



Interview of H. Jay Hill

Interviewed by:
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James Pelkey: Maybe the easiest place to start is with how you got into the business and why did you get involved in the first place and what were you doing before you got involved in the business.

H. Jay Hill: Are you talking, basically, about data communications?

Pelkey: Right.

Hill: Let me give you the three-minute version. I'm a graduate engineer from a small college in Pennsylvania, and started out in life spending two years with a utility company, quickly saw that that was not what I wanted to do, wasn't challenged, had a wife who worked for IBM and that, obviously, was an influence, because she came home talking about all these neat guys that she worked with and how they were going to change the world. I just wanted to be part of what was happening, so I said: "Hey, how about setting up an interview with one of the guys over there that you know and like," so that was how I got into the high tech world. I started with IBM in '63, and just as a personal note, that was a very, very meaningful part of my life. They taught me a way to live from a fairly unsophisticated, country, grew up between a couple of farms guy to getting involved in calling on businesses. It just made a big difference, and certainly the zest for winning a lot came from IBM, as well as a competitive family. Went from IBM -- stayed there about six years -- and joined a start-up in Boston called Inforex, which was in the data entry business, and that was exciting too, because it was a company that went from no revenues to about \$62 million in the time I was there, and that was from 1969 until '76. I had lots of jobs at that company. I was a branch manager in New York when I got there, a regional manager, national sales manager, director of marketing, and director of international distributors covering 23 countries around the world. The handwriting started to become apparent as I talked to international businessmen who wanted to make a living selling our product that the nature of the business was changing and Inforex wasn't. So I, then, allowed -- I interviewed two different companies. One was RDS, Raytheon Data Systems when Joe Hit and Dave Levy and Tom -- lost his last name -- were running RDS on the on-line terminals and dealing a lot with airlines and seismographic, but then the second person I interviewed was Bob Wiggins down at Paradyne, and it was set up by a headhunter who contacted me, and I got captivated with Bob, first, and as I -- well, I'll point that right back to you -- you like to fall in love with the person or the product or the company first, and then do you do this or finds out why you shouldn't, and that's what happened. Bob was such a dynamic, warm but strong leader that I really thought I could learn a lot from him on a personal basis, and I walked into modems and data communications and I didn't know what I was walking into. Quite frankly, I was more captivated -- and I still, to this day go by people sense a lot rather than studying the marketplace or whatever. It did sound like data communications was in a birthing period. I had heard of Milgo and we actually used the Milgo modems in a tangential manner with the data entry when we tied up different data entry systems as they became networked, but that was my very first blush into data communications. So I went down to Florida --

Pelkey: What time of year in '76?

Hill: I joined Paradyne in August -- about August 15th of '76.

Pelkey: Now Bob, if I recall -- how long had he been there?

Hill: Bob had been there just a couple of years. He started talking to them at the end of '72, and joined in the beginning of '73. I may be off by a year, Jim, but Bob was there two or three years, so that might have put him -- may have been the end of '73, '74, but he was just kind of putting his team together and surviving at the time. Bob was brought in as a last ditch effort to save the company by its early investors, and they agreed to put in a million dollars when Bob came in, but it was the last ditch.

Pelkey: How big a company was it at this point in time?

Hill: Ok, in '76, the running rate when I got there was about \$8 million. I think we reported \$9 million for the year, but it was in that range. It was under \$10 million, in the \$7.5 to \$10 million range.

Pelkey: And what role did you assume when you came aboard?

Hill: When I joined I was Vice President of Marketing, sales and marketing, and I had the responsibility for the United States. There was another peer of mine who had responsibility for off- shore.

Pelkey: That was a big decision on his part, your not having come from anything to do with datacom and this being a difficult situation and making you VP of Marketing and Sales.

Hill: Inforex provided a lot of growing opportunity for me, and by growing I mean I had a chance to make a lot of mistakes, but the overall number at Inforex were wonderful. We went from zero to 62 in about six years, six and a half years. We went to a very high P/E ratio. I had both international and domestic, both marketing and sales, and Bob was a people person too, fortunately for me. So he did take a risk. As a matter of fact, he had another guy who wanted the job and he wanted me to make a decision on my third time I met him, and I told him no. It was kind of fun, because he said: "You've got to make a decision or I'm going to have to give this job to the other guy," and I said: "Well, I have too much respect for my family to just make a decision without involving them," and I said: "So if you got to do that," I said: "Go ahead." He appreciated that I had an (unintelligible), and he was very much a family oriented guy, and that's one of the things that allowed us to bond up and work together well, but he did take a risk because I did not know my ass from my elbow in terms of data communications. I just thought I knew how to sell, and I knew how to motivate, and I knew how to feel my way into marketplaces. Frankly, it was exciting for me. I still find today, even the older I get, the shorter my attention span goes. Once I'm with a company for a year or two and understand the dynamics of the marketplace and, more importantly, the dynamics of the company and what it needs to do to play in that marketplace, it gets boring. So I went down there not knowing that, but at least sensing that, so it was a risk.

Pelkey: Now was the OEM strategy in place for them at this point in time?

Hill: Yes, it was. As a matter of fact, that helped them survive. They had some fairly innovative technology. At the time, when I joined, they had LSI technology and were one of the few people that had imbedded LSI in at the modem marketplace, and later on, as we go through, they had a lot of firsts in the modem industry. I can't recite them all from memory, but in the high-speed area they had a lot of firsts. Some of the key ones later on were imbedding microprocessor technology, which allowed them to bring back line measurements other than just deliver the bits back and forth. They were starting to be able to measure lines and do what we commonly today call network management type of functions, and that really allowed Paradyne to go off. So they had good technology. They sold that to two key people; one was -- got through to NTT through NEC, and we sold the technology to them and we sold it to the Scandinavian company, the Swedish company, LM Ericsson. We private labeled for them, and the other one was the Wiley --

Pelkey: UCC?

Hill: No, it was his -- Datran. It was the first network in the United States. It was supposed to be oriented towards carrying data rather than voice.

Pelkey: You didn't have them as a customer for very long after you joined.

Hill: No. As a matter of fact, it was in approximately -- I joined in August of '76 and I would say within 70 days, they filed for protection, and we lost our single largest customer. I still remember, I didn't quite understand the significance of the problem when they were running around the halls saying: "Oh my God, Datran just filed. How much inventory do we have? How much do they owe us? It's been locked up by sheriffs," and things like this, but that wasn't the important part. It was whether we could survive the loss of the top line and the attached profit that went with it. Bob just succinctly came into my office and

said: "We've had a very unfortunate thing happen to us. Our largest customer is gone and you have to make up for it. Get going."

Pelkey: Welcome aboard.

Hill: Right, exactly, and that wasn't brought into perspective until a guy came down -- Tom Unterberg -- was down in my office, and it was after the Datran thing happened, and they either had an investment or had an interest in it, but he just simply asked me: "What the hell did you join this company for?" He said: "Have you lost your head?" I remember a very eloquent answer coming out as I was shaking in my chair saying: "This guy knows a lot about what's going on in the financial world," and I always ask myself that question subsequent to that; "Did I really know the company I joined or did I feel my way into it?" I must confess that a lot of the latter was a good-sized component of my relationship with Paradyne.

Pelkey: So you had this big shock as soon as you came aboard.

Hill: Yeah.

Pelkey: And 9.6 was the state of the art --

Hill: Yes it was.

Pelkey: Because you came out with -- were you the first with 14.4?

Hill: Paradyne was close to the first. They and Codex both jumped pretty early, and I think Paradyne always claimed the first one at 14.4. Certainly they were out there with a working 14.4 and 16.6, which was used in a military version of that probably a good year before Codex had theirs working, easily, on normal lines.

Pelkey: When was that?

Hill: That was subsequent to my departure, which was in '80, and I'm going to guess approximately 1982; and that's a guess on the 14.4.

Pelkey: What were the customers looking for during this period of time? What was the nature of the competition?

Hill: Through the whole span of '76 through '80, that four-year time frame?

Pelkey: Yeah, what was happening?

Hill: Well, as you're aware, data communications during that time was in a robust growth stage. During that time, Bob always quoted -- and I never went back and calculated -- but Bob quoted that, during the late '70s for Paradyne, we were growing at a 70% compounded annual growth rate. The whole industry wasn't growing that fast because we were taking market share, but it was a very robust time. People were putting up simple communication capability; a lot of point-to-point stuff originally, and then as multi-drop became easier to use and more commonplace, those networks would start to go up. The financial institutions in particular were putting them up and getting more information networks connected, like when they would connect up their branches with various services, when DDA would go on line or something like that. We were getting a lot of that type business.

Pelkey: DDA?

Hill: Demand Deposit Accounting -- checking account type things, where they were moving to automated type systems run at their central offices using big IBM mainframes.

Pelkey: It was largely an IBM environment that you were selling into?

Hill: Yes, it was. I'm just trying to go back and mesh 360, which was the first real front-end on a system, and that was about 1964, so we were easily 10 or a dozen years into front-ends by then, and SNA --

Pelkey: It was just coming out in '76, right?

Hill: Yeah, I was going to say, that was fairly new, and adding some, at least, excitement or wiggles in the marketplace; not necessarily the buyers. We had a lot of people who would buy, in my first couple of years there, and some things changed in the marketplace during those four years. A lot of point-to-point stuff was going down. Paradyne's biggest sellers in the '76, '77, and the first half of '78 were LSI point-to-point modems, and they were 4.8 and 9.6. The bulk of Paradyne's stuff was point-to-point then, and we were doing --

Pelkey: Very little network management.

Hill: None. There was literally none. We had one modem that was the 9.6 LSI that went into, what we called internally, mumble- mode, and the only way you found out is you stopped transmitting the data. Something on either end of the thing stopped receiving or sending and they got 'halts,' and they were all picked up by the signals and the feedback that you would get in the front end, or the device at the other end would just stop, and people would then call Bell Telephone or Paradyne, depending who they felt the closest to, and one of the -- as a matter of fact, it was the subject of a whole ad campaign. Back then, what you did, you called the telephone company, you'd say: "Hey, I can't get my data through." They would say: "There was no problem found, but try it again." You would try it and it would work, and that was, most of the time, exactly what happened. There was some -- I finally dug to find out why that phenomenon happened; why were the Bell people not incented not to tell the customers that they had a problem, and it was because of a supervisor reporting structure. They were penalized when --

Pelkey: When it showed up --

Hill: When it showed up that they had a down line, so there was some punitive -- very small, it didn't matter too much, but all the data people who were, when you had a data line, they were their own people, they were not voice people -- and that allowed a whole new product area to come out for Paradyne, that very phenomenon that Bell Telephone had this punitive system for actually allowing to get on their reporting system that a data line was out of spec.

Pelkey: And that innovation or product was?

Hill: The product was the microprocessor 48 Baker, and the product was called Analysis. What it was we used the software capability, or the dynamics of a soft-loaded product when the microprocessors came out to be the main engine of the new line of modems, but we had a little auxiliary board that went in there that would actually, through the use of I-patterns and other techniques that were in vogue back then, but only on test instruments. We automated that process and we could tell, on a data line, about five or six key measurements -- signal to noise ration, phase jitter, that ilk of things -- and we could bring that back and display that on a tube that was fairly easy to use, and it, for the first time, gave the data processing manager or by then, the telecommunications guy, who was evolving at that time, we gave him some control over his own destiny on some of the early networks, and it allowed them to call up the telephone company and be very specific about where their line was out of specifications and command them to fix it. It also gave them the ability to keep their networks up, because they could see trending. The lines back then had trends, and it would drift and drift 'til it got out of spec and wouldn't pass data, and this would allow you to watch the trends and spot them and do preventive work on the networks, rather than just reactive to negative. One of the anecdotes -- I'm not sure, do you want some of the anecdotes? The first large customer that we installed this system for was John Hancock here in Boston. We decided to give it the acid test and ask Hancock to have New England Telephone here when we had the system up and running, because we wanted to see what their reaction would be when we were telling them exactly

what was wrong with their lines, and without a Techtronic scope or a data scope on the end of the line, because on some of the very early Beta sites, the telephone company would just ignore us. They'd fix the problem, but they'd say: "Ah, you guys don't know what you're talking about." We called up and we had them come out and they read the lines along side of Analysis. In other words, they brought their scopes and stuff, and we were extremely close on all of them. The supervisor who was there -- I happened to be there during the day, and I'll never forget him saying to both his technicians and to the guy who was in charge of the networks -- he says: "Look guys, when these guys call, from now on, you do exactly what they say," and I said: "Oh, shit, here we go. That's music to my ears," and ever since then, I was a more aggressive, assertive sales manager. I said: "Look, this shit works. It isn't a joke." I quoted that thing probably a hundred times, to, probably more often my own people to give them confidence, but that's one of the things specifically in Paradyne's history that really gave it a big lift. I should go back and tell you that Paradyne, in 1976, '77 and '78, carried about only 50% of its revenues in modems and the Analysis or the attendant type things. The other portion was in a product area called Pix, which was a very specialized -- actually, it grew out of a modem that was ahead of its time, and it was an error correcting modem before error correcting modems were thought of, heard of or, certainly, trusted. In fact, if you think about Pix and what it is, it is just a great big, specialized, error correcting modem. Pix was sold as a remote peripheral device system, and in brief, what it was a control unit at the site of the computer and a box at the remote end, and they played two functions: the side of the control unit at the host site then was on the computer side appeared to the computer as a control unit for the remote device that we were trying to control; the outbound side of that thing was just a transmission device. It was a modem that sent bits down the line, and at that remote end -- let's say we're driving a remote printer -- the side that looked towards the line was the other end of the modem, and that side that was on the printer side was the multiplexer or selectra-channel re-presented at the remote site. So what we basically did was have a selector or multiplexer channel from the 360 technology extended to a remote site, and we could do very extraordinary things, and by not being bound up by all the 2701, 2704, 3705 constructs that were very limiting in terms of high-speed data communications -- their ports just weren't set up for high-speed stuff. So 50% of Paradyne's revenues during those early years were this Pix product, and frankly I was much more comfortable with that personally, because, with an IBM background and then a data entry background, peripheral devices were a lot easier for me to grasp and understand. Then, after 1978, when Paradyne had the breakthrough, we would sell one Analysis to a major insurance company like Hancock, and 100, 200, 300 modems would go out, and at that time, pricing of modems, which is an interesting thing -- when we get into the competitive stuff, why, pricing played a very key role in Paradyne's success -- pricing of modems then was about 70 cents per baud, bit per second. The list price on a 4800 modem back then, in 1978, was \$3,000, and we would sell them in any reasonable quantity, at \$2,400 per copy and an aggressive bid, back then, and this is '78, '79, we would just get below \$2,000, and our gross margins never on a sale like that, got down to 50%.

Pelkey: Your major competitors were Milgo and Codex, right?

Hill: Codex, initially, was the major competitor, because they really owned the 9.6 world, and they -- and I'm sure through some of your research for the book that you would remember the high gross margins, as I remember some of the industry bantered about things when I got there, that they were running gross margins in the mid to high 80s, 86, 87. As you know, it becomes asymptotic to impossible to run margins that go up because of the formula, and we knew that. We knew what their margins were. They somehow, and I don't quite know how we had the information, but we had reasonable G2 about how they were doing. They were sold in about 1978, '79, in that time frame, and they were sold for three times revenues back then, which is a very lofty number, and gave us great buoyance as we were thinking about an IPO. Their margins were phenomenal. Bob Wiggins was, besides just being an outstanding leader and a manager and a tutor for me personally, was a nut on product costs. I still remember staff meetings, and it seems to me, it would be at least once a month he would ask Bernie Brown, who was then in charge of both engineering and manufacturing, to go get another 10% out of the product. He was sure it was there, and the amazing thing was Bernie used to go back and say: "Yeah, I've got it Bob." I just couldn't -- as basically a salesman, I then used to go in and talk to Bob all the time and say: "Hey, look, how'd you know that was there? How do you manage inventories? How do you manage (unintelligible)?" He was just fabulous of coaching me in a broader business sense, and sharing some of the information (unintelligible) that he used.

Pelkey: How much was direct in that period of time, '76 to '78? Was most of it through resellers or OEM or were you putting a direct selling organization together?

Hill: When I arrived at Paradyne in 1976, we had about 11, 12 sales people and two regions, and so the direct selling was the major way that it was sold. In 1976 through 1980, approximately 80% of our business was done in the United States. We started gaining a little bit internationally later, but it was never as big as I thought it should be at Paradyne, because other companies were doing upwards of 40 to 50%, what I thought were some of my role-model companies. We had started direct, at that time. We continued that but we changed the type of people dramatically. Back in those days, data communications people were technocrats. They were the esoteric guys who huddled together and only talked among themselves and were comfortable there. They absolutely had nothing to do with voice people back then. They were very separate camps, usually managed by separate people in the organizations that we sold to, but direct. We supplemented that with distributors or reps. They were the two classifications. We drove most of them to be stocking distributors because of our discounting structure, and a lot of our reps flipped over to be distributors --

Pelkey: You mean stocking rep?

Hill: A stocking distributor, they had to take product whether or not they had a sale for it. A stocking -- the distinguishing rules that we made -- a rep, basically, acted just like they do today. He'd run out and get an order, we were responsible for invoicing and accounts receivable and he got a commission. What we started doing was we started encouraging some of the better ones to buy on a schedule, and if they signed up for a schedule, they would get the deeper discounts, and we had a very specific discount schedule that went up to 100 units. So we had a combination of reps and distributors that supplemented us. The interesting thing was that we paid the salesmen normal commissions if the rep or the distributor sold them, and so we had a very cooperative thing. We didn't get into a situation where they were fighting each other, which I always thought was a destructive use, or waste, of energy. At the time, Codex was direct and Milgo was almost all reps. So the two leaders, when I ran -- I kind of had my choice -- one of them went the way I was more comfortable with, and the other one went through all reps, so there was a use of different distribution channels. At the time, also, we used OEM exclusively offshore. They had to be major buyers.

Pelkey: How often did you run into either of those competitively? Did you compete in all the cases or half the cases? Was it real competitive, or was it that the market was growing so rapidly that you didn't run into each other that much?

Hill: We ran into Codex more than we did Milgo, but we ran into both of them often. I don't have a number on the tip of my tongue, but I would surmise that about 70% of the time we would have one or the other or both. That was particularly in the early couple of years. After we got our trick product, the Analysis thing, it changed the way we marketed, differently. By that time I had an IBM flavor built into Paradyne's marketing force, and the guys who were really the (unintelligible) \$100,000 a year type salesmen who could get through the maze, because larger and larger companies were buying more and more modems, so we would often deal with a million dollar decision, and they were done at board of directors levels and certainly top financial scrutiny and CEO type stuff for sign-off, so we really -- one of the things we did right, I think, was to bring that caliber of salesman into data communications quickly, and that allowed us to take a lot of the larger decisions. I think the other two companies, particularly Milgo, had a garner on all the really sharp data communication reps in the United States, but they were the old technocrat type, and they were usually owned, the rep firms were owned by these technocrats, and there were only a couple of exceptions. I remember Frank Enise, I think his name was, up in upstate New York, was a really good businessman, and they had several of those guys who did well. There's a couple in California who come to mind, too, that were good.

Pelkey: Did you make this transition to this IBM type of selling course after the Analysis product came out?

Hill: Well, I did it right away. When I got down there and my first day on the job saw all my direct reports I was frightened to death. As a matter of fact I told my wife: "Don't unpack. This may not work. These bozos are from a different world, and I'm scared to death." That's what I told my wife, but there were two regions at the time, and I called on a friend of mine who worked with me at both IBM and Inforex and was just a really solid, good guy. His name is Jerry Kendall, and I said: "Jerry, I need one guy I can trust." I said: "I've been here 30 days, and nobody speaks my language, and I need one person to tell me what the customer is saying so that I can understand it, and it's an insurance policy, but I'll treat you well. Please consider coming over." It took me a month to get him, but he's the first guy that I brought over, and then after --

Pelkey: He came on board as a salesman?

Hill: As a regional manager. Jerry was a salesman at IBM when I met him there, when I was a trainer for IBM, and then I brought him over to Inforex as a branch manager. He opened up Atlanta for us, and then he went on to be a regional manager at Inforex, and I brought him over as a new regional manager at Paradyne. He had a third of the country, and then, as we expanded, he got a fourth of the country, and later I think we went to five regions, but he all the time did a good job. He bought into the modems act pretty fast. He knew how to sell Pix, but he was trained by a guy named Bill Segrist on how to do modems, but he was the initial wave, and that happened within 90 days of me being there. From then on, I hired the people that I knew and could communicate with, and set a new role. I wanted guys to be able to sell on an elegant fashion and a sophisticated sale, and a system sale. How I compensated for taking the technocrats out of the direct line of sales, we put a very strong product manager attached to each region first, and then later it got so popular that it attached down to lower levers, to district levels, and the neat thing was that we put them on an incentive program that was pretty robust. The first guy that we sent out to California was a young guy that we hired away from what is now Infinet, at that time Intertel. He was this skinny little guy. He was 24 years old, and in the first year, he went out to the western region -- it was about 1977, maybe '78 at the latest, where we had both a modem product specialist and a Pix product specialist. He made \$120,000, and that program, I think, from a just tactical basis, did so much for us. It allowed the elegant salesman who didn't know his ass from his elbow about the bit, byte, baud routine to go out and deal with the decision making process, and be able to speak reasonably intelligently about the product, but the product specialist insured that the product was sold properly and applied to the right applications. He also was a motivator for the salesmen. He would literally call up the salesmen and say: "Look, I'm going to be up in San Francisco next week, next Thursday and Friday, and I'd like to make at least five calls on your top modem prospects," and he would just bird-dog the salesmen to go out and do it. Then, it also gave the technical decision maker confidence that we knew what we were doing, so it was one of those things, again, where logically it made sense, it had not been done before except my IBM SE experience. That was the closest thing that I had seen, and the SE performed it, but he wasn't incented, though. At that time he was basically a salaried creature who did what he was told to and supported the pre-sales process, technically. We turned these product guys into crazy people, in terms of really hustling our own distribution organization to do what they should be doing, so that was very key in terms of what I saw as the success. Codex and Paradyne, at that time, were selling about -- and this is when I got there, Paradyne was right at the par -- was selling about \$600,000 per salesman per year. I think the year to date performance was \$590,000, and one of the ways I got the job is that I said: "Wiggins, if what you're telling, all about your product and about the marketplace is true, your guys aren't selling as much as they should," and the first year I was there, we got it up to -- the quota was \$800,000 and the average was over \$900. In 1980, the average salesman at Paradyne sold and shipped over \$1.5 million per year. It went from 600 to 900 to a million one to a million three to a million five in the four years, and that's one of the things, along with an average gross margin across all product lines, but before service, was 68% at Paradyne in '78 and '79, and then with the salesmen selling at upwards of \$1.5 million, that cut down on the period cost on the expense side, so we were able to report very handsome after-tax profits. One of the reason Paradyne ended up in the fourth quarter, for a good portion of that quarter, we were the highest P/E ratio on the New York Stock Exchange.

Pelkey: Were you public when you joined Paradyne?

Hill: No, we went public while I was there, and we went in 1978.

Pelkey: Who did your offering? Alex?

Hill: Alex Brown. I don't know if they -- now that I'm more educated then -- at the time, I didn't have any clues what left- side right-side was Mr. Pelkey sir, going back to several (unintelligible) -- Alex Brown, Hambrecht I think did the initial one. Later, Morgan Stanley and Alex did I think two of the secondary's.

Pelkey: That was an incredibly exciting period for you?

Hill: It was great. I remember Paradyne sent me to Harvard's A&P program, and after -- every morning from 7:00 to 8:00 we had a meeting with eight people or so and we got to tell our life story. I remember one fellow from Israel came up to me, he says: "I loved your story. It sounded more like a hobby. You're the only guy here who's having fun. We've all been with companies for 20 years," and whatever, but I did. It was a very exciting period, especially now when you stand back and look at it. When you're in the thick of it, as one of the operational team -- and we did have a great team there -- why it was exciting momentarily, but most of the time scared to death, big numbers, big objectives, trying to assimilate people in a company that's growing from ten to \$100 million in a four year period, and keep things under control, was a big job. It was fun, it was the way you want to do it, but --

Pelkey: Is it true that you were more price competitive? That's what your competitors tell me, that you used price more effectively. You took the prices down, and that's how you bought into the market.

Hill: We absolutely used that as a tactic amongst, particularly, Codex and Milgo to a degree. They had the market. Codex had the only 9.6 for a while. Milgo was very strong in the 2.4, and then escalated to 4.8. Codex had a strong 9.6, and in my opinion they were the only 9.6 in 1976, and so they could charge whatever they wanted, as long as the bit rate allowed the line usage to beat out four lines with four 2.4s which Milgo would have sold. So we went in and, since Bob is strong on product costs, we just said price is one way we can barge in. We did that, but still, in the end, people -- you know, the few people that I have shared with where Paradyne had gross margins just under 70% the whole time I was there, find that hard to believe because they thought we were absolutely price whores and we destroyed the market in terms of the margins. Actually, one company had very strong margins, and that's fair play, but we used price as a way to buy into the market. Some of the more technically oriented people, including Bob Wiggins at times, love to talk about -- some of them were outside -- about the innovative technology, which we did have, but a lot of that technology was really driven towards the reduction of price or increasing the performance, so I like, when I refer back to it, because I wanted to steer away from the whore-ish nature of disrupting the margins of an industry, was we just delivered better price performance all the time, and price became more of a single factor when we were dealing with the LSI series, the 2.4, 4.8 and 9.6 in the early two years, but then price performance became an issue when we were able to do the Analysis work.

Interview Part One Ends

Interview October 26, 1988

Pelkey: We had finished the last conversation talking about margins and the selling process, and that this buck a bit was the pricing when you got into the industry. The process of changing the pricing of the industry, did it also open the industry up a lot. I know you had the Analyzer product, but did the modem product pricing change open the market up?

Hill: I really don't know. I was so entrenched in a microcosm of the marketplace and just trying to drive Paradyne, and frankly some of the analytical thoughts having to do with it really have come subsequent to my being employed and driven by questions that you ask in some of our midnight chats in California. I frankly think that, like any marketplace, there were multiple factors driving the growth of the market. Certainly, information, as we have seen it explode over the last two decades, that need, and the place that networks played in solving the information flow and transportation of that information as the strategic nature of the information took hold, was at hand during the late '70s, during my time with Paradyne. So I

would say that I would guess that that was one of the most significant drivers of the market. Certainly, when you have a market that's being affected positively by other forces, then you lay on top of that a pricing that becomes more attractive or less of a barrier to entry, you do excite and accelerate the market to some degree, and so from that humble perspective, I think Paradyne played a part, but there were other forces bigger than Paradyne, and we were just fortunate to be there at that time and with good price performing products. So I think we played a part, but probably secondary or tertiary.

Pelkey: When did you leave Paradyne?

Hill: 1980. I was there from '76 until '80.

Pelkey: The early part of '80?

Hill: Yeah, March of '80.

Pelkey: Why did you leave?

Hill: Paradyne had -- I had kind of made a deal going in with them in '76. I had been introduced to Harvard's A&P program, and as part of my list of requests to Wiggins when I went in, that was on it. He had turned so many of them down that by the time I got down to that one that his answer was -- and I'll give it to you verbatim -- "Well, I don't think we can commit to that, Jay, but if you do a good job for Paradyne and me, well I'll try to make sure that you have the opportunity to attend a course like that." With his hand gestures and all -- sorry, you can't see that on the tape -- so we had put one spectacular year after another, and in the beginning of '79 I went back to Bob and said: "Bob, I want to call you on at least an indication you made." So, long story short, I went to that program at the end of '79, and while I was there I decided to leave Paradyne, although I've had one of the best jobs in Florida. I had the thirst to be number one, or run a company, or to own one, so I got back from school and said to Bob, I said: "Look, Bob, this is embarrassing to tell you, but I've made up my mind to leave the company sometime during 1980, and I'm prepared for you to ask me to leave today, or I'll stay as long as you want. I do not have anything planned at this point, nor have I searched around." So he asked me to make it relatively short. He said: "I don't want you to linger here all year while you're looking for another job," so I went out and went through two processes. One was interviewing for presidents -- one CEO and a couple of COO jobs -- and the other was I investigated buying a company, which was the end result. So while I was at Harvard, where you have a chance to just think about your life and who you are and what you do and where you want to go, I decided to leave while Paradyne was on an absolute up-tick and I was as proud as could be of my association with the company, and I accused Bob of setting it, which is the only way I got through the lunch, because he was absolutely pissed. He said: "This is an embarrassment to me. I just invested \$50,000 in your education," and I said: "Well, I'm prepared to pay that back," and he accepted that offer, by the way, the direct costs, but then, so Bob could tell the board that he, in fact, asked for the money back, and that's what he did tell them, but he turned around and he gave me \$10,000 too much in my bonus. That's the way the game is played, and I love it. It's just perfect. Bob, as you know, from our earlier meeting when I told you, I'm just an absolute fan of his. He was just fun, and that's just a little microcosm of how we interacted. We played it straight and high character, high integrity type thing -- so I left in March, which is about three months after I told him, and I bought a business later that month, which I had started to investigate while I was still there, but that's why I left.

Pelkey: So you were subsequently on the boards of some datacom companies.

Hill: Yeah, after I left Paradyne, it kind of opened up the conflict of interest, which I was always worried about, and because of the success of Paradyne, I was offered a few opportunities. The early ones were Avanti and Infotron in the datacom business, and then some of the later ones were Doelz Networks, ComDesign after I left Infotron's board, LP Com -- were some of the major ones.

Pelkey: Let me deal with Infotron for a second. Infotron, as I understand it -- I haven't interviewed anyone directly except Bill Drambracus, who was at Infotron briefly -- some of the Infotron technology came out of the old Western Union.

Hill: RCA in Cherry Hill.

Pelkey: Cherry Hill, right. They were an early player, they ended up being an early player even in the T-1 arena, but they never were a significant player. They were one of those companies that seemed to ride the growth of the industry because they happened to be there and they were adequate, but they never -- they're not going to get much attention in this book, for example, because they didn't do anything that was significant in the industry. Is my view wrong?

Hill: I don't think so. The only thing that I would say is they did have in the 1980 to '85, they had a predominant position in the statmux and high-end statmux marketplace, and then in the concentrator marketplace. Names and technology labels were changing at that time, but two of their products had been quite successful, and they were introduced in the '81, '82 time frame. One of them was the 700 Series, and their initial product was called the 790, and it was a big concentrator.

Pelkey: In your mind, what's the difference between a concentrator and a statmux?

Hill: A concentrator denotes, to me, a lot larger system; with a lot more capability in the I/O and manipulation of data as a switch.

Pelkey: Isn't more accurate that Micom is the one that created the name 'concentrator?' That was a low end product.

Hill: Yeah, but that came later, though. The concentrator, to me, I guess I thought Micom --

Pelkey: Micom was '77, '78, and '79.

Hill: But see, I always put them in -- I didn't call them, so I'm learning as we go here -- I always put them in the statmux, not the total down and dirty, but certainly at the low end.

Pelkey: The orange juice can was the concentrator idea --

Hill: Between Bill and -- how was the English guy? Evans, Roger Evans, I always thought he was marvelous.

Pelkey: I think that Roger Evans is one of the top marketing people in the datacom industry, maybe the top one, and in the technology industry -- what he did with the orange juice can and making the stocking rep, because Vadic is actually the one who created that in the first place, and they stole that idea from Vadic.

Hill: Well, I think Micom and Milgo were the two companies, in my mind, that did an awful lot for what I call the rep/distributor type of thing, and graduating them to allow the reps to earn more profit if they were better business guys. So Micom and Milgo both went to \$100 million based on the distribution system domestically with reps or third party distribution, and despite the character that Matt Kinney well deserves in this industry, the one area that I give Matt a lot of credit: he hustled in the caring and feeding of reps, and frankly I talked to him about it as kind of a mate of his at Paradyne, because we used them as a supplementary, because modems drove you out to the boonies. Where we couldn't cover economically, we used them as a supplementary force, and then Bill Siegrist pushed a lot of them into distribution, where they could get a 40% cut on the product, rather than a 10 to 15% as a rep would. Back to Infotron, I looked at Infotron with their 200, 400 and 600 Series products as what I call robust statmuxes. In fact,

they were over-engineered tanks, but they went out in the marketplace when reliability was a much bigger question than it is today for those types products, and over-designed them and supported them well from a sales and systems engineering, or network design viewpoint. They had a great reputation in those three areas. I came on the board -- as an interest kind of thing --

Pelkey: They were public when you went on?

Hill: Yes, they were, and that's why I went on the board. I was called by Alex Brown, who brought them public along with Merrill Lynch, and that is interesting by itself. It's one of the first high-tech companies that Merrill Lynch played a part in on the IPO. My friends from Paradyne, Dick Franyo and some of those guys, called me and said: "Would you please go up -- they have a sales problem - and look at Infotron." So I went up and met with the chairman of the board, who was with the Pitcairn family, who were the major investors, a very wealthy family, about a billion in assets, who had funded and founded Infotron initially, and the chairman was part of the Pitcairn organization, and we talked, and I eventually went on the board. It turned out to not be a sales problem at all, which it usually isn't. The CEO was a former developer, Jim Hahn, and he came to it with an engineering background. What had happened; as they were trying to make the shift from a larger statmux outfit to a systems/network sell, they geared up the entire sales force and the support organizations to do that, and then were in excess of a year late with both products, so while they were in that never-never land, the sales fell way below predictions. Their revenue history was something like \$8 million, \$14 million, and \$20 million. They went public after the \$20 million year, and next year was \$21 million and they either broke even or lost a little bit of money, and that's why Alex Brown was mortified that their reputation was at risk, and I went on. It turned out to just be really that aberration of bringing out a product late, and it was nothing more than that. They went on in succeeding years and went up in the 50% per year range. After the 21 year, they went to 35, then to 55, then to 72, I believe, in succeeding years, and held a reasonably strong position vis-à-vis Codex 6000 Series, which was their major competitor at the time. Coming up is that kind of funny area -- concentrator, statmux, switching, all kinds of capability, a little bit of network control crept in as that became popular, and whatever. The reluctance of Infotron to keep up with the industry and their conservatism in the development, I think, is what hurt them in the end and why they didn't continue to go and be a hit. They never came on with a follow-on product. They have had four T-1 attempts, including Tony Barber's Datatel offering, which they OEMed and sold, and three of their own.

Pelkey: Didn't they also do Cohesive or NSS?

Hill: NSS. Cohesive ended up down in Atlanta with -- not MSA -- DCA.

Pelkey: Cohesive had a deal with -- they had a deal with somebody too.

Hill: Yeah, but I don't think it was with Infotron. Infotron bought in part of NSS and that never materialized. They did one of their own, and then they did a grand one of their own to compete in the NET marketplace. There's a guy back in the woodworks that was at Infotron -- he's subsequently been let go - - his name is Bud Barnes, and I'm a great fan of Bud's. He was the fellow who put the 790 on the map, and then they also had one of the early data switches, a pure data switch, called the 4000 Series, and that did reasonably well as the increased appetite for data switches . . .

Interruption in Interview

Hill: . . . Is it back on again. Jim, this isn't the draft beer that you ordered, however we're getting closer to a couple lemon bitters here.

Pelkey: The computer museum will be happy to know that I was so earnest that I was out drinking beer and missing my interviews, I'll have you know.

Hill: I hope some of your character comes through in this book. I'm going to be disappointed if your irascible self doesn't come through.

Pelkey: Well, I know the irascible self of a number of people in this industry, including you, will come through.

Hill: You do have control of that image, don't you.

Pelkey: So you went on the board at Infotron in late '80, sometime in '80? Or was it '81?

Hill: Frankly, I don't know. I think it was about -- I think it was in the spring of '81.

Pelkey: Then you went on the board of Avanti as well?

Hill: Yeah, I was on the board of Avanti in 1980. That was one of my longest boards. I was on there eight years, '80 through '87.

Pelkey: What caused you to go on the board there?

Hill: Bruce Elmlad was on the board, and he's my other business father, other than Bob Wiggins. Bruce was a founder of Inforex. He was Executive VP with Prime, and after Prime -- Bruce had been on the board of Avanti for a year or so, and asked me to come up to help with some of their situation. The reason I had to leave Infotron is Doelz Networks and Infotron started going on a collision course, and Avanti, when they decided to come into the T-1 arena, and Infotron came on a collision course, and that was about '84. Then I had an invitation to do the Bob Dolan thing at ComDesign, and that was the catalyst that had me then resign from Infotron so I could pick up that and reduce the conflict of interest potential with the Doelz and Avanti, so it worked out nicely. I was there four years, I think -- maybe '81 through '84.

Pelkey: Avanti is another company that has kind of existed and wandered around, was in a bunch of businesses and, while it tried, it never was anything more than another company.

Hill: Yeah. That one I'm reluctant to talk as candidly as I want, but in essence, Al Lucci is both the genius and the problem at that company. Al is a good personal friend and a guy who I respect personally a lot. I did, however, as a board member, speak my piece about his leadership capability. He is another engineer background. Avanti had a niche, but it was not well done. It was basically high-speed signal processing, and they were early on and some of their lowest speed things that they messed around with were 9.6, and they got up into the T-1 arena and attendant products early in the local area type line driver, short distance, short-haul modems. That was their niche, and they just always had a lot of products without a cohesive marketing approach. They were out just flogging. Then, when they came up with a T-1, they initially were neck and neck with Timeplex, in terms of the development of a T-1 -- a medium-range T-1, not down towards the channel bank and certainly not, the technology was not market available at that time on --

Pelkey: This would have been '83?

Hill: Yeah, '83, and '84. Timeplex, through good marketing, good muscle and being about six months ahead of Avanti's announcement plans, outdid them and took the secondary position behind the Megamux of Chuck Johnson's. They got into a development problem and they were well over a year late, and because of the pressure to get to market, they put product out before it was ready, and as you know, the quality was sub-standard, and that hurt them immensely from a marketing and sales viewpoint.

Pelkey: All Infotron, Timeplex and Avanti's T-1s were all data oriented T-1s. They handle some voice, but I think one of the strengths of NET, when they entered the market, they had a strong voice orientation. They were very robust in the voice domain. They also happened to handle data, whereas the traditional datacom guys, who were there first with products, didn't even know some of the buzz words of the voice side, and because the buying decisions were being made by voice guys, they got out- positioned. They just didn't take care of the voice side.

Hill: That's true. I think the T-1 was one of the great merger products between voice and data, and you're absolutely right, a lot of people scrambled for the voice terminology. I had a slightly different viewpoint of Avanti. If Avanti had one thing, particularly in their second offering -- their more robust offering in the T-1 -- it's an AT&T compatibility. Al Lucci went to great pains to make sure that he was AT&T compatible. I think the school is still out on whether that will ever play. It certainly hasn't manifested itself yet, in terms of a total marketplace.

Pelkey: But the reason it hasn't is because there's been nobody in that marketplace who's known how to market. It's not that it won't play, it's just that you don't have a Bruce Smith. you need somebody -- the T-1 business, all comments aside, Bruce Smith was a large portion of it because of this larger-than-life-ism. He was a marketing guy.

Hill: I don't know if we talked about this on the earlier tape, but if I didn't, I think Bruce Smith is a master marketer, and he created a lot with an ordinary start. He just positioned it well, he talked about Roman architecture, viaducts; I still remember sitting through his presentation saying --

Pelkey: These transportation analogies --

Hill: Exactly, and he was so elegant and so public -- addressed his public, I guess is what I mean to say -- and that shows. He's a modern day example of what good marketing can do when you're one of the pack, in terms of products. Bruce is a master at that.

Pelkey: But Avanti, Infotron, and the datacom companies in general, you can go through the whole list, even Timeplex. Timeplex had Ed Botwinick who has that cigar-smoking, intimidating style that tries to buffalo people.

Hill: I've said this to Ed's face, so I don't mind saying it now: I think Ed has worked hard at being the industry asshole, and he's perfectly aware of what he was doing the whole time.

Pelkey: Absolutely.

Hill: Chuck Johnson did it in a different style -- a lot of puffery, a lot of blowing smoke -- but Botwinick did it knowing exactly what he was doing, and we used to have lots of conversations like that. I said: "Ed, you work at this," and he said: "Of course I do. It's part of the game," and damn, it's worked.

Pelkey: But he didn't have the marketing flare in T-1. Although he captured the largest portion of the market, because he had an existing organization and customer base and so on --

Hill: Botwinick had a distribution system and a service organization, that is so potent in a national --

Pelkey: And he took advantage of it, even though he had an inferior product with his Link Series, he just took advantage of the scale of his organization.

Hill: Its kind of interesting, one of the plays that happened. There was a guy named Bill Smith, who Avanti recruited out of Timeplex, and Bill was a national sales manager with Timeplex. He came up to Avanti and was VP of Sales for them. I think Bill is an excellent old-school sales manager. He's one of the best, and he could not make a go at Avanti because of the rift between development and the expectations -- the same problem that happened at Infotron. They promised it one year, delivered it a year and three months later. It's hard to manage customers with appetites when they have other alternatives, and then put out a product that was sub-standard, and Bill never forgave Al Lucci for, quote, lying to him on the way in about what the product expectation was. Bill would have never taken the job, and I helped recruit Bill and I, frankly, felt badly because I was smoked a little bit too, both as a recruiter and a worker. So those things happen, and they are important in this industry today.

Pelkey: You have to deliver a quality product on time. It's basic, but the technology -- there's always this desire to kind of sell futures or one-upmanship, and it's because product life cycles are so short that you get suckered into this trying to be the leader.

Hill: There's a couple of things that are playing. In some of our private conversations we've talked about over-funding of the venture capital market. That, frankly, in the last five years, with the tremendous appetite that the venture community has to place now, I think has caused, at the end-user level, the buying public, a lot less tolerance for sloppy products, for poor quality, for poor service, and there's just a lot more sophistication in buying and this 'gee whiz stuff,' it's the first stuff out and the highest best price performer doesn't necessarily get that sale anymore. Distribution systems and service, as IBM has taught us and led the way, really drive well down into the high-tech offerings of the late '80s. They're a major factor on small companies starting up.

Pelkey: When did you join the ComDesign board?

Hill: I believe it was the summer of '84. I waited to join that board until the end of a fiscal year and a shareholder meeting of Infotron to make it a non-event for Infotron. I kind of had a pending offer, but didn't officially join the board until Infotron, so I think it was in mid '84.

Pelkey: You were there until '87?

Hill: Until NET purchased them.

Pelkey: And ComDesign was another company that had an interesting technology and had interesting possibilities, and was fun. It was a nice, small, fine company, but we both know Bob well --

Hill: Then we both know the story. I'd rather not detail that one. Why don't you tell that one.

Pelkey: I'll tell that one. You'll read about that story.

Hill: I'd rather have it come from your mouth than my lips. I love Bob to death, but in so many of these companies, I think leadership and awareness and marketing plays such an important part, and if I had to, just on a constructive basis, say that that was one of the areas that affected ComDesign. Again, they had just a tremendous number of offerings.

Pelkey: Only because he couldn't delegate..

Hill: Exactly, and a control issue too. The delegation at ComDesign was never there. It was always very tightly controlled, but I don't think that's necessarily a success factor or not. Wiggins, as much as I like to stroke my own ego and felt that I was doing a good job, Bob had good control on that company. He did delegate, but he knew what was going on, both through communication and reporting system, and one of the reasons that I left is that Bob was so strong that I didn't feel that I'd ever have a chance of running the company, at least in my time frame.

Pelkey: The datacom industry, from when you got involved in '76 and through the early '80s, was one of magnificent growth. It grew very, very rapidly; a very profitable industry. Then sometime in the early '80s, the industry started to really flatten out in terms of growth rates. Companies started to have problems, companies started to get ahead of themselves in terms of expenses. Do you have some views as to why it happened around then?

Hill: I think we can look at the venture capital business in the same way. When you deliver to an excited marketplace, when you're delivering huge returns, better than any other comparable investment thing, what happens is that funds flood into it. More and more people say: "Well, 30% compounded annual growth is pretty sporty stuff," and they started to do it consistently. The same thing happened in datacom. That's part of America. We saw an industry with great growth. We saw some really great start-ups come

out, and these stars, in terms of the investors, so it attracted competition, it attracted more investment, it attracted more companies, and it attracted . . .

Tape Side Ends

Hill: . . . so I think it's the normal supply and demand. The demand was high, supply was low, people --

Pelkey: The T-1 business started to have some impact, didn't it?

Hill: Yeah, the -- I forget the tariffing. When they tariffed T-1s and it became obvious that it was a no-brainer to do T-1s -- T-1s were what I call a subset of --

Pelkey: Because the datacom business had been pushing the 56, and everybody was going from 19.2 to 56 and that was like Nirvana, and all of a sudden T-1 came in and it really took the high end right out of datacom, where the margins were. Companies were pushing for margins because they allowed the bottom end to become a commodity business.

Hill: Right, exactly.

Pelkey: And then all of sudden the top end got taken away from them.

Hill: Yeah, but wasn't it exciting how fast T-1s became a commodity, though. I mean you talk about acceleration, T-1s, in a normal mindset of a guy my age, would say: "Oh my God, that's got at least a 10 year run," and whatever. They became like modems in one-third life.

Pelkey: Newbridge is a T-1 modem company.

Hill: Exactly. Bill Smith, by the way, left Avanti and went down to New Bridge, and he's the guy who's the sales manager. I don't know his exact title, but --

Pelkey: He's done a superb job.

Hill: Exactly.

Pelkey: They are the hot new datacom company, but it's a channel distribution issue.

Hill: Yes. It's almost a channel bank product, too, so that confirms the earlier comment that Bill Smith is a good sales manager. He had the potential to do it at Avanti, but you have to have a well-balanced, functional discipline throughout an organization to make it go, and that's where they didn't match up. Newbridge is where they have a sassy product, a reasonable marketplace, and a great --

Pelkey: Sales/distribution guy.

Hill: Exactly.

Pelkey: And the industry also became the issue of utility networks. In the early days, you saw that at Paradyne, the first application networks, the multi-drop modems. People started thinking about putting networks in. We were talking about the DDA; the banking applications. It started to change, during that period of time, from being remote terminals to a host, shifting to the concept of an application. Then, in the early '80s, mid '80s, it started to move more to this utility network. People were wanting to consolidate all of these individual networks into a larger one, which the T-1 allowed for, but it also changed the nature of the business.

Hill: Even in the mid '80s, I found that most of the networks that were out there were pretty much single purpose networks, though. With all the theoretical capability that SNA offered, in terms of switching

mainframe, switching hosts, dial in, having sessions, as it turned out in practice, even through '84, '85, '86, '87, that a lot of the networks out there were very single purpose. Yes, they had moved from point-to-point to multi-drop because of line efficiencies, and yes, T-1s played in it, but you still carved out your channel for that voice channel or that data channel, and it still, frankly, played into a single purpose network. Even places that are huge, like Bank of America, with some 50 to 75 independent networks that are there today, struggle to bring those together because of the technical complications. There are still political influences on networks, where a trust department or an international monetary transfer department will not commingle for some control reasons, for pride reasons, won't commingle networks. I saw that in a microcosm in my association with Doelz, but that eventually has to come, because even with the technology of the carriers themselves bringing more and more advantage to the end user, the cost of carrier is still a major cost of a network. It's an on going every month's cost, even with leased-lines and satellites and all the other things that are available today. Only the really big users can take advantage of some of this bulk transfer stuff like T-1 started, and there's some excitement in the T-3 market. I don't think that'll take off as fast, because that's really big time, in terms of the available bandwidth.

Pelkey: My understanding of how people see the marketplace, and how I've learned to see the marketplace, is that you brought professional selling to this industry, and that you were largely credited with having done it. That was the first time that kind of a system sale -- a large system sale orientation -- started, as opposed to selling boxes. This is an industry that still has a long way to go to get to really being a system sale versus a box sale. You tried to do that at Doelz, the T-1 companies have been successful in systems sales, the consolidation industry is because the customers want to buy from one vendor and they want a complete solution, and it's forcing the DCAs and so on, Timeplex had to go merge with Unisys. It's forcing the systems selling approach on the industry. Do you agree with that?

Hill: There's diametrically opposed forces, in my opinion. The one that fights against it being a system sale is, for instance, the modem's ride from being a singly sold product we used to sell a couple of to where you can buy them on the shelf now. If you talk about the lower end now, the Hayes 2.4 end, and even T-1s we talked about a few minutes ago becoming a commodity type product, that forces it away from a system type sale. I'll throw out a name: Harris Corporation. You don't think of those guys as being players in the data communications, they sell lots of systems and networks and a lot of communication products. They have a whole sector in the company that is probably -- Harris itself is about 2.4 billion, and that sector, there are five sectors, all about the same -- Harris has a communications sector that is probably in the 300 to 400 million. They won't be in your book, except maybe by this comment, and the reason is -- that they're there is -- because they do -- I want to keep saying MSA. Who are the people here in Boston that do the X-25 and a lot of the government work?

Pelkey: BBN.

Hill: Yeah, BBN, and there's another one, too.

Pelkey: M/A-Com?

Hill: M/A-Com. BBN is another good example. They pick up \$100 million contracts because they have the total thing, certainly above what NET and Doelz did in terms of system. We did that, in terms of the way we approached the sale, by always putting product expertise and network expertise along with the salesmen to make sure that we properly applied, and we called it a systems approach, but we were still only dealing with a piece of it. The real people who do it are the large companies who do 50, 100, \$200 million contracts that are just huge, that last for five years: the FAA implementations, the Social Security, the Veteran's Administration; when they buy things, they buy it from a prime contractor, and the smaller players fit into that somehow. So it depends on the market segment that we're dealing with as to what a 'system sale' really means, but I see a lot of 'do it outside the company,' hire the expertise on a total contractual basis, because companies very rarely are able to even properly, or economically, procure large systems. I've seen that first hand with Bank of America. Because of my Doelz involvement there, AT&T came in with Datakit and they just powered in, and still never will put up the network that they sold them. Since that's a subject of a suit, I can't be too prolific on my comments about that, but it's a good

example of a very large, reasonably well respected at various times, organization that has a tough time procuring a simple statewide branch network. They've failed on a couple of occasions.

Pelkey: I have no other questions. I thank you very, very much for your time.

Hill: As you know, both on a personal basis as well as allowing me to talk about some history, has been great fun for me. Thank you for talking to me.

END OF INTERVIEW