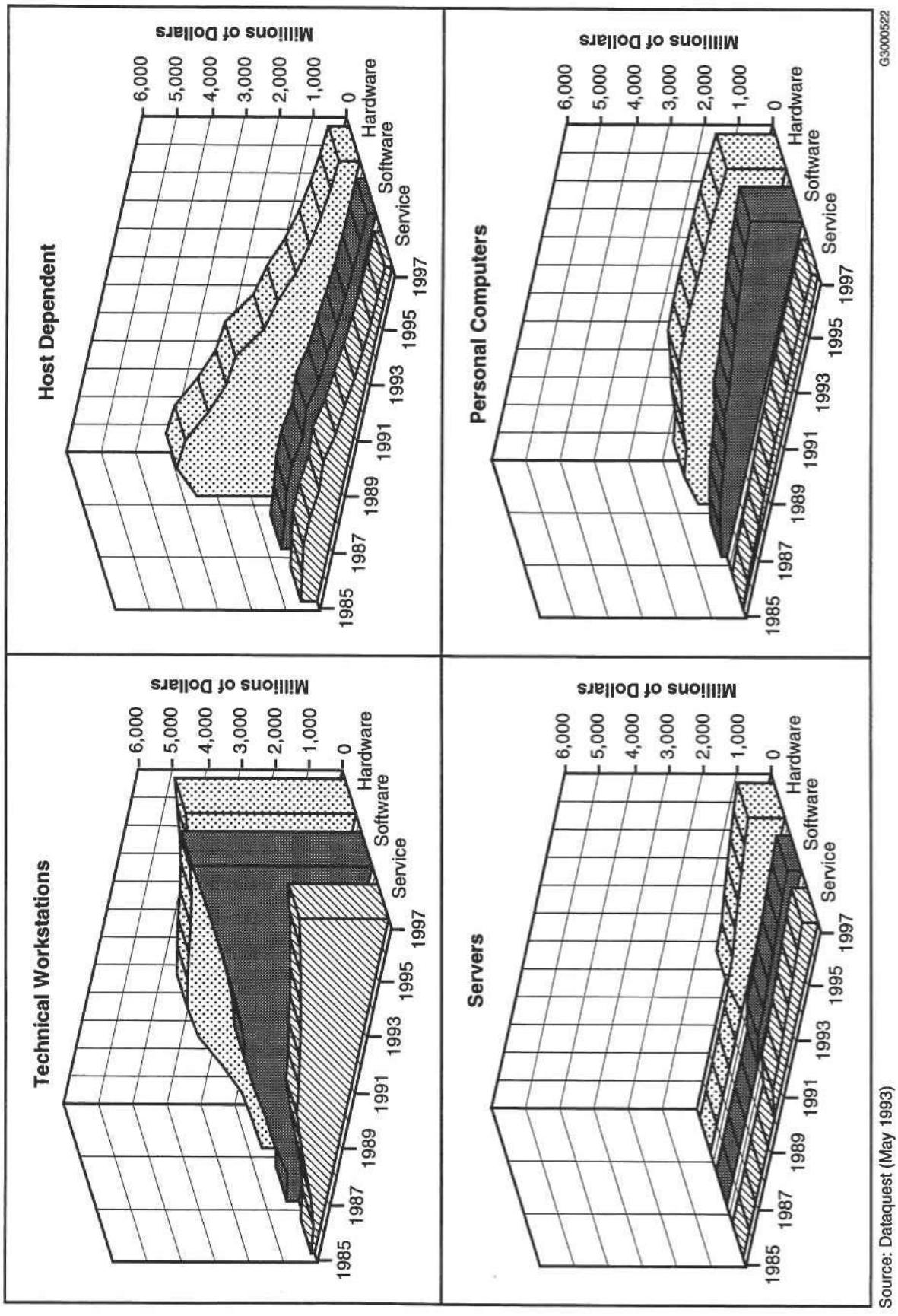
Figure 2
Worldwide Revenue Forecast, by Platform, All Applications



Source: Dataquest (May 1993)

Macro Economy

The recovery with renewed optimism from worldwide recession and increased capital spending will fuel growth gradually, beginning in the United States and the United Kingdom, and in Asian countries other than Japan.

Currency

The decline of the U.S. dollar compared to the ECU and yen from 1991 to 1992 offset sluggish economic growth for multinational corporations, particularly those with a high percentage of costs denominated in dollars. Some companies are utilizing the changes in exchange rates to lower overseas prices effectively, thus stimulating demand. This is particularly true of PC companies striving to increase unit volume gains rapidly in Japan, where the local companies are vulnerable to price competition.

Technology

Computing performance will continue to improve at an exponential rate in the foreseeable future. Dataquest has forecast the growth in millions of instructions per second (mips) shipments. The results show that the total mips shipped through 1992 will be matched by the shipments made in 1993. In other words, the total mips shipped will double in 1993, almost double again in 1994, and double again in 1995. This enabling resource will fuel the next-generation software tools focused on integrated solutions at the enterprise level.

Indispensability

As the complexity of the design, the need to share information, and the need to store information electronically all increase, the benefits of automation improve dramatically and the level of indispensability goes up. CAD/CAM/CAE and GIS are becoming a necessity as these factors are coupled with market pressure to produce higher quality and to reduce production cycles.

Late Buyers

A significant pool of untapped users still exists in mechanical, AEC, and GIS applications, driving additional growth. These conservative buyers will favor market leaders and installed systems for compatibility. For vendors, therefore, the value of high market share and customer satisfaction will increase.

Desktop Dominance

The turf war for desktop dominance is building steam with the introduction of the Pentium chip and Windows NT, which will fight to take market share from the higher-priced, multiple UNIX operating systems with RISC technology. The decline of host-dependent systems also is continuing, with replacements going to networked, desktop systems. The former threatens vendors whose business models depend upon high-priced workstations, while the latter provides opportunity.

Unbundling of Software

With software vendors porting to multiple platforms, software is no longer the hinge upon which hardware swings. The market is quickly moving from proprietary to open systems, resulting in a shift from bundled to unbundled software (see Table 2).

Replacement Market

The replacement market is gaining importance as replacement seats exceed 50 percent of unit sales in 1993 (see Figure 3). This saturation implies that many parallel manual systems can be eliminated and new applications developed if its known that everyone in a company that needs access to the engineering database can have it in electronic format. The savings potential is tremendous. This saturation also implies a growing sophistication in buyers that are more informed of this technology's strategic importance.

Software

With technological advances, growing sophistication of users, and competitive pressures, the demand for software with greater ease of use, flexibility, and interoperability is growing. This demand is driving the growth in business alliances between small innovative software niche players and major software vendors with resources to sell to both the new and replacement markets.

North American Forecast Drivers

Of the three major worldwide regions, North America CAD/CAM/CAE and GIS revenue growth was an anemic 3.4 percent to $5.2 billion in 1992 and is forecast to grow at 5.5 percent CAGR through 1997. The following paragraphs describe the main factors driving the North American forecast.

Capital Spending

According to Dun & Bradstreet's latest monthly survey of 1,000 manufacturers nationwide, optimism is at a three-year high and capital spending is expected to increase 12 percent in 1993 because of competitive global pressures, need for improved productivity, and cost of capital, which is at a three-year low. This bodes well for increased investment in CAD/CAM/CAE and GIS systems, particularly mechanical applications.

Cuts in Defense Spending

Cuts in defense spending will tend to soften the market. However, a focus on fewer, more sophisticated weapons systems will promote use of the latest design optimization and simulation capabilities.

European Forecast Drivers

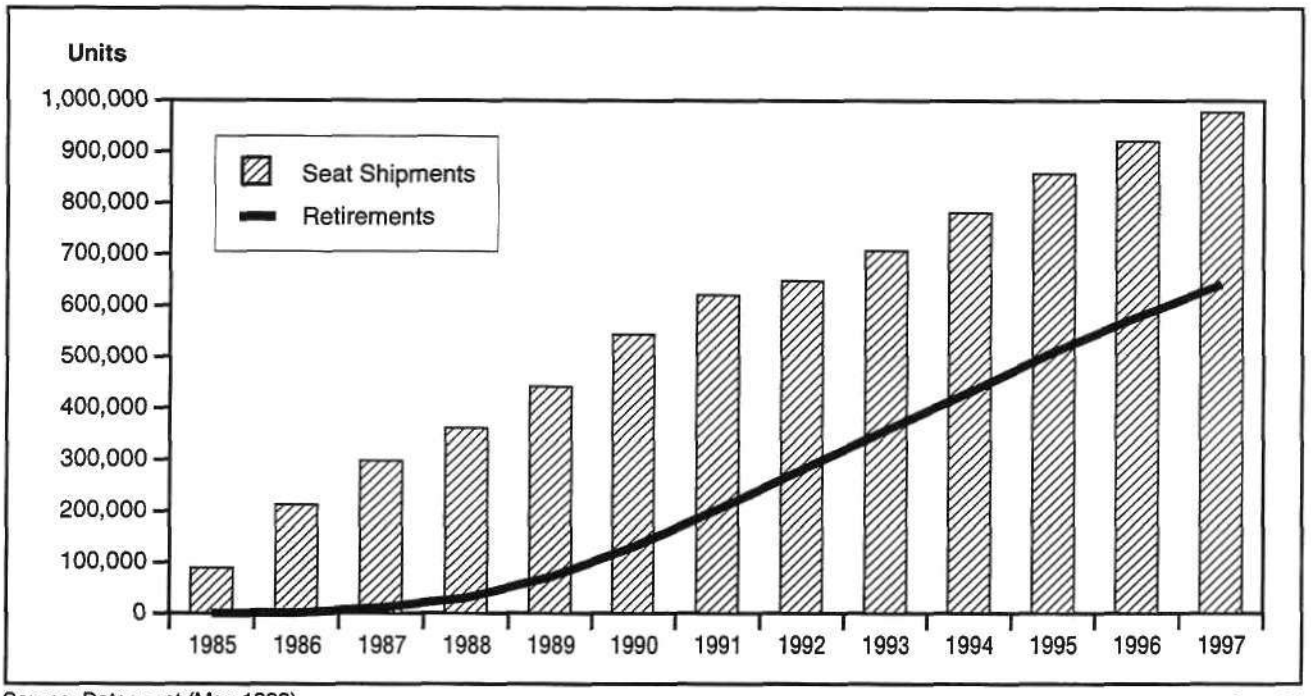
The European market grew 5.3 percent in 1992 to $5.9 billion, making Europe the fastest growing region worldwide. However, the outlook for 1993 is not quite as positive, with growth expected to be 3.7 percent. The major factor behind this slowing growth is the sluggish German economy, which accounts for 34 percent of the European market. A slowdown in

Table 2
CAD/CAM/CAE/GIS Software Revenue Forecast, by Application (Millions of Dollars)

	Revenue						CAGR (%)	Percentage Distribution (%)					
	1992	1993	1994	1995	1996	1997	1992-1997	1992	1993	1994	1995	1996	1997
All Applications													
Total Software	4,885	5,352	5,862	6,389	6,923	7,467	8.9	100.0	100.0	100.0	100.0	100.0	100.0
Bundled Software	1,917	1,935	1,973	2,037	2,118	2,201	2.8	39.3	36.2	33.6	31.9	30.6	29.5
Unbundled Software	2,968	3,416	3,890	4,352	4,804	5,266	12.2	60.7	63.8	66.4	68.1	69.4	70.5
Mechanical													
Total Software	2,233	2,469	2,688	2,868	3,007	3,154	7.2	100.0	100.0	100.0	100.0	100.0	100.0
Bundled Software	1,111	1,119	1,127	1,129	1,123	1,107	-0.1	49.8	45.3	42.0	39.4	37.3	35.1
Unbundled Software	1,122	1,350	1,561	1,739	1,883	2,048	12.8	50.2	54.7	58.0	60.6	62.7	64.9
AEC													
Total Software	730	796	875	966	1,072	1,178	10.0	100.0	100.0	100.0	100.0	100.0	100.0
Bundled Software	327	347	372	404	444	483	8.1	44.8	43.8	42.5	41.7	41.1	41.0
Unbundled Software	403	449	503	562	628	695	11.5	55.2	56.3	57.5	58.3	58.9	59.0
GIS/Mapping													
Total Software	616	700	810	956	1,128	1,317	16.4	100.0	100.0	100.0	100.0	100.0	100.0
Bundled Software	297	325	364	417	482	553	13.2	48.3	45.7	44.4	43.8	42.5	42.0
Unbundled Software	318	375	447	539	646	764	19.2	51.7	54.3	55.6	56.3	57.5	58.0
Electronic CAE													
Total Software	752	812	884	945	1,005	1,057	7.0	100.0	100.0	100.0	100.0	100.0	100.0
Bundled Software	75	61	51	43	37	35	-14.1	9.9	7.4	5.7	4.3	4.0	3.8
Unbundled Software	677	751	834	902	969	1,022	8.6	90.1	92.6	94.3	95.7	96.0	96.2
IC Layout													
Total Software	225	243	269	303	341	378	10.9	100.0	100.0	100.0	100.0	100.0	100.0
Bundled Software	17	13	9	7	6	5	-21.7	7.4	4.2	3.7	3.2	2.9	0.0
Unbundled Software	209	230	260	296	335	373	12.3	92.6	95.8	96.3	96.8	97.1	100.0
PCB/Hybrid/MCM													
Total Software	330	332	336	351	370	383	3.0	100.0	100.0	100.0	100.0	100.0	100.0
Bundled Software	91	71	51	38	26	19	-26.9	27.6	21.2	14.7	11.4	8.1	5.3
Unbundled Software	239	261	286	314	343	364	8.8	72.4	78.8	85.3	88.6	91.9	94.7

Source: Dataquest (May 1993)

Figure 3
Unit Seat Shipments versus Retirements Forecast



Source: Dataquest (May 1993)

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Germany ripples through all other European industries. The following paragraphs describe the main factors driving the European forecast.

Recession

The general recessionary economic climate throughout much of Europe during 1991 and 1992 depressed capital investment and orders for information technology products. Most of the European countries are in or near a recession. The picture for 1993 does not look good. Many individual countries face a slowdown in domestic activity, while there is little hope of strong demand pressures from the United States or Japan to help in any economic upturn anytime soon.

Growth

On average, the 1993 gross domestic product growth in Europe is expected to be only 0.3 percent, with an upturn of 1.9 percent growth expected in 1994. Major European economies such as Germany, United Kingdom, Italy, Spain, and Sweden also have accumulated massive budget deficits that will influence governments to reduce public spending even further and to increase taxes, which in turn will reduce consumer spending. Even the recent falls in interest rates will not change this fact.

Asian Forecast Drivers

The Asian market grew 1.2 percent in 1992 to $4.1 billion. However, the Japanese market declined 6 percent on a yen basis. With 94 percent of the Asian CAD/CAM/CAE and GIS market in Japan, the Japanese economy dominates this segment. Further contraction of the market expected in

1993 will result in a CAGR through 1997 of 2.0 percent. The following paragraphs describe the main factors driving the Asian forecast.

Capital Spending

Dataquest estimates that capital spending by Japanese companies will fall 12.7 percent in 1993, following a precipitous drop of 28.7 percent in 1992. However, signs of recovery in the macro economy are starting to show.

Business Confidence

According to the Sakura Institute of Research in Japan (January 1993), business confidence is expected to brighten some in fall 1993. Recovery is expected to be fueled by small and medium-sized manufacturing companies.

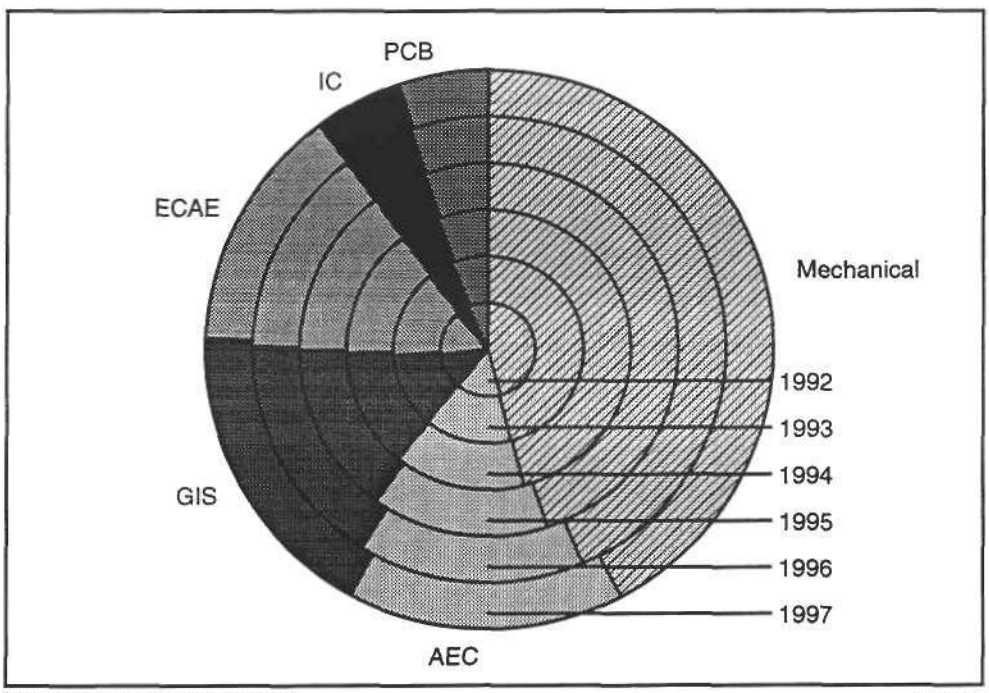
Software Leads Hardware

The preference for Japanese companies investing in CAD/CAM/CAE and GIS has been for low-cost, decentralized networked systems and big central mainframes. Japan- and U.S.-supplied technical workstations are emerging as the platform of choice for most CAD/CAM/CAE and GIS applications. Strong interest in the latest high-end software offerings is dragging the necessary hardware.

Application Forecast Assumptions

Expected growth in AEC and GIS applications during the next three or four years will add significantly to the total growth of the industry and will exceed growth forecasts for all mechanical and electronic applications (see Figures 4 and 5). Factors in this shift in the total market application

Figure 4
Software Revenue Distribution Forecast, by Application



Source: Dataquest (May 1993)

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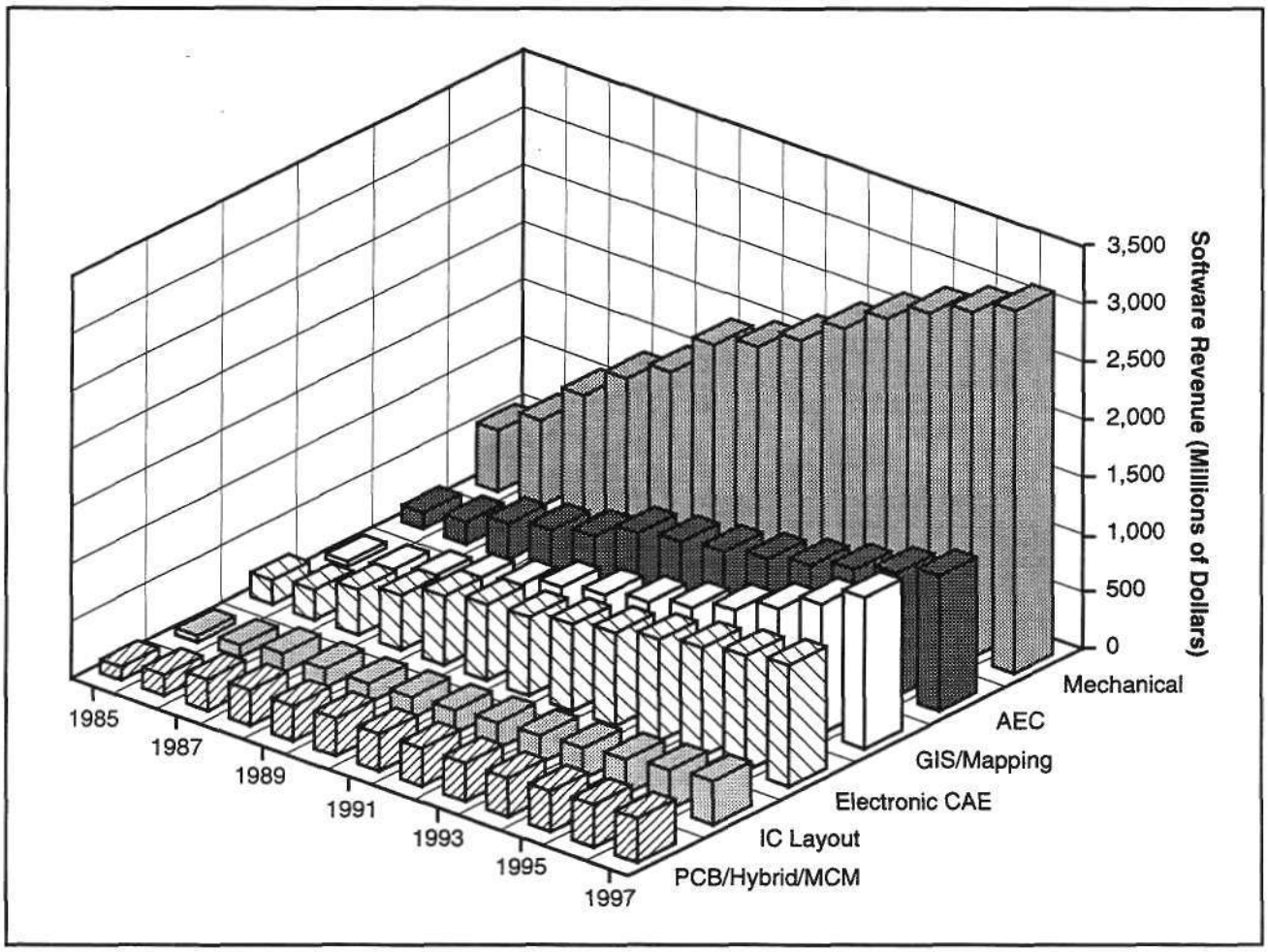
Figure 5
Worldwide Software Revenue Forecast, by Application



Source: Dataquest (May 1993)

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mix include market penetration, new application development, and shifting trends in average selling prices.

Mechanical Forecast Assumptions

The mechanical application area is the largest of the CAD/CAM/CAE and GIS market, with 49 percent share and software revenue growth of 9.3 percent in 1992. The following paragraphs describe the main issues driving the mechanical forecast.

Software Price

Dataquest expects software prices to stabilize or increase slightly for leading products. The average value of software shipped per seat has increased slowly. In 1987, total software revenue divided by total number of seats shipped was $6,740. The average value rose to $8,140 in 1992 and is forecast to rise to $9,390 by 1997. Corresponding numbers in 1992 are $17,040 for technical workstation-based software, $2,470 for the PC, and $16,270 for host-based terminals. Leading vendors on all platforms have

been raising prices directly or indirectly with new pricing structures for network licensing or site licensing.

Hardware Price Erosion

Dataquest expects hardware price erosion to continue, but at a slower rate as package complexity increases and accelerates demand for hardware purchases that provide speed, memory, and storage. This trend can be expected on all platform configurations. Supercomputers increasingly are being used for high-end simulation and analysis applications. Technical workstations range from very expensive, high-performance, real-time imaging systems to lower-cost, two-dimensional documentation systems. The need for integrated applications across platforms will cause significant upgrade and system replacements.

Second-Tier Products

Dataquest expects second-tier products with "stale" technology to fight price erosion. These second-tier vendors are struggling to build market share in an atmosphere of rampant price cutting, particularly on the PC platform.

Hardware Performance

With enabling technology providing increased mips, software vendors can redefine the concept of interactive design. For example, designers will simulate the crash of one car into another and test to see if the doors still open. The value of this level of computing will change the nature of mechanical CAD/CAM/CAE. The result will allow anyone in the design and manufacturing process to simulate real problems, to evaluate potential solutions, and to communicate the change instantly to all involved.

Modeling Technologies

Core modeling technologies will evolve slowly to support a product data structure growing in complexity. Three-dimensional solutions are replacing two-dimensional solutions, which will be replaced by next-generation, integrated, and solid-modeling-based solutions. The more complete data structure with improvements in performance is rapidly building strong interest with end users. Progress is being made in integration between the model and analysis applications, between the model and documentation, and further into manufacturing applications.

Technology Dependence

The major applications in mechanical applications are defined: Product conception, development, production, operation and support will be necessary applications areas a hundred years from now. The dramatic changes taking place in the discrete manufacturing world because of competitive pressures are forcing shorter development cycles, localization, and need for improved quality, resulting in a complexity that forces the users to be fully dependent upon this technology.

Manufacturing Industry

The growth opportunity in each country depends upon the success and health of the local manufacturing industries. Multinational corporations will fuel the growth in newly industrialized countries. Each country has a dominant industry or market segment that sets the tone for CAD/CAM/CAE use. The evolution of these industries has had an important impact on the growth of the CAD/CAM/CAE market in each region and has directed the success of many vendors trying to serve these markets. As an example, the automotive industries in Japan, the United States, Germany, Italy, and France have a major influence on these local CAD/CAM/CAE markets. Aerospace, a major force in the U.S. market, is less of a force in Europe and a minor but growing interest in Japan. All of the other manufacturing industries, such as fabricated metal, machinery, and consumer products, have strongholds in various locations around the world. For example, the machinery industry represents a significant local CAD/CAM/CAE opportunity in Japan and Germany.

Europe

The automotive and aerospace industries, which are the largest customers of mechanical CAD/CAM/CAE tools, are suffering during the ongoing recession in Europe and experiencing budget and staff cuts. On top of this, 34 percent of the European mechanical market is in Germany, where the economy is now in recession and manufacturing output is down. Growth for mechanical CAD in 1992 was only 3.2 percent and is expected to be 3.0 percent in 1993 because the German economy is not expected to get out of its recession before mid-1994 at the earliest.

AEC Forecast Assumptions

The AEC application area had software revenue growth of 7.1 percent in 1992. The five-year CAGR for software is forecast to be 10 percent. The following paragraphs describe the main factors driving the AEC forecast.

Untapped Users

A significant pool of untapped users still exists. The current relatively low market penetration of AEC CAD systems should allow steady worldwide growth during the next five years, despite constant volatility in demand for the building and infrastructure products to be designed.

Mandates for CAD

Electronic design data is increasingly required by the designer's client, from the U.S. federal government to the small commercial developer. Design firms also are growing at the expense of smaller firms. These large end users will increasingly require their employees and suppliers to adopt automation tools in the design and construction process.

Electronic Partnering

Designers in the AEC industry are finding themselves in markets that are more regionally and globally competitive, markets that favor partnering across design disciplines. Smaller design firms will increasingly buy CAD systems, or risk being dropped from consideration as a partner.

Competitive Advantage

CAD purchases are increasingly justified as a competitive advantage in both sales and design reviews. The architect that cannot produce the fourth iteration of a proposed design before signing up a client will lose out to the group that can use changes in a proposal to ratchet a prospect gradually toward closure.

Software Leverage

AEC CAD vendors can fuel upgrade revenue among sophisticated users by leveraging software advances first developed in mechanical design, such as faster structural analysis tools or incorporation of design rules.

New Functionality

Data and database functions (versus graphics functions) will increase in importance in AEC design systems, creating opportunities to sell users significant new functionality.

Europe

AEC growth in Western Europe is tied to the improvement of the infrastructure, manufacturing plants, and power stations in Eastern Europe. In particular, German construction companies are involved in projects in the former East Germany and in Central and Eastern Europe. The encouraging signs that the U.K. economy is picking up also positively affect the construction industry.

Growth Inhibitors to the AEC CAD Industry

The following paragraphs describe trends that will inhibit growth in the AEC CAD industry.

Low Payoff to Users

AEC's one-design/one-build structure means that CAD provides fewer economic benefits to these users than does the one-design/build-many structure of manufacturing. Construction, which is essentially a prototype build, is fraught with uncertainties and delays that are hard to change using current design systems.

Lack of Interoperability

Designs are often split among several different companies representing different aspects of the design process. User companies often have different CAD systems that do not communicate well, and alliances and consolidations in user organizations will only highlight the issue.

Low-Cost Solutions

Because most AEC design is still focused on drafting, which requires relatively little computing power, PC-based growth will be strong for the foreseeable future and PC-based solutions will produce less revenue for the vendor than will other platforms.

Late Adopters

Attitudes of potential users inhibit market growth. Many experienced architects resist change in both the design and construction processes. As this self-destructive mode of operating erodes the viability of the profession, the CAD market is also impacted because many architects that were once prospects for CAD systems are now unemployed.

GIS Forecast Assumptions

The GIS application area had software revenue growth of 12.4 percent in 1992. The five-year CAGR for software revenue is forecast to be 16.4 percent. The assumptions behind the GIS forecast are built both on optimism that the world economy will gradually improve during the forecast period, and on an expectation that global competition will increase. The following paragraphs describe assumptions used to build Dataquest's GIS market forecast.

Low Penetration

Bread-and-butter prospects in government and utilities are charged with maintaining information on land and assets in perpetuity. A large number of utilities, and sovereign and local governments all over the world, are still stuck with tabular data and paper maps (which will degrade over time). These create a plentiful supply of prospective buyers of the more readily changed and renewed computer maps—a first step to building a GIS system.

New Technologies

Faster, cheaper computers and developments in open, distributed systems open the door to an expanded user base. Advances in global positioning systems (GPSs) and aerial photography are making it possible to create GISs significantly more accurate and complete than existing paper maps, giving experienced users some compelling reasons to reinvest. Portable computers, multimedia, cheaper storage, and better compression of satellite imagery will create more opportunities to develop richer, more accurate, and more useful GIS systems. Although many markets will take advantage of these technologies, there is no other market as ready, willing, and able to put to work such a wide range of technology enhancements. A number of users invested in image-oriented GIS systems in the last year or two, either supplementing or completely bypassing conversion of existing paper data. This has helped provide a "mid-life kick" to a market that has been slowed by troubled pilot projects.

New Applications in Industries Such As Retail and Insurance Will Drive Growth

Wherever there is competition for a limited prize—whether the prize is a political or economic reward—GIS can create a competitive edge. Wherever assets or investments are geographically dispersed, GIS offers significant management capabilities. Revenue is growing at more than 50 percent per year among new applications. However, there is a wide band of uncertainty surrounding revenue opportunities. Several new applications in GIS are destined to become embedded as a feature that will

produce relatively little revenue in other software programs (and markets), rather than as a standalone product in the GIS market.

Easier and Less Expensive GIS

Inexpensive spatial data, both public and private, is accumulating and can be passed on to new users. Successful multiparticipant projects are growing, creating larger data sets that can be profitably resold by government/industry consortia. Also, although Dataquest does not envision the technology miracle that will eliminate development costs, implementation of GIS in new sites will be easier and less expensive than it previously has been.

Solutions Filling a Need

GIS addresses the information age's growing problem of overload. Any product that addresses a visible problem is more certain to grow than are solutions still looking for the problem.

The U.S. Government

GIS is one of the rare markets where relatively simple government action can directly fuel industry growth. In fact, the GIS industry depends on government cooperation for base data development. Governments all around the world are cooperating by developing spatial data standards, more sophisticated mapping goals, and increased cooperation across federal and local governments. The U.S. federal government is in a particularly influential position, and all stars are favorably positioned. The LANDSAT program appears to be headed toward making satellite imagery more affordable. GPS satellites are proving extremely valuable outside of defense applications. Freedom of information remains a viable U.S. federal concept, creating opportunities to exploit low-cost, government-generated spatial data. The stage could not be set better for the tenure of a new U.S. president known to appreciate the importance of information technology.

Growth Inhibitors to the GIS Market

High Cost

No silver bullet will emerge to create a low-cost, meaningful data set for traditional customers in government and utilities. Data conversion will remain costly, despite substantially lower scanning costs and increasingly improved automated conversion products. The high cost will remain because, as existing paper records head toward computerization, widespread minor inaccuracies begin to be examined, often for the first time. The significant cost of correcting prior errors and omissions is inevitably bundled into the cost of "conversion." At the same time, increasingly complex applications require increasingly accurate data, also raising conversion costs.

Stuck Projects

The significant number of traditional GIS/mapping projects stuck in the pilot phase will reduce demand for new products, as users struggle to

implement existing purchases. Even worse, the negative publicity created by these projects will chill the buying impulse among nonusers, reducing the ability of GIS projects to compete with other applications for capital equipment dollars.

Price Pressure

Computer prices will certainly drop, even in technical applications such as GIS, where higher-performance hardware will command a premium price. Software prices are likely to come under increasing pressure, despite the industry's current ability to hold overall seat prices relatively even. Our current forecast is built on declining hardware and steady software prices, primarily because of opportunities to add significant software data and functionality content to new sales among core, noncommodity buyers. Any significant deviation from this model would affect the forecast.

Europe

GIS data in Europe is prohibitively expensive and not readily available, slowing down the potential growth. Also holding back the development of GIS are the current state of the various European economies; the enormous budget deficits of major economies such as Germany, Italy, and Great Britain; and major cuts in public spending.

EDA Forecast Assumptions

The year 1992 showed a glimmer of hope in the EDA industry, with software revenue year-to-year growth rates climbing back to 8.3 percent, driven by the continued strength of the IC layout software industry and a resurgence in the CAE market. Dataquest expects EDA software revenue growth to decrease slightly to 6.1 percent year-to-year for 1993. Printed circuit board (PCB) software in particular will remain stagnant until multichip module (MCM) technologies begin to affect the market, which Dataquest anticipates will take effect in the 1994- to-1995 time frame. The following paragraphs describe the factors that will help spur EDA software growth.

New Tool Technologies

New tool technologies, including electronic system level design automation (ESDA), signal integrity, and design automation are becoming available, fueling growth.

Analysis Tools

Increasing clock frequencies require tighter design tolerances that require sophisticated analysis tools to ensure proper operation.

Migration of IC Layout

Migration of IC layout technologies to system designers in the form of floor planners may prove to be the vehicle to expand physical IC design into the larger ASIC design community.

Europe

The EDA industry in Europe is now characterized by two or three big players jockeying for position. Furthermore, following the merger of Cadence Design Systems Inc. and Valid Logic Systems Inc., and several large end-user mergers, some strategic account changes have occurred and will continue. The total software revenue is unaffected, but market share is the prize for the winning EDA company.

Growth Inhibitors to the EDA Market

Dataquest expects the factors described in the following paragraphs to have a detrimental affect on the health of the EDA market in the short term.

Transition and Shifts

Product transition and strategy shifts will have a short-term downward effect. Difficulties at the No. 1 supplier of EDA software, Cadence, may cause a stall in the purchases of new tools as users ponder their options. Ongoing consolidations of key EDA technologies, including simulation and signal integrity, will also protract buying decisions.

Legal Issues

Legal issues may induce fear, uncertainty, and doubt in buyers' minds. The recent spate of legal actions (for example, Synopsys versus Cadence, Analogy versus Anacad/Mentor Graphics, and stockholders versus Cadence) may divert the attention of the buying public and will definitely garner the attention of top management at the EDA vendors.

Use of PC-Based Tools Will Drop Significantly

Looking to EDA's future, Dataquest anticipates the use of what have classically been called PC-based tools to drop significantly. The Dataquest factors determining the differentiation of technical workstations from PCs are a virtual multitasking operating system (UNIX, VMS, and DOMAIN), the ability to run high-performance graphic applications in a multiuser environment, and the user's potential range of expansion on the platform. Windows NT on the Pentium chip will challenge this differentiation.

Dataquest anticipates that use of "classical" PCs as EDA platforms will begin to diminish significantly in 1995. At that time, classes of tools will be differentiated not upon hardware platform or operating system, but rather upon the features and functionality of the tools themselves. The emergence of Windows NT will have a minimal impact upon the overall revenue of the EDA software industry. However, its effect upon competing operating systems, average selling prices, distributing practices, and business and marketing practices will be far-reaching.

Dataquest Perspective

The heady days of rapid expansion are but a memory as CAD/CAM/CAE and GIS continues its anticipated slower but steady growth, with 3.2 percent growth in total factory revenue from 1991 to 1992. Because of the increasing gloom in the European and Asian economic outlook, we

have reduced the CAGR to 4.6 percent (1992 to 1997) from the more optimistic 7.2 percent of last year (1991 to 1996).

This overall single-digit-percentage growth rate is a poor indicator of the dramatic changes taking place in this dynamic market, which continues to be swayed by a number of competing crosscurrents and strong undercurrents, as follows:

- The commodity PC market has been rocked by brutal price competitiveness. The new Pentium chip and Windows NT are clouding the distinction between PCs and technical workstations. Competing UNIX operating systems are finally joining forces and developing standards, and the emerging client/server architecture is replacing the host-dependent behemoths of yore. Software companies are responding to this fluid state of computer platforms in the CAD/CAM/CAE and GIS markets with a flurry of "ark-building," porting to the NT platform and protecting themselves from UNIX dependence.
- With price pressures holding down growth in hardware, growth in the CAD/CAM/CAE and GIS market will be in software and also in the final frontiers of product differentiation, engineering services, and systems integration.
- In addition to the conservative late majority buyers entering the market in search of proven products, half of 1993 sales will be to the more sophisticated and open-eyed replacement buyers. These two classes of buyers, with markedly different needs from a sales and marketing perspective, will challenge existing sales forces.
- Technological change rather than market expansion from new purchases is fueling much of the market growth. Capital investment spending will go to the company most fully engaged in the technological momentum, which includes ease-of-use, open interfaces, and interoperability. The magnitude of the problem will continue to fuel joint ventures and company consolidations as well as create niche opportunities for small companies.

The slowest growing applications are mechanical and EDA, with five-year total revenue CAGRs of 7.2 percent and 6.8 percent, respectively. In contrast, the AEC and GIS applications, serving less mature markets, are entering a period of somewhat higher growth, with forecast five-year CAGRs of 10.0 percent and 16.4 percent, respectively.

Market pressure to produce higher quality with shorter production cycles is making CAD/CAM/CAE and GIS usage a requirement for many companies today. As the complexity of this environment increases, communicating design intent on a global basis becomes more common. All this, combined with a significant improvement in application software and a continued remarkable improvement in hardware performance, is fueling the continuing growth of this $15.5 billion industry.

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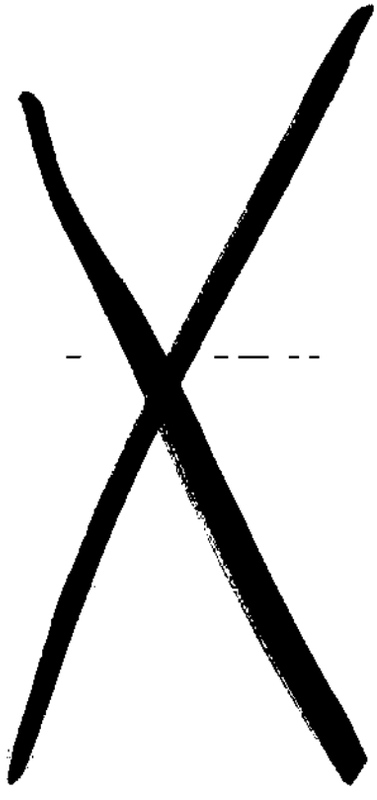

Market Statistics

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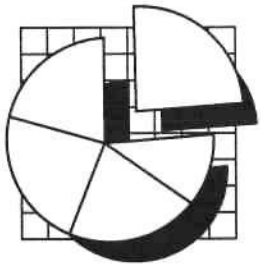

Market Statistics

1993

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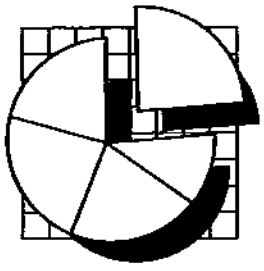
CAD/CAM/CAE and GIS Worldwide Forecast Update



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List of Tables (Continued)

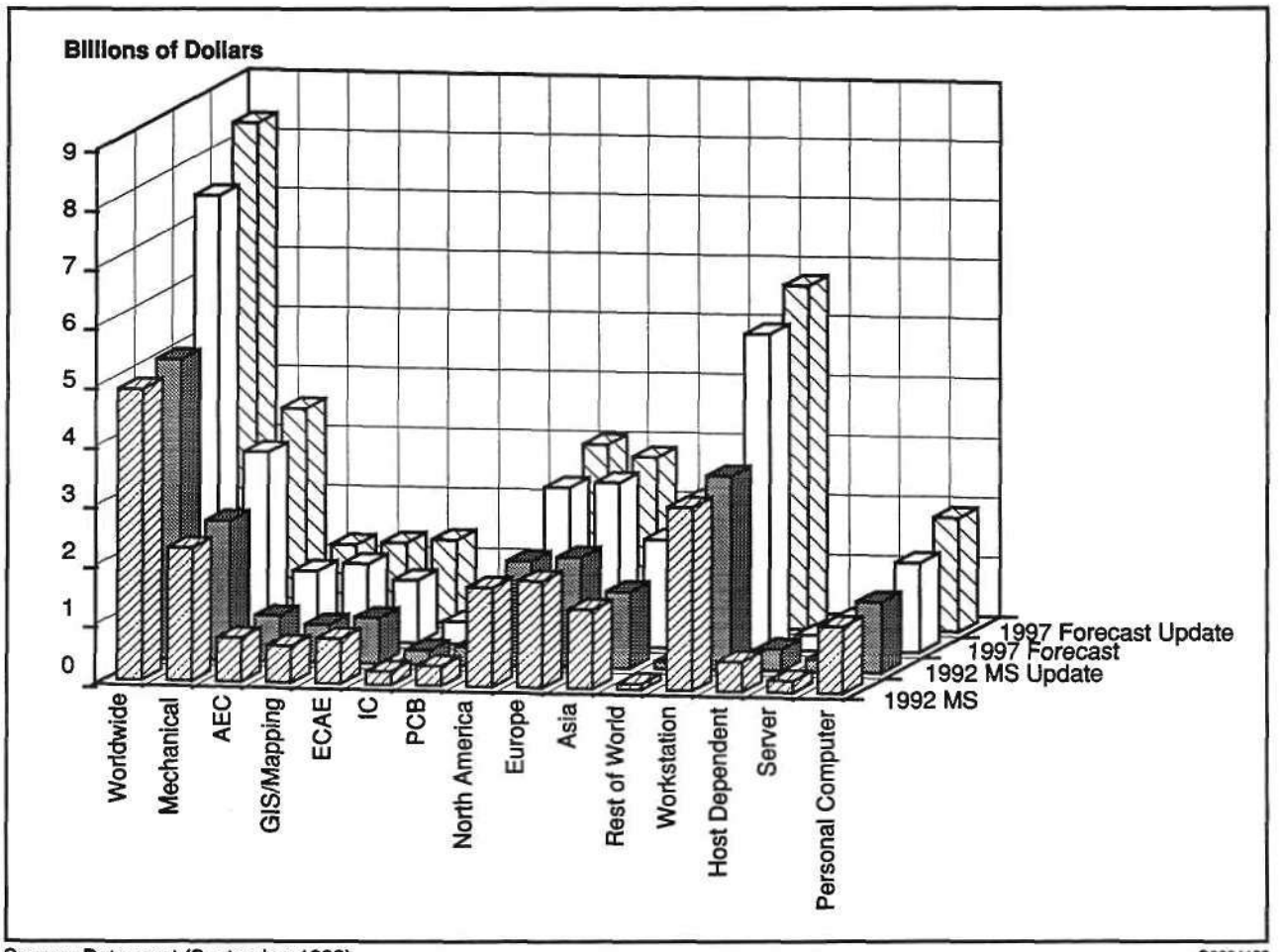
Note: All tables show estimated data.

CAD/CAM/CAE and GIS Worldwide Forecast Update

This forecast update uses the market share update as the basis of a new forecast, incorporating any new information since May, including currency changes since year-end 1992. Additionally, with greater focus on country level data during the market share update process, this forecast update provides forecasts by country in Europe and Asia.

Figure 1 shows change from the 1993 forecast to this update in growth of software revenue by application, region, platform, and the total market. Table 1 provides the corresponding revenue figures and growth rates. This additional growth is divided somewhat equally among the applications, is concentrated in Asia because of currency issues, and resides primarily in the personal computer platform.

Figure 1
Software Forecast Update versus Forecast, 1992-1997



Source: Dataquest (September 1993)

G3004189

Table 1
Software Revenue Forecast Update versus Forecast

	Forecast Update 1992-1993 Change (%)	Forecast Update 1992-1997 CAGR (%)	May Forecast 1992-1993 Change (%)	May Forecast 1992-1997 CAGR (%)	Market Share Update 1992 ($M)	Forecast Update 1993 ($M)	Forecast Update 1997 ($M)	Market Share 1992 ($M)	May Forecast 1993 ($M)	May Forecast 1997 ($M)
Worldwide	12.0	10.6	9.6	8.9	5,036	5,642	8,353	4,885	5,352	7,467
Applications:										
Mechanical	12.3	8.7	10.6	7.2	2,341	2,628	3,548	2,233	2,469	3,154
AEC	11.8	11.0	9.0	10.0	758	847	1,275	730	796	1,178
GIS/Mapping	14.7	16.0	13.8	16.4	629	721	1,323	616	700	1,317
ECAE	12.7	12.7	8.0	7.1	764	861	1,390	752	812	1,057
IC	9.2	11.3	7.8	10.9	233	254	398	225	243	378
PCB	5.8	6.0	0.7	3.1	312	331	418	330	332	383
Regions:										
North America	13.2	11.5	12.0	9.8	1,767	2,000	3,041	1,669	1,869	2,659
Europe	7.7	9.0	10.9	9.0	1,848	1,990	2,840	1,793	1,988	2,753
Asia	15.1	10.6	3.8	6.4	1,288	1,483	2,134	1,327	1,378	1,813
Rest of World	27.2	20.6	22.8	20.3	132	168	338	96	118	242
Platforms:										
Workstation	13.8	12.1	13.5	11.5	3,256	3,705	5,773	3,072	3,486	5,293
Host Dependent	-19.1	-11.8	-19.2	-12.1	369	299	196	500	404	262
Server	22.8	16.8	20.3	15.5	216	265	470	197	237	405
Personal Computer	14.8	9.9	9.7	6.2	1,195	1,373	1,914	1,117	1,225	1,508

Source: Dataquest (August 1993)

Currency Changes

Worldwide revenue estimates include data from many countries, each of which has a different and fluctuating exchange rate. Estimates of non-U.S. revenue are based on the average exchange rate for a given year, calculated as the simple arithmetic mean of the 12 average monthly values. Dataquest does not forecast exchange rates per se; however, we do forecast with the best information available. Exchange rates, for the purposes of forecasting, are calculated assuming the June 1993 exchange rate will apply throughout all future months of the year. Table 2 provides the resulting exchange rates for each European and Asian country.

Given the bleak economic climate, it is surprising that we are forecasting increased growth from our earlier forecast. The main source of this growth comes from the depreciation of the dollar against the yen of 12 percent. With 96 percent of the Asian revenue reported in Japan, the yen dominates that region's revenue figures. Table 3 shows dollar values with equivalent yen values of total factory revenue for Asia for 1992 and 1993, with growth rates, by application, using the exchange rates as shown in Table 2.

Table 2
Foreign Currency per U.S. Dollar

	Country	Currency	Actual 1992	Current 1993	Appreciation (U.S.$)
Europe	United Kingdom	Pound	0.5686	0.6606	16.2
	France	Franc	5.2712	5.5192	4.7
	Germany	Mark	1.5554	1.6334	5.0
	Italy	Lira	1,227.75	1,517.07	23.6
	Spain	Peseta	101.90	123.38	21.1
	Denmark	Krone	6.0153	6.2751	4.3
	Finland	Markka	4.4507	5.5955	25.7
	Norway	Krone	6.1824	6.9298	12.1
	Sweden	Krona	5.8105	7.4584	28.4
	Belgium	Franc	32.02	33.59	4.9
	Netherlands	Guilder	1.7512	1.8073	3.2
	Austria	Schilling	10.95	11.49	4.9
	Switzerland	Franc	1.3976	1.4727	5.4
Asia	Japan	Yen	126.45	111.23	-12.0
	Hong Kong	Dollar	7.7401	7.7327	-0.1
	Korea	Won	782.63	799.43	2.1
	Singapore	Dollar	1.6285	1.6218	-0.4
	Taiwan	Dollar	24.93	25.91	3.9
	China	Renminbi	5.5082	5.7441	4.3

Source: Dataquest (August 1993)

Table 3
Total Factory Revenue in Asia, Dollars as Compared to Yen
(1992 Exchange Rate of U.S.$1/¥126.45; 1993 Exchange Rate of U.S.$1/¥111.23)

	1992 ($M)	1993 ($M)	Change (%)	1992 (¥M)	1993 (¥M)	Change (%)
Mechanical	2,180	2,384	9.4	275,647	265,178	-3.8
AEC	577	618	7.2	72,938	68,780	-5.7
GIS	332	375	12.8	42,016	41,683	-0.8
ECAE	508	585	15.2	64,213	65,096	1.4
IC Layout	194	208	7.5	24,491	23,154	-5.5
PCB	372	380	2.4	46,971	42,305	-9.9
All Applications	4,162	4,551	9.3	526,275	506,197	-3.8

Source: Dataquest (August 1993)

In contrast, the dollar has appreciated against all other European currencies. This forecasting has shown a corresponding decrease in the growth of the European CAD/CAM/CAE/GIS markets as compared to the earlier forecast.

Database Changes

Dataquest intends to freeze the CAD/CAM/CAE/GIS database following the market share update. However, careful scrutiny of European numbers as part of the forecasting process uncovered some discrepancies at the country and application level. Adjustments were made to IBM, Hewlett-Packard, Digital, and Intergraph. In addition, Intergraph was underrepresented in the mechanical market to an alarming extent. Its data was fixed, with a corresponding decrease in service revenue and GIS/Mapping software revenue, moving Intergraph from No. 15 to No. 9 in mechanical software revenue. Finally, ESRI was updated to reflect higher total revenue, most of which was for service. The result is that Intergraph and ESRI are now separated by $8 million in software revenue in the GIS market. There will be no more changes to this database until we begin our survey of 1993 data.

Other Information

Implicit in any forecasting are the GDP/GNP growth rates (see Table 4). We also track quarterly revenue of public companies and corresponding growth rates from previous quarters for a general view of the health of the industries.

This document contains Dataquest's detailed forecast information for the CAD/CAM/CAE and GIS industry. Included are the following:

- Five-year historical data
- Five-year forecast data

More detailed data is available through our client inquiry service, which can provide custom analysis of the mutlidimensional database.

Table 4
GDP/GNP Growth Rate Percentages
(Constant Prices and Exchange Rates, Local Currencies)

		1992	1993	1994	1995	1996
North America	Canada	0.7	3.1	3.8	3.5	3.0
	United States	2.1	2.6	2.9	2.3	2.5
Europe	United Kingdom	-0.5	1.7	2.7	3.2	3.0
	France	1.1	-1.0	1.3	3.1	3.3
	Germany*	1.4	-1.5	1.2	2.8	3.5
	Italy	0.9	0.3	1.5	1.9	2.3
	Spain	1.0	-0.7	1.7	2.9	3.6
	Denmark	1.2	0.6	2.1	2.3	3.5
	Finland	-3.6	-0.2	1.8	2.5	3.2
	Norway	2.9	1.5	2.4	2.6	2.7
	Sweden	-1.8	-1.6	1.4	2.0	2.5
	Belgium	0.8	-0.5	1.8	2.7	3.1
	Netherlands	1.5	-0.4	1.5	2.9	2.9
	Austria	1.5	-0.1	2.0	3.7	3.9
	Switzerland	-0.6	0.2	1.5	2.1	2.4
Asia	Japan	1.5	1.3	2.7	3.6	4.1
	Korea	4.8	6.0	7.0	7.0	7.0
	Taiwan	6.1	6.5	7.0	7.0	7.0
	Singapore	5.8	6.5	6.5	6.5	6.5
	Hong Kong	5.0	5.5	5.5	5.5	5.5
	China	11.5	10.0	12.5	11.5	10.8

*Germany includes the former East Germany.
Source: The Dun & Bradstreet Corporation

Regional Forecast Assumptions

Table 5 provides the CAD/CAM/CAE/GIS forecast for total factory revenue, software revenue, and units. Following are the main worldwide forces driving this forecast.

Worldwide Forecast Drivers

The worldwide CAD/CAM/CAE/GIS market will maintain steady growth during the next five years. Figure 2 shows the forecast of hardware, software, and service revenue worldwide and by region, and Figure 3 shows the worldwide forecast by platform.

The main forces driving the CAD/CAM/CAE/GIS worldwide forecast are described in the following paragraphs.

Macroeconomy

The recovery, with its inherent renewed optimism after a worldwide recession and the resultant increased capital spending, will fuel growth

Table 5
CAD/CAM/CAE/GIS Forecast by Region
(Revenue in Millions of Dollars; Actual Shipments)

	1992	1993	1994	1995	1996	1997	CAGR (%) 1992-1997
Worldwide							
Total Factory Revenue	15,723	16,530	17,500	18,640	19,770	20,860	5.8
Software Revenue	5,036	5,640	6,320	7,040	7,710	8,350	10.6
Unit Shipments	739,511	857,200	972,100	1,072,700	1,155,000	1,215,900	10.5
North America							
Total Factory Revenue	5,437	5,680	6,100	6,550	7,000	7,520	6.7
Software Revenue	1,767	2,000	2,270	2,540	2,790	3,040	11.5
Unit Shipments	291,743	336,300	381,800	420,700	456,600	487,100	10.8
Europe							
Total Factory Revenue	5,736	5,850	6,060	6,390	6,760	7,120	4.4
Software Revenue	1,848	1,990	2,160	2,380	2,610	2,840	9.0
Unit Shipments	245,054	271,900	304,600	337,000	359,700	374,800	8.9
Asia							
Total Factory Revenue	4,162	4,550	4,840	5,110	5,300	5,460	5.6
Software Revenue	1,288	1,480	1,680	1,870	2,020	2,130	10.6
Unit Shipments	182,151	224,000	255,300	277,900	294,800	303,500	10.7
Rest of World							
Total Factory Revenue	388	450	530	600	680	760	14.3
Software Revenue	132	170	210	250	290	340	20.6
Unit Shipments	20,563	25,000	30,400	37,200	43,900	50,600	19.7

Source: Dataquest (August 1993)

gradually beginning in the North American, U.K., and Asian countries other than Japan.

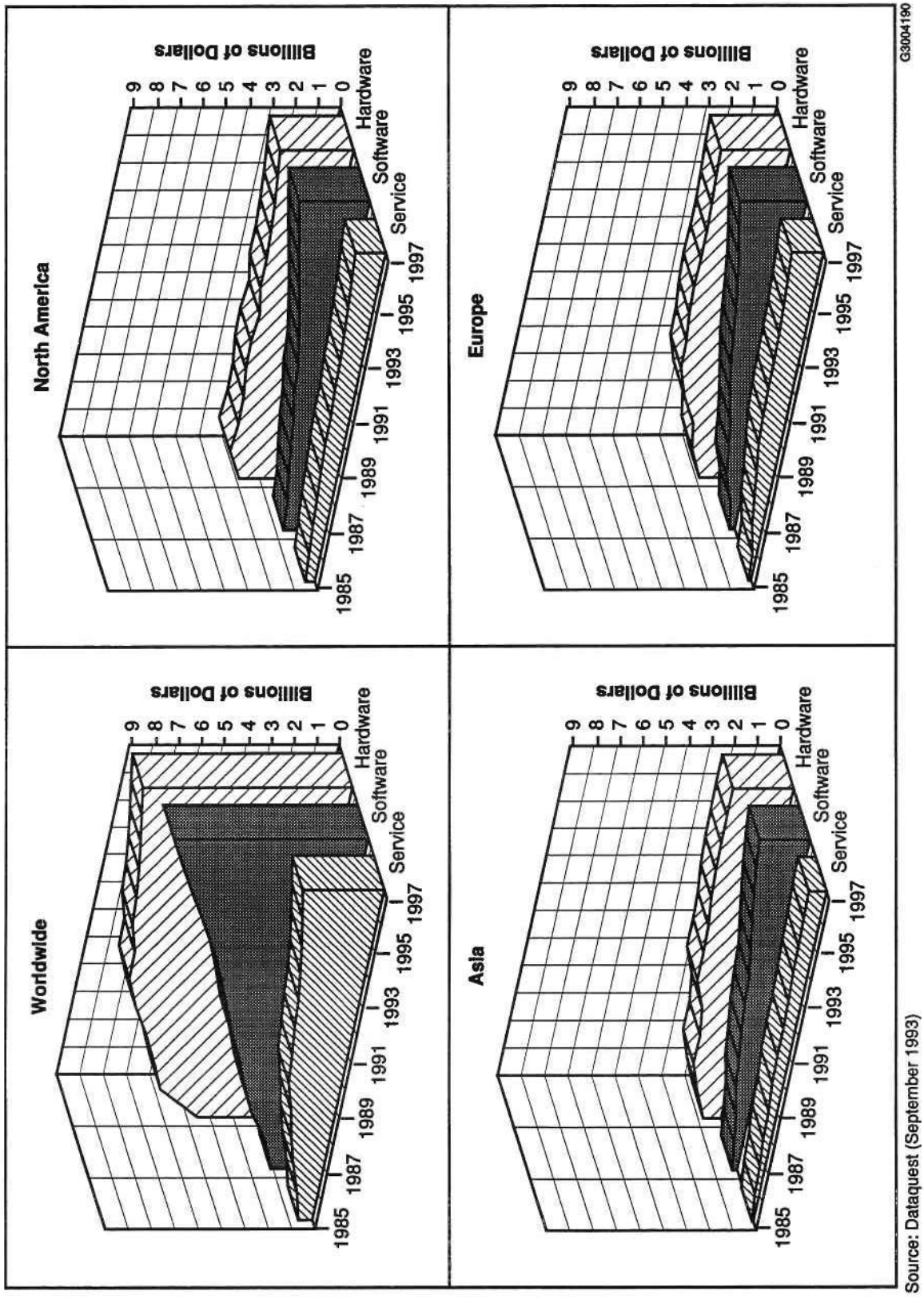
Technology

Computing performance will continue to improve at an exponential rate in the foreseeable future. The Dataquest Technical Computing group has forecast the growth in millions of instructions per second (mips) shipments: the total mips shipped in history through 1992 will be matched by the shipments in 1993. In other words, the total mips shipped will double in 1993, almost double again in 1994, and double again in 1995. This enabling resource will fuel the next-generation software tools focused on integrated solutions at the enterprise level.

Indispensability

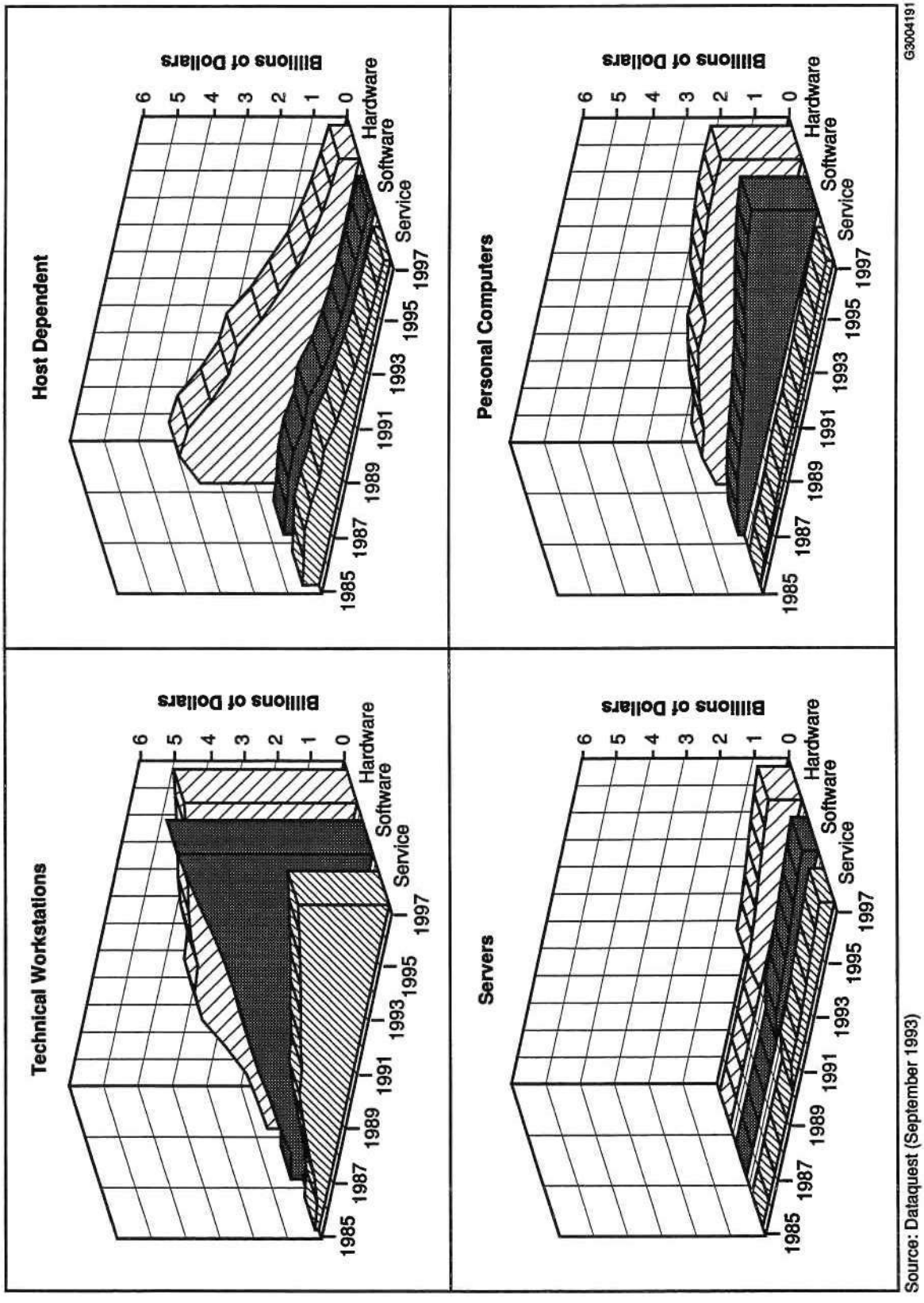
As the complexity of the design, the need to share information, and the need to store information electronically increase, the benefits of automation improve dramatically and the level of indispensability rises. This, coupled with market pressures to produce higher quality and to reduce production cycles, is making CAD/CAM/CAE/GIS a necessity.

Figure 2
Worldwide and Regional Revenue Forecast, All Applications and All Platforms



Source: Dataquest (September 1993)

Figure 3
Worldwide Revenue Forecast, by Platform, All Applications



Source: Dataquest (September 1993)

Late Buyers

A significant pool of untapped users still exists in mechanical, AEC, and GIS applications, driving additional growth. These conservative buyers will favor market leaders and installed systems for compatibility. For vendors, therefore, the value of high market share and customer satisfaction will increase.

Desktop Dominance

The turf war for desktop dominance is building steam with the introduction of the Pentium chip and Windows NT, which will fight to take market share from the higher-priced, multiple UNIX operating systems with RISC technology. In addition, the decline of host-dependent systems is continuing with replacements going to networked, desktop systems. Vendors, whose business models depend upon high-priced workstations, are threatened by these powerful new PCs. At the same time, the replacement of host systems provides them with opportunity for growth.

Unbundling of Software

With software vendors porting to multiple platforms, software is no longer the hinge upon which hardware swings. The market is quickly moving from proprietary to open systems, resulting in a shift from bundled to unbundled software (see Table 6).

Replacement Market

The replacement market is gaining importance as replacement seats exceed 50 percent of unit sales in 1993 (see Figure 4). This saturation implies that many parallel manual systems can be eliminated and new applications developed, knowing that everyone in a company needing access to the engineering database can have it in electronic format. The savings potential is tremendous. This also implies a growing sophistication in buyers who are more informed of the strategic importance of this technology.

Software

With technological advances, growing sophistication of users, and competitive pressures, the demand for software with greater ease of use, flexibility, and interoperability is growing. This demand is driving the growth in business alliances between small innovative software niche players and major software vendors with resources to sell to the new and replacement markets.

North American Forecast Drivers

North American CAD/CAM/CAE/GIS total revenue grew a robust 11.3 percent to $5.4 billion in 1992 and is forecast to grow at a 6.7 percent compound annual growth rate (CAGR) through 1997 to $7.5 billion. The following paragraphs describe the main factors driving the North American forecast.

Economy

According to The Dun & Bradstreet Corporation's August 1993 *Economic Overview*, the growth of the economy is led by capital spending and by trade, as the economies of U.S. trading partners bottom out. Information technology growth for the first two quarters of 1993 is an annualized

Table 6
CAD/CAM/CAE/GIS Software Revenue Forecast, by Application
(Millions of Dollars)

	1992	1993	1994	1995	1996	1997	CAGR (%) 1992-1997
All Applications							
Software Revenue	5,036	5,640	6,320	7,040	7,710	8,350	10.6
Bundled Software Revenue	1,939	1,960	2,000	2,040	2,090	2,120	1.8
Unbundled Software Revenue	3,097	3,680	4,320	4,990	5,620	6,230	15.0
Mechanical							
Software Revenue	2,341	2,630	2,880	3,140	3,360	3,550	8.7
Bundled Software Revenue	1,127	1,180	1,200	1,230	1,250	1,260	2.2
Unbundled Software Revenue	1,214	1,450	1,680	1,910	2,110	2,290	13.6
AEC							
Software Revenue	758	850	950	1,050	1,160	1,280	11.0
Bundled Software Revenue	300	310	330	340	360	380	4.9
Unbundled Software Revenue	458	540	620	710	800	900	14.3
GIS/Mapping							
16.0							
Bundled Software Revenue	267	290	320	340	370	400	8.6
Unbundled Software Revenue	362	430	520	640	770	920	20.5
Electronic CAE							
Software Revenue	764	860	1,010	1,160	1,280	1,390	12.7
Bundled Software Revenue	109	90	80	70	60	50	-13.0
Unbundled Software Revenue	655	770	930	1,090	1,220	1,340	15.3
IC Layout							
Software Revenue	233	260	290	320	360	400	11.3
Bundled Software Revenue	32	20	10	10	10	5	-28.9
Unbundled Software Revenue	201	240	280	310	350	395	14.3
PCB/Hybrid/MCM							
Software Revenue	312	330	350	380	400	420	6.0
Bundled Software Revenue	105	80	50	40	30	20	-26.3
Unbundled Software Revenue	208	250	300	340	370	400	13.7

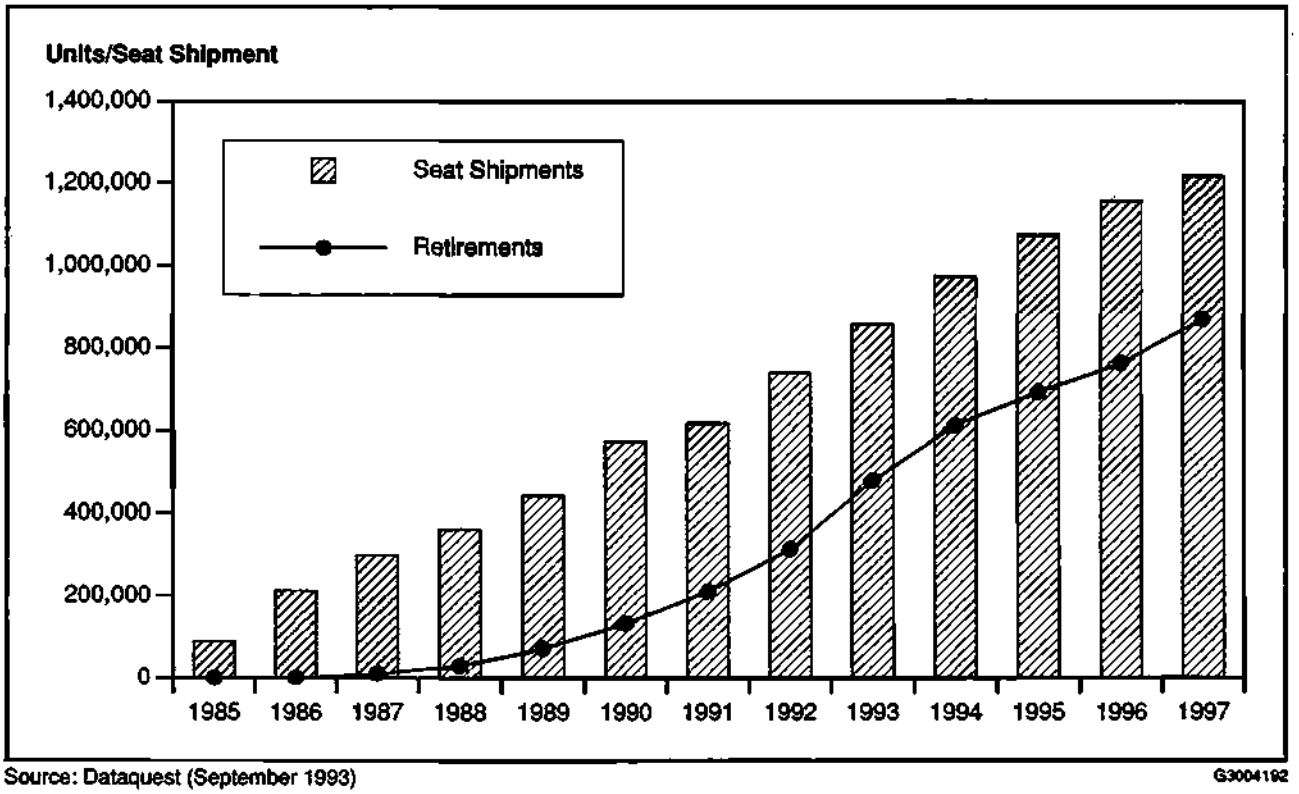
Source: Dataquest (August 1993)

13 percent, down from the 22 percent growth of the previous four quarters. The July 1993 survey of 1,000 manufacturers nationwide indicates that reduced output has resulted in a lowering of expectations, which should continue into the third quarter.

Cuts in Defense Spending

Cuts in defense spending will tend to soften the market. However, a focus on fewer, more sophisticated weapons systems will promote use of the latest design optimization and simulation capabilities.

Figure 4
Unit Shipments versus Retirements–History and Forecast



Source: Dataquest (September 1993) G3004192

European Forecast Drivers

The European market grew 3.6 percent to $5.7 billion in total revenue in 1992. This largest region is forecast to be the slowest growing at a mere 1.9 percent for 1993 to $5.8 billion, with a 1992 to 1997 CAGR of 4.4 percent. The major factor behind this slowing growth is the sluggish German economy, which accounts for 35 percent of the European market. A slowdown in Germany rippled through all other European industries. Table 7 provides the forecast software CAGR for 1992 to 1997 for each country for each application in Europe.

The following paragraphs describe the main factors driving the European forecast.

Economy

Hopes abound for a recovery in the second half of 1994, with the United Kingdom and the Netherlands already leading the way. Governments are struggling to contain mounting budget deficits, particularly in the United Kingdom and in Germany. Manufacturing industries are being affected by a decline in consumer spending because of high unemployment throughout Europe. Massive budget deficits will continue to influence government public spending.

Table 7
Compound Annual Growth Rate, 1992-1997, Software Revenue (Percent)

	Mechanical	AEC	GIS	ECAE	IC	PCB	All
United Kingdom	6.0	5.2	11.8	4.6	0.9	-0.7	6.5
France	6.3	8.4	18.5	3.5	4.6	0.0	7.0
Germany	7.3	10.5	17.0	5.0	3.9	2.7	8.7
Italy	9.6	7.5	10.4	6.4	1.9	3.2	9.0
Benelux	7.2	10.0	18.4	4.1	3.7	4.0	9.3
Scandinavia	9.0	8.9	14.3	4.8	7.1	1.5	9.1
Spain	6.5	9.1	15.5	5.1	3.7	-0.5	9.0
Rest of Europe	16.5	13.9	20.2	8.8	-1.7	0.3	14.7
Europe	8.4	9.8	15.6	5.1	2.7	1.4	9.0

Source: Dataquest (August 1993)

Growth

There are a few bright spots. The European railway industry is undergoing a renaissance. Major public works projects are planned in the Netherlands and Norway. Denmark is the beneficiary of the building in the eastern Germany area. Defense spending is refocusing from the personnel needs of the cold war to the equipment needs for desert warfare, urban terrorism, and rapid response capabilities. This, with the growth of the telecommunications industry, bodes well for EDA spending.

Currency

The appreciation of the dollar against the European currencies places additional pressure on dollar growth rates for the European community. Just as the dollar growth of the Asian market is strikingly higher than growth of the yen, the dollar growth of the European market is less than the growth in local currency. Additionally, this conversion ratio forces U.S. products to sell at reduced dollar prices to remain competitive with the European products, resulting in less revenue for U.S. vendors.

Asian Forecast Drivers

The Asian market grew 2.9 percent to $4.2 billion in total revenue for 1992. This represents a decrease of 4.3 percent on a yen basis. With the further depreciation of the dollar against the yen thus far in 1993, total revenue is forecast to grow 9.2 percent to $4.5 billion, which is a decrease of 3.9 percent on the yen. The following paragraphs describe the main factors driving the Asian forecast.

Economy

After a hopeful but false recovery during the first quarter of 1993, the Japanese economy has once again taken a nosedive. According to a MITI survey, Japanese industry plans to cut capital spending for a second straight fiscal year (*Nikkei Weekly*, June 7, 1993). The survey also indicated that capital spending growth should return during the first quarter of calendar 1994.

Currency

Just as the appreciation of the dollar against the ECU causes pricing pressure on U.S. goods in Europe, the even greater depreciation of the dollar against the yen causes pricing pressure on Japanese goods in the United States. This currency volatility creates a cauldron of price competitiveness in the Japanese markets, with U.S. software and hardware able to provide high profits at low prices relative to the Japanese competitors.

Competitive Model Change

Japanese CAD/CAM/CAE/GIS users are shifting from the large, general-purpose, computer systems to the smaller workstations and personal computers. In response, major Japanese computer manufacturers, no longer the one-stop shop, are joining forces with foreign computer companies to provide the multiple solutions that are being demanded, adding to the already complex relationships among Japanese companies.

Developing Asian Countries

Although the cheap labor of China, Vietnam, and other developing Asian countries is fueling enormous growth in manufacturing, the lack of experienced and highly educated engineers and managers prevents a corresponding growth in the CAD/CAM/CAE/GIS industries in these countries. The design function still resides in Japan, North America, and Europe.

Personal Computer

The Japanese PC platform has been a small part of the CAD/CAM/CAE/GIS market. The introduction of DOS/V and Windows NT will be generating interest in this low-cost solution, especially with the small, late buyers.

Virtual Reality

Japan is creating tools for virtual reality that will eventually lead to the development of new technology suitable to enhance CAD/CAM/CAE/GIS.

Application Forecast Assumptions

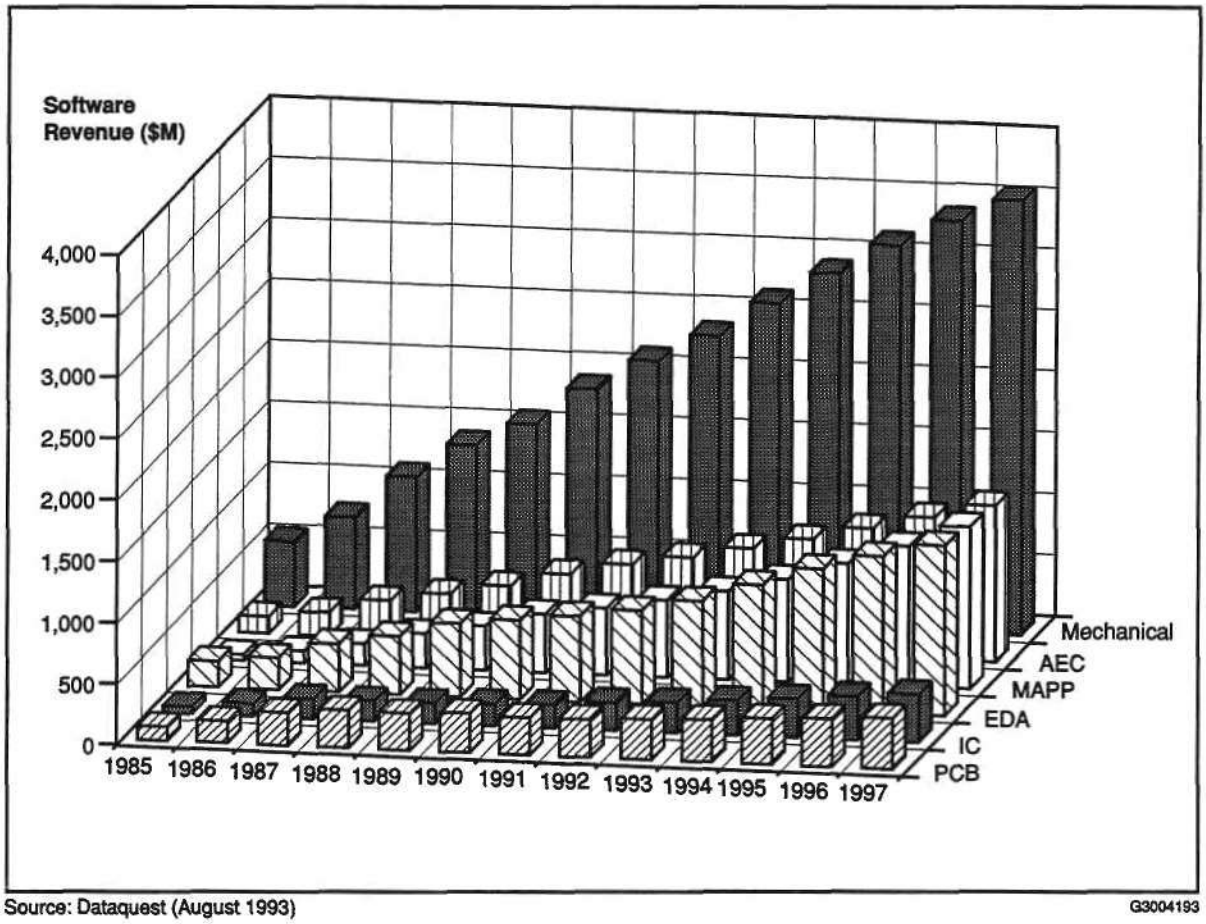
The expected growth in the next three or four years in AEC, GIS, ECAE, and IC applications is adding significantly to the total growth of the industry and is exceeding growth forecasts for mechanical and PCB applications. Market penetration, new application development, and shifting trends in average selling prices are all factors in this shift in total market application mix (see Figures 5 and 6).

Mechanical Forecast Assumptions

The mechanical application area is the largest of the CAD/CAM/CAE/GIS market with 46 percent share of software revenue, and a software revenue growth of 12.3 percent forecast for 1993. The main issues driving the mechanical forecast are as follows:

- Software price—Dataquest expects software prices to stabilize or increase slightly for leading products. The average value of software shipped per seat has increased slowly. In 1987, total software revenue

Figure 5
Worldwide Software Revenue Forecast by Application

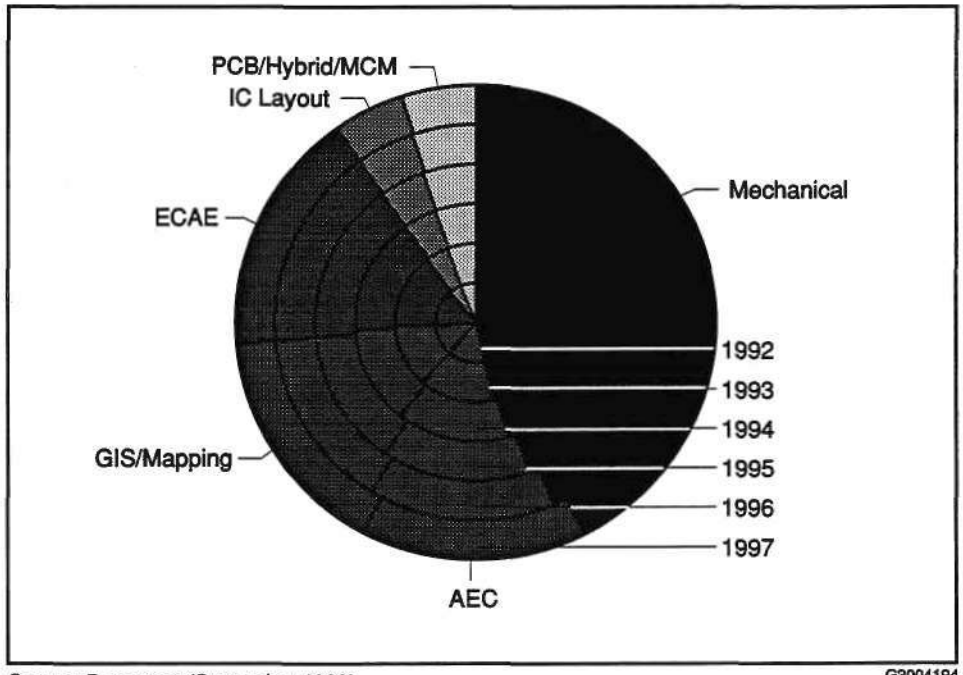


Source: Dataquest (August 1993) G3004193

divided by total number of seats shipped was $6,740. The average value has risen to $7,390 in 1992. Corresponding numbers in 1992 for technical workstation-based software are $19,338; $2,300 for the PC; and $11,544 for host-based seats. Leading vendors on all platforms have been raising prices directly or indirectly with new pricing structures for network licensing or site licensing. Microsoft's Windows NT is also expected to affect software prices, with PC vendors trying to raise prices, and workstation vendors possibly lowering prices as applications are ported to NT.

- Hardware price erosion—Dataquest expects hardware price erosion to continue at a slower rate as package complexity increases and accelerates demand for hardware purchases that provide more speed, memory, and storage. This trend can be expected on all platform configurations. Supercomputers are increasingly being used for high-end simulation and analysis applications while technical workstations range from very expensive, high-performance, real-time imaging systems to lower-cost, 2-D documentation systems. The need for integrated applications across platforms will cause significant upgrade and system replacements.

Figure 6
Software Revenue Distribution Forecast by Application



Source: Dataquest (September 1993) G3004194

- Second-tier products—With a smaller installed base and less market share, second-tier vendors with stale technology are expected to fight forced price erosion. These second-tier vendors are struggling to build market share in an atmosphere of rampant price cutting, particularly on the PC platform. Building market share by cutting prices is becoming a more risky strategy.
- Hardware performance—With enabling technology providing increased mips, software vendors can redefine the concept of interactive design. In the future, designers will simulate the crash of one car into another and test to see if the doors still open. The value of this level of computing will change the nature of mechanical CAD/CAM/CAE.

  The result will allow anyone in the design and manufacturing process to simulate real problems, to evaluate potential solutions, and to communicate the change instantly to all involved.
- Modeling technologies—Core modeling technologies will evolve slowly to support a product data structure growing in complexity. 3-D solutions are replacing 2-D solutions, which will be replaced by next-generation, integrated, solid-modeling-based solutions. The more complete data structure with improvements in performance is rapidly building strong interest with end users. The need to have this higher level of communication among departments is growing as well. Continued progress is being made in integration between the model and analysis applications, between model and documentation, and further into manufacturing applications.

- Technology dependence—The major mechanical applications have been defined: product conception, development, production, operation, and support will be necessary applications areas a hundred years from now. The dramatic changes taking place in the discrete manufacturing world because of competitive pressures are forcing shorter development cycles, localization and need for improved quality, resulting in a complexity that forces the users to be fully dependent upon this technology.
- Manufacturing industry—The growth opportunity in each country is dependent upon the success and health of the local manufacturing industries. Multinational corporations will fuel the growth in newly industrialized countries. Each country has a dominant industry or market segment that sets the tone for CAD/CAM/CAE use. The evolution of these industries has had an important impact on the growth of the CAD/CAM/CAE market in each region and has directed the success of many vendors trying to serve these markets. As an example, the automotive industries in Japan, the United States, Germany, Italy, and France have a major influence on these local CAD/CAM/CAE markets. Aerospace, a major force in the U.S. market, is less of a force in Europe and a minor but growing interest in Japan. All of the other manufacturing industries, such as fabricated metal, machinery, and consumer products, have strongholds in various locations around the world. For example, the machinery industry represents a significant local CAD/CAM/CAE opportunity in Japan and Germany.
- Europe—The automotive and aerospace industries, which are the largest customers of mechanical CAD/CAM/CAE tools, are suffering during the ongoing recession in Europe, experiencing budget and staff cuts. On top of this, 34 percent of the European mechanical market is in Germany where the economy is in a deep recession and manufacturing output is down. Growth for mechanical CAD software in 1992 was 10.1 percent and is expected to be 7.1 percent in 1993 as the German economy is not expected to get out of the recession before mid-1994 at the earliest.

AEC Forecast Assumptions

The AEC application area had software revenue growth in 1992 of 11.4 percent. The five-year CAGR for software is forecast to be 11.0 percent. The main factors driving the AEC forecast are as follows:

- Untapped users—A significant pool of untapped users still exists. The current relatively low market penetration of AEC CAD systems should allow steady worldwide growth during the next five years, despite constant volatility in demand for the building and infrastructure products to be designed.
- Mandates for CAD—Electronic design data is increasingly required by the designer's client, from the federal government down to the small commercial developer. In addition, design firms are growing at the expense of smaller firms. These large end users will increasingly require their employees and suppliers to adopt automation tools in the design and construction process.

- Electronic partnering—Designers in the AEC industry are finding themselves in markets that are more regionally and globally competitive, markets that favor partnering across design disciplines. Smaller design firms will increasingly buy CAD systems or risk being dropped from consideration as a partner.
- Competitive advantage—CAD purchases are increasingly justified as a competitive advantage in sales and design reviews. The architect who cannot produce the fourth iteration of a proposed design before signing up a client will lose out to the group that can use changes in a proposal to ratchet a prospect toward closure gradually.
- Software leverage—AEC CAD vendors can fuel upgrade revenue among sophisticated users by leveraging software advances first developed in mechanical design, such as faster structural analysis tools or incorporation of design rules.
- New functionality—Data and database functions (versus graphics functions) will increase in importance in AEC design systems, creating opportunities to sell users significant and new functionality.
- Europe—AEC growth in western Europe is tied to the construction industry and improvement of the infrastructure, manufacturing plants, and power stations in eastern Europe. In particular, German and Danish construction companies are involved in projects in former East Germany and central and eastern Europe. The construction industry in other countries is rather bleak, given the overbuilding of the 1980s and high interest rates. The Netherlands and Norway have public works projects planned or in process.

Growth Inhibitors to the AEC Industry

Trends that will inhibit growth in the AEC industry are as follows:

- Low payoff to users—AEC's one-design-one-build structure means CAD provides fewer economic benefits to these users than does the one-design-build-many structure of manufacturing. Construction, which is essentially a prototype build, is fraught with uncertainties and delays that are hard to change using design systems as they exist today.
- Lack of interoperability—Designs are often split among several different companies representing different aspects of the design process. User companies often have different CAD systems that do not communicate well, and alliances and consolidations in user organizations will only highlight the issue.
- Low-cost solutions—Because most AEC design is still focused on drafting, which requires relatively little computing power, PC-based growth will be strong for the foreseeable future, and PC-based solutions will produce less revenue to the vendor than other platforms.

- Late adopters—Attitudes of potential users inhibit market growth. Many experienced architects resist change in the design and construction processes. As this self-destructive mode of operating erodes the viability of the profession, the CAD market is also impacted because many architects who were once prospects for CAD systems simply are now unemployed.

GIS/Mapping Forecast Assumptions

The GIS application area had software revenue growth in 1992 of 15.3 percent. The five-year CAGR for software revenue is forecast to be 16.0 percent. The assumptions behind the GIS forecast are built on an optimism that during the forecast period the world economy will gradually improve and on an expectation that global competition will increase. Assumptions used to build Dataquest's GIS market forecast are as follows:

- Low penetration—Bread-and-butter prospects in government and utilities are charged with maintaining information on land and assets in perpetuity. The large number of utilities and sovereign and local governments all over the world still stuck with tabular data and paper maps, which will degrade, creates a plentiful supply of prospective buyers of the more readily changed and renewed computer maps, a first step to building a GIS system.
- New technologies—Faster, cheaper computers and developments in open, distributed systems open the door to an expanded user base. Advances in global positioning systems (GPSs) and aerial photography are making it possible to create GISs significantly more accurate and complete than existing paper maps, giving experienced users some compelling reasons to reinvest. Increasingly, portable computers, multimedia, cheaper storage, and better compression of satellite imagery will create opportunities to develop richer, more accurate, and more useful GIS systems. Although many markets will take advantage of these technologies, we can think of no other market as ready, willing, and able to put to work such a wide range of technology enhancements. Already in the last year or two, a number of users invested in image-oriented GIS systems, either supplementing or completely bypassing conversion of existing paper data that has helped provide a midlife kick to a market that has been slowed by troubled pilot projects.
- New applications in industries like retail and insurance will drive growth—Wherever there is competition for a limited prize—whether the prize is political or economic—GIS can create a competitive edge. Wherever assets or investments are geographically dispersed, GIS offers significant management capabilities. Revenue is growing more than 50 percent per year among new applications. However, we see a wide band of uncertainty surrounding future revenue opportunities. Several new applications in GIS are destined to become embedded as a relatively low revenue-producing feature in another software program (and market), rather than a standalone product in the GIS market.

- Easier and cheaper GIS—Inexpensive spatial data, public and private, is accumulating and can be passed on to new users. Successful multi-participant projects are growing, creating larger data sets that can be profitably resold by government/industry consortia. Also, although we do not envision the technology miracle that will eliminate development costs, implementation of GIS in new sites will be easier and cheaper than it has been.
- Solutions filling a need—GIS addresses the information age's growing problem of information overload. Any product that addresses a visible problem is more certain to grow than solutions that are still looking for the problem.
- The U.S. government—GIS is one of the rare markets where relatively simple government actions can directly fuel industry growth. In fact, the GIS industry depends on government cooperation for base data development. Governments all over the world are cooperating by developing spatial data standards, more sophisticated mapping goals, and increased cooperation across federal and local governments. The U.S. federal government is in a particularly influential position—and all stars are favorably positioned. The Landsat program appears to be headed in the direction of making satellite imagery more affordable. GPS satellites are proving extremely valuable outside of defense applications. Freedom of information remains a viable U.S. federal concept, creating opportunities to exploit low-cost, government-generated spatial data.

Growth Inhibitors to the GIS Industry

Trends that will inhibit growth in the GIS industry are as follows:

- High cost—Nothing important will emerge to create a low-cost, meaningful data set for traditional customers in government and utilities. Data conversion will remain costly, despite substantially lower-scanning costs and increasingly improved automated conversion products. The high cost will remain because, as existing paper records head toward computerization, widespread minor inaccuracies begin to be examined, often for the first time. The significant cost of correcting prior errors and omissions is inevitably bundled into the cost of conversion. At the same time, increasingly complex applications require increasingly accurate data, which also raises conversion costs.
- Stuck projects—The significant number of traditional GIS/mapping projects stuck in the pilot phase will reduce demand for new products, as users struggle to implement existing purchases. Even worse, the negative publicity created by these projects will chill the buying impulse among nonusers, reducing the ability of GIS projects to compete with other applications for capital equipment dollars.
- Price pressure—Computer prices will certainly drop, even in technical applications such as GIS where higher-performance hardware will command a premium price. Software prices are likely to come under increasing pressure, despite the industry's current ability to hold overall seat prices relatively even. Our current forecast is built on declining

hardware and steady software prices, primarily because of opportunities to add significant software data and functionality content to new sales among core, noncommodity buyers. Any significant deviation from this model would affect the forecast.

- Europe—GIS data in Europe is prohibitively expensive and not readily available, slowing down the potential growth. In addition, the current state of the various European economies, the enormous budget deficits of some of the major economies such as Germany, Italy, and the United Kingdom, and major cuts in public spending are holding back the development of GIS. However, the railway industry is a source of growth in GIS in Europe.

EDA Forecast Assumptions

The year 1992 showed a glimmer of hope in the EDA industry, with software revenue year-to-year growth rates climbing back to 8.9 percent, driven by the continued strength of the IC layout software industry and a resurgence in the CAE market. Dataquest expects EDA software revenue growth to increase to 10.4 percent year-to-year for 1993. Printed circuit board (PCB) software in particular will remain stagnant until multichip module (MCM) technologies begin to affect the market, which Dataquest anticipates will take effect in the 1994 to 1995 time frame. Factors that will help spur EDA software growth are as follows:

- New tool technologies—New tool technologies, including electronic system design automation (ESDA), signal integrity, and design automation, are becoming available, fueling growth.
- Analysis tools—Increasing clock frequencies require tighter design tolerances that require sophisticated analysis tools to ensure proper operation.
- Migration of IC layout—Migration of IC layout technologies to system designers in the form of floor planners may prove to be the vehicle to expand physical IC design into the larger ASIC design community.
- Europe—The EDA industry in Europe is now characterized by two or three big players jockeying for position. Furthermore, following the merger of Cadence Design Systems Inc. and Valid Logic Systems Inc., and several large end-user mergers, some strategic account changes have occurred and will continue. The total software revenue is unaffected, but market share is the prize for the winning EDA company.

Growth Inhibitors to the EDA Industry

Trends that will inhibit growth in the EDA industry are as follows:

- Short-term transitions and shifts—Product transition and strategy shifts will have a short-term downward effect. Difficulties at the No. 1 supplier of EDA software, Cadence, may cause a stall in the purchases of new tools as users ponder their options. Ongoing consolidations of key EDA technologies, including simulation and signal integrity, will also protract buying decisions.

- Financial results—Decreased revenue for all of EDA is readily evident in examining public company statements. As part of the forecasting process, Dataquest analyzes the short-term, company-specific issues. There are five publicly traded EDA software companies: Cadence, Mentor Graphics, Synopsys, Viewlogic, and Silvar-Lisco. These companies represent approximately 45 percent of the worldwide EDA software market. Comparing the first six months of 1992 versus the first six months of 1993, we find that the combined revenue of these companies was essentially flat. Cadence's troubles earlier in the year contributed heavily to this fact, but we anticipate that 1993 total EDA software revenue growth will suffer accordingly. Were it not for the stellar growth of such companies as Viewlogic and Synopsys, the EDA market would indeed be posting a poor 1993.
- Legal issues—Legal issues may induce fear, uncertainty, and doubt in buyers' minds. The recent spate of legal actions (for example, Synopsys versus Cadence, Analogy versus Anacad/Mentor Graphics, and stockholders versus Cadence) may divert the attention of the buying public and will definitely garner the attention of top management at the EDA vendors.
- Use of PC-based tools will drop significantly—Looking to EDA's future, Dataquest anticipates the use of what has classically been called PC-based tools to drop significantly. The Dataquest factors determining the differentiation of technical workstations from PCs are a virtual multitasking operating system (UNIX, VMS, and DOMAIN), the ability to run high-performance graphic applications in a multiuser environment, and the user's potential range of expansion on the platform. Windows NT on the Pentium chip will challenge this differentiation.

Dataquest anticipates that use of classical PCs as EDA platforms will begin to diminish significantly in 1995. At that time, classes of tools will be differentiated not upon hardware platform or operating system, but rather upon the features and functionality of the tools themselves. The emergence of Windows NT will have a minimal impact upon the overall revenue of the EDA software industry. However, its effect upon competing operating systems, average selling prices, distributing practices, and business and marketing practices will be far-reaching.

Forecast Comparison

The CAD/CAM/CAE/GIS database has undergone enormous scrutiny through our market share, forecast, market share update, and finally forecast update. It has only slightly changed downward from the 1992 forecast. In fact, the forecast total factory revenue for 1993 of $16.5 billion is only 1.3 percent higher than last year's forecast of $16.3 billion. However, the longer-term sights have been lowered so that the current 1996 forecast total factory revenue of $19.8 billion is 6.1 percent lower

than was forecast last year for 1996. By examining the numbers, we discovered the following lowered expectations:

- The biggest factor in this lowered forecast is in the more rapidly declining host-dependent business. This is supported by the market share update reporting a faster drop in the host-dependent platform than estimates from our earlier market share. The forecast total revenue for 1996 of $1.1 billion is 36.2 percent lower than the forecast last year for 1996.
- Regionally, the largest factor in this lowered forecast is Europe, where the 1996 forecast total factory revenue of $6.8 billion is 14.7 percent lower than the $7.9 billion forecast last year.
- As to applications, these lowered expectations apply to the AEC, GIS, IC, and PCB applications, while the mechanical and ECAE applications have been forecast to grow faster than reported in 1991.

Lowered expectations have become an economic reality, given that the recovery from this prolonged recession is not materializing as the past has taught us. However, a CAGR of 5.8 percent of this $15.7 billion industry is solid and continuing growth. The technologies provided by the CAD/CAM/CAE/GIS industry are no longer just nice ideas, but have become the ticket to compete globally. The technological improvements of software, hardware, and the increasing involvement of vendors through services will continue to fuel the growth of this CAD/CAM/CAE/GIS market.

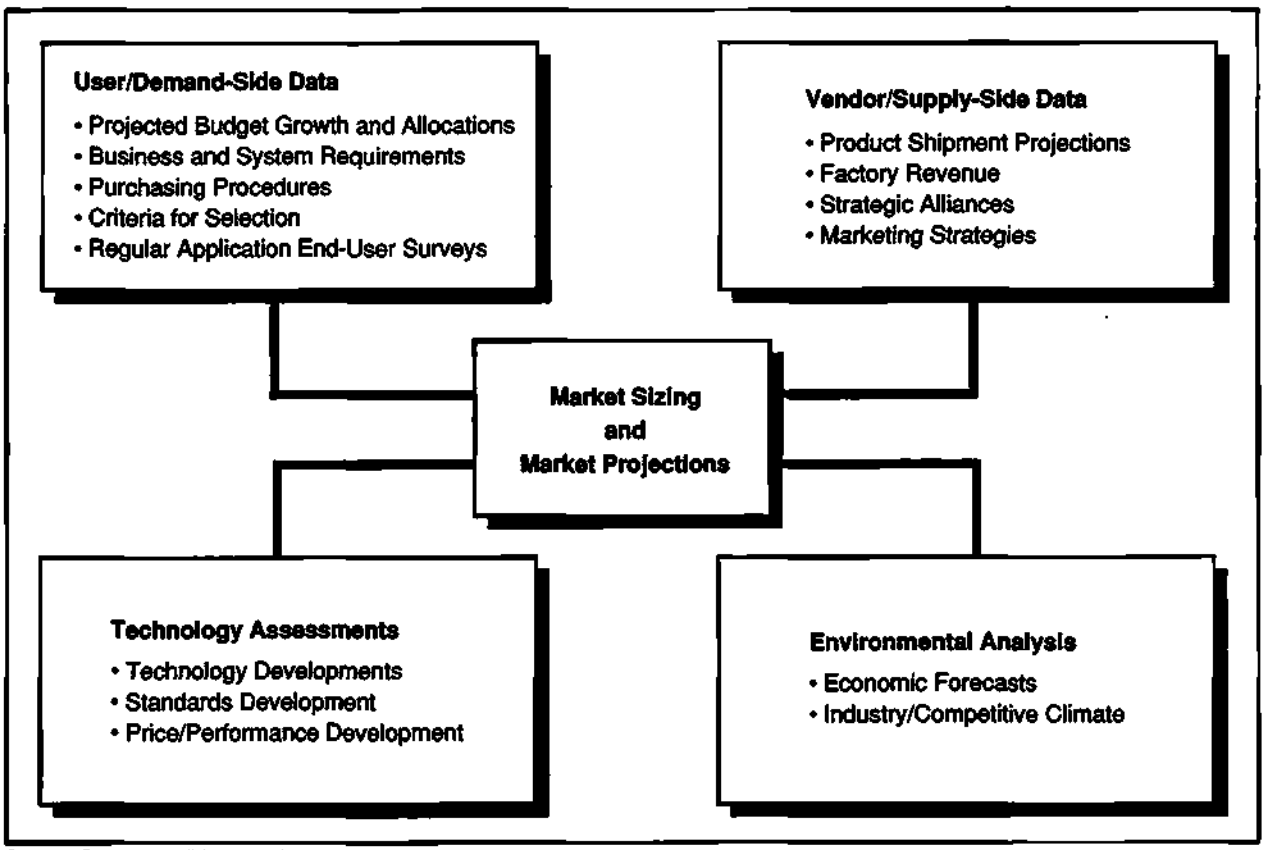
Forecast Methodology

Fundamental to the way Dataquest conducts its research is an underlying philosophy that says the best data and analyses come from a well-balanced program. This program includes the following: balance between primary and secondary collection techniques; balance between supply-side and demand-side analysis; balance between focused, industry-specific research and coordinated, "big-picture" analysis aided by integration of data from the more than 25 separate high-technology industries Dataquest covers; and balance between the perspectives of experienced industry professionals and rigorous, disciplined techniques of seasoned market researchers.

Dataquest also analyzes trends in the macro environment, which can have major influences on both supply-side and demand-side forecasting. In addition to demographics, analysts look at gross national product (GNP) growth, interest rate fluctuation, business expectations, and capital spending plans. In the geopolitical arena, the group looks at trade issues, political stability or lack thereof, tariffs, nontariff barriers, and such factors as the effect on Europe from the events of 1993.

Figure 7 shows the CAD/CAM/CAE and GIS forecasting model. The overall forecasting process uses a combination of forecasting techniques

Figure 7
CAD/CAM/CAE and GIS Forecasting Model



Source: Dataquest (May 1993) G9000529

such as time series and technological modeling. Market estimates and forecasts are derived using the following research techniques:

- "Bottom-up" aggregation—This method involves adding all relevant vendor contributions to arrive at total market estimates for all historical data.
- Segment forecasting—For each application segment tracked by the CAD/CAM/CAE and GIS group, individual forecasts are derived following the basic information model defined previously. Specifically, each design phase covered within each application is segmented by product, region, and platform. In this way, each application segment incorporates its own set of unique assumptions.
- Demand-based analysis—Market growth is tracked and forecast in terms of the present and anticipated demand of current and future users. This requires the development of a total available market model and a satisfied available market figure to assess the levels of penetration accurately. Installed base is also evaluated. Rates of product retirement are primarily based on input from end users in our ongoing survey programs. Dataquest analysts also factor in the acceptance or ability for users to consume new technology.

- Capacity-based analysis—This method involves identifying future shipment volume constraints. These constraints, or "ceilings," can be the result of component availability, manufacturing capacity, or distribution capacity. In any case, capacity limitations are capable of keeping shipments below the demand level.

Segmentation Definitions

This section lists the definitions specific to this document. The following paragraphs define the segments.

Applications

Mechanical

The mechanical segment refers to computer-aided tools used by engineers, designers, analysts, technicians, and draftspeople working predominantly in the discrete manufacturing industries, but includes government and education. Users of mechanical CAD/CAM/CAE tools work in all departments across the typical organization, with a majority found in product design, advanced engineering, and manufacturing engineering. Common design applications include conceptual design, industrial design, structural or thermal analysis, detail design, and electromechanical design (the mechanical part of design with electrical or electronic components and mechanisms). Common manufacturing applications include tool and fixture design, numerical control part programming, off-line robotics programming, and interface to quality control systems. Management tools for database control and distribution are included in this segment, as well as user-defined application programming.

Architecture, Engineering, and Construction (AEC)

The AEC segment covers the use of computer-aided tools by architects, contractors, plant engineers, civil engineers, and other people associated with these disciplines to aid in designing and managing buildings, industrial plants, ships, and other types of nondiscrete entities.

Geographic Information Systems (GIS)/Mapping

GIS is computer-based technology, and the segment is composed of hardware, software, and data used to capture, edit, display, and analyze spatial (tagged by location) information.

Electronic Design Automation (EDA)

The EDA segment covers computer-based tools used to automate the process of designing an electronic product, including printed circuit boards, ICs, and systems. EDA includes ECAE, IC layout, and PCB/hybrid/MCM, as follows:

- Electronic Computer-Aided Engineering (ECAE)—These are computer-aided tools used in the engineering or design phase of electronic products (as opposed to the physical layout phase of the product). Examples of ECAE applications are schematic capture and simulation.

- IC Layout—This is a software application tool used to create and validate the physical implementation of an IC. The IC layout category comprises polygon editors, symbolic editors, placement and routing (gate array, cell, and block), design verification tools (DRC/ERC/ logic-to-layout), compilers, and module development tools.
- PCB/Hybrid/MCM—This segment covers products used to create the placement and routing of the traces and components laid out on a printed circuit board. Also included in this category are thermal analysis tools.

Regions

The following paragraphs define the regions.

North America

North America includes United States, Mexico, and Canada.

Europe

Europe includes the United Kingdom, Scandinavia, Benelux, France, Germany, Italy, Spain, and Rest of Europe (which includes Austria, Switzerland, and eastern Europe)

Asia

Asia includes Japan, Singapore, Taiwan, Korea, China, and Hong Kong.

Rest of World

Rest of World includes all other countries including Australia, New Zealand, Oceania, Africa, Central America, South America, and the Middle East.

Platforms

The following paragraphs define the platforms.

Technical Workstation

A technical workstation is a single-user computer distinguished from a personal computer by its features and by the user's potential range of expansion on the platform. Features include a virtual, multitasking operating system (UNIX, VMS, or Domain); the computer is designed by the manufacturer to run high-performance graphics applications in a multiuser/multitasking environment.

Host-Dependent

Host-dependent is a shared logic system in which the external workstations' functions are dependent on a host computer.

Server

A server is a computer that transparently provides its resources for use by other computer systems. It is a system on a network that provides specific functionality to other computer systems: the clients. Functions include file storage, database access, and compute capability. Dataquest tracks the following major categories of servers used for CAD/CAM/ CAE and GIS applications:

- Compute Servers—These systems provide capabilities for solving numerical problems (for example, simulations, statistical calculations, and simultaneous partial differential equations). System features

usually include high-speed computational capabilities (for example, vector and parallel processing) and large memories.

- Print Servers—These systems provide access to printers, specialized printing applications software, and print-spooling resources to a network.
- File Servers—These systems provide mass storage capability to clients on a network. Services can range from temporary storage of working files to long-term backup and archive systems.
- Database Servers—These systems manage databases as a shared resource to a network. These servers handle such functions as physical data storage, data security, and high-level queries and can access stored information at the record level.

Personal Computer

A personal computer is a single-user computer distinguished from a technical workstation by its features and by the user's potential range of expansion on the platform. Features found in technical workstations (such as a virtual operating system, networking, high-performance graphics, multiuser/multitasking capability) are optional rather than integrated by the manufacturer.

Line Items

Line item definitions are as follows:

- Average selling price (ASP) is defined as the average price of a product, inclusive of any discounts.
- CPU revenue is the portion of revenue derived from a system sale that is related to the value of the CPU. (In the case of technical workstations and personal computers, CPU revenue contains the terminal revenue.)
- CPU shipment is defined as the number of CPUs delivered.
- CPU installed base is defined as the total number of CPUs in active, day-to-day use.
- Unit shipment is defined as the number of products delivered (that is, seats).
- Seats are defined as the number of possible simultaneous users.
- Installed seats are defined as the total number of seats in active, day-to-day use.
- Hardware revenue is defined as the sum of the revenue from the hardware system components: CPU revenue, terminal revenue, and peripherals revenue.
- Peripherals revenue is defined as the value of all the peripherals of a turnkey sale. (Peripherals in this category typically are input and output devices.)

- Terminal revenue is defined as revenue derived from the sale of terminals used to graphically create, analyze, or manipulate designs. The term is applicable only to the host-dependent platform, as terminal revenue is contained within CPU revenue for technical workstations and PCs.
- Software revenue is revenue derived from the sale of bundled (part of a turnkey system) and unbundled software.
- Service revenue is defined as revenue derived from the service and support of CAD/CAM/CAE or GIS systems. Service revenue can be calculated in the tables by subtracting hardware and software revenue from total revenue.
- Total factory revenue is defined as the amount of money received by a manufacturer for its goods measured in U.S. dollars and is the sum of hardware, software, and service revenue. Total factory revenue does not include revenue that a company may receive from products sold to another company for resale (OEM revenue).

Table 8
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Worldwide
Platform: All Platforms

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	327,778	409,510	538,320	588,125	714,918	837,960	956,260	1,059,380	1,143,110	1,204,830	22	11
Unit Shipments or Seats	361,352	441,741	573,145	617,881	739,511	857,220	972,110	1,072,720	1,154,950	1,215,880	20	10
CPU Installed Base	839,647	1,186,194	1,605,578	2,003,389	2,431,227	2,822,290	3,198,700	3,599,140	4,013,230	4,380,310	30	12
Installed Seats	980,787	1,350,923	1,791,358	2,198,827	2,625,122	3,004,370	3,363,650	3,743,980	4,136,500	4,482,760	28	11
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	77.8	61.3	53.9	47.8	44.3	40.7	37.9	36.3	35.4	34.8	-13	-5
Hardware-Only ASP	10.2	10.1	8.1	7.7	7.2	6.4	5.8	5.5	5.4	5.3	-8	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	6,425	7,252	7,757	7,823	8,132	8,237	8,378	8,572	8,786	8,993	6	2
CPU Revenue	4,655	5,720	6,217	6,455	6,850	7,036	7,228	7,461	7,700	7,921	10	3
Terminal Revenue	879	621	530	456	396	311	257	215	190	177	-18	-15
Peripheral Revenue (Turnkey)	891	912	1,010	912	886	891	893	895	896	895	-0	0
Software Revenue	2,991	3,459	4,085	4,544	5,036	5,642	6,315	7,035	7,709	8,353	14	11
Bundled	1,446	1,795	1,991	2,025	1,939	1,964	1,996	2,043	2,086	2,124	8	2
Unbundled	1,545	1,663	2,094	2,520	3,097	3,677	4,320	4,992	5,623	6,229	19	15
Service Revenue	1,664	1,935	2,296	2,409	2,555	2,648	2,830	3,033	3,266	3,510	11	7
Total Factory Revenue	11,080	12,646	14,138	14,776	15,723	16,527	17,524	18,640	19,761	20,856	9	6
Increase over Prior Year (%)	15	14	12	5	6	5	6	6	6	6		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 9
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Worldwide
Platform: Technical Workstation

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	69,726	114,136	132,368	150,748	172,249	199,480	225,500	251,650	276,880	304,700	25	12
Unit Shipments or Seats	69,726	114,136	132,368	150,748	172,249	199,480	225,500	251,650	276,880	304,700	25	12
CPU Installed Base	155,675	260,456	375,661	496,882	622,585	751,440	882,950	1,012,080	1,147,530	1,280,970	41	16
Installed Seats	155,675	260,456	375,661	496,882	622,585	751,440	882,950	1,012,080	1,147,530	1,280,970	41	16
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	59.3	54.3	47.2	47.4	46.1	44.3	42.6	41.4	40.4	39.5	-6	-3
Hardware-Only ASP	21.3	17.3	20.0	16.5	17.9	16.3	15.0	14.1	13.6	13.1	-4	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	2,332	3,208	3,618	3,669	4,039	4,290	4,474	4,672	4,880	5,104	15	5
CPU Revenue	1,865	2,630	2,962	3,096	3,467	3,694	3,868	4,055	4,255	4,472	17	5
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	467	578	656	573	571	596	605	617	625	633	5	2
Software Revenue	1,513	2,017	2,447	2,827	3,256	3,705	4,201	4,749	5,262	5,773	21	12
Bundled	807	1,218	1,343	1,396	1,404	1,444	1,483	1,538	1,590	1,639	15	3
Unbundled	706	799	1,104	1,431	1,852	2,261	2,718	3,211	3,672	4,134	27	17
Service Revenue	819	1,139	1,425	1,527	1,743	1,896	2,076	2,265	2,464	2,671	21	9
Total Factory Revenue	4,664	6,364	7,489	8,022	9,037	9,891	10,752	11,686	12,606	13,548	18	8
Increase over Prior Year (%)	51	36	18	7	13	9	9	9	8	7		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 10
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Worldwide
Platform: Host-Dependent

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	8,968	15,064	17,957	10,142	7,518	5,810	4,810	4,110	3,710	3,470	-4	-14
Unit Shipments or Seats	42,541	47,296	52,782	39,897	32,111	25,070	20,650	17,450	15,550	14,520	-7	-15
CPU Installed Base	37,546	50,106	64,406	69,648	70,928	69,580	65,760	59,790	53,110	48,080	17	-7
Installed Seats	178,687	214,835	250,186	265,086	264,822	251,660	230,700	204,620	176,380	150,530	10	-11
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	403.6	324.8	216.8	206.4	227.3	218.6	215.5	217.3	219.7	222.3	-13	-0
Hardware-Only ASP	300.6	115.7	110.6	238.8	235.3	243.8	240.1	225.3	210.5	200.0	-6	-3
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	2,791	2,475	2,390	1,855	1,490	1,120	904	754	663	609	-15	-16
CPU Revenue	1,627	1,632	1,652	1,256	992	733	585	487	428	391	-12	-17
Terminal Revenue	879	621	530	456	396	311	257	215	190	177	-18	-15
Peripheral Revenue (Turnkey)	284	222	208	143	102	77	62	51	45	41	-23	-17
Software Revenue	820	675	740	496	369	299	250	220	204	196	-18	-12
Bundled	483	438	510	337	241	198	170	150	141	136	-16	-11
Unbundled	337	238	230	160	128	100	80	70	63	61	-22	-14
Service Revenue	758	667	734	543	454	339	276	235	213	201	-12	-15
Total Factory Revenue	4,369	3,817	3,864	2,895	2,313	1,758	1,431	1,210	1,081	1,006	-15	-15
Increase over Prior Year (%)	-10	-13	1	-25	-20	-24	-19	-15	-11	-7		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 11
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Worldwide
Platform: Server

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	NA	NA	NA	14,830	15,424	19,070	23,440	27,830	32,180	36,090	NA	19
Unit Shipments or Seats	NA	NA	NA	14,830	15,424	19,070	23,440	27,830	32,180	36,090	NA	19
CPU Installed Base	NA	NA	NA	14,830	30,253	48,400	69,310	90,780	113,480	132,260	NA	34
Installed Seats	NA	NA	NA	14,830	30,253	48,400	69,310	90,780	113,480	132,260	NA	34
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	NA	NA	NA	64.4	66.7	63.9	61.2	58.2	55.4	52.9	NA	-5
Hardware-Only ASP	NA	NA	NA	36.9	33.4	30.3	27.8	26.4	25.6	25.1	NA	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	NA	NA	NA	586	576	652	737	815	893	958	NA	11
CPU Revenue	NA	NA	NA	521	501	569	646	724	801	868	NA	12
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	NA	NA	NA	65	75	83	91	91	92	91	NA	4
Software Revenue	NA	NA	NA	189	216	265	318	370	421	470	NA	17
Bundled	NA	NA	NA	140	140	163	185	199	207	209	NA	8
Unbundled	NA	NA	NA	49	76	102	133	171	215	260	NA	28
Service Revenue	NA	NA	NA	222	228	265	308	349	391	430	NA	13
Total Factory Revenue	NA	NA	NA	998	1,020	1,183	1,363	1,534	1,705	1,858	NA	13
Increase over Prior Year (%)	NA	NA	NA	NA	2	16	15	13	11	9		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.

Source: Dataquest (September 1993)

Table 12
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Worldwide
Platform: Personal Computer

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	249,085	280,309	387,995	412,406	519,727	613,590	702,520	775,790	830,330	860,570	20	11
Unit Shipments or Seats	249,085	280,309	387,995	412,406	519,727	613,590	702,520	775,790	830,330	860,570	20	11
CPU Installed Base	646,426	875,632	1,165,511	1,422,028	1,707,462	1,952,870	2,180,680	2,436,500	2,699,110	2,919,000	27	11
Installed Seats	646,426	875,632	1,165,511	1,422,028	1,707,462	1,952,870	2,180,680	2,436,500	2,699,110	2,919,000	27	11
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	20.8	19.5	19.6	13.8	13.5	12.2	11.0	10.4	9.9	9.6	-10	-7
Hardware-Only ASP	4.7	4.8	3.9	3.7	3.5	3.2	2.9	2.8	2.6	2.5	-7	-7
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	1,302	1,570	1,749	1,714	2,028	2,174	2,263	2,331	2,350	2,321	12	3
CPU Revenue	1,163	1,458	1,603	1,582	1,890	2,040	2,128	2,195	2,216	2,191	13	3
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	139	112	146	131	138	134	135	136	134	130	-0	-1
Software Revenue	658	767	899	1,032	1,195	1,373	1,546	1,696	1,822	1,914	16	10
Bundled	156	140	139	152	153	159	157	156	149	141	-1	-2
Unbundled	501	627	760	881	1,043	1,214	1,389	1,540	1,673	1,774	20	11
Service Revenue	88	130	137	116	130	148	170	184	198	209	10	10
Total Factory Revenue	2,047	2,466	2,785	2,862	3,353	3,694	3,979	4,211	4,370	4,444	13	6
Increase over Prior Year (%)	23	20	13	3	17	10	8	6	4	2		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 13
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: North America
Platform: All Platforms

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	173,485	178,297	202,068	216,626	284,752	331,970	378,610	417,990	454,150	484,740	13	11
Unit Shipments or Seats	186,357	188,938	216,225	228,976	291,743	336,300	381,810	420,680	456,610	487,050	12	11
CPU Installed Base	454,743	595,031	729,620	843,736	985,687	1,118,370	1,256,780	1,411,860	1,579,150	1,734,620	21	12
Installed Seats	523,506	667,708	807,212	922,102	1,058,242	1,181,280	1,308,990	1,453,440	1,610,370	1,756,340	19	11
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	79.0	68.7	63.4	51.9	46.9	44.0	41.7	40.1	38.8	37.8	-12	-4
Hardware-Only ASP	8.7	9.9	8.8	8.4	7.5	6.5	5.9	5.7	5.5	5.5	-4	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	2,414	2,598	2,629	2,512	2,745	2,732	2,805	2,900	3,023	3,165	3	3
CPU Revenue	1,859	2,105	2,090	2,082	2,404	2,444	2,534	2,636	2,759	2,899	7	4
Terminal Revenue	315	230	250	213	123	71	52	43	39	36	-21	-22
Peripheral Revenue (Turnkey)	240	263	289	217	217	216	220	221	225	230	-3	1
Software Revenue	1,114	1,233	1,459	1,541	1,767	2,000	2,272	2,537	2,788	3,040	12	11
Bundled	367	437	496	433	385	372	382	393	407	421	1	2
Unbundled	747	795	963	1,108	1,383	1,628	1,889	2,144	2,381	2,619	17	14
Service Revenue	670	755	830	833	925	947	1,025	1,108	1,205	1,314	8	7
Total Factory Revenue	4,198	4,586	4,918	4,886	5,437	5,679	6,102	6,545	7,017	7,520	7	7
Increase over Prior Year (%)	6	9	7	-1	11	4	7	7	7	7		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 14
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: North America
Platform: Technical Workstation

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	28,387	42,785	44,261	51,287	64,514	75,450	86,150	96,640	107,440	121,570	23	14
Unit Shipments or Seats	28,387	42,785	44,261	51,287	64,514	75,450	86,150	96,640	107,440	121,570	23	14
CPU Installed Base	72,703	109,787	144,955	182,369	226,862	274,820	325,900	377,690	434,140	493,330	33	17
Installed Seats	72,703	109,787	144,955	182,369	226,862	274,820	325,900	377,690	434,140	493,330	33	17
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	52.1	52.6	47.2	42.7	39.1	37.2	35.7	34.6	33.8	33.0	-7	-3
Hardware-Only ASP	22.7	17.2	19.1	15.6	16.0	14.6	13.5	12.7	12.2	11.9	-8	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	846	1,097	1,115	1,063	1,232	1,298	1,357	1,417	1,496	1,612	10	6
CPU Revenue	702	925	932	947	1,114	1,180	1,238	1,296	1,372	1,483	12	6
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	144	173	183	115	118	118	120	121	125	129	-5	2
Software Revenue	557	692	861	940	1,065	1,200	1,366	1,534	1,692	1,866	18	12
Bundled	247	325	356	311	277	259	261	267	277	289	3	1
Unbundled	310	367	505	629	789	941	1,105	1,266	1,415	1,577	26	15
Service Revenue	333	466	524	541	615	666	733	798	869	954	17	9
Total Factory Revenue	1,735	2,255	2,499	2,544	2,913	3,164	3,456	3,749	4,058	4,431	14	9
Increase over Prior Year (%)	45	30	11	2	15	9	9	8	8	9		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 15
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: North America
Platform: Host-Dependent

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	3,373	6,084	6,324	2,434	2,099	1,260	930	810	780	770	-11	-18
Unit Shipments or Seats	16,245	16,725	20,481	14,784	9,090	5,590	4,130	3,500	3,230	3,080	-14	-19
CPU Installed Base	17,805	22,073	26,223	26,104	25,211	23,430	20,940	17,930	15,070	13,220	9	-12
Installed Seats	86,568	94,750	103,815	104,469	97,766	86,330	73,150	59,510	46,300	34,940	3	-19
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	320.9	388.8	301.1	279.7	342.6	342.3	338.5	330.9	317.4	304.9	2	-2
Hardware-Only ASP	339.2	108.4	114.8	258.2	184.0	173.6	165.8	155.0	145.6	136.6	-14	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	996	876	897	585	430	255	183	152	138	130	-19	-21
CPU Revenue	588	573	576	339	283	168	121	100	90	85	-17	-21
Terminal Revenue	315	230	250	213	123	71	52	43	39	36	-21	-22
Peripheral Revenue (Turnkey)	93	74	71	33	24	15	11	9	9	8	-29	-19
Software Revenue	297	236	250	134	103	80	63	55	52	53	-23	-12
Bundled	113	106	135	64	36	30	25	24	24	25	-25	-7
Unbundled	184	129	115	70	67	50	38	32	29	28	-22	-16
Service Revenue	304	245	271	165	153	96	71	60	55	53	-16	-19
Total Factory Revenue	1,598	1,357	1,418	884	685	430	317	267	245	236	-19	-19
Increase over Prior Year (%)	-22	-15	5	-38	-22	-37	-26	-16	-8	-4		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 16
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: North America
Platform: Server

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	NA	NA	NA	7,373	8,513	10,600	13,180	15,670	18,120	20,290	NA	19
Unit Shipments or Seats	NA	NA	NA	7,373	8,513	10,600	13,180	15,670	18,120	20,290	NA	19
CPU Installed Base	NA	NA	NA	7,373	15,886	25,980	37,750	49,890	62,720	73,350	NA	36
Installed Seats	NA	NA	NA	7,373	15,886	25,980	37,750	49,890	62,720	73,350	NA	36
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	NA	NA	NA	56.7	62.7	60.2	57.8	54.9	52.2	49.8	NA	-5
Hardware-Only ASP	NA	NA	NA	32.1	32.4	29.3	27.0	25.7	24.9	24.4	NA	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	NA	NA	NA	247	304	346	396	439	480	514	NA	11
CPU Revenue	NA	NA	NA	215	263	300	345	388	429	464	NA	12
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	NA	NA	NA	32	41	46	51	51	51	51	NA	5
Software Revenue	NA	NA	NA	83	117	146	177	207	237	263	NA	18
Bundled	NA	NA	NA	53	68	79	92	98	103	104	NA	9
Unbundled	NA	NA	NA	30	49	67	85	108	134	159	NA	26
Service Revenue	NA	NA	NA	97	124	145	171	194	219	240	NA	14
Total Factory Revenue	NA	NA	NA	428	544	637	744	840	936	1,018	NA	13
Increase over Prior Year (%)	NA	NA	NA	NA	27	17	17	13	11	9		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 17
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: North America
Platform: Personal Computer

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	141,725	129,427	151,483	155,531	209,626	244,660	278,350	304,860	327,830	342,110	10	10
Unit Shipments or Seats	141,725	129,427	151,483	155,531	209,626	244,660	278,350	304,860	327,830	342,110	10	10
CPU Installed Base	364,235	463,171	558,442	627,890	717,727	794,140	872,190	966,350	1,067,210	1,154,720	18	10
Installed Seats	364,235	463,171	558,442	627,890	717,727	794,140	872,190	966,350	1,067,210	1,154,720	18	10
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	25.7	17.1	19.7	14.4	11.3	10.1	8.8	8.2	7.4	7.1	-19	-9
Hardware-Only ASP	4.0	4.8	4.0	3.9	3.7	3.4	3.1	2.9	2.8	2.7	-2	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	572	625	617	617	779	832	868	892	909	909	8	3
CPU Revenue	569	608	582	580	745	796	830	852	868	868	7	3
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	3	17	35	37	35	37	38	40	41	42	79	4
Software Revenue	260	305	348	384	482	575	665	741	807	858	17	12
Bundled	7	6	5	4	4	4	4	3	3	3	-12	-6
Unbundled	253	299	343	379	478	571	662	738	804	855	17	12
Service Revenue	33	43	36	30	33	41	50	56	62	67	0	15
Total Factory Revenue	866	974	1,001	1,031	1,295	1,448	1,584	1,689	1,778	1,835	11	7
Increase over Prior Year (%)	24	12	3	3	26	12	9	7	5	3		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 18
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Europe
Platform: All Platforms

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	96,335	139,725	183,170	198,968	234,957	263,840	297,950	331,290	354,560	369,960	25	10
Unit Shipments or Seats	108,197	152,758	195,192	209,125	245,054	271,950	304,570	336,950	359,670	374,780	23	9
CPU Installed Base	233,705	358,617	510,685	656,608	805,395	925,920	1,032,390	1,146,430	1,265,960	1,370,060	36	11
Installed Seats	271,721	408,914	570,919	722,763	874,503	994,060	1,096,620	1,204,840	1,317,650	1,415,190	34	10
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	64.4	68.6	56.9	55.4	48.8	44.7	41.6	39.8	38.5	37.5	-7	-5
Hardware-Only ASP	12.6	10.6	8.1	7.7	7.3	6.5	5.9	5.5	5.3	5.3	-13	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	2,265	2,675	2,688	2,836	2,850	2,805	2,803	2,852	2,912	2,959	6	1
CPU Revenue	1,708	2,109	2,204	2,383	2,407	2,402	2,427	2,493	2,561	2,613	9	2
Terminal Revenue	278	254	165	158	161	131	108	91	80	75	-13	-14
Peripheral Revenue (Turnkey)	280	313	319	295	282	271	268	269	271	271	0	-1
Software Revenue	1,019	1,224	1,455	1,692	1,848	1,990	2,159	2,375	2,609	2,840	16	9
Bundled	488	672	761	852	829	836	847	876	910	940	14	3
Unbundled	531	552	694	840	1,019	1,154	1,312	1,499	1,699	1,900	18	13
Service Revenue	622	773	944	1,007	1,038	1,050	1,093	1,156	1,240	1,325	14	5
Total Factory Revenue	3,906	4,672	5,087	5,535	5,736	5,845	6,055	6,384	6,761	7,124	10	4
Increase over Prior Year (%)	32	20	9	9	4	2	4	5	6	5		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 19
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Europe
Platform: Technical Workstation

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	26,255	41,398	46,749	54,840	62,296	68,640	75,300	82,280	89,440	96,290	24	9
Unit Shipments or Seats	26,255	41,398	46,749	54,840	62,296	68,640	75,300	82,280	89,440	96,290	24	9
CPU Installed Base	51,354	90,575	132,326	177,803	224,260	267,990	309,410	347,790	387,190	423,260	45	14
Installed Seats	51,354	90,575	132,326	177,803	224,260	267,990	309,410	347,790	387,190	423,260	45	14
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	54.4	55.2	47.9	47.3	46.5	44.6	42.8	41.5	40.5	39.6	-4	-3
Hardware-Only ASP	22.9	16.9	20.8	18.1	19.6	17.9	16.4	15.5	14.9	14.5	-4	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	893	1,208	1,325	1,387	1,544	1,574	1,604	1,652	1,715	1,770	15	3
CPU Revenue	736	1,014	1,126	1,207	1,359	1,389	1,419	1,465	1,525	1,578	17	3
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	158	194	199	180	184	185	185	187	190	192	4	1
Software Revenue	554	742	933	1,110	1,290	1,405	1,541	1,714	1,909	2,107	24	10
Bundled	288	467	563	635	662	676	692	719	750	778	23	3
Unbundled	266	274	370	476	628	729	849	995	1,159	1,329	24	16
Service Revenue	317	477	626	656	755	792	842	904	979	1,053	24	7
Total Factory Revenue	1,764	2,427	2,884	3,154	3,589	3,772	3,987	4,270	4,604	4,930	19	7
Increase over Prior Year (%)	63	38	19	9	14	5	6	7	8	7		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.

Source: Dataquest (September 1993)

Table 20
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Europe
Platform: Host-Dependent

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	3,238	5,101	5,381	2,780	1,571	1,270	1,080	970	930	930	-17	-10
Unit Shipments or Seats	15,100	18,135	17,403	12,937	11,668	9,380	7,700	6,630	6,040	5,760	-6	-13
CPU Installed Base	9,904	14,720	19,436	21,173	21,221	20,260	18,600	16,420	14,280	12,840	21	-10
Installed Seats	47,919	65,017	79,669	87,327	90,329	88,400	82,820	74,830	65,970	57,960	17	-8
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	342.8	386.4	240.7	351.2	489.1	465.8	449.4	433.5	416.1	399.5	9	-4
Hardware-Only ASP	375.4	129.3	115.9	205.9	272.7	265.7	250.7	234.4	217.9	204.5	-8	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	975	937	750	671	509	391	313	265	238	225	-15	-15
CPU Revenue	602	614	524	463	319	238	188	160	145	137	-15	-16
Terminal Revenue	278	254	165	158	161	131	108	91	80	75	-13	-14
Peripheral Revenue (Turnkey)	94	69	61	50	29	22	17	15	14	13	-26	-15
Software Revenue	257	225	225	177	114	90	75	68	66	66	-18	-10
Bundled	166	172	170	132	80	62	51	47	47	48	-17	-10
Unbundled	91	53	55	44	34	28	24	21	19	18	-22	-12
Service Revenue	272	252	263	225	165	127	103	89	83	80	-12	-13
Total Factory Revenue	1,504	1,414	1,238	1,072	787	608	491	423	387	370	-15	-14
Increase over Prior Year (%)	10	-6	-12	-13	-27	-23	-19	-14	-8	-4		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 21
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Europe
Platform: Server

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	NA	NA	NA	4,397	4,354	5,250	6,250	7,270	8,250	9,110	NA	16
Unit Shipments or Seats	NA	NA	NA	4,397	4,354	5,250	6,250	7,270	8,250	9,110	NA	16
CPU Installed Base	NA	NA	NA	4,397	8,751	13,740	19,290	24,790	30,460	34,880	NA	32
Installed Seats	NA	NA	NA	4,397	8,751	13,740	19,290	24,790	30,460	34,880	NA	32
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	NA	NA	NA	72.9	68.9	65.9	63.1	60.1	57.3	54.6	NA	-5
Hardware-Only ASP	NA	NA	NA	49.1	36.7	33.7	30.9	29.3	28.5	28.0	NA	-5
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	NA	NA	NA	218	174	194	213	232	251	267	NA	9
CPU Revenue	NA	NA	NA	199	153	171	189	207	226	242	NA	10
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	NA	NA	NA	19	21	23	25	25	25	25	NA	4
Software Revenue	NA	NA	NA	64	61	74	86	99	111	121	NA	15
Bundled	NA	NA	NA	53	45	52	58	63	65	66	NA	8
Unbundled	NA	NA	NA	11	16	22	28	36	46	55	NA	27
Service Revenue	NA	NA	NA	85	69	78	88	98	109	118	NA	11
Total Factory Revenue	NA	NA	NA	368	304	346	387	430	471	505	NA	11
Increase over Prior Year (%)	NA	NA	NA	NA	-17	14	12	11	9	7		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 22
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Europe
Platform: Personal Computer

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	66,843	93,225	131,041	136,951	166,736	188,670	215,310	240,780	255,940	263,630	26	10
Unit Shipments or Seats	66,843	93,225	131,041	136,951	166,736	188,670	215,310	240,780	255,940	263,630	26	10
CPU Installed Base	172,447	253,322	358,923	453,236	551,163	623,930	685,090	757,430	834,030	899,090	34	10
Installed Seats	172,447	253,322	358,923	453,236	551,163	623,930	685,090	757,430	834,030	899,090	34	10
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	13.9	24.9	26.2	17.6	15.3	13.8	12.5	11.8	11.3	10.9	2	-7
Hardware-Only ASP	5.3	5.0	4.2	3.7	3.4	3.2	2.9	2.7	2.6	2.5	-11	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	398	530	614	560	624	645	673	703	708	698	12	2
CPU Revenue	370	481	554	515	575	604	631	661	665	656	12	3
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	28	49	60	45	49	42	42	42	42	41	15	-3
Software Revenue	207	258	297	341	383	421	458	493	523	547	17	7
Bundled	33	33	29	32	42	47	46	47	47	48	6	3
Unbundled	174	225	268	309	342	374	412	446	476	499	18	8
Service Revenue	33	44	54	41	48	53	60	64	69	73	10	9
Total Factory Revenue	637	832	965	941	1,056	1,119	1,190	1,261	1,300	1,318	13	5
Increase over Prior Year (%)	24	30	16	-2	12	6	6	6	3	1		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.

Source: Dataquest (September 1993)

Table 23
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Asia
Platform: All Platforms

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	52,680	83,565	143,497	159,069	175,251	217,740	249,860	273,390	290,910	299,960	35	11
Unit Shipments or Seats	60,394	91,318	151,184	165,368	182,151	224,000	255,330	277,890	294,750	303,470	32	11
CPU Installed Base	135,119	209,709	335,077	462,986	585,719	707,950	822,010	932,890	1,036,940	1,119,700	44	14
Installed Seats	165,236	246,751	377,815	508,325	632,536	753,960	865,930	973,630	1,073,670	1,152,170	40	13
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	99.1	51.5	47.0	40.4	39.2	35.7	33.0	31.4	30.7	30.6	-21	-5
Hardware-Only ASP	11.2	9.4	6.5	6.3	7.0	6.3	5.8	5.6	5.5	5.5	-11	-5
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	1,618	1,843	2,309	2,313	2,350	2,498	2,548	2,576	2,586	2,584	10	2
CPU Revenue	999	1,402	1,822	1,858	1,879	2,014	2,074	2,118	2,145	2,154	17	3
Terminal Revenue	258	120	96	68	102	100	91	75	65	61	-21	-10
Peripheral Revenue (Turnkey)	361	321	390	388	368	384	383	382	376	368	1	0
Software Revenue	820	950	1,114	1,217	1,288	1,483	1,675	1,874	2,020	2,134	12	11
Bundled	571	663	715	709	681	705	709	712	702	691	4	0
Unbundled	249	287	399	508	608	778	966	1,162	1,319	1,444	25	19
Service Revenue	340	368	485	514	523	570	618	662	701	737	11	7
Total Factory Revenue	2,778	3,160	3,909	4,045	4,162	4,551	4,840	5,112	5,308	5,455	11	6
Increase over Prior Year (%)	12	14	24	3	3	9	6	6	4	3		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 24
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Asia
Platform: Technical Workstation

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	13,913	28,187	39,406	42,009	42,193	51,570	59,500	67,420	73,870	79,740	32	14
Unit Shipments or Seats	13,913	28,187	39,406	42,009	42,193	51,570	59,500	67,420	73,870	79,740	32	14
CPU Installed Base	27,847	54,792	91,566	127,994	160,517	195,230	231,280	267,030	302,960	337,210	55	16
Installed Seats	27,847	54,792	91,566	127,994	160,517	195,230	231,280	267,030	302,960	337,210	55	16
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	83.3	54.8	46.6	51.4	51.4	49.3	47.4	46.0	45.0	44.0	-11	-3
Hardware-Only ASP	15.2	19.0	21.0	16.3	20.2	18.3	16.8	15.7	15.1	14.5	7	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	557	850	1,127	1,154	1,187	1,335	1,421	1,503	1,559	1,601	21	6
CPU Revenue	397	649	861	886	928	1,053	1,132	1,207	1,262	1,305	24	7
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	160	201	266	269	259	282	289	295	296	296	13	3
Software Revenue	386	555	624	720	826	1,001	1,167	1,346	1,479	1,594	21	14
Bundled	263	409	410	427	436	476	494	512	518	523	14	4
Unbundled	123	146	214	294	390	524	673	835	962	1,072	33	22
Service Revenue	156	173	254	296	329	386	438	489	531	568	21	12
Total Factory Revenue	1,098	1,579	2,005	2,171	2,343	2,722	3,026	3,338	3,569	3,764	21	10
Increase over Prior Year (%)	44	44	27	8	8	16	11	10	7	5		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 25
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Asia
Platform: Host-Dependent

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	2,198	3,616	5,949	4,778	3,706	3,140	2,660	2,200	1,890	1,670	14	-15
Unit Shipments or Seats	9,913	11,368	13,636	11,078	10,605	9,400	8,130	6,700	5,730	5,180	2	-13
CPU Installed Base	8,730	12,022	17,274	20,897	23,109	24,550	24,920	24,210	22,590	20,910	28	-2
Installed Seats	38,848	49,064	60,011	66,236	69,925	70,550	68,830	64,940	59,330	53,390	16	-5
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	622.8	253.3	172.8	139.4	151.5	148.0	148.2	148.5	148.6	148.7	-30	-0
Hardware-Only ASP	129.3	95.1	77.1	257.7	430.9	416.8	399.0	378.8	358.6	339.3	35	-5
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	752	608	692	560	518	442	376	308	261	231	-9	-15
CPU Revenue	401	413	523	435	368	303	254	207	175	152	-2	-16
Terminal Revenue	258	120	96	68	102	100	91	75	65	61	-21	-10
Peripheral Revenue (Turnkey)	93	74	73	58	48	38	32	26	21	18	-16	-17
Software Revenue	250	204	254	178	144	120	103	88	77	69	-13	-14
Bundled	193	154	200	138	121	101	87	73	64	57	-11	-14
Unbundled	58	50	54	41	23	19	16	14	13	12	-21	-12
Service Revenue	164	155	186	144	124	104	90	75	65	58	-7	-14
Total Factory Revenue	1,166	966	1,133	882	786	666	569	471	403	359	-9	-15
Increase over Prior Year (%)	-10	-17	17	-22	-11	-15	-15	-17	-14	-11		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 26
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Asia
Platform: Server

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	NA	NA	NA	2,614	1,979	2,510	3,160	3,890	4,660	5,380	NA	22
Unit Shipments or Seats	NA	NA	NA	2,614	1,979	2,510	3,160	3,890	4,660	5,380	NA	22
CPU Installed Base	NA	NA	NA	2,614	4,592	6,980	9,820	12,880	16,280	19,330	NA	33
Installed Seats	NA	NA	NA	2,614	4,592	6,980	9,820	12,880	16,280	19,330	NA	33
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	NA	NA	NA	64.9	79.8	76.4	73.1	69.8	66.5	63.6	NA	-4
Hardware-Only ASP	NA	NA	NA	36.0	30.9	27.7	25.4	24.2	23.4	23.0	NA	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	NA	NA	NA	102	74	85	97	110	124	137	NA	13
CPU Revenue	NA	NA	NA	89	64	74	86	99	114	127	NA	15
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	NA	NA	NA	13	10	11	11	11	11	10	NA	0
Software Revenue	NA	NA	NA	36	25	30	37	43	48	52	NA	16
Bundled	NA	NA	NA	30	18	20	22	23	23	22	NA	4
Unbundled	NA	NA	NA	6	7	10	15	20	25	30	NA	33
Service Revenue	NA	NA	NA	31	25	30	35	40	46	52	NA	16
Total Factory Revenue	NA	NA	NA	170	124	145	169	193	218	241	NA	14
Increase over Prior Year (%)	NA	NA	NA	NA	-27	17	16	14	13	11		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 27
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Asia
Platform: Personal Computer

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	36,568	51,762	98,143	109,667	127,374	160,520	184,530	199,880	210,490	213,170	37	11
Unit Shipments or Seats	36,568	51,762	98,143	109,667	127,374	160,520	184,530	199,880	210,490	213,170	37	11
CPU Installed Base	98,542	142,895	226,237	311,481	397,501	481,190	556,000	628,780	695,110	742,240	42	13
Installed Seats	98,542	142,895	226,237	311,481	397,501	481,190	556,000	628,780	695,110	742,240	42	13
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	28.4	18.2	18.2	13.1	13.2	11.9	10.7	10.0	9.6	9.3	-17	-7
Hardware-Only ASP	7.0	4.7	3.1	3.0	3.1	2.9	2.7	2.5	2.4	2.3	-18	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	310	384	490	497	571	636	653	655	642	614	17	1
CPU Revenue	202	339	438	449	519	583	601	605	595	571	27	2
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	107	45	51	48	52	53	52	50	47	44	-17	-3
Software Revenue	184	190	237	283	293	332	368	397	416	418	12	7
Bundled	116	100	105	115	106	107	106	104	97	89	-2	-3
Unbundled	68	90	132	168	187	225	262	293	319	329	29	12
Service Revenue	20	40	45	43	45	50	55	58	59	59	22	5
Total Factory Revenue	514	615	771	823	909	1,018	1,077	1,110	1,118	1,092	15	4
Increase over Prior Year (%)	21	20	25	7	11	12	6	3	1	-2		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 28
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Rest of World
Platform: All Platforms

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	5,279	7,923	9,584	13,463	19,957	24,400	29,840	36,710	43,490	50,170	39	20
Unit Shipments or Seats	6,403	8,727	10,543	14,412	20,563	24,980	30,400	37,200	43,930	50,570	34	20
CPU Installed Base	16,081	22,837	30,195	40,058	54,427	70,040	87,510	107,960	131,180	155,930	36	23
Installed Seats	20,325	27,550	35,413	45,637	59,841	75,080	92,120	112,080	134,800	159,050	31	22
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	70.4	66.7	52.0	45.6	47.3	46.7	45.4	43.4	41.9	40.9	-9	-3
Hardware-Only ASP	16.1	10.7	9.9	7.9	5.4	4.6	4.1	3.8	3.6	3.4	-24	-9
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	127	137	132	162	187	203	222	243	264	285	10	9
CPU Revenue	89	104	102	132	160	176	194	214	234	254	16	10
Terminal Revenue	28	18	18	17	9	8	7	6	6	5	-24	-11
Peripheral Revenue (Turnkey)	10	15	12	13	18	20	21	23	24	25	15	7
Software Revenue	38	52	56	95	132	168	210	249	291	338	36	21
Bundled	20	23	19	31	44	51	57	62	68	72	22	10
Unbundled	18	29	37	64	88	117	152	187	224	266	48	25
Service Revenue	33	39	36	54	69	80	95	107	120	134	20	14
Total Factory Revenue	198	228	224	311	388	452	527	599	676	757	18	14
Increase over Prior Year (%)	-11	15	-2	39	25	16	17	14	13	12		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 29
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Rest of World
Platform: Technical Workstation

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	1,170	1,765	1,952	2,612	3,246	3,830	4,540	5,310	6,140	7,100	29	17
Unit Shipments or Seats	1,170	1,765	1,952	2,612	3,246	3,830	4,540	5,310	6,140	7,100	29	17
CPU Installed Base	3,771	5,302	6,814	8,717	10,946	13,410	16,360	19,570	23,230	27,170	31	20
Installed Seats	3,771	5,302	6,814	8,717	10,946	13,410	16,360	19,570	23,230	27,170	31	20
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	44.7	55.6	44.7	45.8	41.9	39.9	38.3	37.1	36.2	35.4	-2	-3
Hardware-Only ASP	22.9	10.0	18.4	14.0	15.2	13.8	12.7	11.9	11.5	11.2	-10	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	37	52	51	64	76	83	91	100	110	121	20	10
CPU Revenue	31	42	43	55	66	72	79	87	96	106	20	10
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	6	10	8	9	10	11	12	13	14	15	16	8
Software Revenue	16	28	29	56	74	99	128	155	181	206	46	23
Bundled	9	16	14	23	29	33	36	40	45	49	34	11
Unbundled	7	12	15	33	45	66	92	114	136	157	59	28
Service Revenue	14	23	20	34	43	52	63	74	85	96	33	17
Total Factory Revenue	67	103	101	154	193	234	283	328	376	422	30	17
Increase over Prior Year (%)	44	54	-2	53	25	21	21	16	14	12		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 30
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Rest of World
Platform: Host-Dependent

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	159	263	304	149	142	130	140	130	120	110	-3	-5
Unit Shipments or Seats	1,284	1,068	1,262	1,098	748	710	690	620	560	500	-13	-8
CPU Installed Base	1,108	1,291	1,473	1,474	1,387	1,340	1,300	1,230	1,160	1,110	6	-4
Installed Seats	5,352	6,004	6,691	7,053	6,802	6,380	5,900	5,350	4,790	4,240	6	-9
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	422.6	466.2	280.0	245.9	367.5	370.4	361.5	350.0	335.4	322.0	-3	-3
Hardware-Only ASP	587.6	168.3	159.7	298.8	196.2	173.8	156.2	143.2	133.4	141.8	-24	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	68	54	51	39	34	32	32	29	26	23	-16	-7
CPU Revenue	36	32	30	20	23	23	23	20	19	16	-11	-6
Terminal Revenue	28	18	18	17	9	8	7	6	6	5	-24	-11
Peripheral Revenue (Turnkey)	4	4	3	2	2	2	2	2	2	2	-16	-5
Software Revenue	16	11	11	8	9	9	10	9	9	9	-14	-0
Bundled	11	6	5	3	5	6	7	6	6	6	-19	6
Unbundled	5	5	6	5	4	3	3	3	3	2	-6	-10
Service Revenue	18	14	13	10	12	12	12	11	10	9	-9	-5
Total Factory Revenue	101	79	76	56	55	54	54	49	45	41	-14	-6
Increase over Prior Year (%)	-32	-21	-5	-26	-2	-2	0	-9	-8	-9		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.
Source: Dataquest (September 1993)

Table 31
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Rest of World
Platform: Server

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	NA	NA	NA	446	578	710	850	1,000	1,150	1,310	NA	18
Unit Shipments or Seats	NA	NA	NA	446	578	710	850	1,000	1,150	1,310	NA	18
CPU Installed Base	NA	NA	NA	446	1,024	1,700	2,450	3,220	4,020	4,700	NA	36
Installed Seats	NA	NA	NA	446	1,024	1,700	2,450	3,220	4,020	4,700	NA	36
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	NA	NA	NA	62.1	67.0	64.2	61.6	59.1	56.6	54.3	NA	-4
Hardware-Only ASP	NA	NA	NA	32.9	38.1	34.6	31.8	30.0	29.1	28.4	NA	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	NA	NA	NA	19	24	27	31	34	37	40	NA	11
CPU Revenue	NA	NA	NA	18	21	24	26	30	32	35	NA	11
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	NA	NA	NA	1	3	4	4	5	5	5	NA	10
Software Revenue	NA	NA	NA	5	13	15	18	22	26	33	NA	22
Bundled	NA	NA	NA	3	10	12	13	15	16	17	NA	12
Unbundled	NA	NA	NA	2	3	4	5	7	10	16	NA	42
Service Revenue	NA	NA	NA	8	11	12	14	16	17	19	NA	13
Total Factory Revenue	NA	NA	NA	33	47	54	63	72	81	93	NA	15
Increase over Prior Year (%)	NA	NA	NA	NA	43	16	15	14	13	15		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.

Source: Dataquest (September 1993)

Table 32
CAD/CAM/CAE/GIS History and Forecast

Application: All Applications
Region: Rest of World
Platform: Personal Computer

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	CAGR (%) 1988-1992	CAGR (%) 1992-1997
HARDWARE SHIPMENT DATA												
CPU Shipments	3,949	5,894	7,329	10,256	15,991	19,730	24,320	30,280	36,080	41,660	42	21
Unit Shipments or Seats	3,949	5,894	7,329	10,256	15,991	19,730	24,320	30,280	36,080	41,660	42	21
CPU Installed Base	11,202	16,244	21,908	29,421	41,070	53,600	67,400	83,940	102,760	122,950	38	25
Installed Seats	11,202	16,244	21,908	29,421	41,070	53,600	67,400	83,940	102,760	122,950	38	25
CALCULATED AVERAGE SELLING PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	11.4	16.3	9.1	6.5	6.0	5.4	4.9	4.7	4.4	4.2	-15	-7
Hardware-Only ASP	5.5	5.0	3.9	3.9	3.3	3.1	2.8	2.7	2.5	2.4	-12	-6
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	22	30	29	40	53	61	69	80	91	100	24	13
CPU Revenue	22	30	28	39	51	58	66	77	87	96	24	14
Terminal Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	1	1	1	1	3	3	3	4	4	4	51	9
Software Revenue	7	13	16	25	37	45	54	64	76	91	54	20
Bundled	1	1	0	1	1	1	1	1	1	1	19	-8
Unbundled	6	12	16	24	36	44	53	63	75	90	56	20
Service Revenue	1	2	2	2	3	4	5	6	8	9	24	25
Total Factory Revenue	30	46	47	67	93	110	128	150	174	200	33	17
Increase over Prior Year (%)	7	52	4	42	38	17	16	18	16	15		

Note: In 1991, server was added as a platform. This reclassification reduced 1991 growth rates for the other platforms.

Source: Dataquest (September 1993)

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Software

CAD/CAM/CAE/GIS Worldwide Market Share Update

Market Statistics

1993

Program: CAD/CAM/CAE/GIS Worldwide
Product Code: CCAM-WW-MS-9303
Publication Date: July 26, 1993

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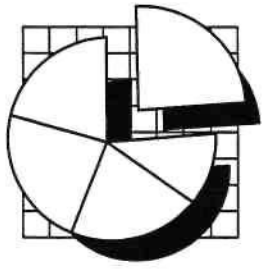
CAD/CAM/CAE/GIS Worldwide Market Share Update



Market Statistics

1993

Program: CAD/CAM/CAE/GIS Worldwide
Product Code: CCAM-WW-MS-9303
Publication Date: July 26, 1993

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Note: All tables show estimated data.

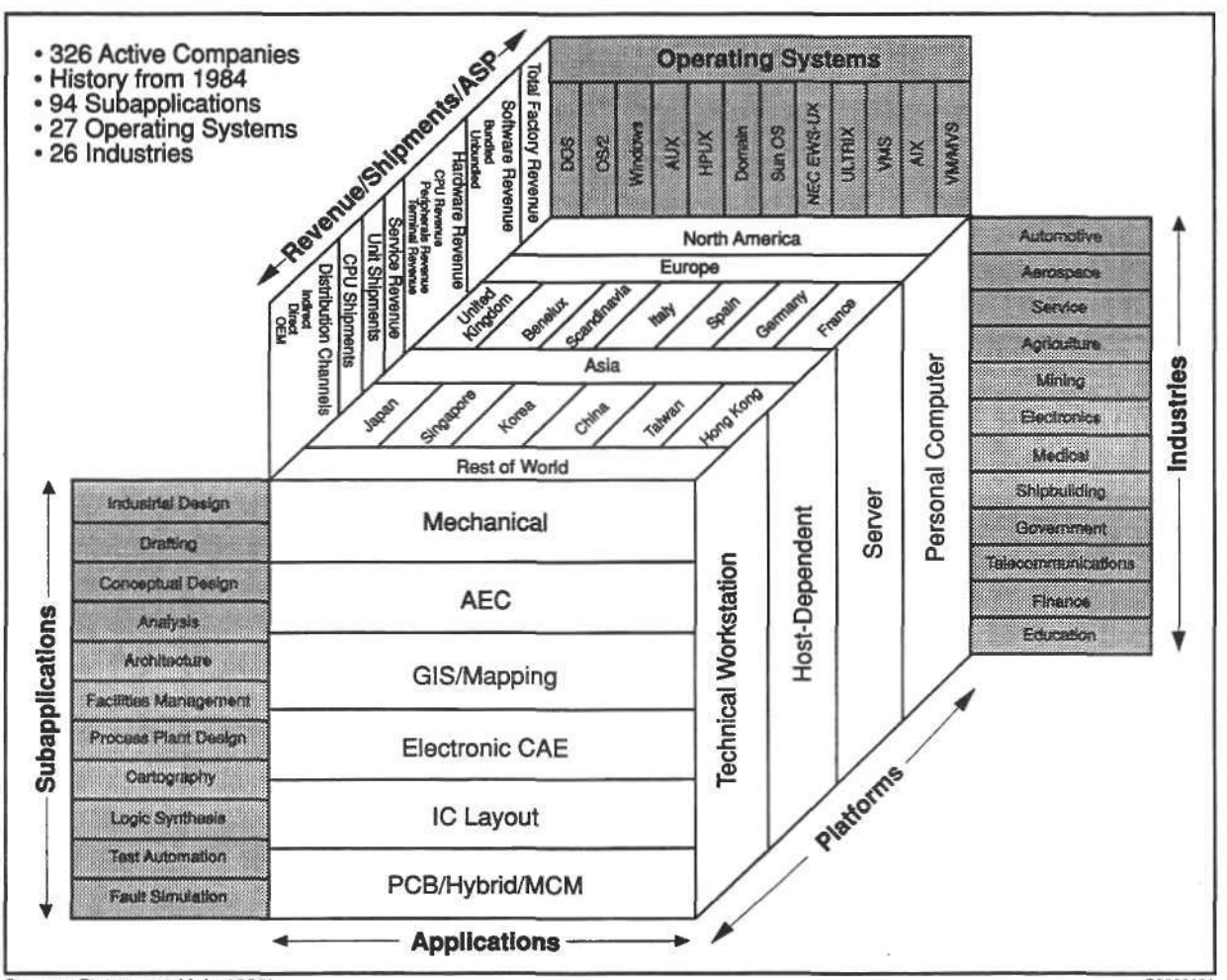
CAD/CAM/CAE/GIS Worldwide Market Share Update

Introduction

CAD/CAM/CAE/GIS systems have dramatically changed the methods by which designers and production managers originate and implement products. CAD and CAE systems allow designers to create, draft, analyze, test, and manipulate products on a screen in two and three dimensions. As CAD/CAM/CAE/GIS systems continue to decrease in cost, they become more available and cost justifiable to new users.

In order to provide a comprehensive view of the CAD/CAM/CAE/GIS industry, Dataquest's CAD/CAM/CAE/GIS group maintains a large database of industry information. The type of information contained in the database is depicted in Figure 1.

Figure 1
CAD/CAM/CAE/GIS Market Database



Source: Dataquest (July 1993)

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CAD/CAM/CAE/GIS Market Share Update

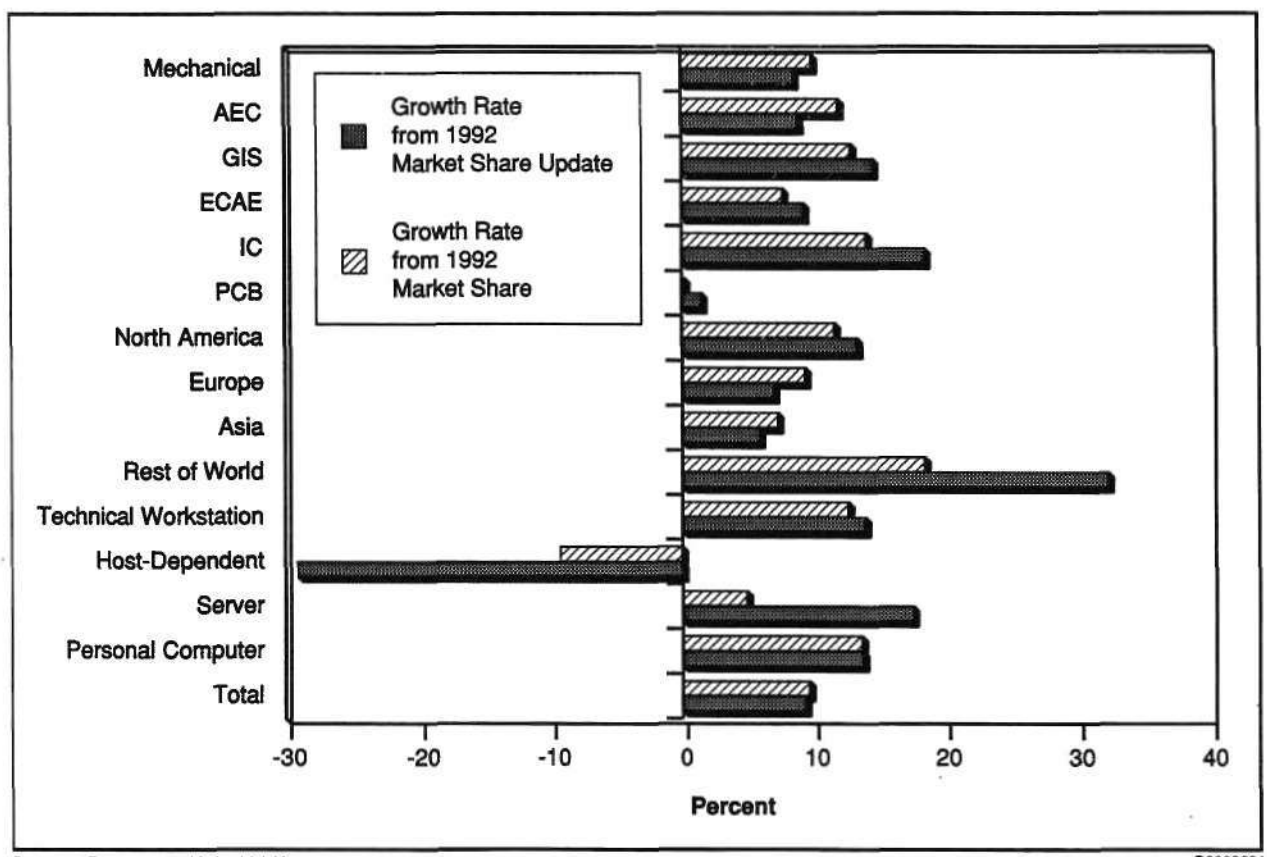
Software Market Grew 9.6 Percent in 1992, Revised Down from 9.7 Percent

Refinements of year-end figures leave the CAD/CAM/CAE/GIS markets essentially unchanged from our earlier market share data, with software revenue growth from 1991 to 1992 reduced to 9.6 percent from 9.7 percent and total factory revenue growth for the same period reduced to 4.0 percent from 4.2 percent. However, the stillness at this top level is deceptive. A look at the segment and company levels of the data and even at the database changes reveals some interesting shifts.

This market share update essentially revisits the companies in our database, seeking refinement of the previously reported market share data. Whereas much of the data from the initial survey came from vendor projections and early, year-end results, the update represents actual 1992 year-end results. From a global perspective, the results indicate that the optimists balanced the pessimists. The view from segments is a little more interesting.

Figure 2 provides a view of growth rates in software revenue by application, by region, and by platform, as well as the total market. In the area

Figure 2
1992 Software Revenue Growth: Market Share versus Market Share Update



Source: Dataquest (July 1993)

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of applications, geographic information system (GIS), electronic computer-aided engineering (ECAE), IC layout, and printed circuit board (PCB) were revised up while mechanical and AEC actually grew less than previously indicated, primarily because of overreporting of revenue for IBM in 1992 coupled with underreporting for 1991 in both areas. In the EDA arena, these revisions came about with more complete vendor input, readjusting some PCB revenue into ECAE and IC (see Table 1), and adding two companies to IC, two to ECAE, and deleting one from PCB, including past revenue.

Economic reality is confirmed by the regional picture with North America and Rest of World, previously reported with the greatest growth, now shown with greater growth, whereas Europe and Asia show less growth than our earlier view. From the view of platforms, the shift from host-dependent systems to client/server systems is occurring with greater speed than earlier indications.

Database Changes

Software

In viewing the actual market size for the above segments, looking at the earlier market share as compared with this updated version, the differences become considerable. We have continued to revise our company information with the best information available, even for past years. In addition to the growth rates changing as indicated above, the actual revenue figures have changed, as indicated in Table 1.

Expanded Definition for Service

In this survey, the service definition was expanded from hardware and software maintenance to now include:

- Hardware and software maintenance fees
- Training and education

Table 1
Comparison of 1991 and 1992 Software Revenue: Market Share versus Market Share Update

	1991 Software Revenue ($M)			1992 Software Revenue ($M)		
	Market Share	Market Share Update	% Change	Market Share	Market Share Update	% Change
Mechanical	2,033.0	2,117.0	4.1	2,235.3	2,299.1	2.9
AEC	666.1	680.2	2.1	746.1	740.8	-0.7
GIS/Mapping	555.8	545.3	-1.9	627.5	630.6	0.5
ECAE	691.2	699.8	1.2	744.1	765.8	2.9
IC	195.8	195.8	0	223.4	232.7	4.2
PCB/Hybrid/MCM	328.3	306.6	-6.6	329.1	311.4	-5.4
Total	4,470.2	4,544.4	1.7	4,905.5	4,980.3	1.5

Source: Dataquest (July 1993)

- Service bureau operators
- Application development
- Consulting
- Systems integration

In 1991, service revenue was $2,408.6 million and was $2,611.4 million in 1992. The resulting growth of 8.4 percent in service revenue reflects growth in service and our change in definition. This change had the largest impact on the IC layout market, and considerably added to the mechanical, ECAE, and PCB markets as well (see Table 2). In mechanical, SDRC was the big foot. The database was not revised backward to reflect this change. Forecasting, however, will now be expanded to include this area of growth.

Shift in Revenue Distribution

Reflecting this expansion of services definition and extreme pressure on hardware revenue is the redistribution of revenue by hardware, software, and services as shown in Table 3.

Table 2
1992 Service as a Percentage of Total Revenue: Market Share versus Market Share Update

	Market Share	Market Share Update	% Change
Mechanical	16.5	17.1	3.4
AEC	14.1	14.0	-0.7
GIS/Mapping	18.0	17.6	-2.2
ECAE	16.6	17.4	4.8
IC Layout	19.0	21.0	10.5
PCB/Hybrid/MCM	18.5	19.0	2.7

Source: Dataquest (July 1993)

Table 3
Change in Distribution of 1992 Revenue: Market Share versus Market Share Update

	Revenue ($M)		% Distribution of Revenue	
	Market Share	Market Share Update	Market Share	Market Share Update
Hardware	8,093.8	7,765.5	52.0	50.5
Software	4,905.5	4,972.6	31.5	32.4
Services	2,578.0	2,624.2	16.5	17.1
Total	15,577.3	15,362.3		

Source: Dataquest (July 1993)

Company Changes

Table 4 provides a listing of the top 20 vendors and the changes in the total revenue figure from the market share previously reported. IBM revenue changes were made following the prior market share but before the subsequent forecasting. Intergraph's earlier reported revenue included document imaging and other graphics software, which does not belong in CAD/CAM. Digital previously did not report its hardware revenue, and neither did Autodesk with its software revenue, whereas SDRC now includes the expanded service.

Analysis of Workstation Distribution

In addition to these changes, the CAD/CAM/CAE/GIS group significantly refined its database model for workstations. Using two years of software revenue distribution by operating system, collected by a survey

Table 4
1992 Top 20 CAD/CAM/CAE/GIS Vendors Total Revenue: Market Share versus Market Share Update

	Total Revenue 1992 ($M) Market Share	Market Share Update	Revenue Change ($M)	Final Market Share (%)	Share Difference (%)
IBM	1,861.2	1,756.9	-104.3	11.4	-0.5
Intergraph	1,171.7	1,126.6	-45.2	7.3	-0.2
Hewlett-Packard	922.4	919.9	-2.5	6.0	0.1
Digital	843.6	918.9	75.3	6.0	0.6
Sun Microsystems	876.8	869.5	-7.3	5.7	0.1
Computervision	781.7	777.3	-4.5	5.1	0.1
Fujitsu	442.0	442.0	0	2.9	0.1
Compaq	416.3	429.8	13.5	2.8	0.1
Cadence	425.6	425.4	-0.2	2.8	0.1
Autodesk	341.6	367.7	26.1	2.4	0.2
Mentor Graphics	350.8	349.4	-1.4	2.3	0
NEC	348.0	348.0	0	2.3	0.1
EDS-Unigraphics	302.9	310.1	7.2	2.0	0.1
Siemens Nixdorf Infosysteme	271.2	271.1	-0.1	1.8	0.1
Apple Computer	243.2	239.0	-4.2	1.6	0
Silicon Graphics	272.9	230.5	-42.4	1.5	-0.3
Nihon Unisys	228.3	228.3	0	1.5	0
Hitachi	174.0	174.0	0	1.1	0
Control Data	169.4	169.4	0	1.1	0
SDRC	123.3	149.8	26.5	1.0	0.2
Top 20 Companies	10,566.9	10,503.6	-63.3	68.3	0.5
All Companies	15,577.3	15,366.8	-210.5	100.0	0

Source: Dataquest (July 1993)

of software vendors, we can estimate the distribution of workstations by hardware vendor in the various application segments (see Table 5). This analysis resulted in realignment of workstation shipments of Hewlett-Packard, Sun, and Silicon Graphics to the distribution of software revenue. (Note that these unit sales are expanded to include units sold through OEMs. They, therefore, will not match the unit sales in the market share tables where OEM is deleted to prevent double counting.)

Company Additions and Deletions

Finally, we added nine new companies to our database with a collective total revenue of $36.0 million for 1991; $46.5 for 1992 (see Table 6). We deleted LPKF and Simulation Science: upon re-evaluation, we realized that both companies are related to, but not included in the CAD/CAM/CAE/GIS market. IGC was purchased by IMSI, which was not previously in our database, so IMSI was added to include IGC for 1991 and 1992. However, we have not incorporated other company name changes (such as Cadam to Altium) or acquisitions (such as Quad Design by Viewlogic) that have occurred during 1993.

Market Share Battles

An interesting view of the CAD/CAM/CAE/GIS market is at the level of market leaders in software revenue for each application. The tables that follow provide software revenue and share of market for 1991 and 1992 as they now appear in the database.

Mechanical

An army of well-equipped companies is on the march in the mechanical market, assaulting the two old guards, IBM and Computervision (see Table 7). IBM, showing decline in its mechanical software despite its partnerships with the market leaders, Dassault, SDRC, and CADAM, is struggling to survive the squeeze of moving from high-margin, host-dependent systems to the more competitive market of technical workstations and client/servers. With losses in its host dependent business as

Table 5
Unit Sales of Technical Workstations by Application Segment, by Top U.S. Vendors for 1992 (Including Units Sold through OEMs)

	Mechanical	AEC	GIS	ECAE	IC	PCB	Total	Share of Market
Sun Microsystems	27,567	3,804	6,607	16,586	7,709	7,624	69,897	40.3
Hewlett-Packard	17,370	3,871	1,581	7,039	2,321	4,054	36,236	20.9
Digital	8,965	1,762	2,327	1,196	855	1,499	16,604	9.6
Intergraph	2,421	4,980	5,698	516	45	422	14,082	8.1
Silicon Graphics	8,574	461	478	117	0	0	9,630	5.6
IBM	6,065	717	213	0	0	244	7,239	4.2
Total Worldwide Units	77,471	22,559	20,453	26,385	11,347	15,264	173,479	100.0
Distribution (%)	44.7	13.0	11.8	15.2	6.5	8.8	100.0	

Source: Dataquest (July 1993)

Table 6
Changes in CAD/CAM/CAE/GIS Vendors with Total Revenue for 1991 and 1992

	1991 Total Revenue ($M)	1992 Total Revenue ($M)	Application Segment
Additions:			
CAMAX Systems	7.3	9.2	Mechanical
Chronologic Simulation	1.0	1.5	ECAE
CrossCheck Technology	4.5	6.8	ECAE
Enghouse Systems	5.4	8.3	GIS/Mapping
High-Level Design System	1.5	2.5	IC Layout
IMSI	1.7	2.2	PC-Design
PCI Remote Sensing	5.0	6.0	GIS/Mapping
PiE Design	6.0	6.0	ECAE
Softronics	3.6	4.0	Spain-Design
Total	36.0	46.5	
Deletions:			
IGC	0.7	0.7	PC-Design
LPKF	15.0	14.1	PCB
Simulation Science	1.2	1.2	AEC
Total	16.9	16.0	
Gross Change	19.1	30.5	

Source: Dataquest (July 1993)

Table 7
Top 10 Mechanical Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
IBM	370.4	17.5	359.8	15.6	-2.9
Computervision	232.4	11.0	206.9	9.0	-11.0
Autodesk	108.3	5.1	147.1	6.4	35.9
Dassault*	133.5	6.3	146.9	6.4	10.0
SDRC	101.1	4.8	129.2	5.6	27.7
EDS-Unigraphics	80.7	3.8	107.7	4.7	33.4
CADAM*	66.3	3.1	88.7	3.9	33.8
Parametric Technology	43.4	2.0	81.2	3.5	87.2
Hewlett-Packard	64.0	3.0	72.1	3.1	12.7
MacNeal-Schwendler	53.4	2.5	64.7	2.8	21.1
Top 10 Companies	1,253.4	59.2	1404.2	61.1	12.0
All Companies	2,117.0	100.0	2,299.1	100.0	8.6

*Includes distributor and/or supplier revenue

Source: Dataquest (July 1993)

well as in Europe and Asia, IBM is outflanked by the hardy and nimble players in the workstation platform where there is real competition.

Computervision is heavily deployed in Europe where the dark cloud of recession continues to cast its gloom. This offshore presence has weakened the company on its home front, resulting in a decrease of 11 percent in software revenue, which is a loss in market share of 2 percentage points, a big loss for a big player. Despite the losses of these two market leaders, the eight attackers grew a collective 28.7 percent, gaining a whopping 5.7 percentage points in market share.

AEC

The AEC market is quite another story, with the market leaders, Autodesk and Intergraph, cementing their leadership by growing faster than the market, gaining a combined 2.6 percentage points share of market while three of the other eight top 10 competitors declined (see Table 8). The interesting part of this picture is right in the middle: two German companies, Nemetschek and IEZ, battling tooth-and-nail for leadership. The companies are growing in stark contrast to the economic climate of Europe's home front.

GIS/Mapping

The GIS market, with its amazing growth rate of 15.6 percent, is marked by a fight for the top. In 1991, Integraph led ESRI in share of market by 5.5 percentage points, whereas in 1992 Integraph's lead was reduced to 2.6 percentage points, giving ESRI a 2.9 percentage points annual gain on Integraph (see Table 9). In the meantime, the remaining top 10 companies most grew at impressive rates, although much of GeoVision's growth resulted from acquisition during 1992.

Table 8
Top 10 AEC Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
Autodesk	128.2	18.9	158.1	21.3	23.3
Intergraph	100.4	14.8	111.0	15.0	10.6
IBM	40.5	6.0	41.5	5.6	2.6
Fujitsu	37.1	5.5	35.6	4.8	-3.9
Nemetschek	24.7	3.6	32.5	4.4	31.7
IEZ	19.8	2.9	32.1	4.3	62.2
Computervision	23.2	3.4	25.1	3.4	8.1
ISICAD	19.4	2.9	17.2	2.3	-11.6
NEC	16.8	2.5	11.7	1.6	-30.2
Dassault*	10.1	1.5	11.1	1.5	9.9
Top 10 Companies	420.1	61.8	476.0	64.3	13.3
All Companies	680.2	100.0	740.8	100.0	6.2

*Includes distributor and/or supplier revenue

Source: Dataquest (July 1993)

Table 9
Top 10 GIS Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
Intergraph	107.2	19.7	114.4	18.1	6.7
ESRI	77.6	14.2	98.0	15.5	26.3
Siemens Nixdorf Infosysteme	49.7	9.1	53.2	8.4	7.0
Autodesk	28.5	5.2	40.5	6.4	42.0
EDS-Unigraphics	17.0	3.1	24.1	3.8	41.5
Landmark Graphics	23.2	4.3	18.8	3.0	-19.0
GeoVision Systems	8.5	1.6	14.0	2.2	64.6
Moss Systems	9.7	1.8	14.0	2.2	43.9
Genasys II	9.7	1.8	13.0	2.1	34.2
Fujitsu	13.2	2.4	12.6	2.0	-3.9
Top 10 Companies	344.3	63.1	402.6	63.8	16.9
All Companies	545.3	100.0	630.6	100.0	15.6

Source: Dataquest (July 1993)

ECAE

The electronic computer-aided engineering (ECAE) market has been shaken up with mergers and acquisitions. Cadence merged with Valid and skipped over Mentor Graphics. Viewlogic bought Vantage, but was still passed by Synopsys. The European ECAE software market grew only 2.3 percent, providing a rough road for Racal-Redac. Wacom, with its emphasis on the personal computer platform in Japan, also had a rough year in this market (see Table 10).

IC Layout

The fastest-growing and smallest application segments have few players. The top 10 comprise almost 97 percent of the market, with Cadence continuing to dominate (see Table 11). The change in growth rates versus The PCB/hybrid/MCM layout market continues to stagnate, showing previous market share is because of changes reported by Cadence. Compass Design Automation appears to be a hard charger, driven by new library development tools.

PCB/Hybrid/MCM Layout

little growth in the past two years (see Table 12). This market is drawn along geographic lines: Zuken rules the Japanese market, whereas Racal-Redac's strength lies in Europe. Neither company has a strong presence in North America where Mentor Graphics and Cadence battle it out.

Market Analysis

The final view of all this activity is shown in Figure 3, which depicts the market size and market growth rate for each segment in the CAD/CAM/CAE/GIS software industry. In Figure 3, the heavy horizontal line

Table 10
Top 10 ECAE Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
Cadence (Valid)	154.2	22.0	165.6	21.6	7.3
Mentor Graphics	73.2	10.5	77.3	10.1	5.6
Synopsys	30.1	4.3	51.3	6.7	70.6
Viewlogic (Vantage)	36.2	4.4	46.7	6.1	29.0
Racal-Redac	28.5	4.1	27.2	3.6	-4.3
Wacom	25.5	3.6	23.3	3.0	-8.7
EEsof	18.1	2.6	22.1	2.9	22.2
Intergraph	17.5	2.5	20.9	2.7	19.4
Marubeni Hytech*	16.5	2.4	19.7	2.6	19.3
Autodesk	17.1	2.4	18.4	2.4	7.5
Top 10 Companies	411.6	58.8	472.5	61.7	14.8
All Companies	699.8	100.0	765.8	100.0	9.5

*Includes distributor and/or supplier revenue

Source: Dataquest (July 1993)

Table 11
Top 10 IC Layout Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
Cadence (Valid)	114.0	56.9	136.3	58.6	19.5
Mentor Graphics	33.7	16.8	31.5	13.5	-6.4
Compass Design	11.7	5.9	17.3	7.4	47.4
Seiko*	13.7	6.8	14.5	6.2	5.9
Sagantec	3.6	1.8	6.7	2.9	86.9
Silvar-Lisco	5.2	2.6	5.8	2.5	9.7
Cascade Design	3.0	1.5	4.7	2.0	55.9
Fujitsu	0	0	3.5	1.5	NA
Integrated Silicon Systems	2.5	1.2	3.0	1.3	21.0
Intergraph	1.6	0.8	1.9	0.8	22.2
Top 10 Companies	189.0	96.5	225.2	96.8	19.1
All Companies	195.8	100.0	232.7	100.0	18.8

*Includes distributor and/or supplier revenue

NA = Not applicable

Source: Dataquest (July 1993)

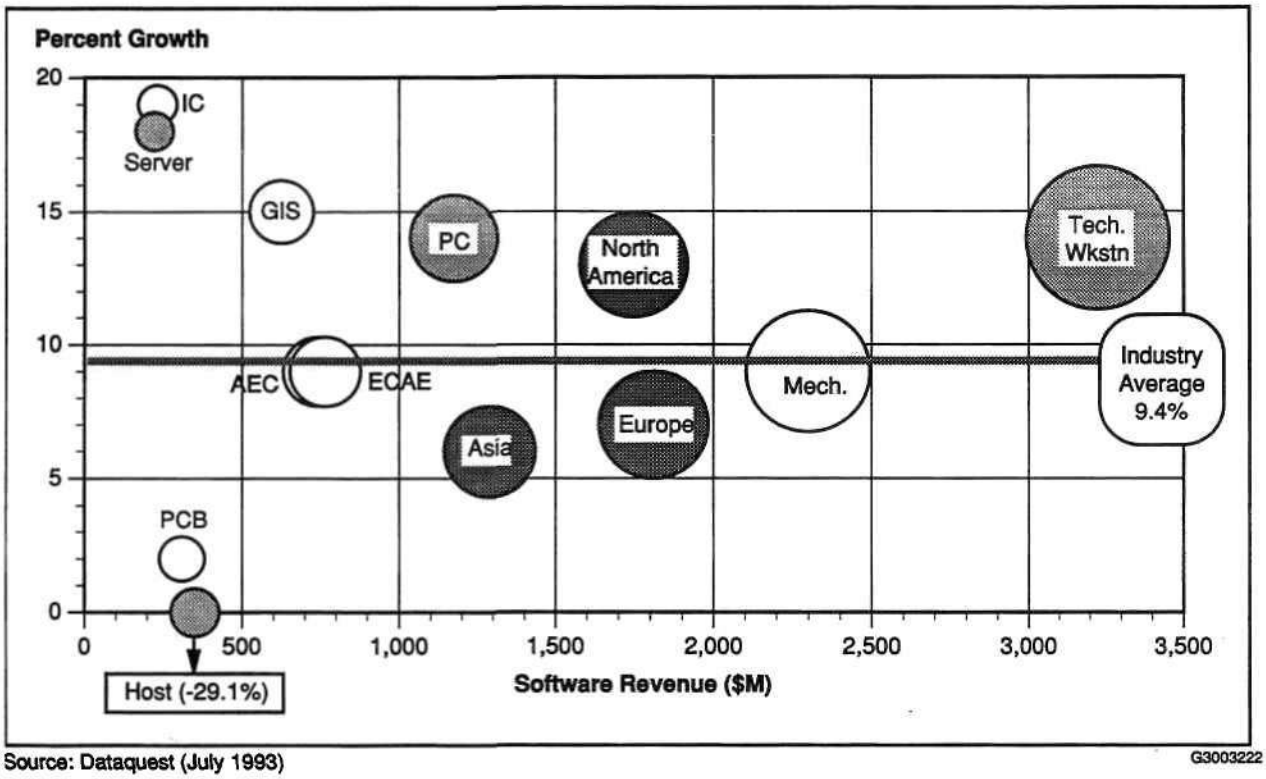
Table 12
Top 10 PCB/Hybrid/MCM Software Companies Worldwide

	1991 Software Revenue ($M)	1991 Share of Market (%)	1992 Software Revenue ($M)	1992 Share of Market (%)	Change in Software Revenue (%)
Racal-Redac	42.1	13.7	46.3	14.9	10.0
Mentor Graphics	39.5	12.9	43.0	13.8	8.7
Zuken	46.9	15.3	41.6	13.4	-11.3
Cadence (Valid)	31.5	10.3	36.5	11.7	15.8
IBM	16.3	5.3	17.1	5.5	4.7
Intergraph	12.7	4.1	16.0	5.1	25.5
Harris EDA	13.9	4.5	12.2	3.9	-11.8
CADIX	11.3	3.7	11.8	3.8	4.0
Sharp*	15.0	4.9	9.6	3.1	-35.8
Fujitsu	8.4	2.7	8.1	2.6	-3.8
Top 10 Companies	237.6	77.5	242.0	77.7	1.9
All Companies	306.6	100.0	311.4	100.0	1.6

*Includes distributor and/or supplier revenue

Source: Dataquest (July 1993)

Figure 3
CAD/CAM/CAE/GIS Market Portfolio for Software Revenue for 1992



Source: Dataquest (July 1993)

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indicates the industry average for software growth, the size of the bubbles reflects market share, and the bubbles are centered over their market size (y-axis) and market growth rate (x-axis) for 1992.

From this figure, the IC layout application segment and server platform are the two smallest and two fastest-growing segments. Workstations are the largest market segment with a higher than average growth rate of 14 percent. Notice that host-dependent platform segment is off the chart with a negative 29. 1 percent growth rate.

Hardware Revenue Suffers

In contrast to the high growth rates of software, hardware took a beating with a total growth rate of negative 0.1 percent despite an increase of seats totaling 5.9 percent (see Table 13). The hardware market continues to be pressured by decreasing margins and increasing competitiveness. Host-dependent systems are being replaced by networked, desktop systems, and distinctions between workstations and PCs are becoming increasingly blurred.

About This Document

This document contains Dataquest's detailed market share information on the CAD/CAM/CAE/GIS industry. Following is a description of the companies included in the *Market Share Update* books:

- Source—All companies in database; overview of industry
- Mechanical Applications—All companies in database with mechanical revenue
- AEC Applications—All companies in database with AEC revenue
- GIS Applications—All companies in database with GIS revenue
- Electronic Design Automation Applications—All companies in database with EDA (electronic CAE, IC layout, PCB/hybrid/MCM) revenue

Table 13
Hardware Seats, Revenue, and Average Selling Price for 1991 and 1992

	1991 Seats	1992 Seats	Growth (%)	1991 Hardware Revenue ($M)	1992 Hardware Revenue ($M)	Growth (%)	1991 Average Selling Price ($K)	1992 Average Selling Price ($K)	Growth (%)
Workstation	150,748	173,489	15.1	3,670.6	3,967.9	8.1	24.3	22.9	-6.0
Host-Dependent	39,897	31,771	-20.4	1,854.6	1,529.8	-17.5	46.5	48.2	3. 6
Server	14,830	16,301	9.9	531.0	573.8	8.1	35.8	35.2	-1.7
Personal Computer	412,406	432,848	5.0	1,718.7	1,705.4	-0.8	4.2	3.9	-5. 5
Total	617,881	654,408	5.9	7,774.8	7,776.8	0	12.5	11.9	-4.8

Source: Dataquest (July 1993)

- Europe Overview—All Europe-based companies and all other companies with more than $1 million in European revenue
- European Countries—All companies in the European overview that report revenue by European country: Benelux, France, Germany, Italy, Scandinavia, Spain, United Kingdom, and Rest of Europe (includes Austria, Switzerland, and Eastern Europe).
- Asia—All Asia-based companies and all other companies with more than $1 million in Asian revenue
- Personal CAD and Distribution Channels—All companies in database with personal computer revenue

More detailed data on these markets may be requested through our client inquiry service.

Dataquest's policy is to continually update its market information, for current and past years, with any new data received in order to arrive at the most accurate market representation possible.

Segmentation Definitions

This section lists the definitions specific to this document. The following paragraphs define the segments.

Applications

Mechanical

The mechanical segment refers to computer-aided tools used by engineers, designers, analysts, technicians, and draftspeople working predominantly in the discrete manufacturing industries, but includes government and education. Users of mechanical CAD/CAM/CAE tools work in all departments across the typical organization, with a majority found in product design, advanced engineering, and manufacturing engineering. Common design applications include conceptual design, industrial design, structural or thermal analysis, detail design, and electromechanical design (the mechanical part of design with electrical or electronic components and mechanisms). Common manufacturing applications include tool and fixture design, numerical control part programming, off-line robotics programming, and interface to quality control systems. Management tools for database control and distribution are included in this segment, as well as user-defined application programming.

Architecture, Engineering, and Construction (AEC)

The AEC segment covers the use of computer-aided tools by architects, contractors, plant engineers, civil engineers, and other people associated with these disciplines to aid in designing and managing buildings, industrial plants, ships, and other types of nondiscrete entities.

Geographic Information Systems (GIS)/Mapping

GIS is computer-based technology, and the segment is composed of hardware, software, and data used to capture, edit, display, and analyze spatial (tagged by location) information.

Electronic Design Automation (EDA)

The EDA segment covers computer-based tools used to automate the process of designing an electronic product, including printed circuit boards, ICs, and systems. EDA includes ECAE, IC layout, and PCB/hybrid/MCM, as follows:

- Electronic Computer-Aided Engineering (ECAE)—These are computer-aided tools used in the engineering or design phase of electronic products (as opposed to the physical layout phase of the product). Examples of electronic CAE applications are schematic capture and simulation.
- IC Layout—This is a software application tool used to create and validate the physical implementation of an IC. The IC layout category comprises polygon editors, symbolic editors, placement and routing (gate array, cell, and block), design verification tools (DRC/ERC/logic-to-layout), compilers, and module development tools.
- PCB/Hybrid/MCM—This segment covers products used to create the placement and routing of the traces and components laid out on a printed circuit board. Also included in this category are thermal analysis tools.

Regions

The following paragraphs define the regions.

North America

North America includes United States, Mexico, and Canada.

Europe

Europe includes the United Kingdom, Scandinavia, Benelux, France, Germany, Italy, Spain, and Rest of Europe.

Asia

Asia includes Japan, Singapore, Taiwan, Korea, China, and Hong Kong.

Rest of World

Rest of World includes all other countries including Australia, New Zealand, Oceania, Africa, Central America, South America, and the Middle East.

Platforms

The following paragraphs define the platforms.

Technical Workstation

A technical workstation is a single-user computer distinguished from a personal computer by its features and by the user's potential range of expansion on the platform. Features include a virtual, multitasking operating system (UNIX, VMS, or Domain); the computer is designed by the manufacturer to run high-performance graphics applications in a multiuser/multitasking environment.

Host-Dependent

Host-dependent is a shared logic system in which the external workstations' functions are dependent on a host computer.

Server

A server is a computer that transparently provides its resources for use by other computer systems. It is a system on a network that provides specific functionality to other computer systems: the clients. Functions include file storage, database access, and compute capability. Dataquest tracks the following major categories of servers used for CAD/CAM/CAE and GIS applications:

- Compute Servers—These systems provide capabilities for solving numerical problems (for example, simulations, statistical calculations, and simultaneous partial differential equations). System features usually include high-speed computational capabilities (for example, vector and parallel processing) and large memories.
- Print Servers—These systems provide access to printers, specialized printing applications software, and print-spooling resources to a network.
- File Servers—These systems provide mass storage capability to clients on a network. Services can range from temporary storage of working files to long-term backup and archive systems.
- Database Servers—These systems manage databases as a shared resource to a network. These servers handle such functions as physical data storage, data security, and high-level queries and can access stored information at the record level.

Personal Computer

A personal computer is a single-user computer distinguished from a technical workstation by its features and by the user's potential range of expansion on the platform. Features found in technical workstations (such as a virtual operating system, networking, high-performance graphics, multiuser/multitasking capability) are optional rather than integrated by the manufacturer.

Metrics

The following paragraphs define measurements.

- Total factory revenue is defined as the amount of money received by a manufacturer for its goods and services measured in U.S. dollars. Total factory revenue does not include revenue that a company may receive from products that are sold to another company for resale (OEM revenue). Total factory revenue is the sum of software revenue, hardware revenue, and service revenue.
- Unit shipment is defined as the number of seats delivered (number of possible simultaneous users of product delivered).
- Hardware revenue is revenue derived from sales of CPUs (including operating systems), terminals (for host-dependent systems), and peripherals.
- Software revenue is revenue derived from the sale of bundled (part of a turnkey system) and unbundled application software.

- Service revenue is defined as all revenue derived from the service and support of CAD/CAM/CAE/GIS systems. Service revenue can be calculated in the tables by subtracting hardware and software revenue from total revenue.
  - Maintenance fees for hardware and software
  - Management and Operations Services—help desk, education and training, disaster recovery, vaulting, and configuration management.
  - Service Bureau—project work, including construction of database, data conversion, product design, analysis, or manufacturing.
  - Application Development—design and development of customized software applications or the modification, enhancement of customization of existing software applications, adding new functionality.
  - Consulting Revenue—assessment of CAD/CAM/CAE/GIS business and information technology needs and the formulation of a plan based on needs identification.
  - Implemenation and Integration Services—planning, implementation, migration, and integration of software products (software network support and integration, account integration management, data center design, and construction).

Market Share Methodology

Dataquest uses both primary and secondary sources to produce our market share data. In the fourth quarter of each year and second quarter of the subsequent year, we survey all participants in each industry. Each vendor is offered the opportunity to self-report the information required. Although there is a primary contact for each company, large companies are surveyed across product lines and across geographic regions. Thus, there is a corresponding increase in the number of contacts at large companies. (Dataquest maintains a large contact database on all sources of information). Examples of the job titles of people contacted for information are the following:

- President and CEO
- Vice President and General Manager
- Vice President of Marketing
- Vice President, Strategic Product Planning
- Director of Strategic Planning
- Director of Marketing
- Director of Market Development
- Manager, CAD/CAM/CAE/GIS Marketing Programs
- Market Research Analyst

The Audit Process

Data supplied by vendors are evaluated against information drawn from many sources, including the following:

- Revenue published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant economic data
- Information and data from online data banks
- Articles in both the general and trade press
- Annual reports, SEC documents, credit reports
- Company publications and press releases
- Reports from financial analysts
- User studies
- Reseller and supplier reports and reports from a vendor's competitors

In addition, Dataquest sums vendor revenue across other industries covered by Dataquest to make sure that revenue is not credited twice and checks with multiple sources at one company to cross-check data on that company.

Dataquest analysts have many years of experience in how to apply the above tools to get the most accurate information possible on a particular company (such as what to use when and what industry averages are). We believe that the estimates presented here are the most accurate and meaningful generally available today. It is the CAD/CAM/CAE/GIS group's policy to continually update our market information for any year, based on any new data received, in order to arrive at the most accurate market representation possible.

Dataquest's CAD/CAM/CAE/GIS market numbers are often higher than those reported by other sources. We survey worldwide, which involves more vendors, higher total market revenue, lower market share per vendor, and a more accurate market picture—particularly useful when comparing regions or applications.

Publishing Schedule

We publish market share and forecasting, twice each year for each, allowing for both timely distribution of data and thorough analysis and forecasting. Our annual delivery schedule is as follows:

- Market share data are available January 31. All tables will be published and distributed to clients by March 31.

- Forecasting from the market share tables provides a five-year forecast period, available after March 31. The books will be shipped by May 31.
- Final updated market share tables, based on additional data collection and analysis, will be completed by May 31. At this point, the market share database is frozen and will not be changed until the end of the year. For the next six months, supplementary market data will be based on these final market data. Books will be shipped by July 31.
- We provide complete final forecast tables by July 31. These tables take into consideration changes in the market share during the previous six months. Books will be shipped by September 31.

Table 14
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	1,756.9	1,015.7	427.7	80,820	11.4%	13.1%	8.6%	12.4%
Intergraph	1,126.6	496.0	313.6	15,885	7.3%	6.4%	6.3%	2.4%
Hewlett-Packard	919.9	706.7	72.1	52,067	6.0%	9.1%	1.4%	8.0%
Digital	918.9	638.6	5.2	25,902	6.0%	8.2%	.1%	4.0%
Sun Microsystems	869.5	751.6	.0	49,537	5.7%	9.7%	.0%	7.6%
Computervision	777.3	242.8	247.5	7,615	5.1%	3.1%	5.0%	1.2%
Fujitsu	442.0	282.9	114.9	8,751	2.9%	3.6%	2.3%	1.3%
Compaq	429.8	429.8	.0	93,060	2.8%	5.5%	.0%	14.2%
Cadence	425.4	.0	338.3	0	2.8%	.0%	6.8%	.0%
Autodesk	367.7	.0	367.7	0	2.4%	.0%	7.4%	.0%
Mentor Graphics	349.4	61.4	151.8	3,688	2.3%	.8%	3.0%	.6%
NEC	348.0	238.9	81.3	22,400	2.3%	3.1%	1.6%	3.4%
EDS	310.1	105.4	142.2	4,849	2.0%	1.4%	2.9%	.7%
Siemens Nixdorf Info systeme	271.1	127.6	102.9	3,085	1.8%	1.6%	2.1%	.5%
Apple Computer	239.0	239.0	.0	50,007	1.6%	3.1%	.0%	7.6%
Silicon Graphics	230.5	210.7	.0	7,833	1.5%	2.7%	.0%	1.2%
Nihon Unisys	228.3	141.6	38.8	2,220	1.5%	1.8%	.8%	.3%
Hitachi	174.0	83.5	73.1	4,675	1.1%	1.1%	1.5%	.7%
Control Data Systems	169.4	82.1	28.1	2,366	1.1%	1.1%	.6%	.4%
SDRC	149.8	.0	129.2	0	1.0%	.0%	2.6%	.0%
Applicon	135.0	45.3	53.2	1,452	.9%	.6%	1.1%	.2%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Zuken	107.8	30.6	57.4	667	.7%	.4%	1.2%	.1%
ESRI	106.3	.0	98.0	0	.7%	.0%	2.0%	.0%
Toshiba—NO OEM	106.2	53.1	42.5	3,114	.7%	.7%	.9%	.5%
Parametric Technology	100.2	.0	81.2	0	.7%	.0%	1.6%	.0%
Matra Datavision	100.0	32.0	51.0	839	.7%	.4%	1.0%	.1%
Mitsubishi Electric	95.0	74.0	12.0	1,722	.6%	1.0%	.2%	.3%
Racal-Redac	86.0	.0	73.5	2	.6%	.0%	1.5%	.0%
Landmark Graphics	81.9	41.0	18.8	424	.5%	.5%	.4%	.1%
Hitachi Zosen Info Systems	77.6	66.2	3.6	800	.5%	.9%	.1%	.1%
Mutoh Industries—NO OEM	72.3	43.4	21.7	1,139	.5%	.6%	.4%	.2%
Synopsys	71.2	.0	51.3	0	.5%	.0%	1.0%	.0%
MacNeal-Schwendler	65.6	.0	65.6	0	.4%	.0%	1.3%	.0%
IEZ	64.3	22.5	32.1	1,360	.4%	.3%	.6%	.2%
Viewlogic Systems	59.2	.0	46.7	0	.4%	.0%	.9%	.0%
ISICAD	58.0	16.8	30.9	348	.4%	.2%	.6%	.1%
Nemetschek	58.0	21.5	32.5	1,609	.4%	.3%	.7%	.2%
Sharp System Products—NO OEM	49.7	25.8	23.9	470	.3%	.3%	.5%	.1%
Auto-Trol	47.6	17.6	18.1	595	.3%	.2%	.4%	.1%
Swanson Analysis	45.3	.0	43.5	0	.3%	.0%	.9%	.0%
Sony	43.5	43.5	.0	1,587	.3%	.6%	.0%	.2%
Wacom	42.5	8.6	29.5	788	.3%	.1%	.6%	.1%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
STI-Straessle	42.5	12.8	20.4	344	.3%	.2%	.4%	.1%
COMPASS Design Automation	40.8	.7	30.6	32	.3%	.0%	.6%	.0%
Unisys	40.0	17.4	13.9	864	.3%	.2%	.3%	.1%
Hakuto	39.9	24.0	16.0	850	.3%	.3%	.3%	.1%
Mitsui Engineering	39.7	27.8	7.9	264	.3%	.4%	.2%	.0%
Cisigraph	39.3	11.0	21.6	250	.3%	.1%	.4%	.0%
Data General	38.1	30.5	1.9	1,998	.2%	.4%	.0%	.3%
ItalCad	38.0	17.9	9.1	360	.2%	.2%	.2%	.1%
Uchida Yoko	37.9	22.9	13.5	900	.2%	.3%	.3%	.1%
PDA Engineering	36.1	.0	34.7	0	.2%	.0%	.7%	.0%
ICL	35.1	20.7	11.9	962	.2%	.3%	.2%	.1%
Harris EDA	35.0	3.8	20.3	150	.2%	.0%	.4%	.0%
Dell Computer	34.6	34.6	.0	9,012	.2%	.4%	.0%	1.4%
Seiko Instruments—NO OEM	34.2	14.2	17.1	258	.2%	.2%	.3%	.0%
CADIX	33.6	13.4	16.8	247	.2%	.2%	.3%	.0%
Alias Research	32.7	.0	29.7	0	.2%	.0%	.6%	.0%
Tokyo Electron—NO OEM	32.3	10.7	14.5	220	.2%	.1%	.3%	.0%
Zycad	31.5	18.9	4.1	239	.2%	.2%	.1%	.0%
ASCAD/ASCAM	30.6	18.4	9.2	450	.2%	.2%	.2%	.1%
Investronica SA	29.3	23.4	2.9	1,170	.2%	.3%	.1%	.2%
Cimatron	29.0	13.1	13.1	921	.2%	.2%	.3%	.1%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Delcam International	29.0	10.7	12.6	347	.2%	.1%	.3%	.1%
Han Dataport	28.6	8.8	15.5	620	.2%	.1%	.3%	.1%
Wiechers Datentechnik	27.4	6.9	12.9	823	.2%	.1%	.3%	.1%
GeoVision Systems	27.0	2.2	14.0	50	.2%	.0%	.3%	.0%
Cimlinc	26.6	.0	18.6	562	.2%	.0%	.4%	.1%
EEsof	26.0	.0	22.1	16	.2%	.0%	.4%	.0%
Gerber Systems	26.0	12.7	8.6	360	.2%	.2%	.2%	.1%
Toyo Information Systems-NO OEM	24.8	15.1	7.2	265	.2%	.2%	.1%	.0%
Century Research Center	22.5	11.9	8.3	119	.1%	.2%	.2%	.0%
Accugraph	22.0	9.7	9.9	779	.1%	.1%	.2%	.1%
MCS	20.2	.0	17.9	0	.1%	.0%	.4%	.0%
ADRA Systems	20.2	1.2	15.2	65	.1%	.0%	.3%	.0%
Marcus Computer Systeme	19.9	10.3	6.8	296	.1%	.1%	.1%	.0%
Tebis	19.6	3.0	13.7	112	.1%	.0%	.3%	.0%
Quickturn Systems	19.5	19.5	.0	162	.1%	.3%	.0%	.0%
Moss Systems	19.5	.9	14.0	60	.1%	.0%	.3%	.0%
CAD Lab	18.7	.0	15.2	0	.1%	.0%	.3%	.0%
Genasys II	18.6	1.9	13.0	86	.1%	.0%	.3%	.0%
PAFEC	18.5	.0	18.5	0	.1%	.0%	.4%	.0%
Logic Modeling Systems	18.2	.0	14.5	0	.1%	.0%	.3%	.0%
Radan Computational	17.6	6.2	8.8	364	.1%	.1%	.2%	.1%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
CAD Distribution	16.9	8.4	6.7	261	.1%	.1%	.1%	.0%
Digital Kienzle	16.3	8.3	4.6	239	.1%	.1%	.1%	.0%
CAD Centre	16.2	.0	13.0	0	.1%	.0%	.3%	.0%
Xilinx	16.0	.0	14.4	0	.1%	.0%	.3%	.0%
Omron	16.0	9.6	6.4	394	.1%	.1%	.1%	.1%
Andor	15.7	3.9	11.1	121	.1%	.1%	.2%	.0%
Research Machines	15.6	15.6	.0	2,517	.1%	.2%	.0%	.4%
Ikos Systems	15.4	14.6	.8	169	.1%	.2%	.0%	.0%
Star Informatic	15.4	2.4	10.9	1,720	.1%	.0%	.2%	.3%
Graphtec Engineering	15.4	7.7	6.9	331	.1%	.1%	.1%	.1%
LSI Logic	15.1	1.5	11.3	38	.1%	.0%	.2%	.0%
ABB Industria	15.0	6.6	6.6	160	.1%	.1%	.1%	.0%
Framasoft	14.8	.0	8.9	0	.1%	.0%	.2%	.0%
Ziegler Informatics	14.4	.0	14.4	0	.1%	.0%	.3%	.0%
INS Engineering	14.3	7.2	7.2	48	.1%	.1%	.1%	.0%
Comdisco Systems	14.0	.0	12.6	0	.1%	.0%	.3%	.0%
Soft-Tech Software Technologies	13.8	2.1	10.4	932	.1%	.0%	.2%	.1%
ICAD	13.5	.0	10.8	0	.1%	.0%	.2%	.0%
Aries Technology	13.4	.0	12.1	0	.1%	.0%	.2%	.0%
Teradyne	13.1	1.4	8.5	30	.1%	.0%	.2%	.0%
Altera	13.0	.0	11.1	0	.1%	.0%	.2%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Kockums Computer Systems	12.9	3.2	7.1	635	.1%	.0%	.1%	.1%
Design Automation	12.7	2.5	9.5	267	.1%	.0%	.2%	.0%
Sumitomo Denko Workstation	12.7	12.7	.0	654	.1%	.2%	.0%	.1%
Microway	12.5	7.6	3.8	133	.1%	.1%	.1%	.0%
Exapt	12.5	6.1	4.2	229	.1%	.1%	.1%	.0%
Technische Computer Systeme	12.5	2.2	10.2	328	.1%	.0%	.2%	.1%
CADKEY	12.3	.0	12.3	0	.1%	.0%	.2%	.0%
Synercom	12.2	.0	6.4	0	.1%	.0%	.1%	.0%
Analogy	12.1	.0	9.7	0	.1%	.0%	.2%	.0%
Fides Industrielle Automation	12.0	3.7	5.0	70	.1%	.0%	.1%	.0%
MARC	11.8	.0	11.8	0	.1%	.0%	.2%	.0%
Laser-Scan	11.6	3.9	4.7	68	.1%	.1%	.1%	.0%
Strategic Mapping	11.5	.0	10.4	0	.1%	.0%	.2%	.0%
Microsim	11.3	.0	10.6	0	.1%	.0%	.2%	.0%
ERDAS	11.0	3.0	7.3	186	.1%	.0%	.1%	.0%
Orcad	10.9	.0	10.9	0	.1%	.0%	.2%	.0%
ETAK	10.7	.5	10.0	23	.1%	.0%	.2%	.0%
MapInfo	10.6	.0	8.5	0	.1%	.0%	.2%	.0%
Smallworld Systems	10.5	2.4	5.8	52	.1%	.0%	.1%	.0%
CPU	10.5	.0	9.5	0	.1%	.0%	.2%	.0%
Silvar-Lisco	10.4	.0	5.8	0	.1%	.0%	.1%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Sysscan	10.4	4.5	2.8	98	.1%	.1%	.1%	.0%
Rasna Corporation	10.3	.0	9.3	0	.1%	.0%	.2%	.0%
Point Control	10.0	.0	7.9	0	.1%	.0%	.2%	.0%
Meta-Software	9.9	.0	6.5	0	.1%	.0%	.1%	.0%
Softdesk	9.9	.0	9.9	0	.1%	.0%	.2%	.0%
GeoQuest	9.6	.0	9.6	0	.1%	.0%	.2%	.0%
Test Systems Strategies	9.5	.0	8.5	0	.1%	.0%	.2%	.0%
Infocel	9.4	1.3	7.2	197	.1%	.0%	.1%	.0%
ACTEL	9.3	.0	8.1	0	.1%	.0%	.2%	.0%
PADS Software	9.2	.0	7.8	0	.1%	.0%	.2%	.0%
CAMAX Systems Inc.	9.2	1.5	5.5	161	.1%	.0%	.1%	.0%
Data I/O	9.1	.0	9.1	0	.1%	.0%	.2%	.0%
Mechanical Dynamics	8.6	.0	6.8	0	.1%	.0%	.1%	.0%
Aucotec	8.5	3.4	3.4	470	.1%	.0%	.1%	.1%
Enghouse Systems Ltd.	8.3	.0	7.2	10	.1%	.0%	.1%	.0%
RIB/RZB	8.3	.7	6.7	52	.1%	.0%	.1%	.0%
EA Systems	8.1	.0	8.1	0	.1%	.0%	.2%	.0%
Cascade Design Automation	8.0	.0	6.0	0	.1%	.0%	.1%	.0%
Ontos	7.9	.0	7.9	0	.1%	.0%	.2%	.0%
DAT Standard info ssystemes	7.9	.0	7.5	0	.1%	.0%	.2%	.0%
Engineering Mechanics	7.9	.4	6.7	628	.1%	.0%	.1%	.1%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Ascent Logic Corp	7.8	.0	6.2	0	.1%	.0%	.1%	.0%
Olivetti	7.8	6.6	.0	890	.1%	.1%	.0%	.1%
Sagantec	7.5	.0	6.7	0	.0%	.0%	.1%	.0%
RoboCAD Solutions	7.3	.0	5.9	0	.0%	.0%	.1%	.0%
Micrografx	7.3	.0	7.3	0	.0%	.0%	.1%	.0%
Spectrum Graphics	7.2	2.2	3.6	67	.0%	.0%	.1%	.0%
Hochtief	7.2	1.1	5.0	86	.0%	.0%	.1%	.0%
Serbi	7.0	.7	6.3	200	.0%	.0%	.1%	.0%
Ground Modelling Systems	7.0	3.7	2.8	611	.0%	.0%	.1%	.1%
Genrad	6.9	1.3	4.6	72	.0%	.0%	.1%	.0%
CNC Software	6.8	.0	6.8	0	.0%	.0%	.1%	.0%
ASG	6.8	.0	6.8	0	.0%	.0%	.1%	.0%
Alper Systems	6.4	3.2	1.6	45	.0%	.0%	.0%	.0%
BATISOFT	6.3	.9	3.2	314	.0%	.0%	.1%	.0%
Moda CAD	6.3	1.5	4.4	52	.0%	.0%	.1%	.0%
Radian Corporation	6.2	.0	3.7	0	.0%	.0%	.1%	.0%
Graphisoft Software Dev	6.2	.0	6.2	0	.0%	.0%	.1%	.0%
CrossCheck Technology	6.2	.0	3.1	0	.0%	.0%	.1%	.0%
ANACAD	6.1	.0	6.1	0	.0%	.0%	.1%	.0%
PCI Remote Sensing Corp	6.0	.0	6.0	0	.0%	.0%	.1%	.0%
PiE Design	6.0	3.0	2.4	152	.0%	.0%	.0%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Scientific & Engineering SW	6.0	.0	6.0	0	.0%	.0%	.1%	.0%
Sigma Design	5.9	.0	5.6	0	.0%	.0%	.1%	.0%
Aspen Technology	5.8	.0	5.2	0	.0%	.0%	.1%	.0%
debis Systemhaus	5.8	1.4	3.4	39	.0%	.0%	.1%	.0%
Solbourne	5.7	5.7	.0	514	.0%	.1%	.0%	.1%
Clemessy	5.7	4.6	.9	19	.0%	.1%	.0%	.0%
Kohns & Poppenhaeger	5.4	2.7	1.9	64	.0%	.0%	.0%	.0%
American Small Business Comp.	5.3	.0	5.3	0	.0%	.0%	.1%	.0%
Quad Design Technology	5.3	.0	4.9	0	.0%	.0%	.1%	.0%
SPATIAL Technology	5.2	.0	5.2	0	.0%	.0%	.1%	.0%
mb Programme	5.1	2.5	1.8	122	.0%	.0%	.0%	.0%
Complansoft CAD	5.0	2.5	2.5	114	.0%	.0%	.1%	.0%
Algor Interactive Systems	4.9	.0	4.3	0	.0%	.0%	.1%	.0%
BETRONEX	4.8	.5	4.3	89	.0%	.0%	.1%	.0%
Dynamic Graphics	4.8	.0	4.1	0	.0%	.0%	.1%	.0%
i-Logix	4.7	.0	4.3	0	.0%	.0%	.1%	.0%
International Software Systems	4.7	.0	4.7	0	.0%	.0%	.1%	.0%
Kubota Computer	4.6	3.4	.8	300	.0%	.0%	.0%	.0%
Claris	4.6	.0	4.6	0	.0%	.0%	.1%	.0%
Wisdom Systems	4.5	.0	3.5	0	.0%	.0%	.1%	.0%
Kloeckner-Moeller	4.5	.9	3.1	46	.0%	.0%	.1%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
HP Cade	4.4	2.6	1.3	44	.0%	.0%	.0%	.0%
Triplan	4.3	1.7	2.1	62	.0%	.0%	.0%	.0%
Whessoe Computing Systems	4.2	.0	4.2	0	.0%	.0%	.1%	.0%
CADSI	4.2	.6	3.1	29	.0%	.0%	.1%	.0%
Computer Services Consultants	4.2	.0	4.2	0	.0%	.0%	.1%	.0%
Contec Microelectronics	4.2	.0	3.8	0	.0%	.0%	.1%	.0%
Pathtrace	4.2	.9	2.7	62	.0%	.0%	.1%	.0%
Pacific Numerics	4.1	.0	4.1	0	.0%	.0%	.1%	.0%
Gable CAD Systems	4.1	2.9	.6	45	.0%	.0%	.0%	.0%
Bechtel Software	4.0	.0	3.7	0	.0%	.0%	.1%	.0%
Softronics	4.0	1.1	3.0	361	.0%	.0%	.1%	.1%
Ricoh—NO OEM	3.9	.0	3.3	0	.0%	.0%	.1%	.0%
Integrated Computer Graphics	3.9	1.5	2.1	250	.0%	.0%	.0%	.0%
Integrated Silicon Systems	3.8	.0	3.0	19	.0%	.0%	.1%	.0%
Sener Sistemas Marinos	3.7	.0	3.7	0	.0%	.0%	.1%	.0%
Compact Software	3.7	.0	3.7	0	.0%	.0%	.1%	.0%
Anilam Electronics	3.7	.8	2.6	88	.0%	.0%	.1%	.0%
Innovative Data Design	3.7	.0	3.7	0	.0%	.0%	.1%	.0%
Datagraphic	3.6	1.8	1.4	57	.0%	.0%	.0%	.0%
EME	3.5	.8	1.6	70	.0%	.0%	.0%	.0%
Autometric	3.5	2.3	1.2	75	.0%	.0%	.0%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
GeoGraphix	3.4	.0	2.5	0	.0%	.0%	.1%	.0%
PacSoft	3.2	.0	3.2	0	.0%	.0%	.1%	.0%
Accel Technologies	3.2	.0	2.9	0	.0%	.0%	.1%	.0%
Intera Tydac	3.2	.0	3.2	0	.0%	.0%	.1%	.0%
ISKA	3.1	1.4	1.3	57	.0%	.0%	.0%	.0%
Vero International Software	3.1	.0	2.9	0	.0%	.0%	.1%	.0%
FEA	3.0	.7	.7	0	.0%	.0%	.0%	.0%
Neocad	3.0	.0	3.0	0	.0%	.0%	.1%	.0%
Minc Software	3.0	.0	3.0	0	.0%	.0%	.1%	.0%
Sweet's Electronic Publishing	3.0	.0	2.4	0	.0%	.0%	.0%	.0%
Assigraph	2.9	.0	2.3	0	.0%	.0%	.0%	.0%
Quantic Laboratories	2.8	.0	2.6	0	.0%	.0%	.1%	.0%
Superdraft	2.8	1.3	1.4	160	.0%	.0%	.0%	.0%
Generation 5 Technology	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
Land Innovation	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
Motorola	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
CADWorks	2.6	.0	2.4	0	.0%	.0%	.0%	.0%
Infinite Graphics	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
EPIC Design Technology	2.5	.0	2.5	0	.0%	.0%	.1%	.0%
High Level Design Systems	2.5	.0	1.8	0	.0%	.0%	.0%	.0%
ACDS Graphic System	2.5	.0	2.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Foresight Resources	2.5	.0	2.3	0	.0%	.0%	.0%	.0%
Visionics	2.5	.0	2.4	10	.0%	.0%	.0%	.0%
Computational Mechanics	2.4	.0	2.4	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	2.4	.0	2.1	0	.0%	.0%	.0%	.0%
ALS Design	2.4	.1	2.2	20	.0%	.0%	.0%	.0%
Catalpa	2.3	.4	1.5	25	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	2.3	.6	1.3	41	.0%	.0%	.0%	.0%
Terra Sciences	2.3	.0	2.3	0	.0%	.0%	.0%	.0%
Caroline Informatique	2.3	.4	1.2	18	.0%	.0%	.0%	.0%
Elstree Computing	2.2	1.0	1.2	62	.0%	.0%	.0%	.0%
IMSI	2.2	.0	2.2	0	.0%	.0%	.0%	.0%
CAD-UL	2.1	.0	2.1	0	.0%	.0%	.0%	.0%
Carrier Corporation	2.1	.0	2.1	0	.0%	.0%	.0%	.0%
Evolution Computing	2.1	.0	2.1	0	.0%	.0%	.0%	.0%
Object Design	2.1	.0	2.1	0	.0%	.0%	.0%	.0%
Lamp Software	2.1	.5	1.5	130	.0%	.0%	.0%	.0%
FEGS	2.1	.0	1.0	0	.0%	.0%	.0%	.0%
ISDATA	2.0	.0	1.8	0	.0%	.0%	.0%	.0%
Kork Systems	2.0	.2	1.4	21	.0%	.0%	.0%	.0%
Sunrise Test Systems	2.0	.0	2.0	0	.0%	.0%	.0%	.0%
Engineering Systems Corp.	2.0	.0	1.8	0	.0%	.0%	.0%	.0%

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Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
CAD-Capture	2.0	.4	.6	10	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	1.9	.0	1.9	0	.0%	.0%	.0%	.0%
Objectivity	1.9	.0	1.9	0	.0%	.0%	.0%	.0%
MEDESIGN	1.9	.5	.7	21	.0%	.0%	.0%	.0%
Macao Systems	1.9	1.0	.6	19	.0%	.0%	.0%	.0%
CAD/CAM Group	1.9	.0	1.9	0	.0%	.0%	.0%	.0%
Geometria GIS Systems House	1.8	.2	.4	15	.0%	.0%	.0%	.0%
SIMUCAD	1.8	.0	1.7	0	.0%	.0%	.0%	.0%
Massteck	1.8	.0	1.8	0	.0%	.0%	.0%	.0%
DAPCO	1.8	.0	1.2	0	.0%	.0%	.0%	.0%
Engineered Software	1.7	.0	1.7	0	.0%	.0%	.0%	.0%
Research Engineers—Civilsoft	1.7	.0	1.7	0	.0%	.0%	.0%	.0%
CAMTEK	1.7	.4	1.1	120	.0%	.0%	.0%	.0%
ALDEC	1.6	.0	1.4	0	.0%	.0%	.0%	.0%
LandCadd	1.6	.0	1.5	0	.0%	.0%	.0%	.0%
ARKTEC	1.6	.2	1.3	43	.0%	.0%	.0%	.0%
Ultimap	1.6	.6	.5	18	.0%	.0%	.0%	.0%
Sinus Software	1.5	.8	.8	36	.0%	.0%	.0%	.0%
Chronologic Simulation	1.5	.0	1.4	0	.0%	.0%	.0%	.0%
GRAPHSOFT	1.4	.0	1.4	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	1.4	.0	1.2	0	.0%	.0%	.0%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Tanner Research	1.4	.0	1.3	0	.0%	.0%	.0%	.0%
Geotrace Technologies	1.4	.1	1.2	21	.0%	.0%	.0%	.0%
GEOVISION Inc.	1.3	.7	.3	67	.0%	.0%	.0%	.0%
Aucos elektronische Gerate	1.2	.4	.9	121	.0%	.0%	.0%	.0%
Valisys	1.2	.0	.0	0	.0%	.0%	.0%	.0%
Spectrum Software	1.1	.0	1.1	0	.0%	.0%	.0%	.0%
Mucke Software	1.1	.6	.4	27	.0%	.0%	.0%	.0%
Mega CADD	1.1	.0	1.1	0	.0%	.0%	.0%	.0%
CAE-link	1.1	.0	1.1	0	.0%	.0%	.0%	.0%
Intrinsix	1.0	1.0	.0	10	.0%	.0%	.0%	.0%
Aura CAD/CAM Systems	1.0	.0	.9	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	1.0	.0	.0	0	.0%	.0%	.0%	.0%
Quicklogic	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Royal Digital Centers	1.0	.0	.9	0	.0%	.0%	.0%	.0%
Maptech	.9	.0	.9	0	.0%	.0%	.0%	.0%
Areon	.9	.5	.2	6	.0%	.0%	.0%	.0%
Contract Data Research	.9	.0	.6	0	.0%	.0%	.0%	.0%
A.I. Systems	.8	.0	.8	0	.0%	.0%	.0%	.0%
CAD Language Systems	.8	.0	.6	0	.0%	.0%	.0%	.0%
Inca	.7	.7	.0	3	.0%	.0%	.0%	.0%
ECOM Associates	.7	.0	.7	4	.0%	.0%	.0%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Mc2 Engineering Software	.7	.0	.7	0	.0%	.0%	.0%	.0%
Phase Three Logic	.6	.0	.5	0	.0%	.0%	.0%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.0%	.0%
S.T.L.D. s.r.l.	.5	.0	.5	0	.0%	.0%	.0%	.0%
Expertest	.5	.0	.5	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.5	.0	.4	0	.0%	.0%	.0%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.0%	.0%
Exemplar Logic	.3	.0	.3	0	.0%	.0%	.0%	.0%
Other Companies	720.3	695.0	10.1	160,893	4.7%	8.9%	.2%	24.6%
All Companies	15,366.8	7,776.8	4,980.3	654,408	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	11,727.9	5,994.3	3,567.8	574,579	76.3%	77.1%	71.6%	87.8%
All Asian-Based Companies	2,157.6	1,278.9	654.8	53,570	14.0%	16.4%	13.1%	8.2%
All European-Based Companies	1,481.3	503.6	757.8	26,259	9.6%	6.5%	15.2%	4.0%
All Hardware Companies	4,410.0	3,855.0	7.6	506,889	28.7%	49.6%	.2%	77.5%
All Turnkey & SW Companies	10,956.8	3,921.9	4,972.8	147,519	71.3%	50.4%	99.8%	22.5%

Source: Dataquest (July 1993)

Table 15
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Intergraph	972.7	438.0	252.1	14,081	10.8%	11.0%	7.8%	8.1%
Hewlett-Packard	830.4	627.1	72.1	28,146	9.3%	15.8%	2.2%	16.2%
Computervision	748.6	236.1	233.6	7,173	8.3%	6.0%	7.2%	4.1%
Sun Microsystems	745.9	648.9	.0	44,834	8.3%	16.4%	.0%	25.8%
Cadence	397.5	.0	316.5	0	4.4%	.0%	9.8%	.0%
Mentor Graphics	349.4	61.4	151.8	3,688	3.9%	1.5%	4.7%	2.1%
IBM	329.6	158.3	125.1	7,238	3.7%	4.0%	3.9%	4.2%
EDS	271.8	93.7	124.7	4,374	3.0%	2.4%	3.9%	2.5%
Siemens Nixdorf Info systeme	248.5	115.9	95.4	2,940	2.8%	2.9%	3.0%	1.7%
Digital	231.5	156.2	4.0	11,125	2.6%	3.9%	.1%	6.4%
Silicon Graphics	218.9	200.8	.0	7,618	2.4%	5.1%	.0%	4.4%
Fujitsu	185.6	118.8	48.3	3,784	2.1%	3.0%	1.5%	2.2%
NEC	165.1	90.8	61.1	5,443	1.8%	2.3%	1.9%	3.1%
SDRC	143.8	.0	124.1	0	1.6%	.0%	3.8%	.0%
Hitachi	125.3	60.1	52.6	2,710	1.4%	1.5%	1.6%	1.6%
Applicon	120.8	40.4	47.6	1,277	1.3%	1.0%	1.5%	.7%
Zuken	107.8	30.6	57.4	667	1.2%	.8%	1.8%	.4%
Parametric Technology	100.2	.0	81.2	0	1.1%	.0%	2.5%	.0%
Matra Datavision	100.0	32.0	51.0	839	1.1%	.8%	1.6%	.5%
Racal-Redac	76.4	.0	64.3	2	.9%	.0%	2.0%	.0%
Nihon Unisys	75.8	47.0	12.9	619	.8%	1.2%	.4%	.4%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Toshiba—NO OEM	73.9	37.0	29.6	875	.8%	.9%	.9%	.5%
Mitsubishi Electric	72.6	61.7	5.1	781	.8%	1.6%	.2%	.5%
Hitachi Zosen Info Systems	72.2	61.3	3.6	739	.8%	1.5%	.1%	.4%
Synopsys	71.2	.0	51.3	0	.8%	.0%	1.6%	.0%
IEZ	64.3	22.5	32.1	1,360	.7%	.6%	1.0%	.8%
Control Data Systems	63.2	38.5	13.3	1,720	.7%	1.0%	.4%	1.0%
ESRI	55.7	.0	51.4	0	.6%	.0%	1.6%	.0%
Landmark Graphics	49.1	24.6	11.3	254	.5%	.6%	.4%	.1%
Sharp System Products—NO OEM	49.1	25.5	23.6	453	.5%	.6%	.7%	.3%
Auto-Trol	47.6	17.6	18.1	595	.5%	.4%	.6%	.3%
ISICAD	46.7	16.8	19.6	348	.5%	.4%	.6%	.2%
Sony	43.5	43.5	.0	1,587	.5%	1.1%	.0%	.9%
STI-Straessle	42.5	12.8	20.4	344	.5%	.3%	.6%	.2%
Viewlogic Systems	41.3	.0	32.6	0	.5%	.0%	1.0%	.0%
COMPASS Design Automation	40.0	.7	30.0	32	.4%	.0%	.9%	.0%
ItalCad	38.0	17.9	9.1	360	.4%	.5%	.3%	.2%
Mitsui Engineering	36.1	25.3	7.2	204	.4%	.6%	.2%	.1%
Cisigraph	35.4	9.9	19.4	225	.4%	.2%	.6%	.1%
ICL	35.1	20.7	11.9	962	.4%	.5%	.4%	.6%
Uchida Yoko	34.1	20.5	11.9	729	.4%	.5%	.4%	.4%
CADIX	33.6	13.4	16.8	247	.4%	.3%	.5%	.1%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Alias Research	32.7	.0	29.7	0	.4%	.0%	.9%	.0%
Tokyo Electron—NO OEM	32.3	10.7	14.5	220	.4%	.3%	.5%	.1%
Mutoh Industries—NO OEM	32.3	19.4	9.7	330	.4%	.5%	.3%	.2%
Harris EDA	31.4	3.4	17.6	132	.4%	.1%	.5%	.1%
Unisys	30.1	13.0	10.7	637	.3%	.3%	.3%	.4%
ASCAD/ASCAM	30.0	18.0	9.0	436	.3%	.5%	.3%	.3%
Seiko Instruments—NO OEM	28.9	11.6	14.5	122	.3%	.3%	.4%	.1%
Data General	28.2	22.6	1.4	1,620	.3%	.6%	.0%	.9%
PDA Engineering	27.1	.0	26.0	0	.3%	.0%	.8%	.0%
Nemetschek	26.7	9.9	14.9	321	.3%	.2%	.5%	.2%
Delcam International	26.3	9.7	11.5	288	.3%	.2%	.4%	.2%
Gerber Systems	26.0	12.7	8.6	360	.3%	.3%	.3%	.2%
Swanson Analysis	25.8	.0	24.7	0	.3%	.0%	.8%	.0%
Han Dataport	25.3	7.6	13.9	556	.3%	.2%	.4%	.3%
Cimlinc	22.6	.0	15.8	562	.3%	.0%	.5%	.3%
EEsof	22.1	.0	18.8	16	.2%	.0%	.6%	.0%
Autodesk	22.0	.0	22.0	0	.2%	.0%	.7%	.0%
Century Research Center	20.9	11.1	7.7	116	.2%	.3%	.2%	.1%
Toyo Information Systems-NO OEM	19.9	12.4	5.7	236	.2%	.3%	.2%	.1%
Marcus Computer Systeme	19.9	10.3	6.8	296	.2%	.3%	.2%	.2%
Accugraph	19.6	9.6	8.0	747	.2%	.2%	.2%	.4%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Quickturn Systems	19.5	19.5	.0	162	.2%	.5%	.0%	.1%
Moss Systems	19.5	.9	14.0	60	.2%	.0%	.4%	.0%
GeoVision Systems	18.9	1.5	9.8	43	.2%	.0%	.3%	.0%
Radan Computational	17.4	6.1	8.7	358	.2%	.2%	.3%	.2%
Cimatron	17.1	7.7	7.7	352	.2%	.2%	.2%	.2%
Genasys II	16.8	1.7	11.7	40	.2%	.0%	.4%	.0%
PAFEC	16.6	.0	16.6	0	.2%	.0%	.5%	.0%
Logic Modeling Systems	16.6	.0	13.2	0	.2%	.0%	.4%	.0%
Digital Kienzle	16.3	8.3	4.6	239	.2%	.2%	.1%	.1%
CAD Centre	16.2	.0	13.0	0	.2%	.0%	.4%	.0%
Omron	16.0	9.6	6.4	394	.2%	.2%	.2%	.2%
CAD Lab	15.9	.0	12.7	0	.2%	.0%	.4%	.0%
Star Informatic	15.4	2.4	10.9	1,720	.2%	.1%	.3%	1.0%
Graphtec Engineering	15.4	7.7	6.9	331	.2%	.2%	.2%	.2%
ADRA Systems	15.2	1.2	11.1	65	.2%	.0%	.3%	.0%
Comdisco Systems	14.0	.0	12.6	0	.2%	.0%	.4%	.0%
INS Engineering	13.6	6.8	6.8	35	.2%	.2%	.2%	.0%
LSI Logic	13.6	1.4	10.2	35	.2%	.0%	.3%	.0%
ICAD	13.5	.0	10.8	0	.2%	.0%	.3%	.0%
Framasoft	13.4	.0	8.0	0	.1%	.0%	.2%	.0%
Kockums Computer Systems	12.9	3.2	7.1	635	.1%	.1%	.2%	.4%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Aries Technology	12.1	.0	10.9	0	.1%	.0%	.3%	.0%
Fides Industrielle Automation	12.0	3.7	5.0	70	.1%	.1%	.2%	.0%
Sumitomo Denko Workstation	11.8	11.8	.0	592	.1%	.3%	.0%	.3%
Analogy	11.5	.0	9.2	0	.1%	.0%	.3%	.0%
Laser-Scan	11.1	3.8	4.5	64	.1%	.1%	.1%	.0%
Technische Computer Systeme	11.0	2.0	9.0	286	.1%	.0%	.3%	.2%
MacNeal-Schwendler	10.7	.0	10.7	0	.1%	.0%	.3%	.0%
Smallworld Systems	10.5	2.4	5.8	52	.1%	.1%	.2%	.0%
Silvar-Lisco	10.4	.0	5.8	0	.1%	.0%	.2%	.0%
MCS	9.3	.0	8.3	0	.1%	.0%	.3%	.0%
CAMAX Systems Inc.	9.2	1.5	5.5	161	.1%	.0%	.2%	.1%
MARC	9.0	.0	9.0	0	.1%	.0%	.3%	.0%
Meta-Software	8.7	.0	5.8	0	.1%	.0%	.2%	.0%
Test Systems Strategies	8.6	.0	7.7	0	.1%	.0%	.2%	.0%
ERDAS	8.4	2.3	5.5	47	.1%	.1%	.2%	.0%
Rasna Corporation	8.1	.0	7.3	0	.1%	.0%	.2%	.0%
Cascade Design Automation	8.0	.0	6.0	0	.1%	.0%	.2%	.0%
Ontos	7.9	.0	7.9	0	.1%	.0%	.2%	.0%
Teradyne	7.9	.9	5.1	20	.1%	.0%	.2%	.0%
Ascent Logic Corp	7.8	.0	6.2	0	.1%	.0%	.2%	.0%
Microway	7.7	4.7	2.3	73	.1%	.1%	.1%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Synercom	7.7	.0	4.0	0	.1%	.0%	.1%	.0%
Sagantec	7.5	.0	6.7	0	.1%	.0%	.2%	.0%
Mechanical Dynamics	7.3	.0	5.7	0	.1%	.0%	.2%	.0%
Spectrum Graphics	7.2	2.2	3.6	67	.1%	.1%	.1%	.0%
Wiechers Datentechnik	7.1	1.8	3.4	101	.1%	.0%	.1%	.1%
Alper Systems	6.4	3.2	1.6	45	.1%	.1%	.0%	.0%
CrossCheck Technology	6.2	.0	3.1	0	.1%	.0%	.1%	.0%
ANACAD	6.1	.0	6.1	0	.1%	.0%	.2%	.0%
Genrad	6.0	1.2	4.0	61	.1%	.0%	.1%	.0%
PiE Design	6.0	3.0	2.4	152	.1%	.1%	.1%	.1%
Scientific & Engineering SW	6.0	.0	6.0	0	.1%	.0%	.2%	.0%
Kohns & Poppenhaeger	5.4	2.7	1.9	64	.1%	.1%	.1%	.0%
Quad Design Technology	5.3	.0	4.9	0	.1%	.0%	.2%	.0%
SPATIAL Technology	5.2	.0	5.2	0	.1%	.0%	.2%	.0%
Complansoft CAD	5.0	2.5	2.5	114	.1%	.1%	.1%	.1%
GeoQuest	4.8	.0	4.8	0	.1%	.0%	.1%	.0%
Xilinx	4.8	.0	4.3	0	.1%	.0%	.1%	.0%
i-Logix	4.7	.0	4.3	0	.1%	.0%	.1%	.0%
Clemessy	4.6	3.7	.7	12	.1%	.1%	.0%	.0%
Engineering Mechanics	4.6	.2	3.9	221	.1%	.0%	.1%	.1%
Wisdom Systems	4.5	.0	3.5	0	.1%	.0%	.1%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
debis Systemhaus	4.4	1.1	2.6	23	.0%	.0%	.1%	.0%
HP Cade	4.4	2.6	1.3	44	.0%	.1%	.0%	.0%
Triplan	4.3	1.7	2.1	62	.0%	.0%	.1%	.0%
Contec Microelectronics	4.2	.0	3.8	0	.0%	.0%	.1%	.0%
Sysscan	4.2	1.4	1.5	49	.0%	.0%	.0%	.0%
Kubota Computer	4.1	2.9	.8	228	.0%	.1%	.0%	.1%
Gable CAD Systems	4.1	2.9	.6	45	.0%	.1%	.0%	.0%
Pacific Numerics	3.9	.0	3.9	0	.0%	.0%	.1%	.0%
Ricoh—NO OEM	3.9	.0	3.3	0	.0%	.0%	.1%	.0%
Dynamic Graphics	3.8	.0	3.2	0	.0%	.0%	.1%	.0%
Radian Corporation	3.7	.0	2.2	0	.0%	.0%	.1%	.0%
Sener Sistemas Marinos	3.7	.0	3.7	0	.0%	.0%	.1%	.0%
Wacom	3.6	.8	2.7	40	.0%	.0%	.1%	.0%
CADSI	3.4	.5	2.5	15	.0%	.0%	.1%	.0%
Exapt	3.4	1.7	1.2	115	.0%	.0%	.0%	.1%
Sigma Design	3.3	.0	3.1	0	.0%	.0%	.1%	.0%
ISKA	3.1	1.4	1.3	57	.0%	.0%	.0%	.0%
Integrated Silicon Systems	3.1	.0	2.4	10	.0%	.0%	.1%	.0%
PCI Remote Sensing Corp	3.0	.0	3.0	0	.0%	.0%	.1%	.0%
Quantic Laboratories	2.8	.0	2.6	0	.0%	.0%	.1%	.0%
Land Innovation	2.6	.0	2.6	0	.0%	.0%	.1%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Motorola	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
EPIC Design Technology	2.5	.0	2.5	0	.0%	.0%	.1%	.0%
High Level Design Systems	2.5	.0	1.8	0	.0%	.0%	.1%	.0%
ACDS Graphic System	2.5	.0	2.1	0	.0%	.0%	.1%	.0%
Integrated Computer Graphics	2.3	.9	1.3	128	.0%	.0%	.0%	.1%
RIB/RZB	2.3	.2	1.9	11	.0%	.0%	.1%	.0%
Softdesk	2.3	.0	2.3	0	.0%	.0%	.1%	.0%
Catalpa	2.1	.4	1.3	15	.0%	.0%	.0%	.0%
Object Design	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
EME	2.1	.4	1.0	29	.0%	.0%	.0%	.0%
Hakuto	2.0	1.2	.8	23	.0%	.0%	.0%	.0%
Sunrise Test Systems	2.0	.0	2.0	0	.0%	.0%	.1%	.0%
Infinite Graphics	2.0	.0	2.0	0	.0%	.0%	.1%	.0%
MEDESIGN	1.9	.5	.7	21	.0%	.0%	.0%	.0%
Objectivity	1.9	.0	1.9	0	.0%	.0%	.1%	.0%
ACTEL	1.9	.0	1.6	0	.0%	.0%	.1%	.0%
CAD/CAM Group	1.9	.0	1.9	0	.0%	.0%	.1%	.0%
DAPCO	1.8	.0	1.2	0	.0%	.0%	.0%	.0%
FEGS	1.8	.0	.9	0	.0%	.0%	.0%	.0%
Autometric	1.7	1.1	.6	40	.0%	.0%	.0%	.0%
Solbourne	1.7	1.6	.0	232	.0%	.0%	.0%	.1%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Caroline Informatique	1.6	.3	.8	8	.0%	.0%	.0%	.0%
Intera Tydac	1.6	.0	1.6	0	.0%	.0%	.0%	.0%
Data I/O	1.6	.0	1.6	0	.0%	.0%	.0%	.0%
Ultimap	1.6	.6	.5	18	.0%	.0%	.0%	.0%
Bechtel Software	1.5	.0	1.4	0	.0%	.0%	.0%	.0%
Chronologic Simulation	1.5	.0	1.4	0	.0%	.0%	.0%	.0%
Sinus Software	1.5	.8	.8	36	.0%	.0%	.0%	.0%
Compact Software	1.5	.0	1.5	0	.0%	.0%	.0%	.0%
Minc Software	1.5	.0	1.5	0	.0%	.0%	.0%	.0%
Assigraph	1.4	.0	1.1	0	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	1.4	.4	.8	17	.0%	.0%	.0%	.0%
SIMUCAD	1.4	.0	1.3	0	.0%	.0%	.0%	.0%
Aucotec	1.3	.5	.5	26	.0%	.0%	.0%	.0%
Enghouse Systems Ltd.	1.2	.0	1.1	10	.0%	.0%	.0%	.0%
FEA	1.2	.3	.3	0	.0%	.0%	.0%	.0%
Microsim	1.1	.0	1.1	0	.0%	.0%	.0%	.0%
Infocel	1.1	.2	.9	11	.0%	.0%	.0%	.0%
Valisys	1.1	.0	.0	0	.0%	.0%	.0%	.0%
Macao Systems	1.1	.6	.4	12	.0%	.0%	.0%	.0%
ETAK	1.1	.0	1.0	1	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	1.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Point Control	1.0	.0	.8	0	.0%	.0%	.0%	.0%
CADKEY	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Royal Digital Centers	1.0	.0	.9	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	1.0	.0	.9	0	.0%	.0%	.0%	.0%
GEOVISION Inc.	.9	.6	.2	29	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	.9	.0	.9	0	.0%	.0%	.0%	.0%
PADS Software	.9	.0	.7	0	.0%	.0%	.0%	.0%
Computational Mechanics	.9	.0	.9	0	.0%	.0%	.0%	.0%
CAD Language Systems	.8	.0	.6	0	.0%	.0%	.0%	.0%
Neocad	.8	.0	.8	0	.0%	.0%	.0%	.0%
Lamp Software	.6	.2	.4	52	.0%	.0%	.0%	.0%
Geometria GIS Systems House	.6	.0	.0	0	.0%	.0%	.0%	.0%
Expertest	.5	.0	.5	0	.0%	.0%	.0%	.0%
Engineering Systems Corp.	.5	.0	.4	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.5	.0	.4	0	.0%	.0%	.0%	.0%
ISDATA	.5	.0	.4	0	.0%	.0%	.0%	.0%
Whessoe Computing Systems	.4	.0	.4	0	.0%	.0%	.0%	.0%
Terra Sciences	.4	.0	.4	0	.0%	.0%	.0%	.0%
ASG	.3	.0	.3	0	.0%	.0%	.0%	.0%
Exemplar Logic	.2	.0	.2	0	.0%	.0%	.0%	.0%
Inca	.2	.2	.0	1	.0%	.0%	.0%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Research Engineers—Civilsoft	.2	.0	.2	0	.0%	.0%	.0%	.0%
Phase Three Logic	.2	.0	.2	0	.0%	.0%	.0%	.0%
Massteck	.2	.0	.2	0	.0%	.0%	.0%	.0%
ARKTEC	.2	.1	.1	11	.0%	.0%	.0%	.0%
Tanner Research	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
CAMTEK	.1	.0	.1	2	.0%	.0%	.0%	.0%
Carrier Corporation	.1	.0	.1	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
LandCadd	.1	.0	.1	0	.0%	.0%	.0%	.0%
CADWorks	.0	.0	.0	0	.0%	.0%	.0%	.0%
ALS Design	.0	.0	.0	0	.0%	.0%	.0%	.0%
ECOM Associates	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	4.3	.6	3.4	28	.0%	.0%	.1%	.0%
All Companies	8,966.3	3,967.9	3,225.9	173,489	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	6,599.8	2,860.5	2,271.8	138,113	73.6%	72.1%	70.4%	79.6%
All Asian-Based Companies	1,279.3	741.4	409.8	21,504	14.3%	18.7%	12.7%	12.4%
All European-Based Companies	1,087.3	366.0	544.2	13,872	12.1%	9.2%	16.9%	8.0%
All Hardware Companies	1,811.2	1,540.0	4.1	88,144	20.2%	38.8%	.1%	50.8%
All Turnkey & SW Companies	7,155.1	2,427.9	3,221.8	85,345	79.8%	61.2%	99.9%	49.2%

Source: Dataquest (July 1993)

Table 16
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	836.9	536.0	104.2	12,357	35.6%	35.0%	29.6%	38.9%
Digital	392.9	270.5	.7	0	16.7%	17.7%	.2%	.0%
Fujitsu	168.0	107.5	43.7	2,340	7.1%	7.0%	12.4%	7.4%
Nihon Unisys	152.6	94.6	25.9	1,601	6.5%	6.2%	7.4%	5.0%
Control Data Systems	103.0	42.1	14.4	634	4.4%	2.8%	4.1%	2.0%
NEC	70.1	53.2	11.2	152	3.0%	3.5%	3.2%	.5%
MacNeal-Schwendler	39.8	.0	39.8	0	1.7%	.0%	11.3%	.0%
Siemens Nixdorf Info systeme	22.6	11.8	7.5	145	1.0%	.8%	2.1%	.5%
Hitachi	17.4	8.3	7.3	310	.7%	.5%	2.1%	1.0%
Cadence	14.1	.0	10.8	0	.6%	.0%	3.1%	.0%
Mitsubishi Electric	13.0	6.1	3.6	41	.6%	.4%	1.0%	.1%
Computervision	10.6	3.0	3.4	164	.4%	.2%	1.0%	.5%
Exapt	9.1	4.5	3.1	114	.4%	.3%	.9%	.4%
PDA Engineering	9.0	.0	8.7	0	.4%	.0%	2.5%	.0%
Swanson Analysis	8.5	.0	8.2	0	.4%	.0%	2.3%	.0%
EA Systems	8.1	.0	8.1	0	.3%	.0%	2.3%	.0%
GeoVision Systems	8.1	.6	4.2	7	.3%	.0%	1.2%	.0%
Unisys	7.0	3.5	2.4	145	.3%	.2%	.7%	.5%
MCS	6.9	.0	6.0	0	.3%	.0%	1.7%	.0%
SDRC	6.1	.0	5.1	0	.3%	.0%	1.4%	.0%
Hitachi Zosen Info Systems	5.4	4.9	.0	61	.2%	.3%	.0%	.2%

(Continued)

Table 16 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Toshiba—NO OEM	5.2	2.6	2.1	74	.2%	.2%	.6%	.2%
Toyo Information Systems-NO OEM	5.0	2.7	1.6	29	.2%	.2%	.4%	.1%
Synercom	4.5	.0	2.4	0	.2%	.0%	.7%	.0%
Intergraph	3.3	.0	3.0	0	.1%	.0%	.8%	.0%
MARC	2.8	.0	2.8	0	.1%	.0%	.8%	.0%
Bechtel Software	2.0	.0	1.8	0	.1%	.0%	.5%	.0%
Autometric	1.8	1.2	.6	35	.1%	.1%	.2%	.1%
Century Research Center	1.6	.9	.6	2	.1%	.1%	.2%	.0%
LSI Logic	1.5	.1	1.2	3	.1%	.0%	.3%	.0%
Computational Mechanics	1.5	.0	1.5	0	.1%	.0%	.4%	.0%
Assigraph	1.4	.0	1.1	0	.1%	.0%	.3%	.0%
Framasoft	1.4	.0	.9	0	.1%	.0%	.2%	.0%
Mechanical Dynamics	1.3	.0	1.0	0	.1%	.0%	.3%	.0%
Clemessy	1.2	.9	.2	7	.0%	.1%	.1%	.0%
Harris EDA	1.1	.2	.8	7	.0%	.0%	.2%	.0%
Geotrace Technologies	1.0	.1	.9	21	.0%	.0%	.2%	.1%
Dynamic Graphics	1.0	.0	.9	0	.0%	.0%	.2%	.0%
ETAK	1.0	.0	.9	3	.0%	.0%	.3%	.0%
Test Systems Strategies	1.0	.0	.8	0	.0%	.0%	.2%	.0%
Compact Software	.9	.0	.9	0	.0%	.0%	.3%	.0%
Meta-Software	.9	.0	.6	0	.0%	.0%	.2%	.0%

(Continued)

Table 16 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Georgia Tech Research Corp.	.9	.0	.9	0	.0%	.0%	.2%	.0%
Whessoe Computing Systems	.8	.0	.8	0	.0%	.0%	.2%	.0%
COMPASS Design Automation	.8	.0	.6	0	.0%	.0%	.2%	.0%
Macao Systems	.8	.4	.3	6	.0%	.0%	.1%	.0%
debis Systemhaus	.7	.2	.4	3	.0%	.0%	.1%	.0%
Genrad	.7	.1	.5	2	.0%	.0%	.1%	.0%
Analogy	.6	.0	.5	0	.0%	.0%	.1%	.0%
ESRI	.5	.0	.5	0	.0%	.0%	.1%	.0%
Olivetti	.5	.4	.0	13	.0%	.0%	.0%	.0%
Kubota Computer	.5	.5	.0	72	.0%	.0%	.0%	.2%
Laser-Scan	.5	.1	.2	4	.0%	.0%	.1%	.0%
Radian Corporation	.4	.0	.2	0	.0%	.0%	.1%	.0%
Aucotec	.4	.2	.2	6	.0%	.0%	.0%	.0%
Electrical Eng. Software	.4	.0	.4	0	.0%	.0%	.1%	.0%
Logic Modeling Systems	.4	.0	.3	0	.0%	.0%	.1%	.0%
Hochtief	.4	.1	.2	2	.0%	.0%	.1%	.0%
FEA	.3	.1	.1	0	.0%	.0%	.0%	.0%
FEGS	.3	.0	.2	0	.0%	.0%	.0%	.0%
Data I/O	.3	.0	.3	0	.0%	.0%	.1%	.0%
Accugraph	.2	.1	.1	21	.0%	.0%	.0%	.1%
Engineering Systems Corp.	.2	.0	.2	0	.0%	.0%	.0%	.0%

(Continued)

Table 16 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ISDATA	.1	.0	.1	0	.0%	.0%	.0%	.0%
Microsim	.1	.0	.1	0	.0%	.0%	.0%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.0%	.0%
Lamp Software	.1	.0	.0	3	.0%	.0%	.0%	.0%
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.1	.1	.0	1	.0%	.0%	.0%	.0%
Teradyne	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	392.7	372.4	.5	13,384	16.7%	24.3%	.1%	42.1%
All Companies	2,354.1	1,529.8	352.2	31,771	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	1,873.3	1,230.0	239.3	26,786	79.6%	80.4%	67.9%	84.3%
All Asian-Based Companies	438.6	281.2	96.0	4,683	18.6%	18.4%	27.3%	14.7%
All European-Based Companies	42.3	18.5	16.9	303	1.8%	1.2%	4.8%	1.0%
All Hardware Companies	804.4	651.1	2.9	13,576	34.2%	42.6%	.8%	42.7%
All Turnkey & SW Companies	1,549.7	878.6	349.3	18,195	65.8%	57.4%	99.2%	57.3%

Source: Dataquest (July 1993)

Table 17
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Server
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	272.4	128.2	91.5	3,484	26.2%	22.3%	40.1%	21.4%
Digital	250.0	172.5	.0	3,465	24.1%	30.1%	.0%	21.3%
Sun Microsystems	123.7	102.7	.0	4,703	11.9%	17.9%	.0%	28.9%
Intergraph	121.0	58.1	29.0	1,804	11.6%	10.1%	12.7%	11.1%
EDS	38.3	11.8	17.5	475	3.7%	2.1%	7.7%	2.9%
ESRI	33.8	.0	31.2	0	3.3%	.0%	13.7%	.0%
Landmark Graphics	32.8	16.4	7.5	170	3.2%	2.9%	3.3%	1.0%
Zycad	31.5	18.9	4.1	239	3.0%	3.3%	1.8%	1.5%
Ikos Systems	15.4	14.6	.8	169	1.5%	2.5%	.3%	1.0%
MacNeal-Schwendler	14.2	.0	14.2	0	1.4%	.0%	6.2%	.0%
Hewlett-Packard	14.2	11.8	.0	401	1.4%	2.1%	.0%	2.5%
Cadence	13.8	.0	11.0	0	1.3%	.0%	4.8%	.0%
Applicon	13.0	4.4	5.1	136	1.2%	.8%	2.3%	.8%
Silicon Graphics	11.6	9.9	.0	215	1.1%	1.7%	.0%	1.3%
Computervision	10.5	3.6	2.9	109	1.0%	.6%	1.3%	.7%
Data General	9.9	7.9	.5	378	1.0%	1.4%	.2%	2.3%
Sysscan	6.2	3.1	1.3	48	.6%	.5%	.6%	.3%
Teradyne	5.2	.6	3.4	10	.5%	.1%	1.5%	.1%
Solbourne	4.1	4.1	.0	282	.4%	.7%	.0%	1.7%
Cisigraph	3.9	1.1	2.2	25	.4%	.2%	1.0%	.2%
Control Data Systems	3.2	1.5	.4	12	.3%	.3%	.2%	.1%

(Continued)

Table 17 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Server
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Unisys	2.9	.9	.7	81	.3%	.2%	.3%	.5%
Cimlinc	2.7	.0	1.9	0	.3%	.0%	.8%	.0%
Han Dataport	1.7	.8	.7	23	.2%	.1%	.3%	.1%
ETAK	1.0	.0	.9	0	.1%	.0%	.4%	.0%
Logic Modeling Systems	.9	.0	.7	0	.1%	.0%	.3%	.0%
Sumitomo Denko Workstation	.9	.9	.0	62	.1%	.2%	.0%	.4%
Radian Corporation	.5	.0	.3	0	.0%	.0%	.1%	.0%
Georgia Tech Research Corp.	.2	.0	.2	0	.0%	.0%	.1%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.0%	.0%
Other Companies	.0	.1	.0	8	.0%	.0%	.0%	.1%
All Companies	1,039.5	573.8	227.9	16,301	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	1,026.7	568.0	223.8	16,142	98.8%	99.0%	98.2%	99.0%
All Asian-Based Companies	.9	.9	.0	62	.1%	.2%	.0%	.4%
All European-Based Companies	11.8	4.9	4.2	97	1.1%	.9%	1.8%	.6%
All Hardware Companies	418.3	313.1	.6	9,573	40.2%	54.6%	.2%	58.7%
All Turnkey & SW Companies	621.2	260.7	227.4	6,728	59.8%	45.4%	99.8%	41.3%

Source: Dataquest (July 1993)

Table 18
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Compaq	429.8	429.8	.0	93,060	14.3%	25.2%	.0%	21.5%
Autodesk	345.7	.0	345.7	0	11.5%	.0%	29.4%	.0%
IBM	318.0	193.2	106.9	57,740	10.6%	11.3%	9.1%	13.3%
Apple Computer	239.0	239.0	.0	50,007	7.9%	14.0%	.0%	11.6%
NEC	112.9	94.8	9.0	16,805	3.8%	5.6%	.8%	3.9%
Fujitsu	88.4	56.6	23.0	2,627	2.9%	3.3%	2.0%	.6%
Hewlett-Packard	75.3	67.8	.0	23,520	2.5%	4.0%	.0%	5.4%
Digital	44.4	39.4	.5	11,311	1.5%	2.3%	.0%	2.6%
Mutoh Industries—NO OEM	40.0	24.0	12.0	809	1.3%	1.4%	1.0%	.2%
Wacom	38.9	7.8	26.8	748	1.3%	.5%	2.3%	.2%
Hakuto	37.9	22.8	15.2	827	1.3%	1.3%	1.3%	.2%
Dell Computer	34.6	34.6	.0	9,012	1.2%	2.0%	.0%	2.1%
Nemetschek	31.3	11.6	17.5	1,288	1.0%	.7%	1.5%	.3%
Hitachi	31.3	15.0	13.2	1,656	1.0%	.9%	1.1%	.4%
Intergraph	29.5	.0	29.5	0	1.0%	.0%	2.5%	.0%
Investronica SA	29.3	23.4	2.9	1,170	1.0%	1.4%	.2%	.3%
Toshiba—NO OEM	27.1	13.5	10.8	2,165	.9%	.8%	.9%	.5%
Wiechers Datentechnik	20.3	5.1	9.5	722	.7%	.3%	.8%	.2%
Tebis	19.6	3.0	13.7	112	.7%	.2%	1.2%	.0%
Viewlogic Systems	17.9	.0	14.1	0	.6%	.0%	1.2%	.0%
CAD Distribution	16.9	8.4	6.7	261	.6%	.5%	.6%	.1%

(Continued)

Table 18 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
ESRI	16.3	.0	15.0	0	.5%	.0%	1.3%	.0%
Andor	15.7	3.9	11.1	121	.5%	.2%	.9%	.0%
Research Machines	15.6	15.6	.0	2,517	.5%	.9%	.0%	.6%
ABB Industria	15.0	6.6	6.6	160	.5%	.4%	.6%	.0%
Ziegler Informatics	14.4	.0	14.4	0	.5%	.0%	1.2%	.0%
Soft-Tech Software Technologies	13.8	2.1	10.4	932	.5%	.1%	.9%	.2%
Altera	13.0	.0	11.1	0	.4%	.0%	.9%	.0%
Design Automation	12.7	2.5	9.5	267	.4%	.1%	.8%	.1%
Cimatron	12.0	5.4	5.4	569	.4%	.3%	.5%	.1%
Strategic Mapping	11.5	.0	10.4	0	.4%	.0%	.9%	.0%
ISICAD	11.3	.0	11.3	0	.4%	.0%	1.0%	.0%
CADKEY	11.2	.0	11.2	0	.4%	.0%	1.0%	.0%
Xilinx	11.2	.0	10.1	0	.4%	.0%	.9%	.0%
Swanson Analysis	11.0	.0	10.6	0	.4%	.0%	.9%	.0%
Orcad	10.9	.0	10.9	0	.4%	.0%	.9%	.0%
MapInfo	10.6	.0	8.5	0	.4%	.0%	.7%	.0%
CPU	10.5	.0	9.5	0	.3%	.0%	.8%	.0%
Microsim	10.1	.0	9.5	0	.3%	.0%	.8%	.0%
Racal-Redac	9.6	.0	9.2	0	.3%	.0%	.8%	.0%
Mitsubishi Electric	9.5	6.3	3.2	900	.3%	.4%	.3%	.2%
Point Control	9.0	.0	7.1	0	.3%	.0%	.6%	.0%

(Continued)

Table 18 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
PADS Software	8.3	.0	7.1	0	.3%	.0%	.6%	.0%
Infocel	8.3	1.2	6.3	186	.3%	.1%	.5%	.0%
DAT Standard info systemes	7.9	.0	7.5	0	.3%	.0%	.6%	.0%
Computervision	7.6	.0	7.6	169	.3%	.0%	.6%	.0%
ETAK	7.6	.4	7.3	18	.3%	.0%	.6%	.0%
Softdesk	7.6	.0	7.6	0	.3%	.0%	.6%	.0%
ACTEL	7.5	.0	6.5	0	.2%	.0%	.6%	.0%
Olivetti	7.3	6.2	.0	877	.2%	.4%	.0%	.2%
RoboCAD Solutions	7.3	.0	5.9	0	.2%	.0%	.5%	.0%
Micrografx	7.3	.0	7.3	0	.2%	.0%	.6%	.0%
Data I/O	7.3	.0	7.3	0	.2%	.0%	.6%	.0%
Enghouse Systems Ltd.	7.1	.0	6.2	0	.2%	.0%	.5%	.0%
Serbi	7.0	.7	6.3	200	.2%	.0%	.5%	.0%
Ground Modelling Systems	7.0	3.7	2.8	611	.2%	.2%	.2%	.1%
CNC Software	6.8	.0	6.8	0	.2%	.0%	.6%	.0%
Aucotec	6.8	2.7	2.7	437	.2%	.2%	.2%	.1%
Hochtief	6.8	1.0	4.8	84	.2%	.1%	.4%	.0%
ASG	6.5	.0	6.5	0	.2%	.0%	.6%	.0%
BATISOFT	6.3	.9	3.2	314	.2%	.1%	.3%	.1%
Moda CAD	6.3	1.5	4.4	52	.2%	.1%	.4%	.0%
Graphisoft Software Dev	6.2	.0	6.2	0	.2%	.0%	.5%	.0%

(Continued)

Table 18 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
RIB/RZB	6.0	.5	4.9	41	.2%	.0%	.4%	.0%
Aspen Technology	5.8	.0	5.2	0	.2%	.0%	.4%	.0%
American Small Business Comp.	5.3	.0	5.3	0	.2%	.0%	.5%	.0%
Seiko Instruments—NO OEM	5.3	2.6	2.6	136	.2%	.2%	.2%	.0%
mb Programme	5.1	2.5	1.8	122	.2%	.1%	.2%	.0%
ADRA Systems	5.0	.0	4.0	0	.2%	.0%	.3%	.0%
BETRONEX	4.8	.5	4.3	89	.2%	.0%	.4%	.0%
GeoQuest	4.8	.0	4.8	0	.2%	.0%	.4%	.0%
Microway	4.7	2.9	1.4	60	.2%	.2%	.1%	.0%
Algor Interactive Systems	4.7	.0	4.2	0	.2%	.0%	.4%	.0%
International Software Systems	4.7	.0	4.7	0	.2%	.0%	.4%	.0%
Claris	4.6	.0	4.6	0	.2%	.0%	.4%	.0%
Kloeckner-Moeller	4.5	.9	3.1	46	.1%	.1%	.3%	.0%
Pathtrace	4.2	.9	2.7	62	.1%	.1%	.2%	.0%
Computer Services Consultants	4.2	.0	4.2	0	.1%	.0%	.4%	.0%
MCS	4.1	.0	3.6	0	.1%	.0%	.3%	.0%
Softronics	4.0	1.1	3.0	361	.1%	.1%	.3%	.1%
EEsof	3.9	.0	3.3	0	.1%	.0%	.3%	.0%
Uchida Yoko	3.8	2.4	1.6	171	.1%	.1%	.1%	.0%
Anilam Electronics	3.7	.8	2.6	88	.1%	.0%	.2%	.0%
Innovative Data Design	3.7	.0	3.7	0	.1%	.0%	.3%	.0%

(Continued)

Table 18 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Mitsui Engineering	3.6	2.5	.7	60	.1%	.1%	.1%	.0%
Datagraphic	3.6	1.8	1.4	57	.1%	.1%	.1%	.0%
GeoGraphix	3.4	.0	2.5	0	.1%	.0%	.2%	.0%
Engineering Mechanics	3.3	.2	2.8	407	.1%	.0%	.2%	.1%
PacSoft	3.2	.0	3.2	0	.1%	.0%	.3%	.0%
Accel Technologies	3.2	.0	2.9	0	.1%	.0%	.2%	.0%
Vero International Software	3.1	.0	2.9	0	.1%	.0%	.2%	.0%
PCI Remote Sensing Corp	3.0	.0	3.0	0	.1%	.0%	.3%	.0%
Sweet's Electronic Publishing	3.0	.0	2.4	0	.1%	.0%	.2%	.0%
Whessoe Computing Systems	3.0	.0	3.0	0	.1%	.0%	.3%	.0%
CAD Lab	2.8	.0	2.5	0	.1%	.0%	.2%	.0%
Superdraft	2.8	1.3	1.4	160	.1%	.1%	.1%	.0%
Delcam International	2.7	1.0	1.1	59	.1%	.1%	.1%	.0%
Sigma Design	2.7	.0	2.5	0	.1%	.0%	.2%	.0%
ERDAS	2.6	.7	1.8	139	.1%	.0%	.1%	.0%
Generation 5 Technology	2.6	.0	2.6	0	.1%	.0%	.2%	.0%
CADWorks	2.6	.0	2.3	0	.1%	.0%	.2%	.0%
Harris EDA	2.6	.2	2.0	10	.1%	.0%	.2%	.0%
Foresight Resources	2.5	.0	2.3	0	.1%	.0%	.2%	.0%
Visionics	2.5	.0	2.4	10	.1%	.0%	.2%	.0%
ALS Design	2.4	.1	2.1	20	.1%	.0%	.2%	.0%

(Continued)

Table 18 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Facility Mapping Systems	2.3	.0	2.0	0	.1%	.0%	.2%	.0%
Neocad	2.3	.0	2.3	0	.1%	.0%	.2%	.0%
Elstree Computing	2.2	1.0	1.2	62	.1%	.1%	.1%	.0%
IMSI	2.2	.0	2.2	0	.1%	.0%	.2%	.0%
Accugraph	2.2	.1	1.8	10	.1%	.0%	.2%	.0%
Rasna Corporation	2.2	.0	2.0	0	.1%	.0%	.2%	.0%
CAD-UL	2.1	.0	2.1	0	.1%	.0%	.2%	.0%
Evolution Computing	2.1	.0	2.1	0	.1%	.0%	.2%	.0%
Carrier Corporation	2.0	.0	2.0	0	.1%	.0%	.2%	.0%
CAD-Capture	2.0	.4	.6	10	.1%	.0%	.1%	.0%
Kork Systems	2.0	.2	1.4	20	.1%	.0%	.1%	.0%
PAFEC	1.9	.0	1.9	0	.1%	.0%	.2%	.0%
Terra Sciences	1.9	.0	1.9	0	.1%	.0%	.2%	.0%
Genasys II	1.9	.2	1.3	46	.1%	.0%	.1%	.0%
Engineered Software	1.7	.0	1.7	0	.1%	.0%	.1%	.0%
Han Dataport	1.7	.5	.9	41	.1%	.0%	.1%	.0%
Massteck	1.6	.0	1.6	0	.1%	.0%	.1%	.0%
ALDEC	1.6	.0	1.4	0	.1%	.0%	.1%	.0%
Intera Tydac	1.6	.0	1.6	0	.1%	.0%	.1%	.0%
Integrated Computer Graphics	1.6	.6	.8	122	.1%	.0%	.1%	.0%
Radian Corporation	1.6	.0	.9	0	.1%	.0%	.1%	.0%

(Continued)

Table 18 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
CAMTEK	1.6	.3	1.0	118	.1%	.0%	.1%	.0%
Research Engineers—Civilsoft	1.5	.0	1.5	0	.1%	.0%	.1%	.0%
FEA	1.5	.4	.4	0	.1%	.0%	.0%	.0%
LandCadd	1.5	.0	1.4	0	.1%	.0%	.1%	.0%
Minc Software	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
EME	1.5	.4	.7	41	.0%	.0%	.1%	.0%
Technische Computer Systeme	1.5	.3	1.2	42	.0%	.0%	.1%	.0%
ISDATA	1.4	.0	1.3	0	.0%	.0%	.1%	.0%
GRAPHSOFT	1.4	.0	1.4	0	.0%	.0%	.1%	.0%
ARKTEC	1.4	.1	1.2	32	.0%	.0%	.1%	.0%
Lamp Software	1.4	.3	1.1	76	.0%	.0%	.1%	.0%
Aries Technology	1.3	.0	1.2	0	.0%	.0%	.1%	.0%
Cimlinc	1.3	.0	.9	0	.0%	.0%	.1%	.0%
Engineering Systems Corp.	1.3	.0	1.3	0	.0%	.0%	.1%	.0%
Compact Software	1.3	.0	1.3	0	.0%	.0%	.1%	.0%
Applicon	1.3	.4	.5	40	.0%	.0%	.0%	.0%
Geometria GIS Systems House	1.3	.2	.4	15	.0%	.0%	.0%	.0%
Tanner Research	1.3	.0	1.1	0	.0%	.0%	.1%	.0%
Aucos elektronische Gerate	1.2	.4	.9	121	.0%	.0%	.1%	.0%
Mucke Software	1.1	.6	.4	27	.0%	.0%	.0%	.0%

(Continued)

Table 18 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Spectrum Software	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Mega CADD	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
CAE-link	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Intrinsix	1.0	1.0	.0	10	.0%	.1%	.0%	.0%
Aura CAD/CAM Systems	1.0	.0	.9	0	.0%	.0%	.1%	.0%
Quicklogic	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
MacNeal-Schwendler	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Areon	.9	.5	.2	6	.0%	.0%	.0%	.0%
Maptech	.9	.0	.9	0	.0%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	.9	.2	.5	24	.0%	.0%	.0%	.0%
Contract Data Research	.9	.0	.6	0	.0%	.0%	.1%	.0%
CADSI	.8	.1	.6	14	.0%	.0%	.1%	.0%
A.I. Systems	.8	.0	.8	0	.0%	.0%	.1%	.0%
INS Engineering	.7	.4	.4	13	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.7	.0	.6	8	.0%	.0%	.0%	.0%
Mc2 Engineering Software	.7	.0	.7	0	.0%	.0%	.1%	.0%
debis Systemhaus	.7	.2	.4	13	.0%	.0%	.0%	.0%
ECOM Associates	.7	.0	.7	4	.0%	.0%	.1%	.0%
Caroline Informatique	.7	.1	.3	10	.0%	.0%	.0%	.0%
Infinite Graphics	.6	.0	.6	0	.0%	.0%	.1%	.0%

(Continued)

Table 18 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
ASCAD/ASCAM	.6	.4	.2	14	.0%	.0%	.0%	.0%
Sharp System Products—NO OEM	.6	.3	.3	17	.0%	.0%	.0%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.0%	.0%
Bechtel Software	.5	.0	.5	0	.0%	.0%	.0%	.0%
Inca	.5	.5	.0	2	.0%	.0%	.0%	.0%
S.T.L.D. s.r.l.	.5	.0	.5	0	.0%	.0%	.0%	.0%
Phase Three Logic	.4	.0	.4	0	.0%	.0%	.0%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.0%	.0%
Logic Modeling Systems	.4	.0	.3	0	.0%	.0%	.0%	.0%
Geotrace Technologies	.3	.0	.3	0	.0%	.0%	.0%	.0%
GEOVISION Inc.	.3	.2	.1	38	.0%	.0%	.0%	.0%
Meta-Software	.3	.0	.2	0	.0%	.0%	.0%	.0%
SIMUCAD	.3	.0	.3	0	.0%	.0%	.0%	.0%
Catalpa	.2	.0	.1	10	.0%	.0%	.0%	.0%
Pacific Numerics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Genrad	.2	.0	.2	9	.0%	.0%	.0%	.0%
Radan Computational	.2	.1	.1	6	.0%	.0%	.0%	.0%
Exemplar Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Teradyne	.0	.0	.0	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 18 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	323.4	321.9	6.2	147,472	10.8%	18.9%	.5%	34.1%
All Companies	3,006.9	1,705.4	1,174.3	432,848	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	2,228.2	1,335.7	832.9	393,538	74.1%	78.3%	70.9%	90.9%
All Asian-Based Companies	438.9	255.4	149.0	27,321	14.6%	15.0%	12.7%	6.3%
All European-Based Companies	339.9	114.3	192.4	11,988	11.3%	6.7%	16.4%	2.8%
All Hardware Companies	1,376.0	1,350.8	.0	395,596	45.8%	79.2%	.0%	91.4%
All Turnkey & SW Companies	1,630.9	354.6	1,174.3	37,251	54.2%	20.8%	100.0%	8.6%

Source: Dataquest (July 1993)

Table 19
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Intergraph	557.1	245.5	162.7	8,535	10.8%	9.7%	9.3%	3.4%
IBM	529.9	306.8	131.3	29,100	10.2%	12.1%	7.5%	11.5%
Sun Microsystems	421.5	364.4	.0	26,172	8.1%	14.4%	.0%	10.3%
Digital	408.9	282.3	4.2	11,122	7.9%	11.1%	.2%	4.4%
Compaq	293.1	293.1	.0	63,467	5.7%	11.6%	.0%	25.0%
Hewlett-Packard	260.4	207.0	14.4	19,806	5.0%	8.2%	.8%	7.8%
Cadence	213.9	.0	160.9	0	4.1%	.0%	9.2%	.0%
Mentor Graphics	178.0	37.4	71.2	2,064	3.4%	1.5%	4.1%	.8%
EDS	175.3	56.3	81.7	2,747	3.4%	2.2%	4.7%	1.1%
Autodesk	168.4	.0	168.4	0	3.3%	.0%	9.6%	.0%
Apple Computer	150.8	150.8	.0	33,506	2.9%	6.0%	.0%	13.2%
Computervision	135.3	50.0	33.6	1,577	2.6%	2.0%	1.9%	.6%
Silicon Graphics	115.8	105.0	.0	4,105	2.2%	4.1%	.0%	1.6%
ESRI	78.7	.0	72.8	0	1.5%	.0%	4.2%	.0%
Control Data Systems	67.3	32.6	11.1	936	1.3%	1.3%	.6%	.4%
Parametric Technology	65.1	.0	52.8	0	1.3%	.0%	3.0%	.0%
Applicon	51.3	16.9	20.0	548	1.0%	.7%	1.1%	.2%
SDRC	49.4	.0	39.5	0	1.0%	.0%	2.3%	.0%
Synopsys	39.2	.0	28.2	0	.8%	.0%	1.6%	.0%
Auto-Trol	36.9	13.6	14.0	461	.7%	.5%	.8%	.2%
Viewlogic Systems	36.7	.0	29.0	0	.7%	.0%	1.7%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Data General	36.2	29.0	1.8	1,898	.7%	1.1%	.1%	.7%
Landmark Graphics	32.8	16.4	7.5	170	.6%	.6%	.4%	.1%
MacNeal-Schwendler	32.2	.0	32.2	0	.6%	.0%	1.8%	.0%
Dell Computer	25.3	25.3	.0	6,597	.5%	1.0%	.0%	2.6%
Unisys	23.4	11.9	8.2	530	.5%	.5%	.5%	.2%
Racal-Redac	23.0	.0	19.7	0	.4%	.0%	1.1%	.0%
Swanson Analysis	22.2	.0	21.4	0	.4%	.0%	1.2%	.0%
PDA Engineering	21.7	.0	20.8	0	.4%	.0%	1.2%	.0%
Alias Research	21.2	.0	19.3	0	.4%	.0%	1.1%	.0%
Accugraph	20.2	9.0	9.2	718	.4%	.4%	.5%	.3%
Zycad	18.9	11.3	2.5	155	.4%	.4%	.1%	.1%
COMPASS Design Automation	18.2	.3	13.7	14	.4%	.0%	.8%	.0%
Harris EDA	17.1	1.9	9.9	73	.3%	.1%	.6%	.0%
Cimlinc	16.0	.0	11.2	337	.3%	.0%	.6%	.1%
ISICAD	15.7	4.0	9.3	85	.3%	.2%	.5%	.0%
MCS	15.6	.0	13.8	0	.3%	.0%	.8%	.0%
Gerber Systems	14.3	7.0	4.7	198	.3%	.3%	.3%	.1%
Quickturn Systems	13.7	13.7	.0	113	.3%	.5%	.0%	.0%
EEsof	11.7	.0	9.9	6	.2%	.0%	.6%	.0%
GeoVision Systems	11.6	.9	6.0	22	.2%	.0%	.3%	.0%
Logic Modeling Systems	10.9	.0	8.7	0	.2%	.0%	.5%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
ADRA Systems	10.7	.6	8.1	36	.2%	.0%	.5%	.0%
Xilinx	10.4	.0	9.4	0	.2%	.0%	.5%	.0%
Ikos Systems	9.9	9.4	.5	108	.2%	.4%	.0%	.0%
Teradyne	9.6	1.1	6.2	22	.2%	.0%	.4%	.0%
Aries Technology	9.4	.0	8.5	0	.2%	.0%	.5%	.0%
CADKEY	9.2	.0	9.2	0	.2%	.0%	.5%	.0%
LSI Logic	9.1	.9	6.8	23	.2%	.0%	.4%	.0%
MapInfo	8.8	.0	7.0	0	.2%	.0%	.4%	.0%
Infocel	8.5	1.2	6.4	177	.2%	.0%	.4%	.1%
Comdisco Systems	8.4	.0	7.6	0	.2%	.0%	.4%	.0%
Softdesk	8.4	.0	8.4	0	.2%	.0%	.5%	.0%
Strategic Mapping	8.2	.0	7.4	0	.2%	.0%	.4%	.0%
ICAD	8.1	.0	6.5	0	.2%	.0%	.4%	.0%
Rasna Corporation	8.1	.0	7.3	0	.2%	.0%	.4%	.0%
ETAK	8.0	.4	7.6	17	.2%	.0%	.4%	.0%
Ascent Logic Corp	7.8	.0	6.2	0	.2%	.0%	.4%	.0%
Microsim	7.7	.0	7.2	0	.1%	.0%	.4%	.0%
Altera	7.5	.0	6.4	0	.1%	.0%	.4%	.0%
Ontos	7.5	.0	7.5	0	.1%	.0%	.4%	.0%
Genasys II	7.4	.7	5.2	34	.1%	.0%	.3%	.0%
Synercom	7.3	.0	3.8	0	.1%	.0%	.2%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
GeoQuest	7.2	.0	7.2	0	.1%	.0%	.4%	.0%
ERDAS	6.8	1.9	4.5	115	.1%	.1%	.3%	.0%
Point Control	6.5	.0	5.1	0	.1%	.0%	.3%	.0%
ASG	6.5	.0	6.5	0	.1%	.0%	.4%	.0%
CAMAX Systems Inc.	6.3	1.0	3.8	111	.1%	.0%	.2%	.0%
EA Systems	6.2	.0	6.2	0	.1%	.0%	.4%	.0%
PCI Remote Sensing Corp	6.0	.0	6.0	0	.1%	.0%	.3%	.0%
Meta-Software	5.7	.0	3.8	0	.1%	.0%	.2%	.0%
Test Systems Strategies	5.7	.0	5.1	0	.1%	.0%	.3%	.0%
ACTEL	5.5	.0	4.8	0	.1%	.0%	.3%	.0%
Analogy	5.4	.0	4.4	0	.1%	.0%	.2%	.0%
Quad Design Technology	5.3	.0	4.9	0	.1%	.0%	.3%	.0%
Zuken	5.3	2.1	3.2	44	.1%	.1%	.2%	.0%
Enghouse Systems Ltd.	5.1	.0	4.5	6	.1%	.0%	.3%	.0%
American Small Business Comp.	4.7	.0	4.7	0	.1%	.0%	.3%	.0%
Delcam International	4.7	1.7	2.0	87	.1%	.1%	.1%	.0%
Aspen Technology	4.6	.0	4.2	0	.1%	.0%	.2%	.0%
PADS Software	4.6	.0	3.9	0	.1%	.0%	.2%	.0%
Cimatron	4.6	2.1	2.1	149	.1%	.1%	.1%	.1%
Scientific & Engineering SW	4.2	.0	4.2	0	.1%	.0%	.2%	.0%
CNC Software	4.1	.0	4.1	0	.1%	.0%	.2%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
i-Logix	4.1	.0	3.7	0	.1%	.0%	.2%	.0%
Algor Interactive Systems	4.1	.0	3.6	0	.1%	.0%	.2%	.0%
Micrografx	4.0	.0	4.0	0	.1%	.0%	.2%	.0%
Mechanical Dynamics	4.0	.0	3.2	0	.1%	.0%	.2%	.0%
PiE Design	4.0	2.0	1.6	102	.1%	.1%	.1%	.0%
Moda CAD	4.0	1.0	2.8	33	.1%	.0%	.2%	.0%
Cascade Design Automation	4.0	.0	3.0	0	.1%	.0%	.2%	.0%
Solbourne	4.0	3.9	.0	353	.1%	.2%	.0%	.1%
Data I/O	3.9	.0	3.9	0	.1%	.0%	.2%	.0%
Matra Datavision	3.9	1.3	2.0	33	.1%	.0%	.1%	.0%
Integrated Computer Graphics	3.9	1.5	2.1	250	.1%	.1%	.1%	.1%
Cisigraph	3.9	1.1	2.2	25	.1%	.0%	.1%	.0%
Orcad	3.8	.0	3.8	0	.1%	.0%	.2%	.0%
Pacific Numerics	3.7	.0	3.7	0	.1%	.0%	.2%	.0%
Bechtel Software	3.6	.0	3.4	0	.1%	.0%	.2%	.0%
Wisdom Systems	3.6	.0	2.8	0	.1%	.0%	.2%	.0%
Innovative Data Design	3.5	.0	3.5	0	.1%	.0%	.2%	.0%
Autometric	3.5	2.3	1.2	75	.1%	.1%	.1%	.0%
Sigma Design	3.4	.0	3.2	0	.1%	.0%	.2%	.0%
PacSoft	3.2	.0	3.2	0	.1%	.0%	.2%	.0%
GeoGraphix	3.2	.0	2.4	0	.1%	.0%	.1%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Intera Tydac	3.2	.0	3.2	0	.1%	.0%	.2%	.0%
Radian Corporation	3.1	.0	1.9	0	.1%	.0%	.1%	.0%
Genrad	3.1	.6	2.1	32	.1%	.0%	.1%	.0%
Neocad	3.0	.0	3.0	0	.1%	.0%	.2%	.0%
Dynamic Graphics	2.9	.0	2.4	0	.1%	.0%	.1%	.0%
Integrated Silicon Systems	2.9	.0	2.3	11	.1%	.0%	.1%	.0%
Silvar-Lisco	2.8	.0	1.6	0	.1%	.0%	.1%	.0%
Engineering Mechanics	2.8	.1	2.4	220	.1%	.0%	.1%	.1%
Sweet's Electronic Publishing	2.7	.0	2.2	0	.1%	.0%	.1%	.0%
CADSI	2.7	.4	2.0	18	.1%	.0%	.1%	.0%
Land Innovation	2.6	.0	2.6	0	.1%	.0%	.2%	.0%
High Level Design Systems	2.5	.0	1.8	0	.0%	.0%	.1%	.0%
Visionics	2.5	.0	2.4	10	.0%	.0%	.1%	.0%
International Software Systems	2.4	.0	2.4	0	.0%	.0%	.1%	.0%
Claris	2.3	.0	2.3	0	.0%	.0%	.1%	.0%
Motorola	2.2	.0	2.2	0	.0%	.0%	.1%	.0%
Infinite Graphics	2.2	.0	2.2	0	.0%	.0%	.1%	.0%
Laser-Scan	2.2	.8	.9	14	.0%	.0%	.0%	.0%
Generation 5 Technology	2.2	.0	2.2	0	.0%	.0%	.1%	.0%
Accel Technologies	2.2	.0	2.0	0	.0%	.0%	.1%	.0%
Minc Software	2.1	.0	2.1	0	.0%	.0%	.1%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
CAD Centre	2.1	.0	1.7	0	.0%	.0%	.1%	.0%
Facility Mapping Systems	2.1	.0	1.8	0	.0%	.0%	.1%	.0%
SPATIAL Technology	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
Foresight Resources	2.1	.0	1.9	0	.0%	.0%	.1%	.0%
Quantic Laboratories	2.0	.0	1.8	0	.0%	.0%	.1%	.0%
ACDS Graphic System	1.9	.0	1.6	0	.0%	.0%	.1%	.0%
CrossCheck Technology	1.9	.0	.9	0	.0%	.0%	.1%	.0%
CAD/CAM Group	1.9	.0	1.9	0	.0%	.0%	.1%	.0%
Technische Computer Systeme	1.8	.3	1.5	49	.0%	.0%	.1%	.0%
Sunrise Test Systems	1.8	.0	1.8	0	.0%	.0%	.1%	.0%
Terra Sciences	1.8	.0	1.8	0	.0%	.0%	.1%	.0%
EPIC Design Technology	1.8	.0	1.8	0	.0%	.0%	.1%	.0%
IMSI	1.8	.0	1.8	0	.0%	.0%	.1%	.0%
Research Engineers—Civilsoft	1.7	.0	1.7	0	.0%	.0%	.1%	.0%
Engineering Systems Corp.	1.7	.0	1.5	0	.0%	.0%	.1%	.0%
Contec Microelectronics	1.7	.0	1.5	0	.0%	.0%	.1%	.0%
Evolution Computing	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
Ultimap	1.6	.6	.5	18	.0%	.0%	.0%	.0%
Object Design	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
SIMUCAD	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
MARC	1.5	.0	1.5	0	.0%	.0%	.1%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Objectivity	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
Chronologic Simulation	1.5	.0	1.4	0	.0%	.0%	.1%	.0%
Compact Software	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
GRAPHSOFT	1.4	.0	1.4	0	.0%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	1.4	.4	.7	24	.0%	.0%	.0%	.0%
Massteck	1.3	.0	1.3	0	.0%	.0%	.1%	.0%
BETRONEX	1.2	.1	1.1	22	.0%	.0%	.1%	.0%
Investronica SA	1.2	1.0	.1	48	.0%	.0%	.0%	.0%
GEOVISION Inc.	1.2	.7	.3	63	.0%	.0%	.0%	.0%
Graphisoft Software Dev	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Georgia Tech Research Corp.	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Tanner Research	1.1	.0	1.0	0	.0%	.0%	.1%	.0%
Geotrace Technologies	1.1	.0	1.0	17	.0%	.0%	.1%	.0%
Kockums Computer Systems	1.1	.3	.6	53	.0%	.0%	.0%	.0%
Carrier Corporation	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
LandCadd	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Spectrum Software	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Intrinsix	1.0	1.0	.0	10	.0%	.0%	.0%	.0%
Engineered Software	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Valisys	1.0	.0	.0	0	.0%	.0%	.0%	.0%
Pathtrace	1.0	.2	.6	14	.0%	.0%	.0%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IEZ	1.0	.3	.5	20	.0%	.0%	.0%	.0%
CAE-link	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Maptech	.9	.0	.9	0	.0%	.0%	.1%	.0%
ANACAD	.9	.0	.9	0	.0%	.0%	.1%	.0%
Computational Mechanics	.9	.0	.9	0	.0%	.0%	.1%	.0%
Quicklogic	.9	.0	.9	0	.0%	.0%	.1%	.0%
ALDEC	.9	.0	.8	0	.0%	.0%	.0%	.0%
Aura CAD/CAM Systems	.9	.0	.8	0	.0%	.0%	.0%	.0%
Royal Digital Centers	.9	.0	.8	0	.0%	.0%	.0%	.0%
Kork Systems	.8	.1	.6	16	.0%	.0%	.0%	.0%
Mega CADD	.8	.0	.8	0	.0%	.0%	.0%	.0%
CADWorks	.7	.0	.6	0	.0%	.0%	.0%	.0%
ECOM Associates	.7	.0	.7	4	.0%	.0%	.0%	.0%
A.I. Systems	.7	.0	.7	0	.0%	.0%	.0%	.0%
Ground Modelling Systems	.7	.4	.3	57	.0%	.0%	.0%	.0%
Electrical Eng. Software	.6	.0	.6	0	.0%	.0%	.0%	.0%
Phase Three Logic	.6	.0	.5	0	.0%	.0%	.0%	.0%
Mc2 Engineering Software	.6	.0	.6	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.6	.0	.0	0	.0%	.0%	.0%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.0%	.0%
Expertest	.5	.0	.5	0	.0%	.0%	.0%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
CAD Language Systems	.5	.0	.4	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.4	.0	.4	0	.0%	.0%	.0%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.0%	.0%
MEDESIGN	.2	.1	.1	2	.0%	.0%	.0%	.0%
Moss Systems	.2	.0	.1	0	.0%	.0%	.0%	.0%
FEGS	.2	.0	.1	0	.0%	.0%	.0%	.0%
BATISOFT	.2	.0	.1	7	.0%	.0%	.0%	.0%
Exemplar Logic	.1	.0	.1	0	.0%	.0%	.0%	.0%
Areon	.1	.0	.0	0	.0%	.0%	.0%	.0%
Complansoft CAD	.1	.0	.0	1	.0%	.0%	.0%	.0%
Star Informatic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	213.8	197.1	10.6	36,036	4.1%	7.8%	.6%	14.2%
All Companies	5,177.9	2,532.9	1,747.2	253,631	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	5,116.4	2,520.5	1,705.5	253,002	98.8%	99.5%	97.6%	99.8%
All Asian-Based Companies	5.3	2.1	3.2	44	.1%	.1%	.2%	.0%
All European-Based Companies	56.2	10.3	38.5	586	1.1%	.4%	2.2%	.2%
All Hardware Companies	1,948.9	1,706.7	4.1	223,845	37.6%	67.4%	.2%	88.3%
All Turnkey & SW Companies	3,229.0	826.3	1,743.2	29,787	62.4%	32.6%	99.8%	11.7%

Source: Dataquest (July 1993)

Table 20
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Intergraph	465.6	214.1	121.2	7,487	16.2%	17.9%	11.3%	11.9%
Sun Microsystems	363.9	316.6	.0	23,727	12.6%	26.5%	.0%	37.6%
Hewlett-Packard	222.3	173.2	14.4	8,442	7.7%	14.5%	1.3%	13.4%
Cadence	194.2	.0	145.7	0	6.7%	.0%	13.6%	.0%
Mentor Graphics	178.0	37.4	71.2	2,064	6.2%	3.1%	6.7%	3.3%
EDS	153.4	49.6	71.7	2,462	5.3%	4.2%	6.7%	3.9%
Computervision	121.3	46.5	27.1	1,364	4.2%	3.9%	2.5%	2.2%
Silicon Graphics	110.7	100.7	.0	4,005	3.8%	8.4%	.0%	6.3%
Digital	103.8	68.8	3.2	4,884	3.6%	5.8%	.3%	7.7%
IBM	94.8	45.6	35.9	2,269	3.3%	3.8%	3.4%	3.6%
Parametric Technology	65.1	.0	52.8	0	2.3%	.0%	4.9%	.0%
SDRC	46.9	.0	37.5	0	1.6%	.0%	3.5%	.0%
Applicon	46.2	15.2	18.0	484	1.6%	1.3%	1.7%	.8%
ESRI	41.2	.0	38.1	0	1.4%	.0%	3.6%	.0%
Synopsys	39.2	.0	28.2	0	1.4%	.0%	2.6%	.0%
Auto-Trol	36.9	13.6	14.0	461	1.3%	1.1%	1.3%	.7%
Data General	26.8	21.4	1.3	1,539	.9%	1.8%	.1%	2.4%
Viewlogic Systems	25.6	.0	20.2	0	.9%	.0%	1.9%	.0%
Control Data Systems	25.0	15.2	5.2	679	.9%	1.3%	.5%	1.1%
Alias Research	21.2	.0	19.3	0	.7%	.0%	1.8%	.0%
Racal-Redac	19.7	.0	16.6	0	.7%	.0%	1.6%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Landmark Graphics	19.7	9.8	4.5	102	.7%	.8%	.4%	.2%
Unisys	18.0	9.2	6.3	418	.6%	.8%	.6%	.7%
Accugraph	18.0	8.8	7.4	688	.6%	.7%	.7%	1.1%
COMPASS Design Automation	17.8	.3	13.4	14	.6%	.0%	1.3%	.0%
PDA Engineering	16.3	.0	15.6	0	.6%	.0%	1.5%	.0%
Harris EDA	15.2	1.7	8.5	64	.5%	.1%	.8%	.1%
Gerber Systems	14.3	7.0	4.7	198	.5%	.6%	.4%	.3%
Quickturn Systems	13.7	13.7	.0	113	.5%	1.1%	.0%	.2%
Cimlinc	13.6	.0	9.5	337	.5%	.0%	.9%	.5%
Swanson Analysis	12.5	.0	12.0	0	.4%	.0%	1.1%	.0%
ISICAD	11.0	4.0	4.6	85	.4%	.3%	.4%	.1%
Autodesk	10.1	.0	10.1	0	.4%	.0%	.9%	.0%
EEsof	10.0	.0	8.5	6	.3%	.0%	.8%	.0%
Logic Modeling Systems	9.9	.0	7.9	0	.3%	.0%	.7%	.0%
Aries Technology	8.5	.0	7.6	0	.3%	.0%	.7%	.0%
Comdisco Systems	8.4	.0	7.6	0	.3%	.0%	.7%	.0%
LSI Logic	8.2	.8	6.1	21	.3%	.1%	.6%	.0%
GeoVision Systems	8.1	.7	4.2	18	.3%	.1%	.4%	.0%
ICAD	8.1	.0	6.5	0	.3%	.0%	.6%	.0%
ADRA Systems	8.0	.6	5.9	36	.3%	.0%	.6%	.1%
Ascent Logic Corp	7.8	.0	6.2	0	.3%	.0%	.6%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Ontos	7.5	.0	7.5	0	.3%	.0%	.7%	.0%
MCS	7.2	.0	6.4	0	.2%	.0%	.6%	.0%
Genasys II	6.7	.7	4.7	16	.2%	.1%	.4%	.0%
Rasna Corporation	6.5	.0	5.8	0	.2%	.0%	.5%	.0%
CAMAX Systems Inc.	6.3	1.0	3.8	111	.2%	.1%	.4%	.2%
Teradyne	5.8	.6	3.7	15	.2%	.1%	.3%	.0%
Quad Design Technology	5.3	.0	4.9	0	.2%	.0%	.5%	.0%
Zuken	5.3	2.1	3.2	44	.2%	.2%	.3%	.1%
ERDAS	5.2	1.4	3.4	29	.2%	.1%	.3%	.0%
Analogy	5.2	.0	4.1	0	.2%	.0%	.4%	.0%
Test Systems Strategies	5.1	.0	4.6	0	.2%	.0%	.4%	.0%
Meta-Software	5.1	.0	3.3	0	.2%	.0%	.3%	.0%
Synercom	4.6	.0	2.4	0	.2%	.0%	.2%	.0%
Delcam International	4.2	1.6	1.8	72	.1%	.1%	.2%	.1%
Scientific & Engineering SW	4.2	.0	4.2	0	.1%	.0%	.4%	.0%
i-Logix	4.1	.0	3.7	0	.1%	.0%	.3%	.0%
PiE Design	4.0	2.0	1.6	102	.1%	.2%	.2%	.2%
Cascade Design Automation	4.0	.0	3.0	0	.1%	.0%	.3%	.0%
Matra Datavision	3.9	1.3	2.0	33	.1%	.1%	.2%	.1%
GeoQuest	3.6	.0	3.6	0	.1%	.0%	.3%	.0%
Wisdom Systems	3.6	.0	2.8	0	.1%	.0%	.3%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
MacNeal-Schwendler	3.5	.0	3.5	0	.1%	.0%	.3%	.0%
Cisigraph	3.5	1.0	1.9	23	.1%	.1%	.2%	.0%
Pacific Numerics	3.5	.0	3.5	0	.1%	.0%	.3%	.0%
Mechanical Dynamics	3.4	.0	2.7	0	.1%	.0%	.3%	.0%
Xilinx	3.1	.0	2.8	0	.1%	.0%	.3%	.0%
PCI Remote Sensing Corp	3.0	.0	3.0	0	.1%	.0%	.3%	.0%
Cimatron	2.9	1.3	1.3	64	.1%	.1%	.1%	.1%
Silvar-Lisco	2.8	.0	1.6	0	.1%	.0%	.1%	.0%
Genrad	2.7	.5	1.8	27	.1%	.0%	.2%	.0%
Land Innovation	2.6	.0	2.6	0	.1%	.0%	.2%	.0%
High Level Design Systems	2.5	.0	1.8	0	.1%	.0%	.2%	.0%
Integrated Computer Graphics	2.3	.9	1.3	128	.1%	.1%	.1%	.2%
Integrated Silicon Systems	2.3	.0	1.8	6	.1%	.0%	.2%	.0%
Dynamic Graphics	2.3	.0	1.9	0	.1%	.0%	.2%	.0%
Motorola	2.2	.0	2.2	0	.1%	.0%	.2%	.0%
CADSI	2.1	.3	1.6	10	.1%	.0%	.1%	.0%
Laser-Scan	2.1	.7	.8	13	.1%	.1%	.1%	.0%
CAD Centre	2.1	.0	1.7	0	.1%	.0%	.2%	.0%
SPATIAL Technology	2.1	.0	2.1	0	.1%	.0%	.2%	.0%
Quantic Laboratories	2.0	.0	1.8	0	.1%	.0%	.2%	.0%
Softdesk	1.9	.0	1.9	0	.1%	.0%	.2%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ACDS Graphic System	1.9	.0	1.6	0	.1%	.0%	.2%	.0%
Sigma Design	1.9	.0	1.8	0	.1%	.0%	.2%	.0%
Radian Corporation	1.9	.0	1.1	0	.1%	.0%	.1%	.0%
CrossCheck Technology	1.9	.0	.9	0	.1%	.0%	.1%	.0%
CAD/CAM Group	1.9	.0	1.9	0	.1%	.0%	.2%	.0%
Sunrise Test Systems	1.8	.0	1.8	0	.1%	.0%	.2%	.0%
EPIC Design Technology	1.8	.0	1.8	0	.1%	.0%	.2%	.0%
Autometric	1.7	1.1	.6	40	.1%	.1%	.1%	.1%
Infinite Graphics	1.7	.0	1.7	0	.1%	.0%	.2%	.0%
Contec Microelectronics	1.7	.0	1.5	0	.1%	.0%	.1%	.0%
Engineering Mechanics	1.6	.1	1.4	77	.1%	.0%	.1%	.1%
Technische Computer Systeme	1.6	.3	1.3	43	.1%	.0%	.1%	.1%
Intera Tydac	1.6	.0	1.6	0	.1%	.0%	.1%	.0%
Object Design	1.6	.0	1.6	0	.1%	.0%	.1%	.0%
Ultimap	1.6	.6	.5	18	.1%	.0%	.0%	.0%
Chronologic Simulation	1.5	.0	1.4	0	.1%	.0%	.1%	.0%
Objectivity	1.5	.0	1.5	0	.1%	.0%	.1%	.0%
Bechtel Software	1.4	.0	1.3	0	.0%	.0%	.1%	.0%
Solbourne	1.2	1.2	.0	164	.0%	.1%	.0%	.3%
SIMUCAD	1.2	.0	1.1	0	.0%	.0%	.1%	.0%
MARC	1.2	.0	1.2	0	.0%	.0%	.1%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
ACTEL	1.1	.0	1.0	0	.0%	.0%	.1%	.0%
Kockums Computer Systems	1.1	.3	.6	53	.0%	.0%	.1%	.1%
Minc Software	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Infocel	1.0	.1	.8	9	.0%	.0%	.1%	.0%
IEZ	1.0	.3	.5	20	.0%	.0%	.0%	.0%
Valisys	.9	.0	.0	0	.0%	.0%	.0%	.0%
ANACAD	.9	.0	.9	0	.0%	.0%	.1%	.0%
GEOVISION Inc.	.9	.5	.2	27	.0%	.0%	.0%	.0%
Royal Digital Centers	.9	.0	.8	0	.0%	.0%	.1%	.0%
ETAK	.8	.0	.8	1	.0%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	.8	.2	.4	10	.0%	.0%	.0%	.0%
CADKEY	.8	.0	.8	0	.0%	.0%	.1%	.0%
Enghouse Systems Ltd.	.8	.0	.7	6	.0%	.0%	.1%	.0%
Microsim	.8	.0	.7	0	.0%	.0%	.1%	.0%
Neocad	.8	.0	.8	0	.0%	.0%	.1%	.0%
Data I/O	.7	.0	.7	0	.0%	.0%	.1%	.0%
Point Control	.7	.0	.5	0	.0%	.0%	.0%	.0%
Compact Software	.6	.0	.6	0	.0%	.0%	.1%	.0%
Georgia Tech Research Corp.	.6	.0	.6	0	.0%	.0%	.1%	.0%
Cooper & Chyan Technology	.6	.0	.0	0	.0%	.0%	.0%	.0%
Expertest	.5	.0	.5	0	.0%	.0%	.0%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
CAD Language Systems	.5	.0	.4	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
PADS Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.4	.0	.4	0	.0%	.0%	.0%	.0%
Computational Mechanics	.4	.0	.4	0	.0%	.0%	.0%	.0%
Engineering Systems Corp.	.4	.0	.3	0	.0%	.0%	.0%	.0%
ASG	.3	.0	.3	0	.0%	.0%	.0%	.0%
Terra Sciences	.3	.0	.3	0	.0%	.0%	.0%	.0%
MEDESIGN	.2	.1	.1	2	.0%	.0%	.0%	.0%
Moss Systems	.2	.0	.1	0	.0%	.0%	.0%	.0%
Research Engineers—Civilsoft	.2	.0	.2	0	.0%	.0%	.0%	.0%
FEGS	.2	.0	.1	0	.0%	.0%	.0%	.0%
Phase Three Logic	.2	.0	.1	0	.0%	.0%	.0%	.0%
Massteck	.1	.0	.1	0	.0%	.0%	.0%	.0%
Exemplar Logic	.1	.0	.1	0	.0%	.0%	.0%	.0%
Tanner Research	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Carrier Corporation	.1	.0	.1	0	.0%	.0%	.0%	.0%
Complansoft CAD	.1	.0	.0	1	.0%	.0%	.0%	.0%
LandCadd	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Star Informatic	.0	.0	.0	0	.0%	.0%	.0%	.0%
ECOM Associates	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	2.0	.1	1.9	13	.1%	.0%	.2%	.0%
All Companies	2,878.7	1,194.7	1,069.2	63,146	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	2,829.3	1,185.8	1,035.8	62,777	98.3%	99.3%	96.9%	99.4%
All Asian-Based Companies	5.3	2.1	3.2	44	.2%	.2%	.3%	.1%
All European-Based Companies	44.2	6.9	30.2	325	1.5%	.6%	2.8%	.5%
All Hardware Companies	777.7	658.6	2.4	41,420	27.0%	55.1%	.2%	65.6%
All Turnkey & SW Companies	2,101.1	536.1	1,066.8	21,726	73.0%	44.9%	99.8%	34.4%

Source: Dataquest (July 1993)

Table 21
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	243.3	156.0	30.1	3,798	36.0%	36.6%	29.2%	42.9%
Digital	175.7	120.8	.6	0	26.0%	28.3%	.6%	.0%
Control Data Systems	41.1	16.8	5.7	253	6.1%	3.9%	5.6%	2.9%
MacNeal-Schwendler	18.4	.0	18.4	0	2.7%	.0%	17.8%	.0%
Cadence	9.7	.0	7.3	0	1.4%	.0%	7.0%	.0%
EA Systems	6.2	.0	6.2	0	.9%	.0%	6.0%	.0%
PDA Engineering	5.4	.0	5.2	0	.8%	.0%	5.0%	.0%
Unisys	5.4	2.8	1.9	112	.8%	.6%	1.8%	1.3%
MCS	5.3	.0	4.6	0	.8%	.0%	4.5%	.0%
Swanson Analysis	4.7	.0	4.5	0	.7%	.0%	4.3%	.0%
GeoVision Systems	3.5	.3	1.8	3	.5%	.1%	1.8%	.0%
Computervision	2.8	1.0	.7	47	.4%	.2%	.7%	.5%
Synercom	2.7	.0	1.4	0	.4%	.0%	1.4%	.0%
Intergraph	2.6	.0	2.3	0	.4%	.0%	2.2%	.0%
SDRC	2.5	.0	2.0	0	.4%	.0%	1.9%	.0%
Autometric	1.8	1.2	.6	35	.3%	.3%	.6%	.4%
Bechtel Software	1.8	.0	1.6	0	.3%	.0%	1.6%	.0%
LSI Logic	.9	.1	.7	2	.1%	.0%	.7%	.0%
Geotrace Technologies	.8	.0	.7	17	.1%	.0%	.7%	.2%
ETAK	.7	.0	.7	2	.1%	.0%	.7%	.0%
Dynamic Graphics	.6	.0	.5	0	.1%	.0%	.5%	.0%

(Continued)

Table 21 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Mechanical Dynamics	.6	.0	.5	0	.1%	.0%	.5%	.0%
Test Systems Strategies	.6	.0	.5	0	.1%	.0%	.5%	.0%
Meta-Software	.5	.0	.3	0	.1%	.0%	.3%	.0%
Harris EDA	.5	.1	.4	4	.1%	.0%	.4%	.0%
Computational Mechanics	.5	.0	.5	0	.1%	.0%	.5%	.0%
Georgia Tech Research Corp.	.4	.0	.4	0	.1%	.0%	.4%	.0%
ESRI	.4	.0	.4	0	.1%	.0%	.3%	.0%
COMPASS Design Automation	.4	.0	.3	0	.1%	.0%	.3%	.0%
MARC	.4	.0	.4	0	.1%	.0%	.3%	.0%
Compact Software	.4	.0	.4	0	.1%	.0%	.3%	.0%
Genrad	.3	.1	.2	1	.0%	.0%	.2%	.0%
Analogy	.3	.0	.2	0	.0%	.0%	.2%	.0%
Radian Corporation	.2	.0	.1	0	.0%	.0%	.1%	.0%
Logic Modeling Systems	.2	.0	.2	0	.0%	.0%	.2%	.0%
Accugraph	.2	.1	.1	20	.0%	.0%	.1%	.2%
Electrical Eng. Software	.2	.0	.2	0	.0%	.0%	.2%	.0%
Engineering Systems Corp.	.2	.0	.1	0	.0%	.0%	.1%	.0%
Data I/O	.1	.0	.1	0	.0%	.0%	.1%	.0%
Laser-Scan	.1	.0	.0	1	.0%	.0%	.0%	.0%
Microsim	.1	.0	.1	0	.0%	.0%	.1%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.1%	.0%

(Continued)

Table 21 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
FEGS	.0	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	1	.0%	.0%	.0%	.0%
Other Companies	134.2	126.9	.3	4,556	19.8%	29.8%	.3%	51.5%
All Companies	676.7	426.1	103.2	8,850	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	676.1	426.1	102.7	8,850	99.9%	100.0%	99.5%	100.0%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	.6	.0	.5	1	.1%	.0%	.5%	.0%
All Hardware Companies	316.3	250.5	1.2	4,622	46.7%	58.8%	1.1%	52.2%
All Turnkey & SW Companies	360.4	175.5	102.1	4,228	53.3%	41.2%	98.9%	47.8%

Source: Dataquest (July 1993)

Table 22
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Server
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Digital	110.6	76.3	.0	1,528	23.9%	30.4%	.0%	20.1%
IBM	77.3	36.7	25.8	980	16.7%	14.6%	23.9%	12.9%
Intergraph	65.4	31.4	15.7	1,048	14.1%	12.5%	14.6%	13.8%
Sun Microsystems	57.6	47.8	.0	2,445	12.4%	19.1%	.0%	32.2%
ESRI	25.0	.0	23.1	0	5.4%	.0%	21.5%	.0%
EDS	21.9	6.7	10.0	284	4.7%	2.7%	9.2%	3.7%
Zycad	18.9	11.3	2.5	155	4.1%	4.5%	2.3%	2.0%
Landmark Graphics	13.1	6.6	3.0	68	2.8%	2.6%	2.8%	.9%
Cadence	10.0	.0	8.0	0	2.2%	.0%	7.4%	.0%
Ikos Systems	9.9	9.4	.5	108	2.1%	3.7%	.5%	1.4%
MacNeal-Schwendler	9.7	.0	9.7	0	2.1%	.0%	9.0%	.0%
Data General	9.4	7.5	.5	359	2.0%	3.0%	.4%	4.7%
Computervision	7.3	2.6	1.9	77	1.6%	1.0%	1.8%	1.0%
Hewlett-Packard	5.9	4.9	.0	185	1.3%	1.9%	.0%	2.4%
Silicon Graphics	5.1	4.3	.0	100	1.1%	1.7%	.0%	1.3%
Applicon	4.6	1.5	1.8	48	1.0%	.6%	1.7%	.6%
Teradyne	3.8	.4	2.5	7	.8%	.2%	2.3%	.1%
Solbourne	2.8	2.8	.0	189	.6%	1.1%	.0%	2.5%
Cimlinc	1.6	.0	1.1	0	.3%	.0%	1.0%	.0%
Control Data Systems	1.3	.6	.2	5	.3%	.2%	.1%	.1%
ETAK	.7	.0	.7	0	.2%	.0%	.6%	.0%

(Continued)

Table 22 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Server
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Logic Modeling Systems	.6	.0	.4	0	.1%	.0%	.4%	.0%
Cisigraph	.4	.1	.2	3	.1%	.0%	.2%	.0%
Radian Corporation	.3	.0	.2	0	.1%	.0%	.1%	.0%
Georgia Tech Research Corp.	.1	.0	.1	0	.0%	.0%	.1%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.1%	.0%
Other Companies	.0	.1	.0	9	.0%	.1%	.0%	.1%
All Companies	463.2	251.0	107.8	7,600	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	462.9	250.9	107.6	7,597	99.9%	100.0%	99.8%	100.0%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	.4	.1	.2	3	.1%	.0%	.2%	.0%
All Hardware Companies	193.1	145.1	.5	4,837	41.7%	57.8%	.5%	63.6%
All Turnkey & SW Companies	270.2	105.9	107.3	2,763	58.3%	42.2%	99.5%	36.4%

Source: Dataquest (July 1993)

Table 23
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Compaq	293.1	293.1	.0	63,467	25.3%	44.3%	.0%	36.5%
Autodesk	158.3	.0	158.3	0	13.7%	.0%	33.9%	.0%
Apple Computer	150.8	150.8	.0	33,506	13.0%	22.8%	.0%	19.3%
IBM	114.6	68.6	39.5	22,053	9.9%	10.4%	8.5%	12.7%
Hewlett-Packard	32.1	28.9	.0	11,178	2.8%	4.4%	.0%	6.4%
Dell Computer	25.3	25.3	.0	6,597	2.2%	3.8%	.0%	3.8%
Intergraph	23.4	.0	23.4	0	2.0%	.0%	5.0%	.0%
Digital	18.8	16.5	.4	4,710	1.6%	2.5%	.1%	2.7%
ESRI	12.0	.0	11.1	0	1.0%	.0%	2.4%	.0%
Viewlogic Systems	11.1	.0	8.8	0	1.0%	.0%	1.9%	.0%
MapInfo	8.8	.0	7.0	0	.8%	.0%	1.5%	.0%
CADKEY	8.4	.0	8.4	0	.7%	.0%	1.8%	.0%
Strategic Mapping	8.2	.0	7.4	0	.7%	.0%	1.6%	.0%
Altera	7.5	.0	6.4	0	.7%	.0%	1.4%	.0%
Infocel	7.4	1.0	5.7	168	.6%	.2%	1.2%	.1%
Xilinx	7.3	.0	6.6	0	.6%	.0%	1.4%	.0%
Microsim	6.8	.0	6.4	0	.6%	.0%	1.4%	.0%
Softdesk	6.5	.0	6.5	0	.6%	.0%	1.4%	.0%
ASG	6.1	.0	6.1	0	.5%	.0%	1.3%	.0%
Point Control	5.9	.0	4.6	0	.5%	.0%	1.0%	.0%
ETAK	5.7	.3	5.5	14	.5%	.0%	1.2%	.0%
Swanson Analysis	5.1	.0	4.9	0	.4%	.0%	1.1%	.0%

(Continued)

Table 23 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
American Small Business Comp.	4.7	.0	4.7	0	.4%	.0%	1.0%	.0%
ISICAD	4.7	.0	4.7	0	.4%	.0%	1.0%	.0%
Aspen Technology	4.6	.0	4.2	0	.4%	.0%	.9%	.0%
ACTEL	4.4	.0	3.8	0	.4%	.0%	.8%	.0%
Enghouse Systems Ltd.	4.4	.0	3.8	0	.4%	.0%	.8%	.0%
PADS Software	4.2	.0	3.5	0	.4%	.0%	.8%	.0%
CNC Software	4.1	.0	4.1	0	.4%	.0%	.9%	.0%
Micrografx	4.0	.0	4.0	0	.3%	.0%	.9%	.0%
Moda CAD	4.0	1.0	2.8	33	.3%	.2%	.6%	.0%
Algor Interactive Systems	4.0	.0	3.5	0	.3%	.0%	.7%	.0%
Computervision	3.9	.0	3.9	90	.3%	.0%	.8%	.1%
Orcad	3.8	.0	3.8	0	.3%	.0%	.8%	.0%
GeoQuest	3.6	.0	3.6	0	.3%	.0%	.8%	.0%
Innovative Data Design	3.5	.0	3.5	0	.3%	.0%	.8%	.0%
PacSoft	3.2	.0	3.2	0	.3%	.0%	.7%	.0%
Racal-Redac	3.2	.0	3.1	0	.3%	.0%	.7%	.0%
GeoGraphix	3.2	.0	2.4	0	.3%	.0%	.5%	.0%
Data I/O	3.1	.0	3.1	0	.3%	.0%	.7%	.0%
MCS	3.1	.0	2.8	0	.3%	.0%	.6%	.0%
PCI Remote Sensing Corp	3.0	.0	3.0	0	.3%	.0%	.6%	.0%
Sweet's Electronic Publishing	2.7	.0	2.2	0	.2%	.0%	.5%	.0%
ADRA Systems	2.7	.0	2.1	0	.2%	.0%	.5%	.0%

(Continued)

Table 23 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Visionics	2.5	.0	2.4	10	.2%	.0%	.5%	.0%
International Software Systems	2.4	.0	2.4	0	.2%	.0%	.5%	.0%
Claris	2.3	.0	2.3	0	.2%	.0%	.5%	.0%
Neocad	2.3	.0	2.3	0	.2%	.0%	.5%	.0%
Generation 5 Technology	2.2	.0	2.2	0	.2%	.0%	.5%	.0%
Accel Technologies	2.2	.0	2.0	0	.2%	.0%	.4%	.0%
Foresight Resources	2.1	.0	1.9	0	.2%	.0%	.4%	.0%
Accugraph	2.0	.1	1.7	10	.2%	.0%	.4%	.0%
Facility Mapping Systems	2.0	.0	1.7	0	.2%	.0%	.4%	.0%
IMSI	1.8	.0	1.8	0	.2%	.0%	.4%	.0%
EEsof	1.8	.0	1.5	0	.2%	.0%	.3%	.0%
Cimatron	1.6	.7	.7	84	.1%	.1%	.2%	.0%
ERDAS	1.6	.4	1.1	86	.1%	.1%	.2%	.0%
Rasna Corporation	1.6	.0	1.5	0	.1%	.0%	.3%	.0%
Intera Tydac	1.6	.0	1.6	0	.1%	.0%	.3%	.0%
Evolution Computing	1.6	.0	1.6	0	.1%	.0%	.3%	.0%
Integrated Computer Graphics	1.6	.6	.8	122	.1%	.1%	.2%	.1%
Sigma Design	1.5	.0	1.4	0	.1%	.0%	.3%	.0%
Research Engineers—Civilsoft	1.5	.0	1.5	0	.1%	.0%	.3%	.0%
Terra Sciences	1.5	.0	1.5	0	.1%	.0%	.3%	.0%
GRAPHSOFT	1.4	.0	1.4	0	.1%	.0%	.3%	.0%
Harris EDA	1.4	.1	1.1	5	.1%	.0%	.2%	.0%

(Continued)

Table 23 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
BETRONEX	1.2	.1	1.1	22	.1%	.0%	.2%	.0%
Investronica SA	1.2	1.0	.1	48	.1%	.1%	.0%	.0%
Engineering Mechanics	1.2	.1	1.0	143	.1%	.0%	.2%	.1%
Massteck	1.1	.0	1.1	0	.1%	.0%	.2%	.0%
Graphisoft Software Dev	1.1	.0	1.1	0	.1%	.0%	.2%	.0%
Engineering Systems Corp.	1.1	.0	1.1	0	.1%	.0%	.2%	.0%
Minc Software	1.1	.0	1.1	0	.1%	.0%	.2%	.0%
Spectrum Software	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Intrinsix	1.0	1.0	.0	10	.1%	.2%	.0%	.0%
Engineered Software	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Carrier Corporation	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Tanner Research	1.0	.0	.9	0	.1%	.0%	.2%	.0%
LandCadd	1.0	.0	.9	0	.1%	.0%	.2%	.0%
Pathtrace	1.0	.2	.6	14	.1%	.0%	.1%	.0%
CAE-link	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Aries Technology	.9	.0	.9	0	.1%	.0%	.2%	.0%
Maptech	.9	.0	.9	0	.1%	.0%	.2%	.0%
Quicklogic	.9	.0	.9	0	.1%	.0%	.2%	.0%
ALDEC	.9	.0	.8	0	.1%	.0%	.2%	.0%
Aura CAD/CAM Systems	.9	.0	.8	0	.1%	.0%	.2%	.0%
Cimlinc	.8	.0	.6	0	.1%	.0%	.1%	.0%
Kork Systems	.8	.1	.6	15	.1%	.0%	.1%	.0%

(Continued)

Table 23 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Radian Corporation	.8	.0	.5	0	.1%	.0%	.1%	.0%
Mega CADD	.8	.0	.8	0	.1%	.0%	.2%	.0%
Genasys II	.7	.1	.5	18	.1%	.0%	.1%	.0%
CADWorks	.7	.0	.6	0	.1%	.0%	.1%	.0%
A.I. Systems	.7	.0	.7	0	.1%	.0%	.1%	.0%
ECOM Associates	.7	.0	.7	4	.1%	.0%	.1%	.0%
Ground Modelling Systems	.7	.4	.3	57	.1%	.1%	.1%	.0%
MacNeal-Schwendler	.6	.0	.6	0	.1%	.0%	.1%	.0%
Mc2 Engineering Software	.6	.0	.6	0	.0%	.0%	.1%	.0%
Infinite Graphics	.6	.0	.6	0	.0%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	.5	.1	.3	14	.0%	.0%	.1%	.0%
Integrated Silicon Systems	.5	.0	.4	5	.0%	.0%	.1%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.1%	.0%
CADSI	.5	.1	.4	9	.0%	.0%	.1%	.0%
Compact Software	.5	.0	.5	0	.0%	.0%	.1%	.0%
Applicon	.5	.2	.2	16	.0%	.0%	.0%	.0%
Bechtel Software	.5	.0	.5	0	.0%	.0%	.1%	.0%
Delcam International	.5	.2	.2	15	.0%	.0%	.0%	.0%
Phase Three Logic	.4	.0	.4	0	.0%	.0%	.1%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.1%	.0%
GEOVISION Inc.	.3	.2	.1	36	.0%	.0%	.0%	.0%
Geotrace Technologies	.3	.0	.3	0	.0%	.0%	.1%	.0%

(Continued)

Table 23 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
SIMUCAD	.2	.0	.2	0	.0%	.0%	.0%	.0%
Technische Computer Systeme	.2	.0	.2	6	.0%	.0%	.0%	.0%
Logic Modeling Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Pacific Numerics	.2	.0	.2	0	.0%	.0%	.0%	.0%
BATISOFT	.2	.0	.1	7	.0%	.0%	.0%	.0%
Meta-Software	.2	.0	.1	0	.0%	.0%	.0%	.0%
Areon	.1	.0	.0	0	.0%	.0%	.0%	.0%
Genrad	.1	.0	.1	4	.0%	.0%	.0%	.0%
Exemplar Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	77.6	69.9	8.4	31,459	6.7%	10.6%	1.8%	18.1%
All Companies	1,159.2	661.2	466.9	174,035	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	1,148.2	657.8	459.3	173,778	99.0%	99.5%	98.4%	99.9%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	11.0	3.4	7.6	257	1.0%	.5%	1.6%	.1%
All Hardware Companies	661.8	652.4	.0	172,966	57.1%	98.7%	.0%	99.4%
All Turnkey & SW Companies	497.4	8.8	466.9	1,070	42.9%	1.3%	100.0%	.6%

Source: Dataquest (July 1993)

Table 24
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
IBM	804.8	479.6	172.7	31,870	14.0%	17.0%	9.5%	14.2%
Computervision	554.9	163.6	185.0	5,537	9.6%	5.8%	10.2%	2.5%
Hewlett-Packard	489.6	372.3	41.8	25,369	8.5%	13.2%	2.3%	11.3%
Intergraph	410.2	182.9	105.1	5,178	7.1%	6.5%	5.8%	2.3%
Digital	409.3	286.9	.0	12,025	7.1%	10.2%	.0%	5.4%
Siemens Nixdorf Info systeme	259.6	121.9	98.8	2,968	4.5%	4.3%	5.4%	1.3%
Sun Microsystems	215.3	185.9	.0	11,485	3.7%	6.6%	.0%	5.1%
Autodesk	137.1	.0	137.1	0	2.4%	.0%	7.5%	.0%
Compaq	116.1	116.1	.0	25,126	2.0%	4.1%	.0%	11.2%
Mentor Graphics	97.3	20.5	38.9	914	1.7%	.7%	2.1%	.4%
Matra Datavision	91.2	29.1	46.5	765	1.6%	1.0%	2.6%	.3%
Control Data Systems	86.4	41.8	14.3	1,206	1.5%	1.5%	.8%	.5%
EDS	81.9	27.2	38.4	1,266	1.4%	1.0%	2.1%	.6%
Applicon	76.3	25.2	29.7	824	1.3%	.9%	1.6%	.4%
Silicon Graphics	74.9	67.8	.0	2,404	1.3%	2.4%	.0%	1.1%
Cadence	71.4	.0	55.7	0	1.2%	.0%	3.1%	.0%
IEZ	63.3	22.2	31.7	1,340	1.1%	.8%	1.7%	.6%
Nemetschek	58.0	21.5	32.5	1,609	1.0%	.8%	1.8%	.7%
SDRC	46.7	.0	46.7	0	.8%	.0%	2.6%	.0%
Apple Computer	46.1	46.2	.0	8,381	.8%	1.6%	.0%	3.7%
Racal-Redac	45.6	.0	39.0	0	.8%	.0%	2.1%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
STI-Straessle	42.5	12.8	20.4	344	.7%	.5%	1.1%	.2%
ISICAD	40.6	12.4	20.7	253	.7%	.4%	1.1%	.1%
ItalCad	38.0	17.9	9.1	360	.7%	.6%	.5%	.2%
ICL	35.1	20.7	11.9	962	.6%	.7%	.7%	.4%
ASCAD/ASCAM	30.6	18.4	9.2	450	.5%	.6%	.5%	.2%
Cisigraph	28.8	8.1	15.8	183	.5%	.3%	.9%	.1%
Han Dataport	28.6	8.8	15.5	620	.5%	.3%	.9%	.3%
Investronica SA	27.6	22.1	2.8	1,102	.5%	.8%	.2%	.5%
Wiechers Datentechnik	27.2	6.8	12.8	815	.5%	.2%	.7%	.4%
Parametric Technology	25.0	.0	20.3	0	.4%	.0%	1.1%	.0%
Landmark Graphics	24.6	12.3	5.7	127	.4%	.4%	.3%	.1%
Delcam International	22.2	8.2	9.5	260	.4%	.3%	.5%	.1%
Marcus Computer Systeme	19.9	10.3	6.8	296	.3%	.4%	.4%	.1%
Tebis	19.6	3.0	13.7	112	.3%	.1%	.8%	.0%
ESRI	19.1	.0	17.4	0	.3%	.0%	1.0%	.0%
Cimatron	18.9	8.5	8.5	590	.3%	.3%	.5%	.3%
CAD Lab	18.7	.0	15.2	0	.3%	.0%	.8%	.0%
PAFEC	18.3	.0	18.3	0	.3%	.0%	1.0%	.0%
MacNeal-Schwendler	18.3	.0	18.3	0	.3%	.0%	1.0%	.0%
Moss Systems	18.0	.9	13.1	60	.3%	.0%	.7%	.0%
Synopsys	17.8	.0	12.8	0	.3%	.0%	.7%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Radan Computational	17.6	6.2	8.8	364	.3%	.2%	.5%	.2%
CAD Distribution	16.9	8.4	6.7	261	.3%	.3%	.4%	.1%
Digital Kienzle	16.3	8.3	4.6	239	.3%	.3%	.3%	.1%
Research Machines	15.6	15.6	.0	2,517	.3%	.6%	.0%	1.1%
Star Informatic	15.2	2.3	10.8	1,720	.3%	.1%	.6%	.8%
ABB Industria	15.0	6.6	6.6	160	.3%	.2%	.4%	.1%
Ziegler Informatics	14.3	.0	14.3	0	.2%	.0%	.8%	.0%
Swanson Analysis	13.8	.0	13.3	0	.2%	.0%	.7%	.0%
Soft-Tech Software Technologies	13.8	2.1	10.4	932	.2%	.1%	.6%	.4%
Viewlogic Systems	13.0	.0	10.3	0	.2%	.0%	.6%	.0%
Microway	12.5	7.6	3.8	133	.2%	.3%	.2%	.1%
Exapt	12.5	6.1	4.2	229	.2%	.2%	.2%	.1%
Framasoft	12.0	.0	7.3	0	.2%	.0%	.4%	.0%
Gerber Systems	10.9	5.4	3.6	151	.2%	.2%	.2%	.1%
PDA Engineering	10.8	.0	10.4	0	.2%	.0%	.6%	.0%
Smallworld Systems	10.5	2.4	5.8	52	.2%	.1%	.3%	.0%
COMPASS Design Automation	10.5	.2	7.9	8	.2%	.0%	.4%	.0%
CAD Centre	10.4	.0	8.3	0	.2%	.0%	.5%	.0%
Technische Computer Systeme	10.3	1.9	8.4	279	.2%	.1%	.5%	.1%
Kockums Computer Systems	10.2	2.6	5.6	502	.2%	.1%	.3%	.2%
Harris EDA	9.8	1.0	5.7	42	.2%	.0%	.3%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Sysscan	9.8	4.2	2.6	92	.2%	.1%	.1%	.0%
Unisys	9.8	2.0	3.3	179	.2%	.1%	.2%	.1%
Dell Computer	9.3	9.3	.0	2,415	.2%	.3%	.0%	1.1%
Auto-Trol	8.9	3.3	3.4	112	.2%	.1%	.2%	.0%
EEsof	8.6	.0	7.3	5	.1%	.0%	.4%	.0%
Aucotec	8.5	3.4	3.4	470	.1%	.1%	.2%	.2%
Laser-Scan	8.5	2.9	3.4	51	.1%	.1%	.2%	.0%
RIB/RZB	8.3	.7	6.7	52	.1%	.0%	.4%	.0%
Cimlinc	8.0	.0	5.6	168	.1%	.0%	.3%	.1%
DAT Standard Info ssystemes	7.9	.0	7.5	0	.1%	.0%	.4%	.0%
Olivetti	7.8	6.6	.0	890	.1%	.2%	.0%	.4%
Sagantec	7.5	.0	6.7	0	.1%	.0%	.4%	.0%
RoboCAD Solutions	7.3	.0	5.9	0	.1%	.0%	.3%	.0%
Spectrum Graphics	7.2	2.2	3.6	67	.1%	.1%	.2%	.0%
Fides Industrielle Automation	7.2	2.2	2.9	42	.1%	.1%	.2%	.0%
Serbi	7.0	.7	6.3	200	.1%	.0%	.3%	.1%
Hochtief	6.9	1.0	4.8	84	.1%	.0%	.3%	.0%
GeoVision Systems	6.8	.5	3.5	13	.1%	.0%	.2%	.0%
Alper Systems	6.4	3.2	1.6	45	.1%	.1%	.1%	.0%
Ground Modelling Systems	6.3	3.4	2.5	554	.1%	.1%	.1%	.2%
Zycad	6.3	3.8	.8	36	.1%	.1%	.0%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
BATISOFT	6.0	.9	3.0	300	.1%	.0%	.2%	.1%
debis Systemhaus	5.8	1.4	3.4	39	.1%	.1%	.2%	.0%
Genasys II	5.6	.6	3.9	26	.1%	.0%	.2%	.0%
Clemessy	5.4	4.4	.8	18	.1%	.2%	.0%	.0%
Kohns & Poppenhaeger	5.4	2.7	1.9	64	.1%	.1%	.1%	.0%
Alias Research	5.2	.0	4.8	0	.1%	.0%	.3%	.0%
Orcad	5.1	.0	5.1	0	.1%	.0%	.3%	.0%
mb Programme	5.1	2.5	1.8	122	.1%	.1%	.1%	.1%
Complansoft CAD	4.9	2.5	2.5	113	.1%	.1%	.1%	.1%
Logic Modeling Systems	4.9	.0	3.9	0	.1%	.0%	.2%	.0%
Analogy	4.8	.0	3.9	0	.1%	.0%	.2%	.0%
ADRA Systems	4.8	.3	3.7	16	.1%	.0%	.2%	.0%
Graphisoft Software Dev	4.6	.0	4.6	0	.1%	.0%	.3%	.0%
Kloeckner-Moeller	4.5	.9	3.1	46	.1%	.0%	.2%	.0%
HP Cade	4.4	2.6	1.3	44	.1%	.1%	.1%	.0%
Triplan	4.3	1.7	2.1	62	.1%	.1%	.1%	.0%
ANACAD	4.3	.0	4.3	0	.1%	.0%	.2%	.0%
Computer Services Consultants	4.2	.0	4.2	0	.1%	.0%	.2%	.0%
Gable CAD Systems	4.0	2.9	.6	44	.1%	.1%	.0%	.0%
Softronics	4.0	1.1	3.0	361	.1%	.0%	.2%	.2%
Quickturn Systems	3.9	3.9	.0	32	.1%	.1%	.0%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
LSI Logic	3.8	.4	2.8	10	.1%	.0%	.2%	.0%
Sener Sistemas Marinos	3.7	.0	3.7	0	.1%	.0%	.2%	.0%
Ikos Systems	3.7	3.5	.2	41	.1%	.1%	.0%	.0%
Xilinx	3.7	.0	3.3	0	.1%	.0%	.2%	.0%
Datagraphic	3.6	1.8	1.4	57	.1%	.1%	.1%	.0%
EME	3.5	.8	1.6	70	.1%	.0%	.1%	.0%
Altera	3.5	.0	3.0	0	.1%	.0%	.2%	.0%
Micrografx	3.3	.0	3.3	0	.1%	.0%	.2%	.0%
MCS	3.2	.0	2.9	0	.1%	.0%	.2%	.0%
Whessoe Computing Systems	3.2	.0	3.2	0	.1%	.0%	.2%	.0%
MARC	3.1	.0	3.1	0	.1%	.0%	.2%	.0%
ISKA	3.1	1.4	1.3	57	.1%	.0%	.1%	.0%
Genrad	3.1	.6	2.1	32	.1%	.0%	.1%	.0%
FEA	3.0	.7	.7	0	.1%	.0%	.0%	.0%
Assigraph	2.9	.0	2.3	0	.1%	.0%	.1%	.0%
Silvar-Lisco	2.8	.0	1.6	0	.0%	.0%	.1%	.0%
Comdisco Systems	2.8	.0	2.5	0	.0%	.0%	.1%	.0%
Teradyne	2.7	.3	1.8	6	.0%	.0%	.1%	.0%
Synercom	2.7	.0	1.4	0	.0%	.0%	.1%	.0%
Zuken	2.6	1.0	1.6	16	.0%	.0%	.1%	.0%
ERDAS	2.5	.7	1.7	43	.0%	.0%	.1%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Pathtrace	2.5	.5	1.6	37	.0%	.0%	.1%	.0%
ALS Design	2.4	.1	2.2	20	.0%	.0%	.1%	.0%
Catalpa	2.3	.4	1.5	25	.0%	.0%	.1%	.0%
Superdraft	2.3	1.1	1.1	132	.0%	.0%	.1%	.1%
Caroline Informatique	2.3	.4	1.2	18	.0%	.0%	.1%	.0%
Microsim	2.3	.0	2.1	0	.0%	.0%	.1%	.0%
Elstree Computing	2.2	1.0	1.2	62	.0%	.0%	.1%	.0%
Anilam Electronics	2.2	.4	1.6	70	.0%	.0%	.1%	.0%
BETRONEX	2.2	.2	1.9	40	.0%	.0%	.1%	.0%
Vero International Software	2.2	.0	2.0	0	.0%	.0%	.1%	.0%
CAD-UL	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
Data I/O	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
Lamp Software	2.1	.5	1.5	130	.0%	.0%	.1%	.1%
ISDATA	2.0	.0	1.8	0	.0%	.0%	.1%	.0%
ICAD	2.0	.0	1.6	0	.0%	.0%	.1%	.0%
CADKEY	2.0	.0	2.0	0	.0%	.0%	.1%	.0%
CAD-Capture	2.0	.4	.6	10	.0%	.0%	.0%	.0%
Test Systems Strategies	1.9	.0	1.7	0	.0%	.0%	.1%	.0%
FEGS	1.9	.0	.9	0	.0%	.0%	.1%	.0%
Macao Systems	1.8	1.0	.6	19	.0%	.0%	.0%	.0%
Geometria GIS Systems House	1.8	.2	.4	15	.0%	.0%	.0%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
PADS Software	1.8	.0	1.5	0	.0%	.0%	.1%	.0%
Point Control	1.8	.0	1.4	0	.0%	.0%	.1%	.0%
DAPCO	1.8	.0	1.2	0	.0%	.0%	.1%	.0%
CAMTEK	1.7	.4	1.1	120	.0%	.0%	.1%	.1%
Enghouse Systems Ltd.	1.7	.0	1.5	2	.0%	.0%	.1%	.0%
MEDESIGN	1.7	.5	.6	18	.0%	.0%	.0%	.0%
ACTEL	1.6	.0	1.4	0	.0%	.0%	.1%	.0%
ETAK	1.6	.1	1.5	3	.0%	.0%	.1%	.0%
ARKTEC	1.6	.2	1.3	43	.0%	.0%	.1%	.0%
SPATIAL Technology	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
Moda CAD	1.6	.4	1.1	13	.0%	.0%	.1%	.0%
Rasna Corporation	1.5	.0	1.4	0	.0%	.0%	.1%	.0%
Strategic Mapping	1.5	.0	1.4	0	.0%	.0%	.1%	.0%
Sinus Software	1.5	.8	.8	36	.0%	.0%	.0%	.0%
Computational Mechanics	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
GeoQuest	1.4	.0	1.4	0	.0%	.0%	.1%	.0%
Sigma Design	1.4	.0	1.3	0	.0%	.0%	.1%	.0%
Solbourne	1.4	1.4	.0	129	.0%	.0%	.0%	.1%
Mechanical Dynamics	1.4	.0	1.1	0	.0%	.0%	.1%	.0%
Aries Technology	1.3	.0	1.2	0	.0%	.0%	.1%	.0%
Aucos elektronische Gerate	1.2	.4	.9	121	.0%	.0%	.0%	.1%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Scientific & Engineering SW	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
Dynamic Graphics	1.2	.0	1.0	0	.0%	.0%	.1%	.0%
Mucke Software	1.1	.6	.4	27	.0%	.0%	.0%	.0%
EA Systems	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
CAMAX Systems Inc.	1.0	.2	.6	18	.0%	.0%	.0%	.0%
CADWorks	1.0	.0	.9	0	.0%	.0%	.0%	.0%
Compact Software	.9	.0	.9	0	.0%	.0%	.1%	.0%
CADSI	.9	.1	.7	6	.0%	.0%	.0%	.0%
CNC Software	.9	.0	.9	0	.0%	.0%	.1%	.0%
Contract Data Research	.9	.0	.6	0	.0%	.0%	.0%	.0%
Meta-Software	.9	.0	.6	0	.0%	.0%	.0%	.0%
Accugraph	.9	.4	.4	31	.0%	.0%	.0%	.0%
Aspen Technology	.9	.0	.8	0	.0%	.0%	.0%	.0%
Cascade Design Automation	.8	.0	.6	0	.0%	.0%	.0%	.0%
Areon	.8	.4	.2	6	.0%	.0%	.0%	.0%
Inca	.7	.7	.0	3	.0%	.0%	.0%	.0%
Algor Interactive Systems	.7	.0	.6	0	.0%	.0%	.0%	.0%
Engineered Software	.6	.0	.6	0	.0%	.0%	.0%	.0%
Carrier Corporation	.6	.0	.6	0	.0%	.0%	.0%	.0%
Minc Software	.6	.0	.6	0	.0%	.0%	.0%	.0%
Terra Sciences	.5	.0	.5	0	.0%	.0%	.0%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Evolution Computing	.5	.0	.5	0	.0%	.0%	.0%	.0%
S.T.L.D. s.r.l.	.5	.0	.5	0	.0%	.0%	.0%	.0%
Accel Technologies	.5	.0	.4	0	.0%	.0%	.0%	.0%
Massteck	.5	.0	.5	0	.0%	.0%	.0%	.0%
ACDS Graphic System	.5	.0	.4	0	.0%	.0%	.0%	.0%
Pacific Numerics	.4	.0	.4	0	.0%	.0%	.0%	.0%
Quantic Laboratories	.4	.0	.4	0	.0%	.0%	.0%	.0%
i-Logix	.4	.0	.4	0	.0%	.0%	.0%	.0%
Kork Systems	.4	.0	.3	4	.0%	.0%	.0%	.0%
LandCadd	.4	.0	.4	0	.0%	.0%	.0%	.0%
Softdesk	.4	.0	.4	0	.0%	.0%	.0%	.0%
Ontos	.4	.0	.4	0	.0%	.0%	.0%	.0%
American Small Business Comp.	.4	.0	.4	0	.0%	.0%	.0%	.0%
Foresight Resources	.4	.0	.3	0	.0%	.0%	.0%	.0%
Wisdom Systems	.3	.0	.3	0	.0%	.0%	.0%	.0%
Bechtel Software	.3	.0	.3	0	.0%	.0%	.0%	.0%
Motorola	.3	.0	.3	0	.0%	.0%	.0%	.0%
Sweet's Electronic Publishing	.3	.0	.2	0	.0%	.0%	.0%	.0%
ALDEC	.3	.0	.3	0	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	.3	.1	.2	5	.0%	.0%	.0%	.0%
Generation 5 Technology	.3	.0	.3	0	.0%	.0%	.0%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Objectivity	.3	.0	.3	0	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	.2	.0	.2	0	.0%	.0%	.0%	.0%
Mega CADD	.2	.0	.2	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
IMSI	.2	.0	.2	0	.0%	.0%	.0%	.0%
CAD Language Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Tanner Research	.2	.0	.2	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
Geotrace Technologies	.2	.0	.2	3	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.2	.0	.2	1	.0%	.0%	.0%	.0%
ASG	.1	.0	.1	0	.0%	.0%	.0%	.0%
Infinite Graphics	.1	.0	.1	0	.0%	.0%	.0%	.0%
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
Object Design	.1	.0	.1	0	.0%	.0%	.0%	.0%
A.I. Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Sunrise Test Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
GEOVISION Inc.	.1	.0	.0	3	.0%	.0%	.0%	.0%
GeoGraphix	.1	.0	.1	0	.0%	.0%	.0%	.0%
Quicklogic	.1	.0	.1	0	.0%	.0%	.0%	.0%
CAE-link	.1	.0	.1	0	.0%	.0%	.0%	.0%
Exemplar Logic	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
EPIC Design Technology	.1	.0	.1	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.0	.0	.0	0	.0%	.0%	.0%	.0%
Phase Three Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	269.7	266.5	.0	63,533	4.7%	9.4%	.0%	28.3%
All Companies	5,755.3	2,825.9	1,816.9	224,187	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	4,401.8	2,349.0	1,141.3	199,127	76.5%	83.1%	62.8%	88.8%
All Asian-Based Companies	2.6	1.0	1.6	16	.0%	.0%	.1%	.0%
All European-Based Companies	1,350.9	476.0	674.0	25,044	23.5%	16.8%	37.1%	11.2%
All Hardware Companies	1,570.4	1,346.3	2.9	169,909	27.3%	47.6%	.2%	75.8%
All Turnkey & SW Companies	4,184.8	1,479.6	1,814.0	54,278	72.7%	52.4%	99.8%	24.2%

Source: Dataquest (July 1993)

Table 25
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Computervision	541.6	160.8	178.6	5,316	15.4%	10.7%	14.3%	8.3%
Hewlett-Packard	448.0	335.2	41.8	14,862	12.7%	22.3%	3.4%	23.2%
Intergraph	372.7	164.8	96.1	4,690	10.6%	11.0%	7.7%	7.3%
Siemens Nixdorf Info systeme	238.3	110.8	91.8	2,832	6.8%	7.4%	7.4%	4.4%
Sun Microsystems	180.3	156.8	.0	10,249	5.1%	10.4%	.0%	16.0%
IBM	164.8	79.1	62.6	3,713	4.7%	5.3%	5.0%	5.8%
Digital	102.0	70.4	.0	5,031	2.9%	4.7%	.0%	7.8%
Mentor Graphics	97.3	20.5	38.9	914	2.8%	1.4%	3.1%	1.4%
Matra Datavision	91.2	29.1	46.5	765	2.6%	1.9%	3.7%	1.2%
EDS	69.5	23.3	32.7	1,116	2.0%	1.6%	2.6%	1.7%
Applicon	68.7	22.7	26.8	727	2.0%	1.5%	2.1%	1.1%
Silicon Graphics	68.4	62.3	.0	2,288	1.9%	4.1%	.0%	3.6%
Cadence	64.9	.0	50.6	0	1.8%	.0%	4.1%	.0%
IEZ	63.3	22.2	31.7	1,340	1.8%	1.5%	2.5%	2.1%
SDRC	45.7	.0	45.7	0	1.3%	.0%	3.7%	.0%
STI-Straessle	42.5	12.8	20.4	344	1.2%	.8%	1.6%	.5%
Racal-Redac	39.2	.0	32.9	0	1.1%	.0%	2.6%	.0%
ItalCad	38.0	17.9	9.1	360	1.1%	1.2%	.7%	.6%
ICL	35.1	20.7	11.9	962	1.0%	1.4%	1.0%	1.5%
ISICAD	34.4	12.4	14.5	253	1.0%	.8%	1.2%	.4%
Control Data Systems	32.2	19.6	6.8	875	.9%	1.3%	.5%	1.4%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ASCAD/ASCAM	30.0	18.0	9.0	436	.9%	1.2%	.7%	.7%
Nemetschek	26.7	9.9	14.9	321	.8%	.7%	1.2%	.5%
Cisigraph	25.9	7.3	14.2	164	.7%	.5%	1.1%	.3%
Han Dataport	25.3	7.6	13.9	556	.7%	.5%	1.1%	.9%
Parametric Technology	25.0	.0	20.3	0	.7%	.0%	1.6%	.0%
Delcam International	20.0	7.4	8.6	216	.6%	.5%	.7%	.3%
Marcus Computer Systeme	19.9	10.3	6.8	296	.6%	.7%	.5%	.5%
Moss Systems	18.0	.9	13.1	60	.5%	.1%	1.1%	.1%
Synopsys	17.8	.0	12.8	0	.5%	.0%	1.0%	.0%
Radan Computational	17.4	6.1	8.7	358	.5%	.4%	.7%	.6%
PAFEC	16.4	.0	16.4	0	.5%	.0%	1.3%	.0%
Digital Kienzle	16.3	8.3	4.6	239	.5%	.6%	.4%	.4%
CAD Lab	15.9	.0	12.7	0	.5%	.0%	1.0%	.0%
Star Informatic	15.2	2.3	10.8	1,720	.4%	.2%	.9%	2.7%
Landmark Graphics	14.7	7.4	3.4	76	.4%	.5%	.3%	.1%
Gerber Systems	10.9	5.4	3.6	151	.3%	.4%	.3%	.2%
Framasoft	10.8	.0	6.5	0	.3%	.0%	.5%	.0%
Cimatron	10.6	4.8	4.8	209	.3%	.3%	.4%	.3%
Smallworld Systems	10.5	2.4	5.8	52	.3%	.2%	.5%	.1%
CAD Centre	10.4	.0	8.3	0	.3%	.0%	.7%	.0%
COMPASS Design Automation	10.3	.2	7.7	8	.3%	.0%	.6%	.0%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Kockums Computer Systems	10.2	2.6	5.6	502	.3%	.2%	.5%	.8%
ESRI	10.0	.0	9.1	0	.3%	.0%	.7%	.0%
Viewlogic Systems	9.1	.0	7.2	0	.3%	.0%	.6%	.0%
Technische Computer Systeme	9.1	1.6	7.4	243	.3%	.1%	.6%	.4%
Harris EDA	8.9	.9	5.0	38	.3%	.1%	.4%	.1%
Auto-Trol	8.9	3.3	3.4	112	.3%	.2%	.3%	.2%
Autodesk	8.2	.0	8.2	0	.2%	.0%	.7%	.0%
Laser-Scan	8.2	2.8	3.3	48	.2%	.2%	.3%	.1%
PDA Engineering	8.1	.0	7.8	0	.2%	.0%	.6%	.0%
Swanson Analysis	8.0	.0	7.7	0	.2%	.0%	.6%	.0%
Microway	7.7	4.7	2.3	73	.2%	.3%	.2%	.1%
Sagantec	7.5	.0	6.7	0	.2%	.0%	.5%	.0%
EEsof	7.3	.0	6.2	5	.2%	.0%	.5%	.0%
Spectrum Graphics	7.2	2.2	3.6	67	.2%	.1%	.3%	.1%
Fides Industrielle Automation	7.2	2.2	2.9	42	.2%	.1%	.2%	.1%
Wiechers Datentechnik	7.1	1.8	3.3	100	.2%	.1%	.3%	.2%
Unisys	6.9	1.1	2.6	98	.2%	.1%	.2%	.2%
Cimlinc	6.8	.0	4.8	168	.2%	.0%	.4%	.3%
Alper Systems	6.4	3.2	1.6	45	.2%	.2%	.1%	.1%
MacNeal-Schwendler	5.5	.0	5.5	0	.2%	.0%	.4%	.0%
Kohns & Poppenhaeger	5.4	2.7	1.9	64	.2%	.2%	.2%	.1%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Alias Research	5.2	.0	4.8	0	.1%	.0%	.4%	.0%
Genasys II	5.0	.5	3.5	12	.1%	.0%	.3%	.0%
Complansoft CAD	4.9	2.5	2.5	113	.1%	.2%	.2%	.2%
GeoVision Systems	4.7	.4	2.5	11	.1%	.0%	.2%	.0%
Analogy	4.6	.0	3.7	0	.1%	.0%	.3%	.0%
Logic Modeling Systems	4.5	.0	3.6	0	.1%	.0%	.3%	.0%
debis Systemhaus	4.4	1.1	2.6	23	.1%	.1%	.2%	.0%
HP Cade	4.4	2.6	1.3	44	.1%	.2%	.1%	.1%
Clemessy	4.4	3.5	.7	11	.1%	.2%	.1%	.0%
Triplan	4.3	1.7	2.1	62	.1%	.1%	.2%	.1%
ANACAD	4.3	.0	4.3	0	.1%	.0%	.3%	.0%
Gable CAD Systems	4.0	2.9	.6	44	.1%	.2%	.0%	.1%
Sysscan	3.9	1.4	1.4	46	.1%	.1%	.1%	.1%
Quickturn Systems	3.9	3.9	.0	32	.1%	.3%	.0%	.1%
Sener Sistemas Marinos	3.7	.0	3.7	0	.1%	.0%	.3%	.0%
ADRA Systems	3.6	.3	2.7	16	.1%	.0%	.2%	.0%
LSI Logic	3.4	.3	2.6	9	.1%	.0%	.2%	.0%
Exapt	3.4	1.7	1.2	115	.1%	.1%	.1%	.2%
ISKA	3.1	1.4	1.3	57	.1%	.1%	.1%	.1%
Silvar-Lisco	2.8	.0	1.6	0	.1%	.0%	.1%	.0%
Comdisco Systems	2.8	.0	2.5	0	.1%	.0%	.2%	.0%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Genrad	2.7	.5	1.8	27	.1%	.0%	.1%	.0%
Zuken	2.6	1.0	1.6	16	.1%	.1%	.1%	.0%
MARC	2.4	.0	2.4	0	.1%	.0%	.2%	.0%
RIB/RZB	2.3	.2	1.9	11	.1%	.0%	.2%	.0%
Catalpa	2.1	.4	1.3	15	.1%	.0%	.1%	.0%
EME	2.1	.4	1.0	29	.1%	.0%	.1%	.0%
ICAD	2.0	.0	1.6	0	.1%	.0%	.1%	.0%
ERDAS	1.9	.5	1.3	11	.1%	.0%	.1%	.0%
DAPCO	1.8	.0	1.2	0	.1%	.0%	.1%	.0%
Test Systems Strategies	1.7	.0	1.5	0	.0%	.0%	.1%	.0%
Synercom	1.7	.0	.9	0	.0%	.0%	.1%	.0%
MEDESIGN	1.7	.5	.6	18	.0%	.0%	.0%	.0%
Teradyne	1.6	.2	1.1	4	.0%	.0%	.1%	.0%
Caroline Informatique	1.6	.3	.8	8	.0%	.0%	.1%	.0%
FEGS	1.6	.0	.8	0	.0%	.0%	.1%	.0%
SPATIAL Technology	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
Sinus Software	1.5	.8	.8	36	.0%	.0%	.1%	.1%
MCS	1.5	.0	1.3	0	.0%	.0%	.1%	.0%
Assigraph	1.4	.0	1.1	0	.0%	.0%	.1%	.0%
Aucotec	1.3	.5	.5	26	.0%	.0%	.0%	.0%
Aries Technology	1.2	.0	1.1	0	.0%	.0%	.1%	.0%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Rasna Corporation	1.2	.0	1.1	0	.0%	.0%	.1%	.0%
FEA	1.2	.3	.3	0	.0%	.0%	.0%	.0%
Scientific & Engineering SW	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
Mechanical Dynamics	1.2	.0	.9	0	.0%	.0%	.1%	.0%
Xilinx	1.1	.0	1.0	0	.0%	.0%	.1%	.0%
Macao Systems	1.1	.6	.4	12	.0%	.0%	.0%	.0%
CAMAX Systems Inc.	1.0	.2	.6	18	.0%	.0%	.0%	.0%
Dynamic Graphics	.9	.0	.8	0	.0%	.0%	.1%	.0%
Cascade Design Automation	.8	.0	.6	0	.0%	.0%	.0%	.0%
Accugraph	.8	.4	.3	30	.0%	.0%	.0%	.0%
Meta-Software	.8	.0	.5	0	.0%	.0%	.0%	.0%
Sigma Design	.8	.0	.7	0	.0%	.0%	.1%	.0%
CADSI	.7	.1	.6	3	.0%	.0%	.0%	.0%
GeoQuest	.7	.0	.7	0	.0%	.0%	.1%	.0%
Lamp Software	.6	.2	.4	52	.0%	.0%	.0%	.1%
Geometria GIS Systems House	.6	.0	.0	0	.0%	.0%	.0%	.0%
ACDS Graphic System	.5	.0	.4	0	.0%	.0%	.0%	.0%
ISDATA	.5	.0	.4	0	.0%	.0%	.0%	.0%
Computational Mechanics	.5	.0	.5	0	.0%	.0%	.0%	.0%
Quantic Laboratories	.4	.0	.4	0	.0%	.0%	.0%	.0%
Pacific Numerics	.4	.0	.4	0	.0%	.0%	.0%	.0%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
i-Logix	.4	.0	.4	0	.0%	.0%	.0%	.0%
Ontos	.4	.0	.4	0	.0%	.0%	.0%	.0%
Compact Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
Data I/O	.4	.0	.4	0	.0%	.0%	.0%	.0%
Solbourne	.4	.4	.0	53	.0%	.0%	.0%	.1%
Whessoe Computing Systems	.3	.0	.3	0	.0%	.0%	.0%	.0%
Wisdom Systems	.3	.0	.3	0	.0%	.0%	.0%	.0%
ACTEL	.3	.0	.3	0	.0%	.0%	.0%	.0%
Motorola	.3	.0	.3	0	.0%	.0%	.0%	.0%
Minc Software	.3	.0	.3	0	.0%	.0%	.0%	.0%
Objectivity	.3	.0	.3	0	.0%	.0%	.0%	.0%
Enghouse Systems Ltd.	.3	.0	.2	2	.0%	.0%	.0%	.0%
Microsim	.2	.0	.2	0	.0%	.0%	.0%	.0%
Inca	.2	.2	.0	1	.0%	.0%	.0%	.0%
CAD Language Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Point Control	.2	.0	.1	0	.0%	.0%	.0%	.0%
PADS Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	.2	.0	.1	2	.0%	.0%	.0%	.0%
ETAK	.2	.0	.2	0	.0%	.0%	.0%	.0%
ARKTEC	.2	.1	.1	11	.0%	.0%	.0%	.0%
Electrical Eng. Software	.2	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Integrated Silicon Systems	.2	.0	.1	1	.0%	.0%	.0%	.0%
Object Design	.1	.0	.1	0	.0%	.0%	.0%	.0%
Bechtel Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	.1	.0	.1	0	.0%	.0%	.0%	.0%
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
CAMTEK	.1	.0	.1	2	.0%	.0%	.0%	.0%
CADKEY	.1	.0	.1	0	.0%	.0%	.0%	.0%
Sunrise Test Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Infinite Graphics	.1	.0	.1	0	.0%	.0%	.0%	.0%
Terra Sciences	.1	.0	.1	0	.0%	.0%	.0%	.0%
Softdesk	.1	.0	.1	0	.0%	.0%	.0%	.0%
GEOVISION Inc.	.1	.0	.0	1	.0%	.0%	.0%	.0%
EPIC Design Technology	.1	.0	.1	0	.0%	.0%	.0%	.0%
Exemplar Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.0	.0	.0	0	.0%	.0%	.0%	.0%
Carrier Corporation	.0	.0	.0	0	.0%	.0%	.0%	.0%
CADWorks	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Tanner Research	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ALS Design	.0	.0	.0	0	.0%	.0%	.0%	.0%
LandCadd	.0	.0	.0	0	.0%	.0%	.0%	.0%
ASG	.0	.0	.0	0	.0%	.0%	.0%	.0%
Phase Three Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	2.2	.4	1.4	15	.1%	.0%	.1%	.0%
All Companies	3,519.6	1,500.6	1,246.4	64,107	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	2,535.3	1,153.7	768.0	50,929	72.0%	76.9%	61.6%	79.4%
All Asian-Based Companies	2.6	1.0	1.6	16	.1%	.1%	.1%	.0%
All European-Based Companies	981.8	345.9	476.8	13,162	27.9%	23.0%	38.3%	20.5%
All Hardware Companies	619.4	517.1	1.4	27,972	17.6%	34.5%	.1%	43.6%
All Turnkey & SW Companies	2,900.2	983.5	1,245.0	36,135	82.4%	65.5%	99.9%	56.4%

Source: Dataquest (July 1993)

Table 26
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	415.2	265.8	51.9	6,310	47.8%	46.7%	48.9%	52.0%
Digital	174.0	120.1	.0	0	20.0%	21.1%	.0%	.0%
Control Data Systems	52.6	21.5	7.4	324	6.0%	3.8%	6.9%	2.7%
Siemens Nixdorf Info systeme	21.3	11.1	7.0	136	2.4%	1.9%	6.6%	1.1%
MacNeal-Schwendler	12.8	.0	12.8	0	1.5%	.0%	12.1%	.0%
Exapt	9.1	4.5	3.1	114	1.0%	.8%	2.9%	.9%
Computervision	7.5	2.0	2.7	114	.9%	.3%	2.5%	.9%
Cadence	3.3	.0	2.6	0	.4%	.0%	2.4%	.0%
Swanson Analysis	2.8	.0	2.7	0	.3%	.0%	2.5%	.0%
PDA Engineering	2.7	.0	2.6	0	.3%	.0%	2.5%	.0%
GeoVision Systems	2.0	.2	1.1	2	.2%	.0%	1.0%	.0%
Assigraph	1.4	.0	1.1	0	.2%	.0%	1.1%	.0%
Framasoft	1.2	.0	.7	0	.1%	.0%	.7%	.0%
Clemessy	1.1	.9	.2	6	.1%	.2%	.2%	.1%
MCS	1.1	.0	1.0	0	.1%	.0%	.9%	.0%
Computational Mechanics	1.1	.0	1.1	0	.1%	.0%	1.0%	.0%
EA Systems	1.1	.0	1.1	0	.1%	.0%	1.0%	.0%
Synercom	1.0	.0	.5	0	.1%	.0%	.5%	.0%
SDRC	.9	.0	.9	0	.1%	.0%	.9%	.0%
MARC	.8	.0	.8	0	.1%	.0%	.7%	.0%
Macao Systems	.7	.4	.3	6	.1%	.1%	.2%	.1%

(Continued)

Table 26 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
debis Systemhaus	.7	.2	.4	3	.1%	.0%	.4%	.0%
Whessoe Computing Systems	.6	.0	.6	0	.1%	.0%	.6%	.0%
Olivetti	.5	.4	.0	13	.1%	.1%	.0%	.1%
Aucotec	.4	.2	.2	6	.0%	.0%	.2%	.1%
LSI Logic	.4	.0	.3	1	.0%	.0%	.3%	.0%
Hochtief	.3	.1	.2	2	.0%	.0%	.2%	.0%
Laser-Scan	.3	.1	.2	3	.0%	.0%	.1%	.0%
FEA	.3	.1	.1	0	.0%	.0%	.1%	.0%
Genrad	.3	.1	.2	1	.0%	.0%	.2%	.0%
Harris EDA	.3	.0	.2	2	.0%	.0%	.2%	.0%
FEGS	.3	.0	.1	0	.0%	.0%	.1%	.0%
Dynamic Graphics	.3	.0	.2	0	.0%	.0%	.2%	.0%
Analogy	.2	.0	.2	0	.0%	.0%	.2%	.0%
Compact Software	.2	.0	.2	0	.0%	.0%	.2%	.0%
Mechanical Dynamics	.2	.0	.2	0	.0%	.0%	.2%	.0%
COMPASS Design Automation	.2	.0	.1	0	.0%	.0%	.1%	.0%
Test Systems Strategies	.2	.0	.2	0	.0%	.0%	.2%	.0%
Bechtel Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
Geotrace Technologies	.2	.0	.1	3	.0%	.0%	.1%	.0%
ETAK	.2	.0	.1	0	.0%	.0%	.1%	.0%
ISDATA	.1	.0	.1	0	.0%	.0%	.1%	.0%

(Continued)

Table 26 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Georgia Tech Research Corp.	.1	.0	.1	0	.0%	.0%	.1%	.0%
Logic Modeling Systems	.1	.0	.1	0	.0%	.0%	.1%	.0%
ESRI	.1	.0	.1	0	.0%	.0%	.1%	.0%
Meta-Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Lamp Software	.1	.0	.0	3	.0%	.0%	.0%	.0%
Data I/O	.1	.0	.1	0	.0%	.0%	.1%	.0%
Electrical Eng. Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Microsim	.0	.0	.0	0	.0%	.0%	.0%	.0%
Accugraph	.0	.0	.0	1	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Valisys	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	148.9	141.4	.1	5,083	17.1%	24.9%	.1%	41.9%
All Companies	869.5	568.7	106.1	12,134	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	829.8	551.0	90.5	11,842	95.4%	96.9%	85.3%	97.6%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	39.8	17.8	15.6	293	4.6%	3.1%	14.7%	2.4%
All Hardware Companies	333.8	266.1	1.5	5,191	38.4%	46.8%	1.4%	42.8%
All Turnkey & SW Companies	535.7	302.6	104.6	6,943	61.6%	53.2%	98.6%	57.2%

Source: Dataquest (July 1993)

Table 27
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Server
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	138.0	64.9	46.4	1,901	34.1%	28.7%	56.7%	31.2%
Digital	112.3	77.6	.0	1,563	27.8%	34.2%	.0%	25.7%
Intergraph	37.5	18.0	9.0	488	9.3%	8.0%	11.0%	8.0%
Sun Microsystems	35.0	29.1	.0	1,236	8.6%	12.8%	.0%	20.3%
EDS	12.5	3.9	5.7	150	3.1%	1.7%	7.0%	2.5%
Landmark Graphics	9.8	4.9	2.3	51	2.4%	2.2%	2.8%	.8%
Applicon	6.9	2.3	2.7	73	1.7%	1.0%	3.3%	1.2%
Silicon Graphics	6.6	5.5	.0	115	1.6%	2.4%	.0%	1.9%
Zycad	6.3	3.8	.8	36	1.6%	1.7%	1.0%	.6%
ESRI	6.1	.0	5.5	0	1.5%	.0%	6.8%	.0%
Hewlett-Packard	6.0	5.0	.0	159	1.5%	2.2%	.0%	2.6%
Sysscan	5.9	2.9	1.2	46	1.4%	1.3%	1.5%	.7%
Ikos Systems	3.7	3.5	.2	41	.9%	1.5%	.2%	.7%
Cadence	3.2	.0	2.5	0	.8%	.0%	3.1%	.0%
Unisys	2.9	.9	.7	81	.7%	.4%	.8%	1.3%
Cisigraph	2.9	.8	1.6	18	.7%	.4%	1.9%	.3%
Computervision	2.7	.9	.8	26	.7%	.4%	1.0%	.4%
Han Dataport	1.7	.8	.7	23	.4%	.3%	.8%	.4%
Control Data Systems	1.6	.8	.2	6	.4%	.3%	.2%	.1%
Teradyne	1.1	.1	.7	2	.3%	.1%	.9%	.0%
Solbourne	1.0	1.1	.0	75	.3%	.5%	.0%	1.2%

(Continued)

Table 27 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Server
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Cimlinc	.8	.0	.6	0	.2%	.0%	.7%	.0%
Logic Modeling Systems	.3	.0	.2	0	.1%	.0%	.2%	.0%
ETAK	.2	.0	.1	0	.0%	.0%	.2%	.0%
Georgia Tech Research Corp.	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	404.7	226.6	81.9	6,091	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	394.3	222.1	78.4	6,004	97.4%	98.0%	95.7%	98.6%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	10.4	4.4	3.5	87	2.6%	2.0%	4.3%	1.4%
All Hardware Companies	162.7	119.8	.0	3,180	40.2%	52.9%	.0%	52.2%
All Turnkey & SW Companies	242.0	106.8	81.9	2,911	59.8%	47.1%	100.0%	47.8%

Source: Dataquest (July 1993)

Table 28
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Autodesk	128.9	.0	128.9	0	13.4%	.0%	33.7%	.0%
Compaq	116.1	116.1	.0	25,126	12.1%	21.9%	.0%	17.7%
IBM	86.7	69.9	11.8	19,947	9.0%	13.2%	3.1%	14.1%
Apple Computer	46.1	46.2	.0	8,381	4.8%	8.7%	.0%	5.9%
Hewlett-Packard	35.7	32.1	.0	10,348	3.7%	6.1%	.0%	7.3%
Nemetschek	31.3	11.6	17.5	1,288	3.3%	2.2%	4.6%	.9%
Investronica SA	27.6	22.1	2.8	1,102	2.9%	4.2%	.7%	.8%
Digital	21.0	18.9	.0	5,431	2.2%	3.6%	.0%	3.8%
Wiechers Datentechnik	20.1	5.0	9.4	714	2.1%	.9%	2.5%	.5%
Tebis	19.6	3.0	13.7	112	2.0%	.6%	3.6%	.1%
CAD Distribution	16.9	8.4	6.7	261	1.8%	1.6%	1.8%	.2%
Research Machines	15.6	15.6	.0	2,517	1.6%	2.9%	.0%	1.8%
ABB Industria	15.0	6.6	6.6	160	1.6%	1.2%	1.7%	.1%
Ziegler Informatics	14.3	.0	14.3	0	1.5%	.0%	3.7%	.0%
Soft-Tech Software Technologies	13.8	2.1	10.4	932	1.4%	.4%	2.7%	.7%
Dell Computer	9.3	9.3	.0	2,415	1.0%	1.7%	.0%	1.7%
Cimatron	8.3	3.8	3.7	381	.9%	.7%	1.0%	.3%
DAT Standard info ssystemes	7.9	.0	7.5	0	.8%	.0%	2.0%	.0%
Olivetti	7.3	6.2	.0	877	.8%	1.2%	.0%	.6%
RoboCAD Solutions	7.3	.0	5.9	0	.8%	.0%	1.5%	.0%
Serbi	7.0	.7	6.3	200	.7%	.1%	1.6%	.1%

(Continued)

Table 28 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Aucotec	6.8	2.7	2.7	437	.7%	.5%	.7%	.3%
Hochtief	6.5	1.0	4.6	82	.7%	.2%	1.2%	.1%
Racal-Redac	6.4	.0	6.1	0	.7%	.0%	1.6%	.0%
Ground Modelling Systems	6.3	3.4	2.5	554	.7%	.6%	.7%	.4%
ISICAD	6.2	.0	6.2	0	.6%	.0%	1.6%	.0%
BATISOFT	6.0	.9	3.0	300	.6%	.2%	.8%	.2%
RIB/RZB	6.0	.5	4.9	41	.6%	.1%	1.3%	.0%
Orcad	5.1	.0	5.1	0	.5%	.0%	1.3%	.0%
mb Programme	5.1	2.5	1.8	122	.5%	.5%	.5%	.1%
Microway	4.7	2.9	1.4	60	.5%	.5%	.4%	.0%
Graphisoft Software Dev	4.6	.0	4.6	0	.5%	.0%	1.2%	.0%
Kloeckner-Moeller	4.5	.9	3.1	46	.5%	.2%	.8%	.0%
Computer Services Consultants	4.2	.0	4.2	0	.4%	.0%	1.1%	.0%
Softronics	4.0	1.1	3.0	361	.4%	.2%	.8%	.3%
Viewlogic Systems	3.9	.0	3.1	0	.4%	.0%	.8%	.0%
Datagraphic	3.6	1.8	1.4	57	.4%	.3%	.4%	.0%
Altera	3.5	.0	3.0	0	.4%	.0%	.8%	.0%
Micrografx	3.3	.0	3.3	0	.3%	.0%	.9%	.0%
Swanson Analysis	3.1	.0	2.9	0	.3%	.0%	.8%	.0%
Computervision	3.0	.0	3.0	80	.3%	.0%	.8%	.1%
ESRI	2.9	.0	2.7	0	.3%	.0%	.7%	.0%

(Continued)

Table 28 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
CAD Lab	2.8	.0	2.5	0	.3%	.0%	.7%	.0%
Xilinx	2.6	.0	2.3	0	.3%	.0%	.6%	.0%
Pathtrace	2.5	.5	1.6	37	.3%	.1%	.4%	.0%
ALS Design	2.4	.1	2.1	20	.2%	.0%	.6%	.0%
Superdraft	2.3	1.1	1.1	132	.2%	.2%	.3%	.1%
Elstree Computing	2.2	1.0	1.2	62	.2%	.2%	.3%	.0%
Whessoe Computing Systems	2.2	.0	2.2	0	.2%	.0%	.6%	.0%
Delcam International	2.2	.8	.9	44	.2%	.2%	.2%	.0%
Anilam Electronics	2.2	.4	1.6	70	.2%	.1%	.4%	.0%
BETRONEX	2.2	.2	1.9	40	.2%	.0%	.5%	.0%
Vero International Software	2.2	.0	2.0	0	.2%	.0%	.5%	.0%
CAD-UL	2.1	.0	2.1	0	.2%	.0%	.6%	.0%
Microsim	2.0	.0	1.9	0	.2%	.0%	.5%	.0%
CAD-Capture	2.0	.4	.6	10	.2%	.1%	.2%	.0%
CADKEY	1.9	.0	1.9	0	.2%	.0%	.5%	.0%
PAFEC	1.9	.0	1.9	0	.2%	.0%	.5%	.0%
Data I/O	1.7	.0	1.7	0	.2%	.0%	.4%	.0%
Han Dataport	1.7	.5	.9	41	.2%	.1%	.2%	.0%
Point Control	1.6	.0	1.3	0	.2%	.0%	.3%	.0%
PADS Software	1.6	.0	1.4	0	.2%	.0%	.4%	.0%
Moda CAD	1.6	.4	1.1	13	.2%	.1%	.3%	.0%

(Continued)

Table 28 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
CAMTEK	1.6	.3	1.0	118	.2%	.1%	.3%	.1%
FEA	1.5	.4	.4	0	.2%	.1%	.1%	.0%
Strategic Mapping	1.5	.0	1.4	0	.2%	.0%	.4%	.0%
EME	1.5	.4	.7	41	.2%	.1%	.2%	.0%
ISDATA	1.4	.0	1.3	0	.1%	.0%	.3%	.0%
ARKTEC	1.4	.1	1.2	32	.1%	.0%	.3%	.0%
Enghouse Systems Ltd.	1.4	.0	1.2	0	.1%	.0%	.3%	.0%
Lamp Software	1.4	.3	1.1	76	.1%	.0%	.3%	.1%
ACTEL	1.3	.0	1.1	0	.1%	.0%	.3%	.0%
EEsof	1.3	.0	1.1	0	.1%	.0%	.3%	.0%
Geometria GIS Systems House	1.3	.2	.4	15	.1%	.0%	.1%	.0%
Technische Computer Systeme	1.2	.2	1.0	36	.1%	.0%	.3%	.0%
Aucos elektronische Gerate	1.2	.4	.9	121	.1%	.1%	.2%	.1%
ADRA Systems	1.2	.0	1.0	0	.1%	.0%	.3%	.0%
ETAK	1.1	.1	1.1	3	.1%	.0%	.3%	.0%
Mucke Software	1.1	.6	.4	27	.1%	.1%	.1%	.0%
CADWorks	1.0	.0	.9	0	.1%	.0%	.2%	.0%
CNC Software	.9	.0	.9	0	.1%	.0%	.2%	.0%
Contract Data Research	.9	.0	.6	0	.1%	.0%	.2%	.0%
Aspen Technology	.9	.0	.8	0	.1%	.0%	.2%	.0%
Areon	.8	.4	.2	6	.1%	.1%	.0%	.0%

(Continued)

Table 28 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Applicon	.8	.2	.3	24	.1%	.0%	.1%	.0%
GeoQuest	.7	.0	.7	0	.1%	.0%	.2%	.0%
debis Systemhaus	.7	.2	.4	13	.1%	.0%	.1%	.0%
Caroline Informatique	.7	.1	.3	10	.1%	.0%	.1%	.0%
Algor Interactive Systems	.7	.0	.6	0	.1%	.0%	.1%	.0%
MCS	.7	.0	.6	0	.1%	.0%	.2%	.0%
Engineered Software	.6	.0	.6	0	.1%	.0%	.2%	.0%
Sigma Design	.6	.0	.6	0	.1%	.0%	.2%	.0%
ASCAD/ASCAM	.6	.4	.2	14	.1%	.1%	.0%	.0%
Carrier Corporation	.6	.0	.6	0	.1%	.0%	.2%	.0%
ERDAS	.6	.2	.4	32	.1%	.0%	.1%	.0%
Genasys II	.6	.0	.4	14	.1%	.0%	.1%	.0%
Harris EDA	.6	.0	.4	2	.1%	.0%	.1%	.0%
Evolution Computing	.5	.0	.5	0	.1%	.0%	.1%	.0%
Inca	.5	.5	.0	2	.1%	.1%	.0%	.0%
S.T.L.D. s.r.l.	.5	.0	.5	0	.1%	.0%	.1%	.0%
Accel Technologies	.5	.0	.4	0	.0%	.0%	.1%	.0%
Terra Sciences	.4	.0	.4	0	.0%	.0%	.1%	.0%
Massteck	.4	.0	.4	0	.0%	.0%	.1%	.0%
Cimlinc	.4	.0	.3	0	.0%	.0%	.1%	.0%
Kork Systems	.4	.0	.3	4	.0%	.0%	.1%	.0%

(Continued)

Table 28 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
LandCadd	.4	.0	.4	0	.0%	.0%	.1%	.0%
American Small Business Comp.	.4	.0	.4	0	.0%	.0%	.1%	.0%
Foresight Resources	.4	.0	.3	0	.0%	.0%	.1%	.0%
Compact Software	.3	.0	.3	0	.0%	.0%	.1%	.0%
Rasna Corporation	.3	.0	.3	0	.0%	.0%	.1%	.0%
Sweet's Electronic Publishing	.3	.0	.2	0	.0%	.0%	.1%	.0%
Softdesk	.3	.0	.3	0	.0%	.0%	.1%	.0%
Minc Software	.3	.0	.3	0	.0%	.0%	.1%	.0%
ALDEC	.3	.0	.3	0	.0%	.0%	.1%	.0%
Generation 5 Technology	.3	.0	.3	0	.0%	.0%	.1%	.0%
Mega CADD	.2	.0	.2	0	.0%	.0%	.1%	.0%
IMSI	.2	.0	.2	0	.0%	.0%	.1%	.0%
Facility Mapping Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Catalpa	.2	.0	.1	10	.0%	.0%	.0%	.0%
Tanner Research	.2	.0	.2	0	.0%	.0%	.0%	.0%
CADSI	.2	.0	.1	3	.0%	.0%	.0%	.0%
Radan Computational	.2	.1	.1	6	.0%	.0%	.0%	.0%
Aries Technology	.1	.0	.1	0	.0%	.0%	.0%	.0%
ASG	.1	.0	.1	0	.0%	.0%	.0%	.0%
A.I. Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	.1	.0	.1	3	.0%	.0%	.0%	.0%
Logic Modeling Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 28 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Genrad	.1	.0	.1	4	.0%	.0%	.0%	.0%
Accugraph	.1	.0	.1	0	.0%	.0%	.0%	.0%
GeoGraphix	.1	.0	.1	0	.0%	.0%	.0%	.0%
Quicklogic	.1	.0	.1	0	.0%	.0%	.0%	.0%
CAE-link	.1	.0	.1	0	.0%	.0%	.0%	.0%
Geotrace Technologies	.1	.0	.1	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Infinite Graphics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Phase Three Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
GEOVISION Inc.	.0	.0	.0	2	.0%	.0%	.0%	.0%
Exemplar Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Pacific Numerics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	118.6	124.7	.0	58,435	12.3%	23.5%	.0%	41.2%
All Companies	961.4	530.1	382.5	141,855	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	642.4	422.1	204.4	130,353	66.8%	79.6%	53.4%	91.9%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	319.0	107.9	178.1	11,502	33.2%	20.4%	46.6%	8.1%
All Hardware Companies	454.5	443.4	.0	133,565	47.3%	83.6%	.0%	94.2%
All Turnkey & SW Companies	506.9	86.7	382.5	8,290	52.7%	16.4%	100.0%	5.8%

Source: Dataquest (July 1993)

Table 29
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Fujitsu	442.0	282.9	114.9	8,751	10.9%	12.6%	8.9%	5.5%
IBM	354.4	186.6	110.9	15,779	8.7%	8.3%	8.6%	9.9%
NEC	348.0	238.9	81.3	22,400	8.6%	10.7%	6.3%	14.1%
Nihon Unisys	228.3	141.6	38.8	2,220	5.6%	6.3%	3.0%	1.4%
Sun Microsystems	223.9	193.6	.0	11,326	5.5%	8.6%	.0%	7.1%
Hitachi	174.0	83.5	73.1	4,675	4.3%	3.7%	5.7%	2.9%
Hewlett-Packard	157.4	118.3	14.4	6,166	3.9%	5.3%	1.1%	3.9%
Cadence	127.5	.0	112.2	0	3.1%	.0%	8.7%	.0%
Toshiba—NO OEM	106.2	53.1	42.5	3,114	2.6%	2.4%	3.3%	2.0%
Zuken	99.4	27.3	52.2	608	2.4%	1.2%	4.0%	.4%
Mitsubishi Electric	95.0	74.0	12.0	1,722	2.3%	3.3%	.9%	1.1%
Intergraph	82.3	33.2	24.1	974	2.0%	1.5%	1.9%	.6%
Hitachi Zosen Info Systems	77.6	66.2	3.6	800	1.9%	3.0%	.3%	.5%
Computervision	76.9	26.1	25.6	427	1.9%	1.2%	2.0%	.3%
Digital	73.5	50.5	1.0	1,984	1.8%	2.3%	.1%	1.2%
Mutoh Industries—NO OEM	72.3	43.4	21.7	1,139	1.8%	1.9%	1.7%	.7%
Mentor Graphics	69.2	2.5	39.8	650	1.7%	.1%	3.1%	.4%
Autodesk	54.8	.0	54.8	0	1.3%	.0%	4.2%	.0%
Sharp System Products—NO OEM	49.7	25.8	23.9	470	1.2%	1.2%	1.8%	.3%
SDRC	44.9	.0	35.9	0	1.1%	.0%	2.8%	.0%
EDS	44.3	18.8	18.1	688	1.1%	.8%	1.4%	.4%

(Continued)

Table 29 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Sony	43.5	43.5	.0	1,587	1.1%	1.9%	.0%	1.0%
Wacom	42.5	8.6	29.5	788	1.0%	.4%	2.3%	.5%
Hakuto	39.9	24.0	16.0	850	1.0%	1.1%	1.2%	.5%
Silicon Graphics	39.9	37.9	.0	1,324	1.0%	1.7%	.0%	.8%
Mitsui Engineering	39.7	27.8	7.9	264	1.0%	1.2%	.6%	.2%
Uchida Yoko	37.9	22.9	13.5	900	.9%	1.0%	1.0%	.6%
Seiko Instruments—NO OEM	34.2	14.2	17.1	258	.8%	.6%	1.3%	.2%
CADIX	33.6	13.4	16.8	247	.8%	.6%	1.3%	.2%
Tokyo Electron—NO OEM	32.3	10.7	14.5	220	.8%	.5%	1.1%	.1%
Apple Computer	30.7	30.7	.0	5,581	.8%	1.4%	.0%	3.5%
Toyo Information Systems-NO OEM	24.8	15.1	7.2	265	.6%	.7%	.6%	.2%
Century Research Center	22.5	11.9	8.3	119	.6%	.5%	.6%	.1%
Racal-Redac	17.5	.0	14.8	2	.4%	.0%	1.1%	.0%
Omron	16.0	9.6	6.4	394	.4%	.4%	.5%	.2%
Andor	15.7	3.9	11.1	121	.4%	.2%	.9%	.1%
Graphtec Engineering	15.4	7.7	6.9	331	.4%	.3%	.5%	.2%
INS Engineering	14.3	7.2	7.2	48	.4%	.3%	.6%	.0%
Synopsys	14.2	.0	10.3	0	.4%	.0%	.8%	.0%
MacNeal-Schwendler	13.9	.0	13.9	0	.3%	.0%	1.1%	.0%
Compaq	12.9	12.9	.0	2,792	.3%	.6%	.0%	1.8%
Design Automation	12.7	2.5	9.5	267	.3%	.1%	.7%	.2%

(Continued)

Table 29 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Sumitomo Denko Workstation	12.7	12.7	.0	654	.3%	.6%	.0%	.4%
Control Data Systems	12.5	6.1	2.1	181	.3%	.3%	.2%	.1%
COMPASS Design Automation	11.4	.2	8.5	9	.3%	.0%	.7%	.0%
CPU	10.5	.0	9.5	0	.3%	.0%	.7%	.0%
Parametric Technology	10.0	.0	8.1	0	.2%	.0%	.6%	.0%
Viewlogic Systems	9.5	.0	7.5	0	.2%	.0%	.6%	.0%
Siemens Nixdorf Info systeme	9.1	4.6	3.0	80	.2%	.2%	.2%	.1%
Landmark Graphics	8.2	4.1	1.9	42	.2%	.2%	.1%	.0%
Harris EDA	8.2	.9	4.7	35	.2%	.0%	.4%	.0%
Swanson Analysis	7.9	.0	7.6	0	.2%	.0%	.6%	.0%
Applicon	7.4	3.2	3.5	80	.2%	.1%	.3%	.1%
MARC	7.2	.0	7.2	0	.2%	.0%	.6%	.0%
Cisigraph	6.6	1.9	3.7	43	.2%	.1%	.3%	.0%
Zycad	6.3	3.8	.8	48	.2%	.2%	.1%	.0%
Alias Research	6.2	.0	5.7	0	.2%	.0%	.4%	.0%
GeoVision Systems	5.9	.5	3.1	11	.1%	.0%	.2%	.0%
EEsof	4.9	.0	4.2	3	.1%	.0%	.3%	.0%
Matra Datavision	4.9	1.6	2.5	41	.1%	.1%	.2%	.0%
Silvar-Lisco	4.8	.0	2.6	0	.1%	.0%	.2%	.0%
Kubota Computer	4.6	3.4	.8	300	.1%	.2%	.1%	.2%
Unisys	4.4	2.3	1.6	101	.1%	.1%	.1%	.1%

(Continued)

Table 29 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
ESRI	4.4	.0	4.0	0	.1%	.0%	.3%	.0%
CrossCheck Technology	4.3	.0	2.2	0	.1%	.0%	.2%	.0%
Ricoh—NO OEM	3.9	.0	3.3	0	.1%	.0%	.3%	.0%
ADRA Systems	3.9	.2	2.9	13	.1%	.0%	.2%	.0%
Fides Industrielle Automation	3.6	1.1	1.6	21	.1%	.0%	.1%	.0%
ICAD	3.4	.0	2.7	0	.1%	.0%	.2%	.0%
Meta-Software	3.3	.0	2.2	0	.1%	.0%	.2%	.0%
Cascade Design Automation	3.2	.0	2.4	0	.1%	.0%	.2%	.0%
Mechanical Dynamics	3.2	.0	2.5	0	.1%	.0%	.2%	.0%
Cimatron	3.0	1.4	1.4	99	.1%	.1%	.1%	.1%
Data I/O	2.7	.0	2.7	0	.1%	.0%	.2%	.0%
Framasoft	2.7	.0	1.6	0	.1%	.0%	.1%	.0%
PADS Software	2.7	.0	2.3	0	.1%	.0%	.2%	.0%
Cimlinc	2.7	.0	1.9	56	.1%	.0%	.1%	.0%
Contec Microelectronics	2.5	.0	2.3	0	.1%	.0%	.2%	.0%
Comdisco Systems	2.4	.0	2.1	0	.1%	.0%	.2%	.0%
Logic Modeling Systems	2.4	.0	1.9	0	.1%	.0%	.1%	.0%
Aries Technology	2.2	.0	1.9	0	.1%	.0%	.1%	.0%
Synercom	2.1	.0	1.1	0	.1%	.0%	.1%	.0%
PiE Design	2.0	1.0	.8	50	.0%	.0%	.1%	.0%
Quickturn Systems	2.0	2.0	.0	16	.0%	.1%	.0%	.0%

(Continued)

Table 29 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
ACTEL	1.9	.0	1.6	0	.0%	.0%	.1%	.0%
Test Systems Strategies	1.9	.0	1.7	0	.0%	.0%	.1%	.0%
Genasys II	1.9	.2	1.3	9	.0%	.0%	.1%	.0%
Ikos Systems	1.9	1.8	.1	20	.0%	.1%	.0%	.0%
CAMAX Systems Inc.	1.8	.3	1.1	32	.0%	.0%	.1%	.0%
PDA Engineering	1.8	.0	1.7	0	.0%	.0%	.1%	.0%
Auto-Trol	1.8	.7	.7	22	.0%	.0%	.1%	.0%
CAD Centre	1.8	.0	1.4	0	.0%	.0%	.1%	.0%
Kockums Computer Systems	1.6	.4	.9	80	.0%	.0%	.1%	.1%
Xilinx	1.6	.0	1.4	0	.0%	.0%	.1%	.0%
SPATIAL Technology	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
LSI Logic	1.5	.1	1.1	4	.0%	.0%	.1%	.0%
Anilam Electronics	1.5	.5	1.0	18	.0%	.0%	.1%	.0%
ISICAD	1.5	.4	.8	9	.0%	.0%	.1%	.0%
MCS	1.4	.0	1.3	0	.0%	.0%	.1%	.0%
Microsim	1.4	.0	1.3	0	.0%	.0%	.1%	.0%
Altera	1.3	.0	1.1	0	.0%	.0%	.1%	.0%
Analogy	1.2	.0	1.0	0	.0%	.0%	.1%	.0%
Point Control	1.2	.0	.9	0	.0%	.0%	.1%	.0%
Enghouse Systems Ltd.	1.2	.0	1.0	1	.0%	.0%	.1%	.0%
CADKEY	1.0	.0	1.0	0	.0%	.0%	.1%	.0%

(Continued)

Table 29 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
ERDAS	1.0	.3	.7	17	.0%	.0%	.1%	.0%
GeoQuest	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
BETRONEX	1.0	.1	.9	18	.0%	.0%	.1%	.0%
Compact Software	.9	.0	.9	0	.0%	.0%	.1%	.0%
Sigma Design	.9	.0	.9	0	.0%	.0%	.1%	.0%
EA Systems	.8	.0	.8	0	.0%	.0%	.1%	.0%
CADWorks	.8	.0	.7	0	.0%	.0%	.1%	.0%
Moss Systems	.8	.0	.5	0	.0%	.0%	.0%	.0%
Gerber Systems	.8	.4	.3	11	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.8	.0	.6	7	.0%	.0%	.0%	.0%
EPIC Design Technology	.7	.0	.7	0	.0%	.0%	.1%	.0%
Whessoe Computing Systems	.7	.0	.7	0	.0%	.0%	.1%	.0%
CNC Software	.7	.0	.7	0	.0%	.0%	.1%	.0%
Teradyne	.7	.1	.4	1	.0%	.0%	.0%	.0%
CADSI	.6	.1	.5	4	.0%	.0%	.0%	.0%
Moda CAD	.6	.2	.4	5	.0%	.0%	.0%	.0%
Sysscan	.6	.3	.2	6	.0%	.0%	.0%	.0%
ANACAD	.6	.0	.6	0	.0%	.0%	.0%	.0%
Softdesk	.6	.0	.6	0	.0%	.0%	.0%	.0%
Scientific & Engineering SW	.6	.0	.6	0	.0%	.0%	.0%	.0%
Wisdom Systems	.6	.0	.5	0	.0%	.0%	.0%	.0%

(Continued)

Table 29 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Electrical Eng. Software	.6	.0	.5	0	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	.6	.2	.3	10	.0%	.0%	.0%	.0%
ETAK	.5	.0	.5	1	.0%	.0%	.0%	.0%
Accel Technologies	.5	.0	.4	0	.0%	.0%	.0%	.0%
Laser-Scan	.4	.1	.2	3	.0%	.0%	.0%	.0%
Accugraph	.4	.2	.2	15	.0%	.0%	.0%	.0%
Quantic Laboratories	.4	.0	.4	0	.0%	.0%	.0%	.0%
Carrier Corporation	.4	.0	.4	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.4	.0	.0	0	.0%	.0%	.0%	.0%
ALDEC	.4	.0	.4	0	.0%	.0%	.0%	.0%
Object Design	.4	.0	.4	0	.0%	.0%	.0%	.0%
Solbourne	.4	.4	.0	32	.0%	.0%	.0%	.0%
Technische Computer Systeme	.3	.1	.3	0	.0%	.0%	.0%	.0%
Rasna Corporation	.3	.0	.3	0	.0%	.0%	.0%	.0%
Investronica SA	.3	.2	.0	12	.0%	.0%	.0%	.0%
Minc Software	.3	.0	.3	0	.0%	.0%	.0%	.0%
Aspen Technology	.3	.0	.3	0	.0%	.0%	.0%	.0%
Wiechers Datentechnik	.3	.1	.1	8	.0%	.0%	.0%	.0%
SIMUCAD	.3	.0	.3	0	.0%	.0%	.0%	.0%
Superdraft	.3	.1	.1	14	.0%	.0%	.0%	.0%
Infinite Graphics	.3	.0	.3	0	.0%	.0%	.0%	.0%

(Continued)

Table 29 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Georgia Tech Research Corp.	.2	.0	.2	0	.0%	.0%	.0%	.0%
Dynamic Graphics	.2	.0	.2	0	.0%	.0%	.0%	.0%
PAFEC	.2	.0	.2	0	.0%	.0%	.0%	.0%
Graphisoft Software Dev	.2	.0	.2	0	.0%	.0%	.0%	.0%
IMSI	.2	.0	.2	0	.0%	.0%	.0%	.0%
i-Logix	.2	.0	.2	0	.0%	.0%	.0%	.0%
BATISOFT	.2	.0	.1	7	.0%	.0%	.0%	.0%
GeoGraphix	.2	.0	.1	0	.0%	.0%	.0%	.0%
ASG	.1	.0	.1	0	.0%	.0%	.0%	.0%
Pathtrace	.1	.0	.1	2	.0%	.0%	.0%	.0%
ACDS Graphic System	.1	.0	.1	0	.0%	.0%	.0%	.0%
Objectivity	.1	.0	.1	0	.0%	.0%	.0%	.0%
Sunrise Test Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
CAD Language Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Mega CADD	.1	.0	.1	0	.0%	.0%	.0%	.0%
Gable CAD Systems	.1	.1	.0	1	.0%	.0%	.0%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.0%	.0%
Exemplar Logic	.1	.0	.1	0	.0%	.0%	.0%	.0%
Bechtel Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Motorola	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 29 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Tanner Research	.1	.0	.1	0	.0%	.0%	.0%	.0%
Geotrace Technologies	.1	.0	.1	1	.0%	.0%	.0%	.0%
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.1	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.1	.0	.0	0	.0%	.0%	.0%	.0%
Quicklogic	.1	.0	.1	0	.0%	.0%	.0%	.0%
The CAD Group	.0	.0	.0	0	.0%	.0%	.0%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.0%	.0%
Foresight Resources	.0	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	219.0	214.2	.3	56,645	5.4%	9.6%	.0%	35.6%
All Companies	4,059.8	2,242.6	1,289.9	159,151	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	1,852.2	953.8	604.0	105,185	45.6%	42.5%	46.8%	66.1%
All Asian-Based Companies	2,149.2	1,275.6	649.7	53,511	52.9%	56.9%	50.4%	33.6%
All European-Based Companies	58.5	13.1	36.2	455	1.4%	.6%	2.8%	.3%
All Hardware Companies	799.0	722.2	.4	99,155	19.7%	32.2%	.0%	62.3%
All Turnkey & SW Companies	3,260.9	1,520.4	1,289.4	59,996	80.3%	67.8%	100.0%	37.7%

Source: Dataquest (July 1993)

Table 30
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Sun Microsystems	194.1	168.8	.0	10,356	8.2%	14.1%	.0%	24.1%
Fujitsu	185.6	118.8	48.3	3,784	7.8%	9.9%	5.8%	8.8%
NEC	165.1	90.8	61.1	5,443	7.0%	7.6%	7.3%	12.7%
Hewlett-Packard	148.7	110.6	14.4	4,469	6.3%	9.2%	1.7%	10.4%
Cadence	126.9	.0	111.7	0	5.3%	.0%	13.3%	.0%
Hitachi	125.3	60.1	52.6	2,710	5.3%	5.0%	6.3%	6.3%
Zuken	99.4	27.3	52.2	608	4.2%	2.3%	6.2%	1.4%
Computervision	76.4	26.1	25.1	427	3.2%	2.2%	3.0%	1.0%
Nihon Unisys	75.8	47.0	12.9	619	3.2%	3.9%	1.5%	1.4%
Toshiba—NO OEM	73.9	37.0	29.6	875	3.1%	3.1%	3.5%	2.0%
Mitsubishi Electric	72.6	61.7	5.1	781	3.1%	5.2%	.6%	1.8%
Hitachi Zosen Info Systems	72.2	61.3	3.6	739	3.0%	5.1%	.4%	1.7%
Intergraph	70.1	29.0	18.7	854	3.0%	2.4%	2.2%	2.0%
Mentor Graphics	69.2	2.5	39.8	650	2.9%	.2%	4.8%	1.5%
IBM	56.9	27.3	21.6	941	2.4%	2.3%	2.6%	2.2%
Sharp System Products—NO OEM	49.1	25.5	23.6	453	2.1%	2.1%	2.8%	1.1%
Sony	43.5	43.5	.0	1,587	1.8%	3.6%	.0%	3.7%
SDRC	42.6	.0	34.1	0	1.8%	.0%	4.1%	.0%
EDS	41.0	17.8	16.6	657	1.7%	1.5%	2.0%	1.5%
Silicon Graphics	39.9	37.9	.0	1,324	1.7%	3.2%	.0%	3.1%
Mitsui Engineering	36.1	25.3	7.2	204	1.5%	2.1%	.9%	.5%

(Continued)

Table 30 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Uchida Yoko	34.1	20.5	11.9	729	1.4%	1.7%	1.4%	1.7%
CADIX	33.6	13.4	16.8	247	1.4%	1.1%	2.0%	.6%
Tokyo Electron—NO OEM	32.3	10.7	14.5	220	1.4%	.9%	1.7%	.5%
Mutoh Industries—NO OEM	32.3	19.4	9.7	330	1.4%	1.6%	1.2%	.8%
Seiko Instruments—NO OEM	28.9	11.6	14.5	122	1.2%	1.0%	1.7%	.3%
Century Research Center	20.9	11.1	7.7	116	.9%	.9%	.9%	.3%
Toyo Information Systems-NO OEM	19.9	12.4	5.7	236	.8%	1.0%	.7%	.5%
Digital	19.0	12.3	.8	879	.8%	1.0%	.1%	2.0%
Racal-Redac	17.5	.0	14.8	2	.7%	.0%	1.8%	.0%
Omron	16.0	9.6	6.4	394	.7%	.8%	.8%	.9%
Graphtec Engineering	15.4	7.7	6.9	331	.6%	.6%	.8%	.8%
Synopsys	14.2	.0	10.3	0	.6%	.0%	1.2%	.0%
INS Engineering	13.6	6.8	6.8	35	.6%	.6%	.8%	.1%
Sumitomo Denko Workstation	11.8	11.8	.0	592	.5%	1.0%	.0%	1.4%
COMPASS Design Automation	11.1	.2	8.3	9	.5%	.0%	1.0%	.0%
Parametric Technology	10.0	.0	8.1	0	.4%	.0%	1.0%	.0%
Siemens Nixdorf Info systeme	7.7	3.9	2.6	72	.3%	.3%	.3%	.2%
Harris EDA	7.3	.8	4.1	31	.3%	.1%	.5%	.1%
Viewlogic Systems	6.6	.0	5.2	0	.3%	.0%	.6%	.0%
Alias Research	6.2	.0	5.7	0	.3%	.0%	.7%	.0%
Cisigraph	6.0	1.7	3.3	38	.3%	.1%	.4%	.1%

(Continued)

Table 30 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Applicon	6.0	2.6	2.8	66	.3%	.2%	.3%	.2%
MARC	5.4	.0	5.4	0	.2%	.0%	.7%	.0%
Control Data Systems	5.0	3.0	1.1	135	.2%	.3%	.1%	.3%
Landmark Graphics	4.9	2.5	1.1	25	.2%	.2%	.1%	.1%
Matra Datavision	4.9	1.6	2.5	41	.2%	.1%	.3%	.1%
Silvar-Lisco	4.8	.0	2.6	0	.2%	.0%	.3%	.0%
Swanson Analysis	4.5	.0	4.4	0	.2%	.0%	.5%	.0%
CrossCheck Technology	4.3	.0	2.2	0	.2%	.0%	.3%	.0%
EEsof	4.2	.0	3.6	3	.2%	.0%	.4%	.0%
GeoVision Systems	4.2	.3	2.2	9	.2%	.0%	.3%	.0%
Kubota Computer	4.1	2.9	.8	228	.2%	.2%	.1%	.5%
Ricoh—NO OEM	3.9	.0	3.3	0	.2%	.0%	.4%	.0%
Wacom	3.6	.8	2.7	40	.2%	.1%	.3%	.1%
Fides Industrielle Automation	3.6	1.1	1.6	21	.2%	.1%	.2%	.0%
Unisys	3.4	1.7	1.2	79	.1%	.1%	.1%	.2%
ICAD	3.4	.0	2.7	0	.1%	.0%	.3%	.0%
Autodesk	3.3	.0	3.3	0	.1%	.0%	.4%	.0%
Cascade Design Automation	3.2	.0	2.4	0	.1%	.0%	.3%	.0%
ADRA Systems	2.9	.2	2.2	13	.1%	.0%	.3%	.0%
Meta-Software	2.9	.0	1.9	0	.1%	.0%	.2%	.0%
Mechanical Dynamics	2.7	.0	2.1	0	.1%	.0%	.3%	.0%

(Continued)

Table 30 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Framasoft	2.5	.0	1.5	0	.1%	.0%	.2%	.0%
Contec Microelectronics	2.5	.0	2.3	0	.1%	.0%	.3%	.0%
Comdisco Systems	2.4	.0	2.1	0	.1%	.0%	.3%	.0%
ESRI	2.3	.0	2.1	0	.1%	.0%	.3%	.0%
Cimlinc	2.3	.0	1.6	56	.1%	.0%	.2%	.1%
Logic Modeling Systems	2.2	.0	1.7	0	.1%	.0%	.2%	.0%
Hakuto	2.0	1.2	.8	23	.1%	.1%	.1%	.1%
PiE Design	2.0	1.0	.8	50	.1%	.1%	.1%	.1%
Quickturn Systems	2.0	2.0	.0	16	.1%	.2%	.0%	.0%
Aries Technology	1.9	.0	1.7	0	.1%	.0%	.2%	.0%
Cimatron	1.9	.9	.9	43	.1%	.1%	.1%	.1%
CAMAX Systems Inc.	1.8	.3	1.1	32	.1%	.0%	.1%	.1%
Auto-Trol	1.8	.7	.7	22	.1%	.1%	.1%	.1%
CAD Centre	1.8	.0	1.4	0	.1%	.0%	.2%	.0%
Test Systems Strategies	1.7	.0	1.5	0	.1%	.0%	.2%	.0%
Genasys II	1.7	.2	1.2	4	.1%	.0%	.1%	.0%
Kockums Computer Systems	1.6	.4	.9	80	.1%	.0%	.1%	.2%
SPATIAL Technology	1.6	.0	1.6	0	.1%	.0%	.2%	.0%
MacNeal-Schwendler	1.5	.0	1.5	0	.1%	.0%	.2%	.0%
LSI Logic	1.4	.1	1.0	3	.1%	.0%	.1%	.0%
PDA Engineering	1.4	.0	1.3	0	.1%	.0%	.2%	.0%

(Continued)

Table 30 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Synercom	1.3	.0	.7	0	.1%	.0%	.1%	.0%
ISICAD	1.2	.4	.5	9	.0%	.0%	.1%	.0%
Analogy	1.2	.0	.9	0	.0%	.0%	.1%	.0%
Gerber Systems	.8	.4	.3	11	.0%	.0%	.0%	.0%
Moss Systems	.8	.0	.5	0	.0%	.0%	.1%	.0%
ERDAS	.8	.2	.5	4	.0%	.0%	.1%	.0%
EPIC Design Technology	.7	.0	.7	0	.0%	.0%	.1%	.0%
MCS	.7	.0	.6	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	.6	.0	.5	4	.0%	.0%	.1%	.0%
ANACAD	.6	.0	.6	0	.0%	.0%	.1%	.0%
Scientific & Engineering SW	.6	.0	.6	0	.0%	.0%	.1%	.0%
Wisdom Systems	.6	.0	.5	0	.0%	.0%	.1%	.0%
Sigma Design	.5	.0	.5	0	.0%	.0%	.1%	.0%
CADSI	.5	.1	.4	2	.0%	.0%	.0%	.0%
GeoQuest	.5	.0	.5	0	.0%	.0%	.1%	.0%
Xilinx	.5	.0	.4	0	.0%	.0%	.1%	.0%
Data I/O	.5	.0	.5	0	.0%	.0%	.1%	.0%
Quantic Laboratories	.4	.0	.4	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.4	.0	.0	0	.0%	.0%	.0%	.0%
Laser-Scan	.4	.1	.2	3	.0%	.0%	.0%	.0%

(Continued)

Table 30 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
ACTEL	.4	.0	.3	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.4	.0	.3	0	.0%	.0%	.0%	.0%
Accugraph	.4	.2	.2	15	.0%	.0%	.0%	.0%
Teradyne	.4	.0	.3	1	.0%	.0%	.0%	.0%
Object Design	.4	.0	.4	0	.0%	.0%	.0%	.0%
Compact Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	.3	.1	.2	4	.0%	.0%	.0%	.0%
Technische Computer Systeme	.3	.1	.3	0	.0%	.0%	.0%	.0%
PADS Software	.3	.0	.2	0	.0%	.0%	.0%	.0%
Sysscan	.3	.1	.1	3	.0%	.0%	.0%	.0%
i-Logix	.2	.0	.2	0	.0%	.0%	.0%	.0%
PAFEC	.2	.0	.2	0	.0%	.0%	.0%	.0%
SIMUCAD	.2	.0	.2	0	.0%	.0%	.0%	.0%
Infinite Graphics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Dynamic Graphics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Enghouse Systems Ltd.	.2	.0	.1	1	.0%	.0%	.0%	.0%
Rasna Corporation	.2	.0	.1	0	.0%	.0%	.0%	.0%
Minc Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
Microsim	.1	.0	.1	0	.0%	.0%	.0%	.0%
Softdesk	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 30 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Georgia Tech Research Corp.	.1	.0	.1	0	.0%	.0%	.0%	.0%
ACDS Graphic System	.1	.0	.1	0	.0%	.0%	.0%	.0%
Point Control	.1	.0	.1	0	.0%	.0%	.0%	.0%
Objectivity	.1	.0	.1	0	.0%	.0%	.0%	.0%
Sunrise Test Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Solbourne	.1	.1	.0	15	.0%	.0%	.0%	.0%
CAD Language Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
CADKEY	.1	.0	.1	0	.0%	.0%	.0%	.0%
Gable CAD Systems	.1	.1	.0	1	.0%	.0%	.0%	.0%
Motorola	.1	.0	.1	0	.0%	.0%	.0%	.0%
Exemplar Logic	.1	.0	.1	0	.0%	.0%	.0%	.0%
Wiechers Datentechnik	.1	.0	.0	1	.0%	.0%	.0%	.0%
Whessoe Computing Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
ETAK	.1	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.1	.0	.0	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Carrier Corporation	.0	.0	.0	0	.0%	.0%	.0%	.0%
CADWorks	.0	.0	.0	0	.0%	.0%	.0%	.0%
ASG	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 30 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Tanner Research	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.1	.0	.1	0	.0%	.0%	.0%	.0%
All Companies	2,374.0	1,197.3	836.8	42,929	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	1,052.9	449.3	400.7	21,180	44.4%	37.5%	47.9%	49.3%
All Asian-Based Companies	1,270.9	738.1	404.7	21,444	53.5%	61.6%	48.4%	50.0%
All European-Based Companies	50.3	10.0	31.4	305	2.1%	.8%	3.7%	.7%
All Hardware Companies	393.3	347.6	.2	17,622	16.6%	29.0%	.0%	41.0%
All Turnkey & SW Companies	1,980.7	849.8	836.6	25,307	83.4%	71.0%	100.0%	59.0%

Source: Dataquest (July 1993)

Table 31
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Fujitsu	168.0	107.5	43.7	2,340	22.5%	21.6%	32.5%	23.5%
Nihon Unisys	152.6	94.6	25.9	1,601	20.4%	19.0%	19.3%	16.1%
IBM	144.8	92.7	18.0	1,723	19.4%	18.7%	13.4%	17.3%
NEC	70.1	53.2	11.2	152	9.4%	10.7%	8.3%	1.5%
Digital	31.5	21.6	.1	0	4.2%	4.4%	.1%	.0%
Hitachi	17.4	8.3	7.3	310	2.3%	1.7%	5.4%	3.1%
Mitsubishi Electric	13.0	6.1	3.6	41	1.7%	1.2%	2.7%	.4%
MacNeal-Schwendler	7.9	.0	7.9	0	1.1%	.0%	5.9%	.0%
Control Data Systems	7.3	3.0	1.0	45	1.0%	.6%	.8%	.5%
Hitachi Zosen Info Systems	5.4	4.9	.0	61	.7%	1.0%	.0%	.6%
Toshiba—NO OEM	5.2	2.6	2.1	74	.7%	.5%	1.5%	.7%
Toyo Information Systems-NO OEM	5.0	2.7	1.6	29	.7%	.5%	1.2%	.3%
SDRC	2.2	.0	1.8	0	.3%	.0%	1.3%	.0%
GeoVision Systems	1.8	.1	.9	2	.2%	.0%	.7%	.0%
MARC	1.7	.0	1.7	0	.2%	.0%	1.3%	.0%
Century Research Center	1.6	.9	.6	2	.2%	.2%	.4%	.0%
Siemens Nixdorf Info systeme	1.4	.7	.5	9	.2%	.1%	.3%	.1%
Unisys	1.0	.5	.4	21	.1%	.1%	.3%	.2%
EA Systems	.8	.0	.8	0	.1%	.0%	.6%	.0%
Swanson Analysis	.8	.0	.8	0	.1%	.0%	.6%	.0%
Synercom	.8	.0	.4	0	.1%	.0%	.3%	.0%

(Continued)

Table 31 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Cadence	.6	.0	.5	0	.1%	.0%	.4%	.0%
MCS	.5	.0	.4	0	.1%	.0%	.3%	.0%
Kubota Computer	.5	.5	.0	72	.1%	.1%	.0%	.7%
Mechanical Dynamics	.5	.0	.4	0	.1%	.0%	.3%	.0%
PDA Engineering	.5	.0	.4	0	.1%	.0%	.3%	.0%
Intergraph	.4	.0	.3	0	.0%	.0%	.2%	.0%
Meta-Software	.3	.0	.2	0	.0%	.0%	.1%	.0%
COMPASS Design Automation	.3	.0	.2	0	.0%	.0%	.1%	.0%
Harris EDA	.3	.1	.2	2	.0%	.0%	.1%	.0%
Compact Software	.2	.0	.2	0	.0%	.0%	.2%	.0%
Framasoft	.2	.0	.1	0	.0%	.0%	.1%	.0%
Test Systems Strategies	.2	.0	.2	0	.0%	.0%	.1%	.0%
Electrical Eng. Software	.2	.0	.1	0	.0%	.0%	.1%	.0%
LSI Logic	.2	.0	.1	0	.0%	.0%	.1%	.0%
Whessoe Computing Systems	.1	.0	.1	0	.0%	.0%	.1%	.0%
Georgia Tech Research Corp.	.1	.0	.1	0	.0%	.0%	.1%	.0%
Data I/O	.1	.0	.1	0	.0%	.0%	.1%	.0%
Analogy	.1	.0	.1	0	.0%	.0%	.0%	.0%
Geotrace Technologies	.1	.0	.0	1	.0%	.0%	.0%	.0%
Dynamic Graphics	.1	.0	.0	0	.0%	.0%	.0%	.0%
ETAK	.1	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 31 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Logic Modeling Systems	.1	.0	.0	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
ESRI	.0	.0	.0	0	.0%	.0%	.0%	.0%
Laser-Scan	.0	.0	.0	0	.0%	.0%	.0%	.0%
SIMUCAD	.0	.0	.0	0	.0%	.0%	.0%	.0%
Microsim	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	101.7	96.7	.0	3,478	13.6%	19.5%	.0%	34.9%
All Companies	747.1	496.7	134.4	9,964	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	306.8	214.8	37.6	5,272	41.1%	43.2%	28.0%	52.9%
All Asian-Based Companies	438.6	281.2	96.0	4,683	58.7%	56.6%	71.5%	47.0%
All European-Based Companies	1.7	.7	.7	9	.2%	.1%	.5%	.1%
All Hardware Companies	134.5	118.9	.2	3,491	18.0%	23.9%	.2%	35.0%
All Turnkey & SW Companies	612.7	377.8	134.2	6,473	82.0%	76.1%	99.8%	65.0%

Source: Dataquest (July 1993)

Table 32
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Server
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	46.2	21.4	15.7	465	35.1%	28.1%	56.0%	22.2%
Sun Microsystems	29.8	24.7	.0	970	22.6%	32.4%	.0%	46.3%
Digital	19.7	13.6	.0	273	15.0%	17.8%	.0%	13.0%
Intergraph	8.9	4.2	2.1	119	6.7%	5.5%	7.5%	5.7%
Zycad	6.3	3.8	.8	48	4.8%	5.0%	2.9%	2.3%
MacNeal-Schwendler	4.2	.0	4.2	0	3.2%	.0%	14.8%	.0%
Landmark Graphics	3.3	1.6	.8	17	2.5%	2.2%	2.7%	.8%
EDS	3.2	1.0	1.5	31	2.5%	1.3%	5.2%	1.5%
Hewlett-Packard	2.2	1.8	.0	51	1.7%	2.4%	.0%	2.4%
Ikos Systems	1.9	1.8	.1	20	1.4%	2.3%	.3%	1.0%
Applicon	1.5	.6	.7	14	1.1%	.8%	2.4%	.7%
ESRI	1.4	.0	1.3	0	1.1%	.0%	4.6%	.0%
Sumitomo Denko Workstation	.9	.9	.0	62	.7%	1.2%	.0%	3.0%
Cisigraph	.7	.2	.4	4	.5%	.2%	1.3%	.2%
Sysscan	.4	.2	.1	3	.3%	.2%	.3%	.1%
Cimlinc	.3	.0	.2	0	.2%	.0%	.7%	.0%
Teradyne	.3	.0	.2	1	.2%	.0%	.6%	.0%
Solbourne	.3	.3	.0	17	.2%	.3%	.0%	.8%
Control Data Systems	.2	.1	.0	1	.2%	.1%	.1%	.0%
Logic Modeling Systems	.1	.0	.1	0	.1%	.0%	.3%	.0%
ETAK	.1	.0	.0	0	.0%	.0%	.1%	.0%

(Continued)

Table 32 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Server
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Georgia Tech Research Corp.	.0	.0	.0	0	.0%	.0%	.1%	.0%
SIMUCAD	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	131.6	76.2	28.0	2,096	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	129.7	74.9	27.6	2,027	98.5%	98.3%	98.4%	96.7%
All Asian-Based Companies	.9	.9	.0	62	.7%	1.2%	.0%	3.0%
All European-Based Companies	1.0	.4	.5	7	.8%	.5%	1.6%	.3%
All Hardware Companies	52.9	41.3	.0	1,373	40.2%	54.2%	.0%	65.5%
All Turnkey & SW Companies	78.7	34.9	28.0	724	59.8%	45.8%	100.0%	34.5%

Source: Dataquest (July 1993)

Table 33
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
NEC	112.9	94.8	9.0	16,805	14.0%	20.1%	3.1%	16.1%
IBM	106.5	45.1	55.6	12,650	13.2%	9.6%	19.1%	12.1%
Fujitsu	88.4	56.6	23.0	2,627	11.0%	12.0%	7.9%	2.5%
Autodesk	51.5	.0	51.5	0	6.4%	.0%	17.7%	.0%
Mutoh Industries—NO OEM	40.0	24.0	12.0	809	5.0%	5.1%	4.1%	.8%
Wacom	38.9	7.8	26.8	748	4.8%	1.6%	9.2%	.7%
Hakuto	37.9	22.8	15.2	827	4.7%	4.8%	5.2%	.8%
Hitachi	31.3	15.0	13.2	1,656	3.9%	3.2%	4.5%	1.6%
Apple Computer	30.7	30.7	.0	5,581	3.8%	6.5%	.0%	5.4%
Toshiba—NO OEM	27.1	13.5	10.8	2,165	3.4%	2.9%	3.7%	2.1%
Andor	15.7	3.9	11.1	121	1.9%	.8%	3.8%	.1%
Compaq	12.9	12.9	.0	2,792	1.6%	2.7%	.0%	2.7%
Design Automation	12.7	2.5	9.5	267	1.6%	.5%	3.3%	.3%
CPU	10.5	.0	9.5	0	1.3%	.0%	3.3%	.0%
Mitsubishi Electric	9.5	6.3	3.2	900	1.2%	1.3%	1.1%	.9%
Hewlett-Packard	6.5	5.9	.0	1,647	.8%	1.2%	.0%	1.6%
Seiko Instruments—NO OEM	5.3	2.6	2.6	136	.7%	.6%	.9%	.1%
Uchida Yoko	3.8	2.4	1.6	171	.5%	.5%	.6%	.2%
Mitsui Engineering	3.6	2.5	.7	60	.4%	.5%	.2%	.1%
Digital	3.3	2.9	.1	832	.4%	.6%	.0%	.8%
Intergraph	3.0	.0	3.0	0	.4%	.0%	1.0%	.0%

(Continued)

Table 33 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Viewlogic Systems	2.9	.0	2.3	0	.4%	.0%	.8%	.0%
Swanson Analysis	2.5	.0	2.4	0	.3%	.0%	.8%	.0%
PADS Software	2.5	.0	2.1	0	.3%	.0%	.7%	.0%
Data I/O	2.2	.0	2.2	0	.3%	.0%	.8%	.0%
ACTEL	1.5	.0	1.3	0	.2%	.0%	.5%	.0%
Anilam Electronics	1.5	.5	1.0	18	.2%	.1%	.4%	.0%
Altera	1.3	.0	1.1	0	.2%	.0%	.4%	.0%
Microsim	1.2	.0	1.1	0	.1%	.0%	.4%	.0%
Xilinx	1.1	.0	1.0	0	.1%	.0%	.3%	.0%
Cimatron	1.1	.5	.5	56	.1%	.1%	.2%	.1%
Point Control	1.0	.0	.8	0	.1%	.0%	.3%	.0%
Enghouse Systems Ltd.	1.0	.0	.9	0	.1%	.0%	.3%	.0%
ADRA Systems	1.0	.0	.8	0	.1%	.0%	.3%	.0%
BETRONEX	1.0	.1	.9	18	.1%	.0%	.3%	.0%
CADKEY	.9	.0	.9	0	.1%	.0%	.3%	.0%
CADWorks	.8	.0	.7	0	.1%	.0%	.2%	.0%
EEsof	.7	.0	.6	0	.1%	.0%	.2%	.0%
INS Engineering	.7	.4	.4	13	.1%	.1%	.1%	.0%
CNC Software	.7	.0	.7	0	.1%	.0%	.2%	.0%
ESRI	.7	.0	.6	0	.1%	.0%	.2%	.0%
Moda CAD	.6	.2	.4	5	.1%	.0%	.1%	.0%

(Continued)

Table 33 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Harris EDA	.6	.1	.5	2	.1%	.0%	.2%	.0%
Sharp System Products—NO OEM	.6	.3	.3	17	.1%	.1%	.1%	.0%
Computervision	.5	.0	.5	0	.1%	.0%	.2%	.0%
GeoQuest	.5	.0	.5	0	.1%	.0%	.2%	.0%
Whessoe Computing Systems	.5	.0	.5	0	.1%	.0%	.2%	.0%
Accel Technologies	.5	.0	.4	0	.1%	.0%	.1%	.0%
Softdesk	.5	.0	.5	0	.1%	.0%	.2%	.0%
Sigma Design	.4	.0	.4	0	.1%	.0%	.1%	.0%
ALDEC	.4	.0	.4	0	.0%	.0%	.1%	.0%
Carrier Corporation	.4	.0	.4	0	.0%	.0%	.1%	.0%
ETAK	.4	.0	.4	1	.0%	.0%	.1%	.0%
Compact Software	.3	.0	.3	0	.0%	.0%	.1%	.0%
Investronica SA	.3	.2	.0	12	.0%	.0%	.0%	.0%
Aspen Technology	.3	.0	.3	0	.0%	.0%	.1%	.0%
ISICAD	.3	.0	.3	0	.0%	.0%	.1%	.0%
MCS	.3	.0	.3	0	.0%	.0%	.1%	.0%
MacNeal-Schwendler	.3	.0	.3	0	.0%	.0%	.1%	.0%
Superdraft	.3	.1	.1	14	.0%	.0%	.0%	.0%
ERDAS	.2	.1	.2	12	.0%	.0%	.1%	.0%
Graphisoft Software Dev	.2	.0	.2	0	.0%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	.2	.1	.1	6	.0%	.0%	.0%	.0%

(Continued)

Table 33 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
IMSI	.2	.0	.2	0	.0%	.0%	.1%	.0%
Aries Technology	.2	.0	.2	0	.0%	.0%	.1%	.0%
Wiechers Datentechnik	.2	.1	.1	7	.0%	.0%	.0%	.0%
Genasys II	.2	.0	.1	5	.0%	.0%	.0%	.0%
BATISOFT	.2	.0	.1	7	.0%	.0%	.0%	.0%
Rasna Corporation	.2	.0	.2	0	.0%	.0%	.1%	.0%
GeoGraphix	.2	.0	.1	0	.0%	.0%	.0%	.0%
Minc Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	.1	.0	.1	3	.0%	.0%	.0%	.0%
CADSI	.1	.0	.1	2	.0%	.0%	.0%	.0%
Cimlinc	.1	.0	.1	0	.0%	.0%	.0%	.0%
ASG	.1	.0	.1	0	.0%	.0%	.0%	.0%
Pathtrace	.1	.0	.1	2	.0%	.0%	.0%	.0%
Meta-Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Mega CADD	.1	.0	.1	0	.0%	.0%	.0%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Tanner Research	.1	.0	.1	0	.0%	.0%	.0%	.0%
Infinite Graphics	.1	.0	.1	0	.0%	.0%	.0%	.0%
Logic Modeling Systems	.1	.0	.0	0	.0%	.0%	.0%	.0%
Quicklogic	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 33 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Facility Mapping Systems	.1	.0	.0	0	.0%	.0%	.0%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.0%	.0%
SIMUCAD	.0	.0	.0	0	.0%	.0%	.0%	.0%
Accugraph	.0	.0	.0	0	.0%	.0%	.0%	.0%
The CAD Group	.0	.0	.0	0	.0%	.0%	.0%	.0%
PAFEC	.0	.0	.0	0	.0%	.0%	.0%	.0%
Geotrace Technologies	.0	.0	.0	0	.0%	.0%	.0%	.0%
Foresight Resources	.0	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Exemplar Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Technische Computer Systeme	.0	.0	.0	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	117.2	117.6	.2	53,167	14.5%	24.9%	.1%	51.0%
All Companies	807.1	472.3	290.7	104,161	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	362.8	214.8	138.1	76,706	45.0%	45.5%	47.5%	73.6%
All Asian-Based Companies	438.9	255.4	149.0	27,321	54.4%	54.1%	51.3%	26.2%
All European-Based Companies	5.4	2.1	3.6	134	.7%	.4%	1.2%	.1%
All Hardware Companies	218.3	214.5	.0	76,669	27.0%	45.4%	.0%	73.6%
All Turnkey & SW Companies	588.8	257.9	290.7	27,492	73.0%	54.6%	100.0%	26.4%

Source: Dataquest (July 1993)

Table 34
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Intergraph	76.9	34.5	21.8	1,198	20.6%	19.7%	17.2%	6.9%
IBM	67.9	42.6	12.8	4,070	18.2%	24.3%	10.1%	23.3%
Digital	27.1	19.0	.0	771	7.3%	10.8%	.0%	4.4%
Landmark Graphics	16.4	8.2	3.8	85	4.4%	4.7%	3.0%	.5%
Cadence	12.7	.0	9.5	0	3.4%	.0%	7.5%	.0%
Hewlett-Packard	12.5	9.1	1.4	727	3.4%	5.2%	1.1%	4.2%
Apple Computer	11.4	11.4	.0	2,539	3.1%	6.5%	.0%	14.6%
Computervision	10.1	3.0	3.3	74	2.7%	1.7%	2.6%	.4%
SDRC	9.0	.0	7.2	0	2.4%	.0%	5.7%	.0%
Sun Microsystems	8.9	7.7	.0	554	2.4%	4.4%	.0%	3.2%
EDS	8.6	3.1	4.0	148	2.3%	1.8%	3.2%	.9%
Compaq	7.7	7.7	.0	1,675	2.1%	4.4%	.0%	9.6%
Autodesk	7.4	.0	7.4	0	2.0%	.0%	5.8%	.0%
Engineering Mechanics	5.1	.3	4.4	408	1.4%	.1%	3.5%	2.3%
Mentor Graphics	4.9	1.0	2.0	59	1.3%	.6%	1.6%	.3%
ESRI	4.2	.0	3.8	0	1.1%	.0%	3.0%	.0%
Genasys II	3.7	.4	2.6	17	1.0%	.2%	2.1%	.1%
Control Data Systems	3.2	1.5	.5	43	.9%	.9%	.4%	.2%
Radian Corporation	3.1	.0	1.9	0	.8%	.0%	1.5%	.0%
GeoVision Systems	2.7	.2	1.4	5	.7%	.1%	1.1%	.0%
Cimatron	2.5	1.1	1.2	83	.7%	.7%	.9%	.5%

(Continued)

Table 34 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Siemens Nixdorf Info systeme	2.5	1.1	1.0	36	.7%	.6%	.8%	.2%
Unisys	2.4	1.2	.8	54	.6%	.7%	.7%	.3%
International Software Systems	2.4	.0	2.4	0	.6%	.0%	1.9%	.0%
Claris	2.3	.0	2.3	0	.6%	.0%	1.8%	.0%
Delcam International	2.1	.7	1.1	0	.6%	.4%	.8%	.0%
CAD Centre	2.0	.0	1.6	0	.5%	.0%	1.3%	.0%
Data General	1.9	1.5	.1	100	.5%	.9%	.1%	.6%
Orcad	1.9	.0	1.9	0	.5%	.0%	1.5%	.0%
Strategic Mapping	1.8	.0	1.7	0	.5%	.0%	1.3%	.0%
PDA Engineering	1.8	.0	1.7	0	.5%	.0%	1.4%	.0%
MapInfo	1.8	.0	1.4	0	.5%	.0%	1.1%	.0%
Swanson Analysis	1.4	.0	1.3	0	.4%	.0%	1.0%	.0%
MacNeal-Schwendler	1.3	.0	1.3	0	.3%	.0%	1.0%	.0%
Fides Industrielle Automation	1.2	.4	.5	7	.3%	.2%	.4%	.0%
CNC Software	1.2	.0	1.2	0	.3%	.0%	.9%	.0%
Vero International Software	1.0	.0	.9	0	.3%	.0%	.7%	.0%
Infocel	.9	.1	.7	20	.3%	.1%	.6%	.1%
ADRA Systems	.8	.2	.5	0	.2%	.1%	.4%	.0%
Kork Systems	.8	.1	.6	1	.2%	.1%	.4%	.0%
EEsof	.8	.0	.7	0	.2%	.0%	.5%	.0%
LSI Logic	.8	.1	.6	2	.2%	.0%	.4%	.0%

(Continued)

Table 34 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
COMPASS Design Automation	.7	.0	.6	1	.2%	.0%	.4%	.0%
Genrad	.7	.1	.5	7	.2%	.1%	.4%	.0%
ERDAS	.7	.2	.4	11	.2%	.1%	.3%	.1%
Altera	.7	.0	.6	0	.2%	.0%	.4%	.0%
Analogy	.6	.0	.5	0	.2%	.0%	.4%	.0%
Pathtrace	.6	.1	.4	9	.2%	.1%	.3%	.1%
Point Control	.6	.0	.4	0	.1%	.0%	.3%	.0%
Zuken	.5	.2	.3	0	.1%	.1%	.3%	.0%
ETAK	.5	.0	.5	1	.1%	.0%	.4%	.0%
Aries Technology	.5	.0	.5	0	.1%	.0%	.4%	.0%
Moss Systems	.5	.0	.3	0	.1%	.0%	.2%	.0%
Softdesk	.5	.0	.5	0	.1%	.0%	.4%	.0%
BETRONEX	.5	.1	.4	9	.1%	.0%	.3%	.1%
Laser-Scan	.5	.1	.2	0	.1%	.1%	.2%	.0%
Dynamic Graphics	.5	.0	.4	0	.1%	.0%	.3%	.0%
Accugraph	.4	.2	.2	15	.1%	.1%	.1%	.1%
Comdisco Systems	.4	.0	.4	0	.1%	.0%	.3%	.0%
Compact Software	.4	.0	.4	0	.1%	.0%	.3%	.0%
Data I/O	.4	.0	.4	0	.1%	.0%	.3%	.0%
Engineering Systems Corp.	.3	.0	.3	0	.1%	.0%	.3%	.0%
Whessoe Computing Systems	.3	.0	.3	0	.1%	.0%	.3%	.0%

(Continued)

Table 34 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Enghouse Systems Ltd.	.3	.0	.3	0	.1%	.0%	.2%	.0%
Rasna Corporation	.3	.0	.3	0	.1%	.0%	.2%	.0%
Xilinx	.3	.0	.3	0	.1%	.0%	.2%	.0%
Georgia Tech Research Corp.	.3	.0	.3	0	.1%	.0%	.3%	.0%
ACTEL	.3	.0	.3	0	.1%	.0%	.2%	.0%
ANACAD	.3	.0	.3	0	.1%	.0%	.2%	.0%
Hochtief	.3	.0	.2	2	.1%	.0%	.2%	.0%
ISICAD	.3	.1	.2	2	.1%	.0%	.1%	.0%
Clemessy	.3	.2	.0	1	.1%	.1%	.0%	.0%
Superdraft	.3	.1	.1	14	.1%	.1%	.1%	.1%
Graphisoft Software Dev	.2	.0	.2	0	.1%	.0%	.2%	.0%
Sigma Design	.2	.0	.2	0	.1%	.0%	.2%	.0%
Investronica SA	.2	.2	.0	8	.1%	.1%	.0%	.0%
Generation 5 Technology	.2	.0	.2	0	.1%	.0%	.2%	.0%
LandCadd	.2	.0	.2	0	.0%	.0%	.1%	.0%
Aura CAD/CAM Systems	.2	.0	.1	0	.0%	.0%	.1%	.0%
Mc2 Engineering Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Royal Digital Centers	.1	.0	.1	0	.0%	.0%	.1%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.1%	.0%
Synercom	.1	.0	.1	0	.0%	.0%	.0%	.0%
Innovative Data Design	.1	.0	.1	0	.0%	.0%	.1%	.0%

(Continued)

Table 34 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Teradyne	.1	.0	.1	0	.0%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	.1	.0	.1	2	.0%	.0%	.1%	.0%
CADWorks	.1	.0	.1	0	.0%	.0%	.1%	.0%
Star Informatic	.1	.0	.0	0	.0%	.0%	.0%	.0%
Spectrum Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
PADS Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Ziegler Informatics	.1	.0	.1	0	.0%	.0%	.1%	.0%
Moda CAD	.1	.0	.0	1	.0%	.0%	.0%	.0%
ASG	.1	.0	.1	0	.0%	.0%	.0%	.0%
Accel Technologies	.1	.0	.1	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.1	.0	.0	0	.0%	.0%	.0%	.0%
CAE-link	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.0%	.0%
Engineered Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
FEA	.0	.0	.0	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.0	.0	.0	0	.0%	.0%	.0%	.0%
ALDEC	.0	.0	.0	0	.0%	.0%	.0%	.0%
Macao Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Foresight Resources	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 34 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: All Platforms
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Areon	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	17.9	17.2	.3	4,680	4.8%	9.8%	.2%	26.8%
All Companies	373.8	175.4	126.4	17,440	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	357.6	171.0	117.0	17,264	95.7%	97.5%	92.6%	99.0%
All Asian-Based Companies	.5	.2	.3	0	.1%	.1%	.3%	.0%
All European-Based Companies	15.7	4.2	9.1	175	4.2%	2.4%	7.2%	1.0%
All Hardware Companies	91.7	79.8	.2	13,981	24.5%	45.5%	.2%	80.2%
All Turnkey & SW Companies	282.1	95.6	126.2	3,458	75.5%	54.5%	99.8%	19.8%

Source: Dataquest (July 1993)

Table 35
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Intergraph	64.3	30.1	16.2	1,050	33.1%	40.0%	22.0%	31.8%
IBM	13.2	6.3	5.0	315	6.8%	8.4%	6.8%	9.5%
Cadence	11.5	.0	8.6	0	5.9%	.0%	11.7%	.0%
Hewlett-Packard	11.4	8.1	1.4	374	5.9%	10.8%	2.0%	11.3%
Landmark Graphics	9.8	4.9	2.3	51	5.1%	6.5%	3.1%	1.5%
Computervision	9.2	2.8	2.8	66	4.7%	3.7%	3.9%	2.0%
SDRC	8.5	.0	6.8	0	4.4%	.0%	9.3%	.0%
EDS	7.9	2.9	3.7	139	4.1%	3.9%	5.0%	4.2%
Sun Microsystems	7.7	6.7	.0	501	4.0%	8.9%	.0%	15.1%
Digital	6.8	4.7	.0	331	3.5%	6.2%	.0%	10.0%
Mentor Graphics	4.9	1.0	2.0	59	2.5%	1.4%	2.7%	1.8%
Genasys II	3.4	.3	2.3	8	1.7%	.4%	3.2%	.2%
Engineering Mechanics	3.0	.2	2.5	144	1.5%	.2%	3.4%	4.3%
Siemens Nixdorf Info systeme	2.5	1.1	1.0	36	1.3%	1.4%	1.4%	1.1%
ESRI	2.2	.0	2.0	0	1.1%	.0%	2.7%	.0%
Delcam International	2.1	.7	1.1	0	1.1%	1.0%	1.4%	.0%
CAD Centre	2.0	.0	1.6	0	1.0%	.0%	2.2%	.0%
GeoVision Systems	1.9	.2	1.0	4	1.0%	.2%	1.3%	.1%
Radian Corporation	1.9	.0	1.1	0	1.0%	.0%	1.5%	.0%
Unisys	1.8	.9	.6	42	.9%	1.2%	.9%	1.3%
Cimatron	1.6	.7	.7	36	.8%	1.0%	1.0%	1.1%

(Continued)

Table 35 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Data General	1.4	1.1	.1	81	.7%	1.5%	.1%	2.4%
PDA Engineering	1.4	.0	1.3	0	.7%	.0%	1.8%	.0%
Fides Industrielle Automation	1.2	.4	.5	7	.6%	.5%	.7%	.2%
Control Data Systems	1.1	.7	.2	30	.6%	.9%	.3%	.9%
Swanson Analysis	.8	.0	.7	0	.4%	.0%	1.0%	.0%
COMPASS Design Automation	.7	.0	.6	1	.4%	.0%	.7%	.0%
LSI Logic	.7	.1	.5	2	.3%	.1%	.7%	.1%
EEsof	.7	.0	.6	0	.3%	.0%	.8%	.0%
ADRA Systems	.6	.2	.4	0	.3%	.3%	.5%	.0%
Genrad	.6	.1	.4	6	.3%	.1%	.5%	.2%
Analogy	.6	.0	.5	0	.3%	.0%	.6%	.0%
Zuken	.5	.2	.3	0	.3%	.3%	.4%	.0%
ERDAS	.5	.1	.3	3	.3%	.2%	.4%	.1%
Moss Systems	.5	.0	.3	0	.3%	.0%	.4%	.0%
Aries Technology	.5	.0	.4	0	.2%	.0%	.6%	.0%
Autodesk	.4	.0	.4	0	.2%	.0%	.6%	.0%
Laser-Scan	.4	.1	.2	0	.2%	.1%	.3%	.0%
Comdisco Systems	.4	.0	.4	0	.2%	.0%	.5%	.0%
Accugraph	.4	.2	.2	15	.2%	.3%	.2%	.5%
Dynamic Graphics	.4	.0	.3	0	.2%	.0%	.4%	.0%
ANACAD	.3	.0	.3	0	.2%	.0%	.4%	.0%

(Continued)

Table 35 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Rasna Corporation	.3	.0	.2	0	.1%	.0%	.3%	.0%
Clemessy	.2	.2	.0	1	.1%	.3%	.0%	.0%
ISICAD	.2	.1	.1	2	.1%	.1%	.1%	.0%
Compact Software	.2	.0	.2	0	.1%	.0%	.2%	.0%
Royal Digital Centers	.1	.0	.1	0	.1%	.0%	.2%	.0%
MacNeal-Schwendler	.1	.0	.1	0	.1%	.0%	.2%	.0%
Sigma Design	.1	.0	.1	0	.1%	.0%	.1%	.0%
Infocel	.1	.0	.1	1	.1%	.0%	.1%	.0%
Star Informatic	.1	.0	.0	0	.1%	.1%	.0%	.0%
Softdesk	.1	.0	.1	0	.1%	.0%	.1%	.0%
Xilinx	.1	.0	.1	0	.1%	.0%	.1%	.0%
Georgia Tech Research Corp.	.1	.0	.1	0	.1%	.0%	.1%	.0%
Engineering Systems Corp.	.1	.0	.1	0	.0%	.0%	.1%	.0%
Synercom	.1	.0	.0	0	.0%	.0%	.1%	.0%
Teradyne	.1	.0	.1	0	.0%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	.1	.0	.0	1	.0%	.0%	.1%	.0%
Data I/O	.1	.0	.1	0	.0%	.0%	.1%	.0%
Point Control	.1	.0	.0	0	.0%	.0%	.1%	.0%
ACTEL	.1	.0	.1	0	.0%	.0%	.1%	.0%
Enghouse Systems Ltd.	.1	.0	.0	0	.0%	.0%	.1%	.0%
ETAK	.1	.0	.0	0	.0%	.0%	.1%	.0%

(Continued)

Table 35 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Technical Workstation
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Whessoe Computing Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.0	.0	.0	0	.0%	.0%	.0%	.0%
Macao Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
LandCadd	.0	.0	.0	0	.0%	.0%	.0%	.0%
PADS Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
FEA	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	193.9	75.2	73.5	3,307	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	182.3	71.8	67.3	3,227	94.0%	95.4%	91.6%	97.6%
All Asian-Based Companies	.5	.2	.3	0	.3%	.3%	.4%	.0%
All European-Based Companies	11.1	3.3	5.9	80	5.7%	4.3%	8.0%	2.4%
All Hardware Companies	20.9	16.7	.1	1,130	10.8%	22.2%	.2%	34.2%
All Turnkey & SW Companies	173.0	58.5	73.3	2,177	89.2%	77.8%	99.8%	65.8%

Source: Dataquest (July 1993)

Table 36
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	33.6	21.5	4.2	526	55.3%	56.2%	48.9%	64.0%
Digital	11.7	8.0	.0	0	19.2%	21.0%	.0%	.0%
Control Data Systems	2.0	.8	.3	12	3.3%	2.1%	3.4%	1.5%
GeoVision Systems	.8	.1	.4	1	1.3%	.2%	5.0%	.1%
MacNeal-Schwendler	.7	.0	.7	0	1.2%	.0%	8.5%	.0%
Cadence	.6	.0	.4	0	.9%	.0%	4.9%	.0%
Unisys	.6	.3	.2	11	.9%	.7%	2.2%	1.4%
PDA Engineering	.5	.0	.4	0	.7%	.0%	5.0%	.0%
SDRC	.5	.0	.4	0	.7%	.0%	4.2%	.0%
Intergraph	.4	.0	.3	0	.6%	.0%	4.0%	.0%
Swanson Analysis	.3	.0	.3	0	.5%	.0%	3.2%	.0%
Radian Corporation	.2	.0	.1	0	.4%	.0%	1.4%	.0%
Georgia Tech Research Corp.	.2	.0	.2	0	.4%	.0%	2.6%	.0%
Computervision	.2	.1	.0	3	.3%	.1%	.5%	.4%
Dynamic Graphics	.1	.0	.1	0	.2%	.0%	1.1%	.0%
Compact Software	.1	.0	.1	0	.1%	.0%	1.1%	.0%
LSI Logic	.1	.0	.1	0	.1%	.0%	.7%	.0%
Genrad	.1	.0	.0	0	.1%	.0%	.5%	.0%
Whessoe Computing Systems	.1	.0	.1	0	.1%	.0%	.7%	.0%
Clemessy	.1	.0	.0	0	.1%	.1%	.1%	.0%
Synercom	.1	.0	.0	0	.1%	.0%	.2%	.0%

(Continued)

Table 36 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Host-Dependent
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
ETAK	.1	.0	.0	0	.1%	.0%	.5%	.0%
Laser-Scan	.0	.0	.0	0	.1%	.0%	.2%	.0%
Analogy	.0	.0	.0	0	.0%	.0%	.2%	.0%
Engineering Systems Corp.	.0	.0	.0	0	.0%	.0%	.4%	.0%
ESRI	.0	.0	.0	0	.0%	.0%	.1%	.0%
Kork Systems	.0	.0	.0	0	.0%	.1%	.0%	.0%
Data I/O	.0	.0	.0	0	.0%	.0%	.1%	.0%
Teradyne	.0	.0	.0	0	.0%	.0%	.0%	.0%
COMPASS Design Automation	.0	.0	.0	0	.0%	.0%	.1%	.0%
Macao Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Hochtief	.0	.0	.0	0	.0%	.0%	.1%	.0%
Other Companies	7.9	7.4	.0	268	13.0%	19.5%	.1%	32.6%
All Companies	60.8	38.3	8.6	823	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	60.6	38.3	8.5	822	99.7%	99.9%	98.8%	99.9%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	.2	.0	.1	0	.3%	.1%	1.2%	.1%
All Hardware Companies	19.9	15.6	.1	271	32.7%	40.8%	.7%	33.0%
All Turnkey & SW Companies	40.9	22.7	8.5	551	67.3%	59.2%	99.3%	67.0%

Source: Dataquest (July 1993)

Table 37
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Server
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	10.9	5.2	3.6	138	27.3%	25.8%	35.8%	26.8%
Intergraph	9.2	4.4	2.2	148	23.1%	22.1%	21.7%	28.7%
Digital	7.4	5.1	.0	102	18.5%	25.6%	.0%	19.9%
Landmark Graphics	6.6	3.3	1.5	34	16.4%	16.4%	14.9%	6.6%
ESRI	1.3	.0	1.2	0	3.3%	.0%	12.0%	.0%
Sun Microsystems	1.3	1.1	.0	53	3.1%	5.3%	.0%	10.3%
EDS	.7	.2	.3	9	1.8%	1.1%	3.3%	1.8%
Cadence	.6	.0	.5	0	1.5%	.0%	4.7%	.0%
Computervision	.5	.2	.2	6	1.4%	.9%	1.6%	1.1%
Data General	.5	.4	.0	19	1.3%	2.0%	.2%	3.7%
MacNeal-Schwendler	.4	.0	.4	0	1.0%	.0%	3.8%	.0%
Radian Corporation	.3	.0	.2	0	.6%	.0%	1.5%	.0%
Hewlett-Packard	.2	.1	.0	6	.5%	.7%	.0%	1.1%
Control Data Systems	.1	.0	.0	0	.2%	.2%	.1%	.0%
ETAK	.1	.0	.0	0	.1%	.0%	.4%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	39.9	20.0	10.1	514	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	39.9	20.0	10.1	514	100.0%	100.0%	100.0%	100.0%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Hardware Companies	9.5	6.9	.0	184	23.9%	34.6%	.2%	35.7%
All Turnkey & SW Companies	30.4	13.1	10.1	330	76.1%	65.5%	99.8%	64.3%

Source: Dataquest (July 1993)

Table 38
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Apple Computer	11.4	11.4	.0	2,539	14.4%	27.3%	.0%	19.8%
IBM	10.2	9.6	.0	3,090	12.9%	23.0%	.0%	24.2%
Compaq	7.7	7.7	.0	1,675	9.8%	18.5%	.0%	13.1%
Autodesk	6.9	.0	6.9	0	8.7%	.0%	20.2%	.0%
Intergraph	3.1	.0	3.1	0	3.9%	.0%	9.0%	.0%
International Software Systems	2.4	.0	2.4	0	3.0%	.0%	6.9%	.0%
Claris	2.3	.0	2.3	0	2.9%	.0%	6.7%	.0%
Engineering Mechanics	2.2	.1	1.8	265	2.7%	.2%	5.3%	2.1%
Orcad	1.9	.0	1.9	0	2.4%	.0%	5.6%	.0%
Strategic Mapping	1.8	.0	1.7	0	2.3%	.0%	4.9%	.0%
MapInfo	1.8	.0	1.4	0	2.3%	.0%	4.2%	.0%
Digital	1.3	1.2	.0	338	1.7%	2.8%	.0%	2.6%
CNC Software	1.2	.0	1.2	0	1.5%	.0%	3.4%	.0%
Hewlett-Packard	1.0	.9	.0	347	1.2%	2.2%	.0%	2.7%
Vero International Software	1.0	.0	.9	0	1.2%	.0%	2.6%	.0%
Cimatron	.9	.4	.4	47	1.2%	1.0%	1.2%	.4%
Infocel	.8	.1	.6	19	1.0%	.3%	1.8%	.1%
Kork Systems	.8	.1	.6	1	1.0%	.2%	1.6%	.0%
Radian Corporation	.8	.0	.5	0	1.0%	.0%	1.4%	.0%
Altera	.7	.0	.6	0	.8%	.0%	1.6%	.0%
ESRI	.6	.0	.6	0	.8%	.0%	1.7%	.0%

(Continued)

Table 38 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Pathtrace	.6	.1	.4	9	.7%	.3%	1.1%	.1%
Point Control	.5	.0	.4	0	.6%	.0%	1.1%	.0%
BETRONEX	.5	.1	.4	9	.6%	.1%	1.3%	.1%
ETAK	.4	.0	.4	1	.5%	.0%	1.1%	.0%
Softdesk	.4	.0	.4	0	.5%	.0%	1.1%	.0%
Genasys II	.4	.0	.3	9	.5%	.1%	.8%	.1%
Swanson Analysis	.3	.0	.3	0	.4%	.0%	.9%	.0%
Data I/O	.3	.0	.3	0	.4%	.0%	.8%	.0%
Hochtief	.3	.0	.2	2	.4%	.1%	.6%	.0%
Enghouse Systems Ltd.	.3	.0	.3	0	.4%	.0%	.7%	.0%
ACTEL	.3	.0	.2	0	.3%	.0%	.7%	.0%
Whessoe Computing Systems	.3	.0	.3	0	.3%	.0%	.7%	.0%
Superdraft	.3	.1	.1	14	.3%	.2%	.3%	.1%
Graphisoft Software Dev	.2	.0	.2	0	.3%	.0%	.7%	.0%
Engineering Systems Corp.	.2	.0	.2	0	.3%	.0%	.6%	.0%
Xilinx	.2	.0	.2	0	.3%	.0%	.6%	.0%
Computervision	.2	.0	.2	0	.3%	.0%	.6%	.0%
Investronica SA	.2	.2	.0	8	.3%	.4%	.1%	.1%
ADRA Systems	.2	.0	.2	0	.3%	.0%	.5%	.0%
Generation 5 Technology	.2	.0	.2	0	.2%	.0%	.6%	.0%
ERDAS	.2	.0	.1	8	.2%	.1%	.3%	.1%

(Continued)

Table 38 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
LandCadd	.2	.0	.1	0	.2%	.0%	.4%	.0%
Aura CAD/CAM Systems	.2	.0	.1	0	.2%	.0%	.4%	.0%
Mc2 Engineering Software	.1	.0	.1	0	.2%	.0%	.4%	.0%
American Small Business Comp.	.1	.0	.1	0	.2%	.0%	.4%	.0%
Compact Software	.1	.0	.1	0	.2%	.0%	.4%	.0%
Innovative Data Design	.1	.0	.1	0	.2%	.0%	.4%	.0%
CADWorks	.1	.0	.1	0	.2%	.0%	.3%	.0%
EEsof	.1	.0	.1	0	.2%	.0%	.3%	.0%
Sigma Design	.1	.0	.1	0	.1%	.0%	.3%	.0%
Spectrum Software	.1	.0	.1	0	.1%	.0%	.3%	.0%
ISICAD	.1	.0	.1	0	.1%	.0%	.3%	.0%
Ziegler Informatics	.1	.0	.1	0	.1%	.0%	.3%	.0%
PADS Software	.1	.0	.1	0	.1%	.0%	.2%	.0%
ASG	.1	.0	.1	0	.1%	.0%	.2%	.0%
Accel Technologies	.1	.0	.1	0	.1%	.0%	.2%	.0%
Rasna Corporation	.1	.0	.1	0	.1%	.0%	.2%	.0%
Moda CAD	.1	.0	.0	1	.1%	.0%	.1%	.0%
Aries Technology	.1	.0	.1	0	.1%	.0%	.1%	.0%
Facility Mapping Systems	.1	.0	.0	0	.1%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	.1	.0	.0	1	.1%	.0%	.1%	.0%
CAE-link	.1	.0	.1	0	.1%	.0%	.1%	.0%

(Continued)

Table 38 (Continued)
1992 CAD/CAM/CAE/GIS Market Share Update

Application: All Applications
Platform: Personal Computer
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Teradyne	.0	.0	.0	0	.1%	.0%	.1%	.0%
Accugraph	.0	.0	.0	0	.1%	.0%	.1%	.0%
Massteck	.0	.0	.0	0	.1%	.0%	.1%	.0%
Algor Interactive Systems	.0	.0	.0	0	.1%	.0%	.1%	.0%
Engineered Software	.0	.0	.0	0	.0%	.0%	.1%	.0%
MacNeal-Schwendler	.0	.0	.0	0	.0%	.0%	.1%	.0%
Genrad	.0	.0	.0	1	.0%	.0%	.1%	.0%
Areon	.0	.0	.0	0	.0%	.0%	.0%	.0%
Foresight Resources	.0	.0	.0	0	.0%	.0%	.1%	.0%
ALDEC	.0	.0	.0	0	.0%	.0%	.0%	.0%
FEA	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	10.0	9.7	.2	4,412	12.6%	23.2%	.7%	34.5%
All Companies	79.3	41.8	34.2	12,796	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	74.8	40.9	31.1	12,702	94.4%	97.9%	90.9%	99.3%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	4.4	.9	3.1	94	5.6%	2.1%	9.1%	.7%
All Hardware Companies	41.4	40.5	.0	12,396	52.2%	96.9%	.0%	96.9%
All Turnkey & SW Companies	37.9	1.3	34.2	400	47.8%	3.1%	100.0%	3.1%

Source: Dataquest (July 1993)

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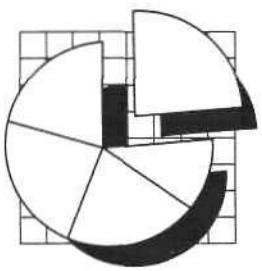
Dataquest®

Software

CAD/CAM/CAE/GIS Worldwide Market Share



Market Statistics

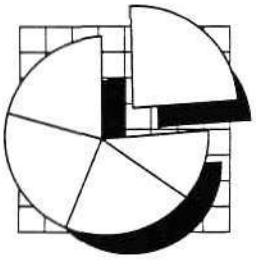
1993

Program: CAD/CAM/CAE/GIS Worldwide
Product Code: CCAM-WW-MS-9301
Publication Date: March 15, 1993

Dataquest®

Software

CAD/CAM/CAE/GIS Worldwide Market Share



Market Statistics

1993

Program: CAD/CAM/CAE/GIS Worldwide
Product Code: CCAM-WW-MS-9301
Publication Date: March 15, 1993

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Note: All tables show estimated data.

CAD/CAM/CAE/GIS Worldwide Market Share

Introduction

CAD/CAM/CAE/GIS systems have dramatically changed the methods by which designers and production managers originate and implement products. CAD and CAE systems allow designers to create, draft, analyze, test, and manipulate products on a screen in two and three dimensions. As CAD/CAM/CAE/GIS systems continue to decrease in cost, they become more available and cost justifiable to new users.

In order to provide a comprehensive view of the CAD/CAM/CAE/GIS industry, Dataquest's CAD/CAM/CAE/GIS group maintains a large database of industry information. The type of information contained in the database is depicted in Figure 1.

Market Analysis

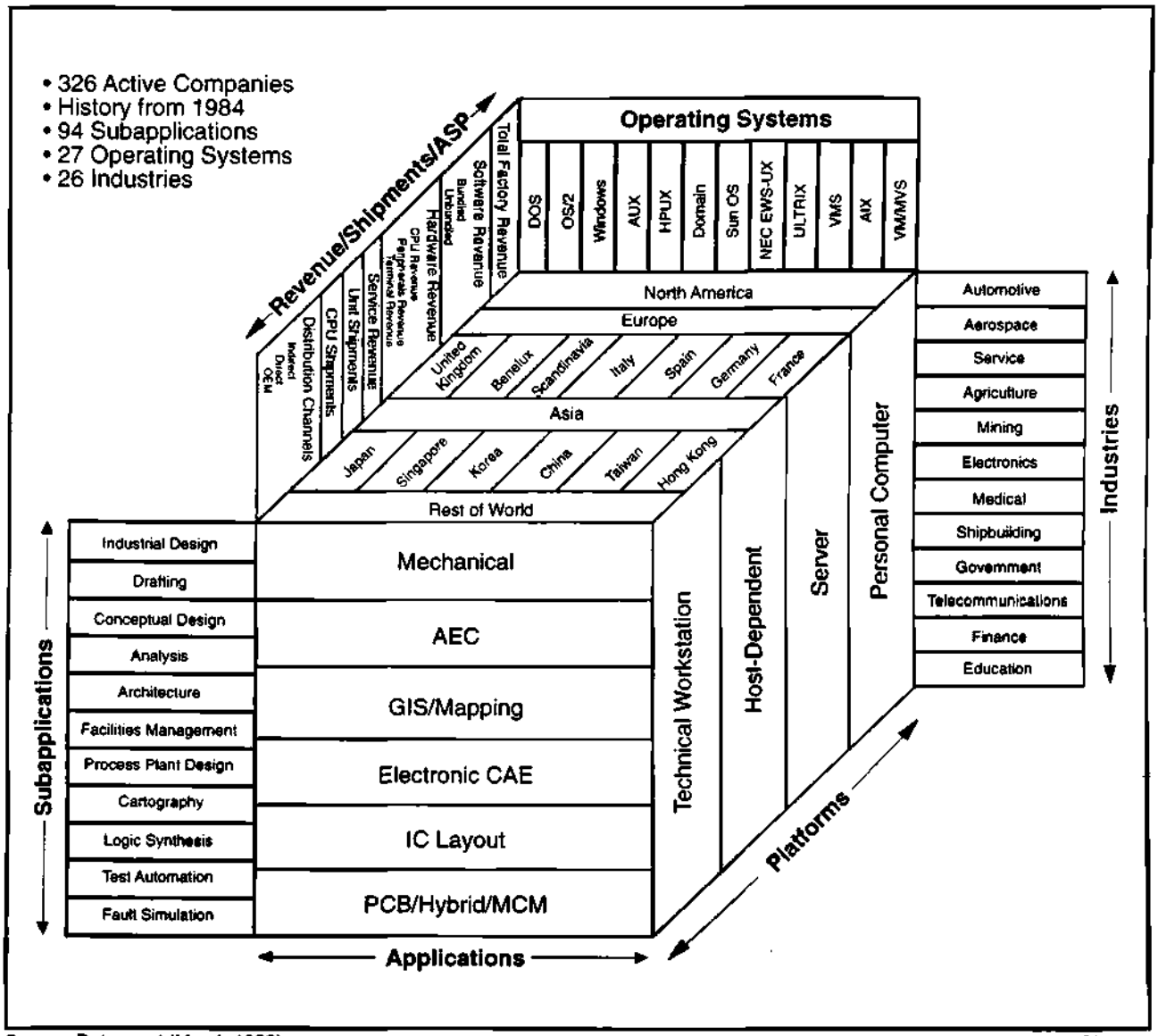
With potentially the lowest growth rates in the history of the industry, 1992 was a year of transition. Turmoil in world economic forces caused recessionary pressures in many of the oldest and strongest markets for CAD/CAM/CAE/GIS. At the same time, competitive pressures in the end-user environment forced a higher level of integration and system complexity with fewer people. Evolution in new hardware and software technologies further added to the transitional pressures. For many, 1992 was the first year to seriously discuss and solve some of the sticky problems of integrating technologies and people. The process is painful, but the result should fuel healthy CAD/CAM/CAE/GIS market growth for the next five years.

Based on our preliminary analysis, shown in Table 1, the year turned out somewhat better than expected, with a 4.2 percent growth rate in total revenue and 9.7 percent growth in software revenue. Regionally, European-based vendors enjoyed the strongest results, at 6.5 percent growth. Asian-based vendors grew 2.1 percent, with North American-based vendors in between the two, at 3.7 percent. In reality, the dollar was devalued against both the yen and the ECU, so the actual growth of both European- and Asian-based companies is lower than it appears.

Dataquest Perspective

The market dynamics in the total CAD/CAM/CAE/GIS market comprises many factors based on application-specific market needs, diverse geographical issues, and the amazing growth of computing and graphics resources. A more detailed analysis of each application area must be made to thoroughly understand the forces driving the entire market. Dataquest will discuss these forces and will provide an in-depth analysis of CAD/CAM/CAE/GIS regional issues, technology trends, and company analyses in future publications.

Figure 1
CAD/CAM/CAE/GIS Market Database



Source: Dataquest (March 1993)

G3000191

Table 1
CAD/CAM/CAE/GIS 1992 Market Summary

	Software Revenue 1991 ($M)	Software Revenue 1992 ($M)	Growth Rate (%)	Total Revenue 1991 ($M)	Total Revenue 1992 ($M)	Growth Rate (%)
Application						
Mechanical	2,033.0	2,235.3	10.0	7,229.2	7,655.3	5.9
AEC	666.1	746.1	12.0	2,345.3	2,420.0	3.2
GIS/Mapping	555.8	627.5	12.9	1,899.4	1,974.8	4.0
Electronic CAE	691.2	744.1	7.7	1,802.7	1,875.4	4.0
IC Layout	195.8	223.4	14.1	584.7	621.0	6.2
PCB/Hybrid/MCM	328.3	329.1	0.2	1,091.1	1,030.8	-5.5
Total	4,470.2	4,905.5	9.7	14,952.5	15,577.3	4.2
Region						
North America	1,516.0	1,693.7	11.7	5,069.2	5,258.8	3.7
Europe	1,623.9	1,775.8	9.4	5,531.0	5,887.7	6.5
Asia	1,249.0	1,339.8	7.3	4,050.4	4,135.6	2.1
Rest of World	81.2	96.2	18.5	302.0	295.1	-2.3
Total	4,470.2	4,905.5	9.7	14,952.5	15,577.3	4.2
Platform						
Technical Workstation	2,712.1	3,056.2	12.7	8,078.7	8,780.1	8.7
Host Dependent	584.1	530.6	-9.2	2,852.2	2,557.0	-10.3
Server	182.7	191.7	4.9	997.9	1,056.2	5.8
Personal Computer	991.3	1,127.0	13.7	3,023.7	3,183.9	5.3
Total	4,470.2	4,905.5	9.7	14,952.5	15,577.3	4.2

Source: Dataquest (March 1993)

About This Document

This document contains Dataquest's detailed market share information on the CAD/CAM/CAE/GIS industry. Following is a description of the information reported in the *Market Share* book for each segment:

- Source—All companies in database; overview of industry
- Mechanical Applications—All companies in database with mechanical revenue
- AEC Applications—All companies in database with AEC revenue
- GIS Applications—All companies in database with GIS revenue
- Electronic Design Automation Applications—All companies in database with EDA (electronic CAE, IC layout, PCB/hybrid/MCM) revenue

- Europe—All Europe-based companies and all other companies with more than $1 million in European revenue
- Asia—All Asia-based companies and all other companies with more than $1 million in Asian revenue
- Personal CAD and Distribution Channels—All companies in database with personal computer revenue

More detailed data on these markets may be requested through our client inquiry service.

Dataquest's policy is to continually update its market information, for current and past years, with any new data received in order to arrive at the most accurate market representation possible.

Segmentation

Dataquest defines CAD/CAM/CAE/GIS as systems used in the mechanical; architecture, engineering, and construction (AEC); GIS/mapping; and electronic design automation (EDA) application areas. The CAD/CAM/CAE/GIS market is defined according to the following segmentation scheme:

- CAD/CAM/CAE/GIS
  - Mechanical
  - AEC (Architecture, Engineering, and Construction)
  - GIS/Mapping (Geographic Information Systems)
  - EDA (Electronic Design Automation)
    - Electronic CAE
    - IC Layout
    - PCB/Hybrid/MCM

In addition, more detailed information by subapplication, by operating systems, and by industry is available, much of it published in *Dataquest Perspectives.*

Definitions

This section lists the definitions that are specific to this document.

Application definitions are as follows:

- Mechanical—Mechanical CAD/CAM refers to computer-aided tools used to design, analyze, document, and manufacture discrete parts, components, and assemblies.
- Architecture, Engineering, and Construction (AEC)—This segment covers the use of computer-aided tools by architects, contractors, plant engineers, civil engineers, and other people associated with these disciplines to aid in designing and managing buildings, industrial plants, ships, and other types of nondiscrete entities.

- Geographic Information Systems (GIS)/Mapping—This is a computer-based technology, composed of hardware, software, and data used to capture, edit, display, and analyze spatial (tagged by location) information.
- Electronic Design Automation (EDA)—This segment covers computer-based tools that are used to automate the process of designing an electronic product including printed circuit boards, ICs, and systems. EDA includes Electronic CAE, IC Layout, and PCB/Hybrid/MCM, as follows:
  - Electronic Computer-Aided Engineering (CAE)—These are computer-aided tools used in the engineering or design phase of electronic products (as opposed to the physical layout phase of the product). Examples of Electronic CAE applications are schematic capture and simulation.
  - IC Layout—This is a software application tool that is used to create and validate the physical implementation of an integrated circuit (IC). The IC layout category comprises polygon editors, symbolic editors, placement and routing (gate array, cell, and block), design verification tools (DRC/ERC/logic-to-layout), compilers, and module development tools.
  - Printed Circuit Board (PCB)/Hybrid/Multichip Module (MCM)—This segment covers products that are used to create the placement and routing of the traces and components laid out on a printed circuit board. Also, included in this category are thermal analysis tools.

Regional definitions are as follows:

- North America—Includes United States, Canada, and Mexico
- Europe—Includes the United Kingdom, Scandinavia, Benelux, France, Germany, Italy, Spain, and Rest of Europe
- Asia—Includes Japan, Singapore, Taiwan, Korea, China, and Hong Kong
- Rest of World—All other countries including Australia, New Zealand, Oceania, Africa, Central America, South America, and the Middle East

Platform definitions are as follows:

- Technical Workstation—This is a single-user computer that is distinguished from a personal computer by its features and by the user's potential range of expansion on the platform. Features include a virtual, multitasking operating system (UNIX, VMS, DOMAIN); the computer is designed by manufacturer to run high-performance graphics applications in a multiuser/multitasking environment.
- Host-Dependent—This is a shared logic system in which the external workstations' functions are dependent on a host computer.

- Server—A server is a computer that transparently provides its resources for use by other computer systems. It is a system on a network that provides specific functionality to other computer systems: the clients. Functions include file storage, database access, compute capability, and others. Dataquest tracks the following major categories of servers used for CAD/CAM/CAE/GIS applications:
  - Compute Servers—These systems provide capabilities for solving numerical problems (for example, simulations, statistical calculations, and simultaneous partial differential equations). System features usually include high-speed computational capabilities (for example, vector and parallel processing) and large memories.
  - Print Servers—These systems provide access to printers, specialized printing applications software, and print spooling resources to a network.
  - File Servers—These systems provide mass storage capability to clients on a network. Services can range from temporary storage of working files to long-term backup and archive systems.
  - Database Servers—These systems manage databases as a shared resource to a network. These servers handle such functions as physical data storage, data security, and high-level queries and can access stored information at the record level.
- Personal Computer—This is defined as a single-user computer that is distinguished from a technical workstation by its features and by the user's potential range of expansion on the platform. Features found in technical workstations (such as a virtual operating system, networking, high-performance graphics, multiuser/multitasking capability) are optional rather than integrated by the manufacturer.

Revenue/shipments/ASP definitions are as follows:

- Total factory revenue is defined as the amount of money received by a manufacturer for its goods measured in U.S. dollars. Total factory revenue does not include revenue that a company may receive from products that are sold to another company for resale (OEM revenue).
- Unit shipment is defined as the number of products delivered (that is, seats).
- Software revenue is revenue derived from the sale of bundled (part of a turnkey system) and unbundled software.
- Service revenue is defined as revenue derived from the service and support of CAD/CAM/CAE/GIS systems not including revenue from consulting. Service revenue can be calculated in the tables by subtracting hardware and software revenue from total revenue.

Market Share Methodology

Dataquest uses both primary and secondary sources to produce our market share data. In the fourth quarter of each year, we survey all major participants in each industry. Each vendor is offered the opportunity to self-report the information required. Although there is a primary contact

for each company, large companies are surveyed across product lines and across geographic regions. Thus, there is a corresponding increase in the number of contacts at large companies. (Dataquest maintains a large contact database on all sources of information). Examples of the job titles of people contacted for information are the following:

- President and CEO
- Vice President and General Manager
- Vice President of Marketing
- Vice President, Strategic Product Planning
- Director of Strategic Planning
- Director of Marketing
- Director of Market Development
- Manager, CAD/CAM/CAE/GIS Marketing Programs
- Market Research Analyst

The Audit Process

Data supplied by vendors are evaluated against information drawn from many sources, including the following:

- Revenue published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant economic data
- Information and data from online data banks
- Articles in both the general and trade press
- Annual reports, SEC documents, credit reports
- Company publications and press releases
- Reports from financial analysts
- User studies
- Reseller and supplier reports and reports from a vendor's competitors

In addition, Dataquest sums vendor revenue across other industries covered by Dataquest to make sure that revenue is not credited twice and checks with multiple sources at one company to cross-check data on that company.

Dataquest analysts have many years of experience in how to apply the above tools to get the most accurate information possible on a

particular company (such as what to use when and what industry averages are). We believe that the estimates presented here are the most accurate and meaningful generally available today. It is the CAD/CAM/CAE/GIS group's policy to continually update our market information for any year, based on any new data received, in order to arrive at the most accurate market representation possible.

Dataquest's CAD/CAM/CAE/GIS market numbers are often higher than those reported by other sources. We survey worldwide, which involves more vendors, higher total market revenue, lower market share per vendor, and a more accurate market picture—particularly useful when comparing regions or applications.

Publishing Schedule

We publish market share and forecasting, twice each year for each, allowing for both timely distribution of data and thorough analysis and forecasting. Our annual delivery schedule is as follows:

- Market share data are available January 31. All tables will be published and distributed to clients by March 31.
- Forecasting from the market share tables provides a five-year forecast period, available after March 31. The books will be shipped by May 31.
- Final updated market share tables, based on additional data collection and analysis, will be completed by May 31. At this point, the market share database is frozen and will not be changed until the end of the year. For the next six months, supplementary market data will be based on these final market data. Books will be shipped by July 31.
- We provide complete final forecast tables by July 31. These tables take into consideration changes in the market share during the previous six months. Books will be shipped by September 31.

Notes on Market Share

CADAM has now been included in IBM's revenue for 1991 and 1992. In addition, based on our analysis of software revenue by operating system, we have changed the percent of Sun revenue allocated to CAD/CAM/CAE/GIS. The result is an increase in hardware revenue—$144 million for Sun in 1991, primarily in the AEC and GIS markets, and an overall increase in market share.

Tables 2 through 4 show other changes made to the database since the last report.

Table 2
Companies Renamed

Old Name	New Name
ABB Trafonor	ABB Industria
Schlumberger	Applicon
Hahn & Kolb	ASCAD/ASCAM
Decad	EME
Robocom	RoboCAD Solutions
Vision 3D	Areon

Source: Dataquest (March 1993)

Table 3
Companies (or CAD Portions Thereof) Sold/Merged

Companies	Sold to/Merged with
Geographic Systems (WPS)	GeoVision Systems
Kewill Systems	Han Dataport
ISYKON Software	Intergraph
Logic Automation	Logic Modeling Systems
Micro Engineering Solutions	Autodesk
Norsk	Technovision
Sumisho Electronic Systems	Sumisho Electronics
t2 Solutions	Alias
Technovision	Intergraph
Valid	Cadence
Vantage Analysis Systems	Viewlogic

Source: Dataquest (March 1993)

Table 4
Companies—Added or Deleted

New Companies	1992 Revenue
CAD Distribution	16.9
CAE-link	1.1
Exemplar Logic	0.3
Expertest	0.5
Minc Software	3.0
Neocad	3.0
Sunrise Test Systems	2.0
Quicklogic	1.0
Deleted Companies	**1991 Revenue**
Everex	19.4
Ferranti	10.0
Nestler	11.0
XAO Industrie	3.7

Source: Dataquest (March 1993)

Table 5
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
IBM	1,861.2	1,065.0	464.0	75,625	11.9%	13.2%	9.5%	11.5%
Intergraph	1,171.7	494.4	313.8	17,429	7.5%	6.1%	6.4%	2.7%
Hewlett-Packard	922.4	696.2	62.8	80,263	5.9%	8.6%	1.3%	12.2%
Sun Microsystems	876.8	751.9	.0	51,854	5.6%	9.3%	.0%	7.9%
Digital	843.6	576.6	5.2	9,398	5.4%	7.1%	.1%	1.4%
Computervision	781.7	297.1	230.9	6,444	5.0%	3.7%	4.7%	1.0%
Fujitsu	442.0	282.9	114.9	8,751	2.8%	3.5%	2.3%	1.3%
Cadence	425.6	1.3	349.4	0	2.7%	.0%	7.1%	.0%
Compaq	416.3	416.3	.0	90,225	2.7%	5.1%	.0%	13.7%
Mentor Graphics	350.8	89.6	154.3	1,492	2.3%	1.1%	3.1%	.2%
NEC	348.0	238.9	81.3	22,400	2.2%	3.0%	1.7%	3.4%
Autodesk	341.6	.0	341.6	0	2.2%	.0%	7.0%	.0%
EDS	302.9	152.0	114.4	4,913	1.9%	1.9%	2.3%	.7%
Silicon Graphics	272.9	251.0	.0	6,999	1.8%	3.1%	.0%	1.1%
Siemens Nixdorf Info systeme	271.2	137.2	95.6	4,498	1.7%	1.7%	1.9%	.7%
Apple Computer	243.2	214.0	.0	57,552	1.6%	2.6%	.0%	8.8%
Nihon Unisys	228.3	141.6	38.8	2,220	1.5%	1.7%	.8%	.3%
Hitachi	174.0	83.5	73.1	4,675	1.1%	1.0%	1.5%	.7%
Control Data Systems	169.4	82.2	28.1	1,194	1.1%	1.0%	.6%	.2%
Applicon	135.0	45.3	53.2	1,452	.9%	.6%	1.1%	.2%
SDRC	123.3	.0	123.3	0	.8%	.0%	2.5%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Zuken	106.9	41.7	65.1	694	.7%	.5%	1.3%	.1%
Toshiba—NO OEM	106.2	53.1	42.5	3,114	.7%	.7%	.9%	.5%
ESRI	101.0	.0	91.9	0	.6%	.0%	1.9%	.0%
Parametric Technology	100.2	.0	84.2	0	.6%	.0%	1.7%	.0%
Matra Datavision	97.3	34.1	43.8	744	.6%	.4%	.9%	.1%
Mitsubishi Electric	95.0	74.0	12.0	1,722	.6%	.9%	.2%	.3%
Racal-Redac	86.0	.8	66.5	2	.6%	.0%	1.4%	.0%
STI-Straessle	85.5	13.4	44.1	620	.5%	.2%	.9%	.1%
Landmark Graphics	81.9	41.0	18.8	424	.5%	.5%	.4%	.1%
Hitachi Zosen Info Systems	77.6	66.2	3.6	800	.5%	.8%	.1%	.1%
Mutoh Industries—NO OEM	72.3	40.7	20.8	1,139	.5%	.5%	.4%	.2%
Synopsys	67.7	.0	48.8	0	.4%	.0%	1.0%	.0%
Viewlogic Systems	65.8	.0	52.6	0	.4%	.0%	1.1%	.0%
IEZ	64.3	22.5	32.1	1,360	.4%	.3%	.7%	.2%
ISICAD	58.0	20.2	31.5	348	.4%	.2%	.6%	.1%
Nemetschek	58.0	21.5	32.5	600	.4%	.3%	.7%	.1%
MacNeal-Schwendler	55.3	.0	53.1	0	.4%	.0%	1.1%	.0%
Sharp System Products—NO OEM	49.7	25.8	23.9	470	.3%	.3%	.5%	.1%
Auto-Trol	47.6	17.6	18.1	595	.3%	.2%	.4%	.1%
Wacom	42.5	8.6	29.5	788	.3%	.1%	.6%	.1%
Wiechers Datentechnik	40.9	10.8	18.9	728	.3%	.1%	.4%	.1%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application:	**All Applications**
Platform:	All Platforms
Region:	Worldwide
Units:	Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
COMPASS Design Automation	40.8	.7	30.6	32	.3%	.0%	.6%	.0%
Unisys	40.0	20.3	13.9	600	.3%	.3%	.3%	.1%
Mitsui Engineering	39.7	27.8	7.9	264	.3%	.3%	.2%	.0%
Cisigraph	39.3	11.0	21.6	250	.3%	.1%	.4%	.0%
Hakuto	38.2	22.9	15.3	850	.2%	.3%	.3%	.1%
Data General	38.1	30.5	1.9	1,998	.2%	.4%	.0%	.3%
ItalCad	38.0	17.9	9.1	360	.2%	.2%	.2%	.1%
Uchida Yoko	37.9	22.9	13.5	900	.2%	.3%	.3%	.1%
PDA Engineering	35.1	.0	33.7	0	.2%	.0%	.7%	.0%
ICL	35.1	20.7	11.9	962	.2%	.3%	.2%	.1%
Harris EDA	35.0	3.8	20.3	150	.2%	.0%	.4%	.0%
Dell Computer	34.6	34.6	.0	9,012	.2%	.4%	.0%	1.4%
Seiko Instruments—NO OEM	34.2	15.3	18.2	258	.2%	.2%	.4%	.0%
CADIX	33.6	13.4	16.8	247	.2%	.2%	.3%	.0%
Alias Research	32.7	.0	29.7	0	.2%	.0%	.6%	.0%
Tokyo Electron—NO OEM	32.3	10.7	14.5	220	.2%	.1%	.3%	.0%
Zycad	31.5	18.9	4.1	239	.2%	.2%	.1%	.0%
Swanson Analysis	31.4	.0	31.4	0	.2%	.0%	.6%	.0%
Han Dataport	31.0	9.3	17.1	625	.2%	.1%	.3%	.1%
ASCAD/ASCAM	30.6	18.4	9.2	450	.2%	.2%	.2%	.1%
Investronica SA	29.3	23.4	2.9	1,170	.2%	.3%	.1%	.2%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: **All Applications**
Platform: **All Platforms**
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Cimatron	29.0	13.1	13.1	921	.2%	.2%	.3%	.1%
GeoVision Systems	27.0	2.1	14.1	25	.2%	.0%	.3%	.0%
Cimlinc	26.6	.0	18.6	562	.2%	.0%	.4%	.1%
Gerber Systems	26.0	12.7	8.6	360	.2%	.2%	.2%	.1%
Toyo Information Systems-NO OEM	24.8	15.1	7.2	265	.2%	.2%	.1%	.0%
Omron	24.2	14.5	9.7	530	.2%	.2%	.2%	.1%
Century Research Center	22.5	11.9	8.3	119	.1%	.1%	.2%	.0%
Delcam International	22.4	7.8	11.2	607	.1%	.1%	.2%	.1%
Accugraph	22.0	9.7	9.9	779	.1%	.1%	.2%	.1%
Quickturn Systems	21.5	21.5	.0	179	.1%	.3%	.0%	.0%
EEsof	21.3	.1	18.8	16	.1%	.0%	.4%	.0%
MCS	20.2	.0	17.9	0	.1%	.0%	.4%	.0%
Solbourne	20.0	19.5	.0	1,614	.1%	.2%	.0%	.2%
Fides Industrielle Automation	19.3	2.9	13.5	166	.1%	.0%	.3%	.0%
ADRA Systems	18.6	1.2	13.8	64	.1%	.0%	.3%	.0%
Genasys II	18.6	1.9	15.8	125	.1%	.0%	.3%	.0%
PAFEC	18.5	.0	18.5	0	.1%	.0%	.4%	.0%
Logic Modeling Systems	18.2	.0	14.5	0	.1%	.0%	.3%	.0%
Radan Computational	17.6	6.2	8.8	364	.1%	.1%	.2%	.1%
CADKEY	17.0	.0	17.0	0	.1%	.0%	.3%	.0%
CAD Distribution	16.9	8.4	6.7	261	.1%	.1%	.1%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Tebis	16.7	2.5	11.7	96	.1%	.0%	.2%	.0%
Digital Kienzle	16.3	8.3	4.6	239	.1%	.1%	.1%	.0%
CAD Centre	16.2	.0	13.0	0	.1%	.0%	.3%	.0%
Xilinx	16.0	.0	14.4	0	.1%	.0%	.3%	.0%
Andor	15.7	3.9	11.1	121	.1%	.0%	.2%	.0%
Research Machines	15.6	15.6	.0	2,517	.1%	.2%	.0%	.4%
Ikos Systems	15.4	14.6	.8	169	.1%	.2%	.0%	.0%
Star Informatic	15.4	4.9	8.7	1,630	.1%	.1%	.2%	.2%
Graphtec Engineering	15.4	7.7	6.9	331	.1%	.1%	.1%	.1%
LSI Logic	15.1	1.5	11.3	38	.1%	.0%	.2%	.0%
Framasoft	14.8	.0	8.9	0	.1%	.0%	.2%	.0%
CAD Lab	14.7	.0	11.8	0	.1%	.0%	.2%	.0%
Ziegler Informatics	14.4	.0	14.4	0	.1%	.0%	.3%	.0%
INS Engineering	14.3	7.2	7.2	48	.1%	.1%	.1%	.0%
LPKF	14.1	9.2	3.6	676	.1%	.1%	.1%	.1%
Comdisco Systems	14.0	.0	12.6	0	.1%	.0%	.3%	.0%
Soft-Tech Software Technologies	13.8	2.1	10.4	932	.1%	.0%	.2%	.1%
ICAD	13.5	.0	10.8	0	.1%	.0%	.2%	.0%
Aries Technology	13.4	.0	12.1	0	.1%	.0%	.2%	.0%
Altera	13.0	.0	11.1	0	.1%	.0%	.2%	.0%
ACTEL	13.0	.0	11.7	0	.1%	.0%	.2%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Kockums Computer Systems	12.9	3.2	7.1	635	.1%	.0%	.1%	.1%
Design Automation	12.7	.6	12.0	67	.1%	.0%	.2%	.0%
Sumitomo Denko Workstation	12.7	12.7	.0	2,080	.1%	.2%	.0%	.3%
Synercom	12.6	.0	6.7	0	.1%	.0%	.1%	.0%
Microway	12.5	7.6	3.8	133	.1%	.1%	.1%	.0%
Exapt	12.5	6.1	4.2	229	.1%	.1%	.1%	.0%
Analogy	12.1	.0	9.7	0	.1%	.0%	.2%	.0%
Teradyne	12.0	1.3	8.3	22	.1%	.0%	.2%	.0%
MARC	12.0	.0	12.0	0	.1%	.0%	.2%	.0%
Laser-Scan	11.6	3.9	4.7	68	.1%	.0%	.1%	.0%
Strategic Mapping	11.5	.0	10.4	0	.1%	.0%	.2%	.0%
ERDAS	11.5	3.1	7.6	1,250	.1%	.0%	.2%	.2%
Moss Systems	11.3	.0	10.1	0	.1%	.0%	.2%	.0%
Orcad	10.9	.0	10.9	0	.1%	.0%	.2%	.0%
ETAK	10.7	.5	10.0	23	.1%	.0%	.2%	.0%
MapInfo	10.6	.0	8.5	0	.1%	.0%	.2%	.0%
Smallworld Systems	10.5	2.4	5.8	52	.1%	.0%	.1%	.0%
CPU	10.5	.0	9.5	0	.1%	.0%	.2%	.0%
Silvar-Lisco	10.4	.0	5.8	0	.1%	.0%	.1%	.0%
Sony	10.4	9.1	.0	603	.1%	.1%	.0%	.1%
Sysscan	10.4	4.5	2.8	98	.1%	.1%	.1%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Marcus Computer Systeme	10.2	5.3	3.5	296	.1%	.1%	.1%	.0%
Aucotec	10.0	1.7	6.5	360	.1%	.0%	.1%	.1%
Test Systems Strategies	10.0	.0	8.5	0	.1%	.0%	.2%	.0%
Point Control	10.0	.0	9.7	0	.1%	.0%	.2%	.0%
Softdesk	9.9	.0	9.9	0	.1%	.0%	.2%	.0%
GeoQuest	9.6	.0	9.6	0	.1%	.0%	.2%	.0%
Meta-Software	9.5	.0	6.6	0	.1%	.0%	.1%	.0%
Infocel	9.4	1.9	7.1	197	.1%	.0%	.1%	.0%
PADS Software	9.2	.0	7.8	0	.1%	.0%	.2%	.0%
Data I/O	9.1	.0	9.1	0	.1%	.0%	.2%	.0%
Technische Computer Systeme	9.1	1.8	7.3	283	.1%	.0%	.1%	.0%
EA Systems	8.9	.0	8.9	0	.1%	.0%	.2%	.0%
Microsim	8.8	.0	8.3	0	.1%	.0%	.2%	.0%
RIB/RZB	8.3	.7	6.7	52	.1%	.0%	.1%	.0%
Cascade Design Automation	8.0	.0	6.0	0	.1%	.0%	.1%	.0%
Ontos	7.9	.0	7.9	0	.1%	.0%	.2%	.0%
DAT Standard info ssystemes	7.9	.0	7.5	0	.1%	.0%	.2%	.0%
Engineering Mechanics	7.9	.4	6.7	628	.1%	.0%	.1%	.1%
Ascent Logic Corp	7.8	.0	6.2	0	.1%	.0%	.1%	.0%
Olivetti	7.8	6.6	.0	890	.1%	.1%	.0%	.1%
Mechanical Dynamics	7.7	.0	6.9	0	.0%	.0%	.1%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Sagantec	7.5	.0	6.7	0	.0%	.0%	.1%	.0%
Ground Modelling Systems	7.3	4.0	3.0	60	.0%	.0%	.1%	.0%
Micrografx	7.3	.0	7.3	0	.0%	.0%	.1%	.0%
Spectrum Graphics	7.2	2.2	3.6	67	.0%	.0%	.1%	.0%
Hochtief	7.2	1.1	5.0	86	.0%	.0%	.1%	.0%
Serbi	7.0	.7	6.3	0	.0%	.0%	.1%	.0%
Genrad	6.9	1.3	4.6	72	.0%	.0%	.1%	.0%
CNC Software	6.8	.0	6.8	0	.0%	.0%	.1%	.0%
ASG	6.8	.0	6.8	0	.0%	.0%	.1%	.0%
Alper Systems	6.4	3.2	1.6	45	.0%	.0%	.0%	.0%
BATISOFT	6.3	.9	3.2	314	.0%	.0%	.1%	.0%
Moda CAD	6.3	1.5	4.4	52	.0%	.0%	.1%	.0%
Radian Corporation	6.2	.0	3.7	0	.0%	.0%	.1%	.0%
Quad Design Technology	6.2	.0	5.7	0	.0%	.0%	.1%	.0%
ANACAD	6.1	.0	6.1	0	.0%	.0%	.1%	.0%
RoboCAD Solutions	6.0	.0	4.5	0	.0%	.0%	.1%	.0%
Sigma Design	5.9	.0	5.6	0	.0%	.0%	.1%	.0%
Graphisoft Software Dev	5.9	.0	5.9	0	.0%	.0%	.1%	.0%
Aspen Technology	5.8	.0	5.2	0	.0%	.0%	.1%	.0%
debis Systemhaus	5.8	1.4	3.4	39	.0%	.0%	.1%	.0%
Clemessy	5.7	4.6	.9	19	.0%	.1%	.0%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
i-Logix	5.7	.0	5.7	0	.0%	.0%	.1%	.0%
Kohns & Poppenhaeger	5.4	2.7	1.9	64	.0%	.0%	.0%	.0%
American Small Business Comp.	5.3	.0	5.3	0	.0%	.0%	.1%	.0%
Integrated Computer Graphics	5.2	2.6	2.1	208	.0%	.0%	.0%	.0%
SPATIAL Technology	5.2	.0	5.2	0	.0%	.0%	.1%	.0%
mb Programme	5.1	2.5	1.8	122	.0%	.0%	.0%	.0%
Complansoft CAD	5.0	2.5	2.5	114	.0%	.0%	.1%	.0%
Algor Interactive Systems	4.9	.0	4.3	0	.0%	.0%	.1%	.0%
Kubota Computer	4.8	3.2	.8	300	.0%	.0%	.0%	.0%
BETRONEX	4.8	.5	4.3	89	.0%	.0%	.1%	.0%
Dynamic Graphics	4.8	.0	4.1	0	.0%	.0%	.1%	.0%
International Software Systems	4.7	.0	4.7	0	.0%	.0%	.1%	.0%
Claris	4.6	.0	4.6	0	.0%	.0%	.1%	.0%
Wisdom Systems	4.5	.0	3.5	0	.0%	.0%	.1%	.0%
Kloeckner-Moeller	4.4	.2	3.1	46	.0%	.0%	.1%	.0%
HP Cade	4.4	2.6	1.3	44	.0%	.0%	.0%	.0%
Rasna Corporation	4.3	.0	3.9	0	.0%	.0%	.1%	.0%
Whessoe Computing Systems	4.2	.0	4.2	0	.0%	.0%	.1%	.0%
CADSI	4.2	.6	3.1	29	.0%	.0%	.1%	.0%
Pathtrace	4.2	.9	2.7	62	.0%	.0%	.1%	.0%
Computer Services Consultants	4.2	.0	4.2	0	.0%	.0%	.1%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application:	**All Applications**
Platform:	All Platforms
Region:	Worldwide
Units:	Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Contec Microelectronics	4.2	.0	3.8	0	.0%	.0%	.1%	.0%
Pacific Numerics	4.1	.0	4.1	0	.0%	.0%	.1%	.0%
Gable CAD Systems	4.1	4.1	.8	59	.0%	.1%	.0%	.0%
Bechtel Software	4.0	.0	3.7	0	.0%	.0%	.1%	.0%
Sener Sistemas Marinos	3.7	.0	3.7	0	.0%	.0%	.1%	.0%
Compact Software	3.7	.0	3.7	0	.0%	.0%	.1%	.0%
Innovative Data Design	3.7	.0	3.7	0	.0%	.0%	.1%	.0%
Scientific & Engineering SW	3.6	.0	3.6	0	.0%	.0%	.1%	.0%
Datagraphic	3.6	1.8	1.4	57	.0%	.0%	.0%	.0%
EME	3.5	.8	1.6	70	.0%	.0%	.0%	.0%
Autometric	3.5	2.3	1.2	75	.0%	.0%	.0%	.0%
GeoGraphix	3.4	.0	2.5	0	.0%	.0%	.1%	.0%
PacSoft	3.2	.0	3.2	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	3.2	.5	2.6	19	.0%	.0%	.1%	.0%
Intera Tydac	3.2	.0	3.2	0	.0%	.0%	.1%	.0%
ISKA	3.1	1.4	1.3	57	.0%	.0%	.0%	.0%
Triplan	3.1	1.3	1.6	37	.0%	.0%	.0%	.0%
Vero International Software	3.1	.0	2.9	0	.0%	.0%	.1%	.0%
FEA	3.0	.7	.7	0	.0%	.0%	.0%	.0%
Sweet's Electronic Publishing	3.0	.0	2.4	0	.0%	.0%	.0%	.0%
Minc Software	3.0	.0	3.0	0	.0%	.0%	.1%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Neocad	3.0	.0	3.0	0	.0%	.0%	.1%	.0%
Accel Technologies	2.9	.0	2.6	0	.0%	.0%	.1%	.0%
Assigraph	2.9	.0	2.3	0	.0%	.0%	.0%	.0%
Quantic Laboratories	2.8	.0	2.6	0	.0%	.0%	.1%	.0%
Superdraft	2.8	1.3	1.4	160	.0%	.0%	.0%	.0%
Catalpa	2.7	.9	1.3	22	.0%	.0%	.0%	.0%
Generation 5 Technology	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
Land Innovation	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
ALDEC	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
Motorola	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
CADWorks	2.6	.0	2.4	0	.0%	.0%	.0%	.0%
Infinite Graphics	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
Visionics	2.5	.0	1.9	10	.0%	.0%	.0%	.0%
EPIC Design Technology	2.5	.0	2.5	0	.0%	.0%	.1%	.0%
ISDATA	2.5	.0	2.2	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	2.5	.0	2.2	0	.0%	.0%	.0%	.0%
ACDS Graphic System	2.5	.0	2.1	0	.0%	.0%	.0%	.0%
Foresight Resources	2.5	.0	2.3	0	.0%	.0%	.0%	.0%
Computational Mechanics	2.4	.0	2.4	0	.0%	.0%	.0%	.0%
ALS Design	2.4	.1	2.2	20	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	2.3	.6	1.3	41	.0%	.0%	.0%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Terra Sciences	2.3	.0	2.3	0	.0%	.0%	.0%	.0%
Caroline Informatique	2.3	.4	1.2	18	.0%	.0%	.0%	.0%
Anilam Electronics	2.3	.6	1.5	18	.0%	.0%	.0%	.0%
Elstree Computing	2.2	1.0	1.2	62	.0%	.0%	.0%	.0%
Ricoh—NO OEM	2.2	.0	1.9	0	.0%	.0%	.0%	.0%
CAD-UL	2.1	.0	2.1	0	.0%	.0%	.0%	.0%
Carrier Corporation	2.1	.0	2.1	0	.0%	.0%	.0%	.0%
CAMTEK	2.1	.5	1.4	0	.0%	.0%	.0%	.0%
Evolution Computing	2.1	.0	2.1	0	.0%	.0%	.0%	.0%
Lamp Software	2.1	.5	1.5	130	.0%	.0%	.0%	.0%
Object Design	2.1	.0	2.1	0	.0%	.0%	.0%	.0%
Kork Systems	2.0	.2	1.4	21	.0%	.0%	.0%	.0%
CAD-Capture	2.0	.4	.6	10	.0%	.0%	.0%	.0%
Sunrise Test Systems	2.0	.0	2.0	0	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	1.9	.0	1.9	0	.0%	.0%	.0%	.0%
MEDESIGN	1.9	.5	.7	21	.0%	.0%	.0%	.0%
Objectivity	1.9	.0	1.9	0	.0%	.0%	.0%	.0%
Macao Systems	1.9	1.0	.6	19	.0%	.0%	.0%	.0%
CAD/CAM Group	1.9	.0	1.9	0	.0%	.0%	.0%	.0%
Geometria GIS Systems House	1.8	.2	.4	15	.0%	.0%	.0%	.0%
SIMUCAD	1.8	.0	1.7	0	.0%	.0%	.0%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Massteck	1.8	.0	1.8	0	.0%	.0%	.0%	.0%
DAPCO	1.8	.0	1.2	0	.0%	.0%	.0%	.0%
FEGS	1.7	.0	1.5	0	.0%	.0%	.0%	.0%
Engineered Software	1.7	.0	1.7	0	.0%	.0%	.0%	.0%
Research Engineers—Civilsoft	1.7	.0	1.7	0	.0%	.0%	.0%	.0%
LandCadd	1.6	.0	1.5	0	.0%	.0%	.0%	.0%
ARKTEC	1.6	.2	1.3	43	.0%	.0%	.0%	.0%
Ultimap	1.6	.6	.5	18	.0%	.0%	.0%	.0%
Sinus Software	1.5	.8	.8	36	.0%	.0%	.0%	.0%
GRAPHSOFT	1.4	.0	1.4	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	1.4	.0	1.2	0	.0%	.0%	.0%	.0%
Tanner Research	1.4	.0	1.3	0	.0%	.0%	.0%	.0%
Geotrace Technologies	1.4	.1	1.2	21	.0%	.0%	.0%	.0%
GEOVISION Inc.	1.3	.7	.3	67	.0%	.0%	.0%	.0%
National Semiconductor	1.2	.2	1.0	12	.0%	.0%	.0%	.0%
Integer	1.2	.0	1.0	0	.0%	.0%	.0%	.0%
Aucos elektronische Gerate	1.2	.4	.9	121	.0%	.0%	.0%	.0%
Secagraphics	1.2	.5	.3	8	.0%	.0%	.0%	.0%
Simulation Science	1.2	.0	1.2	0	.0%	.0%	.0%	.0%
Valisys	1.2	.0	.0	0	.0%	.0%	.0%	.0%
Mucke Software	1.1	.6	.4	27	.0%	.0%	.0%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Spectrum Software	1.1	.0	1.1	0	.0%	.0%	.0%	.0%
Mega CADD	1.1	.0	1.1	0	.0%	.0%	.0%	.0%
CAE-link	1.1	.0	1.1	0	.0%	.0%	.0%	.0%
Intrinsix	1.0	1.0	.0	10	.0%	.0%	.0%	.0%
Geomath	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Cascade Graphics	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Cadisys	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Aura CAD/CAM Systems	1.0	.0	.9	0	.0%	.0%	.0%	.0%
CADMATIC	1.0	.1	.7	6	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Quicklogic	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Royal Digital Centers	1.0	.0	.9	0	.0%	.0%	.0%	.0%
Omation	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Engineering Systems Corp.	1.0	.0	.7	0	.0%	.0%	.0%	.0%
Areon	.9	.5	.2	6	.0%	.0%	.0%	.0%
Maptech	.9	.0	.9	0	.0%	.0%	.0%	.0%
Contract Data Research	.9	.0	.6	0	.0%	.0%	.0%	.0%
Number One Systems	.9	.2	.7	63	.0%	.0%	.0%	.0%
A.I. Systems	.8	.0	.8	0	.0%	.0%	.0%	.0%
Dynaware	.8	.0	.8	0	.0%	.0%	.0%	.0%
Douglas Electronics	.8	.0	.8	0	.0%	.0%	.0%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
CAD Language Systems	.8	.0	.6	0	.0%	.0%	.0%	.0%
Vamp	.7	.0	.7	0	.0%	.0%	.0%	.0%
Uniras	.7	.0	.7	0	.0%	.0%	.0%	.0%
Inca	.7	.7	.0	3	.0%	.0%	.0%	.0%
ECOM Associates	.7	.0	.7	4	.0%	.0%	.0%	.0%
IGC Technology	.7	.0	.7	0	.0%	.0%	.0%	.0%
Mc2 Engineering Software	.7	.0	.7	0	.0%	.0%	.0%	.0%
Ithaca Software	.7	.0	.7	0	.0%	.0%	.0%	.0%
ESDU International	.7	.0	.7	0	.0%	.0%	.0%	.0%
Masta Corporation	.6	.0	.5	0	.0%	.0%	.0%	.0%
Hydrotec	.6	.3	.2	7	.0%	.0%	.0%	.0%
Machinery Sales	.6	.0	.6	0	.0%	.0%	.0%	.0%
Phase Three Logic	.6	.0	.5	0	.0%	.0%	.0%	.0%
Capilano Computing	.5	.0	.5	0	.0%	.0%	.0%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.0%	.0%
Expertest	.5	.0	.5	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.5	.0	.4	0	.0%	.0%	.0%	.0%
S.T.L.D. s.r.l.	.5	.0	.5	0	.0%	.0%	.0%	.0%
Applications in CADD	.4	.1	.3	11	.0%	.0%	.0%	.0%
LEICA Heerberg	.4	.0	.3	0	.0%	.0%	.0%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.0%	.0%

(Continued)

Table 5 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
BV Engineering	.4	.0	.4	0	.0%	.0%	.0%	.0%
Geosoft	.4	.0	.4	0	.0%	.0%	.0%	.0%
Synthesis	.3	.0	.3	0	.0%	.0%	.0%	.0%
Exemplar Logic	.3	.0	.3	0	.0%	.0%	.0%	.0%
The Great Softwestern Co.	.2	.0	.2	0	.0%	.0%	.0%	.0%
Instrumatic Espanola	.2	.0	.2	0	.0%	.0%	.0%	.0%
Bobcat Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Shared Resources	.2	.0	.2	0	.0%	.0%	.0%	.0%
Simutest	.2	.0	.2	0	.0%	.0%	.0%	.0%
TOOL Software	.2	.1	.1	4	.0%	.0%	.0%	.0%
Dolphin Integration	.1	.0	.1	0	.0%	.0%	.0%	.0%
All Companies	15,577.3	8,093.8	4,905.5	656,496	.0%	.0%	.0%	.0%
All N.A.-Based Companies	(3,647.2)	(1,772.6)	(1,425.2)	(80,125)	.0%	.0%	.0%	.0%
All Asian-Based Companies	2,128.6	1,255.9	666.4	53,975	.0%	.0%	.0%	.0%
All European-Based Companies	1,518.6	516.7	758.8	26,150	.0%	.0%	.0%	.0%
All Hardware Companies	4,591.1	3,987.2	7.6	517,486	.0%	.0%	.0%	.0%
All Turnkey & SW Companies	10,986.2	4,106.7	4,898.0	139,010	.0%	.0%	.0%	.0%

Source: Dataquest (March 1993)

Table 6
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Intergraph	975.4	426.4	229.2	15,521	11.1%	10.5%	7.5%	8.1%
Hewlett-Packard	774.5	577.7	62.8	46,242	8.8%	14.3%	2.1%	24.2%
Computervision	744.6	293.7	202.1	6,163	8.5%	7.3%	6.6%	3.2%
Sun Microsystems	728.0	630.5	.0	46,534	8.3%	15.6%	.0%	24.3%
Cadence	397.8	1.3	327.2	0	4.5%	.0%	10.7%	.0%
Mentor Graphics	350.8	89.6	154.3	1,492	4.0%	2.2%	5.0%	.8%
IBM	341.8	189.0	85.8	9,008	3.9%	4.7%	2.8%	4.7%
Silicon Graphics	262.8	242.5	.0	6,808	3.0%	6.0%	.0%	3.6%
EDS	259.5	135.7	91.4	4,448	3.0%	3.4%	3.0%	2.3%
Siemens Nixdorf Info systeme	248.2	124.1	86.9	4,219	2.8%	3.1%	2.8%	2.2%
Fujitsu	185.6	118.8	48.3	3,784	2.1%	2.9%	1.6%	2.0%
Digital	173.5	115.4	4.0	7,518	2.0%	2.9%	.1%	3.9%
NEC	165.1	90.8	61.1	5,443	1.9%	2.2%	2.0%	2.8%
Hitachi	125.3	60.1	52.6	2,710	1.4%	1.5%	1.7%	1.4%
Applicon	120.8	40.4	47.6	1,277	1.4%	1.0%	1.6%	.7%
SDRC	111.0	.0	111.0	0	1.3%	.0%	3.6%	.0%
Zuken	106.9	41.7	65.1	694	1.2%	1.0%	2.1%	.4%
Parametric Technology	100.2	.0	84.2	0	1.1%	.0%	2.8%	.0%
Matra Datavision	97.3	34.1	43.8	744	1.1%	.8%	1.4%	.4%
STI-Straessle	85.5	13.4	44.1	620	1.0%	.3%	1.4%	.3%
Nihon Unisys	75.8	47.0	12.9	619	.9%	1.2%	.4%	.3%

(Continued)

Table 6 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Racal-Redac	74.0	.8	57.7	2	.8%	.0%	1.9%	.0%
Toshiba—NO OEM	73.9	37.0	29.6	875	.8%	.9%	1.0%	.5%
Mitsubishi Electric	72.6	61.7	5.1	781	.8%	1.5%	.2%	.4%
Hitachi Zosen Info Systems	72.2	61.3	3.6	739	.8%	1.5%	.1%	.4%
Synopsys	67.7	.0	48.8	0	.8%	.0%	1.6%	.0%
IEZ	64.3	22.5	32.1	1,360	.7%	.6%	1.1%	.7%
Control Data Systems	63.3	38.6	13.3	860	.7%	1.0%	.4%	.4%
ESRI	51.5	.0	46.8	0	.6%	.0%	1.5%	.0%
Landmark Graphics	49.1	24.6	11.3	254	.6%	.6%	.4%	.1%
Sharp System Products—NO OEM	49.1	25.5	23.6	453	.6%	.6%	.8%	.2%
Auto-Trol	47.6	17.6	18.1	595	.5%	.4%	.6%	.3%
ISICAD	46.7	20.2	20.2	348	.5%	.5%	.7%	.2%
COMPASS Design Automation	40.0	.7	30.0	32	.5%	.0%	1.0%	.0%
ItalCad	38.0	17.9	9.1	360	.4%	.4%	.3%	.2%
Viewlogic Systems	37.5	.0	30.0	0	.4%	.0%	1.0%	.0%
Mitsui Engineering	36.1	25.3	7.2	204	.4%	.6%	.2%	.1%
Cisigraph	35.4	9.9	19.4	225	.4%	.2%	.6%	.1%
ICL	35.1	20.7	11.9	962	.4%	.5%	.4%	.5%
Uchida Yoko	34.1	20.5	11.9	729	.4%	.5%	.4%	.4%
CADIX	33.6	13.4	16.8	247	.4%	.3%	.5%	.1%
Alias Research	32.7	.0	29.7	0	.4%	.0%	1.0%	.0%

(Continued)

Table 6 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Tokyo Electron—NO OEM	32.3	10.7	14.5	220	.4%	.3%	.5%	.1%
Mutoh Industries—NO OEM	32.3	19.4	9.7	330	.4%	.5%	.3%	.2%
Harris EDA	31.4	3.4	17.6	132	.4%	.1%	.6%	.1%
Unisys	30.8	15.6	10.7	476	.4%	.4%	.4%	.2%
ASCAD/ASCAM	30.0	18.0	9.0	436	.3%	.4%	.3%	.2%
Seiko Instruments—NO OEM	28.9	11.6	14.5	122	.3%	.3%	.5%	.1%
Data General	28.2	22.6	1.4	1,620	.3%	.6%	.0%	.8%
Han Dataport	27.9	8.4	15.4	599	.3%	.2%	.5%	.3%
Nemetschek	26.7	9.9	14.9	200	.3%	.2%	.5%	.1%
PDA Engineering	26.3	.0	25.3	0	.3%	.0%	.8%	.0%
Gerber Systems	26.0	12.7	8.6	360	.3%	.3%	.3%	.2%
Omron	24.2	14.5	9.7	530	.3%	.4%	.3%	.3%
Autodesk	22.9	.0	22.9	0	.3%	.0%	.7%	.0%
Cimlinc	22.6	.0	15.8	562	.3%	.0%	.5%	.3%
Delcam International	22.4	7.8	11.2	607	.3%	.2%	.4%	.3%
Quickturn Systems	21.5	21.5	.0	179	.2%	.5%	.0%	.1%
Century Research Center	20.9	11.1	7.7	116	.2%	.3%	.3%	.1%
Toyo Information Systems-NO OEM	19.9	12.4	5.7	236	.2%	.3%	.2%	.1%
Accugraph	19.6	9.6	8.0	747	.2%	.2%	.3%	.4%
GeoVision Systems	18.9	1.5	9.8	21	.2%	.0%	.3%	.0%
Swanson Analysis	17.6	.0	17.6	0	.2%	.0%	.6%	.0%

(Continued)

Table 6 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Radan Computational	17.4	6.1	8.7	358	.2%	.2%	.3%	.2%
Cimatron	17.1	7.7	7.7	352	.2%	.2%	.3%	.2%
Genasys II	16.7	1.7	14.2	87	.2%	.0%	.5%	.0%
PAFEC	16.6	.0	16.6	0	.2%	.0%	.5%	.0%
Logic Modeling Systems	16.6	.0	13.2	0	.2%	.0%	.4%	.0%
Fides Industrielle Automation	16.4	2.5	11.5	155	.2%	.1%	.4%	.1%
Digital Kienzle	16.3	8.3	4.6	239	.2%	.2%	.1%	.1%
CAD Centre	16.2	.0	13.0	0	.2%	.0%	.4%	.0%
Star Informatic	15.4	4.9	8.7	1,630	.2%	.1%	.3%	.9%
Graphtec Engineering	15.4	7.7	6.9	331	.2%	.2%	.2%	.2%
ADRA Systems	14.3	1.2	10.4	64	.2%	.0%	.3%	.0%
Comdisco Systems	14.0	.0	12.6	0	.2%	.0%	.4%	.0%
CAD Lab	13.9	.0	11.1	0	.2%	.0%	.4%	.0%
INS Engineering	13.6	6.8	6.8	35	.2%	.2%	.2%	.0%
LSI Logic	13.6	1.4	10.2	35	.2%	.0%	.3%	.0%
ICAD	13.5	.0	10.8	0	.2%	.0%	.4%	.0%
Framasoft	13.4	.0	8.0	0	.2%	.0%	.3%	.0%
Kockums Computer Systems	12.9	3.2	7.1	635	.1%	.1%	.2%	.3%
EEsof	12.4	.1	10.8	16	.1%	.0%	.4%	.0%
Aries Technology	12.1	.0	10.9	0	.1%	.0%	.4%	.0%
Sumitomo Denko Workstation	11.8	11.8	.0	1,880	.1%	.3%	.0%	1.0%

(Continued)

Table 6 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Analogy	11.5	.0	9.2	0	.1%	.0%	.3%	.0%
Moss Systems	11.3	.0	10.1	0	.1%	.0%	.3%	.0%
Laser-Scan	11.1	3.8	4.5	64	.1%	.1%	.1%	.0%
Wiechers Datentechnik	10.6	2.8	4.9	90	.1%	.1%	.2%	.0%
Smallworld Systems	10.5	2.4	5.8	52	.1%	.1%	.2%	.0%
Silvar-Lisco	10.4	.0	5.8	0	.1%	.0%	.2%	.0%
Sony	10.4	9.1	.0	603	.1%	.2%	.0%	.3%
Marcus Computer Systeme	10.2	5.3	3.5	296	.1%	.1%	.1%	.2%
MacNeal-Schwendler	9.5	.0	9.1	0	.1%	.0%	.3%	.0%
MCS	9.3	.0	8.3	0	.1%	.0%	.3%	.0%
Technische Computer Systeme	9.0	1.8	7.2	282	.1%	.0%	.2%	.1%
Test Systems Strategies	9.0	.0	7.7	0	.1%	.0%	.3%	.0%
MARC	8.4	.0	8.4	0	.1%	.0%	.3%	.0%
Meta-Software	8.3	.0	5.8	0	.1%	.0%	.2%	.0%
Cascade Design Automation	8.0	.0	6.0	0	.1%	.0%	.2%	.0%
Synercom	7.9	.0	4.2	0	.1%	.0%	.1%	.0%
Ontos	7.9	.0	7.9	0	.1%	.0%	.3%	.0%
Ascent Logic Corp	7.8	.0	6.2	0	.1%	.0%	.2%	.0%
Microway	7.7	4.7	2.3	73	.1%	.1%	.1%	.0%
Sagantec	7.5	.0	6.7	0	.1%	.0%	.2%	.0%
Spectrum Graphics	7.2	2.2	3.6	67	.1%	.1%	.1%	.0%

(Continued)

Table 6 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Teradyne	7.2	1.2	4.7	22	.1%	.0%	.2%	.0%
ERDAS	6.9	1.9	4.6	750	.1%	.0%	.1%	.4%
Mechanical Dynamics	6.6	.0	5.9	0	.1%	.0%	.2%	.0%
Alper Systems	6.4	3.2	1.6	45	.1%	.1%	.1%	.0%
Quad Design Technology	6.2	.0	5.7	0	.1%	.0%	.2%	.0%
ANACAD	6.1	.0	6.1	0	.1%	.0%	.2%	.0%
Genrad	6.0	1.2	4.0	61	.1%	.0%	.1%	.0%
Solbourne	5.8	5.6	.0	1,003	.1%	.1%	.0%	.5%
i-Logix	5.7	.0	5.7	0	.1%	.0%	.2%	.0%
Kohns & Poppenhaeger	5.4	2.7	1.9	64	.1%	.1%	.1%	.0%
SPATIAL Technology	5.2	.0	5.2	0	.1%	.0%	.2%	.0%
Complansoft CAD	5.0	2.5	2.5	114	.1%	.1%	.1%	.1%
Xilinx	4.8	.0	4.3	0	.1%	.0%	.1%	.0%
GeoQuest	4.8	.0	4.8	0	.1%	.0%	.2%	.0%
Ctemessy	4.6	3.7	.7	12	.1%	.1%	.0%	.0%
Engineering Mechanics	4.6	.2	3.9	221	.1%	.0%	.1%	.1%
Wisdom Systems	4.5	.0	3.5	0	.1%	.0%	.1%	.0%
debis Systemhaus	4.4	1.1	2.6	23	.0%	.0%	.1%	.0%
HP Cade	4.4	2.6	1.3	44	.0%	.1%	.0%	.0%
Kubota Computer	4.3	2.7	.8	235	.0%	.1%	.0%	.1%
Sysscan	4.2	1.4	1.5	49	.0%	.0%	.0%	.0%

(Continued)

Table 6 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Contec Microelectronics	4.2	.0	3.8	0	.0%	.0%	.1%	.0%
Gable CAD Systems	4.1	4.1	.8	59	.0%	.1%	.0%	.0%
Pacific Numerics	3.9	.0	3.9	0	.0%	.0%	.1%	.0%
Dynamic Graphics	3.8	.0	3.2	0	.0%	.0%	.1%	.0%
Sener Sistemas Marinos	3.7	.0	3.7	0	.0%	.0%	.1%	.0%
Radian Corporation	3.7	.0	2.2	0	.0%	.0%	.1%	.0%
Scientific & Engineering SW	3.6	.0	3.6	0	.0%	.0%	.1%	.0%
Wacom	3.6	.8	2.7	40	.0%	.0%	.1%	.0%
Rasna Corporation	3.5	.0	3.1	0	.0%	.0%	.1%	.0%
Exapt	3.4	1.7	1.2	115	.0%	.0%	.0%	.1%
CADSI	3.4	.5	2.5	15	.0%	.0%	.1%	.0%
Sigma Design	3.3	.0	3.1	0	.0%	.0%	.1%	.0%
ISKA	3.1	1.4	1.3	57	.0%	.0%	.0%	.0%
Integrated Computer Graphics	3.1	1.6	1.3	89	.0%	.0%	.0%	.0%
Triplan	3.1	1.3	1.6	37	.0%	.0%	.1%	.0%
Quantic Laboratories	2.8	.0	2.6	0	.0%	.0%	.1%	.0%
Catalpa	2.7	.9	1.3	22	.0%	.0%	.0%	.0%
Land Innovation	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
Motorola	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
ACTEL	2.6	.0	2.4	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	2.6	.3	2.2	10	.0%	.0%	.1%	.0%

(Continued)

Table 6 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
EPIC Design Technology	2.5	.0	2.5	0	.0%	.0%	.1%	.0%
Aucotec	2.5	.4	1.6	18	.0%	.0%	.1%	.0%
ACDS Graphic System	2.5	.0	2.1	0	.0%	.0%	.1%	.0%
RIB/RZB	2.3	.2	1.9	11	.0%	.0%	.1%	.0%
Softdesk	2.3	.0	2.3	0	.0%	.0%	.1%	.0%
Ricoh—NO OEM	2.2	.0	1.9	0	.0%	.0%	.1%	.0%
EME	2.1	.4	1.0	29	.0%	.0%	.0%	.0%
Object Design	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
Sunrise Test Systems	2.0	.0	2.0	0	.0%	.0%	.1%	.0%
Infinite Graphics	2.0	.0	2.0	0	.0%	.0%	.1%	.0%
Hakuto	1.9	1.2	.8	34	.0%	.0%	.0%	.0%
MEDESIGN	1.9	.5	.7	21	.0%	.0%	.0%	.0%
Objectivity	1.9	.0	1.9	0	.0%	.0%	.1%	.0%
CAD/CAM Group	1.9	.0	1.9	0	.0%	.0%	.1%	.0%
DAPCO	1.8	.0	1.2	0	.0%	.0%	.0%	.0%
Autometric	1.7	1.1	.6	40	.0%	.0%	.0%	.0%
Caroline Informatique	1.6	.3	.8	8	.0%	.0%	.0%	.0%
Intera Tydac	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
Ultimap	1.6	.6	.5	18	.0%	.0%	.0%	.0%
Data I/O	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
Bechtel Software	1.5	.0	1.4	0	.0%	.0%	.0%	.0%

(Continued)

Table 6 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Sinus Software	1.5	.8	.8	36	.0%	.0%	.0%	.0%
Compact Software	1.5	.0	1.5	0	.0%	.0%	.0%	.0%
Minc Software	1.5	.0	1.5	0	.0%	.0%	.0%	.0%
Assigraph	1.4	.0	1.1	0	.0%	.0%	.0%	.0%
CADKEY	1.4	.0	1.4	0	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs.	1.4	.4	.8	17	.0%	.0%	.0%	.0%
SIMUCAD	1.4	.0	1.3	0	.0%	.0%	.0%	.0%
FEGS	1.3	.0	1.1	0	.0%	.0%	.0%	.0%
FEA	1.2	.3	.3	0	.0%	.0%	.0%	.0%
National Semiconductor	1.1	.2	.9	12	.0%	.0%	.0%	.0%
Valisys	1.1	.0	.0	0	.0%	.0%	.0%	.0%
Macao Systems	1.1	.6	.4	12	.0%	.0%	.0%	.0%
Infocel	1.1	.2	.8	16	.0%	.0%	.0%	.0%
ETAK	1.1	.0	1.0	1	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Royal Digital Centers	1.0	.0	.9	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	1.0	.0	.9	0	.0%	.0%	.0%	.0%
Simulation Science	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
GEOVISION Inc.	.9	.6	.2	29	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	.9	.0	.9	0	.0%	.0%	.0%	.0%
Microsim	.9	.0	.8	0	.0%	.0%	.0%	.0%

(Continued)

Table 6 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
PADS Software	.9	.0	.7	0	.0%	.0%	.0%	.0%
Computational Mechanics	.9	.0	.9	0	.0%	.0%	.0%	.0%
Geomath	.8	.0	.8	0	.0%	.0%	.0%	.0%
Point Control	.8	.0	.8	0	.0%	.0%	.0%	.0%
CAD Language Systems	.8	.0	.6	0	.0%	.0%	.0%	.0%
Neocad	.8	.0	.8	0	.0%	.0%	.0%	.0%
Hydrotec	.6	.3	.2	7	.0%	.0%	.0%	.0%
Lamp Software	.6	.2	.4	52	.0%	.0%	.0%	.0%
ISDATA	.6	.0	.5	0	.0%	.0%	.0%	.0%
Geometria GIS Systems House	.6	.0	.0	0	.0%	.0%	.0%	.0%
Expertest	.5	.0	.5	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.5	.0	.4	0	.0%	.0%	.0%	.0%
Whessoe Computing Systems	.4	.0	.4	0	.0%	.0%	.0%	.0%
LEICA Heerberg	.4	.0	.3	0	.0%	.0%	.0%	.0%
Terra Sciences	.4	.0	.4	0	.0%	.0%	.0%	.0%
CADMATIC	.3	.0	.2	2	.0%	.0%	.0%	.0%
ASG	.3	.0	.3	0	.0%	.0%	.0%	.0%
Ithaca Software	.3	.0	.3	0	.0%	.0%	.0%	.0%
CAMTEK	.2	.1	.2	0	.0%	.0%	.0%	.0%
Exemplar Logic	.2	.0	.2	0	.0%	.0%	.0%	.0%
Inca	.2	.2	.0	1	.0%	.0%	.0%	.0%

(Continued)

Table 6 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Shared Resources	.2	.0	.2	0	.0%	.0%	.0%	.0%
Masta Corporation	.2	.0	.2	0	.0%	.0%	.0%	.0%
Research Engineers—Civilsoft	.2	.0	.2	0	.0%	.0%	.0%	.0%
ARKTEC	.2	.1	.1	11	.0%	.0%	.0%	.0%
Phase Three Logic	.2	.0	.2	0	.0%	.0%	.0%	.0%
Massteck	.2	.0	.2	0	.0%	.0%	.0%	.0%
Tanner Research	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Cadisys	.1	.0	.1	0	.0%	.0%	.0%	.0%
Carrier Corporation	.1	.0	.1	0	.0%	.0%	.0%	.0%
LandCadd	.1	.0	.1	0	.0%	.0%	.0%	.0%
TOOL Software	.0	.0	.0	1	.0%	.0%	.0%	.0%
CADWorks	.0	.0	.0	0	.0%	.0%	.0%	.0%
ESDU International	.0	.0	.0	0	.0%	.0%	.0%	.0%
Dolphin Integration	.0	.0	.0	0	.0%	.0%	.0%	.0%
ALS Design	.0	.0	.0	0	.0%	.0%	.0%	.0%
Synthesis	.0	.0	.0	0	.0%	.0%	.0%	.0%
Simutest	.0	.0	.0	0	.0%	.0%	.0%	.0%
ECOM Associates	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 6 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Other Companies	.0	.0	.9	5	.0%	.0%	.0%	.0%
All Companies	8,780.1	4,047.3	3,056.2	191,178	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	6,418.6	2,950.6	2,093.5	153,708	73.1%	72.9%	68.5%	80.4%
All Asian-Based Companies	1,251.8	722.7	419.3	21,990	14.3%	17.9%	13.7%	11.5%
All European-Based Companies	1,109.7	374.0	543.3	15,480	12.6%	9.2%	17.8%	8.1%
All Hardware Companies	1,696.4	1,435.3	4.1	104,273	19.3%	35.5%	.1%	54.5%
All Turnkey & SW Companies	7,083.8	2,612.0	3,052.1	86,904	80.7%	64.5%	99.9%	45.5%

Source: Dataquest (March 1993)

Table 7
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	957.9	517.4	253.8	12,688	37.5%	33.4%	47.8%	39.9%
Digital	448.1	308.5	.7	0	17.5%	19.9%	.1%	.0%
Fujitsu	168.0	107.5	43.7	2,340	6.6%	6.9%	8.2%	7.4%
Nihon Unisys	152.6	94.6	25.9	1,601	6.0%	6.1%	4.9%	5.0%
Control Data Systems	102.9	42.1	14.4	328	4.0%	2.7%	2.7%	1.0%
NEC	70.1	53.2	11.2	152	2.7%	3.4%	2.1%	.5%
MacNeal-Schwendler	33.8	.0	32.5	0	1.3%	.0%	6.1%	.0%
Siemens Nixdorf Info systeme	23.0	13.1	8.7	279	.9%	.8%	1.6%	.9%
Hitachi	17.4	8.3	7.3	310	.7%	.5%	1.4%	1.0%
Cadence	14.4	.0	11.3	0	.6%	.0%	2.1%	.0%
Mitsubishi Electric	13.0	6.1	3.6	41	.5%	.4%	.7%	.1%
Intergraph	12.4	.0	11.1	0	.5%	.0%	2.1%	.0%
SDRC	12.3	.0	12.3	0	.5%	.0%	2.3%	.0%
EDS	11.3	.0	11.3	(40)	.4%	.0%	2.1%	-.1%
Unisys	9.2	4.7	3.2	124	.4%	.3%	.6%	.4%
Exapt	9.1	4.5	3.1	114	.4%	.3%	.6%	.4%
EA Systems	8.9	.0	8.9	0	.3%	.0%	1.7%	.0%
PDA Engineering	8.8	.0	8.4	0	.3%	.0%	1.6%	.0%
GeoVision Systems	8.1	.6	4.2	4	.3%	.0%	.8%	.0%
Swanson Analysis	7.9	.0	7.9	0	.3%	.0%	1.5%	.0%
MCS	6.9	.0	6.0	0	.3%	.0%	1.1%	.0%

(Continued)

Table 7 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Hitachi Zosen Info Systems	5.4	4.9	.0	61	.2%	.3%	.0%	.2%
Toshiba—NO OEM	5.2	2.6	2.1	74	.2%	.2%	.4%	.2%
Toyo Information Systems-NO OEM	5.0	2.7	1.6	29	.2%	.2%	.3%	.1%
Synercom	4.7	.0	2.5	0	.2%	.0%	.5%	.0%
ESRI	4.0	.0	3.7	0	.2%	.0%	.7%	.0%
MARC	3.6	.0	3.6	0	.1%	.0%	.7%	.0%
Han Dataport	3.1	.9	1.7	26	.1%	.1%	.3%	.1%
Fides Industrielle Automation	2.9	.4	2.0	10	.1%	.0%	.4%	.0%
Bechtel Software	2.0	.0	1.8	0	.1%	.0%	.3%	.0%
Computervision	1.9	.7	.5	40	.1%	.0%	.1%	.1%
Autometric	1.8	1.2	.6	35	.1%	.1%	.1%	.1%
Century Research Center	1.6	.9	.6	2	.1%	.1%	.1%	.0%
LSI Logic	1.5	.1	1.2	3	.1%	.0%	.2%	.0%
Computational Mechanics	1.5	.0	1.5	0	.1%	.0%	.3%	.0%
Assigraph	1.4	.0	1.1	0	.1%	.0%	.2%	.0%
Framasoft	1.4	.0	.9	0	.1%	.0%	.2%	.0%
Secagraphics	1.2	.5	.3	8	.0%	.0%	.1%	.0%
Mechanical Dynamics	1.2	.0	1.0	0	.0%	.0%	.2%	.0%
Clemessy	1.2	.9	.2	7	.0%	.1%	.0%	.0%
Harris EDA	1.1	.2	.8	7	.0%	.0%	.2%	.0%
Geotrace Technologies	1.0	.1	.9	21	.0%	.0%	.2%	.1%

(Continued)

Table 7 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Dynamic Graphics	1.0	.0	.9	0	.0%	.0%	.2%	.0%
Test Systems Strategies	1.0	.0	.9	0	.0%	.0%	.2%	.0%
ETAK	1.0	.0	.9	3	.0%	.0%	.2%	.0%
Compact Software	.9	.0	.9	0	.0%	.0%	.2%	.0%
Meta-Software	.9	.0	.6	0	.0%	.0%	.1%	.0%
EEsof	.9	.0	.8	0	.0%	.0%	.1%	.0%
Georgia Tech Research Corp.	.9	.0	.9	0	.0%	.0%	.2%	.0%
Whessoe Computing Systems	.8	.0	.8	0	.0%	.0%	.2%	.0%
COMPASS Design Automation	.8	.0	.6	0	.0%	.0%	.1%	.0%
Macao Systems	.8	.4	.3	6	.0%	.0%	.0%	.0%
debis Systemhaus	.7	.2	.4	3	.0%	.0%	.1%	.0%
Genrad	.7	.1	.5	2	.0%	.0%	.1%	.0%
Teradyne	.6	.1	.4	0	.0%	.0%	.1%	.0%
Analogy	.6	.0	.5	0	.0%	.0%	.1%	.0%
Aucotec	.5	.1	.3	2	.0%	.0%	.1%	.0%
Kubota Computer	.5	.5	.0	65	.0%	.0%	.0%	.2%
Olivetti	.5	.4	.0	13	.0%	.0%	.0%	.0%
Laser-Scan	.5	.1	.2	4	.0%	.0%	.0%	.0%
Radian Corporation	.4	.0	.2	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.4	.0	.4	0	.0%	.0%	.1%	.0%
FEGS	.4	.0	.4	0	.0%	.0%	.1%	.0%

(Continued)

Table 7 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Logic Modeling Systems	.4	.0	.3	0	.0%	.0%	.1%	.0%
Hochtief	.4	.1	.2	2	.0%	.0%	.0%	.0%
FEA	.3	.1	.1	0	.0%	.0%	.0%	.0%
Data I/O	.3	.0	.3	0	.0%	.0%	.1%	.0%
Engineering Systems Corp.	.2	.0	.2	0	.0%	.0%	.0%	.0%
Accugraph	.2	.1	.1	21	.0%	.0%	.0%	.1%
ISDATA	.2	.0	.2	0	.0%	.0%	.0%	.0%
Masta Corporation	.2	.0	.1	0	.0%	.0%	.0%	.0%
Microsim	.1	.0	.1	0	.0%	.0%	.0%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.0%	.0%
Lamp Software	.1	.0	.0	3	.0%	.0%	.0%	.0%
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.1	.1	.0	1	.0%	.0%	.0%	.0%
ESDU International	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	391.3	371.8	.0	13,376	15.3%	24.0%	.0%	42.1%
All Companies	2,557.0	1,550.7	530.6	31,767	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	2,069.5	1,248.3	412.2	26,622	80.9%	80.5%	77.7%	83.8%
All Asian-Based Companies	438.6	281.3	96.0	4,676	17.2%	18.1%	18.1%	14.7%
All European-Based Companies	48.9	21.1	22.4	469	1.9%	1.4%	4.2%	1.5%
All Hardware Companies	859.6	689.2	2.9	13,461	33.6%	44.4%	.5%	42.4%
All Turnkey & SW Companies	1,697.4	861.5	527.7	18,306	66.4%	55.6%	99.5%	57.6%

Source: Dataquest (March 1993)

Table 8
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Server
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	293.2	165.4	71.0	2,043	27.8%	26.3%	37.1%	13.3%
Digital	221.4	152.7	.0	1,880	21.0%	24.3%	.0%	12.3%
Sun Microsystems	148.8	121.4	.0	5,320	14.1%	19.3%	.0%	34.8%
Intergraph	140.1	68.0	32.2	1,908	13.3%	10.8%	16.8%	12.5%
Landmark Graphics	32.8	16.4	7.5	170	3.1%	2.6%	3.9%	1.1%
EDS	32.1	16.3	11.7	505	3.0%	2.6%	6.1%	3.3%
Zycad	31.5	18.9	4.1	239	3.0%	3.0%	2.1%	1.6%
ESRI	29.3	.0	26.6	0	2.8%	.0%	13.9%	.0%
Ikos Systems	15.4	14.6	.8	169	1.5%	2.3%	.4%	1.1%
Solbourne	14.2	14.0	.0	610	1.3%	2.2%	.0%	4.0%
Cadence	13.4	.0	10.9	0	1.3%	.0%	5.7%	.0%
Applicon	13.0	4.4	5.1	136	1.2%	.7%	2.7%	.9%
Hewlett-Packard	12.3	10.0	.0	1,394	1.2%	1.6%	.0%	9.1%
MacNeal-Schwendler	11.2	.0	10.8	0	1.1%	.0%	5.6%	.0%
Silicon Graphics	10.1	8.6	.0	192	1.0%	1.4%	.0%	1.3%
Data General	9.9	7.9	.5	378	.9%	1.3%	.3%	2.5%
Computervision	8.2	2.7	2.7	73	.8%	.4%	1.4%	.5%
Sysscan	6.2	3.1	1.3	48	.6%	.5%	.7%	.3%
Cisigraph	3.9	1.1	2.2	25	.4%	.2%	1.1%	.2%
Control Data Systems	3.2	1.5	.4	6	.3%	.2%	.2%	.0%
Cimlinc	2.7	.0	1.9	0	.3%	.0%	1.0%	.0%

(Continued)

Table 8 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Server
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ETAK	1.0	.0	.9	0	.1%	.0%	.5%	.0%
Logic Modeling Systems	.9	.0	.7	0	.1%	.0%	.4%	.0%
Sumitomo Denko Workstation	.9	.9	.0	200	.1%	.1%	.0%	1.3%
Radian Corporation	.5	.0	.3	0	.0%	.0%	.2%	.0%
Georgia Tech Research Corp.	.2	.0	.2	0	.0%	.0%	.1%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.0%	.0%
Other Companies	.0	.1	.0	9	.0%	.0%	.0%	.1%
All Companies	1,056.2	628.0	191.7	15,305	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	1,045.2	622.9	188.2	15,032	99.0%	99.2%	98.2%	98.2%
All Asian-Based Companies	.9	.9	.0	200	.1%	.1%	.0%	1.3%
All European-Based Companies	10.2	4.2	3.5	73	1.0%	.7%	1.8%	.5%
All Hardware Companies	421.4	318.7	.6	10,790	39.9%	50.8%	.3%	70.5%
All Turnkey & SW Companies	634.8	309.3	191.2	4,515	60.1%	49.2%	99.7%	29.5%

Source: Dataquest (March 1993)

Table 9
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Compaq	416.3	416.3	.0	90,225	13.1%	22.3%	.0%	21.6%
Autodesk	318.8	.0	318.8	0	10.0%	.0%	28.3%	.0%
IBM	268.3	193.2	53.4	51,885	8.4%	10.3%	4.7%	12.4%
Apple Computer	243.2	214.0	.0	57,552	7.6%	11.5%	.0%	13.8%
Hewlett-Packard	135.7	108.5	.0	32,627	4.3%	5.8%	.0%	7.8%
NEC	112.9	94.8	9.0	16,805	3.5%	5.1%	.8%	4.0%
Fujitsu	88.4	56.6	23.0	2,627	2.8%	3.0%	2.0%	.6%
Intergraph	43.9	.0	41.3	0	1.4%	.0%	3.7%	.0%
Mutoh Industries—NO OEM	40.0	21.3	11.1	809	1.3%	1.1%	1.0%	.2%
Wacom	38.9	7.8	26.8	748	1.2%	.4%	2.4%	.2%
Hakuto	36.3	21.8	14.5	816	1.1%	1.2%	1.3%	.2%
Dell Computer	34.6	34.6	.0	9,012	1.1%	1.9%	.0%	2.2%
Hitachi	31.3	15.0	13.2	1,656	1.0%	.8%	1.2%	.4%
Nemetschek	31.3	11.6	17.5	400	1.0%	.6%	1.6%	.1%
Wiechers Datentechnik	30.3	8.0	14.0	638	1.0%	.4%	1.2%	.2%
Investronica SA	29.3	23.4	2.9	1,170	.9%	1.3%	.3%	.3%
Viewlogic Systems	28.3	.0	22.6	0	.9%	.0%	2.0%	.0%
Toshiba—NO OEM	27.1	13.5	10.8	2,165	.9%	.7%	1.0%	.5%
Computervision	27.0	.0	25.6	169	.8%	.0%	2.3%	.0%
CAD Distribution	16.9	8.4	6.7	261	.5%	.5%	.6%	.1%
Tebis	16.7	2.5	11.7	96	.5%	.1%	1.0%	.0%

(Continued)

Table 9 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ESRI	16.2	.0	14.7	0	.5%	.0%	1.3%	.0%
Andor	15.7	3.9	11.1	121	.5%	.2%	1.0%	.0%
CADKEY	15.6	.0	15.6	0	.5%	.0%	1.4%	.0%
Research Machines	15.6	15.6	.0	2,517	.5%	.8%	.0%	.6%
Ziegler Informatics	14.4	.0	14.4	0	.5%	.0%	1.3%	.0%
LPKF	14.1	9.2	3.6	676	.4%	.5%	.3%	.2%
Soft-Tech Software Technologies	13.8	2.1	10.4	932	.4%	.1%	.9%	.2%
Altera	13.0	.0	11.1	0	.4%	.0%	1.0%	.0%
Design Automation	12.7	.6	12.0	67	.4%	.0%	1.1%	.0%
Racal-Redac	12.1	.0	8.8	0	.4%	.0%	.8%	.0%
Cimatron	12.0	5.4	5.4	569	.4%	.3%	.5%	.1%
Strategic Mapping	11.5	.0	10.4	0	.4%	.0%	.9%	.0%
ISICAD	11.3	.0	11.3	0	.4%	.0%	1.0%	.0%
Xilinx	11.2	.0	10.1	0	.4%	.0%	.9%	.0%
Orcad	10.9	.0	10.9	0	.3%	.0%	1.0%	.0%
CPU	10.5	.0	9.5	0	.3%	.0%	.8%	.0%
ACTEL	10.4	.0	9.4	0	.3%	.0%	.8%	.0%
Mitsubishi Electric	9.5	6.3	3.2	900	.3%	.3%	.3%	.2%
Point Control	9.2	.0	8.9	0	.3%	.0%	.8%	.0%
MapInfo	8.6	.0	6.9	0	.3%	.0%	.6%	.0%
Infocel	8.3	1.7	6.2	181	.3%	.1%	.6%	.0%

(Continued)

Table 9 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
PADS Software	8.3	.0	7.1	0	.3%	.0%	.6%	.0%
EEsof	8.1	.0	7.3	0	.3%	.0%	.6%	.0%
DAT Standard info ssystemes	7.9	.0	7.5	0	.2%	.0%	.7%	.0%
Microsim	7.9	.0	7.4	0	.2%	.0%	.7%	.0%
ETAK	7.6	.4	7.3	18	.2%	.0%	.6%	.0%
Softdesk	7.6	.0	7.6	0	.2%	.0%	.7%	.0%
Ground Modelling Systems	7.3	4.0	3.0	60	.2%	.2%	.3%	.0%
Olivetti	7.3	6.2	.0	877	.2%	.3%	.0%	.2%
Micrografx	7.3	.0	7.3	0	.2%	.0%	.6%	.0%
Data I/O	7.3	.0	7.3	0	.2%	.0%	.6%	.0%
Aucotec	7.0	1.2	4.6	340	.2%	.1%	.4%	.1%
Serbi	7.0	.7	6.3	0	.2%	.0%	.6%	.0%
CNC Software	6.8	.0	6.8	0	.2%	.0%	.6%	.0%
Hochtief	6.8	1.0	4.8	84	.2%	.1%	.4%	.0%
ASG	6.5	.0	6.5	0	.2%	.0%	.6%	.0%
BATISOFT	6.3	.9	3.2	314	.2%	.1%	.3%	.1%
Moda CAD	6.3	1.5	4.4	52	.2%	.1%	.4%	.0%
RoboCAD Solutions	6.0	.0	4.5	0	.2%	.0%	.4%	.0%
RIB/RZB	6.0	.5	4.9	41	.2%	.0%	.4%	.0%
Swanson Analysis	6.0	.0	6.0	0	.2%	.0%	.5%	.0%
Graphisoft Software Dev	5.9	.0	5.9	0	.2%	.0%	.5%	.0%

(Continued)

Table 9 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Aspen Technology	5.8	.0	5.2	0	.2%	.0%	.5%	.0%
American Small Business Comp.	5.3	.0	5.3	0	.2%	.0%	.5%	.0%
Seiko Instruments—NO OEM	5.3	3.8	3.8	136	.2%	.2%	.3%	.0%
mb Programme	5.1	2.5	1.8	122	.2%	.1%	.2%	.0%
BETRONEX	4.8	.5	4.3	89	.2%	.0%	.4%	.0%
GeoQuest	4.8	.0	4.8	0	.2%	.0%	.4%	.0%
Microway	4.7	2.9	1.4	60	.1%	.2%	.1%	.0%
Algor Interactive Systems	4.7	.0	4.2	0	.1%	.0%	.4%	.0%
International Software Systems	4.7	.0	4.7	0	.1%	.0%	.4%	.0%
ERDAS	4.6	1.2	3.0	500	.1%	.1%	.3%	.1%
Claris	4.6	.0	4.6	0	.1%	.0%	.4%	.0%
Kloeckner-Moeller	4.4	.2	3.1	46	.1%	.0%	.3%	.0%
ADRA Systems	4.3	.0	3.4	0	.1%	.0%	.3%	.0%
Teradyne	4.2	.0	3.2	0	.1%	.0%	.3%	.0%
Pathtrace	4.2	.9	2.7	62	.1%	.0%	.2%	.0%
Computer Services Consultants	4.2	.0	4.2	0	.1%	.0%	.4%	.0%
MCS	4.1	.0	3.6	0	.1%	.0%	.3%	.0%
Uchida Yoko	3.8	2.4	1.6	171	.1%	.1%	.1%	.0%
Innovative Data Design	3.7	.0	3.7	0	.1%	.0%	.3%	.0%
Mitsui Engineering	3.6	2.5	.7	60	.1%	.1%	.1%	.0%
Datagraphic	3.6	1.8	1.4	57	.1%	.1%	.1%	.0%

(Continued)

Table 9 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
GeoGraphix	3.4	.0	2.5	0	.1%	.0%	.2%	.0%
Engineering Mechanics	3.3	.2	2.8	407	.1%	.0%	.3%	.1%
PacSoft	3.2	.0	3.2	0	.1%	.0%	.3%	.0%
Vero International Software	3.1	.0	2.9	0	.1%	.0%	.3%	.0%
Sweet's Electronic Publishing	3.0	.0	2.4	0	.1%	.0%	.2%	.0%
Whessoe Computing Systems	3.0	.0	3.0	0	.1%	.0%	.3%	.0%
Accel Technologies	2.9	.0	2.6	0	.1%	.0%	.2%	.0%
Superdraft	2.8	1.3	1.4	160	.1%	.1%	.1%	.0%
Sigma Design	2.7	.0	2.5	0	.1%	.0%	.2%	.0%
Generation 5 Technology	2.6	.0	2.6	0	.1%	.0%	.2%	.0%
ALDEC	2.6	.0	2.6	0	.1%	.0%	.2%	.0%
CADWorks	2.6	.0	2.3	0	.1%	.0%	.2%	.0%
Harris EDA	2.6	.2	2.0	10	.1%	.0%	.2%	.0%
Visionics	2.5	.0	1.9	10	.1%	.0%	.2%	.0%
Foresight Resources	2.5	.0	2.3	0	.1%	.0%	.2%	.0%
Facility Mapping Systems	2.4	.0	2.1	0	.1%	.0%	.2%	.0%
ALS Design	2.4	.1	2.1	20	.1%	.0%	.2%	.0%
Anilam Electronics	2.3	.6	1.5	18	.1%	.0%	.1%	.0%
Neocad	2.3	.0	2.3	0	.1%	.0%	.2%	.0%
Elstree Computing	2.2	1.0	1.2	62	.1%	.1%	.1%	.0%
Accugraph	2.2	.1	1.8	10	.1%	.0%	.2%	.0%

(Continued)

Table 9 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
CAD-UL	2.1	.0	2.1	0	.1%	.0%	.2%	.0%
Evolution Computing	2.1	.0	2.1	0	.1%	.0%	.2%	.0%
Integrated Computer Graphics	2.1	1.0	.8	119	.1%	.1%	.1%	.0%
Carrier Corporation	2.0	.0	2.0	0	.1%	.0%	.2%	.0%
CAD-Capture	2.0	.4	.6	10	.1%	.0%	.1%	.0%
Kork Systems	2.0	.2	1.4	20	.1%	.0%	.1%	.0%
PAFEC	1.9	.0	1.9	0	.1%	.0%	.2%	.0%
Terra Sciences	1.9	.0	1.9	0	.1%	.0%	.2%	.0%
CAMTEK	1.9	.4	1.2	0	.1%	.0%	.1%	.0%
Genasys II	1.9	.2	1.6	38	.1%	.0%	.1%	.0%
ISDATA	1.8	.0	1.6	0	.1%	.0%	.1%	.0%
Engineered Software	1.7	.0	1.7	0	.1%	.0%	.2%	.0%
Massteck	1.6	.0	1.6	0	.1%	.0%	.1%	.0%
Intera Tydac	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
Radian Corporation	1.6	.0	.9	0	.0%	.0%	.1%	.0%
Research Engineers—Civilsoft	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
FEA	1.5	.4	.4	0	.0%	.0%	.0%	.0%
LandCadd	1.5	.0	1.4	0	.0%	.0%	.1%	.0%
Minc Software	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
EME	1.5	.4	.7	41	.0%	.0%	.1%	.0%
GRAPHSOFT	1.4	.0	1.4	0	.0%	.0%	.1%	.0%

(Continued)

Table 9 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ARKTEC	1.4	.1	1.2	32	.0%	.0%	.1%	.0%
Lamp Software	1.4	.3	1.1	76	.0%	.0%	.1%	.0%
Aries Technology	1.3	.0	1.2	0	.0%	.0%	.1%	.0%
Cimlinc	1.3	.0	.9	0	.0%	.0%	.1%	.0%
Compact Software	1.3	.0	1.3	0	.0%	.0%	.1%	.0%
Applicon	1.3	.4	.5	40	.0%	.0%	.0%	.0%
Geometria GIS Systems House	1.3	.2	.4	15	.0%	.0%	.0%	.0%
Tanner Research	1.3	.0	1.1	0	.0%	.0%	.1%	.0%
Integer	1.2	.0	1.0	0	.0%	.0%	.1%	.0%
Aucos elektronische Gerate	1.2	.4	.9	121	.0%	.0%	.1%	.0%
Mucke Software	1.1	.6	.4	27	.0%	.0%	.0%	.0%
Spectrum Software	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Mega CADD	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
CAE-link	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Intrinsix	1.0	1.0	.0	10	.0%	.1%	.0%	.0%
Cascade Graphics	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Aura CAD/CAM Systems	1.0	.0	.9	0	.0%	.0%	.1%	.0%
Quicklogic	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Omation	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Cadisys	.9	.0	.9	0	.0%	.0%	.1%	.0%
Areon	.9	.5	.2	6	.0%	.0%	.0%	.0%

(Continued)

Table 9 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Terr-Mar Resource Info Svs	.9	.2	.5	24	.0%	.0%	.0%	.0%
Maptech	.9	.0	.9	0	.0%	.0%	.1%	.0%
Contract Data Research	.9	.0	.6	0	.0%	.0%	.1%	.0%
Number One Systems	.9	.2	.7	63	.0%	.0%	.1%	.0%
Rasna Corporation	.9	.0	.8	0	.0%	.0%	.1%	.0%
CADSI	.8	.1	.6	14	.0%	.0%	.1%	.0%
A.I. Systems	.8	.0	.8	0	.0%	.0%	.1%	.0%
Dynaware	.8	.0	.8	0	.0%	.0%	.1%	.0%
Douglas Electronics	.8	.0	.8	0	.0%	.0%	.1%	.0%
CAD Lab	.8	.0	.7	0	.0%	.0%	.1%	.0%
MacNeal-Schwendler	.8	.0	.7	0	.0%	.0%	.1%	.0%
Vamp	.7	.0	.7	0	.0%	.0%	.1%	.0%
Uniras	.7	.0	.7	0	.0%	.0%	.1%	.0%
Engineering Systems Corp.	.7	.0	.6	0	.0%	.0%	.0%	.0%
INS Engineering	.7	.4	.4	13	.0%	.0%	.0%	.0%
IGC Technology	.7	.0	.7	0	.0%	.0%	.1%	.0%
debis Systemhaus	.7	.2	.4	13	.0%	.0%	.0%	.0%
Mc2 Engineering Software	.7	.0	.7	0	.0%	.0%	.1%	.0%
ECOM Associates	.7	.0	.7	4	.0%	.0%	.1%	.0%
Digital	.7	.0	.5	0	.0%	.0%	.0%	.0%
CADMATIC	.7	.0	.4	4	.0%	.0%	.0%	.0%

(Continued)

Table 9 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Caroline Informatique	.7	.1	.3	10	.0%	.0%	.0%	.0%
Infinite Graphics	.6	.0	.6	0	.0%	.0%	.1%	.0%
ESDU International	.6	.0	.6	0	.0%	.0%	.1%	.0%
ASCAD/ASCAM	.6	.4	.2	14	.0%	.0%	.0%	.0%
Machinery Sales	.6	.0	.6	0	.0%	.0%	.1%	.0%
Sharp System Products—NO OEM	.6	.3	.3	17	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.6	.2	.4	8	.0%	.0%	.0%	.0%
Capilano Computing	.5	.0	.5	0	.0%	.0%	.0%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.0%	.0%
Bechtel Software	.5	.0	.5	0	.0%	.0%	.0%	.0%
Inca	.5	.5	.0	2	.0%	.0%	.0%	.0%
S.T.L.D. s.r.l.	.5	.0	.5	0	.0%	.0%	.0%	.0%
Phase Three Logic	.4	.0	.4	0	.0%	.0%	.0%	.0%
Applications in CADD	.4	.1	.3	11	.0%	.0%	.0%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.0%	.0%
Ithaca Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
Logic Modeling Systems	.4	.0	.3	0	.0%	.0%	.0%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.0%	.0%
Geosoft	.4	.0	.4	0	.0%	.0%	.0%	.0%
Geotrace Technologies	.3	.0	.3	0	.0%	.0%	.0%	.0%
GEOVISION Inc.	.3	.2	.1	38	.0%	.0%	.0%	.0%

(Continued)

Table 9 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Synthesis	.3	.0	.3	0	.0%	.0%	.0%	.0%
Meta-Software	.3	.0	.2	0	.0%	.0%	.0%	.0%
SIMUCAD	.3	.0	.3	0	.0%	.0%	.0%	.0%
Masta Corporation	.3	.0	.2	0	.0%	.0%	.0%	.0%
The Great Softwestern Co.	.2	.0	.2	0	.0%	.0%	.0%	.0%
Simulation Science	.2	.0	.2	0	.0%	.0%	.0%	.0%
Bobcat Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Instrumatic Espanola	.2	.0	.2	0	.0%	.0%	.0%	.0%
Geomath	.2	.0	.2	0	.0%	.0%	.0%	.0%
Genrad	.2	.0	.2	9	.0%	.0%	.0%	.0%
Pacific Numerics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Simutest	.2	.0	.2	0	.0%	.0%	.0%	.0%
Radan Computational	.2	.1	.1	6	.0%	.0%	.0%	.0%
TOOL Software	.1	.0	.1	3	.0%	.0%	.0%	.0%
National Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
Exemplar Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Technische Computer Systeme	.0	.0	.0	1	.0%	.0%	.0%	.0%
Electrical Eng. Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Dolphin Integration	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 9 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Worldwide
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Other Companies	522.9	524.0	.0	138,025	16.4%	28.1%	.0%	33.0%
All Companies	3,183.9	1,867.9	1,127.0	418,247	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	2,396.8	1,499.5	786.4	381,009	75.3%	80.3%	69.8%	91.1%
All Asian-Based Companies	437.2	251.0	151.0	27,111	13.7%	13.4%	13.4%	6.5%
All European-Based Companies	349.8	117.4	189.6	10,127	11.0%	6.3%	16.8%	2.4%
All Hardware Companies	1,613.8	1,544.0	.0	388,962	50.7%	82.7%	.0%	93.0%
All Turnkey & SW Companies	1,570.1	323.9	1,127.0	29,285	49.3%	17.3%	100.0%	7.0%

Source: Dataquest (March 1993)

Table 10
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Intergraph	627.8	262.4	173.2	9,772	11.9%	9.9%	10.2%	3.6%
IBM	481.4	275.1	120.6	21,812	9.2%	10.4%	7.1%	7.9%
Sun Microsystems	423.6	363.2	.0	28,297	8.1%	13.7%	.0%	10.3%
Digital	412.2	280.6	4.2	4,483	7.8%	10.6%	.2%	1.6%
Hewlett-Packard	292.2	225.3	16.6	32,386	5.6%	8.5%	1.0%	11.8%
Cadence	211.3	.0	167.0	0	4.0%	.0%	9.9%	.0%
Compaq	197.5	197.5	.0	42,808	3.8%	7.4%	.0%	15.6%
Autodesk	168.2	.0	168.2	0	3.2%	.0%	9.9%	.0%
Mentor Graphics	157.6	36.3	59.9	635	3.0%	1.4%	3.5%	.2%
Apple Computer	150.7	132.6	.0	35,682	2.9%	5.0%	.0%	13.0%
Computervision	147.4	48.0	54.4	1,405	2.8%	1.8%	3.2%	.5%
EDS	143.8	70.8	53.6	2,252	2.7%	2.7%	3.2%	.8%
Silicon Graphics	126.7	115.0	.0	3,278	2.4%	4.3%	.0%	1.2%
ESRI	72.7	.0	66.2	0	1.4%	.0%	3.9%	.0%
Control Data Systems	67.3	32.6	11.1	472	1.3%	1.2%	.7%	.2%
Parametric Technology	65.1	.0	54.7	0	1.2%	.0%	3.2%	.0%
Applicon	51.3	16.9	20.0	548	1.0%	.6%	1.2%	.2%
Viewlogic Systems	43.4	.0	34.7	0	.8%	.0%	2.1%	.0%
Synopsys	37.2	.0	26.8	0	.7%	.0%	1.6%	.0%
SDRC	36.9	.0	36.9	0	.7%	.0%	2.2%	.0%
Auto-Trol	36.9	13.6	14.0	461	.7%	.5%	.8%	.2%

(Continued)

Table 10 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Data General	36.2	29.0	1.8	1,898	.7%	1.1%	.1%	.7%
Landmark Graphics	32.8	16.4	7.5	170	.6%	.6%	.4%	.1%
Dell Computer	25.3	25.3	.0	6,597	.5%	1.0%	.0%	2.4%
MacNeal-Schwendler	24.6	.0	23.6	0	.5%	.0%	1.4%	.0%
Racal-Redac	23.0	.0	19.3	0	.4%	.0%	1.1%	.0%
PDA Engineering	22.9	.0	22.0	0	.4%	.0%	1.3%	.0%
Unisys	21.3	10.8	7.4	318	.4%	.4%	.4%	.1%
Alias Research	21.2	.0	19.3	0	.4%	.0%	1.1%	.0%
Accugraph	20.2	9.0	9.2	718	.4%	.3%	.5%	.3%
Zycad	18.9	11.3	2.5	155	.4%	.4%	.1%	.1%
COMPASS Design Automation	18.2	.3	13.7	14	.3%	.0%	.8%	.0%
Quickturn Systems	17.2	17.2	.0	143	.3%	.6%	.0%	.1%
Harris EDA	17.1	1.9	9.9	73	.3%	.1%	.6%	.0%
Cimlinc	16.0	.0	11.2	337	.3%	.0%	.7%	.1%
ISICAD	15.7	4.7	9.4	85	.3%	.2%	.6%	.0%
MCS	15.6	.0	13.8	0	.3%	.0%	.8%	.0%
Swanson Analysis	15.4	.0	15.4	0	.3%	.0%	.9%	.0%
Gerber Systems	14.3	7.0	4.7	198	.3%	.3%	.3%	.1%
Solbourne	13.8	13.5	.0	1,114	.3%	.5%	.0%	.4%
CADKEY	12.8	.0	12.8	0	.2%	.0%	.8%	.0%
Logic Modeling Systems	10.9	.0	8.7	0	.2%	.0%	.5%	.0%

(Continued)

Table 10 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
GeoVision Systems	10.8	.9	5.6	10	.2%	.0%	.3%	.0%
Xilinx	10.4	.0	9.4	0	.2%	.0%	.6%	.0%
Ikos Systems	9.9	9.4	.5	108	.2%	.4%	.0%	.0%
Aries Technology	9.4	.0	8.5	0	.2%	.0%	.5%	.0%
LSI Logic	9.1	.9	6.8	23	.2%	.0%	.4%	.0%
ADRA Systems	8.9	.5	6.6	32	.2%	.0%	.4%	.0%
EEsof	8.7	.1	7.7	6	.2%	.0%	.5%	.0%
Infocel	8.5	1.7	6.4	177	.2%	.1%	.4%	.1%
Comdisco Systems	8.4	.0	7.6	0	.2%	.0%	.4%	.0%
Softdesk	8.4	.0	8.4	0	.2%	.0%	.5%	.0%
Strategic Mapping	8.2	.0	7.4	0	.2%	.0%	.4%	.0%
ICAD	8.1	.0	6.5	0	.2%	.0%	.4%	.0%
ACTEL	8.1	.0	7.3	0	.2%	.0%	.4%	.0%
ETAK	8.0	.4	7.6	17	.2%	.0%	.4%	.0%
Genasys II	7.8	.8	6.7	52	.1%	.0%	.4%	.0%
Ascent Logic Corp	7.8	.0	6.2	0	.1%	.0%	.4%	.0%
Teradyne	7.7	.8	5.3	14	.1%	.0%	.3%	.0%
Synercom	7.6	.0	4.0	0	.1%	.0%	.2%	.0%
Altera	7.5	.0	6.4	0	.1%	.0%	.4%	.0%
Ontos	7.5	.0	7.5	0	.1%	.0%	.4%	.0%
GeoQuest	7.2	.0	7.2	0	.1%	.0%	.4%	.0%

(Continued)

Table 10 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
MapInfo	7.1	.0	5.7	0	.1%	.0%	.3%	.0%
Meta-Software	7.1	.0	5.0	0	.1%	.0%	.3%	.0%
ERDAS	7.0	1.9	4.6	762	.1%	.1%	.3%	.3%
Point Control	6.8	.0	6.6	0	.1%	.0%	.4%	.0%
ASG	6.5	.0	6.5	0	.1%	.0%	.4%	.0%
EA Systems	6.2	.0	6.2	0	.1%	.0%	.4%	.0%
Quad Design Technology	6.2	.0	5.7	0	.1%	.0%	.3%	.0%
Microsim	6.0	.0	5.6	0	.1%	.0%	.3%	.0%
Test Systems Strategies	6.0	.0	5.1	0	.1%	.0%	.3%	.0%
Zuken	5.5	2.2	3.3	32	.1%	.1%	.2%	.0%
Analogy	5.4	.0	4.4	0	.1%	.0%	.3%	.0%
Integrated Computer Graphics	5.2	2.6	2.1	208	.1%	.1%	.1%	.1%
American Small Business Comp.	4.7	.0	4.7	0	.1%	.0%	.3%	.0%
Aspen Technology	4.6	.0	4.2	0	.1%	.0%	.2%	.0%
PADS Software	4.6	.0	3.9	0	.1%	.0%	.2%	.0%
Cimatron	4.6	2.1	2.1	149	.1%	.1%	.1%	.1%
i-Logix	4.3	.0	4.3	0	.1%	.0%	.3%	.0%
CNC Software	4.1	.0	4.1	0	.1%	.0%	.2%	.0%
Algor Interactive Systems	4.1	.0	3.6	0	.1%	.0%	.2%	.0%
Micrografx	4.0	.0	4.0	0	.1%	.0%	.2%	.0%
Moda CAD	4.0	1.0	2.8	33	.1%	.0%	.2%	.0%

(Continued)

Table 10 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Cascade Design Automation	4.0	.0	3.0	0	.1%	.0%	.2%	.0%
Data I/O	3.9	.0	3.9	0	.1%	.0%	.2%	.0%
Cisigraph	3.9	1.1	2.2	25	.1%	.0%	.1%	.0%
Orcad	3.8	.0	3.8	0	.1%	.0%	.2%	.0%
Matra Datavision	3.8	1.3	1.7	35	.1%	.1%	.1%	.0%
Pacific Numerics	3.7	.0	3.7	0	.1%	.0%	.2%	.0%
Mechanical Dynamics	3.6	.0	3.2	0	.1%	.0%	.2%	.0%
Bechtel Software	3.6	.0	3.4	0	.1%	.0%	.2%	.0%
Wisdom Systems	3.6	.0	2.8	0	.1%	.0%	.2%	.0%
Innovative Data Design	3.5	.0	3.5	0	.1%	.0%	.2%	.0%
Autometric	3.5	2.3	1.2	75	.1%	.1%	.1%	.0%
Sigma Design	3.4	.0	3.2	0	.1%	.0%	.2%	.0%
PacSoft	3.2	.0	3.2	0	.1%	.0%	.2%	.0%
GeoGraphix	3.2	.0	2.4	0	.1%	.0%	.1%	.0%
Intera Tydac	3.2	.0	3.2	0	.1%	.0%	.2%	.0%
Genrad	3.1	.6	2.1	32	.1%	.0%	.1%	.0%
Radian Corporation	3.1	.0	1.9	0	.1%	.0%	.1%	.0%
Rasna Corporation	3.0	.0	2.7	0	.1%	.0%	.2%	.0%
Neocad	3.0	.0	3.0	0	.1%	.0%	.2%	.0%
Dynamic Graphics	2.9	.0	2.4	0	.1%	.0%	.1%	.0%
Silvar-Lisco	2.8	.0	1.6	0	.1%	.0%	.1%	.0%

(Continued)

Table 10 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Engineering Mechanics	2.8	.1	2.4	220	.1%	.0%	.1%	.1%
Sweet's Electronic Publishing	2.7	.0	2.2	0	.1%	.0%	.1%	.0%
CADSI	2.7	.4	2.0	18	.1%	.0%	.1%	.0%
Land Innovation	2.6	.0	2.6	0	.1%	.0%	.2%	.0%
Scientific & Engineering SW	2.6	.0	2.6	0	.0%	.0%	.2%	.0%
Visionics	2.5	.0	1.9	10	.0%	.0%	.1%	.0%
MARC	2.4	.0	2.4	0	.0%	.0%	.1%	.0%
International Software Systems	2.4	.0	2.4	0	.0%	.0%	.1%	.0%
Claris	2.3	.0	2.3	0	.0%	.0%	.1%	.0%
Motorola	2.2	.0	2.2	0	.0%	.0%	.1%	.0%
Infinite Graphics	2.2	.0	2.2	0	.0%	.0%	.1%	.0%
Accel Technologies	2.2	.0	2.0	0	.0%	.0%	.1%	.0%
Laser-Scan	2.2	.8	.9	14	.0%	.0%	.1%	.0%
Facility Mapping Systems	2.2	.0	1.9	0	.0%	.0%	.1%	.0%
Generation 5 Technology	2.2	.0	2.2	0	.0%	.0%	.1%	.0%
Minc Software	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
CAD Centre	2.1	.0	1.7	0	.0%	.0%	.1%	.0%
SPATIAL Technology	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
Foresight Resources	2.1	.0	1.9	0	.0%	.0%	.1%	.0%
ALDEC	2.0	.0	2.0	0	.0%	.0%	.1%	.0%
Quantic Laboratories	2.0	.0	1.8	0	.0%	.0%	.1%	.0%

(Continued)

Table 10 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ACDS Graphic System	1.9	.0	1.6	0	.0%	.0%	.1%	.0%
CAD/CAM Group	1.9	.0	1.9	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	1.8	.3	1.5	11	.0%	.0%	.1%	.0%
Sunrise Test Systems	1.8	.0	1.8	0	.0%	.0%	.1%	.0%
Terra Sciences	1.8	.0	1.8	0	.0%	.0%	.1%	.0%
EPIC Design Technology	1.8	.0	1.8	0	.0%	.0%	.1%	.0%
Research Engineers—Civilsoft	1.7	.0	1.7	0	.0%	.0%	.1%	.0%
Contec Microelectronics	1.7	.0	1.5	0	.0%	.0%	.1%	.0%
Evolution Computing	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
LPKF	1.6	1.0	.4	68	.0%	.0%	.0%	.0%
Ultimap	1.6	.6	.5	18	.0%	.0%	.0%	.0%
Object Design	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
SIMUCAD	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
Objectivity	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
Compact Software	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
Delcam International	1.5	.5	.7	25	.0%	.0%	.0%	.0%
GRAPHSOFT	1.4	.0	1.4	0	.0%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	1.4	.4	.7	24	.0%	.0%	.0%	.0%
Massteck	1.3	.0	1.3	0	.0%	.0%	.1%	.0%
Investronica SA	1.2	1.0	.1	48	.0%	.0%	.0%	.0%
BETRONEX	1.2	.1	1.1	22	.0%	.0%	.1%	.0%

(Continued)

Table 10 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
GEOVISION Inc.	1.2	.7	.3	63	.0%	.0%	.0%	.0%
Secagraphics	1.2	.5	.3	8	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Tanner Research	1.1	.0	1.0	0	.0%	.0%	.1%	.0%
Geotrace Technologies	1.1	.0	1.0	17	.0%	.0%	.1%	.0%
Kockums Computer Systems	1.1	.3	.6	53	.0%	.0%	.0%	.0%
Carrier Corporation	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Intrinsix	1.0	1.0	.0	10	.0%	.0%	.0%	.0%
Cadisys	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
LandCadd	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Spectrum Software	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Geomath	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Engineered Software	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Valisys	1.0	.0	.0	0	.0%	.0%	.0%	.0%
IEZ	1.0	.3	.5	20	.0%	.0%	.0%	.0%
Pathtrace	1.0	.2	.6	14	.0%	.0%	.0%	.0%
Graphisoft Software Dev	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
CAE-link	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Maptech	.9	.0	.9	0	.0%	.0%	.1%	.0%
ANACAD	.9	.0	.9	0	.0%	.0%	.1%	.0%
Computational Mechanics	.9	.0	.9	0	.0%	.0%	.1%	.0%

(Continued)

Table 10 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Quicklogic	.9	.0	.9	0	.0%	.0%	.1%	.0%
Aura CAD/CAM Systems	.9	.0	.8	0	.0%	.0%	.0%	.0%
Royal Digital Centers	.9	.0	.8	0	.0%	.0%	.0%	.0%
Cascade Graphics	.8	.0	.8	0	.0%	.0%	.0%	.0%
Kork Systems	.8	.1	.6	16	.0%	.0%	.0%	.0%
Engineering Systems Corp.	.8	.0	.6	0	.0%	.0%	.0%	.0%
Dynaware	.8	.0	.8	0	.0%	.0%	.0%	.0%
Douglas Electronics	.8	.0	.8	0	.0%	.0%	.0%	.0%
National Semiconductor	.8	.1	.6	7	.0%	.0%	.0%	.0%
Mega CADD	.8	.0	.8	0	.0%	.0%	.0%	.0%
Uniras	.7	.0	.7	0	.0%	.0%	.0%	.0%
ECOM Associates	.7	.0	.7	4	.0%	.0%	.0%	.0%
IGC Technology	.7	.0	.7	0	.0%	.0%	.0%	.0%
CADWorks	.7	.0	.6	0	.0%	.0%	.0%	.0%
A.I. Systems	.7	.0	.7	0	.0%	.0%	.0%	.0%
Ground Modelling Systems	.7	.5	.3	4	.0%	.0%	.0%	.0%
Electrical Eng. Software	.6	.0	.6	0	.0%	.0%	.0%	.0%
Machinery Sales	.6	.0	.6	0	.0%	.0%	.0%	.0%
Omation	.6	.0	.6	0	.0%	.0%	.0%	.0%
Vamp	.6	.0	.6	0	.0%	.0%	.0%	.0%
Phase Three Logic	.6	.0	.5	0	.0%	.0%	.0%	.0%

(Continued)

Table 10 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Mc2 Engineering Software	.6	.0	.6	0	.0%	.0%	.0%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.0%	.0%
Expertest	.5	.0	.5	0	.0%	.0%	.0%	.0%
Capilano Computing	.5	.0	.5	0	.0%	.0%	.0%	.0%
CAD Language Systems	.5	.0	.4	0	.0%	.0%	.0%	.0%
Moss Systems	.5	.0	.4	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.4	.0	.4	0	.0%	.0%	.0%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.0%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.0%	.0%
Geosoft	.4	.0	.4	0	.0%	.0%	.0%	.0%
Simulation Science	.4	.0	.4	0	.0%	.0%	.0%	.0%
Ithaca Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
FEGS	.3	.0	.3	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.3	.0	.3	0	.0%	.0%	.0%	.0%
The Great Softwestern Co.	.2	.0	.2	0	.0%	.0%	.0%	.0%
Bobcat Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
MEDESIGN	.2	.1	.1	2	.0%	.0%	.0%	.0%
Simutest	.2	.0	.2	0	.0%	.0%	.0%	.0%
Shared Resources	.2	.0	.2	0	.0%	.0%	.0%	.0%
BATISOFT	.2	.0	.1	7	.0%	.0%	.0%	.0%
Synthesis	.2	.0	.2	0	.0%	.0%	.0%	.0%

(Continued)

Table 10 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Exemplar Logic	.1	.0	.1	0	.0%	.0%	.0%	.0%
Technische Computer Systeme	.1	.0	.1	3	.0%	.0%	.0%	.0%
Areon	.1	.0	.0	0	.0%	.0%	.0%	.0%
Complansoft CAD	.1	.0	.0	1	.0%	.0%	.0%	.0%
Star Informatic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Number One Systems	.0	.0	.0	3	.0%	.0%	.0%	.0%
CADMATIC	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	404.6	399.1	.0	76,335	7.7%	15.0%	.0%	27.8%
All Companies	5,258.8	2,654.9	1,693.7	274,951	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	5,200.4	2,643.5	1,654.6	274,425	98.9%	99.6%	97.7%	99.8%
All Asian-Based Companies	5.5	2.2	3.3	32	.1%	.1%	.2%	.0%
All European-Based Companies	53.0	9.3	35.9	494	1.0%	.4%	2.1%	.2%
All Hardware Companies	2,097.1	1,819.0	4.1	247,075	39.9%	68.5%	.2%	89.9%
All Turnkey & SW Companies	3,161.7	835.9	1,689.7	27,876	60.1%	31.5%	99.8%	10.1%

Source: Dataquest (March 1993)

Table 11
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Intergraph	504.3	220.7	118.7	8,665	18.1%	18.4%	11.9%	12.9%
Sun Microsystems	350.6	303.6	.0	24,989	12.6%	25.4%	.0%	37.3%
Hewlett-Packard	220.0	167.4	16.6	12,905	7.9%	14.0%	1.7%	19.3%
Cadence	191.9	.0	151.6	0	6.9%	.0%	15.3%	.0%
Mentor Graphics	157.6	36.3	59.9	635	5.7%	3.0%	6.0%	.9%
Computervision	123.0	44.8	37.2	1,210	4.4%	3.7%	3.7%	1.8%
EDS	122.1	62.3	42.7	2,009	4.4%	5.2%	4.3%	3.0%
Silicon Graphics	121.8	110.8	.0	3,186	4.4%	9.3%	.0%	4.8%
IBM	88.0	49.3	21.6	3,154	3.2%	4.1%	2.2%	4.7%
Digital	85.1	55.8	3.2	3,583	3.1%	4.7%	.3%	5.4%
Parametric Technology	65.1	.0	54.7	0	2.3%	.0%	5.5%	.0%
Applicon	46.2	15.2	18.0	484	1.7%	1.3%	1.8%	.7%
Synopsys	37.2	.0	26.8	0	1.3%	.0%	2.7%	.0%
ESRI	37.1	.0	33.7	0	1.3%	.0%	3.4%	.0%
Auto-Trol	36.9	13.6	14.0	461	1.3%	1.1%	1.4%	.7%
SDRC	33.3	.0	33.3	0	1.2%	.0%	3.3%	.0%
Data General	26.8	21.4	1.3	1,539	1.0%	1.8%	.1%	2.3%
Control Data Systems	25.0	15.2	5.2	339	.9%	1.3%	.5%	.5%
Viewlogic Systems	24.8	.0	19.8	0	.9%	.0%	2.0%	.0%
Alias Research	21.2	.0	19.3	0	.8%	.0%	1.9%	.0%
Racal-Redac	19.7	.0	16.6	0	.7%	.0%	1.7%	.0%

(Continued)

Table 11 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Landmark Graphics	19.7	9.8	4.5	102	.7%	.8%	.5%	.2%
Accugraph	18.0	8.8	7.4	688	.6%	.7%	.7%	1.0%
COMPASS Design Automation	17.8	.3	13.4	14	.6%	.0%	1.3%	.0%
Quickturn Systems	17.2	17.2	.0	143	.6%	1.4%	.0%	.2%
PDA Engineering	17.2	.0	16.5	0	.6%	.0%	1.7%	.0%
Unisys	16.4	8.3	5.7	253	.6%	.7%	.6%	.4%
Harris EDA	15.2	1.7	8.5	64	.5%	.1%	.9%	.1%
Gerber Systems	14.3	7.0	4.7	198	.5%	.6%	.5%	.3%
Cimline	13.6	.0	9.5	337	.5%	.0%	1.0%	.5%
ISICAD	11.0	4.7	4.7	85	.4%	.4%	.5%	.1%
Logic Modeling Systems	9.9	.0	7.9	0	.4%	.0%	.8%	.0%
Swanson Analysis	8.6	.0	8.6	0	.3%	.0%	.9%	.0%
Aries Technology	8.5	.0	7.6	0	.3%	.0%	.8%	.0%
Comdisco Systems	8.4	.0	7.6	0	.3%	.0%	.8%	.0%
Autodesk	8.4	.0	8.4	0	.3%	.0%	.8%	.0%
LSI Logic	8.2	.8	6.1	21	.3%	.1%	.6%	.0%
ICAD	8.1	.0	6.5	0	.3%	.0%	.7%	.0%
Ascent Logic Corp	7.8	.0	6.2	0	.3%	.0%	.6%	.0%
GeoVision Systems	7.6	.6	3.9	9	.3%	.1%	.4%	.0%
Ontos	7.5	.0	7.5	0	.3%	.0%	.8%	.0%
MCS	7.2	.0	6.4	0	.3%	.0%	.6%	.0%

(Continued)

Table 11 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Genasys II	7.0	.7	6.0	37	.3%	.1%	.6%	.1%
ADRA Systems	6.8	.5	5.0	32	.2%	.0%	.5%	.0%
Meta-Software	6.2	.0	4.4	0	.2%	.0%	.4%	.0%
Quad Design Technology	6.2	.0	5.7	0	.2%	.0%	.6%	.0%
Zuken	5.5	2.2	3.3	32	.2%	.2%	.3%	.0%
Test Systems Strategies	5.4	.0	4.6	0	.2%	.0%	.5%	.0%
Analogy	5.2	.0	4.1	0	.2%	.0%	.4%	.0%
EEsof	5.1	.1	4.4	6	.2%	.0%	.4%	.0%
Synercom	4.8	.0	2.5	0	.2%	.0%	.3%	.0%
Teradyne	4.6	.8	3.0	14	.2%	.1%	.3%	.0%
i-Logix	4.3	.0	4.3	0	.2%	.0%	.4%	.0%
ERDAS	4.2	1.1	2.8	457	.2%	.1%	.3%	.7%
Solbourne	4.1	4.0	.0	706	.1%	.3%	.0%	1.1%
Cascade Design Automation	4.0	.0	3.0	0	.1%	.0%	.3%	.0%
Matra Datavision	3.8	1.3	1.7	35	.1%	.1%	.2%	.1%
Wisdom Systems	3.6	.0	2.8	0	.1%	.0%	.3%	.0%
GeoQuest	3.6	.0	3.6	0	.1%	.0%	.4%	.0%
Cisigraph	3.5	1.0	1.9	23	.1%	.1%	.2%	.0%
Pacific Numerics	3.5	.0	3.5	0	.1%	.0%	.4%	.0%
Integrated Computer Graphics	3.1	1.6	1.3	89	.1%	.1%	.1%	.1%
Xilinx	3.1	.0	2.8	0	.1%	.0%	.3%	.0%

(Continued)

Table 11 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Mechanical Dynamics	3.1	.0	2.8	0	.1%	.0%	.3%	.0%
Cimatron	2.9	1.3	1.3	64	.1%	.1%	.1%	.1%
Silvar-Lisco	2.8	.0	1.6	0	.1%	.0%	.2%	.0%
Genrad	2.7	.5	1.8	27	.1%	.0%	.2%	.0%
MacNeal-Schwendler	2.7	.0	2.6	0	.1%	.0%	.3%	.0%
Land Innovation	2.6	.0	2.6	0	.1%	.0%	.3%	.0%
Scientific & Engineering SW	2.6	.0	2.6	0	.1%	.0%	.3%	.0%
Rasna Corporation	2.4	.0	2.2	0	.1%	.0%	.2%	.0%
Dynamic Graphics	2.3	.0	1.9	0	.1%	.0%	.2%	.0%
Motorola	2.2	.0	2.2	0	.1%	.0%	.2%	.0%
CADSI	2.1	.3	1.6	10	.1%	.0%	.2%	.0%
Laser-Scan	2.1	.7	.8	13	.1%	.1%	.1%	.0%
CAD Centre	2.1	.0	1.7	0	.1%	.0%	.2%	.0%
SPATIAL Technology	2.1	.0	2.1	0	.1%	.0%	.2%	.0%
Quantic Laboratories	2.0	.0	1.8	0	.1%	.0%	.2%	.0%
Softdesk	1.9	.0	1.9	0	.1%	.0%	.2%	.0%
ACDS Graphic System	1.9	.0	1.6	0	.1%	.0%	.2%	.0%
Sigma Design	1.9	.0	1.8	0	.1%	.0%	.2%	.0%
Radian Corporation	1.9	.0	1.1	0	.1%	.0%	.1%	.0%
CAD/CAM Group	1.9	.0	1.9	0	.1%	.0%	.2%	.0%
Sunrise Test Systems	1.8	.0	1.8	0	.1%	.0%	.2%	.0%

(Continued)

Table 11 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
EPIC Design Technology	1.8	.0	1.8	0	.1%	.0%	.2%	.0%
Autometric	1.7	1.1	.6	40	.1%	.1%	.1%	.1%
MARC	1.7	.0	1.7	0	.1%	.0%	.2%	.0%
Infinite Graphics	1.7	.0	1.7	0	.1%	.0%	.2%	.0%
Contec Microelectronics	1.7	.0	1.5	0	.1%	.0%	.2%	.0%
ACTEL	1.6	.0	1.5	0	.1%	.0%	.1%	.0%
Engineering Mechanics	1.6	.1	1.4	77	.1%	.0%	.1%	.1%
Intera Tydac	1.6	.0	1.6	0	.1%	.0%	.2%	.0%
Ultimap	1.6	.6	.5	18	.1%	.0%	.0%	.0%
Object Design	1.6	.0	1.6	0	.1%	.0%	.2%	.0%
Objectivity	1.5	.0	1.5	0	.1%	.0%	.2%	.0%
Delcam International	1.5	.5	.7	25	.1%	.0%	.1%	.0%
Integrated Silicon Systems	1.5	.2	1.3	6	.1%	.0%	.1%	.0%
Bechtel Software	1.4	.0	1.3	0	.0%	.0%	.1%	.0%
SIMUCAD	1.2	.0	1.1	0	.0%	.0%	.1%	.0%
CADKEY	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Kockums Computer Systems	1.1	.3	.6	53	.0%	.0%	.1%	.1%
Minc Software	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Infocel	1.0	.2	.8	15	.0%	.0%	.1%	.0%
IEZ	1.0	.3	.5	20	.0%	.0%	.0%	.0%
Valisys	.9	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 11 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ANACAD	.9	.0	.9	0	.0%	.0%	.1%	.0%
GEOVISION Inc.	.9	.5	.2	27	.0%	.0%	.0%	.0%
Royal Digital Centers	.9	.0	.8	0	.0%	.0%	.1%	.0%
Geomath	.8	.0	.8	0	.0%	.0%	.1%	.0%
ETAK	.8	.0	.8	1	.0%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	.8	.2	.4	10	.0%	.0%	.0%	.0%
Neocad	.8	.0	.8	0	.0%	.0%	.1%	.0%
National Semiconductor	.7	.1	.5	7	.0%	.0%	.1%	.0%
Data I/O	.7	.0	.7	0	.0%	.0%	.1%	.0%
Compact Software	.6	.0	.6	0	.0%	.0%	.1%	.0%
Microsim	.6	.0	.6	0	.0%	.0%	.1%	.0%
Georgia Tech Research Corp.	.6	.0	.6	0	.0%	.0%	.1%	.0%
Point Control	.5	.0	.5	0	.0%	.0%	.1%	.0%
Expertest	.5	.0	.5	0	.0%	.0%	.1%	.0%
CAD Language Systems	.5	.0	.4	0	.0%	.0%	.0%	.0%
Moss Systems	.5	.0	.4	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
PADS Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.4	.0	.4	0	.0%	.0%	.0%	.0%
Computational Mechanics	.4	.0	.4	0	.0%	.0%	.0%	.0%
ASG	.3	.0	.3	0	.0%	.0%	.0%	.0%

(Continued)

Table 11 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Terra Sciences	.3	.0	.3	0	.0%	.0%	.0%	.0%
Simulation Science	.3	.0	.3	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.3	.0	.3	0	.0%	.0%	.0%	.0%
MEDESIGN	.2	.1	.1	2	.0%	.0%	.0%	.0%
Shared Resources	.2	.0	.2	0	.0%	.0%	.0%	.0%
Ithaca Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
FEGS	.2	.0	.2	0	.0%	.0%	.0%	.0%
Research Engineers—Civilsoft	.2	.0	.2	0	.0%	.0%	.0%	.0%
Phase Three Logic	.2	.0	.1	0	.0%	.0%	.0%	.0%
Technische Computer Systeme	.1	.0	.1	3	.0%	.0%	.0%	.0%
Massteck	.1	.0	.1	0	.0%	.0%	.0%	.0%
Exemplar Logic	.1	.0	.1	0	.0%	.0%	.0%	.0%
Tanner Research	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Cadisys	.1	.0	.1	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Complansoft CAD	.1	.0	.0	1	.0%	.0%	.0%	.0%
Carrier Corporation	.1	.0	.1	0	.0%	.0%	.0%	.0%
LandCadd	.1	.0	.1	0	.0%	.0%	.0%	.0%
Star Informatic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Simutest	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 11 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ECOM Associates	.0	.0	.0	0	.0%	.0%	.0%	.0%
Synthesis	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	5	.0%	.0%	.0%	.0%
All Companies	2,778.9	1,196.2	993.7	66,926	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	2,733.3	1,188.5	962.5	66,654	98.4%	99.3%	96.9%	99.6%
All Asian-Based Companies	5.5	2.2	3.3	32	.2%	.2%	.3%	.0%
All European-Based Companies	40.1	5.6	28.0	240	1.4%	.5%	2.8%	.4%
All Hardware Companies	751.0	637.4	2.4	45,211	27.0%	53.3%	.2%	67.6%
All Turnkey & SW Companies	2,027.9	558.8	991.3	21,715	73.0%	46.7%	99.8%	32.4%

Source: Dataquest (March 1993)

Table 12
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	246.0	132.9	65.2	4,320	33.5%	30.7%	43.5%	47.1%
Digital	219.5	151.0	.6	0	29.9%	34.9%	.4%	.0%
Control Data Systems	41.1	16.8	5.7	131	5.6%	3.9%	3.8%	1.4%
MacNeal-Schwendler	14.0	.0	13.5	0	1.9%	.0%	9.0%	.0%
Intergraph	10.2	.0	9.2	0	1.4%	.0%	6.1%	.0%
Cadence	9.8	.0	7.7	0	1.3%	.0%	5.1%	.0%
EA Systems	6.2	.0	6.2	0	.8%	.0%	4.2%	.0%
PDA Engineering	5.7	.0	5.5	0	.8%	.0%	3.7%	.0%
MCS	5.3	.0	4.6	0	.7%	.0%	3.1%	.0%
EDS	5.0	.0	5.0	(18)	.7%	.0%	3.3%	-.2%
Unisys	4.9	2.5	1.7	66	.7%	.6%	1.1%	.7%
Swanson Analysis	3.9	.0	3.9	0	.5%	.0%	2.6%	.0%
SDRC	3.7	.0	3.7	0	.5%	.0%	2.5%	.0%
GeoVision Systems	3.2	.3	1.7	1	.4%	.1%	1.1%	.0%
ESRI	2.9	.0	2.7	0	.4%	.0%	1.8%	.0%
Synercom	2.8	.0	1.5	0	.4%	.0%	1.0%	.0%
Autometric	1.8	1.2	.6	35	.2%	.3%	.4%	.4%
Computervision	1.8	.6	.5	38	.2%	.1%	.3%	.4%
Bechtel Software	1.8	.0	1.6	0	.2%	.0%	1.1%	.0%
Secagraphics	1.2	.5	.3	8	.2%	.1%	.2%	.1%
LSI Logic	.9	.1	.7	2	.1%	.0%	.5%	.0%

(Continued)

Table 12 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Geotrace Technologies	.8	.0	.7	17	.1%	.0%	.5%	.2%
ETAK	.7	.0	.7	2	.1%	.0%	.5%	.0%
MARC	.7	.0	.7	0	.1%	.0%	.5%	.0%
Meta-Software	.6	.0	.5	0	.1%	.0%	.3%	.0%
Dynamic Graphics	.6	.0	.5	0	.1%	.0%	.4%	.0%
Test Systems Strategies	.6	.0	.5	0	.1%	.0%	.3%	.0%
Mechanical Dynamics	.6	.0	.5	0	.1%	.0%	.3%	.0%
Harris EDA	.5	.1	.4	4	.1%	.0%	.3%	.0%
Computational Mechanics	.5	.0	.5	0	.1%	.0%	.3%	.0%
Georgia Tech Research Corp.	.4	.0	.4	0	.1%	.0%	.3%	.0%
Teradyne	.4	.1	.2	0	.1%	.0%	.2%	.0%
COMPASS Design Automation	.4	.0	.3	0	.1%	.0%	.2%	.0%
Compact Software	.4	.0	.4	0	.0%	.0%	.2%	.0%
EEsof	.4	.0	.3	0	.0%	.0%	.2%	.0%
Genrad	.3	.1	.2	1	.0%	.0%	.1%	.0%
Analogy	.3	.0	.2	0	.0%	.0%	.1%	.0%
Radian Corporation	.2	.0	.1	0	.0%	.0%	.1%	.0%
Logic Modeling Systems	.2	.0	.2	0	.0%	.0%	.1%	.0%
Accugraph	.2	.1	.1	20	.0%	.0%	.1%	.2%
Engineering Systems Corp.	.2	.0	.1	0	.0%	.0%	.1%	.0%
Electrical Eng. Software	.2	.0	.2	0	.0%	.0%	.1%	.0%

(Continued)

Table 12 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
FEGS	.1	.0	.1	0	.0%	.0%	.1%	.0%
Data I/O	.1	.0	.1	0	.0%	.0%	.1%	.0%
Laser-Scan	.1	.0	.0	1	.0%	.0%	.0%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.0%	.0%
Microsim	.1	.0	.1	0	.0%	.0%	.0%	.0%
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	1	.0%	.0%	.0%	.0%
Other Companies	133.0	126.4	.0	4,548	18.1%	29.2%	.0%	49.6%
All Companies	734.6	432.7	150.1	9,175	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	733.9	432.6	149.4	9,174	99.9%	100.0%	99.6%	100.0%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	.7	.0	.6	1	.1%	.0%	.4%	.0%
All Hardware Companies	360.1	280.8	1.2	4,577	49.0%	64.9%	.8%	49.9%
All Turnkey & SW Companies	374.5	151.9	148.9	4,598	51.0%	35.1%	99.2%	50.1%

Source: Dataquest (March 1993)

Table 13
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Server
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Digital	107.0	73.8	.0	901	22.1%	26.0%	.0%	11.0%
Intergraph	86.1	41.8	19.8	1,108	17.7%	14.7%	21.6%	13.5%
IBM	75.9	42.9	18.3	614	15.6%	15.1%	20.0%	7.5%
Sun Microsystems	73.0	59.6	.0	3,309	15.0%	20.9%	.0%	40.3%
ESRI	21.1	.0	19.2	0	4.3%	.0%	20.9%	.0%
Zycad	18.9	11.3	2.5	155	3.9%	4.0%	2.7%	1.9%
EDS	16.7	8.5	5.8	261	3.4%	3.0%	6.4%	3.2%
Landmark Graphics	13.1	6.6	3.0	68	2.7%	2.3%	3.3%	.8%
Ikos Systems	9.9	9.4	.5	108	2.0%	3.3%	.5%	1.3%
Solbourne	9.6	9.4	.0	408	2.0%	3.3%	.0%	5.0%
Cadence	9.6	.0	7.8	0	2.0%	.0%	8.5%	.0%
Data General	9.4	7.5	.5	359	1.9%	2.6%	.5%	4.4%
Computervision	7.7	2.6	2.5	68	1.6%	.9%	2.8%	.8%
MacNeal-Schwendler	7.4	.0	7.1	0	1.5%	.0%	7.7%	.0%
Hewlett-Packard	5.5	4.5	.0	688	1.1%	1.6%	.0%	8.4%
Silicon Graphics	4.9	4.1	.0	93	1.0%	1.5%	.0%	1.1%
Applicon	4.6	1.5	1.8	48	1.0%	.5%	2.0%	.6%
Cimlinc	1.6	.0	1.1	0	.3%	.0%	1.2%	.0%
Control Data Systems	1.3	.6	.2	2	.3%	.2%	.2%	.0%
ETAK	.7	.0	.7	0	.2%	.0%	.7%	.0%
Logic Modeling Systems	.6	.0	.4	0	.1%	.0%	.5%	.0%

(Continued)

Table 13 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Server
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Cisigraph	.4	.1	.2	3	.1%	.0%	.2%	.0%
Radian Corporation	.3	.0	.2	0	.1%	.0%	.2%	.0%
Georgia Tech Research Corp.	.1	.0	.1	0	.0%	.0%	.1%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.1%	.0%
Other Companies	.0	.1	.0	8	.0%	.0%	.0%	.1%
All Companies	485.4	284.4	91.7	8,202	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	485.0	284.3	91.5	8,199	99.9%	100.0%	99.8%	100.0%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	.4	.1	.2	3	.1%	.0%	.2%	.0%
All Hardware Companies	210.8	160.2	.5	6,038	43.4%	56.3%	.5%	73.6%
All Turnkey & SW Companies	274.6	124.2	91.2	2,163	56.6%	43.7%	99.5%	26.4%

Source: Dataquest (March 1993)

Table 14
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Compaq	197.5	197.5	.0	42,808	15.7%	26.6%	.0%	22.5%
Autodesk	159.8	.0	159.8	0	12.7%	.0%	34.9%	.0%
Apple Computer	150.7	132.6	.0	35,682	12.0%	17.9%	.0%	18.7%
IBM	71.4	50.0	15.5	13,725	5.7%	6.7%	3.4%	7.2%
Hewlett-Packard	66.7	53.4	.0	18,793	5.3%	7.2%	.0%	9.9%
Intergraph	27.2	.0	25.5	0	2.2%	.0%	5.6%	.0%
Dell Computer	25.3	25.3	.0	6,597	2.0%	3.4%	.0%	3.5%
Viewlogic Systems	18.7	.0	14.9	0	1.5%	.0%	3.3%	.0%
Computervision	14.9	.0	14.1	90	1.2%	.0%	3.1%	.0%
CADKEY	11.7	.0	11.7	0	.9%	.0%	2.6%	.0%
ESRI	11.6	.0	10.6	0	.9%	.0%	2.3%	.0%
Strategic Mapping	8.2	.0	7.4	0	.6%	.0%	1.6%	.0%
Altera	7.5	.0	6.4	0	.6%	.0%	1.4%	.0%
Infocel	7.5	1.5	5.6	163	.6%	.2%	1.2%	.1%
Xilinx	7.3	.0	6.6	0	.6%	.0%	1.4%	.0%
MapInfo	7.1	.0	5.7	0	.6%	.0%	1.2%	.0%
Softdesk	6.5	.0	6.5	0	.5%	.0%	1.4%	.0%
ACTEL	6.5	.0	5.8	0	.5%	.0%	1.3%	.0%
Point Control	6.3	.0	6.1	0	.5%	.0%	1.3%	.0%
ASG	6.1	.0	6.1	0	.5%	.0%	1.3%	.0%
ETAK	5.7	.3	5.5	14	.5%	.0%	1.2%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Microsim	5.4	.0	5.0	0	.4%	.0%	1.1%	.0%
American Small Business Comp.	4.7	.0	4.7	0	.4%	.0%	1.0%	.0%
ISICAD	4.7	.0	4.7	0	.4%	.0%	1.0%	.0%
Aspen Technology	4.6	.0	4.2	0	.4%	.0%	.9%	.0%
PADS Software	4.2	.0	3.5	0	.3%	.0%	.8%	.0%
CNC Software	4.1	.0	4.1	0	.3%	.0%	.9%	.0%
Micrografx	4.0	.0	4.0	0	.3%	.0%	.9%	.0%
Moda CAD	4.0	1.0	2.8	33	.3%	.1%	.6%	.0%
Algor Interactive Systems	4.0	.0	3.5	0	.3%	.0%	.8%	.0%
Orcad	3.8	.0	3.8	0	.3%	.0%	.8%	.0%
GeoQuest	3.6	.0	3.6	0	.3%	.0%	.8%	.0%
Innovative Data Design	3.5	.0	3.5	0	.3%	.0%	.8%	.0%
EEsof	3.3	.0	3.0	0	.3%	.0%	.7%	.0%
PacSoft	3.2	.0	3.2	0	.3%	.0%	.7%	.0%
Racal-Redac	3.2	.0	2.7	0	.3%	.0%	.6%	.0%
GeoGraphix	3.2	.0	2.4	0	.3%	.0%	.5%	.0%
Data I/O	3.1	.0	3.1	0	.2%	.0%	.7%	.0%
MCS	3.1	.0	2.8	0	.2%	.0%	.6%	.0%
Swanson Analysis	2.9	.0	2.9	0	.2%	.0%	.6%	.0%
ERDAS	2.8	.8	1.9	305	.2%	.1%	.4%	.2%
Sweet's Electronic Publishing	2.7	.0	2.2	0	.2%	.0%	.5%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Teradyne	2.7	.0	2.1	0	.2%	.0%	.5%	.0%
Visionics	2.5	.0	1.9	10	.2%	.0%	.4%	.0%
International Software Systems	2.4	.0	2.4	0	.2%	.0%	.5%	.0%
Claris	2.3	.0	2.3	0	.2%	.0%	.5%	.0%
Neocad	2.3	.0	2.3	0	.2%	.0%	.5%	.0%
Accel Technologies	2.2	.0	2.0	0	.2%	.0%	.4%	.0%
Generation 5 Technology	2.2	.0	2.2	0	.2%	.0%	.5%	.0%
Integrated Computer Graphics	2.1	1.0	.8	119	.2%	.1%	.2%	.1%
Facility Mapping Systems	2.1	.0	1.8	0	.2%	.0%	.4%	.0%
Foresight Resources	2.1	.0	1.9	0	.2%	.0%	.4%	.0%
ADRA Systems	2.0	.0	1.6	0	.2%	.0%	.4%	.0%
Accugraph	2.0	.1	1.7	10	.2%	.0%	.4%	.0%
ALDEC	2.0	.0	2.0	0	.2%	.0%	.4%	.0%
Cimatron	1.6	.7	.7	84	.1%	.1%	.2%	.0%
Intera Tydac	1.6	.0	1.6	0	.1%	.0%	.3%	.0%
Evolution Computing	1.6	.0	1.6	0	.1%	.0%	.3%	.0%
LPKF	1.6	1.0	.4	68	.1%	.1%	.1%	.0%
Research Engineers—Civilsoft	1.5	.0	1.5	0	.1%	.0%	.3%	.0%
Sigma Design	1.5	.0	1.4	0	.1%	.0%	.3%	.0%
Terra Sciences	1.5	.0	1.5	0	.1%	.0%	.3%	.0%
GRAPHSOFT	1.4	.0	1.4	0	.1%	.0%	.3%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Harris EDA	1.4	.1	1.1	5	.1%	.0%	.2%	.0%
Investronica SA	1.2	1.0	.1	48	.1%	.1%	.0%	.0%
BETRONEX	1.2	.1	1.1	22	.1%	.0%	.2%	.0%
Engineering Mechanics	1.2	.1	1.0	143	.1%	.0%	.2%	.1%
Massteck	1.1	.0	1.1	0	.1%	.0%	.2%	.0%
Minc Software	1.1	.0	1.1	0	.1%	.0%	.2%	.0%
Intrinsix	1.0	1.0	.0	10	.1%	.1%	.0%	.0%
Spectrum Software	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Engineered Software	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Carrier Corporation	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Tanner Research	1.0	.0	.9	0	.1%	.0%	.2%	.0%
LandCadd	1.0	.0	.9	0	.1%	.0%	.2%	.0%
Pathtrace	1.0	.2	.6	14	.1%	.0%	.1%	.0%
Graphisoft Software Dev	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
CAE-link	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Cadisys	.9	.0	.9	0	.1%	.0%	.2%	.0%
Aries Technology	.9	.0	.9	0	.1%	.0%	.2%	.0%
Maptech	.9	.0	.9	0	.1%	.0%	.2%	.0%
Quicklogic	.9	.0	.9	0	.1%	.0%	.2%	.0%
Aura CAD/CAM Systems	.9	.0	.8	0	.1%	.0%	.2%	.0%
Cascade Graphics	.8	.0	.8	0	.1%	.0%	.2%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Cimlinc	.8	.0	.6	0	.1%	.0%	.1%	.0%
Dynaware	.8	.0	.8	0	.1%	.0%	.2%	.0%
Genasys II	.8	.1	.7	16	.1%	.0%	.1%	.0%
Kork Systems	.8	.1	.6	15	.1%	.0%	.1%	.0%
Radian Corporation	.8	.0	.5	0	.1%	.0%	.1%	.0%
Douglas Electronics	.8	.0	.8	0	.1%	.0%	.2%	.0%
Mega CADD	.8	.0	.8	0	.1%	.0%	.2%	.0%
Uniras	.7	.0	.7	0	.1%	.0%	.2%	.0%
IGC Technology	.7	.0	.7	0	.1%	.0%	.2%	.0%
CADWorks	.7	.0	.6	0	.1%	.0%	.1%	.0%
A.I. Systems	.7	.0	.7	0	.1%	.0%	.2%	.0%
ECOM Associates	.7	.0	.7	4	.1%	.0%	.1%	.0%
Ground Modelling Systems	.7	.5	.3	4	.1%	.1%	.1%	.0%
Engineering Systems Corp.	.6	.0	.5	0	.0%	.0%	.1%	.0%
Machinery Sales	.6	.0	.6	0	.0%	.0%	.1%	.0%
Omation	.6	.0	.6	0	.0%	.0%	.1%	.0%
Rasna Corporation	.6	.0	.5	0	.0%	.0%	.1%	.0%
Vamp	.6	.0	.6	0	.0%	.0%	.1%	.0%
Mc2 Engineering Software	.6	.0	.6	0	.0%	.0%	.1%	.0%
Infinite Graphics	.6	.0	.6	0	.0%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	.5	.1	.3	14	.0%	.0%	.1%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Digital	.5	.0	.4	0	.0%	.0%	.1%	.0%
CADSI	.5	.1	.4	9	.0%	.0%	.1%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.1%	.0%
Compact Software	.5	.0	.5	0	.0%	.0%	.1%	.0%
Applicon	.5	.2	.2	16	.0%	.0%	.0%	.0%
MacNeal-Schwendler	.5	.0	.5	0	.0%	.0%	.1%	.0%
Capilano Computing	.5	.0	.5	0	.0%	.0%	.1%	.0%
Bechtel Software	.5	.0	.5	0	.0%	.0%	.1%	.0%
Phase Three Logic	.4	.0	.4	0	.0%	.0%	.1%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	.4	.1	.2	5	.0%	.0%	.1%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.1%	.0%
Geosoft	.4	.0	.4	0	.0%	.0%	.1%	.0%
GEOVISION Inc.	.3	.2	.1	36	.0%	.0%	.0%	.0%
Geotrace Technologies	.3	.0	.3	0	.0%	.0%	.1%	.0%
The Great Softwestern Co.	.2	.0	.2	0	.0%	.0%	.1%	.0%
SIMUCAD	.2	.0	.2	0	.0%	.0%	.0%	.0%
Bobcat Systems	.2	.0	.2	0	.0%	.0%	.1%	.0%
Logic Modeling Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Meta-Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
Geomath	.2	.0	.2	0	.0%	.0%	.0%	.0%

(Continued)

Table 14 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: North America
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Pacific Numerics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Simutest	.2	.0	.2	0	.0%	.0%	.0%	.0%
Ithaca Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
BATISOFT	.2	.0	.1	7	.0%	.0%	.0%	.0%
Synthesis	.1	.0	.1	0	.0%	.0%	.0%	.0%
Areon	.1	.0	.0	0	.0%	.0%	.0%	.0%
Genrad	.1	.0	.1	4	.0%	.0%	.0%	.0%
Simulation Science	.1	.0	.1	0	.0%	.0%	.0%	.0%
National Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
Number One Systems	.0	.0	.0	3	.0%	.0%	.0%	.0%
Exemplar Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
CADMATIC	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	271.6	272.5	.0	71,773	21.6%	36.7%	.0%	37.6%
All Companies	1,260.0	741.6	458.2	190,648	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	1,248.3	738.1	451.1	190,397	99.1%	99.5%	98.5%	99.9%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	11.8	3.6	7.1	251	.9%	.5%	1.5%	.1%
All Hardware Companies	775.3	740.7	.0	191,249	61.5%	99.9%	.0%	100.3%
All Turnkey & SW Companies	484.8	1.0	458.2	(601)	38.5%	.1%	100.0%	-.3%

Source: Dataquest (March 1993)

Table 15
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	843.7	491.0	201.3	32,322	14.3%	16.2%	11.3%	13.6%
Computervision	546.3	215.1	153.6	4,523	9.3%	7.1%	8.6%	1.9%
Hewlett-Packard	454.7	342.4	28.6	34,827	7.7%	11.3%	1.6%	14.7%
Intergraph	411.1	177.8	103.1	5,755	7.0%	5.9%	5.8%	2.4%
Digital	335.5	230.9	.0	3,862	5.7%	7.6%	.0%	1.6%
Siemens Nixdorf Info systeme	259.4	131.2	91.5	4,304	4.4%	4.3%	5.2%	1.8%
Sun Microsystems	254.0	217.7	.0	12,756	4.3%	7.2%	.0%	5.4%
Compaq	197.3	197.3	.0	42,765	3.4%	6.5%	.0%	18.0%
Autodesk	115.2	.0	115.2	0	2.0%	.0%	6.5%	.0%
EDS	111.1	57.2	43.1	1,894	1.9%	1.9%	2.4%	.8%
Mentor Graphics	108.4	40.1	41.2	499	1.8%	1.3%	2.3%	.2%
Matra Datavision	88.7	31.0	39.9	709	1.5%	1.0%	2.2%	.3%
Control Data Systems	86.4	41.9	14.3	608	1.5%	1.4%	.8%	.3%
STI-Straessle	85.5	13.4	44.1	620	1.5%	.4%	2.5%	.3%
Applicon	76.3	25.2	29.7	824	1.3%	.8%	1.7%	.3%
Cadence	71.3	.0	56.3	0	1.2%	.0%	3.2%	.0%
Silicon Graphics	63.5	57.5	.0	1,610	1.1%	1.9%	.0%	.7%
IEZ	63.3	22.2	31.7	1,340	1.1%	.7%	1.8%	.6%
Apple Computer	63.2	55.6	.0	14,964	1.1%	1.8%	.0%	6.3%
Nemetschek	58.0	21.5	32.5	600	1.0%	.7%	1.8%	.3%
Racal-Redac	45.6	.0	38.2	0	.8%	.0%	2.2%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ISICAD	40.6	14.9	21.1	253	.7%	.5%	1.2%	.1%
Wiechers Datentechnik	40.5	10.7	18.7	721	.7%	.4%	1.1%	.3%
SDRC	39.3	.0	39.3	0	.7%	.0%	2.2%	.0%
ItalCad	38.0	17.9	9.1	360	.6%	.6%	.5%	.2%
ICL	35.1	20.7	11.9	962	.6%	.7%	.7%	.4%
Han Dataport	31.0	9.3	17.1	625	.5%	.3%	1.0%	.3%
ASCAD/ASCAM	30.6	18.4	9.2	450	.5%	.6%	.5%	.2%
Cisigraph	28.8	8.1	15.8	183	.5%	.3%	.9%	.1%
Investronica SA	27.6	22.1	2.8	1,102	.5%	.7%	.2%	.5%
Landmark Graphics	24.6	12.3	5.7	127	.4%	.4%	.3%	.1%
Parametric Technology	22.0	.0	18.5	0	.4%	.0%	1.0%	.0%
Cimatron	18.9	8.5	8.5	590	.3%	.3%	.5%	.2%
PAFEC	18.3	.0	18.3	0	.3%	.0%	1.0%	.0%
MacNeal-Schwendler	17.8	.0	17.1	0	.3%	.0%	1.0%	.0%
Radan Computational	17.6	6.2	8.8	364	.3%	.2%	.5%	.2%
ESRI	17.2	.0	15.6	0	.3%	.0%	.9%	.0%
Synopsys	16.9	.0	12.2	0	.3%	.0%	.7%	.0%
CAD Distribution	16.9	8.4	6.7	261	.3%	.3%	.4%	.1%
Tebis	16.7	2.5	11.7	96	.3%	.1%	.7%	.0%
Digital Kienzle	16.3	8.3	4.6	239	.3%	.3%	.3%	.1%
Delcam International	16.0	5.6	8.0	500	.3%	.2%	.5%	.2%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Research Machines	15.6	15.6	.0	2,517	.3%	.5%	.0%	1.1%
Star Informatic	15.2	4.9	8.7	1,630	.3%	.2%	.5%	.7%
CAD Lab	14.7	.0	11.8	0	.2%	.0%	.7%	.0%
Fides Industrielle Automation	14.4	2.1	10.1	111	.2%	.1%	.6%	.0%
Ziegler Informatics	14.3	.0	14.3	0	.2%	.0%	.8%	.0%
Unisys	14.2	7.2	4.9	214	.2%	.2%	.3%	.1%
Soft-Tech Software Technologies	13.8	2.1	10.4	932	.2%	.1%	.6%	.4%
Microway	12.5	7.6	3.8	133	.2%	.3%	.2%	.1%
Exapt	12.5	6.1	4.2	229	.2%	.2%	.2%	.1%
Framasoft	12.0	.0	7.3	0	.2%	.0%	.4%	.0%
LPKF	11.0	7.2	2.8	541	.2%	.2%	.2%	.2%
Gerber Systems	10.9	5.4	3.6	151	.2%	.2%	.2%	.1%
Smallworld Systems	10.5	2.4	5.8	52	.2%	.1%	.3%	.0%
COMPASS Design Automation	10.5	.2	7.9	8	.2%	.0%	.4%	.0%
PDA Engineering	10.4	.0	10.1	0	.2%	.0%	.6%	.0%
CAD Centre	10.4	.0	8.3	0	.2%	.0%	.5%	.0%
Kockums Computer Systems	10.2	2.6	5.6	502	.2%	.1%	.3%	.2%
Marcus Computer Systeme	10.2	5.3	3.5	296	.2%	.2%	.2%	.1%
Swanson Analysis	10.1	.0	10.1	0	.2%	.0%	.6%	.0%
Aucotec	10.0	1.7	6.5	360	.2%	.1%	.4%	.2%
Harris EDA	9.8	1.0	5.7	42	.2%	.0%	.3%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Sysscan	9.8	4.2	2.6	92	.2%	.1%	.1%	.0%
Moss Systems	9.7	.0	8.7	0	.2%	.0%	.5%	.0%
Genasys II	9.3	1.0	7.9	63	.2%	.0%	.4%	.0%
Dell Computer	9.3	9.3	.0	2,415	.2%	.3%	.0%	1.0%
Viewlogic Systems	9.2	.0	7.4	0	.2%	.0%	.4%	.0%
Auto-Trol	8.9	3.3	3.4	112	.2%	.1%	.2%	.0%
Technische Computer Systeme	8.6	1.7	6.9	271	.1%	.1%	.4%	.1%
Laser-Scan	8.5	2.9	3.4	51	.1%	.1%	.2%	.0%
RIB/RZB	8.3	.7	6.7	52	.1%	.0%	.4%	.0%
GeoVision Systems	8.1	.6	4.2	8	.1%	.0%	.2%	.0%
Cimlinc	8.0	.0	5.6	168	.1%	.0%	.3%	.1%
DAT Standard info ssystemes	7.9	.0	7.5	0	.1%	.0%	.4%	.0%
Olivetti	7.8	6.6	.0	890	.1%	.2%	.0%	.4%
Sagantec	7.5	.0	6.7	0	.1%	.0%	.4%	.0%
EEsof	7.5	.0	6.6	5	.1%	.0%	.4%	.0%
Spectrum Graphics	7.2	2.2	3.6	67	.1%	.1%	.2%	.0%
Serbi	7.0	.7	6.3	0	.1%	.0%	.4%	.0%
Hochtief	6.9	1.0	4.8	84	.1%	.0%	.3%	.0%
Ground Modelling Systems	6.6	3.6	2.7	56	.1%	.1%	.2%	.0%
Alper Systems	6.4	3.2	1.6	45	.1%	.1%	.1%	.0%
Zycad	6.3	3.8	.8	36	.1%	.1%	.0%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
BATISOFT	6.0	.9	3.0	300	.1%	.0%	.2%	.1%
RoboCAD Solutions	6.0	.0	4.5	0	.1%	.0%	.3%	.0%
debis Systemhaus	5.8	1.4	3.4	39	.1%	.0%	.2%	.0%
Clemessy	5.4	4.4	.8	18	.1%	.1%	.0%	.0%
Kohns & Poppenhaeger	5.4	2.7	1.9	64	.1%	.1%	.1%	.0%
Alias Research	5.2	.0	4.8	0	.1%	.0%	.3%	.0%
Orcad	5.1	.0	5.1	0	.1%	.0%	.3%	.0%
mb Programme	5.1	2.5	1.8	122	.1%	.1%	.1%	.1%
Solbourne	5.0	4.9	.0	400	.1%	.2%	.0%	.2%
Complansoft CAD	4.9	2.5	2.5	113	.1%	.1%	.1%	.0%
Logic Modeling Systems	4.9	.0	3.9	0	.1%	.0%	.2%	.0%
Analogy	4.8	.0	3.9	0	.1%	.0%	.2%	.0%
Graphisoft Software Dev	4.5	.0	4.5	0	.1%	.0%	.3%	.0%
ADRA Systems	4.4	.2	3.3	16	.1%	.0%	.2%	.0%
Kloeckner-Moeller	4.4	.2	3.1	46	.1%	.0%	.2%	.0%
HP Cade	4.4	2.6	1.3	44	.1%	.1%	.1%	.0%
ANACAD	4.3	.0	4.3	0	.1%	.0%	.2%	.0%
Computer Services Consultants	4.2	.0	4.2	0	.1%	.0%	.2%	.0%
Gable CAD Systems	4.0	4.0	.8	58	.1%	.1%	.0%	.0%
LSI Logic	3.8	.4	2.8	10	.1%	.0%	.2%	.0%
Sener Sistemas Marinos	3.7	.0	3.7	0	.1%	.0%	.2%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Ikos Systems	3.7	3.5	.2	41	.1%	.1%	.0%	.0%
Xilinx	3.7	.0	3.3	0	.1%	.0%	.2%	.0%
Datagraphic	3.6	1.8	1.4	57	.1%	.1%	.1%	.0%
EME	3.5	.8	1.6	70	.1%	.0%	.1%	.0%
Altera	3.5	.0	3.0	0	.1%	.0%	.2%	.0%
Micrografx	3.3	.0	3.3	0	.1%	.0%	.2%	.0%
Teradyne	3.2	.4	2.2	6	.1%	.0%	.1%	.0%
Whessoe Computing Systems	3.2	.0	3.2	0	.1%	.0%	.2%	.0%
MCS	3.2	.0	2.9	0	.1%	.0%	.2%	.0%
ISKA	3.1	1.4	1.3	57	.1%	.0%	.1%	.0%
Triplan	3.1	1.3	1.6	37	.1%	.0%	.1%	.0%
Genrad	3.1	.6	2.1	32	.1%	.0%	.1%	.0%
FEA	3.0	.7	.7	0	.1%	.0%	.0%	.0%
MARC	3.0	.0	3.0	0	.1%	.0%	.2%	.0%
Assigraph	2.9	.0	2.3	0	.0%	.0%	.1%	.0%
Silvar-Lisco	2.8	.0	1.6	0	.0%	.0%	.1%	.0%
CADKEY	2.8	.0	2.8	0	.0%	.0%	.2%	.0%
Comdisco Systems	2.8	.0	2.5	0	.0%	.0%	.1%	.0%
Synercom	2.8	.0	1.5	0	.0%	.0%	.1%	.0%
Catalpa	2.7	.9	1.3	22	.0%	.0%	.1%	.0%
ACTEL	2.6	.0	2.3	0	.0%	.0%	.1%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ERDAS	2.5	.7	1.7	275	.0%	.0%	.1%	.1%
ISDATA	2.5	.0	2.2	0	.0%	.0%	.1%	.0%
Pathtrace	2.5	.5	1.6	37	.0%	.0%	.1%	.0%
ALS Design	2.4	.1	2.2	20	.0%	.0%	.1%	.0%
Superdraft	2.3	1.1	1.1	132	.0%	.0%	.1%	.1%
Caroline Informatique	2.3	.4	1.2	18	.0%	.0%	.1%	.0%
Elstree Computing	2.2	1.0	1.2	62	.0%	.0%	.1%	.0%
BETRONEX	2.2	.2	1.9	40	.0%	.0%	.1%	.0%
Quickturn Systems	2.2	2.2	.0	18	.0%	.1%	.0%	.0%
Vero International Software	2.2	.0	2.0	0	.0%	.0%	.1%	.0%
CAD-UL	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
Data I/O	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
CAMTEK	2.1	.5	1.4	0	.0%	.0%	.1%	.0%
Lamp Software	2.1	.5	1.5	130	.0%	.0%	.1%	.1%
ICAD	2.0	.0	1.6	0	.0%	.0%	.1%	.0%
CAD-Capture	2.0	.4	.6	10	.0%	.0%	.0%	.0%
Test Systems Strategies	2.0	.0	1.7	0	.0%	.0%	.1%	.0%
Macao Systems	1.8	1.0	.6	19	.0%	.0%	.0%	.0%
Geometria GIS Systems House	1.8	.2	.4	15	.0%	.0%	.0%	.0%
PADS Software	1.8	.0	1.5	0	.0%	.0%	.1%	.0%
DAPCO	1.8	.0	1.2	0	.0%	.0%	.1%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Microsim	1.8	.0	1.7	0	.0%	.0%	.1%	.0%
Point Control	1.7	.0	1.6	0	.0%	.0%	.1%	.0%
MEDESIGN	1.7	.5	.6	18	.0%	.0%	.0%	.0%
ETAK	1.6	.1	1.5	3	.0%	.0%	.1%	.0%
Aries Technology	1.6	.0	1.5	0	.0%	.0%	.1%	.0%
ARKTEC	1.6	.2	1.3	43	.0%	.0%	.1%	.0%
Moda CAD	1.6	.4	1.1	13	.0%	.0%	.1%	.0%
SPATIAL Technology	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
Sinus Software	1.5	.8	.8	36	.0%	.0%	.0%	.0%
Strategic Mapping	1.5	.0	1.4	0	.0%	.0%	.1%	.0%
Computational Mechanics	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
GeoQuest	1.4	.0	1.4	0	.0%	.0%	.1%	.0%
Sigma Design	1.4	.0	1.3	0	.0%	.0%	.1%	.0%
FEGS	1.4	.0	1.2	0	.0%	.0%	.1%	.0%
Mechanical Dynamics	1.2	.0	1.1	0	.0%	.0%	.1%	.0%
Aucos elektronische Gerate	1.2	.4	.9	121	.0%	.0%	.0%	.1%
Dynamic Graphics	1.2	.0	1.0	0	.0%	.0%	.1%	.0%
Mucke Software	1.1	.6	.4	27	.0%	.0%	.0%	.0%
Integer	1.1	.0	.9	0	.0%	.0%	.1%	.0%
Zuken	1.1	.4	.6	6	.0%	.0%	.0%	.0%
EA Systems	1.1	.0	1.1	0	.0%	.0%	.1%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
CADWorks	1.0	.0	.9	0	.0%	.0%	.0%	.0%
CADSI	.9	.1	.7	6	.0%	.0%	.0%	.0%
Compact Software	.9	.0	.9	0	.0%	.0%	.1%	.0%
CNC Software	.9	.0	.9	0	.0%	.0%	.1%	.0%
Contract Data Research	.9	.0	.6	0	.0%	.0%	.0%	.0%
Accugraph	.9	.4	.4	31	.0%	.0%	.0%	.0%
CADMATIC	.9	.1	.6	6	.0%	.0%	.0%	.0%
i-Logix	.9	.0	.9	0	.0%	.0%	.0%	.0%
Aspen Technology	.9	.0	.8	0	.0%	.0%	.0%	.0%
Cascade Design Automation	.8	.0	.6	0	.0%	.0%	.0%	.0%
Areon	.8	.4	.2	6	.0%	.0%	.0%	.0%
Anilam Electronics	.8	.1	.6	0	.0%	.0%	.0%	.0%
Number One Systems	.8	.1	.6	55	.0%	.0%	.0%	.0%
Inca	.7	.7	.0	3	.0%	.0%	.0%	.0%
Scientific & Engineering SW	.7	.0	.7	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.7	.0	.6	0	.0%	.0%	.0%	.0%
ESDU International	.7	.0	.7	0	.0%	.0%	.0%	.0%
Rasna Corporation	.7	.0	.6	0	.0%	.0%	.0%	.0%
Masta Corporation	.6	.0	.5	0	.0%	.0%	.0%	.0%
Engineered Software	.6	.0	.6	0	.0%	.0%	.0%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Carrier Corporation	.6	.0	.6	0	.0%	.0%	.0%	.0%
Hydrotec	.6	.3	.2	7	.0%	.0%	.0%	.0%
Minc Software	.6	.0	.6	0	.0%	.0%	.0%	.0%
Evolution Computing	.5	.0	.5	0	.0%	.0%	.0%	.0%
Terra Sciences	.5	.0	.5	0	.0%	.0%	.0%	.0%
ALDEC	.5	.0	.5	0	.0%	.0%	.0%	.0%
S.T.L.D. s.r.l.	.5	.0	.5	0	.0%	.0%	.0%	.0%
National Semiconductor	.5	.1	.4	5	.0%	.0%	.0%	.0%
ACDS Graphic System	.5	.0	.4	0	.0%	.0%	.0%	.0%
Massteck	.5	.0	.5	0	.0%	.0%	.0%	.0%
Applications in CADD	.4	.1	.3	11	.0%	.0%	.0%	.0%
Quantic Laboratories	.4	.0	.4	0	.0%	.0%	.0%	.0%
LEICA Heerberg	.4	.0	.3	0	.0%	.0%	.0%	.0%
Pacific Numerics	.4	.0	.4	0	.0%	.0%	.0%	.0%
Kork Systems	.4	.0	.3	4	.0%	.0%	.0%	.0%
Accel Technologies	.4	.0	.4	0	.0%	.0%	.0%	.0%
LandCadd	.4	.0	.4	0	.0%	.0%	.0%	.0%
Softdesk	.4	.0	.4	0	.0%	.0%	.0%	.0%
Ontos	.4	.0	.4	0	.0%	.0%	.0%	.0%
American Small Business Comp.	.4	.0	.4	0	.0%	.0%	.0%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Foresight Resources	.4	.0	.3	0	.0%	.0%	.0%	.0%
Simulation Science	.4	.0	.4	0	.0%	.0%	.0%	.0%
Omation	.3	.0	.3	0	.0%	.0%	.0%	.0%
Wisdom Systems	.3	.0	.3	0	.0%	.0%	.0%	.0%
Bechtel Software	.3	.0	.3	0	.0%	.0%	.0%	.0%
Motorola	.3	.0	.3	0	.0%	.0%	.0%	.0%
Sweet's Electronic Publishing	.3	.0	.2	0	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	.3	.1	.2	5	.0%	.0%	.0%	.0%
Generation 5 Technology	.3	.0	.3	0	.0%	.0%	.0%	.0%
Objectivity	.3	.0	.3	0	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	.2	.0	.2	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Instrumatic Espanola	.2	.0	.2	0	.0%	.0%	.0%	.0%
Mega CADD	.2	.0	.2	0	.0%	.0%	.0%	.0%
Geotrace Technologies	.2	.0	.2	3	.0%	.0%	.0%	.0%
CAD Language Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
Tanner Research	.2	.0	.2	0	.0%	.0%	.0%	.0%
Cascade Graphics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Meta-Software	.2	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
TOOL Software	.2	.1	.1	4	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.2	.0	.1	1	.0%	.0%	.0%	.0%
Synthesis	.2	.0	.2	0	.0%	.0%	.0%	.0%
ASG	.1	.0	.1	0	.0%	.0%	.0%	.0%
Infinite Graphics	.1	.0	.1	0	.0%	.0%	.0%	.0%
Object Design	.1	.0	.1	0	.0%	.0%	.0%	.0%
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
A.I. Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Vamp	.1	.0	.1	0	.0%	.0%	.0%	.0%
Sunrise Test Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
GEOVISION Inc.	.1	.0	.0	3	.0%	.0%	.0%	.0%
GeoGraphix	.1	.0	.1	0	.0%	.0%	.0%	.0%
Dolphin Integration	.1	.0	.1	0	.0%	.0%	.0%	.0%
Exemplar Logic	.1	.0	.1	0	.0%	.0%	.0%	.0%
CAE-link	.1	.0	.1	0	.0%	.0%	.0%	.0%
Quicklogic	.1	.0	.1	0	.0%	.0%	.0%	.0%
Phase Three Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 15 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Other Companies	322.7	315.3	.0	50,907	5.5%	10.4%	.0%	21.4%
All Companies	5,887.7	3,026.4	1,775.8	237,402	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	4,499.5	2,537.7	1,094.6	212,590	76.4%	83.8%	61.6%	89.5%
All Asian-Based Companies	1.1	.4	.6	6	.0%	.0%	.0%	.0%
All European-Based Companies	1,387.2	488.4	680.6	24,806	23.6%	16.1%	38.3%	10.4%
All Hardware Companies	1,679.0	1,446.5	2.9	188,956	28.5%	47.8%	.2%	79.6%
All Turnkey & SW Companies	4,208.7	1,580.0	1,772.9	48,446	71.5%	52.2%	99.8%	20.4%

Source: Dataquest (March 1993)

Table 16
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Computervision	535.6	215.1	143.4	4,444	15.4%	13.7%	12.4%	6.1%
Hewlett-Packard	389.2	289.9	28.6	23,404	11.2%	18.5%	2.5%	32.4%
Intergraph	363.3	160.1	84.1	5,244	10.5%	10.2%	7.3%	7.3%
Siemens Nixdorf Info systeme	237.7	118.9	83.3	4,042	6.8%	7.6%	7.2%	5.6%
Sun Microsystems	209.6	181.6	.0	11,719	6.0%	11.6%	.0%	16.2%
IBM	158.1	86.2	40.8	3,227	4.6%	5.5%	3.5%	4.5%
Mentor Graphics	108.4	40.1	41.2	499	3.1%	2.6%	3.6%	.7%
EDS	96.6	51.9	35.0	1,730	2.8%	3.3%	3.0%	2.4%
Matra Datavision	88.7	31.0	39.9	709	2.6%	2.0%	3.4%	1.0%
STI-Straessle	85.5	13.4	44.1	620	2.5%	.9%	3.8%	.9%
Applicon	68.7	22.7	26.8	727	2.0%	1.4%	2.3%	1.0%
Digital	68.3	46.4	.0	3,092	2.0%	3.0%	.0%	4.3%
Cadence	64.7	.0	51.1	0	1.9%	.0%	4.4%	.0%
IEZ	63.3	22.2	31.7	1,340	1.8%	1.4%	2.7%	1.9%
Silicon Graphics	58.3	53.0	.0	1,511	1.7%	3.4%	.0%	2.1%
Racal-Redac	39.2	.0	32.9	0	1.1%	.0%	2.8%	.0%
ItalCad	38.0	17.9	9.1	360	1.1%	1.1%	.8%	.5%
SDRC	35.4	.0	35.4	0	1.0%	.0%	3.1%	.0%
ICL	35.1	20.7	11.9	962	1.0%	1.3%	1.0%	1.3%
ISICAD	34.4	14.9	14.8	253	1.0%	.9%	1.3%	.3%
Control Data Systems	32.3	19.6	6.8	438	.9%	1.3%	.6%	.6%

(Continued)

Table 16 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ASCAD/ASCAM	30.0	18.0	9.0	436	.9%	1.1%	.8%	.6%
Han Dataport	27.9	8.4	15.4	599	.8%	.5%	1.3%	.8%
Nemetschek	26.7	9.9	14.9	200	.8%	.6%	1.3%	.3%
Cisigraph	25.9	7.3	14.2	164	.7%	.5%	1.2%	.2%
Parametric Technology	22.0	.0	18.5	0	.6%	.0%	1.6%	.0%
Radan Computational	17.4	6.1	8.7	358	.5%	.4%	.7%	.5%
Synopsys	16.9	.0	12.2	0	.5%	.0%	1.1%	.0%
PAFEC	16.4	.0	16.4	0	.5%	.0%	1.4%	.0%
Digital Kienzle	16.3	8.3	4.6	239	.5%	.5%	.4%	.3%
Delcam International	16.0	5.6	8.0	500	.5%	.4%	.7%	.7%
Star Informatic	15.2	4.9	8.7	1,630	.4%	.3%	.7%	2.3%
Landmark Graphics	14.7	7.4	3.4	76	.4%	.5%	.3%	.1%
CAD Lab	13.9	.0	11.1	0	.4%	.0%	1.0%	.0%
Fides Industrielle Automation	12.3	1.8	8.6	104	.4%	.1%	.7%	.1%
Autodesk	11.5	.0	11.5	0	.3%	.0%	1.0%	.0%
Unisys	11.0	5.5	3.8	170	.3%	.4%	.3%	.2%
Gerber Systems	10.9	5.4	3.6	151	.3%	.3%	.3%	.2%
Framasoft	10.8	.0	6.5	0	.3%	.0%	.6%	.0%
Cimatron	10.6	4.8	4.8	209	.3%	.3%	.4%	.3%
Wiechers Datentechnik	10.5	2.8	4.9	89	.3%	.2%	.4%	.1%
Smallworld Systems	10.5	2.4	5.8	52	.3%	.2%	.5%	.1%

(Continued)

Table 16 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
CAD Centre	10.4	.0	8.3	0	.3%	.0%	.7%	.0%
COMPASS Design Automation	10.3	.2	7.7	8	.3%	.0%	.7%	.0%
Kockums Computer Systems	10.2	2.6	5.6	502	.3%	.2%	.5%	.7%
Marcus Computer Systeme	10.2	5.3	3.5	296	.3%	.3%	.3%	.4%
Moss Systems	9.7	.0	8.7	0	.3%	.0%	.8%	.0%
Auto-Trol	8.9	3.3	3.4	112	.3%	.2%	.3%	.2%
Harris EDA	8.9	.9	5.0	38	.3%	.1%	.4%	.1%
ESRI	8.8	.0	8.0	0	.3%	.0%	.7%	.0%
Technische Computer Systeme	8.6	1.7	6.9	270	.2%	.1%	.6%	.4%
Genasys II	8.4	.8	7.1	44	.2%	.1%	.6%	.1%
Laser-Scan	8.2	2.8	3.3	48	.2%	.2%	.3%	.1%
PDA Engineering	7.8	.0	7.5	0	.2%	.0%	.6%	.0%
Microway	7.7	4.7	2.3	73	.2%	.3%	.2%	.1%
Sagantec	7.5	.0	6.7	0	.2%	.0%	.6%	.0%
Spectrum Graphics	7.2	2.2	3.6	67	.2%	.1%	.3%	.1%
Cimlinc	6.8	.0	4.8	168	.2%	.0%	.4%	.2%
Alper Systems	6.4	3.2	1.6	45	.2%	.2%	.1%	.1%
GeoVision Systems	5.7	.5	3.0	6	.2%	.0%	.3%	.0%
Swanson Analysis	5.6	.0	5.6	0	.2%	.0%	.5%	.0%
Kohns & Poppenhaeger	5.4	2.7	1.9	64	.2%	.2%	.2%	.1%
MacNeal-Schwendler	5.4	.0	5.1	0	.2%	.0%	.4%	.0%

(Continued)

Table 16 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Viewlogic Systems	5.3	.0	4.2	0	.2%	.0%	.4%	.0%
Alias Research	5.2	.0	4.8	0	.2%	.0%	.4%	.0%
Complansoft CAD	4.9	2.5	2.5	113	.1%	.2%	.2%	.2%
Analogy	4.6	.0	3.7	0	.1%	.0%	.3%	.0%
Logic Modeling Systems	4.5	.0	3.6	0	.1%	.0%	.3%	.0%
debis Systemhaus	4.4	1.1	2.6	23	.1%	.1%	.2%	.0%
HP Cade	4.4	2.6	1.3	44	.1%	.2%	.1%	.1%
Clemessy	4.4	3.5	.7	11	.1%	.2%	.1%	.0%
EEsof	4.3	.0	3.8	5	.1%	.0%	.3%	.0%
ANACAD	4.3	.0	4.3	0	.1%	.0%	.4%	.0%
Gable CAD Systems	4.0	4.0	.8	58	.1%	.3%	.1%	.1%
Sysscan	3.9	1.4	1.4	46	.1%	.1%	.1%	.1%
Sener Sistemas Marinos	3.7	.0	3.7	0	.1%	.0%	.3%	.0%
ADRA Systems	3.4	.2	2.5	16	.1%	.0%	.2%	.0%
LSI Logic	3.4	.3	2.6	9	.1%	.0%	.2%	.0%
Exapt	3.4	1.7	1.2	115	.1%	.1%	.1%	.2%
ISKA	3.1	1.4	1.3	57	.1%	.1%	.1%	.1%
Triplan	3.1	1.3	1.6	37	.1%	.1%	.1%	.1%
Silvar-Lisco	2.8	.0	1.6	0	.1%	.0%	.1%	.0%
Comdisco Systems	2.8	.0	2.5	0	.1%	.0%	.2%	.0%
Genrad	2.7	.5	1.8	27	.1%	.0%	.2%	.0%

(Continued)

Table 16 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Catalpa	2.7	.9	1.3	22	.1%	.1%	.1%	.0%
Aucotec	2.5	.4	1.6	18	.1%	.0%	.1%	.0%
RIB/RZB	2.3	.2	1.9	11	.1%	.0%	.2%	.0%
Quickturn Systems	2.2	2.2	.0	18	.1%	.1%	.0%	.0%
MARC	2.1	.0	2.1	0	.1%	.0%	.2%	.0%
EME	2.1	.4	1.0	29	.1%	.0%	.1%	.0%
ICAD	2.0	.0	1.6	0	.1%	.0%	.1%	.0%
Teradyne	1.9	.3	1.3	6	.1%	.0%	.1%	.0%
Test Systems Strategies	1.8	.0	1.5	0	.1%	.0%	.1%	.0%
DAPCO	1.8	.0	1.2	0	.1%	.0%	.1%	.0%
Synercom	1.8	.0	.9	0	.1%	.0%	.1%	.0%
MEDESIGN	1.7	.5	.6	18	.0%	.0%	.1%	.0%
Caroline Informatique	1.6	.3	.8	8	.0%	.0%	.1%	.0%
SPATIAL Technology	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
ERDAS	1.5	.4	1.0	165	.0%	.0%	.1%	.2%
Sinus Software	1.5	.8	.8	36	.0%	.0%	.1%	.0%
MCS	1.5	.0	1.3	0	.0%	.0%	.1%	.0%
Aries Technology	1.5	.0	1.3	0	.0%	.0%	.1%	.0%
Assigraph	1.4	.0	1.1	0	.0%	.0%	.1%	.0%
Solbourne	1.3	1.2	.0	234	.0%	.1%	.0%	.3%
FEA	1.2	.3	.3	0	.0%	.0%	.0%	.0%

(Continued)

Table 16 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
FEGS	1.1	.0	1.0	0	.0%	.0%	.1%	.0%
Xilinx	1.1	.0	1.0	0	.0%	.0%	.1%	.0%
Macao Systems	1.1	.6	.4	12	.0%	.0%	.0%	.0%
Zuken	1.1	.4	.6	6	.0%	.0%	.1%	.0%
Mechanical Dynamics	1.1	.0	.9	0	.0%	.0%	.1%	.0%
Dynamic Graphics	.9	.0	.8	0	.0%	.0%	.1%	.0%
i-Logix	.9	.0	.9	0	.0%	.0%	.1%	.0%
Cascade Design Automation	.8	.0	.6	0	.0%	.0%	.1%	.0%
Accugraph	.8	.4	.3	30	.0%	.0%	.0%	.0%
Sigma Design	.8	.0	.7	0	.0%	.0%	.1%	.0%
CADSI	.7	.1	.6	3	.0%	.0%	.0%	.0%
Scientific & Engineering SW	.7	.0	.7	0	.0%	.0%	.1%	.0%
GeoQuest	.7	.0	.7	0	.0%	.0%	.1%	.0%
Hydrotec	.6	.3	.2	7	.0%	.0%	.0%	.0%
Lamp Software	.6	.2	.4	52	.0%	.0%	.0%	.1%
ISDATA	.6	.0	.5	0	.0%	.0%	.0%	.0%
Geometria GIS Systems House	.6	.0	.0	0	.0%	.0%	.0%	.0%
ACTEL	.5	.0	.5	0	.0%	.0%	.0%	.0%
Rasna Corporation	.5	.0	.5	0	.0%	.0%	.0%	.0%
ACDS Graphic System	.5	.0	.4	0	.0%	.0%	.0%	.0%
Computational Mechanics	.5	.0	.5	0	.0%	.0%	.0%	.0%

(Continued)

Table 16 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
National Semiconductor	.4	.1	.4	5	.0%	.0%	.0%	.0%
LEICA Heerberg	.4	.0	.3	0	.0%	.0%	.0%	.0%
Quantic Laboratories	.4	.0	.4	0	.0%	.0%	.0%	.0%
Pacific Numerics	.4	.0	.4	0	.0%	.0%	.0%	.0%
Ontos	.4	.0	.4	0	.0%	.0%	.0%	.0%
Compact Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
Data I/O	.4	.0	.4	0	.0%	.0%	.0%	.0%
Whessoe Computing Systems	.3	.0	.3	0	.0%	.0%	.0%	.0%
Wisdom Systems	.3	.0	.3	0	.0%	.0%	.0%	.0%
Motorola	.3	.0	.3	0	.0%	.0%	.0%	.0%
CADMATIC	.3	.0	.2	2	.0%	.0%	.0%	.0%
Minc Software	.3	.0	.3	0	.0%	.0%	.0%	.0%
Simulation Science	.3	.0	.3	0	.0%	.0%	.0%	.0%
Objectivity	.3	.0	.3	0	.0%	.0%	.0%	.0%
CAMTEK	.2	.1	.2	0	.0%	.0%	.0%	.0%
Inca	.2	.2	.0	1	.0%	.0%	.0%	.0%
CAD Language Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Masta Corporation	.2	.0	.2	0	.0%	.0%	.0%	.0%
Microsim	.2	.0	.2	0	.0%	.0%	.0%	.0%
PADS Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Sys	.2	.0	.1	2	.0%	.0%	.0%	.0%

(Continued)

Table 16 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ETAK	.2	.0	.2	0	.0%	.0%	.0%	.0%
Meta-Software	.2	.0	.1	0	.0%	.0%	.0%	.0%
ARKTEC	.2	.1	.1	11	.0%	.0%	.0%	.0%
Electrical Eng. Software	.2	.0	.1	0	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.1	.0	.1	1	.0%	.0%	.0%	.0%
CADKEY	.1	.0	.1	0	.0%	.0%	.0%	.0%
Point Control	.1	.0	.1	0	.0%	.0%	.0%	.0%
Object Design	.1	.0	.1	0	.0%	.0%	.0%	.0%
Bechtel Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	.1	.0	.1	0	.0%	.0%	.0%	.0%
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
Infinite Graphics	.1	.0	.1	0	.0%	.0%	.0%	.0%
Terra Sciences	.1	.0	.1	0	.0%	.0%	.0%	.0%
Sunrise Test Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Softdesk	.1	.0	.1	0	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
GEOVISION Inc.	.1	.0	.0	1	.0%	.0%	.0%	.0%
TOOL Software	.0	.0	.0	1	.0%	.0%	.0%	.0%
Exemplar Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.0%	.0%
ESDU International	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 16 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Carrier Corporation	.0	.0	.0	0	.0%	.0%	.0%	.0%
Dolphin Integration	.0	.0	.0	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
LandCadd	.0	.0	.0	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.0	.0	.0	0	.0%	.0%	.0%	.0%
CADWorks	.0	.0	.0	0	.0%	.0%	.0%	.0%
ALS Design	.0	.0	.0	0	.0%	.0%	.0%	.0%
Tanner Research	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
ASG	.0	.0	.0	0	.0%	.0%	.0%	.0%
Synthesis	.0	.0	.0	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Phase Three Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	3,471.2	1,565.7	1,159.4	72,303	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	2,461.5	1,211.2	676.2	57,584	70.9%	77.4%	58.3%	79.6%
All Asian-Based Companies	1.1	.4	.6	6	.0%	.0%	.1%	.0%
All European-Based Companies	1,008.7	354.1	482.6	14,713	29.1%	22.6%	41.6%	20.3%
All Hardware Companies	563.5	464.2	1.4	35,716	16.2%	29.6%	.1%	49.4%
All Turnkey & SW Companies	2,907.7	1,101.5	1,158.1	36,587	83.8%	70.4%	99.9%	50.6%

Source: Dataquest (March 1993)

Table 17
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	443.5	239.5	117.5	4,608	48.7%	43.8%	64.5%	44.5%
Digital	177.8	122.8	.0	0	19.5%	22.4%	.0%	.0%
Control Data Systems	52.5	21.5	7.4	167	5.8%	3.9%	4.0%	1.6%
Siemens Nixdorf Info systeme	21.6	12.3	8.2	263	2.4%	2.3%	4.5%	2.5%
MacNeal-Schwendler	12.5	.0	12.0	0	1.4%	.0%	6.6%	.0%
Exapt	9.1	4.5	3.1	114	1.0%	.8%	1.7%	1.1%
EDS	4.1	.0	4.1	(13)	.4%	.0%	2.2%	-.1%
SDRC	3.9	.0	3.9	0	.4%	.0%	2.2%	.0%
Cadence	3.3	.0	2.6	0	.4%	.0%	1.4%	.0%
Unisys	3.3	1.6	1.1	44	.4%	.3%	.6%	.4%
Han Dataport	3.1	.9	1.7	26	.3%	.2%	.9%	.3%
PDA Engineering	2.6	.0	2.5	0	.3%	.0%	1.4%	.0%
Swanson Analysis	2.5	.0	2.5	0	.3%	.0%	1.4%	.0%
GeoVision Systems	2.4	.2	1.3	1	.3%	.0%	.7%	.0%
Fides Industrielle Automation	2.2	.3	1.5	7	.2%	.1%	.8%	.1%
Assigraph	1.4	.0	1.1	0	.2%	.0%	.6%	.0%
Framasoft	1.2	.0	.7	0	.1%	.0%	.4%	.0%
Clemessy	1.1	.9	.2	6	.1%	.2%	.1%	.1%
MCS	1.1	.0	1.0	0	.1%	.0%	.5%	.0%
Computational Mechanics	1.1	.0	1.1	0	.1%	.0%	.6%	.0%

(Continued)

Table 17 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
EA Systems	1.1	.0	1.1	0	.1%	.0%	.6%	.0%
Synercom	1.0	.0	.5	0	.1%	.0%	.3%	.0%
MARC	.9	.0	.9	0	.1%	.0%	.5%	.0%
Macao Systems	.7	.4	.3	6	.1%	.1%	.1%	.1%
debis Systemhaus	.7	.2	.4	3	.1%	.0%	.2%	.0%
ESRI	.7	.0	.6	0	.1%	.0%	.3%	.0%
Whessoe Computing Systems	.6	.0	.6	0	.1%	.0%	.4%	.0%
Aucotec	.5	.1	.3	2	.1%	.0%	.2%	.0%
Olivetti	.5	.4	.0	13	.1%	.1%	.0%	.1%
LSI Logic	.4	.0	.3	1	.0%	.0%	.2%	.0%
Hochtief	.3	.1	.2	2	.0%	.0%	.1%	.0%
Laser-Scan	.3	.1	.2	3	.0%	.0%	.1%	.0%
FEA	.3	.1	.1	0	.0%	.0%	.0%	.0%
Genrad	.3	.1	.2	1	.0%	.0%	.1%	.0%
EEsof	.3	.0	.3	0	.0%	.0%	.1%	.0%
Harris EDA	.3	.0	.2	2	.0%	.0%	.1%	.0%
FEGS	.3	.0	.2	0	.0%	.0%	.1%	.0%
Dynamic Graphics	.3	.0	.2	0	.0%	.0%	.1%	.0%
Analogy	.2	.0	.2	0	.0%	.0%	.1%	.0%
Compact Software	.2	.0	.2	0	.0%	.0%	.1%	.0%

(Continued)

Table 17 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Test Systems Strategies	.2	.0	.2	0	.0%	.0%	.1%	.0%
COMPASS Design Automation	.2	.0	.1	0	.0%	.0%	.1%	.0%
ISDATA	.2	.0	.2	0	.0%	.0%	.1%	.0%
Mechanical Dynamics	.2	.0	.2	0	.0%	.0%	.1%	.0%
Masta Corporation	.2	.0	.1	0	.0%	.0%	.1%	.0%
Teradyne	.2	.0	.1	0	.0%	.0%	.1%	.0%
Geotrace Technologies	.2	.0	.1	3	.0%	.0%	.1%	.0%
Bechtel Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
ETAK	.2	.0	.1	0	.0%	.0%	.1%	.0%
Logic Modeling Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	.1	.0	.1	0	.0%	.0%	.1%	.0%
Lamp Software	.1	.0	.0	3	.0%	.0%	.0%	.0%
Data I/O	.1	.0	.1	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
ESDU International	.0	.0	.0	0	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Microsim	.0	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Accugraph	.0	.0	.0	1	.0%	.0%	.0%	.0%
Valisys	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 17 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Other Companies	148.7	141.3	.0	5,083	16.3%	25.8%	.0%	49.1%
All Companies	911.1	547.3	182.2	10,347	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	865.5	527.1	161.9	9,899	95.0%	96.3%	88.8%	95.7%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	45.5	20.2	20.3	448	5.0%	3.7%	11.2%	4.3%
All Hardware Companies	337.6	268.8	1.5	5,133	37.1%	49.1%	.8%	49.6%
All Turnkey & SW Companies	573.5	278.5	180.7	5,214	62.9%	50.9%	99.2%	50.4%

Source: Dataquest (March 1993)

Table 18
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Server
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
IBM	136.0	76.9	32.9	966	36.1%	33.7%	52.8%	20.8%
Digital	89.4	61.7	.0	770	23.7%	27.0%	.0%	16.6%
Sun Microsystems	44.3	36.1	.0	1,037	11.8%	15.8%	.0%	22.4%
Intergraph	36.3	17.7	8.3	511	9.7%	7.7%	13.4%	11.0%
EDS	10.4	5.3	4.1	177	2.8%	2.3%	6.5%	3.8%
Landmark Graphics	9.8	4.9	2.3	51	2.6%	2.2%	3.6%	1.1%
Applicon	6.9	2.3	2.7	73	1.8%	1.0%	4.3%	1.6%
Zycad	6.3	3.8	.8	36	1.7%	1.7%	1.3%	.8%
Sysscan	5.9	2.9	1.2	46	1.6%	1.3%	2.0%	1.0%
Silicon Graphics	5.2	4.5	.0	99	1.4%	1.9%	.0%	2.1%
ESRI	5.0	.0	4.5	0	1.3%	.0%	7.3%	.0%
Hewlett-Packard	4.5	3.7	.0	646	1.2%	1.6%	.0%	13.9%
Ikos Systems	3.7	3.5	.2	41	1.0%	1.5%	.3%	.9%
Solbourne	3.7	3.7	.0	166	1.0%	1.6%	.0%	3.6%
Cadence	3.2	.0	2.6	0	.9%	.0%	4.2%	.0%
Cisigraph	2.9	.8	1.6	18	.8%	.4%	2.5%	.4%
Control Data Systems	1.6	.8	.2	3	.4%	.3%	.3%	.1%
Cimlinc	.8	.0	.6	0	.2%	.0%	.9%	.0%
Logic Modeling Systems	.3	.0	.2	0	.1%	.0%	.3%	.0%
ETAK	.2	.0	.1	0	.0%	.0%	.2%	.0%
Georgia Tech Research Corp.	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 18 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Server
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	376.3	228.3	62.2	4,639	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	367.6	224.7	59.4	4,575	97.7%	98.4%	95.5%	98.6%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	8.7	3.7	2.8	64	2.3%	1.6%	4.5%	1.4%
All Hardware Companies	149.4	111.6	.0	3,198	39.7%	48.9%	.0%	68.9%
All Turnkey & SW Companies	226.9	116.8	62.2	1,441	60.3%	51.1%	100.0%	31.1%

Source: Dataquest (March 1993)

Table 19
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Compaq	197.3	197.3	.0	42,765	17.5%	28.8%	.0%	28.5%
IBM	106.0	88.5	10.1	23,521	9.4%	12.9%	2.7%	15.7%
Autodesk	103.6	.0	103.6	0	9.2%	.0%	27.9%	.0%
Apple Computer	63.2	55.6	.0	14,964	5.6%	8.1%	.0%	10.0%
Hewlett-Packard	61.0	48.8	.0	10,777	5.4%	7.1%	.0%	7.2%
Nemetschek	31.3	11.6	17.5	400	2.8%	1.7%	4.7%	.3%
Wiechers Datentechnik	30.0	7.9	13.9	632	2.7%	1.2%	3.7%	.4%
Investronica SA	27.6	22.1	2.8	1,102	2.4%	3.2%	.7%	.7%
CAD Distribution	16.9	8.4	6.7	261	1.5%	1.2%	1.8%	.2%
Tebis	16.7	2.5	11.7	96	1.5%	.4%	3.1%	.1%
Research Machines	15.6	15.6	.0	2,517	1.4%	2.3%	.0%	1.7%
Ziegler Informatics	14.3	.0	14.3	0	1.3%	.0%	3.9%	.0%
Soft-Tech Software Technologies	13.8	2.1	10.4	932	1.2%	.3%	2.8%	.6%
Intergraph	11.4	.0	10.7	0	1.0%	.0%	2.9%	.0%
LPKF	11.0	7.2	2.8	541	1.0%	1.0%	.7%	.4%
Computervision	10.8	.0	10.2	80	1.0%	.0%	2.7%	.1%
Dell Computer	9.3	9.3	.0	2,415	.8%	1.4%	.0%	1.6%
Cimatron	8.3	3.8	3.7	381	.7%	.5%	1.0%	.3%
DAT Standard info ssystemes	7.9	.0	7.5	0	.7%	.0%	2.0%	.0%
Olivetti	7.3	6.2	.0	877	.6%	.9%	.0%	.6%
Aucotec	7.0	1.2	4.6	340	.6%	.2%	1.2%	.2%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Serbi	7.0	.7	6.3	0	.6%	.1%	1.7%	.0%
Ground Modelling Systems	6.6	3.6	2.7	56	.6%	.5%	.7%	.0%
Hochtief	6.5	1.0	4.6	82	.6%	.1%	1.2%	.1%
Racal-Redac	6.4	.0	5.3	0	.6%	.0%	1.4%	.0%
ISICAD	6.2	.0	6.2	0	.6%	.0%	1.7%	.0%
BATISOFT	6.0	.9	3.0	300	.5%	.1%	.8%	.2%
RoboCAD Solutions	6.0	.0	4.5	0	.5%	.0%	1.2%	.0%
RIB/RZB	6.0	.5	4.9	41	.5%	.1%	1.3%	.0%
Orcad	5.1	.0	5.1	0	.5%	.0%	1.4%	.0%
mb Programme	5.1	2.5	1.8	122	.4%	.4%	.5%	.1%
Microway	4.7	2.9	1.4	60	.4%	.4%	.4%	.0%
Graphisoft Software Dev	4.5	.0	4.5	0	.4%	.0%	1.2%	.0%
Kloeckner-Moeller	4.4	.2	3.1	46	.4%	.0%	.8%	.0%
Computer Services Consultants	4.2	.0	4.2	0	.4%	.0%	1.1%	.0%
Viewlogic Systems	4.0	.0	3.2	0	.4%	.0%	.9%	.0%
Datagraphic	3.6	1.8	1.4	57	.3%	.3%	.4%	.0%
Altera	3.5	.0	3.0	0	.3%	.0%	.8%	.0%
Micrografx	3.3	.0	3.3	0	.3%	.0%	.9%	.0%
EEsof	2.8	.0	2.6	0	.3%	.0%	.7%	.0%
ESRI	2.7	.0	2.5	0	.2%	.0%	.7%	.0%
CADKEY	2.7	.0	2.7	0	.2%	.0%	.7%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Xilinx	2.6	.0	2.3	0	.2%	.0%	.6%	.0%
Pathtrace	2.5	.5	1.6	37	.2%	.1%	.4%	.0%
ALS Design	2.4	.1	2.1	20	.2%	.0%	.6%	.0%
Superdraft	2.3	1.1	1.1	132	.2%	.2%	.3%	.1%
Elstree Computing	2.2	1.0	1.2	62	.2%	.1%	.3%	.0%
Whessoe Computing Systems	2.2	.0	2.2	0	.2%	.0%	.6%	.0%
BETRONEX	2.2	.2	1.9	40	.2%	.0%	.5%	.0%
Vero International Software	2.2	.0	2.0	0	.2%	.0%	.5%	.0%
CAD-UL	2.1	.0	2.1	0	.2%	.0%	.6%	.0%
ACTEL	2.1	.0	1.9	0	.2%	.0%	.5%	.0%
CAD-Capture	2.0	.4	.6	10	.2%	.1%	.2%	.0%
Swanson Analysis	1.9	.0	1.9	0	.2%	.0%	.5%	.0%
PAFEC	1.9	.0	1.9	0	.2%	.0%	.5%	.0%
CAMTEK	1.9	.4	1.2	0	.2%	.1%	.3%	.0%
ISDATA	1.8	.0	1.6	0	.2%	.0%	.4%	.0%
Data I/O	1.7	.0	1.7	0	.1%	.0%	.5%	.0%
PADS Software	1.6	.0	1.4	0	.1%	.0%	.4%	.0%
Microsim	1.6	.0	1.5	0	.1%	.0%	.4%	.0%
Moda CAD	1.6	.4	1.1	13	.1%	.1%	.3%	.0%
Point Control	1.6	.0	1.5	0	.1%	.0%	.4%	.0%
FEA	1.5	.4	.4	0	.1%	.1%	.1%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Strategic Mapping	1.5	.0	1.4	0	.1%	.0%	.4%	.0%
EME	1.5	.4	.7	41	.1%	.1%	.2%	.0%
ARKTEC	1.4	.1	1.2	32	.1%	.0%	.3%	.0%
Lamp Software	1.4	.3	1.1	76	.1%	.0%	.3%	.1%
Geometria GIS Systems House	1.3	.2	.4	15	.1%	.0%	.1%	.0%
Aucos elektronische Gerate	1.2	.4	.9	121	.1%	.1%	.2%	.1%
Mucke Software	1.1	.6	.4	27	.1%	.1%	.1%	.0%
ETAK	1.1	.1	1.1	3	.1%	.0%	.3%	.0%
Teradyne	1.1	.0	.9	0	.1%	.0%	.2%	.0%
Integer	1.1	.0	.9	0	.1%	.0%	.2%	.0%
ADRA Systems	1.0	.0	.8	0	.1%	.0%	.2%	.0%
ERDAS	1.0	.3	.7	110	.1%	.0%	.2%	.1%
CADWorks	1.0	.0	.9	0	.1%	.0%	.2%	.0%
Genasys II	.9	.1	.8	19	.1%	.0%	.2%	.0%
CNC Software	.9	.0	.9	0	.1%	.0%	.2%	.0%
Contract Data Research	.9	.0	.6	0	.1%	.0%	.2%	.0%
Aspen Technology	.9	.0	.8	0	.1%	.0%	.2%	.0%
Areon	.8	.4	.2	6	.1%	.1%	.0%	.0%
Anilam Electronics	.8	.1	.6	0	.1%	.0%	.2%	.0%
Applicon	.8	.2	.3	24	.1%	.0%	.1%	.0%
Number One Systems	.8	.1	.6	55	.1%	.0%	.2%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
CAD Lab	.8	.0	.7	0	.1%	.0%	.2%	.0%
GeoQuest	.7	.0	.7	0	.1%	.0%	.2%	.0%
debis Systemhaus	.7	.2	.4	13	.1%	.0%	.1%	.0%
Caroline Informatique	.7	.1	.3	10	.1%	.0%	.1%	.0%
Algor Interactive Systems	.7	.0	.6	0	.1%	.0%	.2%	.0%
MCS	.7	.0	.6	0	.1%	.0%	.2%	.0%
Engineered Software	.6	.0	.6	0	.1%	.0%	.2%	.0%
Sigma Design	.6	.0	.6	0	.1%	.0%	.2%	.0%
ASCAD/ASCAM	.6	.4	.2	14	.1%	.1%	.0%	.0%
Carrier Corporation	.6	.0	.6	0	.1%	.0%	.2%	.0%
ESDU International	.6	.0	.6	0	.1%	.0%	.2%	.0%
CADMATIC	.6	.0	.4	4	.1%	.0%	.1%	.0%
Harris EDA	.6	.0	.4	2	.0%	.0%	.1%	.0%
Evolution Computing	.5	.0	.5	0	.0%	.0%	.1%	.0%
ALDEC	.5	.0	.5	0	.0%	.0%	.1%	.0%
Inca	.5	.5	.0	2	.0%	.1%	.0%	.0%
S.T.L.D. s.r.l.	.5	.0	.5	0	.0%	.0%	.1%	.0%
Applications in CADD	.4	.1	.3	11	.0%	.0%	.1%	.0%
Terra Sciences	.4	.0	.4	0	.0%	.0%	.1%	.0%
Massteck	.4	.0	.4	0	.0%	.0%	.1%	.0%
Cimlinc	.4	.0	.3	0	.0%	.0%	.1%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Accel Technologies	.4	.0	.4	0	.0%	.0%	.1%	.0%
Kork Systems	.4	.0	.3	4	.0%	.0%	.1%	.0%
LandCadd	.4	.0	.4	0	.0%	.0%	.1%	.0%
American Small Business Comp.	.4	.0	.4	0	.0%	.0%	.1%	.0%
Foresight Resources	.4	.0	.3	0	.0%	.0%	.1%	.0%
Omation	.3	.0	.3	0	.0%	.0%	.1%	.0%
Compact Software	.3	.0	.3	0	.0%	.0%	.1%	.0%
Minc Software	.3	.0	.3	0	.0%	.0%	.1%	.0%
Softdesk	.3	.0	.3	0	.0%	.0%	.1%	.0%
Sweet's Electronic Publishing	.3	.0	.2	0	.0%	.0%	.1%	.0%
Generation 5 Technology	.3	.0	.3	0	.0%	.0%	.1%	.0%
Masta Corporation	.3	.0	.2	0	.0%	.0%	.0%	.0%
Instrumatic Espanola	.2	.0	.2	0	.0%	.0%	.1%	.0%
Mega CADD	.2	.0	.2	0	.0%	.0%	.1%	.0%
Facility Mapping Systems	.2	.0	.2	0	.0%	.0%	.1%	.0%
Cascade Graphics	.2	.0	.2	0	.0%	.0%	.1%	.0%
Tanner Research	.2	.0	.2	0	.0%	.0%	.0%	.0%
CADSI	.2	.0	.1	3	.0%	.0%	.0%	.0%
Radan Computational	.2	.1	.1	6	.0%	.0%	.0%	.0%
Aries Technology	.2	.0	.2	0	.0%	.0%	.0%	.0%
Synthesis	.2	.0	.2	0	.0%	.0%	.0%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
TOOL Software	.1	.0	.1	3	.0%	.0%	.0%	.0%
ASG	.1	.0	.1	0	.0%	.0%	.0%	.0%
Rasna Corporation	.1	.0	.1	0	.0%	.0%	.0%	.0%
A.I. Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	.1	.0	.1	3	.0%	.0%	.0%	.0%
Vamp	.1	.0	.1	0	.0%	.0%	.0%	.0%
Logic Modeling Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Genrad	.1	.0	.1	4	.0%	.0%	.0%	.0%
Accugraph	.1	.0	.1	0	.0%	.0%	.0%	.0%
Simulation Science	.1	.0	.1	0	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
GeoGraphix	.1	.0	.1	0	.0%	.0%	.0%	.0%
Geotrace Technologies	.1	.0	.1	0	.0%	.0%	.0%	.0%
National Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
CAE-link	.1	.0	.1	0	.0%	.0%	.0%	.0%
Quicklogic	.1	.0	.1	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Infinite Graphics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Technische Computer Systeme	.0	.0	.0	1	.0%	.0%	.0%	.0%
GEOVISION Inc.	.0	.0	.0	2	.0%	.0%	.0%	.0%

(Continued)

Table 19 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Europe
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Dolphin Integration	.0	.0	.0	0	.0%	.0%	.0%	.0%
Phase Three Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Pacific Numerics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Exemplar Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	173.9	174.0	.0	45,824	15.4%	25.4%	.0%	30.5%
All Companies	1,129.1	685.1	372.0	150,114	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	804.9	574.7	197.1	140,533	71.3%	83.9%	53.0%	93.6%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	324.2	110.5	174.9	9,581	28.7%	16.1%	47.0%	6.4%
All Hardware Companies	628.5	601.9	.0	144,909	55.7%	87.9%	.0%	96.5%
All Turnkey & SW Companies	500.6	83.2	372.0	5,204	44.3%	12.1%	100.0%	3.5%

Source: Dataquest (March 1993)

Table 20
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
IBM	509.9	280.4	138.1	18,493	12.3%	12.4%	10.3%	14.5%
Fujitsu	442.0	282.9	114.9	8,751	10.7%	12.5%	8.6%	6.9%
NEC	348.0	238.9	81.3	22,400	8.4%	10.5%	6.1%	17.6%
Nihon Unisys	228.3	141.6	38.8	2,220	5.5%	6.2%	2.9%	1.7%
Sun Microsystems	190.2	163.3	.0	10,201	4.6%	7.2%	.0%	8.0%
Hitachi	174.0	83.5	73.1	4,675	4.2%	3.7%	5.5%	3.7%
Hewlett-Packard	161.2	118.5	15.9	11,989	3.9%	5.2%	1.2%	9.4%
Cadence	130.3	1.3	116.0	0	3.2%	.1%	8.7%	.0%
Toshiba—NO OEM	106.2	53.1	42.5	3,114	2.6%	2.3%	3.2%	2.4%
Zuken	99.8	38.9	60.9	653	2.4%	1.7%	4.5%	.5%
Mitsubishi Electric	95.0	74.0	12.0	1,722	2.3%	3.3%	.9%	1.4%
Intergraph	83.8	32.8	24.3	1,113	2.0%	1.4%	1.8%	.9%
Silicon Graphics	82.7	78.6	.0	2,111	2.0%	3.5%	.0%	1.7%
Computervision	78.3	30.7	19.5	427	1.9%	1.4%	1.5%	.3%
Mentor Graphics	77.8	11.7	50.6	358	1.9%	.5%	3.8%	.3%
Hitachi Zosen Info Systems	77.6	66.2	3.6	800	1.9%	2.9%	.3%	.6%
Mutoh Industries—NO OEM	72.3	40.7	20.8	1,139	1.7%	1.8%	1.6%	.9%
Digital	70.6	47.7	1.0	767	1.7%	2.1%	.1%	.6%
Autodesk	54.2	.0	54.2	0	1.3%	.0%	4.0%	.0%
Sharp System Products—NO OEM	49.7	25.8	23.9	470	1.2%	1.1%	1.8%	.4%
EDS	45.8	22.8	16.9	732	1.1%	1.0%	1.3%	.6%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
SDRC	42.9	.0	42.9	0	1.0%	.0%	3.2%	.0%
Wacom	42.5	8.6	29.5	788	1.0%	.4%	2.2%	.6%
Mitsui Engineering	39.7	27.8	7.9	264	1.0%	1.2%	.6%	.2%
Hakuto	38.2	22.9	15.3	850	.9%	1.0%	1.1%	.7%
Uchida Yoko	37.9	22.9	13.5	900	.9%	1.0%	1.0%	.7%
Seiko Instruments—NO OEM	34.2	15.3	18.2	258	.8%	.7%	1.4%	.2%
CADIX	33.6	13.4	16.8	247	.8%	.6%	1.3%	.2%
Tokyo Electron—NO OEM	32.3	10.7	14.5	220	.8%	.5%	1.1%	.2%
Apple Computer	26.7	23.5	.0	6,331	.6%	1.0%	.0%	5.0%
Toyo Information Systems-NO OEM	24.8	15.1	7.2	265	.6%	.7%	.5%	.2%
Omron	24.2	14.5	9.7	530	.6%	.6%	.7%	.4%
Century Research Center	22.5	11.9	8.3	119	.5%	.5%	.6%	.1%
Racal-Redac	17.5	.8	9.0	2	.4%	.0%	.7%	.0%
Andor	15.7	3.9	11.1	121	.4%	.2%	.8%	.1%
Graphtec Engineering	15.4	7.7	6.9	331	.4%	.3%	.5%	.3%
INS Engineering	14.3	7.2	7.2	48	.3%	.3%	.5%	.0%
Synopsys	13.5	.0	9.8	0	.3%	.0%	.7%	.0%
Viewlogic Systems	13.2	.0	10.5	0	.3%	.0%	.8%	.0%
Parametric Technology	13.0	.0	10.9	0	.3%	.0%	.8%	.0%
Design Automation	12.7	.6	12.0	67	.3%	.0%	.9%	.1%
Sumitomo Denko Workstation	12.7	12.7	.0	2,080	.3%	.6%	.0%	1.6%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Control Data Systems	12.5	6.1	2.1	91	.3%	.3%	.2%	.1%
MacNeal-Schwendler	11.8	.0	11.3	0	.3%	.0%	.8%	.0%
COMPASS Design Automation	11.4	.2	8.5	9	.3%	.0%	.6%	.0%
CPU	10.5	.0	9.5	0	.3%	.0%	.7%	.0%
Sony	10.4	9.1	.0	603	.3%	.4%	.0%	.5%
Siemens Nixdorf Info systeme	9.1	4.6	3.2	147	.2%	.2%	.2%	.1%
Landmark Graphics	8.2	4.1	1.9	42	.2%	.2%	.1%	.0%
Harris EDA	8.2	.9	4.7	35	.2%	.0%	.4%	.0%
Applicon	7.4	3.2	3.5	80	.2%	.1%	.3%	.1%
Cisigraph	6.6	1.9	3.7	43	.2%	.1%	.3%	.0%
MARC	6.6	.0	6.6	0	.2%	.0%	.5%	.0%
Zycad	6.3	3.8	.8	48	.2%	.2%	.1%	.0%
Alias Research	6.2	.0	5.7	0	.2%	.0%	.4%	.0%
GeoVision Systems	5.4	.4	2.8	5	.1%	.0%	.2%	.0%
Swanson Analysis	5.3	.0	5.3	0	.1%	.0%	.4%	.0%
ESRI	5.1	.0	4.6	0	.1%	.0%	.3%	.0%
Fides Industrielle Automation	4.8	.7	3.4	55	.1%	.0%	.3%	.0%
Silvar-Lisco	4.8	.0	2.6	0	.1%	.0%	.2%	.0%
Kubota Computer	4.8	3.2	.8	300	.1%	.1%	.1%	.2%
Matra Datavision	4.8	1.7	2.2	0	.1%	.1%	.2%	.0%
EEsof	4.7	.0	4.1	3	.1%	.0%	.3%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ADRA Systems	4.4	.2	3.3	16	.1%	.0%	.2%	.0%
Unisys	4.2	2.1	1.5	63	.1%	.1%	.1%	.0%
ICAD	3.4	.0	2.7	0	.1%	.0%	.2%	.0%
Cascade Design Automation	3.2	.0	2.4	0	.1%	.0%	.2%	.0%
Cimatron	3.0	1.4	1.4	99	.1%	.1%	.1%	.1%
Mechanical Dynamics	2.9	.0	2.6	0	.1%	.0%	.2%	.0%
Delcam International	2.8	1.0	1.4	46	.1%	.0%	.1%	.0%
Data I/O	2.7	.0	2.7	0	.1%	.0%	.2%	.0%
Framasoft	2.7	.0	1.6	0	.1%	.0%	.1%	.0%
PADS Software	2.7	.0	2.3	0	.1%	.0%	.2%	.0%
Cimline	2.7	.0	1.9	56	.1%	.0%	.1%	.0%
Contec Microelectronics	2.5	.0	2.3	0	.1%	.0%	.2%	.0%
Comdisco Systems	2.4	.0	2.1	0	.1%	.0%	.2%	.0%
Logic Modeling Systems	2.4	.0	1.9	0	.1%	.0%	.1%	.0%
Ricoh—NO OEM	2.2	.0	1.9	0	.1%	.0%	.1%	.0%
Meta-Software	2.2	.0	1.5	0	.1%	.0%	.1%	.0%
Quickturn Systems	2.2	2.2	.0	18	.1%	.1%	.0%	.0%
Synercom	2.1	.0	1.1	0	.1%	.0%	.1%	.0%
ACTEL	2.0	.0	1.8	0	.0%	.0%	.1%	.0%
Aries Technology	2.0	.0	1.8	0	.0%	.0%	.1%	.0%
Test Systems Strategies	2.0	.0	1.7	0	.0%	.0%	.1%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Ikos Systems	1.9	1.8	.1	20	.0%	.1%	.0%	.0%
Auto-Trol	1.8	.7	.7	22	.0%	.0%	.1%	.0%
PDA Engineering	1.8	.0	1.7	0	.0%	.0%	.1%	.0%
CAD Centre	1.8	.0	1.4	0	.0%	.0%	.1%	.0%
Kockums Computer Systems	1.6	.4	.9	80	.0%	.0%	.1%	.1%
Xilinx	1.6	.0	1.4	0	.0%	.0%	.1%	.0%
SPATIAL Technology	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
LSI Logic	1.5	.1	1.1	4	.0%	.0%	.1%	.0%
Anilam Electronics	1.5	.5	.9	18	.0%	.0%	.1%	.0%
ISICAD	1.5	.5	.8	9	.0%	.0%	.1%	.0%
MCS	1.4	.0	1.3	0	.0%	.0%	.1%	.0%
CADKEY	1.4	.0	1.4	0	.0%	.0%	.1%	.0%
LPKF	1.4	.9	.4	61	.0%	.0%	.0%	.0%
Altera	1.3	.0	1.1	0	.0%	.0%	.1%	.0%
Solbourne	1.2	1.2	.0	100	.0%	.1%	.0%	.1%
Analogy	1.2	.0	1.0	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	1.2	.2	1.0	7	.0%	.0%	.1%	.0%
ERDAS	1.2	.3	.8	125	.0%	.0%	.1%	.1%
Point Control	1.2	.0	1.1	0	.0%	.0%	.1%	.0%
Moss Systems	1.1	.0	1.0	0	.0%	.0%	.1%	.0%
Microsim	1.1	.0	1.0	0	.0%	.0%	.1%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Teradyne	1.0	.1	.7	2	.0%	.0%	.0%	.0%
BETRONEX	1.0	.1	.9	18	.0%	.0%	.1%	.0%
GeoQuest	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Compact Software	.9	.0	.9	0	.0%	.0%	.1%	.0%
Sigma Design	.9	.0	.9	0	.0%	.0%	.1%	.0%
EA Systems	.8	.0	.8	0	.0%	.0%	.1%	.0%
CADWorks	.8	.0	.7	0	.0%	.0%	.1%	.0%
Gerber Systems	.8	.4	.3	11	.0%	.0%	.0%	.0%
EPIC Design Technology	.8	.0	.8	0	.0%	.0%	.1%	.0%
Cooper & Chyan Technology	.7	.0	.7	0	.0%	.0%	.1%	.0%
Whessoe Computing Systems	.7	.0	.7	0	.0%	.0%	.1%	.0%
CNC Software	.7	.0	.7	0	.0%	.0%	.1%	.0%
Moda CAD	.6	.2	.4	5	.0%	.0%	.0%	.0%
CADSI	.6	.1	.5	4	.0%	.0%	.0%	.0%
Sysscan	.6	.3	.2	6	.0%	.0%	.0%	.0%
ANACAD	.6	.0	.6	0	.0%	.0%	.0%	.0%
Softdesk	.6	.0	.6	0	.0%	.0%	.0%	.0%
Rasna Corporation	.6	.0	.6	0	.0%	.0%	.0%	.0%
Wisdom Systems	.6	.0	.5	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.6	.0	.5	0	.0%	.0%	.0%	.0%
i-Logix	.6	.0	.6	0	.0%	.0%	.0%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Genasys II	.6	.1	.5	4	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	.6	.2	.3	10	.0%	.0%	.0%	.0%
ETAK	.5	.0	.5	1	.0%	.0%	.0%	.0%
Laser-Scan	.4	.1	.2	3	.0%	.0%	.0%	.0%
Accugraph	.4	.2	.2	15	.0%	.0%	.0%	.0%
Carrier Corporation	.4	.0	.4	0	.0%	.0%	.0%	.0%
Quantic Laboratories	.4	.0	.4	0	.0%	.0%	.0%	.0%
Wiechers Datentechnik	.4	.1	.2	7	.0%	.0%	.0%	.0%
Object Design	.4	.0	.4	0	.0%	.0%	.0%	.0%
Simulation Science	.4	.0	.4	0	.0%	.0%	.0%	.0%
Scientific & Engineering SW	.4	.0	.4	0	.0%	.0%	.0%	.0%
Technische Computer Systeme	.3	.1	.3	9	.0%	.0%	.0%	.0%
Investronica SA	.3	.2	.0	12	.0%	.0%	.0%	.0%
Minc Software	.3	.0	.3	0	.0%	.0%	.0%	.0%
Aspen Technology	.3	.0	.3	0	.0%	.0%	.0%	.0%
Accel Technologies	.3	.0	.2	0	.0%	.0%	.0%	.0%
SIMUCAD	.3	.0	.3	0	.0%	.0%	.0%	.0%
Superdraft	.3	.1	.1	14	.0%	.0%	.0%	.0%
Infinite Graphics	.3	.0	.3	0	.0%	.0%	.0%	.0%
Dynamic Graphics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	.2	.0	.2	0	.0%	.0%	.0%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Graphisoft Software Dev	.2	.0	.2	0	.0%	.0%	.0%	.0%
PAFEC	.2	.0	.2	0	.0%	.0%	.0%	.0%
BATISOFT	.2	.0	.1	7	.0%	.0%	.0%	.0%
GeoGraphix	.2	.0	.1	0	.0%	.0%	.0%	.0%
ALDEC	.1	.0	.1	0	.0%	.0%	.0%	.0%
ASG	.1	.0	.1	0	.0%	.0%	.0%	.0%
Pathtrace	.1	.0	.1	2	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
ACDS Graphic System	.1	.0	.1	0	.0%	.0%	.0%	.0%
Integer	.1	.0	.1	0	.0%	.0%	.0%	.0%
Objectivity	.1	.0	.1	0	.0%	.0%	.0%	.0%
Mega CADD	.1	.0	.1	0	.0%	.0%	.0%	.0%
Sunrise Test Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
CAD Language Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Gable CAD Systems	.1	.1	.0	1	.0%	.0%	.0%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.0%	.0%
Exemplar Logic	.1	.0	.1	0	.0%	.0%	.0%	.0%
Tanner Research	.1	.0	.1	0	.0%	.0%	.0%	.0%
Motorola	.1	.0	.1	0	.0%	.0%	.0%	.0%
Bechtel Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 20 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Geotrace Technologies	.1	.0	.1	1	.0%	.0%	.0%	.0%
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
Quicklogic	.1	.0	.1	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.1	.0	.0	0	.0%	.0%	.0%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.0%	.0%
The CAD Group	.0	.0	.0	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Vamp	.0	.0	.0	0	.0%	.0%	.0%	.0%
Foresight Resources	.0	.0	.0	0	.0%	.0%	.0%	.0%
Omation	.0	.0	.0	0	.0%	.0%	.0%	.0%
National Semiconductor	.0	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	163.0	158.0	.9	19,627	3.9%	7.0%	.1%	15.4%
All Companies	4,135.6	2,266.3	1,339.8	127,520	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	1,950.0	998.5	643.6	72,956	47.2%	44.1%	48.0%	57.2%
All Asian-Based Companies	2,121.5	1,253.0	662.1	53,934	51.3%	55.3%	49.4%	42.3%
All European-Based Companies	64.2	14.8	34.1	630	1.6%	.7%	2.5%	.5%
All Hardware Companies	713.6	632.6	.4	67,143	17.3%	27.9%	.0%	52.7%
All Turnkey & SW Companies	3,422.0	1,633.8	1,339.4	60,377	82.7%	72.1%	100.0%	47.3%

Source: Dataquest (March 1993)

Table 21
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Fujitsu	185.6	118.8	48.3	3,784	7.8%	9.7%	5.7%	7.7%
NEC	165.1	90.8	61.1	5,443	6.9%	7.4%	7.2%	11.1%
Sun Microsystems	160.4	138.9	.0	9,299	6.7%	11.3%	.0%	18.9%
Hewlett-Packard	153.1	112.0	15.9	9,416	6.4%	9.1%	1.9%	19.1%
Cadence	129.7	1.3	115.4	0	5.4%	.1%	13.6%	.0%
Hitachi	125.3	60.1	52.6	2,710	5.2%	4.9%	6.2%	5.5%
Zuken	99.8	38.9	60.9	653	4.2%	3.2%	7.1%	1.3%
IBM	92.3	51.6	22.6	2,505	3.9%	4.2%	2.7%	5.1%
Silicon Graphics	82.7	78.6	.0	2,111	3.5%	6.4%	.0%	4.3%
Mentor Graphics	77.8	11.7	50.6	358	3.3%	.9%	5.9%	.7%
Computervision	77.7	30.7	19.0	427	3.3%	2.5%	2.2%	.9%
Nihon Unisys	75.8	47.0	12.9	619	3.2%	3.8%	1.5%	1.3%
Toshiba—NO OEM	73.9	37.0	29.6	875	3.1%	3.0%	3.5%	1.8%
Mitsubishi Electric	72.6	61.7	5.1	781	3.0%	5.0%	.6%	1.6%
Hitachi Zosen Info Systems	72.2	61.3	3.6	739	3.0%	5.0%	.4%	1.5%
Intergraph	69.0	27.8	17.9	917	2.9%	2.3%	2.1%	1.9%
Sharp System Products—NO OEM	49.1	25.5	23.6	453	2.1%	2.1%	2.8%	.9%
EDS	38.9	20.5	13.0	678	1.6%	1.7%	1.5%	1.4%
SDRC	38.6	.0	38.6	0	1.6%	.0%	4.5%	.0%
Mitsui Engineering	36.1	25.3	7.2	204	1.5%	2.1%	.8%	.4%
Uchida Yoko	34.1	20.5	11.9	729	1.4%	1.7%	1.4%	1.5%

(Continued)

Table 21 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
CADIX	33.6	13.4	16.8	247	1.4%	1.1%	2.0%	.5%
Tokyo Electron—NO OEM	32.3	10.7	14.5	220	1.4%	.9%	1.7%	.4%
Mutoh Industries—NO OEM	32.3	19.4	9.7	330	1.4%	1.6%	1.1%	.7%
Seiko Instruments—NO OEM	28.9	11.6	14.5	122	1.2%	.9%	1.7%	.2%
Omron	24.2	14.5	9.7	530	1.0%	1.2%	1.1%	1.1%
Century Research Center	20.9	11.1	7.7	116	.9%	.9%	.9%	.2%
Toyo Information Systems-NO OEM	19.9	12.4	5.7	236	.8%	1.0%	.7%	.5%
Graphtec Engineering	15.4	7.7	6.9	331	.6%	.6%	.8%	.7%
Racal-Redac	15.0	.8	8.3	2	.6%	.1%	1.0%	.0%
Digital	15.0	9.6	.8	614	.6%	.8%	.1%	1.2%
INS Engineering	13.6	6.8	6.8	35	.6%	.6%	.8%	.1%
Synopsys	13.5	.0	9.8	0	.6%	.0%	1.1%	.0%
Parametric Technology	13.0	.0	10.9	0	.5%	.0%	1.3%	.0%
Sumitomo Denko Workstation	11.8	11.8	.0	1,880	.5%	1.0%	.0%	3.8%
COMPASS Design Automation	11.1	.2	8.3	9	.5%	.0%	1.0%	.0%
Sony	10.4	9.1	.0	603	.4%	.7%	.0%	1.2%
Siemens Nixdorf Info systeme	7.7	3.8	2.7	131	.3%	.3%	.3%	.3%
Viewlogic Systems	7.5	.0	6.0	0	.3%	.0%	.7%	.0%
Harris EDA	7.3	.8	4.1	31	.3%	.1%	.5%	.1%
Alias Research	6.2	.0	5.7	0	.3%	.0%	.7%	.0%
Cisigraph	6.0	1.7	3.3	38	.2%	.1%	.4%	.1%

(Continued)

Table 21 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Applicon	6.0	2.6	2.8	66	.2%	.2%	.3%	.1%
Control Data Systems	5.0	3.0	1.1	68	.2%	.2%	.1%	.1%
Landmark Graphics	4.9	2.5	1.1	25	.2%	.2%	.1%	.1%
Silvar-Lisco	4.8	.0	2.6	0	.2%	.0%	.3%	.0%
Matra Datavision	4.8	1.7	2.2	0	.2%	.1%	.3%	.0%
MARC	4.6	.0	4.6	0	.2%	.0%	.5%	.0%
Kubota Computer	4.3	2.7	.8	235	.2%	.2%	.1%	.5%
Fides Industrielle Automation	4.1	.6	2.9	51	.2%	.1%	.3%	.1%
GeoVision Systems	3.8	.3	2.0	4	.2%	.0%	.2%	.0%
Wacom	3.6	.8	2.7	40	.2%	.1%	.3%	.1%
ADRA Systems	3.4	.2	2.5	16	.1%	.0%	.3%	.0%
ICAD	3.4	.0	2.7	0	.1%	.0%	.3%	.0%
Unisys	3.2	1.6	1.1	50	.1%	.1%	.1%	.1%
Cascade Design Automation	3.2	.0	2.4	0	.1%	.0%	.3%	.0%
Swanson Analysis	3.0	.0	3.0	0	.1%	.0%	.4%	.0%
Delcam International	2.8	1.0	1.4	46	.1%	.1%	.2%	.1%
EEsof	2.7	.0	2.4	3	.1%	.0%	.3%	.0%
Autodesk	2.7	.0	2.7	0	.1%	.0%	.3%	.0%
ESRI	2.6	.0	2.3	0	.1%	.0%	.3%	.0%
Framasoft	2.5	.0	1.5	0	.1%	.0%	.2%	.0%
Contec Microelectronics	2.5	.0	2.3	0	.1%	.0%	.3%	.0%

(Continued)

Table 21 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Mechanical Dynamics	2.4	.0	2.2	0	.1%	.0%	.3%	.0%
Comdisco Systems	2.4	.0	2.1	0	.1%	.0%	.3%	.0%
Cimlinc	2.3	.0	1.6	56	.1%	.0%	.2%	.1%
Ricoh—NO OEM	2.2	.0	1.9	0	.1%	.0%	.2%	.0%
Quickturn Systems	2.2	2.2	.0	18	.1%	.2%	.0%	.0%
Logic Modeling Systems	2.2	.0	1.7	0	.1%	.0%	.2%	.0%
Cimatron	1.9	.9	.9	43	.1%	.1%	.1%	.1%
Hakuto	1.9	1.2	.8	34	.1%	.1%	.1%	.1%
Meta-Software	1.9	.0	1.3	0	.1%	.0%	.2%	.0%
Aries Technology	1.8	.0	1.6	0	.1%	.0%	.2%	.0%
Test Systems Strategies	1.8	.0	1.5	0	.1%	.0%	.2%	.0%
Auto-Trol	1.8	.7	.7	22	.1%	.1%	.1%	.0%
CAD Centre	1.8	.0	1.4	0	.1%	.0%	.2%	.0%
Kockums Computer Systems	1.6	.4	.9	80	.1%	.0%	.1%	.2%
SPATIAL Technology	1.6	.0	1.6	0	.1%	.0%	.2%	.0%
LSI Logic	1.4	.1	1.0	3	.1%	.0%	.1%	.0%
Synercom	1.4	.0	.7	0	.1%	.0%	.1%	.0%
PDA Engineering	1.3	.0	1.3	0	.1%	.0%	.1%	.0%
MacNeal-Schwendler	1.3	.0	1.2	0	.1%	.0%	.1%	.0%
ISICAD	1.2	.5	.5	9	.0%	.0%	.1%	.0%
Analogy	1.2	.0	.9	0	.0%	.0%	.1%	.0%

(Continued)

Table 21 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Moss Systems	1.1	.0	1.0	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	1.0	.1	.8	4	.0%	.0%	.1%	.0%
Gerber Systems	.8	.4	.3	11	.0%	.0%	.0%	.0%
EPIC Design Technology	.8	.0	.8	0	.0%	.0%	.1%	.0%
Cooper & Chyan Technology	.7	.0	.7	0	.0%	.0%	.1%	.0%
ERDAS	.7	.2	.5	75	.0%	.0%	.1%	.2%
MCS	.7	.0	.6	0	.0%	.0%	.1%	.0%
ANACAD	.6	.0	.6	0	.0%	.0%	.1%	.0%
Wisdom Systems	.6	.0	.5	0	.0%	.0%	.1%	.0%
Teradyne	.6	.1	.4	2	.0%	.0%	.0%	.0%
i-Logix	.6	.0	.6	0	.0%	.0%	.1%	.0%
CADSI	.5	.1	.4	2	.0%	.0%	.0%	.0%
Genasys II	.5	.1	.4	3	.0%	.0%	.1%	.0%
Sigma Design	.5	.0	.5	0	.0%	.0%	.1%	.0%
GeoQuest	.5	.0	.5	0	.0%	.0%	.1%	.0%
Xilinx	.5	.0	.4	0	.0%	.0%	.1%	.0%
Rasna Corporation	.5	.0	.4	0	.0%	.0%	.1%	.0%
Data I/O	.5	.0	.5	0	.0%	.0%	.1%	.0%
Laser-Scan	.4	.1	.2	3	.0%	.0%	.0%	.0%
Quantic Laboratories	.4	.0	.4	0	.0%	.0%	.0%	.0%

(Continued)

Table 21 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ACTEL	.4	.0	.4	0	.0%	.0%	.0%	.0%
Accugraph	.4	.2	.2	15	.0%	.0%	.0%	.0%
Electrical Eng. Software	.4	.0	.3	0	.0%	.0%	.0%	.0%
Object Design	.4	.0	.4	0	.0%	.0%	.0%	.0%
Solbourne	.4	.4	.0	63	.0%	.0%	.0%	.1%
Compact Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
Scientific & Engineering SW	.4	.0	.4	0	.0%	.0%	.0%	.0%
Terr-Mar Resource Info Svs	.3	.1	.2	4	.0%	.0%	.0%	.0%
Technische Computer Systeme	.3	.1	.3	9	.0%	.0%	.0%	.0%
Simulation Science	.3	.0	.3	0	.0%	.0%	.0%	.0%
PADS Software	.3	.0	.2	0	.0%	.0%	.0%	.0%
Sysscan	.3	.1	.1	3	.0%	.0%	.0%	.0%
SIMUCAD	.2	.0	.2	0	.0%	.0%	.0%	.0%
PAFEC	.2	.0	.2	0	.0%	.0%	.0%	.0%
Infinite Graphics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Dynamic Graphics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Minc Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
CADKEY	.1	.0	.1	0	.0%	.0%	.0%	.0%
Softdesk	.1	.0	.1	0	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 21 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ACDS Graphic System	.1	.0	.1	0	.0%	.0%	.0%	.0%
Objectivity	.1	.0	.1	0	.0%	.0%	.0%	.0%
Wiechers Datentechnik	.1	.0	.1	1	.0%	.0%	.0%	.0%
CAD Language Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Sunrise Test Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Microsim	.1	.0	.1	0	.0%	.0%	.0%	.0%
Gable CAD Systems	.1	.1	.0	1	.0%	.0%	.0%	.0%
Point Control	.1	.0	.1	0	.0%	.0%	.0%	.0%
Motorola	.1	.0	.1	0	.0%	.0%	.0%	.0%
Exemplar Logic	.1	.0	.1	0	.0%	.0%	.0%	.0%
Whessoe Computing Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Valisys	.1	.0	.0	0	.0%	.0%	.0%	.0%
ETAK	.1	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.1	.0	.0	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
CADWorks	.0	.0	.0	0	.0%	.0%	.0%	.0%
Carrier Corporation	.0	.0	.0	0	.0%	.0%	.0%	.0%
National Semiconductor	.0	.0	.0	0	.0%	.0%	.0%	.0%
ASG	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 21 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Tanner Research	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.9	0	.0%	.0%	.1%	.0%
All Companies	2,389.4	1,230.0	851.2	49,240	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	1,093.4	499.0	408.3	26,883	45.8%	40.6%	48.0%	54.6%
All Asian-Based Companies	1,244.7	719.9	415.1	21,948	52.1%	58.5%	48.8%	44.6%
All European-Based Companies	51.3	11.2	27.8	408	2.1%	.9%	3.3%	.8%
All Hardware Companies	363.6	319.0	.2	22,195	15.2%	25.9%	.0%	45.1%
All Turnkey & SW Companies	2,025.8	911.0	851.0	27,044	84.8%	74.1%	100.0%	54.9%

Source: Dataquest (March 1993)

Table 22
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
IBM	258.8	139.8	68.6	3,592	29.7%	25.5%	36.0%	30.4%
Fujitsu	168.0	107.5	43.7	2,340	19.3%	19.6%	22.9%	19.8%
Nihon Unisys	152.6	94.6	25.9	1,601	17.5%	17.3%	13.6%	13.6%
NEC	70.1	53.2	11.2	152	8.0%	9.7%	5.9%	1.3%
Digital	37.2	25.5	.1	0	4.3%	4.7%	.1%	.0%
Hitachi	17.4	8.3	7.3	310	2.0%	1.5%	3.8%	2.6%
Mitsubishi Electric	13.0	6.1	3.6	41	1.5%	1.1%	1.9%	.3%
Control Data Systems	7.3	3.0	1.0	23	.8%	.5%	.5%	.2%
MacNeal-Schwendler	6.7	.0	6.4	0	.8%	.0%	3.4%	.0%
Hitachi Zosen Info Systems	5.4	4.9	.0	61	.6%	.9%	.0%	.5%
Toshiba—NO OEM	5.2	2.6	2.1	74	.6%	.5%	1.1%	.6%
Toyo Information Systems-NO OEM	5.0	2.7	1.6	29	.6%	.5%	.8%	.2%
SDRC	4.3	.0	4.3	0	.5%	.0%	2.2%	.0%
EDS	2.2	.0	2.2	(8)	.3%	.0%	1.2%	-.1%
MARC	2.0	.0	2.0	0	.2%	.0%	1.0%	.0%
Century Research Center	1.6	.9	.6	2	.2%	.2%	.3%	.0%
GeoVision Systems	1.6	.1	.8	1	.2%	.0%	.4%	.0%
Siemens Nixdorf Info systeme	1.4	.8	.5	16	.2%	.1%	.3%	.1%
Intergraph	1.4	.0	1.2	0	.2%	.0%	.6%	.0%
Swanson Analysis	1.3	.0	1.3	0	.2%	.0%	.7%	.0%
Unisys	1.0	.5	.3	13	.1%	.1%	.2%	.1%

(Continued)

Table 22 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
EA Systems	.8	.0	.8	0	.1%	.0%	.4%	.0%
Synercom	.8	.0	.4	0	.1%	.0%	.2%	.0%
Fides Industrielle Automation	.7	.1	.5	3	.1%	.0%	.3%	.0%
Cadence	.6	.0	.6	0	.1%	.0%	.3%	.0%
Kubota Computer	.5	.5	.0	65	.1%	.1%	.0%	.6%
MCS	.5	.0	.4	0	.1%	.0%	.2%	.0%
PDA Engineering	.4	.0	.4	0	.1%	.0%	.2%	.0%
Mechanical Dynamics	.4	.0	.4	0	.0%	.0%	.2%	.0%
COMPASS Design Automation	.3	.0	.2	0	.0%	.0%	.1%	.0%
Harris EDA	.3	.1	.2	2	.0%	.0%	.1%	.0%
Compact Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
Framasoft	.2	.0	.1	0	.0%	.0%	.1%	.0%
Test Systems Strategies	.2	.0	.2	0	.0%	.0%	.1%	.0%
ESRI	.2	.0	.2	0	.0%	.0%	.1%	.0%
Meta-Software	.2	.0	.1	0	.0%	.0%	.1%	.0%
EEsof	.2	.0	.2	0	.0%	.0%	.1%	.0%
Electrical Eng. Software	.2	.0	.1	0	.0%	.0%	.1%	.0%
LSI Logic	.2	.0	.1	0	.0%	.0%	.1%	.0%
Whessoe Computing Systems	.1	.0	.1	0	.0%	.0%	.1%	.0%
Georgia Tech Research Corp.	.1	.0	.1	0	.0%	.0%	.1%	.0%
Data I/O	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 22 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Analogy	.1	.0	.1	0	.0%	.0%	.0%	.0%
Teradyne	.1	.0	.0	0	.0%	.0%	.0%	.0%
Logic Modeling Systems	.1	.0	.0	0	.0%	.0%	.0%	.0%
Geotrace Technologies	.1	.0	.0	1	.0%	.0%	.0%	.0%
Dynamic Graphics	.1	.0	.0	0	.0%	.0%	.0%	.0%
ETAK	.1	.0	.0	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Laser-Scan	.0	.0	.0	0	.0%	.0%	.0%	.0%
SIMUCAD	.0	.0	.0	0	.0%	.0%	.0%	.0%
Microsim	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	101.7	96.6	.0	3,478	11.7%	17.6%	.0%	29.5%
All Companies	872.5	547.8	190.7	11,799	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	431.5	265.7	93.4	7,103	49.5%	48.5%	49.0%	60.2%
All Asian-Based Companies	438.6	281.3	96.0	4,676	50.3%	51.3%	50.4%	39.6%
All European-Based Companies	2.5	.9	1.3	20	.3%	.2%	.7%	.2%
All Hardware Companies	140.2	122.8	.2	3,483	16.1%	22.4%	.1%	29.5%
All Turnkey & SW Companies	732.3	425.0	190.5	8,316	83.9%	77.6%	99.9%	70.5%

Source: Dataquest (March 1993)

Table 23
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Server
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
IBM	78.2	43.8	19.1	396	47.4%	43.9%	61.7%	18.9%
Sun Microsystems	29.9	24.4	.0	903	18.1%	24.4%	.0%	43.1%
Digital	18.2	12.5	.0	153	11.1%	12.6%	.0%	7.3%
Intergraph	10.4	5.0	2.4	197	6.3%	5.0%	7.7%	9.4%
Zycad	6.3	3.8	.8	48	3.8%	3.8%	2.6%	2.3%
EDS	4.7	2.4	1.6	61	2.8%	2.4%	5.3%	2.9%
MacNeal-Schwendler	3.5	.0	3.4	0	2.1%	.0%	10.9%	.0%
Landmark Graphics	3.3	1.6	.8	17	2.0%	1.6%	2.4%	.8%
Hewlett-Packard	2.1	1.7	.0	41	1.3%	1.7%	.0%	1.9%
Ikos Systems	1.9	1.8	.1	20	1.1%	1.8%	.3%	1.0%
ESRI	1.5	.0	1.3	0	.9%	.0%	4.3%	.0%
Applicon	1.5	.6	.7	14	.9%	.6%	2.2%	.7%
Sumitomo Denko Workstation	.9	.9	.0	200	.6%	.9%	.0%	9.5%
Solbourne	.9	.8	.0	36	.5%	.8%	.0%	1.7%
Cisigraph	.7	.2	.4	4	.4%	.2%	1.2%	.2%
Sysscan	.4	.2	.1	3	.2%	.2%	.3%	.1%
Cimlinc	.3	.0	.2	0	.2%	.0%	.6%	.0%
Control Data Systems	.2	.1	.0	0	.1%	.1%	.1%	.0%
Logic Modeling Systems	.1	.0	.1	0	.1%	.0%	.3%	.0%
ETAK	.1	.0	.0	0	.0%	.0%	.1%	.0%
Georgia Tech Research Corp.	.0	.0	.0	0	.0%	.0%	.1%	.0%

(Continued)

Table 23 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Server
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
SIMUCAD	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	164.8	99.8	31.0	2,094	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	162.9	98.5	30.6	1,887	98.8%	98.7%	98.6%	90.1%
All Asian-Based Companies	.9	.9	.0	200	.6%	.9%	.0%	9.5%
All European-Based Companies	1.0	.4	.5	7	.6%	.4%	1.4%	.3%
All Hardware Companies	52.0	40.3	.0	1,332	31.6%	40.4%	.0%	63.6%
All Turnkey & SW Companies	112.8	59.5	31.0	761	68.4%	59.6%	100.0%	36.4%

Source: Dataquest (March 1993)

Table 24
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
NEC	112.9	94.8	9.0	16,805	15.9%	24.4%	3.4%	26.1%
Fujitsu	88.4	56.6	23.0	2,627	12.5%	14.6%	8.6%	4.1%
IBM	80.7	45.1	27.8	12,000	11.4%	11.6%	10.4%	18.6%
Autodesk	51.5	.0	51.5	0	7.3%	.0%	19.3%	.0%
Mutoh Industries—NO OEM	40.0	21.3	11.1	809	5.6%	5.5%	4.2%	1.3%
Wacom	38.9	7.8	26.8	748	5.5%	2.0%	10.1%	1.2%
Hakuto	36.3	21.8	14.5	816	5.1%	5.6%	5.4%	1.3%
Hitachi	31.3	15.0	13.2	1,656	4.4%	3.9%	4.9%	2.6%
Toshiba—NO OEM	27.1	13.5	10.8	2,165	3.8%	3.5%	4.1%	3.4%
Apple Computer	26.7	23.5	.0	6,331	3.8%	6.1%	.0%	9.8%
Andor	15.7	3.9	11.1	121	2.2%	1.0%	4.2%	.2%
Design Automation	12.7	.6	12.0	67	1.8%	.2%	4.5%	.1%
CPU	10.5	.0	9.5	0	1.5%	.0%	3.5%	.0%
Mitsubishi Electric	9.5	6.3	3.2	900	1.3%	1.6%	1.2%	1.4%
Hewlett-Packard	6.1	4.9	.0	2,532	.9%	1.3%	.0%	3.9%
Viewlogic Systems	5.7	.0	4.5	0	.8%	.0%	1.7%	.0%
Seiko Instruments—NO OEM	5.3	3.8	3.8	136	.7%	1.0%	1.4%	.2%
Uchida Yoko	3.8	2.4	1.6	171	.5%	.6%	.6%	.3%
Mitsui Engineering	3.6	2.5	.7	60	.5%	.6%	.3%	.1%
Intergraph	3.0	.0	2.8	0	.4%	.0%	1.1%	.0%
PADS Software	2.5	.0	2.1	0	.3%	.0%	.8%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Racal-Redac	2.5	.0	.7	0	.3%	.0%	.3%	.0%
Data I/O	2.2	.0	2.2	0	.3%	.0%	.8%	.0%
EEsof	1.8	.0	1.6	0	.3%	.0%	.6%	.0%
ACTEL	1.6	.0	1.5	0	.2%	.0%	.5%	.0%
Anilam Electronics	1.5	.5	.9	18	.2%	.1%	.3%	.0%
LPKF	1.4	.9	.4	61	.2%	.2%	.1%	.1%
Altera	1.3	.0	1.1	0	.2%	.0%	.4%	.0%
CADKEY	1.3	.0	1.3	0	.2%	.0%	.5%	.0%
Xilinx	1.1	.0	1.0	0	.2%	.0%	.4%	.0%
Cimatron	1.1	.5	.5	56	.2%	.1%	.2%	.1%
Point Control	1.1	.0	1.0	0	.1%	.0%	.4%	.0%
ADRA Systems	1.0	.0	.8	0	.1%	.0%	.3%	.0%
Swanson Analysis	1.0	.0	1.0	0	.1%	.0%	.4%	.0%
BETRONEX	1.0	.1	.9	18	.1%	.0%	.3%	.0%
Microsim	1.0	.0	.9	0	.1%	.0%	.3%	.0%
ESRI	.8	.0	.7	0	.1%	.0%	.3%	.0%
CADWorks	.8	.0	.7	0	.1%	.0%	.3%	.0%
INS Engineering	.7	.4	.4	13	.1%	.1%	.1%	.0%
CNC Software	.7	.0	.7	0	.1%	.0%	.3%	.0%
Moda CAD	.6	.2	.4	5	.1%	.0%	.2%	.0%
Harris EDA	.6	.1	.5	2	.1%	.0%	.2%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Sharp System Products—NO OEM	.6	.3	.3	17	.1%	.1%	.1%	.0%
Computervision	.5	.0	.5	0	.1%	.0%	.2%	.0%
Whessoe Computing Systems	.5	.0	.5	0	.1%	.0%	.2%	.0%
GeoQuest	.5	.0	.5	0	.1%	.0%	.2%	.0%
ERDAS	.5	.1	.3	50	.1%	.0%	.1%	.1%
Softdesk	.5	.0	.5	0	.1%	.0%	.2%	.0%
Sigma Design	.4	.0	.4	0	.1%	.0%	.1%	.0%
Carrier Corporation	.4	.0	.4	0	.1%	.0%	.1%	.0%
ETAK	.4	.0	.4	1	.1%	.0%	.1%	.0%
Teradyne	.3	.0	.3	0	.0%	.0%	.1%	.0%
Compact Software	.3	.0	.3	0	.0%	.0%	.1%	.0%
Investronica SA	.3	.2	.0	12	.0%	.1%	.0%	.0%
Wiechers Datentechnik	.3	.1	.1	6	.0%	.0%	.1%	.0%
ISICAD	.3	.0	.3	0	.0%	.0%	.1%	.0%
Aspen Technology	.3	.0	.3	0	.0%	.0%	.1%	.0%
MCS	.3	.0	.3	0	.0%	.0%	.1%	.0%
Accel Technologies	.3	.0	.2	0	.0%	.0%	.1%	.0%
Superdraft	.3	.1	.1	14	.0%	.0%	.0%	.0%
MacNeal-Schwendler	.2	.0	.2	0	.0%	.0%	.1%	.0%
Graphisoft Software Dev	.2	.0	.2	0	.0%	.0%	.1%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Terr-Mar Resource Info Svs	.2	.1	.1	6	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.2	.1	.1	3	.0%	.0%	.1%	.0%
Aries Technology	.2	.0	.2	0	.0%	.0%	.1%	.0%
BATISOFT	.2	.0	.1	7	.0%	.0%	.0%	.0%
Minc Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
GeoGraphix	.2	.0	.1	0	.0%	.0%	.0%	.0%
Digital	.1	.0	.1	0	.0%	.0%	.0%	.0%
ALDEC	.1	.0	.1	0	.0%	.0%	.1%	.0%
CADSI	.1	.0	.1	2	.0%	.0%	.0%	.0%
ASG	.1	.0	.1	0	.0%	.0%	.0%	.0%
Cimlinc	.1	.0	.1	0	.0%	.0%	.0%	.0%
Pathtrace	.1	.0	.1	2	.0%	.0%	.0%	.0%
Rasna Corporation	.1	.0	.1	0	.0%	.0%	.0%	.0%
Integer	.1	.0	.1	0	.0%	.0%	.0%	.0%
Mega CADD	.1	.0	.1	0	.0%	.0%	.0%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Tanner Research	.1	.0	.1	0	.0%	.0%	.0%	.0%
Meta-Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Simulation Science	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Genasys II	.1	.0	.1	1	.0%	.0%	.0%	.0%
Infinite Graphics	.1	.0	.1	0	.0%	.0%	.0%	.0%
Logic Modeling Systems	.1	.0	.0	0	.0%	.0%	.0%	.0%
Quicklogic	.1	.0	.1	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
The CAD Group	.0	.0	.0	0	.0%	.0%	.0%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.0%	.0%
SIMUCAD	.0	.0	.0	0	.0%	.0%	.0%	.0%
Accugraph	.0	.0	.0	0	.0%	.0%	.0%	.0%
Vamp	.0	.0	.0	0	.0%	.0%	.0%	.0%
PAFEC	.0	.0	.0	0	.0%	.0%	.0%	.0%
Foresight Resources	.0	.0	.0	0	.0%	.0%	.0%	.0%
Omation	.0	.0	.0	0	.0%	.0%	.0%	.0%
Geotrace Technologies	.0	.0	.0	0	.0%	.0%	.0%	.0%
Technische Computer Systeme	.0	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Exemplar Logic	.0	.0	.0	0	.0%	.0%	.0%	.0%
Electrical Eng. Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 24 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Asia
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Other Companies	61.3	61.3	.0	16,149	8.6%	15.8%	.0%	25.1%
All Companies	708.9	388.7	266.9	64,388	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	262.3	135.3	111.3	37,083	37.0%	34.8%	41.7%	57.6%
All Asian-Based Companies	437.2	251.0	151.0	27,111	61.7%	64.6%	56.6%	42.1%
All European-Based Companies	9.4	2.4	4.6	195	1.3%	.6%	1.7%	.3%
All Hardware Companies	157.8	150.4	.0	40,132	22.3%	38.7%	.0%	62.3%
All Turnkey & SW Companies	551.1	238.3	266.9	24,256	77.7%	61.3%	100.0%	37.7%

Source: Dataquest (March 1993)

Table 25
1992 CAD/CAM/CAE/GIS Market Share

Application:	All Applications
Platform:	All Platforms
Region:	Rest of World
Units:	Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Intergraph	49.1	21.3	13.1	788	16.6%	14.6%	13.6%	4.7%
IBM	26.3	18.5	4.1	2,997	8.9%	12.7%	4.2%	18.0%
Digital	25.3	17.5	.0	285	8.6%	12.0%	.0%	1.7%
Compaq	21.5	21.5	.0	4,653	7.3%	14.7%	.0%	28.0%
Landmark Graphics	16.4	8.2	3.8	85	5.5%	5.6%	3.9%	.5%
Hewlett-Packard	14.3	10.0	1.8	1,061	4.8%	6.9%	1.9%	6.4%
Cadence	12.7	.0	10.0	0	4.3%	.0%	10.4%	.0%
Computervision	9.8	3.3	3.4	89	3.3%	2.3%	3.6%	.5%
Sun Microsystems	9.0	7.7	.0	600	3.0%	5.3%	.0%	3.6%
Mentor Graphics	7.0	1.6	2.7	0	2.4%	1.1%	2.8%	.0%
ESRI	6.1	.0	5.5	0	2.1%	.0%	5.7%	.0%
Engineering Mechanics	5.1	.3	4.4	408	1.7%	.2%	4.5%	2.5%
SDRC	4.2	.0	4.2	0	1.4%	.0%	4.3%	.0%
Autodesk	4.1	.0	4.1	0	1.4%	.0%	4.3%	.0%
Control Data Systems	3.2	1.5	.5	22	1.1%	1.1%	.6%	.1%
Radian Corporation	3.1	.0	1.9	0	1.1%	.0%	1.9%	.0%
Siemens Nixdorf Info systeme	2.7	1.4	1.0	47	.9%	.9%	1.0%	.3%
GeoVision Systems	2.7	.2	1.4	3	.9%	.1%	1.5%	.0%
Cimatron	2.5	1.1	1.2	83	.9%	.8%	1.2%	.5%
Apple Computer	2.4	2.2	.0	576	.8%	1.5%	.0%	3.5%
International Software Systems	2.4	.0	2.4	0	.8%	.0%	2.4%	.0%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Claris	2.3	.0	2.3	0	.8%	.0%	2.4%	.0%
EDS	2.3	1.2	.8	36	.8%	.8%	.8%	.2%
Delcam International	2.1	.7	1.1	36	.7%	.5%	1.1%	.2%
CAD Centre	2.0	.0	1.6	0	.7%	.0%	1.7%	.0%
Data General	1.9	1.5	.1	100	.6%	1.0%	.1%	.6%
Orcad	1.9	.0	1.9	0	.6%	.0%	2.0%	.0%
Strategic Mapping	1.8	.0	1.7	0	.6%	.0%	1.7%	.0%
MapInfo	1.5	.0	1.2	0	.5%	.0%	1.2%	.0%
CNC Software	1.2	.0	1.2	0	.4%	.0%	1.2%	.0%
MacNeal-Schwendler	1.1	.0	1.1	0	.4%	.0%	1.1%	.0%
Vero International Software	1.0	.0	.9	0	.3%	.0%	.9%	.0%
Infocel	.9	.2	.7	20	.3%	.1%	.7%	.1%
Genasys II	.9	.1	.8	6	.3%	.1%	.8%	.0%
ADRA Systems	.8	.2	.5	0	.3%	.1%	.6%	.0%
EA Systems	.8	.0	.8	0	.3%	.0%	.8%	.0%
ERDAS	.8	.2	.5	88	.3%	.2%	.5%	.5%
Kork Systems	.8	.1	.6	1	.3%	.1%	.6%	.0%
LSI Logic	.8	.1	.6	2	.3%	.1%	.6%	.0%
COMPASS Design Automation	.7	.0	.6	1	.2%	.0%	.6%	.0%
Genrad	.7	.1	.5	7	.2%	.1%	.5%	.0%
Altera	.7	.0	.6	0	.2%	.0%	.6%	.0%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Swanson Analysis	.6	.0	.6	0	.2%	.0%	.7%	.0%
Analogy	.6	.0	.5	0	.2%	.0%	.5%	.0%
Pathtrace	.6	.1	.4	9	.2%	.1%	.4%	.1%
Zuken	.5	.2	.3	3	.2%	.2%	.3%	.0%
ETAK	.5	.0	.5	1	.2%	.0%	.5%	.0%
BETRONEX	.5	.1	.4	9	.2%	.0%	.4%	.1%
Softdesk	.5	.0	.5	0	.2%	.0%	.5%	.0%
Laser-Scan	.5	.1	.2	0	.2%	.1%	.2%	.0%
Dynamic Graphics	.5	.0	.4	0	.2%	.0%	.4%	.0%
EEsof	.4	.0	.4	0	.1%	.0%	.4%	.0%
Accugraph	.4	.2	.2	15	.1%	.1%	.2%	.1%
Comdisco Systems	.4	.0	.4	0	.1%	.0%	.4%	.0%
Aries Technology	.4	.0	.4	0	.1%	.0%	.4%	.0%
Compact Software	.4	.0	.4	0	.1%	.0%	.4%	.0%
Data I/O	.4	.0	.4	0	.1%	.0%	.4%	.0%
Point Control	.4	.0	.4	0	.1%	.0%	.4%	.0%
Unisys	.4	.2	.1	5	.1%	.1%	.1%	.0%
Whessoe Computing Systems	.3	.0	.3	0	.1%	.0%	.4%	.0%
Georgia Tech Research Corp.	.3	.0	.3	0	.1%	.0%	.3%	.0%
ACTEL	.3	.0	.3	0	.1%	.0%	.3%	.0%
Xilinx	.3	.0	.3	0	.1%	.0%	.3%	.0%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
ANACAD	.3	.0	.3	0	.1%	.0%	.3%	.0%
Clemessy	.3	.2	.0	1	.1%	.2%	.0%	.0%
ISICAD	.3	.1	.2	2	.1%	.1%	.2%	.0%
Hochtief	.3	.0	.2	2	.1%	.0%	.2%	.0%
Superdraft	.3	.1	.1	14	.1%	.1%	.1%	.1%
Sigma Design	.2	.0	.2	0	.1%	.0%	.2%	.0%
Investronica SA	.2	.2	.0	8	.1%	.1%	.0%	.0%
Generation 5 Technology	.2	.0	.2	0	.1%	.0%	.2%	.0%
LPKF	.2	.1	.0	7	.1%	.1%	.0%	.0%
LandCadd	.2	.0	.2	0	.1%	.0%	.2%	.0%
Engineering Systems Corp.	.2	.0	.1	0	.1%	.0%	.1%	.0%
Graphisoft Software Dev	.2	.0	.2	0	.1%	.0%	.2%	.0%
Aura CAD/CAM Systems	.2	.0	.1	0	.1%	.0%	.1%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.1%	.0%
Royal Digital Centers	.1	.0	.1	0	.0%	.0%	.1%	.0%
Mc2 Engineering Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Innovative Data Design	.1	.0	.1	0	.0%	.0%	.1%	.0%
Synercom	.1	.0	.1	0	.0%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	.1	.0	.1	2	.0%	.0%	.1%	.0%
Teradyne	.1	.0	.1	0	.0%	.0%	.1%	.0%
CADMATIC	.1	.0	.1	1	.0%	.0%	.1%	.0%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
CADWorks	.1	.0	.1	0	.0%	.0%	.1%	.0%
Star Informatic	.1	.0	.0	0	.0%	.0%	.0%	.0%
Simulation Science	.1	.0	.1	0	.0%	.0%	.1%	.0%
Spectrum Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Ziegler Informatics	.1	.0	.1	0	.0%	.0%	.1%	.0%
PADS Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Number One Systems	.1	.0	.1	4	.0%	.0%	.1%	.0%
Moda CAD	.1	.0	.0	1	.0%	.0%	.0%	.0%
ASG	.1	.0	.1	0	.0%	.0%	.1%	.0%
Facility Mapping Systems	.1	.0	.1	0	.0%	.0%	.1%	.0%
Accel Technologies	.1	.0	.1	0	.0%	.0%	.1%	.0%
Secagraphics	.1	.0	.0	0	.0%	.0%	.0%	.0%
CAE-link	.1	.0	.1	0	.0%	.0%	.1%	.0%
Capilano Computing	.1	.0	.1	0	.0%	.0%	.1%	.0%
Algor Interactive Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Rasna Corporation	.0	.0	.0	0	.0%	.0%	.0%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.0%	.0%
Engineered Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Macao Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Areon	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 25 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: All Platforms
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Fides Industrielle Automation	.0	.0	.0	0	.0%	.0%	.0%	.0%
FEA	.0	.0	.0	0	.0%	.0%	.0%	.0%
Foresight Resources	.0	.0	.0	0	.0%	.0%	.0%	.0%
ESDU International	.0	.0	.0	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	23.9	23.7	.0	4,546	8.1%	16.2%	.0%	27.3%
All Companies	295.1	146.1	96.2	16,623	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	280.3	141.7	87.7	16,399	95.0%	97.0%	91.2%	98.7%
All Asian-Based Companies	.5	.2	.3	3	.2%	.2%	.3%	.0%
All European-Based Companies	14.4	4.2	8.2	221	4.9%	2.9%	8.5%	1.3%
All Hardware Companies	101.4	89.1	.2	14,312	34.3%	61.0%	.2%	86.1%
All Turnkey & SW Companies	193.8	57.0	96.0	2,311	65.7%	39.0%	99.8%	13.9%

Source: Dataquest (March 1993)

Table 26
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Intergraph	38.7	17.8	8.5	695	27.5%	32.2%	16.4%	25.7%
Hewlett-Packard	12.3	8.4	1.8	517	8.7%	15.2%	3.5%	19.1%
Cadence	11.5	.0	9.1	0	8.2%	.0%	17.5%	.0%
Landmark Graphics	9.8	4.9	2.3	51	7.0%	8.9%	4.4%	1.9%
Computervision	8.4	3.1	2.5	82	5.9%	5.6%	4.8%	3.0%
Sun Microsystems	7.4	6.4	.0	528	5.3%	11.6%	.0%	19.5%
Mentor Graphics	7.0	1.6	2.7	0	5.0%	2.9%	5.1%	.0%
Digital	5.2	3.6	.0	229	3.7%	6.4%	.0%	8.4%
SDRC	3.8	.0	3.8	0	2.7%	.0%	7.2%	.0%
IBM	3.4	1.9	.8	122	2.4%	3.5%	1.6%	4.5%
ESRI	3.1	.0	2.8	0	2.2%	.0%	5.4%	.0%
Engineering Mechanics	3.0	.2	2.5	144	2.1%	.3%	4.9%	5.3%
Siemens Nixdorf Info systeme	2.7	1.4	1.0	47	1.9%	2.5%	1.9%	1.7%
Delcam International	2.1	.7	1.1	36	1.5%	1.3%	2.0%	1.3%
CAD Centre	2.0	.0	1.6	0	1.4%	.0%	3.1%	.0%
EDS	1.9	1.0	.6	31	1.3%	1.8%	1.2%	1.1%
GeoVision Systems	1.9	.2	1.0	2	1.3%	.3%	1.9%	.1%
Radian Corporation	1.9	.0	1.1	0	1.3%	.0%	2.2%	.0%
Cimatron	1.6	.7	.7	36	1.2%	1.3%	1.4%	1.3%
Data General	1.4	1.1	.1	81	1.0%	2.0%	.1%	3.0%
Control Data Systems	1.1	.7	.2	15	.8%	1.2%	.5%	.6%

(Continued)

Table 26 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Genasys II	.8	.1	.7	4	.6%	.2%	1.4%	.2%
COMPASS Design Automation	.7	.0	.6	1	.5%	.0%	1.1%	.0%
LSI Logic	.7	.1	.5	2	.5%	.1%	1.0%	.1%
ADRA Systems	.6	.2	.4	0	.5%	.4%	.7%	.0%
Genrad	.6	.1	.4	6	.4%	.2%	.8%	.2%
Analogy	.6	.0	.5	0	.4%	.0%	.9%	.0%
Zuken	.5	.2	.3	3	.4%	.4%	.6%	.1%
ERDAS	.5	.1	.3	53	.3%	.2%	.6%	1.9%
Laser-Scan	.4	.1	.2	0	.3%	.2%	.4%	.0%
Comdisco Systems	.4	.0	.4	0	.3%	.0%	.7%	.0%
Accugraph	.4	.2	.2	15	.3%	.4%	.3%	.6%
Dynamic Graphics	.4	.0	.3	0	.3%	.0%	.6%	.0%
Aries Technology	.4	.0	.3	0	.3%	.0%	.6%	.0%
Swanson Analysis	.4	.0	.4	0	.2%	.0%	.7%	.0%
ANACAD	.3	.0	.3	0	.2%	.0%	.6%	.0%
Unisys	.3	.1	.1	4	.2%	.2%	.2%	.2%
EEsof	.3	.0	.2	0	.2%	.0%	.4%	.0%
Clemessy	.2	.2	.0	1	.2%	.3%	.1%	.0%
ISICAD	.2	.1	.1	2	.1%	.2%	.2%	.1%
Autodesk	.2	.0	.2	0	.1%	.0%	.4%	.0%
Compact Software	.2	.0	.2	0	.1%	.0%	.3%	.0%

(Continued)

Table 26 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application:	All Applications
Platform:	Technical Workstation
Region:	Rest of World
Units:	Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Royal Digital Centers	.1	.0	.1	0	.1%	.0%	.2%	.0%
MacNeal-Schwendler	.1	.0	.1	0	.1%	.0%	.2%	.0%
Sigma Design	.1	.0	.1	0	.1%	.0%	.2%	.0%
Star Informatic	.1	.0	.0	0	.1%	.1%	.1%	.0%
Softdesk	.1	.0	.1	0	.1%	.0%	.2%	.0%
Infocel	.1	.0	.1	2	.1%	.1%	.2%	.1%
Georgia Tech Research Corp.	.1	.0	.1	0	.1%	.0%	.2%	.0%
Xilinx	.1	.0	.1	0	.1%	.0%	.2%	.0%
Simulation Science	.1	.0	.1	0	.1%	.0%	.2%	.0%
Synercom	.1	.0	.0	0	.1%	.0%	.1%	.0%
Terr-Mar Resource Info Svs	.1	.0	.0	1	.0%	.0%	.1%	.0%
Teradyne	.1	.0	.1	0	.0%	.0%	.1%	.0%
Data I/O	.1	.0	.1	0	.0%	.0%	.1%	.0%
ACTEL	.1	.0	.1	0	.0%	.0%	.1%	.0%
ETAK	.1	.0	.0	0	.0%	.0%	.1%	.0%
CADMATIC	.0	.0	.0	0	.0%	.0%	.1%	.0%
Whessoe Computing Systems	.0	.0	.0	0	.0%	.0%	.1%	.0%
Point Control	.0	.0	.0	0	.0%	.0%	.1%	.0%
Rasna Corporation	.0	.0	.0	0	.0%	.0%	.1%	.0%
Macao Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 26 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Technical Workstation
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
FEA	.0	.0	.0	0	.0%	.0%	.0%	.0%
LandCadd	.0	.0	.0	0	.0%	.0%	.0%	.0%
PADS Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	140.6	55.4	51.8	2,709	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	130.4	52.0	46.5	2,587	92.8%	93.8%	89.8%	95.5%
All Asian-Based Companies	.5	.2	.3	3	.4%	.4%	.6%	.1%
All European-Based Companies	9.6	3.2	5.0	119	6.8%	5.8%	9.6%	4.4%
All Hardware Companies	18.3	14.7	.1	1,151	13.0%	26.5%	.2%	42.5%
All Turnkey & SW Companies	122.3	40.7	51.7	1,558	87.0%	73.5%	99.8%	57.5%

Source: Dataquest (March 1993)

Table 27
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Digital	13.5	9.3	.0	0	34.6%	40.5%	.0%	.0%
IBM	9.6	5.2	2.5	168	24.7%	22.5%	33.1%	37.6%
Control Data Systems	2.0	.8	.3	6	5.2%	3.6%	3.8%	1.4%
Intergraph	.8	.0	.8	0	2.1%	.0%	9.8%	.0%
GeoVision Systems	.8	.1	.4	0	2.1%	.3%	5.6%	.1%
EA Systems	.8	.0	.8	0	2.1%	.0%	10.6%	.0%
MacNeal-Schwendler	.6	.0	.6	0	1.6%	.0%	7.9%	.0%
Cadence	.6	.0	.5	0	1.5%	.0%	5.9%	.0%
SDRC	.4	.0	.4	0	1.1%	.0%	5.5%	.0%
ESRI	.2	.0	.2	0	.6%	.0%	2.9%	.0%
Georgia Tech Research Corp.	.2	.0	.2	0	.6%	.0%	2.9%	.0%
Radian Corporation	.2	.0	.1	0	.6%	.0%	1.6%	.0%
Swanson Analysis	.2	.0	.2	0	.4%	.0%	2.1%	.0%
Computervision	.1	.0	.0	2	.3%	.1%	.3%	.5%
Dynamic Graphics	.1	.0	.1	0	.3%	.0%	1.2%	.0%
Compact Software	.1	.0	.1	0	.2%	.0%	1.2%	.0%
Unisys	.1	.0	.0	1	.2%	.2%	.4%	.2%
LSI Logic	.1	.0	.1	0	.2%	.0%	.8%	.0%
Genrad	.1	.0	.0	0	.2%	.0%	.5%	.0%

(Continued)

Table 27 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Clemessy	.1	.0	.0	0	.2%	.2%	.1%	.1%
Whessoe Computing Systems	.1	.0	.1	0	.2%	.0%	.8%	.0%
Secagraphics	.1	.0	.0	0	.1%	.1%	.1%	.1%
ETAK	.1	.0	.0	0	.1%	.0%	.5%	.0%
Synercom	.1	.0	.0	0	.1%	.0%	.3%	.0%
EDS	.1	.0	.1	(0)	.1%	.0%	.7%	-.0%
Laser-Scan	.0	.0	.0	0	.1%	.0%	.3%	.0%
Engineering Systems Corp.	.0	.0	.0	0	.1%	.0%	.4%	.0%
Analogy	.0	.0	.0	0	.1%	.0%	.3%	.0%
Kork Systems	.0	.0	.0	0	.1%	.1%	.0%	.0%
Fides Industrielle Automation	.0	.0	.0	0	.1%	.0%	.1%	.0%
EEsof	.0	.0	.0	0	.1%	.0%	.1%	.0%
Data I/O	.0	.0	.0	0	.0%	.0%	.1%	.0%
Macao Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Hochtief	.0	.0	.0	0	.0%	.0%	.1%	.0%
COMPASS Design Automation	.0	.0	.0	0	.0%	.0%	.1%	.0%
Teradyne	.0	.0	.0	0	.0%	.0%	.0%	.0%
Vero International Software	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 27 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Host-Dependent
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Other Companies	7.8	7.4	.0	268	20.1%	32.4%	.0%	59.9%
All Companies	38.9	22.9	7.6	447	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	38.7	22.9	7.5	446	99.5%	99.8%	98.6%	99.9%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	.2	.0	.1	0	.5%	.2%	1.4%	.1%
All Hardware Companies	21.7	16.9	.1	269	55.8%	73.6%	.8%	60.2%
All Turnkey & SW Companies	17.2	6.1	7.6	178	44.2%	26.4%	99.2%	39.8%

Source: Dataquest (March 1993)

Table 28
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Server
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Intergraph	7.3	3.5	1.7	93	24.4%	22.9%	24.6%	25.2%
Digital	6.7	4.6	.0	57	22.6%	30.0%	.0%	15.3%
Landmark Graphics	6.6	3.3	1.5	34	22.0%	21.2%	22.3%	9.2%
IBM	3.1	1.8	.7	67	10.4%	11.8%	10.5%	18.0%
ESRI	1.8	.0	1.6	0	5.9%	.0%	23.7%	.0%
Sun Microsystems	1.6	1.3	.0	72	5.3%	8.4%	.0%	19.4%
Cadence	.6	.0	.5	0	2.0%	.0%	7.1%	.0%
Computervision	.5	.2	.2	4	1.7%	1.0%	2.4%	1.2%
Data General	.5	.4	.0	19	1.7%	2.6%	.3%	5.1%
MacNeal-Schwendler	.3	.0	.3	0	1.1%	.0%	4.6%	.0%
EDS	.3	.2	.1	5	1.1%	1.0%	1.6%	1.3%
Radian Corporation	.3	.0	.2	0	.8%	.0%	2.2%	.0%
Hewlett-Packard	.2	.1	.0	20	.6%	.8%	.0%	5.3%
Control Data Systems	.1	.0	.0	0	.2%	.2%	.1%	.0%
ETAK	.1	.0	.0	0	.2%	.0%	.6%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	29.8	15.4	6.8	370	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	29.8	15.4	6.8	370	100.0%	100.0%	100.0%	100.0%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Hardware Companies	9.2	6.7	.0	221	30.9%	43.1%	.3%	59.6%
All Turnkey & SW Companies	20.6	8.8	6.7	150	69.1%	56.9%	99.7%	40.4%

Source: Dataquest (March 1993)

Table 29
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

					Market Share			
Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped
Compaq	21.5	21.5	.0	4,653	25.0%	40.9%	.0%	35.5%
IBM	10.2	9.6	.0	2,639	11.9%	18.3%	.0%	20.2%
Autodesk	3.9	.0	3.9	0	4.5%	.0%	13.0%	.0%
Apple Computer	2.4	2.2	.0	576	2.8%	4.1%	.0%	4.4%
International Software Systems	2.4	.0	2.4	0	2.7%	.0%	7.8%	.0%
Claris	2.3	.0	2.3	0	2.7%	.0%	7.7%	.0%
Intergraph	2.3	.0	2.2	0	2.7%	.0%	7.2%	.0%
Engineering Mechanics	2.2	.1	1.8	265	2.5%	.2%	6.1%	2.0%
Orcad	1.9	.0	1.9	0	2.2%	.0%	6.4%	.0%
Hewlett-Packard	1.9	1.5	.0	525	2.2%	2.8%	.0%	4.0%
Strategic Mapping	1.8	.0	1.7	0	2.1%	.0%	5.5%	.0%
MapInfo	1.5	.0	1.2	0	1.7%	.0%	3.9%	.0%
CNC Software	1.2	.0	1.2	0	1.3%	.0%	3.8%	.0%
ESRI	1.0	.0	.9	0	1.1%	.0%	3.0%	.0%
Vero International Software	1.0	.0	.9	0	1.1%	.0%	2.9%	.0%
Cimatron	.9	.4	.4	47	1.1%	.8%	1.4%	.4%
Infocel	.8	.2	.6	18	1.0%	.3%	2.1%	.1%
Computervision	.8	.0	.8	0	1.0%	.0%	2.6%	.0%
Kork Systems	.8	.1	.6	1	.9%	.1%	1.9%	.0%
Radian Corporation	.8	.0	.5	0	.9%	.0%	1.6%	.0%
Altera	.7	.0	.6	0	.8%	.0%	1.8%	.0%

(Continued)

Table 29 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Pathtrace	.6	.1	.4	9	.7%	.2%	1.3%	.1%
BETRONEX	.5	.1	.4	9	.6%	.1%	1.4%	.1%
ETAK	.4	.0	.4	1	.4%	.0%	1.2%	.0%
Softdesk	.4	.0	.4	0	.4%	.0%	1.2%	.0%
Point Control	.3	.0	.3	0	.4%	.0%	1.1%	.0%
ERDAS	.3	.1	.2	35	.4%	.2%	.7%	.3%
Data I/O	.3	.0	.3	0	.3%	.0%	1.0%	.0%
Hochtief	.3	.0	.2	2	.3%	.1%	.7%	.0%
ACTEL	.3	.0	.2	0	.3%	.0%	.8%	.0%
Superdraft	.3	.1	.1	14	.3%	.2%	.4%	.1%
Whessoe Computing Systems	.3	.0	.3	0	.3%	.0%	.8%	.0%
Xilinx	.2	.0	.2	0	.3%	.0%	.7%	.0%
Investronica SA	.2	.2	.0	8	.2%	.3%	.1%	.1%
ADRA Systems	.2	.0	.2	0	.2%	.0%	.5%	.0%
Generation 5 Technology	.2	.0	.2	0	.2%	.0%	.6%	.0%
EEsof	.2	.0	.2	0	.2%	.0%	.5%	.0%
LPKF	.2	.1	.0	7	.2%	.2%	.1%	.1%
Graphisoft Software Dev	.2	.0	.2	0	.2%	.0%	.5%	.0%
Aura CAD/CAM Systems	.2	.0	.1	0	.2%	.0%	.4%	.0%
LandCadd	.2	.0	.1	0	.2%	.0%	.5%	.0%
American Small Business Comp.	.1	.0	.1	0	.2%	.0%	.5%	.0%
Mc2 Engineering Software	.1	.0	.1	0	.2%	.0%	.5%	.0%

(Continued)

Table 29 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Compact Software	.1	.0	.1	0	.2%	.0%	.4%	.0%
Innovative Data Design	.1	.0	.1	0	.2%	.0%	.4%	.0%
Engineering Systems Corp.	.1	.0	.1	0	.1%	.0%	.3%	.0%
CADWorks	.1	.0	.1	0	.1%	.0%	.3%	.0%
Swanson Analysis	.1	.0	.1	0	.1%	.0%	.4%	.0%
Spectrum Software	.1	.0	.1	0	.1%	.0%	.3%	.0%
Sigma Design	.1	.0	.1	0	.1%	.0%	.3%	.0%
Genasys II	.1	.0	.1	2	.1%	.0%	.3%	.0%
ISICAD	.1	.0	.1	0	.1%	.0%	.3%	.0%
Ziegler Informatics	.1	.0	.1	0	.1%	.0%	.3%	.0%
Ithaca Software	.1	.0	.1	0	.1%	.0%	.3%	.0%
PADS Software	.1	.0	.1	0	.1%	.0%	.2%	.0%
CADMATIC	.1	.0	.0	1	.1%	.0%	.1%	.0%
Number One Systems	.1	.0	.1	4	.1%	.0%	.2%	.0%
Moda CAD	.1	.0	.0	1	.1%	.0%	.1%	.0%
Accel Technologies	.1	.0	.1	0	.1%	.0%	.2%	.0%
ASG	.1	.0	.1	0	.1%	.0%	.2%	.0%
Facility Mapping Systems	.1	.0	.1	0	.1%	.0%	.2%	.0%
Terr-Mar Resource Info Svs	.1	.0	.0	1	.1%	.0%	.1%	.0%
Capilano Computing	.1	.0	.1	0	.1%	.0%	.2%	.0%
CAE-link	.1	.0	.1	0	.1%	.0%	.2%	.0%
Aries Technology	.0	.0	.0	0	.0%	.0%	.1%	.0%

(Continued)

Table 29 (Continued)
1992 CAD/CAM/CAE/GIS Market Share

Application: All Applications
Platform: Personal Computer
Region: Rest of World
Units: Millions of U.S. Dollars/Actual Units

Company	Total Factory Revenue	Hardware Revenue	Software Revenue	Hardware Units Shipped	Market Share: Total Factory Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Hardware Units Shipped
Algor Interactive Systems	.0	.0	.0	0	.0%	.0%	.1%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.1%	.0%
Accugraph	.0	.0	.0	0	.0%	.0%	.1%	.0%
Teradyne	.0	.0	.0	0	.0%	.0%	.1%	.0%
Engineered Software	.0	.0	.0	0	.0%	.0%	.1%	.0%
Areon	.0	.0	.0	0	.0%	.0%	.0%	.0%
Genrad	.0	.0	.0	1	.0%	.0%	.1%	.0%
Foresight Resources	.0	.0	.0	0	.0%	.0%	.1%	.0%
Simulation Science	.0	.0	.0	0	.0%	.0%	.1%	.0%
MacNeal-Schwendler	.0	.0	.0	0	.0%	.0%	.1%	.0%
ESDU International	.0	.0	.0	0	.0%	.0%	.0%	.0%
Rasna Corporation	.0	.0	.0	0	.0%	.0%	.0%	.0%
FEA	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	16.1	16.2	.0	4,279	18.7%	31.0%	.0%	32.7%
All Companies	85.9	52.4	30.0	13,097	100.0%	100.0%	100.0%	100.0%
All N.A.-Based Companies	81.4	51.4	26.9	12,996	94.7%	98.1%	89.7%	99.2%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	4.5	1.0	3.1	101	5.3%	1.9%	10.3%	.8%
All Hardware Companies	52.2	51.0	.0	12,671	60.8%	97.2%	.0%	96.8%
All Turnkey & SW Companies	33.7	1.5	30.0	426	39.2%	2.8%	100.0%	3.2%

Source: Dataquest (March 1993)

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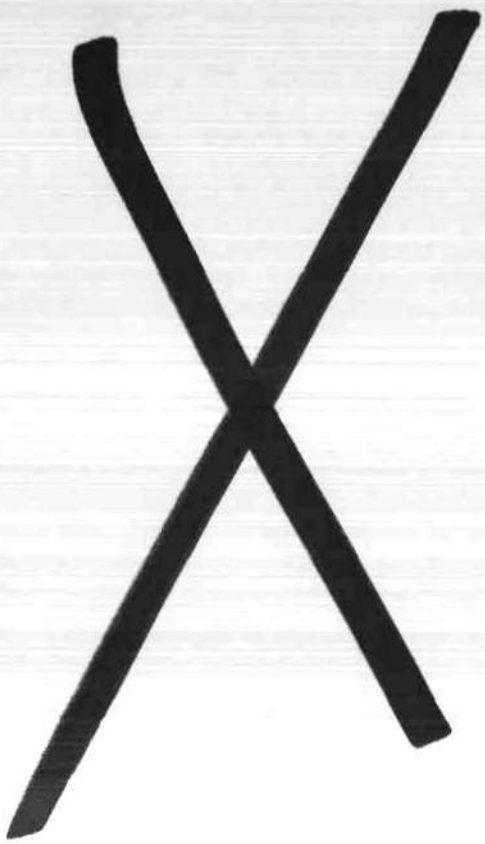

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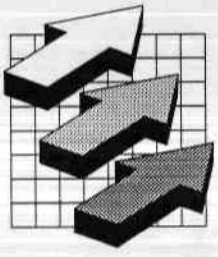
CAD/CAM Market Definitions



Dataquest Guide

1993

Program: CAD/CAM/CAE/GIS Worldwide
Product Code: CCAM-WW-GU-9301
Publication Date: October 18, 1993

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CAD/CAM Market Definitions

Dataquest Guide
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Chapter 1
Market Share Survey Overview

Each year, Dataquest surveys CAD/CAM/CAE/GIS vendors to estimate their annual revenue. The survey for 1993 will cover 323 vendors worldwide by six main application segments, four platforms, and four world regions; by European and Asian countries; by hardware, software, and service; and by distribution channel. This exercise provides input for Dataquest's dynamic database of CAD/CAM/CAE/GIS shipments and revenue by world region/country, platform, and application segment. The information gained is supplemented by, and cross-checked with, Dataquest's other information sources.

The CAD/CAM/CAE/GIS market share survey takes place twice each year. The first survey in the fourth quarter prepares early estimates for the calendar year. This is followed by a second survey in the spring that finalizes estimates for the previous calendar year. The first survey takes place from October to December. Our preliminary estimates are completed by the end of the calendar year in review, and the results are summarized in a fax report, which is released in January of the following year and published in a *Source: Dataquest* document by January 31.

The second survey takes place during April. Our final CAD/CAM/CAE/GIS market share estimates are again published in a *Source: Dataquest* document by May 31. There is usually minimal difference between early and final rankings, as Dataquest makes every effort to ensure preliminary estimates are as accurate as possible. However, early optimism and pessimism and surprise year ends create a change in our numbers. It should also be noted that when new information becomes available concerning a previous year's numbers, the database is updated to reflect the best information available.

The categories for which CAD/CAM/CAE/GIS revenue is reported are defined comprehensively for the purpose of clarity and guidance to survey participants. These definitions may occasionally be revised, altered, or expanded to reflect changes in the industry. To support these definitions, Dataquest will send an annual survey guide to all participants in its CAD/CAM/CAE/GIS market share survey program. This document comprises the 1993 survey guide.

Methodology

Dataquest utilizes primary and secondary sources to produce market share data. In addition to the annual market share survey, Dataquest uses the following sources to quantify market activity accurately:

- Information published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data

- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant economic data
- Information and data from online and/or CD-ROM data banks
- Articles in the general and trade press
- Reports from financial analysts

Despite the care taken in gathering, analyzing, and categorizing the data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in this document. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between data provided by Dataquest and data provided by other suppliers.

Chapter 2
CAD/CAM/CAE/GIS Companies to Be Surveyed Worldwide for 1993

In 1993, Dataquest will survey 323 CAD/CAM/CAE/GIS companies throughout the world.

North American Companies Surveyed

A.I. Systems
Accel Technologies
Accugraph
ACDS Graphic System
ACTEL
ADRA Systems
ALDEC
Algor Interactive Systems
Alias Research
Altera Corporation Altium
American Small Business Comp.
Analogy
Apple Computer Inc.
Applicon
Aptix
Ascent Logic Corp.
Ashlar
Aspen Technology
Aura CAD/CAM Systems
Auto-Trol
Autodesk Incorporated
Autometric
Bechtel Software
CAD Artisans
CAD Language Systems
Cadence
CADKEY
CADLYNX
CADSI
CADWorks
CAE-link
CAMAX
Carrier Corporation
Cascade Design Automation
Chronologic Simulation
Cimlinc
Claris Corporation
CNC Software
Compact Software
COMPASS Design Automation
Computervision
Contec Microelectronics
Control Data Systems
Cooper & Chyan Technology
CrossCheck Technology
Data General
Data I/O Corporation
Dell Computer Corporation
Digital Equipment Corporation
Dynamic Graphics
Dynaware
EA Systems
Earth Resource Mapping
ECOM Associates
EDS
Electrical Engineering Software
Enghouse Systems Ltd. (Canada)
Engineered Software
Engineering Mechanics Research
EPIC Design Technology
ERDAS
ESRI
ETAK
Evolution Computing
Exemplar Logic
Facility Mapping Systems
Foresight Resources
GDS
Genasys II
Generation 5 Technology
Genrad
GeoGraphix
Georgia Tech. Research Corporation
GEOVISION Inc.
Gerber Systems
GRAPHSOFT
Harris EDA
Hewlett-Packard Company

High Level Design Systems
i-Logix Inc.
IBM Corporation
ICAD
Ikos Systems
IMSI
Infinite Graphics
Innovative Data Design
Integrated Computer Graphics
Integrated Silicon Systems
Intera Tydac Technologies
Intergraph
International Software Systems
Intrinsix Corporation
ISICAD
Kork Systems
Land Innovation
LandCaDD
Landmark Graphics
Logic Modeling Systems
LSI Logic
MacNeal-Schwendler Corporation
MapInfo
Maptech
MARC
Massteck
Mc2 Engineering Software
MCS
Mechanical Dynamics
Mega CADD
Mentor Graphics
Meta-Software
Micrografx
Microsim
Minc Software
Moda CAD
Motorola
NCR Microelectronics
NeoCAD
Object Design
Objectivity
Ontos
Orcad
Pacific Numerics
PacSoft
PADS Software
Parametric Technology
PCI Remote Sensing Corp.
PDA Engineering
Phase Three Logic
Point Control
Quantic Laboratories
Quicklogic
Quickturn Systems
Radian Corporation
Rasna Corporation
Research Engineers—Civilsoft
Royal Digital Systems
Scientific & Engineering SW
SDRC
Sigma Design
Silicon Graphics Inc.
Silvar-Lisco
SIMUCAD
Softdesk
Solbourne
Spatial Technology Inc.
Spectrum Software
Strategic Mapping
Sun Microsystems
Sunrise Test Systems
Superdraft
Swanson Analysis
Sweet's Electronic Publishing
Synercom
Synopsys
Systems Science
Tanner Research
Teradyne
Terr-Mar Resource Information Systems
Terra Sciences
Test Systems Strategies
The CAD Group
Understanding Systems
Unisys Corporation
Valisys
Viewlogic Systems
Visionics
VLSI Libraries
Xilinx
Zycad

European Companies Surveyed

ABB Industria
Alper Systems
ALS Design
ANACAD Computer Systems
Anilam Electronics
APLEIN
Areon
ARKTEC SA
ASCAD/ASCAM
ASICOM
Assigraph
Aucos Elektronische Geraete
AUCOTEC GmbH
Batisoft SA
Betronex
CADCentre Ltd.
CAD Lab SA
CAD TECH Iberica
CAD-Capture
Cad-Distribution AG
CAD-UL
Cadtronic Computer Systeme
CAMTEK
Caroline Informatique SA
Cimatron
CIMTEK SA
Cisigraph
Clemessy Innovation SA
Club Informatico SA
Complansoft CAD GmbH
Computational Mechanics
Computer Services Consultants
Contract Data Research Ltd.
Dapco SA
Dassault
DAT Informationssysteme
DATA Technology
Datagraphic SA
DATAID Technologies
debis Systemhaus GmbH
DECISA
Delcam Systems International
DELTA CAD
Digital Kienzle
Elstree Computing Ltd.
EME SA
Engineering Computer Services
Exapt
FEA
Fegs Ltd.
FHECOR
Framasoft
Gable CAD Systems
Geometria GIS Systems House
Graphisoft Software Development
Ground Modeling Systems Ltd.
Han Dataport
Hochtief
ICL Finland OY
IEZ CAD-Systeme GmbH
IGE-XAO
Investronica SA
ISDATA GmbH
ISKA
ItalCAD
Kloeckner-Moeller GmbH
Kockums Computer Systems AS
Kohns & Poppenhaeger
Lamp Software Ltd.
Laser-Scan
Logic Control
MACAO Systems
Marcus Computer Systeme
Matra Datavision
mb Programme
MEDesign Engineering
Microway GmbH
Missler Informatique
Moss Systems
Mucke Software
Nemetschek Programmsystem GmbH
Olivetti
PAFEC
Pathtrace Engineering Systems
Racal-Redac
Radan Computational Ltd.
Research Machines Ltd.
RIB/RZB
RoboCAD Solutions Ltd.

S.T.L.D. s.r.l.
Sagantec Europe BV
Sener Sistemas Marinos SA
Serbi SA
Siemens Nixdorf Infomationssysteme
Sinus Software GmbH
Smallworld Systems Ltd.
Soft SA
Soft-Tech Software Technologies
Softronics
Spectrum Graphics
Star Infromatic
STI-Straessle AG
Sysscan A/S
Tactics Intertational Ltd. (Australian)
Tebis
Technische Computer Systeme GmbH
Triplan
Vero International Software
Whessoe Computing Systems
Wiechers Datentechnik
Ziegler Informatics

Japanese Companies Surveyed

Andor
ARGO Graphics
Cadix
Century Research Center
C. Itoh Techno-Science
CPU
Design Automation
Fujitsu
Graphtec Engineering
Hakuto
Hitachi
Hitachi Zosen Info Systems
Info. Services International Dentsu
Informatix
INS Engineering
Kanematsu Computer Systems
Kanematsu Semiconductor
Kubota Computer
Marubeni Hytech
Mitsubishi Electric
Mitsui Engineering
Mutoh Industries
NEC
Nihon Itek
Nihon Unisys
Omron
Pasco
Ricoh
Seiko Instruments
Sharp System Products
Sony
Sophia Systems
Sumisho Electronics
Sumitomo Denko Workstation
Tokyo Electron
Toshiba
Toyo Information Systems
Uchida Yoko
Wacom
Zuken

Summary

The following is a list of the number of companies surveyed by region:

- 172 North American companies
- 111 European companies
- 40 Japanese companies
- 323 Worldwide companies

Chapter 3
Research Metrics

Total revenue with OEM. Is the total amount of money received by a company for all goods and services sold into the CAD/CAM/CAE/GIS market and is typically published on inquiries only.

Distribution channels. We divide total revenue by distribution channels defined as follows:

- **Direct channel.** Is the channel through which product moves directly from the manufacturer or vendor to the end user, usually by means of a professionally trained sales force.
- **Original equipment manufacturer (OEM).** Is the channel through which vendors or manufacturers sell their finished product to other companies for resale through an OEM agreement. Once sold, the product is usually modified slightly and then resold directly to the end user or through an indirect channel. Vendors that resell nonbranded product differ from VARs in that they often add their name to the product and back up its warranties.
- **Indirect channel.** Includes all other channels through which the finished product moves to the end user, including VARs, dealers, and mass merchandisers.

Turnkey. Is the bundling of hardware and software for sale as a unit.

Total factory revenue. Is the amount of money received by a company for its goods, excluding OEM revenue.

- **Hardware revenue.** Is revenue derived from the sales of CPUs (including operating systems), terminals (for host-dependent systems), and peripherals.
- **Software revenue.** Is revenue derived from the sales of bundled (part of a turnkey system) and unbundled application software and does not include operating systems revenue, which is part of the hardware.
- **Service revenue.** Is revenue derived from the service and support of CAD/CAM/CAE/GIS systems. Service revenue can be calculated in the market share tables by subtracting hardware and software revenue from total factory revenue. Service revenue includes the following:
  - **Application development.** Adding new functionality through design and development of new customized CAD/CAM/CAE/GIS software applications or modification, enhancement, or customization of existing software applications
  - **Consulting.** Including assessment of a company's CAD/CAM/CAE/GIS business information technology (IT) needs and formulation of a strategic plan based on identification needs

- **Integration services**. Including planning, implementation, migration, and integration of CAD/CAM/CAE software products
- **Maintenance.** Fees for CAD/CAM/CAE hardware and software maintenance
- **Management and operations services.** Including help desk, education and training, disaster recovery, vaulting, facilities management, configuration management, and relocation services
- **Service bureau**. Including construction of database, data conversion, product design, analysis, or manufacturing

Seats. Is defined as the number of possible simultaneous users.

Unit shipments. Is the number of seats delivered, excluding those sold to another company for resale (OEM).

CPU shipments. Is the number of CPUs delivered, which is the same as unit shipments for all platforms except host-dependent.

Average selling price (ASP). Is the average amount of money received by the factory for the sale of a turnkey/hardware system. The database forces reconciliation of a company's revenue and unit shipments to average selling price for each application and platform.

Installed base. Is the total number of seats/CPUs in use, calculated in forecasting as the previous year's installed base plus the year's unit/CPU shipments less retirements.

Compound annual growth rate (CAGR). Is a computed, compounded five-year growth rate used in forecasting.

Note: All revenue is converted to $U.S. (see Chapter 4 for exchange rates).

Chapter 4
Worldwide Geographical Region Definitions and Exchange Rates

- North America
  - Includes Canada, Mexico, Puerto Rico, and the United States (50 states)
- Europe
  - Includes Benelux (Belgium, Netherlands, Luxembourg), France, Italy, Scandinavia (Denmark, Finland, Norway, Sweden), United Kingdom, Germany (including former East Germany), and the rest of Europe (Spain, Switzerland, eastern Europe, and all other European countries and principalities)
- Asia/Pacific
  - Includes Japan, Hong Kong, Korea, Singapore, Taiwan, and China
- Rest of World
  - Includes Africa, Central America, the Caribbean, the Middle East, Oceania, and South America

When converting a company's local currency sales into U.S. dollars, or vice versa, it is important to use the 1992 exchange rates provided in Table 4-1. These rates will prevent inconsistencies in the conversion of offshore sales between each company. These are the exchange rates that will be used in the final 1992 CAD/CAM/CAE/GIS market share survey. Exchange rates for historical years are available on request.

Table 4-1
Average 1992 and Preliminary 1993 Exchange Rates against the U.S. Dollar

Country	1992 Rate	1993 Rate (Preliminary)	Currency
Austria	10.95	11.55	Schillings/$
Belgium	32.02	34.47	Belgian Francs/$
China	5.5082	5.7441	Renminbi/$
Denmark	6.0153	6.4794	Danish Kroner/$
Finland	4.4507	5.7423	Markka/$
France	5.2712	5.6409	French Francs/$
Germany	1.5554	1.6427	Deutsche Marks/$
Hong Kong	7.7401	7.7386	Hong Kong $/$
Italy	1,227.75	1,557.94	Lire/$
Japan	126.45	110.46	Yen/$
Netherlands	1.7512	1.8444	Gulden/$
Norway	6.1824	7.0534	Norwegian Kroner/$

(Continued)

Table 4-1 (Continued)
Average 1992 and Preliminary 1993 Exchange Rates against the U.S. Dollar

Country	1992 Rate	1993 Rate (Preliminary)	Currency
Singapore	1.6285	1.6157	Singapore $/$
South Korea	782.63	799.45	Won/$
Spain	101.9	126.55	Pesetas/$
Sweden	5.8105	7.7833	Swedish Kronor/$
Switzerland	1.3976	1.4694	Swiss Francs/$
Taiwan	24.93	26.21	NT$/$
United Kingdom	0.5686	0.6651	Pounds/$
ECU	0.770	0.853	ECU/$

Note: The annual rate is estimated as the arithmetic mean of the 12 monthly rates. The preliminary 1993 rates assumes the currency will remain stable for the remainder of the year.
Source: Dataquest (October 1993)

Chapter 5
CAD/CAM/CAE Platform Definitions

Technical workstation. This is a single-user computer that is distinguished from a personal computer by its features and by the user's potential migration path within the platform. Dataquest classifies workstations based on their hardware, software, and product features (as opposed to usage). In general, a workstation must come standard with an integrated floating-point coprocessor, integrated networking, a 32-bit multitasking operating system (UNIX, VMS, DOMAIN), and it must include a configuration that has a high-resolution graphics capability (typically a 1-megapixel display). Systems that have similar characteristics without the graphics capability are classified as servers.

Host-dependent. This is a shared logic system in which the external workstation's functions are dependent on a host computer.

Server. A server is a workstation, without the high-resolution graphics capability, that transparently provides its resources for use by other computer systems. It is a system on a network that provides specific functionality to other computer systems: the clients. Functions include file storage, database access, print, and compute capability. Dataquest tracks the following major categories of servers used for CAD/CAM/CAE/GIS applications:

- **Compute servers.** These systems provide capabilities for solving numerical problems (for example, simulations, statistical calculations, and simultaneous partial differential equations). System features usually include high-speed computational capabilities (for example, vector and parallel processing) and large memories.
- **Print servers.** These systems provide access to printers, specialized printing applications software, and print spooling resources to a network.
- **File servers.** These systems provide mass storage capability to clients on a network. Services can range from temporary storage of working files to long-term backup and archive systems.
- **Database servers.** These systems manage databases as a shared resource to a network. These servers handle such functions as physical data storage, data security, and high-level queries and can access stored information at the record level.

Personal computer. This is defined as a general-purpose computer that is distinguished from other computers by its adherence to hardware and software compatibility. This compatibility drives high unit volumes of commodity-like products that do not require on-site technical support. High-performance features (such as networking, graphics, a floating-point coprocessor, and a virtual, multiuser/multitasking operating system) are normally optional and are not integral system features. IBM/IBM-compatible, and Macintosh personal computers are two of the

platforms in this product segment. A single-user PC's resident operating system typically is DOS, OS/2, or MAC OS. PCs have a performance ceiling that is typically lower than that of workstations—lower in computer performance, I/O channel speed, disk speed, and sophistication or available application software. Standard graphics is normally in the 640 x 480-pixel range, and optional high-end graphics are limited compared with graphics options on workstations.

Chapter 6
CAD/CAM/CAE/GIS Software Application Definitions

Mechanical. This segment refers to computer-aided tools used by engineers, designers, analysts, technicians, and drafting professionals working predominantly in the discrete manufacturing industries but includes government and education. Users of mechanical CAD/CAM/CAE tools work in all departments across the typical organization with a majority found in product design, advanced engineering, and manufacturing engineering. Common design applications include conceptual design, industrial design, structural or thermal analysis, detail design, and electromechanical design, being the mechanical part of design with electrical or electronic components and mechanisms. Common manufacturing applications include tool and fixture design, numerical control part programming, off-line robotics programming, and interface to quality control systems. Management tools for database control and distribution are included in this segment as well as user-defined application programming.

Architecture, engineering, and construction (AEC). This segment covers the use of computer-aided tools by architects, contractors, plant engineers, civil engineers, and other people associated with these disciplines to aid in designing and managing buildings, industrial plants, ships, and other types of nondiscrete entities.

Geographic information systems /mapping. This is a computer-based technology, composed of hardware, software, and data used to capture, edit, display, and analyze spatial (tagged by location) information.

Electronic design automation (EDA). This segment covers computer-based tools that are used to automate the process of designing an electronic product including printed circuit boards, ICs, and systems. EDA includes ECAE, IC layout, and PCB/hybrid/MCM, as follows:

- **Electronic computer-aided engineering (ECAE).** These are computer-aided tools used in the engineering or design phase of electronic products (as opposed to the physical layout phase of the product). Examples of electronic CAE applications are schematic capture and simulation.
- **IC layout.** This is a software application tool that is used to create and validate the physical implementation of an integrated circuit (IC). The IC layout category comprises polygon editors, symbolic editors, placement and routing (gate array, cell, and block), design verification tools (DRC/ERC/logic-to-layout), compilers, and module development tools.
- **Printed circuit board (PCB)/hybrid/multichip module (MCM).** This segment covers products that are used to create the placement and routing of the traces and components laid out on a printed circuit board. Also included in this category are thermal analysis tools.

Chapter 7
CAD/CAM/CAE Subapplication Segmentation

Additional surveys are made to segment the industry further with software revenue sales by subapplication.

Mechanical

The mechanical application is segmented as follows:

- Modeling technology, which includes the following:
  - **Solid modeling.** The representation of a part or assembly capturing all relevant data describing solid characteristics of a project. This can include shape, weight, color, surface texture, and mass properties. Boolean operations are commonly used to add and subtract volumes to define the final shape of the object.
  - **2-D modeling.** The representation of a part in two dimensions (has an x and y coordinate); this format requires three or more views (top, front, and side) to depict all aspects of the part. 2-D is the most common geometric modeling format and is used extensively with a drafting function.
  - **3-D modeling.** The representation of a part in three dimensions, usually in a wire-frame format (has an x, y, and z coordinate). This format is commonly used in high-level CAD systems to determine the placement and fit of components in an assembly. Generally not used for final drafting, although some systems have the capability to translate the 3-D image to a 2-D standard drafting format.
  - **Integrated.** The integration of all three modeling technologies.
- Mechanical subapplications, which include the following:
  - System management/tools, which include the following:
    - **Configuration management.** Management of the structure of a product design or assembly. Where-used and made-from analyses are typical capabilities.
    - **Engineering change management.** Management of engineering changes caused by product enhancements or product updates. Version control is an important element of this process.
    - **Network file management.** Management of data files across a network with mass storage capability. File content can include drawings, design and analysis files, manufacturing information, and test data.
    - **User application software development.** Programming tools to aid the generation of user-defined programs. Programs will drive or interface with CAD/CAM/CAE applications.

- **Knowledge-based engineering tools (KBE).** Users can capture design intent and build standard practices for controlling and modifying design and manufacturing activities. Knowledge-based engineering can aid in integrating various software programs.
- **Training tools.** Online training tools for all mechanical CAD/CAM/CAE applications.

- Documentation/drafting, which includes the following:
  - **Detail drafting.** The representation of a part in standard geometric drafting format. This representation will include all part geometry dimensions and notations describing mechanical/structural, functional, and material characteristics.
  - **Schematics/detailed diagrams.** In a mechanical application, schematics are used to describe hydraulic and pneumatic systems. A set of symbols are available for both applications representing standard components.
  - **Technical illustration.** A drawing of a component or assembly that is generally intended for publication. This drawing will omit unnecessary dimensions and other detailed drafting items and will be drawn in a manner to more realistically depict the part.
  - **Charts.** Any table, graph, or drawing depicting a range of technical data.
- Conceptual design, which includes the following:
  - **Industrial design.** A process that integrates the design tools that define the style and functional aspects of the total design; a process that automates creative design processes while generating data that can be used directly in product engineering, manufacturing, and marketing; a process that provides a common environment for the entire conceptual process including painting, modeling, rendering, and visualization.
  - **Design layout.** An initial design process in which the major components and part interfaces are defined.
  - **Styling.** A detailed design process in which aesthetic considerations are foremost in importance. Systems supporting this application have special refinements for rendering, modeling, and editing functions.
- Functional design, which includes the following:
  - **Component design.** Design of the individual components in an assembly.
  - **Assembly verification.** The integration of various component designs into an assembly to test size/shape and functional characteristics.
  - **Linkage/Mechanism.** An assembly of components with two or more movable parts usually providing some means of power, control, or fastening application.

- Analysis, which includes the following:
  - **Mass property.** The analysis of the physical characteristics of a part, assembly, or system. The evaluation of multiple properties; measures volume, weight, surface area, and locates center of gravity.
  - **Stack-up.** Analysis of the impact of dimensional variation in each component of an assembly.
  - **Fatigue.** The degradation of the performance of materials, parts, or circuits with repeated stress over time.
  - **Structural.** The analysis of a physical system; usually refers to the static stability/integrity of a part, assembly, or system.
  - **Thermal.** Analysis of the effects of temperature in a system.
  - **Vibrational.** Analysis of the effects of vibration in a mechanical system.
  - **Magnetic.** Analysis of magnetism/flux in a mechanism such as an electric motor.
  - **Composite.** The analysis of composite materials (carbon fiber and so on) to predict performance in the final product and as it changes in the manufacturing process.
  - **Quality control.** Comparison analysis of the CAD design model to the results of physical measurement of components in the manufacturing process.
- Manufacturing engineering, which includes the following:
  - **Tool design.** The design of custom-made tooling to facilitate an effective manufacturing process.
  - **Fixture design.** The design of a variety of structural aids that hold the component or assembly during the manufacturing process.
  - **Part processing design.** The design of a series of manufacturing processes.
- Manufacturing process simulation, which includes the following:
  - **NC part programming.** The programming of a numerical control machine tool or automated processing system. Graphics and language-based programming tools are available.
  - **Coordinate measuring machines.** Programming of machines used to measure the physical dimensions of a part; also the output of gathered data for analysis.
  - **Offline robotics.** A special-purpose process simulation that graphically represents the sequence of steps to program a robot for a particular operation. The resulting data can be downloaded to a robot to update its control program.

AEC

The AEC application is segmented as follows:

- **Architectural.** Software used in the design and drafting of buildings and grounds.
- **Civil.** Software for site and structural engineering, typical for design and drafting of sites for buildings, roads, bridges, and airports; and for design of steel and concrete structures.
- **Facilities design/management.** Software used to lay out, inventory, and manage assets, such as personnel space, equipment, and utilities, within a building or geographic service area.
- **Process plant design.** Software used in design, analysis, drafting, and management of process, power, and manufacturing plants and ships.

GIS/Mapping Software

GIS/mapping software is used to capture, edit, display, and analyze spatial (tagged by location) information, and can be categorized as follows:

- **Base data.** Software used to create baseline geographic data, as follows:
  - **Photogrammetry and surveying.** Software used in developing original data for a GIS system based on ground surveying or on remotely sensed data, such as aerial photography or satellite imagery.
  - **Data for resale.** Includes both GIS software used to create data for resale to end users and revenue from the sale of geographic data.
- **Land information,** which includes the following:
  - **Land records.** GIS software used to manage land ownership or parcel information; typical user is a tax assessor.
  - **Planning and land use.** GIS software used to manage land use; typical user is a city planner.
- **Biological.** Software used to manage and analyze plant and animal life, including the following:
  - **Environmental; public health and safety.** GIS software used to manage natural resources and to monitor and analyze environmental factors that contribute to the welfare of the earth and its people.
  - **Forestry and agriculture.** GIS software used for management of forests and crops.
- **Geoscience (formerly energy exploration).** GIS software used to manage oil, gas, and mineral exploration projects. Emphasis is typically on subsurface data.
-

- **Infrastructure management.** Management and analysis of manmade assets except for utilities, including the following:
  - **Transportation and logistics.** GIS software used in transportation applications such as road or rail network modeling or route planning.
  - **Emergency and dispatch services.** GIS software used to manage emergency services such as "911" services and also for profit dispatch management systems.
- **AM/FM (automated mapping/facility management).** GIS software used for managing utility industry networks, based on the following categories:
  - Telecommunications/telephone
  - Electric
  - Water and waste water
  - Other utilities (primarily gas)
- **Business marketing and sales.** GIS software used to promote and sell services and products, and to identify and evaluate opportunities in a competitive environment, which includes the following:
  - **Demographic and location analysis.** GIS software used to analyze problems in demographics or site characteristics. Examples include sales territory selection, site selection, or population analysis. Typical users are in advertising and marketing, insurance, banking, and real estate.
  - **Sales and directional support.** GIS software used to help salespeople locate targets of a sales effort (for example, to locate potential customers, specific properties for sale, and driving routes to the properties). This also includes software used to help customers locate establishments, typically used as travelers' aids.
- **Geopolitics.** The sum of software used in defense/military and political districting applications, including the following:
  - **Defense/military.** GIS software used to manage military or defense projects for the purpose of command and control.
  - **Political districting.** GIS software used to manage the redistricting process; based on census data.
- **Cartography.** GIS software used in map-making applications.

ECAE

The ECAE application is segmented as follows:

- **Framework.** All revenue associated with EDA frameworks, which includes graphical user interfaces (GUIs), database and design management, and library management.
- Digital design, which includes the following:

- Design entry, which includes the following:
  - **Schematic entry.** A design process that consists of graphical schematic entry, netlist extraction, schematic translators (for example, EDIF), and electrical rule checking.
  - **High-level design entry.** A design process that consists of high-level design entry, including hardware description languages, state machine description languages, Boolean equation descriptions, truth table descriptions, and any other utilities that support high-level design entry, such as syntax checkers, lint, and debuggers.
  - **Libraries.** In electronic computer-aided engineering, libraries are compiled data, sometimes in database form, of component and device properties; libraries can also include device and interaction models. They are device models that are used in conjunction with design-entry and verification software.

- **Digital design verification.** A software application that includes logic simulation, behavioral simulation, and timing analysis, including the following:
  - **Simulation.** An application or system that uses representative or artificial data to reproduce various conditions in a model that are likely to occur in the actual performance of a system. Simulation frequently is used to test the behavior of a system under different operating policies, which includes the following:
    - **Gate level.** Simulation based upon gate level netlist (not VHDL or Verilog)
    - **VHDL.** Simulation using VHSIC HDL
    - **Verilog.** Simulation using the Verilog HDL
  - **Static timing verification.** Providing inputs to a physical circuit model or computer simulation to test the nondynamic functions of the design; timing verification software that does not require the use of the test vectors to determine timing violations.
- **Logic synthesis.** A design process that translates high-level hardware descriptions to gate-level equivalents and optimizes parameters (for example, area, speed, and power) in gate-level circuits.
- **Test automation.** Tools that are used to determine and improve the testability of electronic circuits or systems, which independently measure, analyze, and act on properties and characteristics of circuits or systems, including the following:
  - **Automatic test vector generation.** A process that automatically creates the appropriate set of test vectors to exercise a given percentage of the nodes within a circuit.
  - **Design for testability, test logic synthesis.** A process that facilitates and/or automates the process of inserting test logic structures into a design to make the design more easily tested.

- **Fault simulation/grading.** A process that uses either deterministic or nondeterministic methods to simulate faulty nodes and determines which nodes can be detected by a given set of test vectors.

- **Analog design**, which includes the following:
  - **Design entry**, which includes the following:
    - **Schematic capture.** (see previous definition)
    - **Libraries.** (see previous definition)
  - **Analog design verification.** A software application that includes analog simulation, analog synthesis, Monte Carlo analysis, worst-case analysis, and parametric plotting, including the following:
    - **Circuit simulation.** Analog simulation software such as SPICE.
    - **Mixed-signal simulation.** This process consists of providing inputs to a physical or computer-simulated circuit to test the response to multiple, multiplexed, or analog and digital inputs.
  - **Signal integrity tools**, which includes the following:
    - **Crosstalk analysis.** Analysis of high-speed coupling effects between signal line, either on PC boards, MCMs, or ICs.
    - **Electromagnetic analysis.** Tools that analyze EMC generation, interference of electronic products, boards, and ICs.
    - **Transmission line analysis.** Analysis of reflection/degradation of high-speed signal on PC boards, MCMs, or ICs.

IC Layout

The IC layout application is segmented as follows:

- **Automatic placement and routing (APR).** Automatic placement and routing consists of two different sets of tools: those for gate-array design and those for cell-based IC design.
- **Compilers.** Compilers are predominantly cell compilers and associated tools for the automatic creation of library cells based upon low-level silicon design rule information.
- **Design verification.** Design verification tools include design rule checking, electrical rules checking, layout-versus-schematic checkers, and parasitic extraction.
- **Full custom IC design tools.** Full custom tools include polygon editors, symbolic editors, compaction tools, and floor-planning systems.
- **Module generators.** Module generators are software packages that use parameterized inputs to create high-level library cells (such as datapath, RAM, and ROM) based upon lower-level ASIC vendor-supplied cells.

Chapter 8
CAD/CAM/CAE/GIS Operating System and Industry Segmentation

Additional surveys segment the industry with software revenue by operating systems and by industry, providing yet another look at the CAD/CAM/CAE/GIS software industry. These segments are as follows:

Operating Systems

Apollo AEGIS
DOMAIN/Apollo UNIX
Apple AUX
Apple Macintosh/OS
AT&T Systems V Derivatives
DEC OSF
DEC ULTRIX
DEC VMS
DOS
DOS with Windows
HP UX
IBM AIX
IBM VM/VMS
MIPS UNIX
OS/2
XENIX/SCO UNIX
SGI UNIX
Solaris
Sun-UNIX/OS
Prime PRIMOS
Intergraph UNIX
CDC CYBER NOX/VE
CRAY UNIX
CONVEX UNIX
Sony NEWS-OS (UNIX)
NEC EWS-UX (UNIX)
Hitachi HI-UX/G (UNIX)
Siemens-UNIX
Siemens-Host/Proprietary
Windows NT
Others—UNIX

Industry Sectors

Service companies (architects, consulting engineers, and design services)
Agriculture, forestry, and fishing
Mining
Construction, contractors, building
Chemical, allied, petroleum products
Fabricated metal products, except machinery and transportation
Industrial and commercial machinery (engines, heavy equipment)
Computers, office equipment, computer peripherals
Industrial controls, robotics, AGVs
Electrical/electronic equipment (power, appliances, test, measurement, semiconductors)
Consumer electronics (TV, VCR, CD)
Medical manufacturing (instrument, X-ray)
Automotive, motorcycles, bicycles
Aerospace, guided missiles, space vehicles
Manufacturing not elsewhere classified (textiles, furniture, foundries)

Shipbuilding and repairing, offshore rigs

Transportation (rail, public transit, freight transport)

Telecommunications and data communications (telephone, radio, TV, cable)

Utilities and pipelines (electric, gas, sanitary services, water)

Finance, insurance, real estate

Government: general, executive, public order, and taxation

Government: public works and engineering

Government: environment and public health resource conservation/management, waste management

Government: national security (defense)

Education

Results from these and the subapplication surveys are published in a *Dataquest Perspective* and are available to our clients through individual inquiries in the fall.

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