ETAK, Inc.

For Series "C"
—
Sandi Minks
file

ETAK, Inc.

Business Plan

May 10, 1984

This business plan includes proprietary information of ETAK, Inc. with respect to, among other things, current product development plans. Each person to whom this business plan is given agrees, by accepting this business plan, (i) not to disclose any of such proprietary information to any person, other than the employees and independent contractors of ETAK, Inc. and his or its financial or legal advisors, and (ii) not to reproduce, photograph, copy in any manner, or distribute, other than to his or its financial or legal advisors, this business plan, or any portion thereof. The business plan has been prepared by the management of ETAK, Inc.

Copy # _____

TABLE OF CONTENTS

SUMMARY

ETAK, Inc. has developed patentable breakthroughs in two important technologies:

1. Computerized vehicle navigation.

2. Digitized map production and storage.

These innovations open the way for profit generation in selected segments of two distinct markets:

1. Motor vehicle owners and operators--particularly those who can economically justify an investment in more efficient driving.

2. Users of digitized geographic information--map publishers, engineering firms, direct mail organizations, etc.

Products

Recognizing that motor vehicles represent the larger near-term opportunity, ETAK is initially concentrating all of its resources on the automotive market. Two companion products are already in advanced stages of development:

1. An on-board vehicle navigation computer (the NAVIGATOR) which displays a complete map of an area's streets, locates the vehicle on that map, and indicates the location of driver-selected destinations.

2. A series of tape cassettes for use in the NAVIGATOR, each cassette containing street map data for an area equivalent to two or three typical paper maps of urban areas.

A third key product for the motor vehicle market will reach prototype form by early 1985:

3. An automatic vehicle location (AVL) system for use by dispatcher-controlled fleets.

Legal and regulatory aspects of these new products, and their underlying technologies, have been researched by two respected law firms. The results to date are uniformly favorable, including patentability (several patents have been applied for), safety, and compatability with FCC regulations.

A prototype of the ETAK NAVIGATOR has been installed in a passenger car and is currently operating, using a digitized map of Sunnyvale, California. Several months of driving have made it clear that the system works and will deliver meaningful benefits to its purchasers:

1. For commercial vehicle owners: cost-effective improvements in utilization of driver and vehicle time.

2. For individual drivers: more pleasant, efficient and distraction-free driving over unfamiliar streets, with potentially great savings in time and mileage.

Market Potential

The U.S. market potential for products offering such benefits is huge. It encompasses all 160,000,000 cars and trucks currently in use. However, with ETAK's initial factory selling price projected at $800, the following customer groups have been selected as initial targets:

1. Car rental companies--550,000 cars (replaced on an average of every 12 months).

2. National package delivery companies--40,000 delivery vans.

3. Commercial users--6,000,000 trucks in commercial fleets. (The primary focus is on 3,000,000 intra-urban delivery, service, and repair vehicles, in fleets of 2 to 200 vehicles.)

4. Business users--10,000,000 passenger cars used primarily for business by independent sales people, small business owners, and others.

5. Casual users--some proportion of the 115,000,000 passenger cars used primarily for personal transportation. (Within this group, the primary focus is on 4,000,000 recent model luxury and specialty cars.)

These are large but clearly identifiable market segments. In order to sell 100,000 ETAK NAVIGATORS for annual sales of $65,000,000, the following segment penetrations would be required, for example:

2.0% of rental cars;
2.0% of package delivery fleet vehicles;
0.5% of commercial fleet vehicles;
0.35% of business users;
0.02% of casual users (.6% of recent model luxury and specialty cars).

Marketing Plan

ETAK will establish a marketing and sales organization which can serve each of these customer groups, with an entire line of potential ETAK products. This organization will consist of a national sales office and seven regional sales offices. The national sales office will call on OEM and national account customers, including car rental fleets and package delivery fleets. Regional sales managers will sell to large regional fleets, and direct sales representatives will sell to smaller commercial fleets. Another group of sales representatives in the regional offices will set up and service land mobile and auto stereo dealers, who will sell to business users and casual users.

Sales forecasts call for increasing penetration as ETAK proceeds with an orderly market-by-market roll-out. The dealer network will cover three of seven regions by year-end 1985, and will cover the continental U.S. by late 1986 or early 1987. The rate of this roll-out is constrained more by the speed with which an effective field sales organization can be built than with the pace of digital map development. In some cases, national account sales may be made into areas in which ETAK has not yet established a field marketing presence.

Financial Projections

ETAK's financial projections display an accelerating profit momentum as the market-by-market national expansion builds during 1985 and 1986. They illustrate that, when operating in something as large as the motor vehicle market, modest estimates of market penetration in selected segments can produce very large sales and profits, even with no Detroit OEM sales included:

Summary of Financial Projections
(Thousands)

	1984	1985	1986
NAVIGATORS Sold	.225	11	44
Net Revenue	$200	$10,000	$29,000
Gross Margin	100	5,000	15,500
Reserve	(500)	(500)	(1,000)
Pre-tax Income	(2,200)	(500)	3,600
Net Income	(2,600)	(500)	3,200
Cash Flow	(3,200)	(4,300)	1,000

Management Team

To achieve these results, ETAK's management team includes key people with proven skills and successful experience in the areas of technical development, manufacturing, marketing, and general management. Individual accomplishments include:

- as CEO: restoring a publicly-held corporation to profitability and successful merger while increasing market penetration in major automotive aftermarket segments;

- as vice president of marketing and sales: building a sales force from 10 to 300 as divisional sales grow from $5 million to $40 million; coordinating advertising, promotion, and selling activities to achieve sales targets, both for commercial products and consumer products;

- as operations director: improving production efficiency and product quality while reducing manufacturing costs for several types of electronics products;

- as research engineer: managing an engineering team which developed a series of innovations in navigation, radar, signal processing, and circuit design; and

- as research scientist: acting as principal designer for the digital map database system used by the U.S. Census Bureau to create the only nationwide digital street map.

Funding Plans

Financing requirements for ETAK include $3,000,000 to be raised by May 15, 1984. This money will be used to complete product development and tooling, manufacture an initial quantity of 225 NAVIGATORS, build the digitized mapping capability, conduct a limited market test, and move the company into an appropriate building.

The summary of key milestones on the next page shows that ETAK, having achieved the critical goal of a working product prototype in December 1983, is pointed toward other major accomplishments in the first ten months of 1984. The current round of financing will provide sufficient capital into November 1984, at which time additional funds will be needed for manufacturing start-up, product launch, and working capital.

	Oct.	Nov.	Dec.	Jan. 1984	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan. 1985	Feb.	Mar.	Apr.	May	June
ENGINEERING			form & function prototype			wire wrap prototype		printed wired board (PWB) prototype						start AVL system design							
								----tooling----------						start semi-custom IC design							
									software refinement for human factors										AVL system test		
									PWB artwork to manufacturing												
										Alpha Test											
DIGITAL MAPPING		begin system development				mapping begins											California, 2 major SMSA's completed by end 1984 (all SMSA's by end 1985)				
							Bay Area completed														
												Los Angeles completed									
MANUFACTURING						test prototype															
							tooling														
								life test													
								temperature test													
								Alpha test													
						completed units:		25	25	75	75	75	100	200	350	500	(build 11,000 in 1985)				
MARKETING						complete industry overview							collateral material developed								
						select distribution approach							POS material developed								
						complete consumer survey							installation manual developed								
						complete dealer survey							initial dealers lined up								
						auto rental test agreement							product introduction								
						complete marketing plan							begin building sales force								
						human factors study							CES trade show								
										finalize Beta program								MC Expo, NADA trade show			
												----Beta test----									
FINANCE AND ADMINISTRATION				complete business plan																	
							revised business plan														
							complete installation of NCA Business System														
							take over all administrative functions														
							close venture capital financing														
							obtain lease line														
									move into rented building												
															close subsequent financing round						

COMPANY AND MANAGEMENT

Company Background

ETAK was founded in May 1983, by a team of three engineers who had been working on advanced technical projects at SRI International. This technical team was expanded during the following months by adding a group of carefully selected technical experts, bringing together an engineering team uniquely qualified to accomplish a challenging product development effort.

The engineering team is well suited to this task. Most of the group came from SRI where they worked together in a wide field of technologies: navigation systems, electronic counter measures, Arctic radio location, spacecraft electronics, medical electronics, high density magnetic recording, over-the-horizon radar, and digital signal processing.

These fields include the technologies crucial to the present product and demonstrate experience in harsh environments requiring high reliability, from Arctic to space. The experience of having worked together for several years, always on high-priority projects, has allowed ETAK's engineering group to make very rapid progress on the development of the present product.

Management team members joined ETAK as the technical feasibility of the product was proven. George Bremser joined ETAK in October 1983, following an extensive nationwide search for a Chief Executive Officer. Other management positions were subsequently filled, completing a strong management team.

Financing History

ETAK's initial financing was provided by a partnership associated with Catalyst Technologies. When George Bremser joined the company, he made a significant personal investment to supplement this initial financing round. A second round of financing was completed in November 1983. Second-round investors include Catalyst Ventures, Ltd., company employees, and several other individuals.

Management Team

ETAK has assembled a strong management team of carefully selected individuals. Team members have broadly based strengths in general management, engineering, cartography, manufacturing, marketing, and operations management.

The present team includes:

George Bremser, Chairman, President and Chief Executive Officer. Mr. Bremser has over 15 years of general management experience within three large corporations. After early career experience in advertising and marketing management, including a position as marketing manager of Maxwell House coffee, he became general manager and later President of General Foods International. He subsequently served as Executive Vice President in charge of all U.S. operations for Shaklee Corporation.

Mr. Bremser also spent 10 years as Chairman, President, and CEO of the Texstar Corporation. In this capacity, he had overall responsibility for Texstar's ARA division, a major supplier of automotive after-market equipment.

Mr. Bremser received his B.A. degree from Yale University in 1949, and his M.B.A. from NYU's Graduate School of Business Administration. He is currently a director of Butler International and PBI Industries.

Stanley K. Honey, Vice President Engineering. Mr. Honey is a founder of ETAK, and the inventor of the navigational algorithm on which the vehicle navigation product is based. In May 1983, Mr. Honey started work on this product and assembled the initial engineering group. Mr. Honey spent the previous five years as a Research Engineer at SRI International. There he was principal investigator and manager of various programs resulting in innovations in ultra-precise radio navigation, underwater optical instrumentation, electronic radar countermeasures, spectrum surveillance systems, RF circuit design, and digital signal processing.

Mr. Honey's interests and skills in navigation accrue from his leisure activities as well. Mr. Honey is well known as a world class offshore yacht racing navigator. He has navigated and won two Pacific Yacht Races, the Southern Ocean Racing Conference, the Bermuda Race, and navigated

the highest scoring American boat in the Admiral's Cup. Mr. Honey built navigational computers that were instrumental in several of these victories.

Mr. Honey received a B.S. with distinction in Engineering and Applied Science at Yale University and an M.S. in Electrical Engineering at Stanford University. While at Yale he earned the Lamphier prize for "proficiency in electrical engineering and initiative in research."

Ken Broome, Senior Vice President Marketing. Mr. Broome joined ETAK in April 1984 after several months as the company's outside marketing consultant. He has an extensive background in sales and marketing. Mr. Broome began his career with positions as a field sales representative and national sales trainer for Skil Power Tools. After this, he became Vice President Sales for Rainbow Industries. In 1975, he joined Allen Group as a regional manager. One year later he became Vice President for Sales and Marketing of the Allen Test Products Division.

Since 1982, Mr. Broome has been President of Symposia Marketing, an organization providing a variety of marketing and consulting services to high-technology companies. In this capacity he has developed the operational marketing plan for several start-up companies.

Mr. Broome received his B.S.M.E. from the University of Michigan and has completed advanced course work in Marketing and Business Administration at Wayne State University.

Bill Baker, Vice President Manufacturing. Mr. Baker joined ETAK in January, 1984. He has nearly 20 years of experience in several manufacturing and operations management positions. Mr. Baker began his career with the Singer Company, where he held positions in purchasing and materials management for several lines of office automation products. After his Singer experience, he moved to General Automation where he became General Manager of the division responsible for producing mini-computers.

Following this, Mr. Baker joined National Semiconductor, where he was responsible for material and production control, as well as physical distribution for the $50 million division which produces point-of-sale

products. Most recently Mr. Baker has been Director of Operations at Pro-Log Corporation. At Pro-Log he reported directly to the company President and served as a member of the Executive Committee, with overall responsibility for production, materials, manufacturing engineering, and quality control.

Mr. Baker received his B.S.E.E. from Clemson University in 1958.

Walter B. Zavoli, Ph.D., Director of Research and Development. Before joining ETAK, Dr. Zavoli was Assistant Director of the Remote Measurements Laboratory of SRI International. There his responsibilities included technical direction, promotion, and general line management duties for a 70-person, 10 million dollar research organization. During his 13-year association with SRI, Dr. Zavoli developed an international reputation for his developments in Over-the-Horizon Radar technology. He provided direct technical and operational consulting to the Air Force and Navy in support of their OTH Radar programs. Dr. Zavoli has led and supervised highly successful team efforts responsible for detection, tracking, correlation, display, and signal processing systems. Additionally, Dr. Zavoli has been involved in the development of hardware and software systems for biomedical applications.

Dr. Zavoli received his B.S. in 1968 from Columbia University. He received his M.S. and Ph.D. in Electrical Engineering from Stanford University in 1970 and 1977.

Marvin S. White, Research Scientist. Mr. White came to ETAK from the U.S. Census Bureau where he was a Research Scientist on the Applied Mathematics Research Staff. Mr. White was the principal designer of the digital map data base system used to create the only nationwide digital map, the Census Bureau DIME File. As an expert in automated cartography, topology, and graph theory, he established the foundation for automated mapping and geoprocessing. Mr. White was the principal researcher in several projects resulting in advances in multi-variate data storage and retrieval, record linkage, and interactive graphics. He provided direction and advice to federal, state and local government agencies, and to private producers of geographic products. Mr. White is the author of over twenty professional papers on digital mapping.

Mr. White received his B.S. in Physics with High Honors at the University of Illinois in 1969, and has done graduate studies in Physics at the University of California at Los Angeles.

Alan C. Phillips, Ph.D., Senior Research Engineer. Dr. Phillips came to ETAK from SRI International where he was the senior hardware designer in the Remote Measurements Laboratory, one of the most respected laboratories at SRI. Dr. Phillips is known world-wide in the HF community for his developments in receiver, synthesizer, and repeater design. While at SRI, Dr. Phillips was the principal designer of satellite receivers, medical electronics, high-density recorders, and multi-channel receivers used in both U.S. and Australian Over-The-Horizon radars. Prior to this, Dr. Phillips was with the Ionospheric Dynamics Group of the Radio Science Laboratory at Stanford University, and before that was with Hughes Aircraft Company, where he worked in guided missile design.

Dr. Phillips received his B.S. in 1958 from North Carolina State, his M.S. in 1960 from the University of Southern California, and his Ph.D. in Electrical Engineering in 1968 from Stanford University.

The NAVIGATOR

A. Functional Description

The ETAK NAVIGATOR is designed for use in vehicles. It has the capability to show drivers their current position in relation to an electronic street map, and to indicate the location of driver-selected destinations. It is useful to anyone dependent upon paper maps or verbal instructions for finding his or her destination.

The NAVIGATOR has a graphic display which continuously shows a vehicle's position on a map of the surrounding area. An arrowhead represents the position of the vehicle and points in the direction the vehicle is heading. As the vehicle is driven, the map moves accordingly, at all times indicating the vehicle's correct position. Different size streets are represented by lines of varying brightness with key streets and landmarks clearly labeled.

The display can be adjusted by the operator to show other areas, or can be zoomed in and out. In the most zoomed-in mode, even the smallest streets are displayed and labeled. In the most zoomed-out mode, the entire continent is displayed with only the interstate arteries plotted and labeled. As the display is zoomed in and out, features and labels appear and disappear in an orderly fashion according to their priority.

The NAVIGATOR indicates the location of a selected destination on the screen with a flashing star symbol. The driver enters destinations by scrolling through the map index to select a landmark or street. Once a street is selected, a cross-street can be chosen or a street address entered. The NAVIGATOR then displays a map on which both the car and the destination are shown. If the display is subsequently zoomed in so that the destination is off the screen, the direction and distance to the destination are indicated.

The driver can select either a heading-up or north-up display mode. In the heading-up mode, the map rotates as the car turns so that the car symbol is always heading up the screen. This is desirable when driving toward an indicated destination. In the north-up mode, the map is displayed with north at the top. North-up mode is useful for planning trips.

B. Packaging

The NAVIGATOR is packaged in three parts: a computer unit, a tape drive, and a display. In addition, a compass and two wheel sensors are required. The computer unit is mounted in the trunk. The tape drive is small enough to mount under the dashboard or in the glove compartment. Access to the tape drive is required only to change cassettes. In urban fleet applications in which the cassette is rarely changed, the tape drive can be packaged with the computer in a single rugged enclosure.

Two displays are offered. The standard display is a 7-inch CRT which mounts under the dashboard. This display fits in medium and large cars and commercial vehicles. For aftermarket applications, especially cars with consoles between the seats, a smaller (4.5-inch) CRT is mounted on a flexible stalk that can be adjusted for convenience.

The ETAK NAVIGATOR is electronically and mechanically designed to work in the rugged environment of an automobile or a commercial vehicle. Design specifications have been set for vibration, temperature, electrical stress, and EMI susceptability.

C. Installation

The installation of a NAVIGATOR will be comparable in difficulty to the installation of an auto sound system. The computer unit is mounted in the trunk. In passenger vehicles, the tape drive is mounted within reach of the driver in the passenger compartment of the car. The under-dash display or the stalk display is installed using simple brackets. The digital compass, which is the size of a cigarette lighter, can be mounted inside the exterior sheet metal in a variety of locations, such as inside the trunk lid. Sensors are installed on two wheels. Each wheel sensor consists of special tape which is applied to the inside of the wheel rim, and a sensor assembly

which is clamped to the suspension. Wires run to the computer from the display, wheel sensors, compass, and twelve volt power supply. The NAVIGATOR draws approximately twenty watts from the car's electrical system. Installation takes an average of 2 hours for a fleet vehicle, and 2 1/2 to 3 hours for a typical passenger vehicle.

D. Patentability

ETAK is aggressively pursuing patent, copyright, and trademark protection with the firm of Fliesler, Dubb, Meyer & Lovejoy as patent counsel. Patent applications are being prepared on seven aspects of the technology:

- navigation algorithm
- map data base development technique
- map data base storage technique
- flux gate compass electronics
- display drive electronics
- map display technique
- sensor compensation technique.

E. Safety and Regulatory Considerations

Safety and regulatory aspects of the ETAK vehicle navigation product have been researched by the law firm of Gibson, Dunn & Crutcher. The results are uniformly favorable. The ETAK product will easily comply with all relevant passenger safety and radio emission requirements.

Map Cassettes

A. Description

Cassettes containing the map data will be sold separately. Each cassette covers an area comparable to the area covered by two to three typical paper street maps. For example, one cassette will cover residential streets from San Francisco to Palo Alto, major streets throughout the Bay Area, state and federal highways throughout the state and interstate highways for the rest of the country. Certain areas such as airports will be covered in exhaustive detail showing airline terminals, rental car return areas, and all access roads.

B. Digital Map Development

ETAK requires a precise digital map of the entire country for its map cassettes. The U.S. Census Bureau has a digital map data base which contains an estimated ninety percent of the street segments in the metropolitan areas of the U.S. The Census Bureau spent approximately $60 million to assemble this data. This data is in the public domain, and available for the cost of copying.

ETAK's application requires improving the coordinate accuracy of this data, adding data such as road classifications and turn restrictions, and eventually extending the data base to cover every street in the U.S. Additionally, ETAK will undertake a continuing program of updating and extending this data base.

ETAK has developed a technique that allows a three-to-one improvement in productivity per workstation-hour in creating and updating digital map data. Using this technique, the improvements to the Census Bureau data for the San Francisco Bay Area will be completed in time for an Alpha Test in August 1984. The remainder of California will be complete by ETAK's initial market roll-out in early 1985. The remaining metropolitan areas in the U.S. will be finished in 1985, and the data base will be extended to cover every road in the U.S. during 1986. This task requires a budget of $500,000 per year, including salaries for a staff of fifteen and lease payments for $300,000 of capital equipment.

ETAK has contacted vendors who are capable of performing data base work, but are more expensive than the company's internal cost for the same work. The existence of these vendors reduces risks and allows ETAK the option of expediting the development of the map data base, should it decide that any time saved is worth the added cost.

Alternatively, ETAK could obtain additional equipment and hire more staff to speed the rate of internal map development. It is possible that the company could complete mapping the entire U.S. by the end of 1985. This would require an additional $250,000 per year in staff and equipment lease expenses.

Automatic Vehicle Location (AVL) System

A. Functional Description

ETAK is actively developing an Automatic Vehicle Location (AVL) System for use by dispatcher-controlled fleets. The technology embodied in the ETAK NAVIGATOR serves as the basis for a cost-effective AVL System. This system will provide, at a central installation, a display of the current locations of suitably equipped vehicles. Such a system will have numerous applications for radio dispatched fleets.

Presently, these vehicles are dispatched using voice communications over VHF mobile radios. With ETAK's system, each vehicle's radio will be connected to an ETAK NAVIGATOR and used to automatically transmit the vehicle's position and status to the dispatch center. The radio could still be used to provide normal voice communications.

At the dispatch center, the ETAK AVL System displays a map showing the current position and status of all vehicles. In addition, other operator-selected locations are displayed. The map scale and center point can be adjusted according to changing needs. Location data can be presented individually or by data category. Once the dispatcher assigns a vehicle, the destination is digitally communicated and it appears on the vehicle's digital map display.

B. Packaging

The AVL System will be sold as a turn-key package which includes specialized NAVIGATORS and a computer for the dispatch center. NAVIGATORS in an AVL application require a communications interface to a vehicle's existing VHF radio. This will be provided either as a separate interface box or as a built-in capability of a specialized NAVIGATOR unit. The dispatch center system will use off-the-shelf hardware, including a microcomputer, a communications interface, and a display. In addition, ETAK applications software will be provided for use in the microcomputer.

COMPETITION

Competing Vehicle Navigation Technology

No product has yet been found, either available or under development, that is directly competitive with the ETAK NAVIGATOR. Several companies presently make vehicle navigation systems that display range and bearing to a destination after the driver has entered coordinates for both his location and destination. These systems do not have the map display and the automatic location capabilities of the ETAK system. Systems of this type are available in Japan from Toyota and Nissan, and are under development by VDO in Germany.

Volkswagen, Blaupunkt, Siemens, and Mercedes have all described future systems that will contain a similar range and bearing capability, and will use the driver information system that is being installed in Germany. This system transmits information to drivers concerning traffic conditions, detours, and location while on the Autobahn. These systems do not offer complete navigation; they either indicate the direction of a given destination (if the driver knows and enters all the coordinates), or offer drivers other information of general interest.

Honda has released a car navigation product in Japan called the "Electro Gyro-Cater." It dead-reckons, relying on continuous corrections by the driver. A dot is displayed on a CRT; as the car is driven, the dot moves. Maps are supplied on mylar overlays which the driver places over the CRT. The driver then adjusts knobs to move the dot to the position on the mylar map which corresponds to the location of the car. Periodically the driver has to readjust the dot to remove accumulated error in the dead reckoning. In addition, the driver has to replace map overlays whenever the car reaches the edge of the coverage area. The Honda system retails for $1300. It is considered by some to be a failure in the market; the need for continuous adjustments by the driver, the need to use map overlays, and an inadequate map data base have limited its utility.

General Motors, Ford and Chrysler each include navigation systems in their "cars of the future," and Phillips is developing a concept prototype to promote use of their compact laser disk for map data storage. These systems, like the ETAK system, offer automatic location, map displays, and destination locator functions. Ford and

Chrysler intend to use the satellite-based Global Positioning System (GPS) which is expected to be available in 1990. GM is reportedly considering systems based on GPS, Loran, and dead reckoning. Phillips is using the Transit satellite system in conjunction with dead-reckoning. Industry sources report that none of these companies has yet made a decision to develop a navigation product.

Both Ford and GM, however, will be installing CRT's in a limited number of 1984 cars. These CRT's will be used for non-essential displays such as climate control, stereo, clock, calendar, and M.P.G. If the CRT's are favorably received, the automakers may consider navigation as an additional application for CRT's in future cars.

Industry sources assume that the major automakers will eventually offer navigation systems as an option, but that it will take them three years to reach the market once they make the decision to develop such a system. Alternately, they could reduce their time to reach the market by signing an interim contract with an aftermarket manufacturer, such as the contract between GM/Delco and Bose for high-end car stereos.

Competing Vehicle Location Technologies

Several companies have produced Automatic Vehicle Location (AVL) systems. Five municipalities have installed such systems but only three are currently in operation. Because of high costs and poor performance, these systems have not yet been used in commercial applications. A brief description of competing systems follows:

Boeing. Boeing developed a dead reckoning system with rudimentary map matching. The system was inadequate to keep vehicles from getting lost. Furthermore, the navigation processing for each vehicle was done at the dispatch center, requiring nearly continuous communications. When a vehicle became lost, it took voice communications between vehicle and driver to reset vehicle location. In the mid-1970's, the Boeing system was implemented and tested by the St. Louis Police Department. It has met with mixed success and has not been implemented elsewhere.

Hazeltine. Hazeltine developed a radio navigation system using pulse trilateration. With such a system, each vehicle transmits pulses which are received at three or more locations. Vehicle locations are computed from the time of reception of the pulses at the different receive sites. In 1977, the system was implemented in one of the five Dallas police districts. The system developed equipment problems and the Police Department is uncertain of its future plans. To ETAK's knowledge, no other Hazeltine systems have been sold.

Gould (AVM Systems Inc.). Gould has developed a proximity signpost system. With this system, low level battery powered radio transmitters are distributed throughout the coverage area. Each radio transmits a unique identifying code. Each vehicle equipped with a special receiver will pick up the weak signal and report the code back to the dispatch center. The location of the vehicle is inferred by its proximity to a known radio signpost. Such systems have demonstrated their capability but are costly for accurate location within large areas (necessitating purchase and upkeep of large quantities of signposts). A signpost system was installed in 1976 in Huntington Beach, California and is still in operation. Since then, AVM Systems, Inc. has sold several other systems primarily to fixed route municipal bus fleets and to foreign governments such as Saudi Arabia.

Motorola. Motorola has announced plans to market an AVL system utilizing Loran-C, which is a government operated radio navigation system used primarily for maritime navigation. This system will require a Loran-C receiver in each vehicle. Loran-C reception is typically subject to propagation anomolies, particularly in city highrise areas. In addition, certain areas of the country are not covered by these radio signals. This product is expected to be useful for situations not requiring map displays, or location accuracy sufficient to locate vehicles on specific streets.

ETAK's Competitive Position

ETAK is applying two innovative technologies to the problems of vehicle navigation and vehicle location. The company's proprietary navigation techniques and its unique digital map database enable navigation and location products which offer a unique set of user benefits. ETAK believes its products will be seen as superior to the products of current competitors for many applications.

The NAVIGATOR provides several benefits not offered by any competing product:

1. It is the only product to accurately indicate the vehicle's current position on a moving map display.

2. It is the only product which allows a destination to be found and displayed by entering street names and addresses.

3. It is the only product which offers complete map coverage of large geographic areas.

4. It will provide more accurate location information than any competing product.

5. It is not subject to errors because of weather, radio propagation, or line-of-sight interference.

ETAK's AVL System has several competitive advantages over the other systems described:

1. It is the only system which has a street map in the vehicle showing current position.

2. It is the only system that can plot positions accurately on a street map display at the dispatch center.

3. It is the only system which can communicate destinations to the driver graphically.

4. It is the only system which determines vehicle location at the vehicle without requiring external equipment.

5. It will provide greater accuracy at a lower price than known competitors' systems.

Competitive Strategy

ETAK believes it will receive several benefits from the introduction by other manufacturers of products which compete with the NAVIGATOR and the AVL System:

- publicity and credibility for the concept
- creation of a price umbrella
- opportunity for ETAK to develop clearly differentiated products.

When viable competitors emerge, ETAK will be well positioned to maintain a leading position as a provider of vehicle navigation and location products. To achieve this, ETAK has developed the following competitive strategy:

1. Focus on applications integrating vehicle navigation and digital mapping technologies. Work with third parties to develop needed technologies outside of ETAK's area of specific expertise.

2. As appropriate, license the map database to third party software developers, publishers, and possibly to ETAK's competitors. This will generate additional revenues at a very low marginal cost, help develop an "applications library" for ETAK products, and may help establish ETAK's technology as an industry standard.

3. Retain the company's current position as a technology leader by constantly improving the initial products, and integrating new technologies as they become cost-effective. Aggressively pursue patent protection for all applicable aspects of ETAK's technology.

4. Offer a line of products to well-defined markets. While ETAK believes its products are broadly applicable, the company will focus its marketing efforts on a limited number of markets where it determines the opportunity is greatest.

5. Develop and maintain a well-trained distribution network capable of selling a line of ETAK vehicle navigation and vehicle location products.

6. Undertake an aggressive cost-reduction program to position ETAK as a low-cost manufacturer. A key element in this program will be a product redesign scheduled for mid-1985. In addition, ETAK expects to obtain cost advantages from volume production. To achieve this, the company will use product designs offering the greatest possible amount of commonality among different products.

7. Create an organization which works hard, works smart, listens to customers, and limits its activities to what it does best. Maintain an emphasis on flexibility, and make mid-course corrections as recommended by new information and a changing competitive environment.

MARKETING

ETAK will market a line of high-quality vehicle navigation and vehicle location products which offer tangible user benefits to clearly-defined customer groups. The company's marketing plan reflects inputs from a wide variety of outside sources:

- conversations with potential end-users, dealers, competitors, and industry experts;
- formal market research, including a national mail survey of 12,000 consumers, in-depth telephone interviews with 80 retailers in 6 cities, and a formal focus group;
- numerous direct marketing contacts with potential customers.

More input will be obtained in the coming months from continuing outside contacts as well as a limited market test, which is scheduled for autumn 1984.

As ETAK continues to learn from the marketplace, it will continually refine its marketing plan. In every way, the approach will be pragmatic: "try it early, improve it quickly, try it again." Even after initial testing, there will be opportunities for mid-course corrections as the company proceeds with an orderly market-by-market roll-out. This roll-out will begin in early 1985, with completion scheduled for late 1986.

Target Markets

Based on market research to date, ETAK has chosen to target five customer groups:

1. Car rental companies. There are 550,000 rental cars in the United States, 90% of which are owned by the four largest rental car companies. The ETAK NAVIGATOR will be particularly useful in rental cars, where drivers are often unfamiliar with the area in which they are driving.

   The NAVIGATOR provides a potentially strong promotional tool for rental car companies, who would use it to differentiate themselves from competitors, as well as to generate additional revenues.

2. National package delivery companies. The four largest package delivery companies operate over 40,000 delivery vehicles. National package delivery fleets represent a prime opportunity for ETAK. Pick-ups and deliveries by these vehicles are particularly time-critical, with companies competing on the basis of delivery speed.

3. Commercial users. Commercial users maintain fleets of trucks or cars which are used for delivery service and repair. Within this group of users, ETAK will focus on intra-urban applications. Commercial users can be divided into two groups:

   - Small Fleets: Small fleets are defined as having from 2 to 10 vehicles. There are 200,000 firms in the U.S. which have small vehicle fleets, for a total of 900,000 commercial vehicles.

   - Large Fleets: Fleets from 11 to 200 vehicles. There are 75,000 U.S. firms with large vehicle fleets. These fleets maintain 5,000,000 vehicles, at least half of which operate primarily in intra-urban areas.

   The high operating costs of these fleets and the highly competitive nature of many commercial fleet businesses create a substantial opportunity for ETAK, especially with vehicles involved in intra-urban pick-up and delivery (estimated at 3,000,000).

4. Business Users. Over 10,000,000 passenger cars are used for business in the United States. Field sales people comprise the largest single segment of business users. Individuals in service, delivery or repair businesses are another major group. In addition, there is a large market segment of "highly mobile business people" that can benefit from ETAK products. The customer profile in this segment is very similar to that of mobile telephone owners and potential cellular telephone owners: busy, affluent individuals for whom "time is money," and who see the economic value of increased efficiency while driving.

   This customer segment will find the NAVIGATOR a convenience item but, more importantly, will be able to cost-justify its purchase.

2. Package Delivery Companies. A large package delivery company has also committed to participation in this test. Other direct contacts have confirmed that there is an immediate market, both for the NAVIGATOR and the AVL System among package delivery fleets.

3. Commercial Users. Numerous interviews with fleet owners have indicated strong interest in ETAK products, both the NAVIGATOR and the AVL System. These products have been seen as useful across a wide range of applications, from armored car services to regional trucking companies to cement delivery companies. In addition, conversations with land mobile communications dealers and a telephone survey of these dealers have confirmed that ETAK's products are of immediate interest to those who regularly sell to commercial fleet customers.

4. Business Users. Casual conversations as well as formal research have demonstrated a high degree of interest in the ETAK NAVIGATOR among business people. A mail survey sent to 12,000 households and a focus group test both indicated a nearly universal recognition of the value of the NAVIGATOR for the business person who drives as part of his job. Likewise, conversations with land mobile dealers who presently sell mobile telephones to this customer group have indicated that the NAVIGATOR offers tangible benefits to business people, many of whom could cost-justify its purchase based on improved driving efficiency.

5. Casual Users. The mail survey mentioned above, as well as contacts with auto sound dealers, have indicated a high level of interest in the NAVIGATOR. The overwhelming majority (85%) of survey respondents were positive about the product concept. Most said they would like to own one. A smaller, but significant, number (10.5%) said they would be willing to pay over $1000 to own a NAVIGATOR. As expected, these were primarily affluent purchasers of other expensive electronics products. High-end auto sound dealers, who regularly sell $1000-$2500 auto sound systems, clearly perceive a type of customer who will buy ETAK's NAVIGATOR for reasons other than cost-justified business use.

Taken as a whole, the comments of potential end-users, dealers, and industry experts suggest an immediate market for ETAK products. Accurately quantifying this market at the present time is not possible; a great deal more will be learned in the marketing test this fall. Based on the results of this test, ETAK will reassess its current strategy and may change priorities to emphasize particular target segments.

User Benefits: The NAVIGATOR

The ETAK NAVIGATOR allows drivers to do something they do nearly every day--select a route to a particular destination--in a way which is easier, more efficient, safer, and less subject to error than current means of route selection (i.e., paper maps, verbal instructions). For anyone who has ever taken a wrong exit, been lost, or been confused by a paper map or verbal directions, the value of ETAK's product is clear.

1. Economic Benefits

ETAK products provide strong economic benefits to anyone for whom "time is money." By selecting more efficient routes, not getting lost, and not being late for important business meetings, an ETAK customer can reduce wasted time and money. British studies have shown that 4% of all driving time is wasted by people who are lost or, at least, not taking the best route to their destinations (Computerworld, pg. 7, Dec. 22, 1980).

Delivery and service fleets will receive several benefits from using ETAK's products, including increased driver productivity, reduced vehicle mileage, and reduced new driver training time.

For dispatch applications, ETAK's AVL system increases efficiency in dispatch centers, and reduces congestion of radio frequencies as well. In some cases, commercial fleets will be able to operate with fewer vehicles and lower labor costs by using ETAK products.

Car rental companies will also gain economic benefits from ETAK products. They would install NAVIGATORS primarily in high-end cars. By promoting rental cars with navigation capability, they would hope to increase use of high-end cars (for which they charge higher rates) as well as charge a premium for use of the ETAK NAVIGATOR. They could use ETAK products to differentiate themselves from competition in order to increase revenues and profits.

2. Functional Benefits

The ETAK NAVIGATOR and ETAK's map cassettes provide a number of important functional benefits which are relevant to each of the target market groups:

- faster, easier, and more convenient to use than conventional maps
- less distracting and safer to use than paper road maps, especially at night
- eliminates need for verbal directions
- reduces anxiety and frustration of taking wrong turns and getting lost
- enables selection of more efficient routes
- gives drivers more confidence to explore unfamiliar areas and take alternative routes.

3. Intangible Benefits

Beyond the economic and functional benefits listed above, ETAK's products provide some important "intangible" benefits which are important to a particular group of potential customers. The NAVIGATOR is designed to be physically attractive, and to present a graphic display unlike any available auto instrumentation. Most automobile manufacturers are currently emphasizing the appearance of new electronic dashboard displays in luxury and high-performance cars. The NAVIGATOR offers an aftermarket option in state-of-the-art electronics which is unavailable in any factory production vehicle.

User Benefits: The AVL System

The ETAK AVL System can aid dispatching in the following ways:

1. Dispatch of The Most Appropriate Vehicle. Because current vehicle location and status and the locations of destinations are simultaneously displayed, the dispatcher can quickly assimilate this information and make effective dispatch decisions.

2. Efficient Destination Instructions. When the dispatcher assigns a vehicle to a destination, that destination appears on the electronic map within the assigned vehicle. The driver immediately sees where he is and where he has to go, minimizing time lost in orientation, route selection, or finding the destination.

3. Driver Safety. When the driver of an equipped vehicle indicates he is in danger, dispatcher knowledge of his exact location can aid in responding rapidly.

4. Reduced Congestion of Voice Circuits. Crowding of voice circuits will be alleviated because automatic digital communication of position and destination information is more efficient than voice communication and because the on-vehicle map will reduce confusion and hence the need for clarification instructions.

5. Dynamic Reassignment of Vehicles. As vehicles are dispatched and their availability status changes, current knowledge of the distribution of vehicles can aid in developing more efficient vehicle assignments.

6. Enhanced Computer Aided Dispatch (CAD) Systems. Present CAD systems perform routing and accounting functions, but do not track the locations of the vehicles that are being dispatched. The capabilities of these CAD Systems will be enhanced through the addition of an ETAK AVL System.

In addition, each vehicle in a fleet using ETAK's AVL System will have all of the benefits of the stand-alone NAVIGATOR.

Pricing

ETAK's pricing strategy has the objective of maximizing company profits while maintaining orderly company growth. Initial prices have been selected which are expected to achieve this goal. The experience of a live marketing test in late summer will elicit valuable information on consumer price points which may recommend modifications to the current price schedule. The price list below shows this schedule, which is reflected in the company's current financial plan:

	Quantity	1985 Price	1986 Price
Direct Sales			
- NAVIGATOR	1-4	$ 1333	$ 1000
	5-9	5% discount	
	10-99	10% discount	
	100-999	20% discount	
	1000-4999	30% discount	
	5000 and over	40% discount	
- Map Cassettes	1-4	$ 13	$ 13
	5-9	5% discount	
	10-99	10% discount	
	100-999	20% discount	
	1000-4999	30% discount	
	5000 and over	40% discount	
- AVL Dispatch Computer	1-4	$ 35000	$35000
	5-9	10% discount	
	10 and over	20% discount	
Dealer Sales			
- NAVIGATOR	sugg. retail	$ 1333	$ 1000
	1-4	35% discount	
	5-24	40% discount	
	25 and over	40% + 5% discount	
- Map Cassettes	sugg. retail	$ 13	$ 13
	dealer price	50% discount	
- AVL Dispatch Computer	sugg. retail	$ 35000	$35000
	dealer price	35% discount	

Distribution

ETAK has established a marketing and sales organization model capable of serving each of the customer segments described above. This organization will become the distribution channel not only for the company's initial products, but for future products as well. Accordingly, the emphasis is on establishing a flexible organization oriented toward understanding and meeting the needs of a limited number of well-defined customer groups.

1. Distribution Architecture

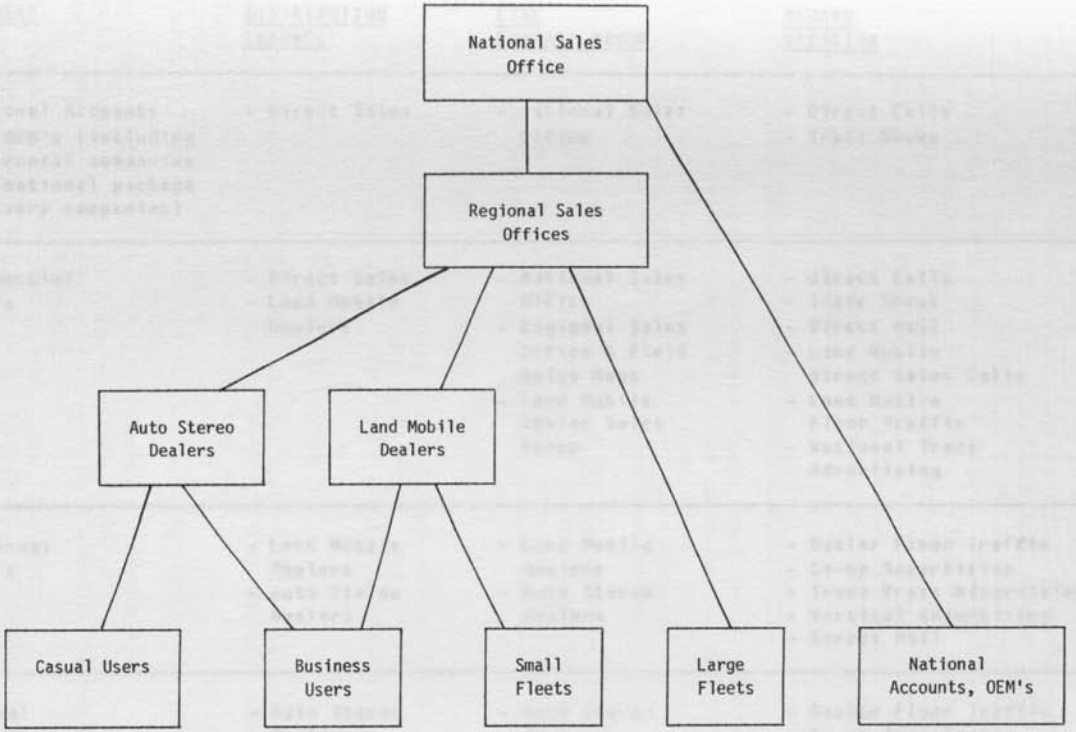
The diagram on the following page shows ETAK's distribution architecture. ETAK will maintain a national sales office and will develop seven regional offices, each with a direct field sales force. The national sales office will sell to national account customers, and explore opportunities for OE sales, foreign sales, licensing agreements, and government contracts. The field sales force will establish a network of 750-1000 dealers who will sell and install ETAK products. In addition, the field sales group will sell directly to fleets, municipalities, and branch locations of national accounts.

The diagram on page 32 shows the customer groups each element in the distribution structure will serve. ETAK will clearly define these responsibilities to help minimize cross-channel problems and potential problems which could otherwise develop between retailers and ETAK's direct field sales force.

This distribution architecture has been described to numerous industry participants, as well as to 80 dealers who were the subjects of a telephone survey. There has been almost unanimous endorsement of ETAK's distribution approach. Another positive indication regarding this approach is the ease with which dealer participants for the summer market test have been lined up.

The distribution "reach" chart on page 33 shows specifically how ETAK will address each of the targeted customer segments. In addition, it identifies the primary means of demand creation for each of these groups.

Distribution Architecture



DISTRIBUTION "REACH" CHART

SEGMENT	DISTRIBUTION CHANNEL	ETAK CONTACT GROUP	DEMAND CREATION
National Accounts and OEM's (including car rental companies and national package delivery companies)	- Direct Sales	- National Sales Office	- Direct Calls - Trade Shows
Commercial Users	- Direct Sales - Land Mobile Dealers	- National Sales Office - Regional Sales Office & Field Sales Reps - Land Mobile Dealer Sales Force	- Direct Calls - Trade Shows - Direct Mail - Land Mobile Direct Sales Calls - Land Mobile Floor Traffic - National Trade Advertising
Business Users	- Land Mobile Dealers - Auto Stereo Dealers	- Land Mobile Dealers - Auto Stereo Dealers	- Dealer Floor Traffic - Co-op Advertising - Trade Press Advertising - Vertical Advertising - Direct Mail
Casual Users	- Auto Stereo Dealers - Land Mobile Dealers	- Auto Stereo Dealers - Land Mobile Dealers	- Dealer Floor Traffic - Co-op Advertising - National Advertising

2. Advantages of One-Step Distribution

The one-step distribution architecture offers several advantages over other potential distribution approaches. With a one-step system, ETAK can maintain a much higher level of awareness and a much greater degree of control. Response time is shorter for any alignments which need to be made. Feedback from the field is significantly greater. ETAK will have a much greater ability to handle any problems which arise. Finally, close customer contact will allow ETAK to much more effectively define needed marketing corrections, product modifications, and new product development efforts.

3. Flexibility of Distribution Structure

The distribution structure described above offers a high degree of flexibility for changes in customer group priorities. The national sales office can quickly re-channel its efforts to concentrate on large customers offering the greatest potential.

The regional sales structure is appropriate for a wide range of sales priorities. If necessary, the mix of dealer and direct sales people can be altered, as can the emphasis on auto stereo and land mobile dealers.

4. Geographic Roll-out

ETAK will establish its field sales effort in a controlled city-by-city roll-out. The current marketing plan calls for the following schedule:

Launch Date	Metropolitan Areas
January 1985	Bay Area, Southern California
May 1985	New York, Northern New Jersey, Connecticut
August 1985	Balance of Far West
November 1985	Texas
December 1985	Washington, D.C., Pennsylvania, Maryland, Virginia
February 1986	Illinois, Missouri, Wisconsin
April 1986	Michigan, Ohio, Indiana
June 1986	Georgia, Florida, Alabama, Carolinas, New England
July 1986	Minnesota, Iowa, Nebraska
September 1986	Balance of Mid-West, Mountain States
December 1986	Kentucky, Louisiana, W. Virginia, Tennessee
Early 1987	All remaining rural areas

Within each area, ETAK dealer reps will set up and service auto stereo and land mobile dealers, who will retail the company's products. Direct sales reps will sell to small fleets. Regional sales managers will sell to large regional fleets. ETAK regional offices will be established in San Francisco, New York and Dallas in 1985, and in Los Angeles, Chicago and Atlanta in 1986.

5. Dealer Profiles

ETAK will sell its products through two types of dealers: land mobile communications dealers and "high-end" auto stereo dealers. Each of these dealer types has a different set of strengths and capabilities, and each addresses a different customer base:

- Land Mobile Dealers

  Land mobile dealers sell and install VHF two-way radios and mobile telephones for commercial fleet applications, as well as for use by individual business drivers. They have a customer base which includes many high-potential ETAK customers, both for the NAVIGATOR and the AVL System. These customers commonly spend $1000-$3,000 for each radio unit installed in a vehicle. Land mobile dealers have high levels of technical expertise, both in installing and servicing electronics products in vehicles.

  The larger and more sophisticated land mobile dealers generally have a small outside sales force which calls on commercial fleet customers. These sales people are familiar with "cost-justification" selling and are capable of selling both the NAVIGATOR and the AVL System.

  Land mobile dealers generally have a very low profile and do not exhibit a high level of marketing sophistication. ETAK pull-through programs will be important as an aid to the sales efforts of these dealers. ETAK will position its products as cost-justified adjuncts to land mobile communications equipment currently in use.

- Auto Stereo Dealers

Auto stereo dealers sell and install auto stereo systems and auto alarm systems, primarily for personal use in passenger vehicles. The auto stereo customer base includes a wide range of individuals who spend from $250 to $2500 for an auto stereo system. Approximately 30% of industry revenues come from sales over $1200. "High-end" dealers make a disproportionate number of these sales.

Dealers concentrating on high-end sales of this type have a great deal of familiarity with complex installations of electronics products in automobiles. They have an inside sales force which is familiar with selling the intangible benefits of quality sound and the appearance of high-end auto sound products. These dealers generate a large amount of walk-in traffic, which offers ETAK a tremendous amount of marketing exposure. With effective pull-through programs and point-of-sale programs, the NAVIGATOR should become a high visibility item in selected high-end auto stereo stores. ETAK will position the NAVIGATOR as a functional, attractive addition to other sophisticated auto electronics products.

Demand Creation

1. Advertising

ETAK has budgeted a significant advertising effort subject to testing for cost-effectiveness.

The following programs are being considered:

- advertising in trade publications read by car dealers, land mobile dealers, auto stereo dealers, fleet vehicle buyers, and mobile communications manufacturers
- co-op advertising programs for land mobile dealers and auto stereo dealers
- advertising in specialty publications directed to end-users: commercial fleet operators; owners of delivery, service and repair businesses; sales people; real estate agents; and, auto and electronics enthusiasts.

2. Promotion

A variety of promotional materials will be developed for use in sales presentations to commercial customers, for trade show exhibits, and for use by land mobile and auto stereo dealers. These will include product brochures, sales literature, and point-of-sale demonstration displays for use in retail outlets. Such displays will include a demonstration of the NAVIGATOR, simulating operation in a moving vehicle.

3. Public Relations

ETAK will contract with an outside public relations firm to generate appropriate publicity for the company and its products. This firm will be directed to reach dealers, targeted customers, and members of the investment community. Trade and general media exposure will be sought in appropriate publications, as well as on radio and television.

4. Direct Marketing

ETAK will use several direct marketing approaches to reach targeted customers:

- Sales calls by ETAK's field sales force to demonstrate the product and present a cost-justification rationale for purchasing the company's products.

- Participation in a limited number of trade shows. The largest of these are the Land Mobile Expo, the National Auto Dealers Association Show, and the Consumer Electronics Show. Smaller specialized shows include trucking industry shows and recreational vehicle shows.

- Direct mail programs oriented to small fleets and business people. Land mobile dealers have found direct mail to be an effective marketing approach, and many have extensive mailing lists of high-potential ETAK customers. Direct sales programs targeted at specific occupational groups (real estate agents, electronics sales people) will be used to pull customers into retail outlets.

Sales Objectives

ETAK has established a specific set of sales objectives which represent a realistic growth plan. The company plans to sell approximately 11,000 NAVIGATORS in 1985 and 44,000 in 1986. Specific sales objectives by customer group are shown on page 39. These are stated in terms of market penetration in the table on page 40.

These objectives are based on assumptions regarding the numbers of dealers and sales per dealer which are detailed in the "Financial Projections" section of this plan.

The potential exists for higher sales volumes if large fleet customers choose to equip a significant percentage of their vehicles with NAVIGATORS, if potential OEM or licensing agreements are concluded, or if any segment of individual drivers embraces the product and buys in significant quantities.

Sales Objectives
(Units)

	National Sales Office	Direct-Field Sales	Land Mobile Dealers	Auto Stereo Dealers	Total
1985 NAVIGATOR Sales					
National Accounts	2000	-	-	-	2000 (18%)
Commercial Users	-	1139	2056	-	3195 (28%)
Business Users	-	-	2056	1645	3701 (33%)
Casual Users	-	-	-	2468	2468 (22%)
Total	2000	1139	4112	4113	11364
1986 NAVIGATOR Sales					
National Accounts	4500	-	-	-	4500 (10%)
Commercial Users	-	3740	8912	-	12652 (29%)
Business Users	-	-	8913	7130	16043 (37%)
Casual Users	-	-	-	10695	10695 (24%)
Total	4500	3740	17825	17825	43890

Market Penetration Assumptions

	1985	1986
National Accounts and Commercial Users[1]		
Total market	6,600,000	6,600,000
NAVIGATORS sold	5,195	17,152
portion of total market	1 in 1270	1 in 385
Business Users[2]		
Total market	10,000,000	10,000,000
NAVIGATORS sold	3,701	16,043
portion of total market	1 in 2702	1 in 623
Casual Users[3]		
Total market	115,000,000	115,000,000
NAVIGATORS sold	2,468	10,695
portion of total market	1 in 46,596	1 in 10,753

Trade Penetration Assumptions

	Year End 1985	Year End 1986
Land Mobile Dealers		
total number	5,000	5,000
ETAK dealers	130	420
portion of total market	1 in 38	1 in 12
Auto Stereo Dealers		
total number	8,000	8,000
ETAK dealers	130	420
portion of total market	1 in 62	1 in 19

1/ Source: Fleet Owner magazine: Represents total class 1-8 trucks, in fleets of 2 or more vehicles, as well as rental car vehicles and national delivery vehicles.

2/ Source: Automotive Fleet magazine.

3/ Source: U.S. Passenger Car Registrations, Wards Automotive Review: represents total passenger car registrations, less passenger cars in business use.

MANUFACTURING

ETAK will develop the capability to manufacture quality products at low cost, over a wide range of potential demand levels. The company's baseline production plan calls for production of 225 NAVIGATOR units in 1984, 11,000 units in 1985, and 44,000 units in 1986. Contingency plans call for higher and lower production levels during this time period. Manufacturing will produce additional ETAK products as well: map cassettes, AVL systems, specialized NAVIGATORS for commercial fleet applications, and future products.

ETAK's products are relatively simple to manufacture. The microprocessor-based NAVIGATOR computer unit is similar to a home computer in complexity. Other parts of ETAK's unit are similar to other existing products and require no unique manufacturing capability. Contract manufacturing companies have quoted on the ETAK product and reported that they are comfortable with all aspects of its manufacture.

To meet ETAK's manufacturing objectives, several manufacturing programs have been developed:

1. Small initial production run.

   225 NAVIGATOR units will be built in 1984, beginning in August. These will be complete production units, using the same set of parts planned for larger production volumes in 1985. Likewise, all housings will be made using tools that will continue to be used in 1985. The initial production run will include a mix of NAVIGATORS with 7-inch displays and 4.5-inch displays.

   The emphasis in the initial production run will be on producing quality units, and on learning about potential production problems. Accordingly, all units will be assembled by ETAK's engineering and manufacturing staff. Board stuffing will be done by an outside contract assembly firm. Production cost will be a secondary priority during this initial production period.

During the initial production run, ETAK will assess any problems experienced, and will carefully monitor the performance of all units built. During this period, final manufacturing decisions for 1985's full-scale production will be made. Only after this is done will assembly and test equipment be ordered, and production workers be hired.

2. Flexible plans for full-scale production.

The baseline production plan for 1985 calls for 11,000 units to be completed. Under this plan, 100 units will be available for shipment in January. By year-end 1985, the company will be producing 1700 units per month. Throughout this period, ETAK will continue to use outside suppliers for board stuffing and cable assembly. ETAK will hire its own employees for final assembly and test. Use of specialized manufacturing equipment will be kept at a minimum until production volume justifies automated assembly techniques. Emphasis will be on flexibility and cost reduction, as well as on establishing a routine manufacturing process.

Two contingency plans have been developed: one for production of 6,000 units in 1985; and one for production of 30,000 units. The company believes it can efficiently manufacture products across this entire range of potential production volumes. Until demand for ETAK's products is proven, the company will make no major commitments regarding manufacturing equipment or hiring production workers. On an ongoing basis, the company will use outside services to cope with any short-term needs for high-volume production.

3. Use of outside manufacturing where appropriate.

ETAK will continually evaluate the alternatives of outside manufacturing for all aspects of its products, including local and off-shore contract assembly.

Initially, printed circuit board stuffing will be done through a local contract assembly house. Wheel sensors will be completely manufactured outside to ETAK's specifications. Cassette tapes will be manufactured and recorded for ETAK by a cassette tape manufacturer.

ETAK is currently receiving bids for off-shore manufacturing of the 7-inch and 4.5-inch display units, as well as the tape drive. It is possible that units produced off-shore could be shipped as early as May 1985. If this is done, ETAK would continue for some time to manufacture the computer unit in-house in order to retain control of the manufacturing process for this most complex part of the product.

After a final design has been established, and all production problems solved, the company will consider off-shore production of the computer unit as well. If this is done, ETAK will maintain a small local production facility in order to develop improved manufacturing procedures, to identify and solve any production problems which arise with design changes, and to enable the rapid introduction of new products. Commercial products would likely continue to be manufactured domestically.

4. Aggressive cost reduction program.

Beginning in 1985, ETAK will implement an aggressive cost reduction program. By January 1986, unit costs for the NAVIGATOR should be reduced from $375 to $257. The cost reductions will be achieved by a combination of factors: a simplified product design for the computer unit, improved efficiency in in-house production, off-shore manufacturing of the display and tape units, and price breaks on component parts because of volume purchases.

The simplified product design involves the use of semi-custom integrated circuits and an enhanced microprocessor, which will reduce the component parts count significantly. ETAK's engineering group will begin work on the new product design

in early 1985, after the performance results from the units produced in 1984 have been analyzed. The new low-cost product will be available for testing in November, and is planned for volume production beginning in January 1986.

The table on the next page details ETAK's current production cost estimates. ETAK may be able to achieve earlier, smaller-scale cost reductions in May or June 1985 as it utilizes off-shore manufacturing for the display and tape units. Depending on production volumes, ETAK may receive quantity discounts on component part orders during this time period as well.

Product Cost Estimates

	1984	1985	1986[b]
QUANTITY	200	11,000	44,000
Electronics[a]	$262	$225	$150
Display	68	55	35
Cassette	53	40	30
Compass	3	3	3
CPU Housing	26	17	14
Wheel Sensor	9	6	6
Labor	47	29	19
	$468	$375	$257
Manufacturing OH		37	15
		$412	$272

(a) The electronics for the display and cassette unit are priced in the individual unit.

(b) The 1986 product includes several design and manufacturing changes:

1. Use 80188 to replace 8088 and support chips.
2. Use semi-custom IC's to reduce part count and number of printed circuit boards.
3. Have display manufactured off-shore.
4. Have cassette unit manufactured off-shore.
5. Use automated test equipment for printed circuit board testing.
6. Use auto insertion of printed wire assemblies.

5. Manufacturing Information System

ETAK is in the final stages of implementing an on-line business information system (NCA Maxcim). This system will provide information relative to all aspects of manufacturing, including manufacturing engineering, materials management, production control, and inventory control. ETAK will benefit in several ways from this system. Benefits will include economies in purchasing, efficiencies in production, lowered inventory costs, and increased control of the entire production process.

6. Plans For Other Products.

ETAK will develop manufacturing plans in 1985 for the AVL System, as well as other potential products. None of these products offer any particular difficulties in production.

The AVL System will be comprised mainly of off-the-shelf hardware from other manufacturers (microcomputer, display, modem). ETAK will provide only specialized software for these systems. These systems will, however, require a specialized NAVIGATOR with an integrated communication interface. Manufacturing requirements for this product are essentially the same as for the basic NAVIGATOR.

Most future products currently being assessed have similar manufacturing requirements to ETAK's initial products. These products may include a different type of CRT, or a different set of electronic components, but would essentially require the same manufacturing process. Possible exceptions are specialized products for the military. ETAK will assess whether military orders justify the potential requirements of manufacturing to military specifications. Alternatives include using outside contractors to manufacture specialized military products.

PRODUCT DEVELOPMENT

The vehicle navigation, display and digital map technologies developed at ETAK are being applied to new product concepts which have significant commercial and military market potential.

Government and Military Products

Contacts with the Defense Advance Research Project Agency (DARPA), the Army's Office of Command, Control, Communications and Intelligence (C^3I), and the Army Science Board have indicated numerous applications for ETAK's NAVIGATOR and AVL products directly or with suitable modifications. Application areas include:

- on-base and off-base driver assistance;
- foreign territory driver assistance;
- tactical communications for tanks, mobile armament and combat vehicles;
- Autonomous Vehicle Program;
- registration of Global Positioning Satellite (GPS) navigation onto a map data base; and
- trip recorders.

Government and military customers offer long-term potential as ETAK customers. Contact with the following government organizations have generated substantial interest:

1. Department of Defense
   - Office of the Assistant Secretary of the ARMY (Research, Development and Acquisition)
   - Material Development and Readiness Command (DARCOM)
   - Army Development and Employment Agency (ADEA)
   - Defense Advanced Research Projects Agency (DARPA), Information Processing Technical Office (IPTO)

2. Department of Justice

- National Institute of Justice
- Federal Bureau of Investigation (FBI)
- Drug Enforcement Agency (DEA)

Map Data Base Products

There is a rapidly emerging business in the field of digital map data base production and application. The ETAK data base will be the most accurate and complete digital map data base available for the U.S., and will have applications beyond vehicle navigation:

- Map publishing. High quality paper maps such as those made by AAA or Rand McNally could be automatically plotted from digital data base information. Maps for special purposes could be produced quickly and easily.
- As a base for specialized maps. The ETAK data base could be extended, on contract, to engineering firms, utilities, and public works departments to cover particular cities in great detail showing locations of property and equipment owned or maintained by these organizations.
- Geocoding. Geocoding is the assignment of geographic codes, like city, county, zip code, and census tract, to particular addresses. Geocoding makes the data base appropriate for sale to the Census Bureau, and useful for planning and thematic mapping.
- Planning and research applications. The data base could be used to optimally configure police beats, school service areas, sales territories, and determine desirable retail business locations.
- Thematic mapping. The data base could be used as a base that shows important features, highways, and shorelines on a thematic map. Thematic maps might be used to show income by zip code, or family size by census tract, for example.
- Routing. An accurate digital roadmap is necessary to determine optimal routes for companies having fleets of trucks. Computerized routing programs would use ETAK's digitized map data base for determining these routes.

- Yellow pages map data base. A digital map data base could be used in conjunction with the presently available yellow pages data base to offer a service showing yellow pages information tied to locations. For example, one could choose to see only the six closest locksmiths, rather than all of the locksmiths listed in a yellow pages area.

In addition to these applications, ETAK is discussing direct licensing of the data base to the U.S. Bureau of the Census.

Product Enhancements

ETAK will continually examine potential product enhancements and study appropriate technologies for inclusion in its products. Future ETAK products will use color CRT's and may eventually incorporate flat panel displays. Voice input and output are also being considered. The NAVIGATOR could warn the driver of upcoming turns, and the driver could zoom the display in and out by voice command.

The method used for data storage will undoubtedly change. Currently, ETAK uses a cassette for data storage, which is presently the only cost-effective approach. However, when a different storage technology offers superior reliability, density, and cost, it will be incorporated. Storage methods which may become appropriate include optical cards and disks.

New navigation technologies are also under consideration. For special applications in survey or off-road travel, it may be appropriate to include a Global Positioning System (GPS) receiver in an ETAK product.

Other Product Concepts

In addition to the ETAK NAVIGATOR and AVL System, other product concepts are currently being assessed:

1. Cellular Telephone AVL System. ETAK's AVL Syste could be modified to use cellular telephone communications instead of mobile radio. Discussions have been initiated with one of the large cellular licensees about implementing the AVL communication function as a new service to be offered by cellular system operators.

2. Integrated Navigator/Cellular Telephone. The addition of a cellular telephone could greatly enhance the capabilities of a navigation system for individual drivers. In an integrated system, the NAVIGATOR would serve as the control head for the telephone, using the same keys and display. A car equipped with a cellular telephone, a keyboard, and a NAVIGATOR would essentially have a computer terminal aboard. A secretary could leave a message on the display in a vehicle. Alternately, the salesman could access customer information and enter orders by logging into a computer at his company.

   Future versions of the NAVIGATOR could store commonly used numbers, and possibly dial by voice command. In addition, the cellular radio could be used by the NAVIGATOR to access data base services offering information on either traffic conditions or yellow pages information. The NAVIGATOR would display this information on its CRT.

3. Trip Recorder. A trip recorder could be added to the NAVIGATOR which would record vehicle parameters (RPM, speed, etc.) as well as the vehicle's time/location track. Trip recorders for commercial fleets (without location track recording capabilities) are presently manufactured by several companies. Only ETAK can provide a location track recording capability which would be useful for billing and driver supervision functions.

4. Locator. Another product being assessed is an inexpensive computer/graphics display terminal for the counter-top. This product would have a map display like the NAVIGATOR's, but would have no navigation capability. In its simplest form it would offer the capability to find specific locations, much like the NAVIGATOR's destination function. An inexpensive printer could be tied to the locator which would allow users to generate a paper map of a specific area showing specific locations. Examples of applications are:

   - Destination Aid: The basic NAVIGATOR destination function applied to non-vehicle situations.

- Yellow Pages: When you want to know the closest store.

- Travel Agencies: To solve the problem of locating a convenient hotel close to a given location in some unfamiliar city.

- Realtors: To provide an up-to-date map showing the locations of selected listings.

5. Specialized Software. Specialized software cassettes could be developed to provide applications beyond those offered by the NAVIGATOR and ETAK's map cassettes. One set of these would be map-related. Examples include:

   - Realtors' map which includes MLS listings.

   - Truckers' map which indicates streets accessible to large trucks.

   - Restaurant guide which describes local restaurants and indicates their position on a map.

   - Tour guide which indicates and describes points of interest.

   Another type of software could use the capabilities of the NAVIGATOR and its sensors, but would not be map-related. For example:

   - Performance monitoring cassettes which would provide graphic displays of vehicle performance parameters for use by auto enthusiasts.

   - Maintenance schedule software which would prompt drivers for routine maintenance, and keep a log of a vehicle's maintenance history.

   - Business expense report cassettes which would automatically log business mileage, and keep track of other on-the-road business expenses incurred by a driver.

   Eventually, ETAK expects outside software developers to create this type of software. ETAK will establish a licensing program to encourage this. Initially, ETAK may develop some software in-house if necessary to provide additional capabilities for owners of ETAK products.

FINANCIAL PROJECTIONS

Assumptions

1. Gross Revenue - Based on assumptions shown in sales forecast. Critical assumptions are as follows:

   - initial dealer stocking order of 10 units;
   - re-orders at rate of 5 per month, beginning in second month;
   - 17 NAVIGATOR units sold each month by each direct sales person;
   - 1 AVL system sold every 3 months (at $21,000) by each direct sales person;
   - 1985 prices for dealer sales:
     40% off $1333 = $800;
   - 1985 prices for direct sales:
     20% off $1333 = $1067;
   - 1986 prices for dealer sales:
     40% off $1000 = $600;
   - 1986 prices for direct sales:
     20% off $1000 = $800;
   - Cassette unit sales assume that each NAVIGATOR sale will generate three cassette sales (at $5 each) in year 1, two in year 2, and two in year 3. Commercial customers will buy one cassette in year 1, one in year 2, and one in year 3.

2. Discounts - Assumes a 2% cash discount is offered, which is applied to 25% of NAVIGATOR, cassette, and AVL revenues.

3. Bad Debts - Assumes 1% uncollectible bad debts for NAVIGATOR, cassette, and AVL revenues.

4. Cost of Goods Sold - Costs will be reduced over time because of: product modifications for cost reduction, purchasing efficiencies from increased volumes, production efficiencies from manufacturing experience, and a decrease in manufacturing overhead as a percentage of unit manufacturing costs. Specific cost assumptions are as follows:

- NAVIGATOR	
1984	$ 468
1985	$ 375
1986	$ 257
- Cassettes	$ 2
- AVL Systems	$12,600

5. Warranty Costs - Assumes 2% of NAVIGATOR and AVL Systems sales will cover total cost of service, repair, and replacement of defective units covered by warranty. These costs are treated as part of the cost of goods sold.

6. Operating Expenses - Expense assumptions through 1985 are based on detailed departmental operating plans and budgets. In 1986, marketing expenses are determined in the same manner. Other departments are budgeted to grow at rates of 2.5-5% per month.

7. Interest Income - Assumes 8% annual interest received on all cash and investments maintained.

8. Taxes - Assumes 10% state income tax paid from initial month of profitability, beginning in the first profitable year. Assumes 36% federal income tax paid after tax loss carry-forward is depleted. Taxes assumed to be paid one month after they are incurred.

9. Lease Payments - Assumes use of lease lines for all capital equipment needs. Lease terms for MasterLease and Behr lines include a 10% deposit and a rate of $22 per $1000 of leased equipment per month on a five-year lease. Lease terms for InterLease assume a 3-year lease, with payments of $31.50 per $1000 per month. This lease requires ETAK to maintain a 25% interest-bearing cash security deposit based on the outstanding amount of the lease. The security deposit requirement is released after three quarters of profitability.

10. Accounts Receivable - Assumes receivables will be collected in an average of 60 days.

11. Accounts Payable - Assumes operating expenses are paid in an average of 15 days. Assumes non-expense items are paid in the month in which they are incurred. Assumes inventory purchases are paid in 30 days.

12. Inventory, Labor and Overhead - Assumes materials purchases and contract assembly charges are incurred 75 days prior to sale of products in 1985, and 60 days prior to product sale in 1986. Assumes labor expense is incurred and paid 45 days prior to product sale. Assumes manufacturing overhead is paid in the same month as product sale.

SUMMARY FINANCIAL PROJECTIONS
($Thousands)

	1984	1985	1986
Pro Forma Income Statement			
Net Revenue	$200	$10154	$ 28965
Cost of Goods Sold	92	5107	13515
Gross Margin	108	5047	15450
Operating Expenses:			
Engineering	918	1348	2199
Digital Mapping	370	654	835
Manufacturing Start-up	211	0	0
Marketing	293	2431	6783
Finance/Administration	555	742	1109
Total Operating Expenses	2347	5175	10926
Operating Income	(2239)	(128)	4524
Interest Income	111	133	82
Reserve	(500)	(500)	(1000)
Pre-Tax Income	(2628)	(495)	3606
Taxes	0	0	(368)
Net Income	(2628)	(495)	3238
Cumulative Net Income	(3091)	(3586)	(348)
Cash Flow			
Sales Receipts	$ 65	$6954	$25715
Operating Expenses	(2262)	(5023)	(10650)
Non-Operating Items	(752)	(915)	(1829)
Inventory	(205)	(5287)	(12180)
Total Cash Flow	(3154)	(4271)	1056
Cumulative Cash Flow	(3606)	(7877)	(6821)
Capital Requirements			
New Capital Required	$5000	$2500	$ 0
Cumulative Capital Invested	6100	8600	8600

5-1-84 BASELINE PLAN
SALES FORECAST

	JAN 1984	FEB 1984	MAR 1984	APR 1984	MAY 1984	JUN 1984	JUL 1984	AUG 1984	SEP 1984	OCT 1984	NOV 1984	DEC 1984
SALES PLAN (DEALERS)												
REGIONS										MARKET TEST		
DEALERS												
new dealers										6	0	0
total dealers										6	6	6
UNIT SALES												
stocking										60	0	0
re-order										0	50	50
TOTAL UNITS										60	50	50
REVENUE												
stocking										48000	0	0
re-order										0	40000	40000
TOTAL REVENUE										48000	40000	40000
SALES PLAN (DIRECT)												
UNIT SALES												
direct field sales										15	25	25
auto rental fleets										0	0	0
nat'l accounts										0	0	0
OEM accounts										0	0	0
int'l sales										0	0	0
TOTAL UNITS										15	25	25
REVENUE										16005	26675	26675
TOTAL UNIT SALES										75	75	75
CUM UNIT SALES										75	150	225
CASSETTE UNIT SALES										135	125	125
TOTAL REVENUE--NAVIGATOR										64005	66675	66675
OTHER REVENUE												
cassettes										810	750	750
AVL systems										0	0	0
map data base										0	0	0
licensing										0	0	0
gov't contracts										0	0	0
										810	750	750
TOTAL ETAK REVENUE										64815	67425	67425
CUM ETAK REVENUE										64815	132240	199665

5-1-84 BASELINE PLAN
SALES FORECAST

	JAN 1985	FEB 1985	MAR 1985	APR 1985	MAY 1985	JUN 1985	JUL 1985	AUG 1985	SEP 1985	OCT 1985	NOV 1985	DEC 1985
SALES PLAN (DEALERS)												
REGIONS	1 SF	1	1	1	2 NY	2	2	2	2	2	3 Houston	3
DEALERS												
new dealers	4	10	15	15	20	20	20	30	30	30	30	30
total dealers	10	20	35	50	70	90	110	140	170	200	230	260
UNIT SALES												
stocking	40	100	150	150	200	200	200	300	300	300	300	300
re-order	60	50	100	175	250	350	450	550	700	850	1000	1150
TOTAL UNITS	100	150	250	325	450	550	650	850	1000	1150	1300 85 TOT	1450 8225
REVENUE												
stocking	32000	80000	120000	120000	160000	160000	160000	240000	240000	240000	240000	240000
re-order	48000	40000	80000	140000	200000	280000	360000	440000	560000	680000	800000	920000
TOTAL REVENUE	80000	120000	200000	260000	360000	440000	520000	680000	800000	920000	1040000 85 TOT	1160000 6560000
SALES PLAN (DIRECT)												
UNIT SALES												
direct field sales	0	17	17	68	68	102	102	136	136	136	153	204
auto rental fleets	0	0	150	150	150	150	150	150	150	150	150	150
nat'l accounts	0	0	0	0	0	0	50	50	100	100	100	100
OEM accounts	0	0	0	0	0	0	0	0	0	0	0	0
int'l sales	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL UNITS	0	17	167	218	218	252	302	336	386	386	403 85 TOT	454 3139
REVENUE	0	18139	138139	192556	192556	228834	268834	305112	345112	345112	363251	417668
TOTAL UNIT SALES	100	167	417	543	668	802	952	1186	1386	1536	1703 85 TOT	1904 11364
CUM UNIT SALES	325	492	909	1452	2120	2922	3874	5060	6446	7982	9685	11589
CASSETTE UNIT SALES	200	317	667	868	1118	1352	1702	2186	2636	3011	3453	3904
TOTAL REVENUE--NAVIG	80000	138139	338139	452556	552556	668834	788834	985112	1145112	1265112	1403251 85 TOT	1577668 9395313
OTHER REVENUE												
cassettes	1200	1902	4002	5208	6708	8112	10212	13116	15816	18066	20718	23424
AVL systems	0	0	0	0	0	0	0	0	60000	60000	67500	90000
map data base	0	0	0	0	0	0	0	0	0	0	0	0
licensing	0	0	0	0	0	0	0	100000	100000	100000	100000	100000
gov't contracts	0	0	0	0	0	0	0	0	0	0	0	0
	1200	1902	4002	5208	6708	8112	10212	113116	175816	178066	188218	213424
TOTAL ETAK REVENUE	81200	140041	342141	457764	559264	676946	799046	1098228	1320928	1443178	1591469 85 TOT	1791092 10500962
CUM ETAK REVENUE	280865	420906	763047	1220811	1780075	2457021	3256067	4354295	5675223	7118401	8709870	10500962

5-1-84 BASELINE PLAN
SALES FORECAST

SALES PLAN (DEALERS)	JAN 1986	FEB 1986	MAR 1986	APR 1986	MAY 1986	JUN 1986	JUL 1986	AUG 1986	SEP 1986	OCT 1986	NOV 1986	DEC 1986
REGIONS	4 LA	5 Chicago	5	5	5	6 Atlanta	6	6	6	6	6	6
DEALERS												
new dealers	30	40	40	50	50	50	50	50	50	50	50	50
total dealers	290	330	370	420	470	520	570	620	670	720	770	820
UNIT SALES												
stocking	300	400	400	500	500	500	500	500	500	500	500	500
re-order	1300	1450	1650	1850	2100	2350	2600	2850	3100	3350	3600	3850
TOTAL UNITS	1600	1850	2050	2350	2600	2850	3100	3350	3600	3850	4100 86 TOT	4350 35650
REVENUE												
stocking	180000	240000	240000	300000	300000	300000	300000	300000	300000	300000	300000	300000
re-order	780000	870000	990000	1110000	1260000	1410000	1560000	1710000	1860000	2010000	2160000	2310000
TOTAL REVENUE	960000	1110000	1230000	1410000	1560000	1710000	1860000	2010000	2160000	2310000	2460000 86 TOT	2610000 21390000
SALES PLAN (DIRECT)												
UNIT SALES												
direct field sales	221	238	255	272	289	289	306	374	374	374	374	374
auto rental fleets	200	200	200	200	250	250	250	250	300	300	300	300
nat'l accounts	120	120	120	120	120	120	130	130	130	130	130	130
OEM accounts	0	0	0	0	0	0	0	0	0	0	0	0
int'l sales	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL UNITS	541	558	575	592	659	659	686	754	804	804	804 86 TOT	804 8240
REVENUE	368800	382400	396000	409600	453200	453200	472800	527200	557200	557200	557200	557200
TOTAL UNIT SALES	2141	2408	2625	2942	3259	3509	3786	4104	4404	4654	4904 86 TOT	5154 43893
CUM UNIT SALES	13730	16138	18763	21705	24964	28473	32259	36363	40767	45421	50325	55479
CASSETTE UNIT SALES	4491	5275	6092	6985	7827	8611	9538	10640	11690	12715	13757	14808
TOTAL REVENUE--NAVIG	1328800	1492400	1626000	1819600	2013200	2163200	2332800	2537200	2717200	2867200	3017200 86 TOT	3167200 27082000
OTHER REVENUE												
cassettes	26946	31650	36552	41910	46962	51666	57228	63840	70140	76290	82542	88848
AVL systems	97500	105000	112500	120000	127500	127500	135000	165000	165000	165000	165000	165000
map data base	0	0	0	0	0	0	0	0	0	0	0	0
licensing	0	0	0	0	0	0	0	0	0	0	0	0
gov't contracts	0	0	0	0	0	0	0	0	0	0	0	0
	124446	136650	149052	161910	174462	179166	192228	228840	235140	241290	247542	253848
TOTAL ETAK REVENUE	1453246	1629050	1775052	1981510	2187662	2342366	2525028	2766040	2952340	3108490	3264742 86 TOT	3421048 29406574
CUM ETAK REVENUE	11954208	13583258	15358310	17339820	19527482	21869848	24394876	27160916	30113256	33221746	36486488	39907536

5-1-84 BASELINE PLAN

PRO-FORMA FINANCIALS	JAN 1984	FEB 1984	MAR 1984	APR 1984	MAY 1984	JUN 1984	JUL 1984	AUG 1984	SEP 1984	OCT 1984	NOV 1984	DEC 1984
PRO-FORMA INCOME STATEMENT												
REVENUE												
navigator	0	0	0	0	0	0	0	0	0	64005	66675	66675
cassettes	0	0	0	0	0	0	0	0	0	810	750	750
AVL systems	0	0	0	0	0	0	0	0	0	0	0	0
map data base	0	0	0	0	0	0	0	0	0	0	0	0
licensing	0	0	0	0	0	0	0	0	0	0	0	0
gov't contracts	0	0	0	0	0	0	0	0	0	0	0	0
GROSS REVENUE	0	0	0	0	0	0	0	0	0	64815	67425	67425
											1984 TOT	199665
less discounts	0	0	0	0	0	0	0	0	0	0	0	0
less bad debts	0	0	0	0	0	0	0	0	0	0	0	0
NET REVENUES	0	0	0	0	0	0	0	0	0	64815	67425	67425
											1984 TOT	199665
COST OF GOODS SOLD												
navigator	0	0	0	0	0	0	0	0	0	35100	28125	28125
cassettes	0	0	0	0	0	0	0	0	0	270	250	250
AVL systems	0	0	0	0	0	0	0	0	0	0	0	0
map data base	0	0	0	0	0	0	0	0	0	0	0	0
gov't cont.	0	0	0	0	0	0	0	0	0	0	0	0
manufacturing OH												
warranty accrual									0	1280	1334	1334
TOTAL CGS	0	0	0	0	0	0	0	0	0	35370	28375	28375
											1984 TOT	92120
GROSS MARGIN	0	0	0	0	0	0	0	0	0	29445	39050	39050
											1984 TOT	107545
OPERATING EXPENSES												
engineering	41805	67088	73030	74563	75563	88021	88021	77021	77021	85209	85209	85209
digital mapping	24645	14645	19095	20745	31525	36879	36879	36979	36979	36979	37179	37179
mfg. startup	7688	7188	9104	9604	16354	15854	17771	17771	22221	27971	29971	30367
marketing	3354	7454	12554	15667	15979	16979	34375	34375	34375	29292	29292	59521
finance & admin.	52780	32780	37802	54702	37163	41343	52255	45582	52076	48942	49473	50023
TOTAL EXPENSES	130271	129155	151585	175281	176584	199077	229301	211728	222672	228392	231123	262298
											1984 TOT	2347467
OPERATING INCOME	-130271	-129155	-151585	-175281	-176584	-199077	-229301	-211728	-222672	-198947	-192073	-223248
											1984 TOT	-2239922
INTEREST EXPENSE												
INTEREST INCOME	4507	3550	2592	1439	162	18628	16574	14547	12524	10496	8210	18773
RESERVE					-62500	-62500	-62500	-62500	-62500	-62500	-62500	-62500
PRE-TAX INCOME	-125764	-125605	-148994	-173842	-238922	-242949	-275226	-259681	-272648	-250952	-246362	-266975
											1984 TOT	-2627920
TAXES	0	0	0	0	0	0	0	0	0	0	0	0
NET INCOME (FORECAST	-125764	-125605	-148994	-173842	-238922	-242949	-275226	-259681	-272648	-250952	-246362	-266975
NET INCOME (ACTUAL)	-115500	-125277	-135077									
VARIANCE	10264	328	13917	173842	238922	242949	275226	259681	272648	250952	246362	266975
CUM NET INCOME	-578886	-704163	-839240	-1013082	-1252004	-1494953	-1770179	-2029860	-2302508	-2553460	-2799822	-3066797
	(actual)	(actual)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)
											NI 84 TOT	-2627920
CUM PRE-TAX INCOME	-589150	-714755	-863748	-1037590	-1276512	-1519461	-1794687	-2054368	-2327017	-2577968	-2824330	-3091306

5-1-84 BASELINE PLAN

NON-EXPENSE PAYMENTS	JAN 1984	FEB 1984	MAR 1984	APR 1984	MAY 1984	JUN 1984	JUL 1984	AUG 1984	SEP 1984	OCT 1984	NOV 1984	DEC 1984
ASSIGNED TO LEASE LINE												
Behr	269000	269000	269000	281000	281000	281000	281000	281000	281000	281000	281000	281000
Masterlease	47000	47000	47000	47000	47000	47000	47000	47000	47000	47000	47000	47000
Interlease	0	0	0	0	157682	251048	256348	283908	413228	555938	635998	647498
LEASE DEPOSITS	0	0	0	3200	0	0	0	0	0	0	0	0
EQUIPMENT PURCHASES	0	0	39750	18974	-37524	1065	8500	1065	2000	20000	80000	15000
LEASE PAYMENTS	7093	7093	7093	7357	12324	15265	15432	16300	20374	24869	27391	27753
INTEREST & OTHER EXPENSES								11700	11700			
TOTAL	7093	7093	46843	29531	-25200	16330	23932	29065	34074	44869	107391	42753
											1984 TOT	363774
CASH FLOW PROJECTION												
EQUITY INVESTMENT					3000000						2000000	
SALES RECEIPTS	0	0	0	0	0	0	0	0	0	0	0	64815
											84 TOT	64815
CASH FROM OPERATIONS	-111223	-129713	-140370	-163433	-175932	-187830	-214189	-220515	-217200	-225532	-229757	-246710
											84 TOT	-2262405
NON-OPERATING CASH	-2586	-3543	-44251	-28092	-37138	-60202	-69858	-77018	-84050	-96873	-161681	-86480
											84 TOT	-751772
INVENTORY PURCHASES	0	0	0	0	-17000	-60000	-20000	0	0	-9375	-16900	-45106
OTHER MFG CHARGES												
direct labor	0	0	0	0	0	0	0	-3000	-3000	-6000	-6000	-6000
contract assembly	0	0	0	0	0	0	0	-3000	0	-5000	-1250	-3338
	0	0	0	0	0	0	0	-6000	-3000	-11000	-7250	-9338
											84 TOT	-204969
CASH FLOW PROJ.	-113808	-133256	-184621	-191525	-230070	-308032	-304046	-303532	-304250	-342781	-415588	-322819
											1984 TOT	-3154330
ACTUAL CASH FLOW	-143588	-143741	-172964									
VARIANCE	-29780	-10485	11657	191525	230070	308032	304046	303532	304250	342781	415588	322819
CUM CASH FLOW	-566604	-710345	-883309	-1074834	-1304905	-1612937	-1916983	-2220516	-2524766	-2867546	-3283134	-3605953
CASH BALANCE	532496 (actual)	388755 (actual)	215791 (actual)	24266 (proj.)	2794775 (proj.)	2486163 (proj.)	2182117 (proj.)	1878584 (proj.)	1574334 (proj.)	1231554 (proj.)	2815966 (proj.)	2493147 (proj.)
LEASE SECURITY DEP.	0	0	0	0	39421	62762	64087	70977	103307	138985	159000	161875
AVAILABLE CASH	532496	388755	215791	24266	2754775	2423401	2118030	1807607	1471027	1092569	2656966	2331272

5-1-84 BASELINE PLAN

PRO-FORMA FINANCIALS	JAN 1985	FEB 1985	MAR 1985	APR 1985	MAY 1985	JUN 1985	JUL 1985	AUG 1985	SEP 1985	OCT 1985	NOV 1985	DEC 1985
PRO-FORMA INCOME STATEMENT												
REVENUE												
navigator	80000	138139	338139	452556	552556	668834	788834	985112	1145112	1265112	1403251	1577668
cassettes	1200	1902	4002	5208	6708	8112	10212	13116	15816	18066	20718	23424
AVL systems	0	0	0	0	0	0	0	0	60000	60000	67500	90000
map data base	0	0	0	0	0	0	0	0	0	0	0	0
licensing	0	0	0	0	0	0	0	100000	100000	100000	100000	100000
gov't contracts	0	0	0	0	0	0	0	0	0	0	0	0
GROSS REVENUE	81200	140041	342141	457764	559264	676946	799046	1098228	1320928	1443178	1591469	1791092
											1985 TOT	10301297
less discounts	-406	-700	-1711	-2289	-2796	-3385	-3995	-4991	-6105	-6716	-7457	-8455
less bad debts	-812	-1400	-3421	-4578	-5593	-6769	-7990	-9982	-12209	-13432	-14915	-16911
NET REVENUES	79982	137940	337009	450898	550875	666792	787060	1083255	1302614	1423030	1569097	1765726
											1985 TOT	10154278
COST OF GOODS SOLD												
navigator	37500	62625	156375	203625	250500	300750	357000	444750	519750	576000	638625	714000
cassettes	400	634	1334	1736	2236	2704	3404	4372	5272	6022	6906	7808
AVL systems	0	0	0	0	0	0	0	0	24000	24000	27000	36000
map data base	0	0	0	0	0	0	0	0	0	0	0	0
gov't cont.	0	0	0	0	0	0	0	0	0	0	0	0
manufacturing OH	31517	33433	38267	38267	42142	42142	42642	44292	44792	45292	45792	49646
warranty accrual	1600	2763	6763	9051	11051	13377	15777	19702	24102	26502	29415	33353
TOTAL CGS	71017	99455	202738	252679	305929	358972	418822	513116	617916	677816	747738	840807
											1985 TOT	5107005
GROSS MARGIN	8965	38485	134270	198219	244946	307819	368238	570139	684698	745214	821359	924918
											1985 TOT	5047272
OPERATING EXPENSES												
engineering	90709	91709	104167	104167	104167	105167	121000	121000	121000	122000	131584	131584
digital mapping	40179	48429	51783	51783	51783	57137	57137	59054	59054	59054	59054	59054
mfg. startup	0	0	0	0	0	0	0	0	0	0	0	0
marketing	128767	101397	121143	137058	184766	172873	225941	227329	241224	280231	309508	305113
finance & admin.	53543	55613	53571	54267	54998	57205	73016	63873	66215	67173	68188	70702
TOTAL EXPENSES	313198	297147	330664	347274	395714	392382	477095	471256	487493	528458	568333	566453
											1985 TOT	5175466
OPERATING INCOME	-304232	-258662	-196393	-149055	-150768	-84562	-108857	98883	197205	216757	253026	358465
											1985 TOT	-128194
INTEREST EXPENSE												
INTEREST INCOME	16621	14017	10850	7315	20285	16794	14064	11147	8278	5755	4527	3923
RESERVE	-41667	-41667	-41667	-41667	-41667	-41667	-41667	-41667	-41667	-41667	-41667	-41667
PRE-TAX INCOME	-329278	-286312	-227211	-183407	-172150	-109435	-136460	68363	163816	180845	215886	320722
											1985 TOT	-494621
TAXES	0	0	0	0	0	0	0	0	0	0	0	0
NET INCOME (FORECAST	-329278	-286312	-227211	-183407	-172150	-109435	-136460	68363	163816	180845	215886	320722
NET INCOME (ACTUAL)												
VARIANCE	329270	286312	227211	183407	172150	109435	136460	-68363	-163816	-180845	-215886	-320722
CUM NET INCOME	-3396076	-3682387	-3909598	-4093006	-4265155	-4374591	-4511051	-4442688	-4278872	-4098027	-3882141	-3561419
	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)
											NI 85 TOT	-494621
CUM PRE-TAX INCOME	-3420584	-3706895	-3934106	-4117514	-4289663	-4399099	-4535559	-4467196	-4303380	-4122535	-3906649	-3585927

5-1-84 BASELINE PLAN

NON-EXPENSE PAYMENTS	JAN 1985	FEB 1985	MAR 1985	APR 1985	MAY 1985	JUN 1985	JUL 1985	AUG 1985	SEP 1985	OCT 1985	NOV 1985	DEC 1985
ASSIGNED TO LEASE LINE												
Rent	281000	281000	281000	281000	281000	281000	281000	281000	281000	281000	281000	281000
Masterlease	47000	47000	47000	47000	47000	47000	47000	47000	47000	47000	47000	47000
Interlease	660208	661798	921498	934208	933743	935333	1001583	1001583	1003173	1034973	1061473	1061473
LEASE DEPOSITS	0	0	0	0	0	0	0	0	0	0	0	0
EQUIPMENT PURCHASES	4250	0	0	4250	99045	0	0	0	0	0	0	0
LEASE PAYMENTS	28154	28204	36384	36785	36770	36820	38907	38907	38957	39959	40793	40793
INTEREST & OTHER EXPENSES												
TOTAL	32404	28204	36384	41035	135815	36820	38907	38907	38957	39959	40793	40793
											1985 TOT	548977
CASH FLOW PROJECTION												
EQUITY INVESTMENT				2500000								
SALES RECEIPTS	67425	67425	79982	137940	337009	450898	550875	666792	787060	1083255	1302614	1423030
											85 TOT	6954305
CASH FROM OPERATIONS	-287748	-305172	-313905	-338969	-371494	-394048	-434738	-474175	-479375	-507976	-548395	-567393
											85 TOT	-5023389
NON-OPERATING CASH	-57450	-55854	-67202	-75387	-157197	-61693	-66510	-69427	-72346	-75870	-77933	-78537
											85 TOT	-915404
INVENTORY PURCHASES	-98512	-161855	-204223	-247960	-295972	-360934	-434346	-493621	-547377	-609726	-683910	-565744
OTHER MFG CHARGES												
direct labor	-7000	-7680	-9688	-11760	-14036	-17104	-20576	-23376	-25912	-28856	-32360	-36392
contract assembly	-7300	-12000	-15138	-18375	-21925	-26725	-32150	-36525	-40488	-45088	-50563	-41813
	-14300	-19680	-24826	-30135	-35957	-43829	-52726	-59901	-66400	-73944	-82923	-78205
											85 TOT	-5287003
CASH FLOW PROJ.	-390584	-475136	-530174	-554510	-523611	-409606	-437446	-430332	-378436	-184261	-90547	133152
											1985 TOT	-4271491
ACTUAL CASH FLOW												
VARIANCE	390584	475136	530174	554510	523611	409606	437446	430332	378436	184261	90547	-133152
CUM CASH FLOW	-3996538	-4471674	-5001847	-5556357	-6079968	-6489575	-6927020	-7357353	-7735789	-7920050	-8010597	-7877445
CASH BALANCE	2102562 (proj.)	1627426 (proj.)	1097253 (proj.)	3042743 (proj.)	2519132 (proj.)	2109525 (proj.)	1672080 (proj.)	1241747 (proj.)	863311 (proj.)	679050 (proj.)	588503 (proj.)	721655 (proj.)
LEASE SECURITY DEP.	165052	165450	230375	233552	233436	233833	250396	250396	250793	258743	265368	265368
AVAILABLE CASH	1937510	1461977	866878	2809191	2285696	1875692	1421684	991352	612518	420307	323135	456287

Percent of Sales	JAN 1985	FEB 1985	MAR 1985	APR 1985	MAY 1985	JUN 1985	JUL 1985	AUG 1985	SEP 1985	OCT 1985	NOV 1985	DEC 1985
GROSS REVENUES	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
NET REVENUES	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.6%	98.6%	98.6%	98.6%	98.6%
COST OF GOODS SOLD	87.5%	71.0%	59.3%	55.2%	54.7%	53.0%	52.4%	46.7%	46.8%	47.0%	47.0%	46.9%
GROSS MARGIN	11.0%	27.5%	39.2%	43.3%	43.8%	45.5%	46.1%	51.9%	51.8%	51.6%	51.6%	51.6%
OPERATING EXPENSES												
engineering	111.7%	65.5%	30.4%	22.8%	18.6%	15.5%	15.1%	11.0%	9.2%	8.5%	8.3%	7.3%
digital mapping	49.5%	34.6%	15.1%	11.3%	9.3%	8.4%	7.2%	5.4%	4.5%	4.1%	3.7%	3.3%
manufacturing												
marketing	158.6%	72.4%	35.4%	29.9%	33.0%	25.5%	28.3%	20.7%	18.3%	19.4%	19.4%	17.0%
finance & administ	65.9%	39.7%	15.7%	11.9%	9.8%	8.5%	9.1%	5.8%	5.0%	4.7%	4.3%	3.9%
TOTAL OPERATING EXPENSES	385.7%	212.2%	96.6%	75.9%	70.8%	58.0%	59.7%	42.9%	36.9%	36.6%	35.7%	31.6%
OPERATING INCOME	-374.7%	-184.7%	-57.4%	-32.6%	-27.0%	-12.5%	-13.6%	9.0%	14.9%	15.0%	15.9%	20.0%
NET INCOME--FORECAST	-405.5%	-204.4%	-66.4%	-40.1%	-30.8%	-16.2%	-17.1%	6.2%	12.4%	12.5%	13.6%	17.9%

	1985 TOTAL
GROSS REVENUES	100.0%
NET REVENUES	98.6%
COST OF GOODS SOLD	49.6%
GROSS MARGIN	49.0%
OPERATING EXPENSES	
engineering	13.1%
digital mapping	6.3%
manufacturing	0.0%
marketing	23.6%
finance & administration	7.2%
TOTAL OPERATING EXPENSES	50.2%
OPERATING INCOME	-1.2%
NET INCOME--FORECAST	-4.8%

5-1-84 BASELINE PLAN
PRO-FORMA FINANCIALS

	JAN 1986	FEB 1986	MAR 1986	APR 1986	MAY 1986	JUN 1986	JUL 1986	AUG 1986	SEP 1986	OCT 1986	NOV 1986	DEC 1986
PRO-FORMA INCOME STATEMENT												
REVENUE												
navigator	1328000	1492400	1626000	1819600	2013200	2163200	2332800	2537200	2717200	2867200	3017200	3167200
cassettes	26946	31650	36552	41910	46962	51666	57228	63840	70140	76290	82542	88848
AVL systems	97500	105000	112500	120000	127500	127500	135000	165000	165000	165000	165000	165000
map data base	0	0	0	0	0	0	0	0	0	0	0	0
licensing	0	0	0	0	0	0	0	0	0	0	0	0
gov't contracts	0	0	0	0	0	0	0	0	0	0	0	0
GROSS REVENUE	1453246	1629050	1775052	1981510	2187662	2342366	2525028	2766040	2952340	3108490	3264742	3421048
											1986 TOT	29406574
less discounts	-7266	-8145	-8875	-9908	-10938	-11712	-12625	-13830	-14762	-15542	-16324	-17105
less bad debts	-14532	-16291	-17751	-19815	-21877	-23424	-25250	-27660	-29523	-31085	-32647	-34210
NET REVENUES	1431447	1604614	1748426	1951787	2154847	2307231	2487153	2724549	2908055	3061863	3215771	3369732
											1986 TOT	28965475
COST OF GOODS SOLD												
navigator	550237	618856	674625	756094	837563	901813	973002	1054728	1131828	1196078	1260328	1324578
cassettes	8982	10550	12184	13970	15654	17222	19076	21280	23380	25430	27514	29616
AVL systems	39000	42000	45000	48000	51000	51000	54000	66000	66000	66000	66000	66000
map data base	0	0	0	0	0	0	0	0	0	0	0	0
gov't cont.	0	0	0	0	0	0	0	0	0	0	0	0
manufacturing OH	51632	53697	55845	58079	60402	62818	65331	67944	70662	73488	76427	79485
warranty accrual	28526	31948	34770	38792	42814	45814	49356	54044	57644	60644	63644	66644
TOTAL CGS	678377	757051	822424	914935	1007433	1078667	1160765	1263996	1349514	1421640	1493913	1566323
											1986 TOT	13515035
GROSS MARGIN	753071	847563	926002	1036853	1147414	1228564	1326388	1460554	1558541	1640223	1721857	1803410
											1986 TOT	15450440
OPERATING EXPENSES												
engineering	138163	145071	152325	159941	167938	176335	185152	194409	204130	214336	225053	236305
digital mapping	60530	62043	63594	65184	66814	68484	70196	71951	73750	75594	77484	79421
mfg. startup	0	0	0	0	0	0	0	0	0	0	0	0
marketing	369550	406616	446408	508353	524790	569764	598448	626799	669600	681983	694705	689839
finance & admin.	73531	76472	79531	82712	86020	89461	93040	96761	100632	104657	108843	113197
TOTAL EXPENSES	641773	690202	741858	816190	845562	904044	946836	989921	1048111	1076570	1106084	1118822
											1986 TOT	10925975
OPERATING INCOME	111297	157361	184145	220663	301852	324520	379552	470633	510430	563653	615773	684587
											1986 TOT	4524465
INTEREST EXPENSE												
INTEREST INCOME	4811	7269	9198	7980	6906	5965	5528	5520	5666	6160	7470	9330
RESERVE	-83333	-83333	-83333	-83333	-83333	-83333	-83333	-83333	-83333	-83333	-83333	-83333
PRE-TAX INCOME	32775	81298	110009	145309	225425	247152	301748	392820	432763	486480	539910	610584
											1986 TOT	3606273
TAXES	-3278	-8130	-11001	-14531	-22542	-24715	-30175	-39282	-43276	-48648	-53991	-68383
NET INCOME (FORECAST	29498	73168	99008	130778	202882	222436	271573	353538	389487	437832	485919	542201
NET INCOME (ACTUAL)												
VARIANCE	-29498	-73168	-99008	-130778	-202882	-222436	-271573	-353538	-389487	-437832	-485919	-542201
CUM NET INCOME	-3531921 (proj.)	-3458753 (proj.)	-3359745 (proj.)	-3228966 (proj.)	-3026084 (proj.)	-2803647 (proj.)	-2532075 (proj.)	-2178537 (proj.)	-1789050 (proj.)	-1351218 (proj.)	-865299 (proj.)	-323098 (proj.)
											NI 86 TOT	3238321
CUM PRE-TAX INCOME	-3553151	-3471854	-3361845	-3216535	-2991110	-2743959	-2442211	-2049391	-1616628	-1130148	-590238	20346

5-1-84 BASELINE PLAN

NON-EXPENSE PAYMENTS	JAN 1986	FEB 1986	MAR 1986	APR 1986	MAY 1986	JUN 1986	JUL 1986	AUG 1986	SEP 1986	OCT 1986	NOV 1986	DEC 1986
ASSIGNED TO LEASE LINE												
Denr	281000	281000	281000	281000	281000	281000	281000	281000	281000	281000	281000	281000
Masterlease	47000	47000	47000	47000	47000	47000	47000	47000	47000	47000	47000	47000
Interlease	1103932	1148089	1194013	1241773	1291444	1343102	1396826	1452699	1510807	1571239	1634089	1699452
LEASE DEPOSITS	0	0	0	0	0	0	0	0	0	0	0	0
EQUIPMENT PURCHASES	0	0	0	0	0	0	0	0	0	0	0	0
LEASE PAYMENTS	42131	43522	44968	46473	48037	49665	51357	53117	54947	56851	58831	60890
INTEREST & OTHER EXPENSES												
TOTAL	42131	43522	44968	46473	48037	49665	51357	53117	54947	56851	58831	60890
											1986 TOT	610789

CASH FLOW PROJECTION

EQUITY INVESTMENT												
SALES RECEIPTS	1569097	1765726	1431447	1604614	1748426	1951787	2154847	2307231	2487153	2724549	2908055	3061863
											86 TOT	25714795
CASH FROM OPERATIONS	-604113	-665988	-716030	-779024	-830876	-874803	-925440	-968378	-1019016	-1062341	-1091327	-1112453
											86 TOT	-10649790
NON-OPERATING CASH	-120653	-122863	-127233	-132827	-138995	-149575	-153877	-161105	-171896	-177300	-183342	-188884
											86 TOT	-1828550
INVENTORY PURCHASES	-453995	-660559	-740644	-820627	-883945	-954218	-1034968	-1111168	-1174968	-1238802	-1302654	-1328750
OTHER MFG CHARGES												
direct labor	-12583	-13918	-15503	-16920	-18238	-19725	-21270	-22645	-23895	-25145	-26010	-26875
contract assembly	-9030	-13125	-14710	-16295	-17545	-18930	-20520	-22020	-23270	-24520	-25770	-26250
	-21613	-27043	-30213	-33215	-35783	-38655	-41790	-44665	-47165	-49665	-51780	-53125
											86 TOT	-1218000
CASH FLOW PROJ.	368724	289273	-182673	-161079	-141173	-65464	-1228	21915	74107	196442	278952	378650
											1986 TOT	1056447
ACTUAL CASH FLOW												
VARIANCE	-368724	-289273	182673	161079	141173	65464	1228	-21915	-74107	-196442	-278952	-378650
CUM CASH FLOW	-7508721	-7219447	-7402120	-7563199	-7704372	-7769836	-7771063	-7749149	-7675042	-7478600	-7199648	-6820998
CASH BALANCE	1090379	1379653	1196980	1035901	894728	829264	828037	849951	924058	1120500	1399452	1778102
	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)	(proj.)
LEASE SECURITY DEP.	275983	287022	298503	0	0	0	0	0	0	0	0	0
AVAILABLE CASH	814396	1092630	898477	1035901	894728	829264	828037	849951	924058	1120500	1399452	1778102

5-1-84 BASELINE PLAN

Percent of Sales	JAN 1986	FEB 1986	MAR 1986	APR 1986	MAY 1986	JUN 1986	JUL 1986	AUG 1986	SEP 1986	OCT 1986	NOV 1986	DEC 1986
GROSS REVENUES	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
NET REVENUES	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%
COST OF GOODS SOLD	46.7%	46.5%	46.3%	46.2%	46.1%	46.1%	46.0%	45.7%	45.7%	45.7%	45.8%	45.8%
GROSS MARGIN	51.8%	52.0%	52.2%	52.3%	52.4%	52.4%	52.5%	52.8%	52.8%	52.8%	52.7%	52.7%
OPERATING EXPENSES												
engineering	9.5%	8.9%	8.6%	8.1%	7.7%	7.5%	7.3%	7.0%	6.9%	6.9%	6.9%	6.9%
digital mapping	4.2%	3.8%	3.6%	3.3%	3.1%	2.9%	2.8%	2.6%	2.5%	2.4%	2.4%	2.3%
manufacturing												
marketing	25.4%	25.0%	25.1%	25.7%	24.0%	24.3%	23.7%	22.7%	22.7%	21.9%	21.3%	20.2%
finance & administ	5.1%	4.7%	4.5%	4.2%	3.9%	3.8%	3.7%	3.5%	3.4%	3.4%	3.3%	3.3%
TOTAL OPERATING EXPENSES	44.2%	42.4%	41.8%	41.2%	38.7%	38.6%	37.5%	35.8%	35.5%	34.6%	33.9%	32.7%
OPERATING INCOME	7.7%	9.7%	10.4%	11.1%	13.8%	13.9%	15.0%	17.0%	17.3%	18.1%	18.9%	20.0%
NET INCOME--FORECAST	2.0%	4.5%	5.6%	6.6%	9.3%	9.5%	10.8%	12.8%	13.2%	14.1%	14.9%	15.8%

	1986 TOTAL
GROSS REVENUES	100.0%
NET REVENUES	98.5%
COST OF GOODS SOLD	46.0%
GROSS MARGIN	52.5%
OPERATING EXPENSES	
engineering	7.5%
digital mapping	2.8%
manufacturing	0.0%
marketing	23.1%
finance & administration	3.8%
TOTAL OPERATING EXPENSES	37.2%
OPERATING INCOME	15.4%
NET INCOME--FORECAST	11.0%