Mentor Graphics Oral History Panel Session

David Moffenbeier, Gerry Langeler, and Tom Bruggere

Moderated by:
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David Moffenbeier, Gerard Langeler, and Tom Bruggere, March 22, 2013

Fairbairn: My name is Doug Fairbairn. I'm here interviewing the three founders of Mentor Graphics. We are at the Mentor Graphics studio and television video studio in Wilsonville, Oregon. It is March 22, 2013 and with us are Gerry Langeler, Tom Bruggere and David Moffenbeier. And they are going to give us the background on sort of their individual histories and then we are going to go into a sort of team discussion on the founding and rapid growth of Mentor Graphics in the 1980s and early 1990s. So maybe we'll just start on the left hand side and ask Dave to introduce himself and give us a little- your personal background and how did that lead up to the Mentor Graphics.

Moffenbeier: I grew up in Portland Oregon and my first job was for a timber products company that was big in Oregon at the time. And I worked for the CFO, so I decided that career wise I wanted to be a CFO. In order to do that it helped to have an MBA and a CPA. So I applied to Harvard Business School and I got in where I met Gerry Langeler. We were in the same section together. After that I came back to Portland. Became a CPA with Peat Marwick. By that time Gerry was already working at Tektronix and I decided to come over to the Finance department at Tektronix. Worked there for three years and at that time eight of us got together to think about starting a new company. So I worked for about 12 years, CFO for four and in sales for eight. After that I did another startup with electronic medical records called Medicalogic. It went public in 1999, the height of the dotcom explosion. Stayed there until 2002 and then I did another startup in agriculture that I'm in the middle of right now. Over those 1981 to today I've raised about $250,000,000. About fifty or sixty million in private and a couple hundred million in public offerings and secondary offerings.

Fairbairn: So going back to your early days, did you ever see yourself getting into technology or was that anything that was interesting? Or your interest was in finance and-

Moffenbeier: My interest was just being a CFO and I always thought of it would be in timber, but when I went to Tektronix, I got in the finance side. I didn't know much about the technology so I just worked my way up in finance and then when we started Mentor I was the CFO... So it was mostly finance, raising money, doing books. And after we went public and raised a bunch of money and Tom and Gerry figured I was good at raising money but I was also good at spending money. So they wanted a different CFO. I was asked to go help with Europe. Got into sales and I stayed there forever and that's what I ended up liking the best.

Fairbairn: Fascinating. Okay, Tom, could you give us a little bit about your background?

Bruggere: Sure so I grew up in Berkeley, California, small conservative town in the Bay Area. My father was a traveling candy salesman who dropped out of school in the eighth grade to support his family. I graduated from Berkeley High School and went away to college and graduated from UC Santa Barbara. I started there as en economics major who was going to go to law school until I realized that you had to do a lot of reading to be an economics major and to go to law school and so I wound up taking a degree in math. I had no idea what I wanted to do but I had taken the first computer programming class that they offered down there at the time and I thought that was kind of fun, but there wasn't much to do in the way of jobs back then. So I decided I was going to be a career army officer. Left in 1968 and when I graduated I went into the army. I went through all the training, went to Vietnam and decided that was not what I wanted to do for the rest of my life for fairly obvious reasons. I applied to grad school when I was in Vietnam, took my tests in a bunker and then went to grad school at the University of Wisconsin, got a degree in Computer Science, which is what I enjoyed doing when I was an undergrad. And then I came back to California and got my first job at a company called Burroughs, one of the original computer companies.

Fairbairn: Where was that?

Bruggere: In Pasadena in Southern California. While I was there I went back and did an Executive MBA program, which sort of sparked an interest in me in starting a company. Everyone in that program was in their 40’s and was trying to find a new job, and I was in my 20s and trying to figure out how to buy a house. So it was fascinating to me that a lot of people wanted to start companies, and I thought that was kind of interesting. But I didn't like Southern California so my wife and I moved to Oregon because we'd been here one time to visit in August; the sun was shining, it seemed like a great place. There were ten million people in the greater LA area and two million people in the state of Oregon and it seemed rather nice. So I got a job at Tektronix and I worked there for four years. I loved working at Tektronix. I thought it was a marvelous place culture wise and everything else. I wound up managing a small group of computer software people who were doing application software for a new generation of desktop computers. Tektronix had a 4051 desktop computer and they were doing a new generation, which would actually have been the first engineering desktop computer, engineering workstation if you will. We were doing a word processing system; we were doing a spreadsheet ala VisiCorp; we were doing a 2D drafting system;

we were doing a presentation graphics systems very much like PowerPoint; and we were researching some other things at the same time including an electronic design package to run on the new desktop computer. But Tektronix was not a computer company. They didn't know how to build a computer. They were trying to vertically integrate and build an operating system, a graphic subsystem, a microprocessor, and the computer software all at the same time.

Fairbairn: What year was this?

Bruggere: When they started working on that project it was probably about 1979 and when it imploded it was 1980. And so toward the end of 1980 when it imploded my little group really didn't have anything else to do and it was time for me to go find something else to do in the company or elsewhere. And that's when I decided that this would be a good time to try to start a company. So it was probably about the summer of 1980 or something like that. One of the fellows who was in graduate school with me, Jack Bennett, I had I'd gotten a job at Tektronix. We used to go jogging together and I'd kind of talk to him about "You know, I think I want to start a company. This is what we might do." And things like that. We'd just talk it over as we'd run. Finally, when it got to be about December of 1980 or January of 1981 I decided, "well I've got to do something. This might be a good time to try to go start that company.".. Because even though Tektronix couldn't build this new desktop computer, I figured somebody was going to. There was sort of a prototype from a company; I think it was called PERQ.

Langeler: Three Rivers PERQ.

Bruggere: Three Rivers PERQ.

Fairbairn: Yeah, PERQ, yeah.

Bruggere: PERQ was doing something that they'd introduced several times, never quite getting it working very well, but at least there was a model that was out there. So I went around and I started talking to some of the engineers who were in my group. I talked to Jack who wound up coming on and being our database person. I talked to Ken Willett who was kind of a technical leader in my group at the time. And I talked to each one of these people individually and the pitch was something along the lines of "You know, I'm thinking about starting a company to do these kinds of things. I'd love to have you get involved. Yeah, there are some risks but the biggest risk is you go off and try, we fail, and you come back and you do the same thing that you're doing right now." So I talked to them.. I talked to a fellow named Charlie Sorgie, who was doing our word processing system for the new product, which now had imploded. And then Jack introduced me to someone who had worked at Burroughs when I was there but whom I didn't really know, Rick Samco, who was now working at Tek Labs. That became significant because Rick is the one who got the early look at the Apollo computer when they had come out to visit Tektronix. Also, in about the spring of 1980 I'd met a fellow at a computer a graphics conference. After I'd

given a little talk, he came up and gave me a card. It turned out that he was a venture capitalist. Today we would probably call him an angel investor. Back then he was sort of considered a venture capitalist. So after I talked to the engineers, I went down and met him in San Francisco. We had coffee in the St. Francis Hotel and I said, "You know, I'm thinking about starting this company. I don't know what we would do. I don't know what the product is. I've got a few engineers who are interested. What does it take to get a company started?" And he basically said, "Well, if you want to get a company started, you need a good product in a growing market and a good group of people."

Fairbairn: Who was this person?

Bruggere: His name was Vernon Anderson, and he was a very nice guy, very kind to sit down and talk with me because he didn't really know me. We'd met back in was Boston and we just talked. I don't know where he is now, but he'd been a successful executive. . And after he said "a good product in a growing market with a good group of people" I literally said, "So if I put together a good product in a growing market and I had a good group of people, could we get funding?" It was a very hypothetical question. He said, "If you did something like that, you probably could." So being a little overly optimistic I took that as a funding commitment and I came back and I told this group of engineers. I said, "Okay, I've got"—

Fairbairn: Let me interrupt. Before you get into the Mentor Graphics story, can you jump ahead and we'll get into the Mentor Graphics thing after we get through the personal stories. So jump ahead now because we're really getting to the formation of Mentor it looks like at this point.

Bruggere: Okay. So then when I left Mentor, Wally came in. I went off and ran for the U.S. Senate, but I lost after five days of counting absentee ballots. I then took a little decompression time off and began to get involved in investing and some board positions in some small companies. I was a Founding Chairman of Stamps.com. We raised four hundred million dollars in a nine-month period of time for that company, one of the only dotcoms that's still around. I got involved in a company on the East Coast called Open Market that did a public offering, and I was involved with a number of other companies in a whole range of different industries, most of which I knew nothing about. But currently I'm running a drug development company, a pharmaceutical company. As I've gotten older I've come to realize the world needs more good new drugs than good new computers! I'm the Chairman and we're out trying to raise money and trying to go through the FDA process and commercialize the compounds.

Fairbairn: Interesting. Quite a broad background there. I had a question but I'll come back. Gerry, can you?

Langeler: Okay so I'm just going to go back slightly farther than Tom and Dave did just for context. I was a child of the space age and so growing up I actually remember standing on my high school field and a plane went over, a little private plane went over and I looked up and I said "I want to do that." And that

started me down a path toward trying to get into the astronaut program. And as you see that didn't go all that far, but I did start flying when I was 16 and got my pilot's license.

Fairbairn: Where were you?

Langeler: In New Haven, Connecticut. And started flying then. In school I was good in math and science and so therefore I should be an engineer. And so I went to Cornell.

Fairbairn: Did you know what that was?

Langeler: I knew what an engineer was simply because I had a brother-in-law who was 10 years older than me who was an engineer at Cornell, an engineering grad at Cornell and so I admired him. And so I wanted to be an astronaut. He was an engineer. That was cool. So I went to Cornell to be an engineer because I was good in math and science and discovered that while I was good in some parts of math, algebra, calculus did not compute in my brain at all. So basically I was flunking out of engineering school. In fact the story I love to tell about that is first day in engineering school they say "Look to your left, look to your right. In four years two of the three of you won't be here." I was the guy on the left. So I went through a series of majors because I also had draft number 34 and I didn't want to go to Vietnam, and so—

Fairbairn: You were scared… <laughs>. You figured it out soon enough

Langeler: But I had to graduate in four years or lose my 2-S deferment. And so I bumped around in a bunch of majors ending up as a chemistry major. But the other thing I did is I was in the Air Force ROTC when I got there because that was going to help me get toward the astronaut program and then my eyes went bad. So now I wasn't good at engineering and I could fly private planes, but I couldn't fly for the Air Force and the Air Force said "You could be a navigator" and my response was "I'm not going to sit in the back of the plane. That's no fun." So I bailed on that as well. Came out of college again with a chemistry degree but not a burning desire to be a chemist or anything like that. But I had grown up in an entrepreneurial household. My dad stared an industrial advertising agency in 1950 and he was and remains one of the most creative guys I've ever known, although an absolutely awful businessman. So he could get clients, he just couldn't manage an organization. I had much more of a business mind, obviously not trained yet, but not the creativity. So I joined the family business for three years to try to help kind of stabilize that a bit and did. In industrial advertising, one of the accounts was a company called E.L. Instruments that was a bread boarding company that made this little white breadboard, you could plug wires in and connect things together and breadboard circuitry. And this was back in 1972. So that gave me my first real exposure to anything in the electronics field. After three years in the family business I realized I was flying by the seat of my pants and the seat was thin. So applied to Harvard, got in, and that's where I met Dave and sort of got my business grounding but with no real plans to go back into the family business. I didn't know what I wanted to do but I wanted to do something other than that. And I still

had this interest in technology but obviously not a deep appreciation for what it took to do engineering other than the fact that I couldn't do it myself. And what happened at Harvard was a couple of things. One was that Dave and his wife Beth took me kind of under their wing and fed me and the other thing is they were both from Portland, Oregon and they were really nice people and they did a sales job on me for two years saying "This is the only place to live if you were smart enough to know that." I was single. I didn't care. And I did want to be close to skiing and close to the beach. So I came out here and started knocking on doors and Tektronix was the biggest door. And Tek at the time had a program to hire a few MBAs even though later on they couldn't figure out what to do with us as MBAs. But I joined Tek in a group called New Ventures which was sort of a really, really early example of industrial venture capital. There were four of us, all very different backgrounds: a guy who was an electrical engineer and a Tek salesman in Eastern Europe, a guy who was an economist, a guy who had a PhD in physics and an undergraduate in philosophy which I think is the same thing, and me as a chemistry major with an MBA. And if we could agree on anything we figured it might be useful to the company. We did agree on a couple of things but none of which got approved by senior management. One, interestingly enough looking now forward was we suggested that the company Tektronix acquire Calma. This was in 1978 and shortly after that GE bought Calma for sixteen million dollars and sold it just three years later for one hundred and sixty million. So I was exposed to electronic computer graphics, electronic design stuff, and exposed to sort of venture capital like behavior at the same time. I stayed at Tek in a number of other roles. Marketing communications built on my advertising background. They had an internal agency that was running amok and I ran that for a year or so and then went down to Wilsonville where Tom was to help form a group in the computer graphics hard copy business where Tek had a few products but no business unit and we were the first business unit in the printer business doing graphics printers. I did that for two years. I'll stop shortly here before we jump way ahead but Tom got on my calendar and it was about January of 1981 and I kind of knew him casually, not really well. He was an Engineering Manager and obviously had more of a business mindset than most Engineering Managers at Tek. I thought he was looking for a job in my marketing department. And so we met in the little room off the cafeteria in Wilsonville and he started to interview me, which was puzzling the hell out of me because I was ready to interview him. And there was a very awkward period I think for a while during that lunch while each of us were trying to figure it out. Well, he wasn't trying to figure out what was going on but I was. Finally he said "Well I'm thinking of starting a company and Gerry, you're a good marketing guy and would you consider doing that?" And so I went home and talked to my wife and we agreed that was a really bad idea. I was on a good fast track at Tektronix. Probably was going to be a business unit general manager in the next year and so shouldn't do the startup. But I think having come from an entrepreneurial family and recognizing that this maybe was the brass ring going by, I kind of slept on it and got back to Tom some number of days later. I said "You know, maybe that would be interesting."

Fairbairn: The question I have is did you tell your wife?

Langeler: Did I tell my wife that I was— yes. I did tell my wife that I was having second thoughts and fortunately for both of us had a job so we could handle that. So that sort of leads up to where we got going. The other thing was then I said to Tom "I know this guy, Dave Moffenbeier, he's the best finance guy I know. We ought to pull him into this." And that's how we got connected there. So jumping ahead I

left Mentor in 1992 for a couple of reasons. We'd been doing it for a long time and I found myself being very deep but very narrow, right? I could talk to you about electronics automation software until your ears fell off but not much else because we were so focused on the intensity of the business. And I kind of liked the idea of going more broad and shallow rather than narrow and deep and there's nothing more broad and more shallow than venture capital. And it turns out that in 1985 shortly after we went public I had been asked by Greylock, who was one of the investors in Mentor, to go on the board of one of their startups up in Seattle as an operating guy to help that company. On that board were a couple of other venture capitalists one of which was from the firm I'm now with, OVP Venture Partners then called Olympic Venture Partners. They had a Portland partner who by 1992 had not worked out and so by '92 they had a Portland office but no partner in it and I was starting to get antsy looking around to do something and they said "Hey, why don't you come over and be a venture capitalist?" I had noted that the venture capitalists in Mentor had made thirty times their money in three years and we'd done all the work. So I said I kind of like their model. Now I'm still waiting for the “thirty times my money in three years deal” twenty some odd years later but it looked like it would be fun. It looked like it would be intellectually intriguing which it has been. And it looked like it would be easy, which it's not. So then jumping ahead over the last 21 years now I've been at OVP Venture Partners as a venture capitalist investing principally in software technology but also in some wireless communications hardware companies, a little bit in biotech and more recently in clean tech.

Fairbairn: In terms of the background, I want to go back to some of the things that you were talking about, Tom. I was intrigued. What was— where did the impetus for this sort of engineering or development workstation come from in Tektronix and say a little bit more about why it didn't work? And then secondly, how did your experience at Tektronix or what were the things there or elsewhere that sort of formed your ideas about what type of in terms of what type of company, not in terms of its product, but in terms of the style of the company and so forth. What were the formative factors that came into play?

Bruggere: So on the workstation, Tektronix had this desktop workstation called the 4051 that was literally a little desktop computer for an engineer. It had in it an eight-track tape and it ran a little Basic language interpreter that it bought from a little company in New Mexico called Microsoft. My group was doing applications for it because that was kind of what we had to work with. And then we were working on the next generation of that which had a name that I cannot recall.

Langeler: 4061.

Bruggere: Is that what it was? 4061?

Langeler: Yep.

Bruggere: Yeah, and literally the company was trying to design a microprocessor, design a graphics subsystem, which obviously they knew how to do, design an operating system from scratch which they had no experience doing, and create application software, build the whole thing from scratch, a totally vertically integrated approach.

Fairbairn: Was there one individual who was sort of driving that? I mean that's a big step from oscillscopes and other things.

Bruggere: Who was driving that project?

Fairbairn: That project, yeah.

Bruggere: Yeah, there was an individual who was driving that project whom I won't name but probably gets the responsibility for the creation of it and everything else that kind of went along with it I guess I would say. Yeah.

Langeler: But the microprocessor was called Tina.

Bruggere: It was - that's right.

Langeler: It supposedly stood for “This Is Not an Acronym.”

Bruggere: Yeah, that's right, very good!. I had forgotten all about that.

Fairbairn: That's his daughter's name or something?

Langeler: I don't know.

Bruggere: It was a big project and I had worked for a computer company and I had worked on the design of a new generation of computers, and I knew what a difficult task that would be even at a computer company like Burroughs. The one that we were working on we couldn't do. It imploded. So the idea of a company like Tektronix that was not a computer company trying to do something, that was—

Fairbairn: Trying to do their own microprocessor?

Bruggere: Yeah. The whole microprocessor was very difficult. The whole operating system from scratch was totally over the heads of the people who were doing it, and the vertical integration and everything else was just too much and so it imploded at the end of the day. But to your second question, what I took from Tektronix? Burroughs at the time was a very old-line computer company. Headquarters in Detroit, our satellite in Pasadena, and when the executives from Detroit came out they literally rolled the red carpet out onto the street for them to walk on from their limos. And this was Southern California. At that time the only people who had limos were in Hollywood and the only red carpets were at award shows. And so it was a very old-fashioned culture, if you will. Tektronix had a much more people-oriented culture to me. It was only the second company that I'd worked for and the only second job that I'd had beyond carrying a rifle and pumping gas, so I didn't know too much about other kinds of things. But Tektronix had a very people-oriented culture. People were given a lot of freedom to innovate. Hours were very flexible. The company at the time was very involved in the community doing things through contributions and supporting the community. There were a lot of families that worked at Tektronix where you'd have a husband, a wife, and even children that worked at the company. And so I thought for that me, given what I'd seen at the other extreme, the culture of the company was very employee-friendly. The campus that the company had, still has I guess, in Beaverton was very unique from the things that I'd seen before. So there was a cultural aspect of it that I liked a lot. I never worked at HP, but I understand Hewlett Packard had a similar kind of environment. And it's one of the things that I really wanted to replicate or take the best parts of at Mentor.

Langeler: I only had one other thing. I think it's embedded in what you said, Tom, but I think your experience with the Tek 4061 and the challenges of incredible vertical integration helped drive Mentor's mentality of “we're not going to do all things. We're going to do one thing really well and use standard hardware.” You might want to expand on that.

Bruggere: Right. Because I'd been through two failed computer building projects, one in a big computer company and one in Tektronix, there was no way I was going to get involved in trying to build our own computer. Now at the time that we were kind of getting this stuff going, we didn't know about Apollo Computer so it was really more of “somebody is going to do it so let's just get started and we'll find out who that person is going to be.” And then, almost serendipitously I think, we stumbled across Apollo Computer because they'd come out to do a sales call or a presentation at Tek Labs and Rick Samco had a chance to see that. So that was one of I think a number of very serendipitous things that happened in the early days of Mentor.

Moffenbeier: When we were raising the first round of money from Venrock, Greylock, and Sutter Hill one of the concerns was we were going to bet our startup on another startup called Apollo Computer and they said "That's not a problem because we're the investors in Apollo Computer also and so we're sure they're going to make it." So that worked out pretty well for us.

Bruggere: Yeah, I think that definitely helped us raise that first round of money because they were looking for something to make Apollo successful. We were looking for something to make us successful.

Fairbairn: So Tom, let's pick up the story where you were before with a little back step. You were going around talking to all these people within Tektronix that you thought might want to join your company you had had this conversation with this individual who at least appeared to be a venture capitalist in terms of the ability to raise money. When you were going around talking to these people were there any that you talked to that you didn't want to join? Did you sort of very carefully select the people you talked to? Were you worried about the word getting out that you were in the process of trying to steal all these people? Tell me a little bit about that.

Bruggere: So nobody said no. I did very carefully select the people. I mean most of the people I either knew and a few of them worked in my group so I knew what their capabilities were. So nobody said no, but to be perfectly honest the pitch didn't really require them to say yes or no. It was more along the lines - until the three of us got together but this is talking with the engineers - the pitch for the engineers really was more along the lines "I'm thinking about doing this, haven't really made the decision yet. If I did, is this something you'd be interested in? And here is why you should do it. Don't need you to say anything right now because we still have a lot of stuff to go ahead and do and then we'll see." What the fellow that I met with in San Francisco had said is that I needed management and particularly in marketing and sales - that kind of person in particular. So like Gerry said, I came back and asked a friend of mine at Tektronix, Melissa Waggener, Waggener who went on to found the Waggener Edstrom Group, which I think is the largest private PR firm in the country now or the world. Anyway I asked Melissa who are the best marketing people in Tektronix, because I didn't really know. And at the top of her list was Gerry. And that's the point in time when I got on Gerry's calendar and we had the meeting in the little conference room and kind of sat down and I gave Gerry the pitch. I don't remember the entire pitch I gave. I think maybe it came across as more of an interview but to me it was definitely a soft pitch.

Fairbairn: It didn't sound like he had much of a plan at that point anyway, so.

Bruggere: No I mean I'm just trying to find people at this point. We didn't have a product. We didn't have a market. Didn't have a company. Didn't have any investors. We just had me wanting to start a company at that point. But then as we kind of progressed, I met Dave through Gerry and the three of us would talk a little bit. I talked with the engineers a little bit. And then I'm telling the engineers how committed Gerry and Dave were. I think I was telling Gerry and Dave how committed the engineers were. But in truth, nobody was committed except for me. And then we had a meeting at my house one time when Gerry and Dave came over and the engineers came over and they all got to meet for the first time, and I was kind of hoping that nobody would come up and say, "Oh, I understand you really want to do this." And then we started talking about what product, and I had a person in my little group who was researching this whole area of engineering workstations, software for engineering workstations. There had been a project at Bell Labs that had been sort of a prototype way back in the day. And we were doing a project where we were

doing some research on different products, so there were about, I think, three things that we put on a list that could be potential products. The ones that I remember were electronic engineering on the desktop, 2D drafting, I think was one of the ones that we had, and then there was-

Langeler: Business graphics.

Bruggere: Business graphics or we called it Management Information Systems or something?

Langeler: Yeah, something like that.

Bruggere: I think statistical mapping was maybe on the list too and maybe not 2D drafting. And as sort of a team building process we talked through all of those things which would make the most sense. There's only one that made any sense at all to be honest because nobody really knew what management information systems were. Statistical mapping you were going to have to sell to counties and they had no money, so there was really only one that made sense and we kind of focused in on that: the engineering workstation.

Fairbairn: So all these years you had had the technical background. They were working on technical related things.

Bruggere: The engineers had computer software backgrounds, but none of them at that point in time had an electronics background. But what we were missing at that point in time was an engineer who had an electronics background. So after we all sort of unanimously decided that the electronic design field was something we wanted to go into, then I went off to get an engineer who had that background. I'd had an engineer in my group, John Stedman, who had worked in electronic CAD at one of the bigger ones. I don't think it was Applicon. [I recall it was Intergraph] He worked at one of them anyway doing printed circuit board layout software so he became our expert if you will. And then a little bit after that so now the three—

Fairbairn: None of the others knew about schematic entry or what that looked like or what the requirements were?

Bruggere: None of the others had electronics background. Ken was and is very smart and might have had more knowledge than the others, but the others were just computer software people. And so then there were the five engineers after we got John and the three of us. And it became fairly clear to us that we needed somebody to manage these engineers who knew something about electronics. The three of us all knew Steve Swerling in different roles from Tektronix and I think we approached him at somebody's going away party as I remember, and asked if he'd be willing to talk to us about coming on as an

engineering manager. Steve had a degree from M.I.T I think a Master's, and he was working in Tektronix in Beaverton. And so we recruited Steve.

Fairbairn: This was all before any of you had left, before you had the product really defined?

Bruggere: The three of us might have left at that point.

Moffenbeier: The three of us had left before.

Fairbairn: What was the impetus? What said okay, you'd been talking for a long time, what was the thing that triggered you to say okay, now is the time to cut the cord?

Bruggere: I left a month before these guys left and I can't remember if that was February or March of 1981 but it was around that time.

Moffenbeier: I think February because—

Bruggere: Did you guys leave in March?

Moffenbeier: Think so.

Bruggere: So I probably left in February. And I started working out of my house.

Fairbairn: It just had come to the point where that was time to go? Was there any precipitating event?

Bruggere: No, it was just kind of time to go. I mean I think I said something to people "I'm going to go start a company." I didn't say whom I'd been talking to or anything like that. It was just that of it got to a point where it wasn't going to be honest to try to start a company while I was working at Tektronix, so I left and started working out of my house. Literally I would get up in the morning and I would make calls to the East Coast at about 9:00 when they were at lunch so they'd have to call me back on their own nickel. This was when you paid for phone calls. Remember those old days. And then I'd do the same thing at noon to the West Coast. And when I left Tektronix there was a very small little blurb in something called the *Harvard Computer Graphics* newsletter or something like that?

Langeler: That's right.

Bruggere: That I had been at Tektronix, managing this little group and I was leaving to start up company. And it was about that long. Why they even bothered to write it I have no idea but it was about that long. And then I got a call one day from a fellow named Dave Strohm who was just out of business school and had gone to work for a firm called Greylock, and he was what do you call them? He was like a scout.

Langeler: Associate.

Bruggere: Associate, yeah, who was out there looking for things and he talked to me and I told him this is what we're doing and I think by that time we had actually focused in on the electronic side of things so I probably told him a little bit about that because I was making calls about electronics. And he said one of his partners, Charlie Waite was on the Board of Floating Point Systems in Portland and he was coming out to a board meeting and would we be willing to meet with him. I'm not sure if you had left by that time or not, by the time he got here.

Langeler: We met with Charlie.

Moffenbeier: Yeah, I think we met with Charlie.

Bruggere: And so we met with him. By then it was just the three of us meeting with people. And then Charlie went back to the Board meeting, as I understand the story, and Earl Wantland who was the Tektronix President, was on that Board and he asked Earl: "I understand these guys are trying to start this company. What do you know about it? What's going on?" things like that. As I understand the story, correct me if I'm wrong, Earl said something about "Yeah, I know the people, we think they are three of the best people in the company. We are sorry to see them go but if it were possible I'd invest and is that an option?" And at that point in time basically Greylock was ready to do the deal.

Langeler: We wish we had known that conversation had taken place. We might have negotiated better terms from the venture capitalists.

Fairbairn: Where was Greylock?

Bruggere: Boston. They only had a Boston office. And so Greylock went and brought in Sutter Hill with whom they liked to invest back then. That was one of their favorites. Sort of in parallel after we'd had the talk with Greylock the three of us met Dave Hathaway from Venrock. He was also new. I don't know if he was a partner or associate back at that time, but he was making a first trip through Portland and we hooked up with him through kind of a lawyer contact that we'd had and met with him and by then I think we probably had identified Apollo. We didn’t really know and he was an investor in Apollo, but he got interested because of that. But he didn't know about Greylock and Sutter Hill. So he became interested

and started talking to us. We had gone off and gotten a small space that was probably what would you say? About half the size of this room?

Moffenbeier: Half the size of this room but it was free and we had two desks and three chairs.

Bruggere: Yeah, a blackboard that leaned against the wall.

Moffenbeier: Right.

Bruggere: And we were writing a business plan. And Venrock was calling and Greylock was calling and Greylock told us, as I recall, to stop writing a business plan. Let's do a deal. And then I was talking to them trying to get Venrock involved because that seemed like a good thing to do and they didn't really want to get Venrock involved. We were trying to raise - what were we trying to raise? Six hundred thousand dollars?

Langeler: Yeah, six hundred thousand dollars was what we said was all we'd ever need. That number will come back around later.

Bruggere: Yeah, and so why do you need a third?

Fairbairn: Right for that amount of money.

Bruggere: But we ducked calls and put them off to actually finish the business plan. We never really sent it to anybody but it still is around. And then we kind of worked behind the scenes to get Venrock involved and got a term sheet. We let them talk us up to a million dollars I think for the first round, and we put together the deal. It was still just the three of us that had left our jobs and once we had the money the engineers—

Fairbairn: So did all three come in for a total of a million?

Bruggere: Yeah.

Moffenbeier: Which was a big deal at the time.

Bruggere: Yeah.

Moffenbeier: It was the first venture deal in Portland I believe. Floating Point Systems had started ten years before that, and there weren't any comparables for valuations and so I think if I remember right we raised a million dollars at a three million dollar valuation.

Bruggere: Yeah, I think we gave away about a third.

Moffenbeier: Gave a third of the company, which was a huge valuation post money, three million dollars.

Bruggere: Yeah. Now we had no product. We hadn't even started coding at that point in time. We had a slide show that we put together that we used to take around to prospective customers and say "We're building this, what do you think?" And then they'd say, "I like that, I like that, I don't like that." And then we'd come back and Gerry would change the slide show and then we'd go back out again. And then we gave it to the engineers and basically said, "Build this".

Fairbairn: Was it just the three of you going around to potential customers?

Bruggere: Yeah it was mostly Gerry and I.

Moffenbeier: The two of them went to customers. I was on the finance side. I didn't know how to build electronics.

Langeler: Yeah and once Steve Swerling showed up, then he was also part of the customer – product definition business.

Bruggere: Yeah he was much better than I was, because he had an electronics background.

Langeler: Yeah he was critical because he could actually understand what they were saying.

Fairbairn: Yeah I'm sort of surprised at how well you did given the general lack of electronics background amongst the people involved.

Bruggere: Well Gerry picked it up really well. I think he and Steve used to sit on the airplane together and do tutorials. Of course Steve was very steeped in it. I could always talk for fifteen minutes about anything and then I'd stop.

Langeler: Steve and I would actually stop on the Jersey Turnpike at the rest stop and both change the slides from what we'd heard in the previous visit. But also Steve would say "When they said this, this is what they mean. And Gerry, when you responded to that, you sounded really stupid. Don't say that again." So he did a marvelous job tutoring me.

Fairbairn: Did you have trouble setting up meetings with customers? Were they all open to this idea?

Langeler: Remarkably not. I found it true then. I find it true today in my venture capital career. If you call people up and say "We've got this interesting new product idea. We'd like to expose it to you and see what you think." People will drop what they're doing. We got to see essentially everybody we wanted to see.

Fairbairn: The other thing was you had a lot of interest. You said you were the only start up in the Portland area for ten years or whatever, venture funded startup. So that also it seems was unusual. In general it's hard to get venture capital people interested especially those in Silicon Valley or New York or whatever.

Bruggere: Right, it was another one I think of those serendipitous things that happened. It just happened that Greylock was coming through to go to a Board meeting with Floating Point Systems. That's just going to happen. It just happened that Venrock was coming through on their first visit through Portland and we just happened to connect with them because we were talking to the right person at the right time. And so that kind of all came together. Subsequent to them doing us, at least Venrock did another investment in Sequent. I don't think others were involved in Sequent. When Sequent spun out of Intel that was probably a year or two after we had gotten started.

Moffenbeier: They raised quite a bit of money at the time and at a much higher valuation. I think there were eight or ten of them.

Bruggere: Maybe more. Maybe a dozen that came out of it.

Langeler: But I think it's important that we were asked, not told but asked, by some of our venture capital investors, I don't know whether it was Sutter Hill or who, to move to Silicon Valley and we said no. And that was a gutsy thing we did then. They could have easily said "Well, that's too bad. Have a nice life." But they invested in us anyway.

Moffenbeier: There was no infrastructure in town. There was no law firm that knew what do to. There was no accounting firm. 83B, which is really important if you're a startup, nobody in town had ever heard of. So we had to teach everybody what was going on.

Fairbairn: My experience was just the opposite in Silicon Valley. Everybody knew the drill. You could go to real estate people. You could go to finance people. You could go to lawyers. Everybody knew the drill. Oh startup, this is how you treat them. This is the deal you do and blah blah blah. And it's one of the things that made it easier to do a startup in Silicon Valley was that from the employees to the investors to everybody knew the drill as far as what was expected and how you did these deals and that sort of thing.

Bruggere: Yeah, we were fortunate that - let's see I think it was Sutter Hill introduced us— they wanted like an independent board member and Sutter Hill introduced us to a fellow named Bob Schroder who had been with Qume and-

Langeler: Quantum.

Bruggere: Was it Quantum?

Langeler: Uh-hum.

Bruggere: Okay. Anyway a disk drive company, and also AT&T or something like that as well and had retired. But he was in Silicon Valley, smart guy, and he came on the board and he gave us a lot of that Silicon Valley knowledge in how to get things kind of going. He was great until he tragically passed away from cancer. He helped us a lot in that regard.

Fairbairn: So you were in a situation where people were sort of falling over themselves to give you money more than—

Bruggere: Those three were.

Fairbairn: That's pretty good. And so you figured you needed a million dollars to do the plan that you eventually ended up doing and was what you raised the money on, was that basically what you pursued?

Bruggere: So we had a nice business plan. It also described the product in there. The million dollars, which was really six hundred thousand dollars in the business plan was to be enough to build a product, take the product to market and money we were it was all the company was going to need.

Langeler: Yeah, we were supposed to turn profitable on that.

Bruggere: Yeah basically. And so we got the commitment for the money and then we found space and we got the engineers to join. Everybody joined.

Fairbairn: Nobody backed out.

Bruggere: Nobody backed out. But I think we had money and I think it was about June 14th or 15th, wasn't it, of 1981 when we opened the doors for the first time officially? I think incorporation day has always been considered April second.

Moffenbeier: April Second.

Bruggere: Because that's when we filed the papers. But the really the first day of work was like June 14th or 15th and that's when we opened the doors in the little business center and everybody showed up for work and engineers started building the product and we started-

Fairbairn: Did you get any flak from Tektronix?

Bruggere: Oh no. Never, no.

Langeler: They were very good.

Bruggere: We got more flak from Intel when we hired a couple of low-level people from Intel than we ever did from Tektronix. That's just the cultural kind of thing. So then the engineers set off to build the product and we'd go along and still meet with customers. Especially Gerry and Steve were out there meeting with customers to kind of refine what was needed, but we basically built what was described in the business plan which was initially a schematic design and I think we had simulation in there, initially. Those were the two big things.

Langeler: And the documentation.

Bruggere: And the documentation part of it.

Fairbairn: And a database?

Bruggere: And there was a database for the design.

Fairbairn: Schematic capture, and simulation?

Bruggere: Yeah.

Fairbairn: So you had four things that you were working on, the simulation, schematic entry, documentation, and database?

Langeler: Right.

Bruggere: Yeah. I never really thought they were quite separate things but documentation was kind of separate and then electronic design and everything was sort of more—

Moffenbeier: And then we had a graphics expert who made it look nice.

Langeler: Actually and the other part was email. It was integrated with email in the system.

Fairbairn: Your own email or?

Langeler: It was our own email system that was sort of integrated with the other stuff so you could easily send some of the materials around. Back at that point attaching documents and things like that wasn't very clean in existing early email systems.

Fairbairn: Yeah, email wasn't widely-

Langeler: Yeah.

Bruggere: Right. So we discovered, we had come across, Apollo because of Rick and the meeting they had at Tektronix, and so I think we became one of Apollo's first customers. And at the time the model for electronic design sales, or just CAD in general, was systems. People bought hardware-software combinations, and so we started buying/importing Apollo computers but they weren't very reliable back at the time so we would have to burn them in and test them and fix them and everything before we could ship them.

Moffenbeier: They generated so much heat.

Bruggere: Yeah.

Moffenbeier: In our small office we had to take the back panels off and have fans to just keep the whole room from getting too hot to work.

Bruggere: Yeah. But that's basically what we did for the second half of 1981 through the fall of 1982 was the engineers built the product. We introduced the product at the first [actually the 20th] Design Automation Conference in Las Vegas in 1982. I can't remember if it was because we didn't have any money or because we didn't want to take the risk of having it in the exhibition hall, which was about the size of this room, so we had a suite up there. And Dave went around at two o'clock in the morning in Caesar's Palace handing out these brochures under the doors of every room.

Fairbairn: Tell me about that, Dave. What was the—

Moffenbeier: I think there's one story before that which is why that mainly worked which is Gerry and I went back to Princeton, New Jersey to see if we could get the cover of the June edition of Design Automation with the—

Langeler: *Electronic Design* magazine.

Moffenbeier: *Electronic Design* magazine and the lady loved the product that Gerry showed but when we asked for the cover she said no.

Fairbairn: Were you demonstrating the product? Did you actually—

Langeler: Not at that point. It was static although the demonstration story I think is worth telling but.

Moffenbeier: So we asked for the cover. She said "No, we only do established companies like Hewlett Packard, Tektronix." And we said "If can convince you that we're going to make it, will you give us a cover?" And she said "Yes but I don't know how you'd do that." So about two months before the conference we invited her to our board meeting that had been moved to New York and was in the 55th floor of the Rockefeller Center.

Langeler: With Venrock's help.

Moffenbeier: With Venrock's help, and she was there, and I think it was David Rockefeller who came in and said to her "The entire Rockefeller fortune is behind this company." And she said "You have the cover." So it was that cover which we got a few days ahead of time and we put it on a wrapper and we slid it underneath every doo, which was against the rules. That's why we did it at 2:00 in the morning inviting them to our suite and we had a huge turnout.

Fairbairn: So you paid off somebody to let you do this?

Moffenbeier: We had some help with the guys that got us on the floor. Never claimed to do that. And they subsequently the next year changed the rule that you couldn't do that anymore. Because we also slid it under the doors of the competition because we didn't know what room they were in and somebody showed it was it from Valid or Daisy and Dave Hathaway wouldn't let them in.

Bruggere: Yeah I remember that.

Moffenbeier: And so it was an innovative way. We just weren't sure if the software was going to run and so we didn't want to be on the floor. We figured if it would run we could do a last-minute invite and it worked out perfect.

Fairbairn: So during this '81-'82 timeframe what did you know about any competition?

Bruggere: We didn't know when we started the company; we didn't know about any competition. And then after we moved into our offices we learned about Daisy and Valid. I don't remember how we learned about them - if it came from the venture capitalists or if it came from a customer that we were talking with or whomever. I don't remember how we learned, but we learned that they were there. And then venture capitalists tend like to do G2 for their companies so we learned a little bit more that way. But we didn't know getting started that they were out there. I think they were a little bit ahead of us.

Langeler: They were about six months ahead of us in terms of product maturity.

Fairbairn: So they had gotten started and you just hadn't heard about it.

Langeler: Yeah.

Fairbairn: And they'd been stealth or whatever?

Bruggere: Yeah.

Langeler: Right.

Bruggere: And then we saw them at this Design Automation Conference for the first time.

Fairbairn: You had decided to focus on printed circuit board based design. Not on IC design, is that right?

Langeler: No. Just again, a schematic doesn't know. Doesn't know how it's going to be.

Fairbairn: Depends what libraries you want to include.

Langeler: Right and this was before there were libraries.

Moffenbeier: This is before there were PCs.

Langeler: Yeah. So we weren't doing any layout technology at that point. Just design capture and simulation and basically whatever library you wanted to put in there or create whether it was a PCB or an IC based library.

Fairbairn: So it was up to the user to create their own libraries to put in whether they were-

Langeler: Initially, yes.

Fairbairn: TTL or—

Langeler: Initially. We ultimately developed libraries but initially we didn't have any.

Fairbairn: It wasn't part of the initial product spec. Was there a lot of discussion about that? You realized the importance of those?

Langeler: Oh yeah we did but we couldn't get everything done at once so most of the early customers were actually okay with creating their own libraries and there was a little tool to do that with as part of the schematic design.

Fairbairn: Okay. So when you started learning about this competition was there sort of a point of fear, discouragement, excitement? Did that impact you in any way?

Langeler: I would say we were scared to death in one way because since Daisy and Valid but particularly Daisy had done their own hardware. Their graphics were blinding fast and ours were not. And so the first thing you saw is their schematic comes up, pow! And ours is going nehhhh and painting, painting slowly. And it looked like initially the choice of not doing hardware along with software in our case was going to be a real problem and they used that to the hilt.

Fairbairn: You didn't actually see a demo until the Design Automation Conference, is that right?

Langeler: That's right. I think that was the first time.

Fairbairn: So leading up to DAC you didn't know what you were facing. You knew there was somebody out there but you didn't really know you needed.

Langeler: And because we didn't even have our beta sites yet we couldn't really ask customers to say "Gee, you've seen ours, you've seen theirs, what do you think?" because they hadn't seen ours.

Fairbairn: So you were going in blind.

Langeler: And at the Design Automation Conference we discovered that not only our graphics did not work very fast but our load time, our invoke time for the application, was more geologic time than real time.

Moffenbeier: And the cost of the hardware was one-half of the cost of their hardware since they were building their own hardware. So we had a cost problem and a speed problem and a graphics problem.

Langeler: Yeah we had to throw the database out between Design Automation Conference of '82 and the fall of '82 when we shipped. We had to go back and redo the entire database.

Fairbairn: Because it was too slow?

Langeler: Too slow.

Fairbairn: What database had you been using?

Langeler: We used a public domain database called Rim out of Boeing.

Bruggere: Oh that's right, yeah.

Langeler: And again, good news was it was public domain, we could get our hands on it right away. The bad news was it was just terribly slow, but credit the engineers. I've got a couple more engineer stories to tell. I think they're important.

Fairbairn: Let's talk about what Tom sort of blithely said "And we spent the next year developing." There are probably some stories embedded in that process?

Langeler: So I think there are a couple and we all probably have slightly different ones of those, but there was the palace revolt. The engineers came to us at one point relatively early on and said they were all going to quit. And we of course said why? And they said "Well, we're tripping on the way to our cars at two o'clock in the morning because the lights are off in the parking lot and you guys won't buy us cots so we can sleep over while the software is compiling." This is true. And so Dave went to the landlord and got him to leave the lights on. It wasn't me so I assume it was Tom or somebody else went to what was then GI Joes surplus store and got cots, and everybody went back to work. But they were really intense about this.

Bruggere: You weren't letting them sleep at work.

Langeler: And the stories are legion, so I'll finish my little monologue on this part. I have a couple stories about how hard these engineers worked. Once we got to the point of being able to demonstrate the software but didn't yet have beta sites so it must have been late summer, early fall of 1982. I was on the East Coast giving demos and I was in Morristown, New Jersey at RCA and I had scheduled an eight o'clock demo so I'm there at seven o'clock and the software won't load. I've got a bunch of people coming in and they were going to be a beta site for us and I can't get the thing to come up. So regrettably I called Rick Samco who is our core engineering organizing guy at home so it's four o'clock in the morning in Portland, right? And his wife Martha answers the phone and I said "Hi Martha, I'm sorry. It's Gerry, is Rick there?" and there's a pause and she says "No he's at work." And so I never again called anyone at home before I called work first. But it was typical of the way these guys worked. They worked at a level that I don't think any of us expected was possible or something that you could expect.

Fairbairn: Were each of you putting any kind of these number of hours, were you-

Bruggere: We put a lot of hours in but we weren't there at four o'clock in the morning trying to code things. But like any startup it was pretty intense in terms of the amount of time that you had to put in. But it was also very energizing I guess I would say.

Moffenbeier: It was a tiny group of nine people. I mean we did a lot of things together.

Bruggere: And then we hired some folks.

Moffenbeier: Then we hired.

Langeler: We had two Intel guys who became every bit a part of that.

Fairbairn: Who was writing the manuals and doing the other stuff?

Langeler: Manuals? You want manuals?

Bruggere: I don't remember manuals.

Langeler: I think at that point maybe the engineers were.

Moffenbeier: Probably Charlie.

Langeler: Yeah.

Bruggere: Maybe Jack was working on that. I don't remember.

Langeler: I have no memory. I'm sure there were user's manuals.

Fairbairn: You had documentation you were writing but nothing with it.

Langeler: Yeah.

Fairbairn: I know it takes a long time to go through all of this and I see that the time is moving along. Dave, you have to leave at 9:30?

Moffenbeier: I have a little bit more time.

Fairbairn: I want to make sure that we don't miss some of your important later sales activities stories and so forth. So you go to DAC. You got it working by DAC.

Langeler: Mostly.

Bruggere: Yeah, sure we did.

Fairbairn: You got a demo.

Langeler: If you were very careful what you did and didn't do.

Moffenbeier: You couldn't shuffle across the rug and touch the screen or it blew up.

Langeler: Yeah.

Bruggere: But we were in a suite so we had a little more of a controlled environment.

Fairbairn: Yeah, but you had a demo in. And it was- you managed to get around the slow issues with your demo and so forth?

Langeler: Yeah because by definition, the demo of the product was running so we didn't have to invoke it so that masked a big problem. And then the graphics we put up on the screen we kept simple so that people could see them if they were three or four deep. And so we didn't have to display lots and lots of graphics either.

Fairbairn: What was the feedback? DAC was over, what was the feedback from yours? What did you then go away with respect to the competition? What was the feedback from that?

Bruggere: What I remember the feedback from us is that people liked it. They liked the open system of Apollo. That was attractive to them. We got a lot of good leads there. At that point in time we weren't

selling so we weren't losing business to Daisy or Valid. We were just kind of getting customer feedback and so were working on the product. We wouldn't ship the product until about the last six weeks of 1982 I think is when we finally shipped. So it was a good introduction from the standpoint of a lot more people knew about us, knew about the product. We had a lot more contacts. I don't really personally recall any huge concerns about the competition at that point because we hadn't really done any head-to-head battles. I'm not even sure if they were shipping at that point in time to be honest. But we had clearly, I think, validated the need for such a product and the potential market for such a product. And then we shipped in November?

Langeler: November.

Bruggere: Of 1982. I think we still have pictures of Dave carrying some of the pallets out or something.

Moffenbeier: There were a whole bunch of us lifting a pallet onto John Stedman's pickup truck. First unit going to RCA.

Langeler: Subaru Brat, actually was his car. I remember vividly.

Bruggere: We shipped about a million and a half, a million six worth of product in those last six weeks of 1982 and then 1983 things just began to take off. And that's when I remember that we really started having some of the head-to-head battles with Daisy and Valid at that point.

Fairbairn: So how did doing one point six million in 1982, how did that correspond with the business plan? How was the financial part of the world going at that point?

Moffenbeier: I don't remember how it corresponded to the business plan.

Langeler: I actually do. I'm not sure about that particular small piece but I will say that since I actually have the original business plan sitting in my desk drawer, over the first couple of years of our life we tripled our business plan. It wasn't because we were conservative, it was because we were clueless. We caught a tiger by the tail and the tiger was a thing called an ASIC. If you look at our original business plan the term "ASIC" does not appear.

Fairbairn: Application Specific Integrated Circuits (ASIC)

Langeler: There were no ASICs in 1981 but by 1983 or the fall of 1982, there were.

Fairbairn: Right.

Langeler: And all these printed circuit board designers who never had to simulate before all of a sudden had to simulate. And so that's really what triggered the explosive growth.

Moffenbeier: I don't remember what was in the plan but I can tell you what the numbers were for six years: One million, five million, twenty-five million, eighty million, a hundred forty million, two hundred million. So and I think Gerry will say we are the only company that he ever saw or invested in who actually made their business plan.

Langeler: Yeah, my firm has invested in probably one hundred and twenty five companies over its life and not one has ever made its business plan.

Bruggere: The numbers in the plan were basically five years, fifty million dollars. That was a generic kind of plan. We did 1.6M or 1.5M, and then in 1983 I think we did 27M actually. And then we did a public offering in 1984, and then we did eighty-four million that year. We did one hundred and thirty-five million the next year and then I think it was two something the year after that. So our five-year fifty million dollars was probably four years, a hundred and thirty-five or five years two hundred million. Something like that.

Fairbairn: So you had raised a million dollars in the beginning. When did you have to go out and raise the next round and-

Bruggere: Oh that.

Fairbairn: What was the- given that you were ahead on that?

Bruggere: We decided to wait until we ran out of money.

Langeler: Which didn't take long. <laughs>

Bruggere: Which was pretty quick. So the six hundred thousand dollars or the million dollars it was going to take us to fifty million dollars in sales actually ran out before we shipped the product. So we had to go back in a fairly—

Fairbairn: And that was because— what was the major discrepancy? You had to hire a lot more people?

Bruggere: We had to pay these engineers. I'm not really sure why that came about but we had to pay people.

Moffenbeier: There was actually an error in the business plan that nobody caught in terms of salaries. I had the wrong number in there. I had applied a— it was missed by a large amount.

Bruggere: There were too many MBAs working on the business model. But we got to a point where we had not yet shipped the product and we had to raise more money, and if you've been through that and I'm sure you have in various ways, that's not the most fun process. So we had to bring in our second round. We had to bring in another- I think we brought in $1.75M to get to finish it off where we could say we'd ship the product so we could actually do another round of financing. And that round, I remember. I was talking to the venture capitalists about how we're going to need more money and then we were talking about valuations and we were arguing step ups and all this kind of stuff and one of our venture capitalists famously snapped his pen in the middle of the discussion of the board meeting as we were—

Moffenbeier: That's because we had Payless willing to pay an up-round and the venture capitalists- that's Payless drug store. Well they had some very wealthy people and they were willing to put two million in at a good valuation and our venture capitalists said "Well you can't even think about that. That breaks the way things work. You have a V.C. and there is the way things are financed. You would never bring in a non-V.C. at this point." And we said "Well but they're willing to pay this valuation." That's when the pen snapped in his hands, his big hands and we ended up getting close to what we wanted I think.

Bruggere: So we raised $1.75M is what I remember the amount being in that round. And then we raised—

Fairbairn: That's equal or better valuation?

Bruggere: I don't even remember the valuation, do you?

Langeler: It was a little bit better but not much.

Moffenbeier: I think it was a little better. They wanted it worse and Payless was a lot better so we took a little increase but we kept them on.

Bruggere: And then that got us through the initial product shipment and then we did it must have been now 1983 we did I think it was a ten million dollar round where we brought in—

Moffenbeier: Seven.

Langeler: Seven.

Bruggere: Oh seven, ten in total.

Langeler: The total was ten.

Bruggere: That's right, it was a seven million dollar round and we brought in some investment banking firms. I think we brought in H&Q, and Robertson Stephens, and was it GE Capital that came in then?

Moffenbeier: Yep.

Bruggere: A few more. The kind of rounds you used to bring in before you go public.

Moffenbeier: Mezzanine.

Bruggere: Mezzanine round.

Moffenbeier: Beg them all to pay higher but they follow the V.C.

Bruggere: Right. And then we did our public offering in I think it was January of '84. We raised about fifty million and then in '85 we did another fifty million dollar public round which we didn't really need to do but we—

Langeler: Well we were about to run out of cash. <laughs>

Fairbairn: <laughs> Details.

Langeler: Yeah, I mean versus the $600K we would need for all time in our plan, we raised one hundred and ten million dollars so just that's the perspective I have. It was what we said we needed versus what we actually did. And the second fifty happened because we were buying hardware from Apollo and we were having to carry the inventory because we had to burn it in because it wasn't reliable.

Moffenbeier: And those working capital needs, when you're growing that fast, you need huge amounts of cash.

Langeler: Yeah and so that second fifty, we were growing like a rocket and running out of money because of the working capital problem.

Fairbairn: All right, so you shipped product and you innovated too, things were looking better. Was it clear what the competitive situation was at that point? And tell me about that and how sales filled out.

Bruggere: What I remember as kind of, at least in my mind, a defining moment of the competition and when we found out where we stood, was the LSI Logic sale, remember that? LSI Logic early on they were going to buy five hundred workstations, I think it was. And they were playing us off against both Daisy and Valid. I don't know which year this was but we were still in the original space back then so it must have been '83 probably?

Moffenbeier: Eighty-seven?.

Bruggere: Yeah and it was a huge competition against us, Valid, and Daisy and it really went back and forth and they were just squeezing every last dime out of all the different competitors but we won it at the end of the day. Which at least in my mind kind of put us in a position where we knew we could win business and we knew that we were as good as anything that the competition had out there. Because of that whole bakeoff, we had I thought a better understanding of their weaknesses, the lack of reliability in their hardware and the future sets and things like that. So I've always thought of that as the defining moment against the competition.

Fairbairn: Gerry, what's your perspective on that?

Langeler: So I have sort of two others. One was Daisy went public and Valid went public but Daisy went public well ahead of us. They were six to nine months ahead of us. They had gross margins of eighty percent because they were making their own hardware. And we had gross margins of forty percent because we were buying from Apollo. Our fear and actually I've talked to some of their executives since then, but our fear was that once they had the war chest of cash they would cut price. And they could cut their price in half and still make money and if we cut our price in half we didn't. And they could basically have kept us from going public and they didn't do that. But you could look at the two income statements and figure out quickly that we were competitively very vulnerable. My recollection of the turning point was later than Tom's because we were in the new building by then and it was the Novatel deal.

Moffenbeier: I agree with that.

Langeler: And so the deal was Daisy had their V.P. of Sales in Calgary at Novatel and we were sitting on the phone in Beaverton, Oregon.

Moffenbeier: And we had won the business.

Langeler: Yeah.

Moffenbeier: We had won the business and we needed that sale in order to make our number so we could go public in January so this was a really— it was a big deal and we were just going to get the numbers so we could go public, get our fifty million because Daisy already had fifty million so that sets it up for this phone call.

Langeler: Anyway so Novatel told us we won on technical merit then said but either product will do the job, the thing you never want to hear, right? "Either product can do the job." So we'll do a Dutch auction. How low will you go? And it was essentially a nearly live bid. They would bid. Novatel would say "Daisy has bid X. Can you beat that?" We would bid, they would bid. And so the step down was dramatic and it got down to the point that Daisy bid exactly at our cost because they could tell- they knew who Apollo was, they could figure out what our discounts were and so they were right at cost. And we all swallowed hard and we bid lower again and Daisy freaked. They said one of two things has happened. Either we've lost our minds or there is something that they don't understand about our business or the future of Apollo products or something. And so they stopped bidding. We won the business and lost money. Actually Novatel, bless them, allowed us to renegotiate later so we didn't end up losing money on all of it. But Daisy never played that price game again.

Moffenbeier: Never did it again. And they could have, I think they could have kept us from going public.

Langeler: Yeah, but they obviously said "These guys are either crazy or there's something we don't understand and we're not going to play the game." And it turns out we were crazy.

Fairbairn: Did you manage to meet their performance and other issues you talked about before, were you sort of gradually improving or you had other feature sets and so forth that made it compelling relative to their offering?

Langeler: I think we were a lot richer feature set, a lot more flexible because of the general computing platform, and also people could see us riding the computer improvement ramp that was different than Daisy because they couldn't keep up with Apollo. Our simulator I think in the early years was absolutely better. They introduced a simulator ultimately that was much faster. It was hardware simulation that was much faster and it caused us trouble for a while. But my recollection is we just had a much richer feature

set, not as flashy graphics and not as fast simulation when they had their hardware simulator for a bit. But ultimately—

Bruggere: And the fact that they could put, customers could put, their own software on because the Apollo system was a fairly open system so they could run some of their own software if they wanted to on it. I think that was attractive to a lot of the customers as well.

Fairbairn: Tell me about the sales. You're starting to build out. We talked about some of the individual sale situations but you obviously have a hot product. Tell me about the whole transition from getting one customer to selling it to the world.

Moffenbeier: Well one of the interesting things we did is we fairly quickly went to Europe and Japan and I remember Tom, I think, went to Europe, came back and said "Either I found a VP of sales or I want to hire a VP of sales," and we had never even talked about going to Europe. Colin Kidd was a senior sales person for GE over there so we got started early in Europe and Japan. Those became really attractive markets. We did very well over there. Especially Japan. One year Japan alone was 50 percent of our profits. So we just started building up a direct sales force which was the only thing you could do with strong technical support. When we got into a city where we were large enough we would put a two-person team there. And it was expensive. Besides the working capital part of that hundred million dollars was that if you set up twenty-five sales office overseas and I don't know how many we had in the U.S., twenty, and staff them, it's a huge investment. But you then control that and so we ended up I think winning on the sales and technical support over a three to five-year period of time against Daisy and Valid.

Bruggere: We made that decision to go direct in Europe and then later in Japan. And as I recall Daisy and Valid were going through distributors initially. But we set up our own offices, our own people, and Colin had been at National with Charlie Sporck and then he'd been with Fairchild at one time?

M1: SGS Thomson

Bruggere: Okay. And he knew a lot of people in Europe and helped us get these direct operations set up. I think that was a big difference between what we were doing and what Daisy and Valid were doing.

Moffenbeier: Like a person that started Italy for us ran Apple Italy and one other.

Bruggere: One other, it might have been National.

Moffenbeier: So we— Colin was able to hire the right country manager in Germany, France, U.K., Italy and sales took off and we got lucky. We got a great team in Japan and they did really well. So Aryeh Finegold was the competition and he would try if we would win something he would try and fly there and stop it. And what happened is we sort of split up into three teams. I focused on Europe as the executive in Europe. Tom was it in Japan. He focused on Japan, and Gerry focused on the U.S. and so Aryeh couldn't go everywhere that-

Fairbairn: Couldn't go all those places.

Moffenbeier: Couldn't go all those places and he was sort of the one-man executive and we were down to a three-person team and I think that really helped.

Fairbairn: So was this whole sales strategy, an aggressive sales strategy, was that set by yourselves? Was that the board pressing you? Who was the—

Bruggere: No we really did that. What happened is Gerry and I were supposed to go to Europe. Was it the end of '82 or '83? It was in December of '82 or '83. Probably '83 would make more sense. And for some reason Gerry couldn't go so I went by myself and I had an introduction from a fellow from the American Electronics Association in the Valley whose name I now forget, to this fellow named Colin Kidd. And we sat down and met at Browns Hotel in London and talked kind of philosophically. He was supposed to introduce me to people. And we kind of talked and we talked about sales strategy, how to get started in Europe, how you sell to these big companies. He'd been in the semiconductor business but we were selling to those same people. And we kind of mutually agreed that the best way to do it would be to go direct and kind of one thing led to another on the trip and after I left him I went to Germany to have some similar meetings. But by the time I had left Europe I had offered him the job of heading up Europe for us, which he was fairly shocked about, and the only thing that was more shocking was that he accepted it. And left a job with actual security and an office and things like that. And then Colin went around. First we set up in the U.K. and then we began to set up small, like Dave said, in the cities where we would get some business we'd set up like a small thing, but we were direct. So rather than having to teach distributors about how to sell our product or try to get them to load up their inventory or whatever, we were actually going and calling on customers. I think that made a big difference there. I think that international strategy around the world really set us apart from Daisy and Valid in addition to the general computer strategies.

Langeler: I think in Japan we had the benefit of Fontaine Richardson who joined our board and was one of the founders of Applicon. Fontaine had used Marubeni Hitech in Japan as their distributor and so we were introduced to them by him and we brought with us his credibility, which is why they took us on initially. And very quickly we said we want to go direct in Japan but we'll start with you at Marubeni Hitech and see how that works. Over the course of a few years they agreed to allow us to essentially take thirty, forty people?

Moffenbeier: About forty.

Langeler: Forty of their people in one lump in return for getting essentially a commission on our sales that would have been their profit margin had they stayed as part of Marubeni. So we got to take this entire Japanese team who by then were well-trained on Mentor into a wholly owned sub in Japan and again, that was unheard of at that time.

Fairbairn: Let's get back to the product side. You're starting to ship this product. Was a major application of it in the printed circuit board T.T.L. business or in this burgeoning ASIC semiconductor design side of things? Did you focus on one area or the other?

Langeler: Mostly ASIC that really generated sales. I mean we certainly got pulled toward PCB and had to start develop libraries over time for PCBs but I think ASIC was the real driver.

Fairbairn: And you launched a product with simulation. Was the documentation piece a big piece? What happened with that piece of it?

Bruggere: I don't remember it being a driving sales decision part of it, but it was attractive to some of the kinds of customers like the aerospace customers that we would sell to that had to do a lot of documentation, and later when those markets became big enough that we created sort of a wholly owned subsidiary just for documentation.

Moffenbeier: Just for the Boeing 777 or the 67?

Bruggere: Yeah, one of the, yeah.

Langeler: At that point, we had a documentation system that did word processing with graphics you could drop in which was not possible by other systems in 1982, '3, '4. Today we all take it for granted but it didn't exist then.

Fairbairn: Right.

Bruggere: And our documentation person, Charlie, I think he actually is the one who invented the what-you-see-is-what-you-get feature in a documentation package. We never did anything with it other than just sell it. I think we were the first to have something like that actually.

Fairbairn: What was the next major transition? You were out. You had this initial product and things started to explode in 1983. What did you have to add? What were the major product additional product things that were drivers, new competition? And what about the physical design part of the world?

Bruggere: The first thing that we added, which I to this day think was a mistake, but we acquired this company that was doing gate array layout.

Langeler: Yeah right before the IPO

Bruggere: Right before the IPO, had a huge dilution to the company. And the product never really amounted to anything at the end of the day but we were doing that to check a box.

Fairbairn: Was the place and route for gate arrays?

Langeler: Yeah because Daisy had it by then.

Moffenbeier: We needed it for the story.

Langeler: Yep.

Bruggere: Yeah and then we never really did much with it.

Langeler: But we tried.

Bruggere: But we tried.

Langeler: It never did much.

Bruggere: It never really went anywhere at the end of the day.

Fairbairn: So what was the next major acquisition or product enhancement or features or capability to the customers?

Bruggere: Well we had a PCB layout. When did we do that?

Langeler: Yeah so out of that place and route for gate arrays there was a small team who ended up doing our first product for PCB place and route. And separately we developed a custom IC layout team up here in Portland, while that gate array group was in San Jose. So that was really the next big push - all forms of physical layout from boards to ASICs to custom chips.

Moffenbeier: At some point I don't remember when we added another hardware platform besides Apollo.

Langeler: Yeah.

Moffenbeier: I don't remember if it was Sun or HP.

Langeler: It was Sun.

Bruggere: Yeah.

Langeler: HP bought Apollo so it was Sun but that wasn't until 8.0 shipped.

Moffenbeier: Okay.

Bruggere: Yeah, that was a mess.

<laughter>

Bruggere: To say it kindly.

Fairbairn: Any other major developments or issues within the company? I know the 8.0 story is legend.

Moffenbeier: I'll tell you a decision we made which was probably the best decision ever in terms of return to the company and we did it in eight hours, so and I can't remember if it was I'm going to guess '85 but we were getting ready to- we knew we were going to go to Europe. We knew we were going to go to Asia and we had Dave Brinker who was overseeing Asia for us, he was also a tax expert. We knew that during that year the IRS was still allowing people to ship to transfer the technology overseas without it being a taxable event. And so we were starting the planning but you had until December 31st to do that. Well our accounting firm Peat Marwick somehow found out that there was a secret meeting of the House and the Senate back in D.C. and they were closing that window that day at midnight and we found out like at one o'clock. And so Dave Brinker took Europe. We knew we were going to go to Holland. Woke up the head

of Peat Marwick guy in Holland at nine at night or ten at night saying "We got to setup a company." We had a lot of the paperwork so we had to set up the company and get everything established in Holland. I had to call Peat Marwick Singapore, introduce myself, and say "Do you have a shell company?" They said "Yes" so in about a ten-hour period of time we set up two companies, got the technology transferred with no taxable event. That decision saved us a hundred million dollars over a ten-year period of time.

Langeler: Yeah we consistently ran ten points lower in tax rate than our competitors.

Moffenbeier: I mean we didn't get it done until like 11:40 P.M. but as far as we know we're the only company in the U.S. that was able to beat that deadline but it saved a gigantic amount of money.

Fairbairn: So the shipments overseas were out of those-

Moffenbeier: Right, we did the Apollo burn in and all the manufacturing in Holland. And we captured all the profits for Europe in Holland and they gave us ten years, no taxes. Singapore the exact same thing which is what if you look at Hewlett Packard they capture half of their profits in HP Singapore for their ink jet printers and they pay no taxes so we were able to do that for all of our international sales and so we saved huge amounts and that gave us a big competitive advantage over everybody.

Fairbairn: So things are rolling along. Sales are exploding. You became the number one company in C.A.E. right?

Bruggere: Right. So at one point in time our sales were twice the size of the next three competitors combined. But what had happened was sort of as we had predicted: Apollo was able to come out with future generations of a somewhat open system. Daisy and Valid had to go back and do next generation computers basically and they began to falter as they were doing that. And we were able to gain market share and kind of along the way - I mean this is over a ten-year period of time - we were asked by and almost demanded by in no particular order: DEC that wouldn't buy from us unless we put or software on their platform;. IBM wouldn't buy from us unless we put our software on their platform. NEC wouldn't buy from us unless we put our software on their platform.

Moffenbeier: Steve Jobs came up, "Put it on Apple."

Bruggere: Apple, yeah, I mean there were probably six or—

Langeler: And NeXT.

Moffenbeier: And NeXT.

Bruggere: Yeah there is always six or eight of them that said, "We won't buy from you unless you put your software on our platform because our platform is going to be number one." And every time we took a look at it and we considered and we said no. And every time we said no we got a little more tied to Apollo and Apollo was running - what do they call their operating system? Domain or something like that? They were running their own operating system, which kept getting a little more proprietary and a little more proprietary. We kept getting more entangled in that. But every time we made that decision, and we must have made that decision six times or more, it was the right decision and we got more involved in all that. But then we came to the point where Sun began to get traction and Sun had taken a very open approach out of Stanford to run the UNIX operating system, to run Open Graphics, to run kind of off-the-shelf kinds of things and that became less obvious at that point in time. We didn't jump on it, which we probably should have. But they began to get more traction against Apollo and really began to become Apollo, and Sun started beating Apollo over that period of time. And it became obvious, long story short, that we had to get our software running on Sun but we couldn't port it because we were too tied into Apollo to be able to just do a straight port, so we set off on a rewriting kind of thing. Lots of opinions as to the decisions as to whether we made the right ones or the wrong ones or what we did, but what became 8.0 was the porting to Sun, getting off of Apollo and porting to Sun.

Fairbairn: What was the language it was written in?

Langeler: 8.0 was C++.

Fairbairn: And the original language was?

Bruggere: It was written in C or Pascal? I can't remember.

Langeler: Pascal originally.

Bruggere: Pascal.

Moffenbeier: Pascal was it.

Bruggere: And the problem with C++ at the time was we were like one of the first big users of C++. So the language was still, the compilers were still very raw. Their debugging tools were very raw. I remember one point in time we had to send engineers over to Ireland, I think it was to work on some of the debugging tools and it's a whole different programming paradigm language wise, so the engineers had to

learn a whole different way of programming really like going back to school. But that's what we did. We chose C++.

Langeler: And I think to be fair it wasn't we chose to not only to port. We chose to develop this “we're going to solve all the problems we never solved in the first generation system” and the second generation system was to be built on the C++ platform that's unstable while we go onto a hardware platform we've never been on. But no worries.

Bruggere: Right.

Moffenbeier: And do it in a year.

Bruggere: So if you ever read the famous book of “second system effect” on IBM 360, we basically did the remake of that movie.

Fairbairn: But the initial driving force was the port to Sun?

Langeler: Yes.

Bruggere: Yes.

Fairbairn: Tell me a little bit more about it. I know 8.0 is in the lore of CAE and software in terms of sort of all the things that can go wrong. Just summarize a little bit more detail what were the issues? What were the problems? How did you eventually surmount that? What was the whole process there?

Langeler: Well I actually remember vividly a bad decision I made that reflects on that. We were sitting in a conference room and we were going to rewrite the schematic capture system and the simulator and all that, and the question was do we take the database across as is but just have it running on UNIX? Or do we go to a full object oriented database, which again nobody really had those days? Then the engineering manager in charge of the project said, “We’ve got to do this the right way and go to the object oriented database. That's the wave of the future. “And I remember saying okay. And boy, I'd love to have that decision back. Because I think of all the things that slowed us down it was that if we'd taken this database that worked pretty damn well, got it on UNIX and then had all the other applications stuff that people saw on the screen as new, we’d have been fine.

Bruggere: The application programs on top of that.

Langeler: Right but the original database which was very stable and very functional even though it wouldn't have done everything we wanted it to do, I think we would have cut at least a year maybe two off the port. It was that important and that bad a decision in retrospect.

Fairbairn: Did you eventually have to redo that, I mean come back on that or did you eventually come out with the object oriented database?

Langeler: We plowed our way through. Once we got into it, you sort of get to a point where you can't go back and reset. You have to just soldier on and we continued to soldier on until we got the database right, but that added I think a couple of years to the whole effort.

Bruggere: The first product that we did was done by a dozen or so engineers working in close nexus to one another. The 8.0 project probably had two or three hundred engineers working on it spread over geographical locations, buildings, organizations and everything. It was a classic second systems kind of effect for software.

Fairbairn: Were you continuing to do all the development here either here or in San Jose or were there now development organizations scattered in other parts of the world?

Bruggere: Gosh at the time we had here, we had some in San Jose, we had a few people in a couple of other places.

Langeler: Little bit in Singapore.

Moffenbeier: Little bit in Singapore, about 20 people to get our tax advantage for the small group.

Bruggere: Didn't we have something in the U.K. at that point too?

Langeler: Not that I recall, but.

Fairbairn: Okay. So, we're talking sort of the general product development direction. The bottom line was that there was evolution, but not revolution in the products up until the 8.0 kind of milestone. Is that--

Langeler: Right. I would say what there was largely product application expansion. So, going from schematic capture and simulation to physical layout to design rule checking to fault simulation to other--

Fairbairn: And did all that happen in the ‘80s?

Langeler: Yes. Right.

Fairbairn: And was that mainly through acquisition, or mainly through internal development or a combination of the two?

Langeler: Other than the one acquisition that Tom mentioned of the gate array software which ultimately gave us our PCB software, most everything else was internally developed.

Fairbairn: Okay. So, the thing that drove you to making a major transition decision was the desire to move to the Sun Workstation. When did you make that decision? Do you know the year?

Bruggere: That was probably in the late ‘80s I would say, probably ‘88-‘89, somewhere around in there. I’d have to go back and trace Sun’s rise to prevalence, but we slowly got more and more and more pressure to be on Sun and then Cadence came into being I guess and did a very good job in positioning themselves as a company that was going to be software only and selling on different platforms and Sun was a third of the platform. So, we kept getting more and more pressure to do that. And the thing that was difficult for us is we had said “no” many times correctly to new platforms, and not just once, but half a dozen times and then, getting more and more tied to the Apollo platform, but then, Sun becoming more and more of a player and more and more competitive against Apollo and Apollo started to falter a bit. If we had been a little more prescience perhaps, we would have started the Sun effort earlier, but we saw so many others fail and fail from big companies.

Fairbairn: You congratulated yourself so many times on making the right decision that--

Bruggere: Right, and it wasn’t like they were startups. We’re talking about Digital Equipment and NEC and IBM and all of these people that were going to take over the workstation world.

Fairbairn: So, were those two decisions, that is move to Sun and then sort of make these sort of major steps forward, or was that just sort of, “Okay, we’re going to move to Sun. Now what is that going to look like,” and then started rolling that out?

Langeler: Yeah. I think it was first we moved to Sun and then there was a combination of, oh, my gosh, this is going to be ridiculously hard with our current software because of the entanglement with the Apollo operating system, and gee, we’ve been doing this now coming up on a decade. Technology has moved

forward. Object-oriented databases are the next cool thing. If we're going to have this be a company with a lot of legs to it, we ought to build on the next new architecture.

Fairbairn: So, at that time, was Mentor riding high? I mean things were going well and you were the leader in--

Langeler: Yeah. I think we were certainly starting to hear footsteps from Cadence and a little bit from Synopsys, but mostly from Cadence. An interesting story about Cadence; if we had also been more prescient, as Tom was saying, Cadence would never have existed because Cadence was essentially the combination of three companies: ECAD, which was the Dracula, SDA Solomon Design Automation, and Gateway Design Automation, where Prabhu [Goel] was. And we had the opportunity to acquire either ECAD or Gateway, and we decided to do neither, but the opportunity was clearly there and partly because we had been fairly successful in developing our own software and particularly over time and we had the sort of leadership position. We figured the only thing we really lacked was Sun, and we didn't step up to that. And it's funny; I'm actually on a board with Prabhu now. So, we chuckle about that regularly.

Fairbairn: Did you have acquisition discussions with him?

Langeler: Yes, with both-- not with Solomon, but with ECAD and with Prabhu we had acquisition discussions.

Fairbairn: And so, did you not do Gateway Design Automation because you figured you would do your own, or you just not think it was--

Langeler: We had our own simulator, right? What we didn't have was an HDL simulator, but VHDL was coming along as a standard thought. And so, we said we can build that on top of our simulator. Why would we spend all the money to acquire Prabhu.

Fairbairn: Go off and do this other thing, right. Okay. What was the conversation with ECAD?

Langeler: Actually, Dave did most of that conversation. So, I'm sorry, he's not here, but again, we had IC physical layout. We did not have any material design rule checking stuff, and so we had a conversation there, but--

Fairbairn: But, you figured that you'd do--

Langeler: Either we figured we could do it ourselves or more likely, I think we figured we didn't really need it. Of course, we didn't see those three companies coming together. So, as long ECAD was independent, it wasn't really a threat to us.

Fairbairn: Right. Right. They were fairly narrowly focused themselves and so you didn't have to do that.

Bruggere: And we'd done a marvelous job for a long period of time of not making mistakes. But, what was put together--gosh, what was it? It was like 35 consecutive quarters of revenue growth and 33 consecutive quarters of profitability. So, we're talking about over an eight-nine year period of time where everything we had done and every decision that we had made had been correct, and then we started making some wrong decisions.

Fairbairn: So, you made the decision for Sun in the '88 time frame. When did it become sort of the big 8.0 program? What was that?

Langeler: By '89, again, we had figured out that we couldn't port release 7 and we also decided we were going to take the next big leap forward in software technology. And so, by '89 we were really into it.

Fairbairn: And it was--

Langeler: And it was supposed to take about 18 months, maybe 2 years. So, I think we figured by '90-'91, somewhere in there we would ship 8.0 and the world would beat a path to our door. I think there was another company at the time, whose name is escaping me now, who had a really nice new user interface technology, darn it, anyway, that we were going to take a page out of their book too with the new, more modular user interface technology we could get.

Bruggere: Right, because one of the things that was happening around the time or evolving in the EDA industry was the most to open software where people wanted to buy, let's say, a simulator from Daisy, a PCB layout system from somebody else and have it all run together. And so, the whole open framework movement began to gain steam from customers. And of course, we were open in the sense that we were running on a more standard platform, but we didn't have an open system in the sense that you could take somebody else's software and plug it into ours and have it work. So, that was another goal of getting to 8.0 was to get more of that open framework.

Langeler: I think it's also ironic. When we started, we were the definition of "Open" in our industry compared to our competitors and by 1990, we were closed because Apollo wasn't open compared to Sun. Our software wasn't open compared to more modular plug-and-play approaches.

Fairbairn: And the world was changing. There was a quick move to HDL and Synthesis started to evolve There were a bunch of changes in the landscape there that further complicated your position. So, when, I'm not even sure what the right statement is here, but you released 8.0 at some point. Is it called 8.0? What was the evolution of that?

Langeler: Did we ever release 8.0? Is there any historical record?

Bruggere: We did <inaudible>.

Fairbairn: Did you release it as 8.0?

Langeler: Yes. No. No. We released it as 8.0 not knowing that it would become an epithet.

Fairbairn: Right.

Bruggere: We had buttons made up at one point in time. I think I still have a book of matches that say 8.0 on them. And eight, of course, is supposed to be a lucky number in the Chinese culture.

Fairbairn: You had everything going for you, button.

Bruggere: We did. It was painful getting it out because of all of the moving pieces. I mean there were so many different organizations and so many different individual products and everything that had to be coordinated together to all work.

Fairbairn: Everything had to be changed.

Bruggere: But, we got it out and that was probably about 1992 I want to say.

Langeler: I think it was actually '91. The only reason I say that is because when I left in '92, we just shipped 8.1 and that was when I felt I could leave. That was sort of the stabilization release. I felt I could leave with my head at least not hanging low.

Fairbairn: And so, you plowed through and you basically shipped what you originally intended to ship. It just took a heck a lot of longer than--

Langeler: Much longer.

Bruggere: It took a couple of years longer than we thought it was going to take.

Langeler: And of course, we had the other issue here, which we haven't really talked about, but all of this had to be forward compatible. I mean that was a requirement. Not only was it going to have all this new technology, but all the stuff that went before, all the design before had to work. Your libraries had to work. Everything had to work as it did before. And so, that was another huge constraint on the system.

Bruggere: And of course, we had the effect of customers. We had talked to customers about it and we talked about it in the press. People knew 8.0 was coming and so then we would, again, have customers hold off on their sales. I mean why buy now when we can wait and get 8.0. And so, that impacted the business significantly. And so, for the first time, we lost money as a result of that and then we had to restructure the company, which we had never done before. We used to pride ourselves on having gone through these recessions without having any layoffs or losing money and all of a sudden, we were losing money and had to have a layoff; dug ourselves out of that only to hit the Japanese recession that came on; had to have a second layoff. It was very painful.

Fairbairn: Was it during this time that Cadence became larger than Mentor?

Langeler: Just about then. I'm not sure if it was--

Bruggere: Cadence was certainly on the uptick then, but I'm not sure when their sales would have passed us.

Langeler: Somewhere in the early to mid-'90s.

Bruggere: Yeah, it was later in the '90s, but I'm not really sure.

Langeler: One thing I think is an interesting anecdote because it sort of harkens back to this initial five or six engineers who work such crazy hours; we actually got this now many hundreds of people organization to do that again, maybe not quite to the same degree. But, the 8.0 thing ended up being a cultural rival in some ways for all of its pain. It got to the point that we would actually go in on Saturdays and serve lunch to the engineering teams and their families because the deal was that's the only time the engineers are going to see their families is if they come to work to see them. We can't do any coding. So, we'll just sling the hash. This became a company event, and we finally got to the point where I think it-- it must have been for DAC '91. That's where I think 8.0 was at least demonstrable then, maybe shipped then.

We told the engineers if you get 8.0 ready, we'll take you and your families, all of you to Disney World. And so, it was remarkable what a great deal you can get when you take hundreds of people on plane fare and everything else. We took the entire company. And of course, for many of these engineers, they had never been to a trade show and they'd certainly never seen our competitors' products. And so, not only were they getting rewarded, but they actually spread out and did a tremendous amount of competitive analysis of what they saw and what they heard that actually, I think, helped us from then the middle of '91 into '92 and beyond to not only get 8.0 finished, but also to sort of beef up the feature set in various areas that they wouldn't have appreciated.

Fairbairn: So then, you left in '92.

Langeler: I left in the summer of '92.

Fairbairn: The summer of '92. And so, 8.0 was 8.1 by that time. You had a stable release out. The company was back on reasonable technical footing. What was the state of the financials by that time? Did you feel like you were really over the hump and you could grow again?

Bruggere: I think we-- didn't we do about $400 million in '93 or something like that?

Langeler: Yeah. It was $400 million in '91 or '92.

Rhines: I think it was $450 million in 1990 and then it dropped to $325 in 1993. That was the low point.

Fairbairn: Okay. And they were profitable in '93? I don't remember if profitable in '93 or not.

Langeler: I mean also at that same time, as revenues went down, we stopped shipping hardware. So, we had been shipping systems, buying from Apollo or Sun.

Fairbairn: In what year?

Langeler: Somewhere right in there. I think part of the sales drop was there was also no hardware component.

Bruggere: Yeah, it was '91ish probably because we built a building over here as a manufacturing facility. So, we were down on the campus. I think we move into this campus in about the first part of '91, didn't

we? And then, subsequent to that, we stopped actually manufacture, doing the system integration and then that did drop the overall top line revenue. We weren't selling the hardware anymore.

Fairbairn: Because part of the switch to Sun basically was the--

Bruggere: And that was going to be software only.

Fairbairn: Yeah.

Bruggere: Yeah, exactly. We didn't need to do the same thing with Sun. We started shipping the Apollo system because way back then, it was a systems integrating business from Calma and the rest. We kept doing it because the Apollo was so unreliable and we had to bring them in and then the model just had a life of its own after that.

Fairbairn: Right. Sure. Sure. So, are there any other sort of major milestones or issues or events in sort of the company development? Everything was around 8.0. You got that out. It was a good time for you to move on. What about sort of the '92-'94 time frame? Was there any other--

Bruggere: Well, through that whole time frame when 8.0 was late, when sales dropped, we had a peak of about 3,000 employees and we had our first layoff. And that took it down to I think about 2,200 employees and that got us back, as I recall, for a short period of time to profitability again or at least to breakeven. I don't remember exactly what the numbers were. And then, the Japanese recession hit and then 8.0 and then 8.1 were out there, but still needed improvement. And so, we had competitors taking away some of our business. We wound up having another layoff then. And the layoffs got pretty messy in terms of interpersonal relations, in terms of our relations with Wall Street, in terms of our relationships with the board, in terms of a whole bunch of different kinds of things. Gerry left in 1992. I was trying to hire a chief operating officer initially to come into the company. We didn't really find what we considered to be the right kind of candidates for that, and then I agreed to let it be a CEO kind of thing. We then started a CEO search, and we had one of these things where we came down to a candidate that we offered the job to. It was a search that came down to one candidate. Prime lesson in companies is you're never to come down to one candidate. Went and offered that person the job. The person accepted the job, went back to his family on the East Coast and then came back and said the family won't move. And we restarted the search and of course, by that point in time, because Wall Street wasn't particularly enamored with me because we'd lost money and investors lost money and whatever. Then people were accusing me of not wanting to give up the reigns because we had the failed search. So then, we restarted the search all over again. This time, we came down to two candidates, one of which was Wally and one other candidate, and we hired Wally kind of at the end of that. We had a very contentious board meeting because we were split on who wanted to hire whom kind of thing. And I was very strongly in favor of hiring Wally because I thought he would do the best job of kind of maintaining the

kind of company that I tried to create and some of the other board members were more in the line of taking a meat cleaver to the company and it would have been a very different kind of situation. But, we hired Wally. Wally came in, as I recall, like October/November of 1993 is what I remember. I stayed around for about another six months and left in about April of '94, something like that, as kind of I recall. And then, it was kind of-- I went out and ran for the Senate.

Fairbairn: That was quite a change. Let me get to that in a minute. I'd like to finish up with just a couple of things on Mentor. My perception sort of working on the outside of things was the Mentor was also more systems oriented, more board oriented than the competitors out there. And in particular, you had a business even in wiring harnesses and that sort of thing. You had a position with the car companies that was important. Can you say just a) is that accurate and b) say a little bit about the strategy and sort of how you got that--

Langeler: So first, I think it is accurate and I think there are two things along the way. One is we certainly tried to go broader than our competitors did. And in doing so, we didn't go as deep in the IC side. And so, we grew up in the IC design, but we viewed electronic design as electronic design, not IC or PCB. And as developed the PCB product, which, again, came out of the gate array So, its genesis was in the IC side of the house. Then, we got customers for that product. Those customers said, "Well, gee, if you have that, couldn't you do some thermal mapping and couldn't you do some-- we have to put these boards together in a backplane and wire them." And so, we were essentially reacting to some degree to what customers said and also our desire to grow a much broader company. I think if you look back in retrospect, had we stepped close to the initial part of the company and gone deeper, we might not have been gotten by Cadence. We might not have been, to some degree, blindsided by Synopsys. We saw synthesis as that's a nice little product line as opposed to, no, that's a paradigm shift. And so, we were very late to go after synthesis. So, I think our orientation coming from Tektronix, which was a company that was, again, sort of much more broad-based in terms of its electronic activity in both systems and chips; I mean chip testing systems and everything else, and the fact that we weren't all semiconductor guys. So, we were comfortable going more broad, and customers were pulling us there, and we weren't as focused on going deep and being able to get as big as the company now is by staying narrow. I think part of it was we didn't think that we would have the headroom as an organization to get to a billion dollars in sales staying that tightly focused on semiconductor.

Fairbairn: Right. So, not to belabor this, but just perhaps maybe if there's another perspective on this and that is you obviously labored through a lot of difficulties associated with the 8.0 release. Some of that was absolutely necessary and you had to do a port. You couldn't live on Apollo. You were tied in with that. There was quite a bit of work necessary just to do that if you did nothing else. If you had just done the minimum, was there a better path? As painful as the 8.0 thing was, I mean was there a better--

Langeler: Oh, I think so. I mean I think-- again, that's why I went back to that comment earlier about the fateful conference meeting where I agreed that we would go to a fully object-oriented database. I think if

we had limited the scope of that, even using C++ was very immature, but if we limited our scope and then over time bolted in different parts; maybe you replace the database a couple of years later, again, under the covers where people don't see it and you've had plenty of time to develop it and test it--

Fairbairn: You _____ the products and everything to sell and not lose the momentum.

Langeler: Right, I think we would have done much better.

Bruggere: And I agree with Gerry. I just gave a talk a month or so ago at a little group where there were some old Mentor engineers that were in this group and that question came up. Could we have done something different? I mean could we have just done a straight port rather than an entire rewrite kind of thing. Could we have not used C++? Could we have made it simpler? From my perspective, I think we could have. From the engineers' perspective, what they'll say is, no, there's no way we could have done it. There's no way we could have done a port. There's no way we could have done what we did using a language like C. It's one of those things that we'll never know for sure. Standing, I think, from where Gerry and I were, yeah, there clearly was a better path, but the engineering group said that that path wouldn't work and they didn't want to do that path.

Langeler: And my problem is I'm not sure which one of those two was more important, it wouldn't work or they didn't want to do it.

Bruggere: Personally, I think it's the latter. I've always thought it was the latter. But, one of the things that we missed--

Fairbairn: And it may not have worked because they didn't want to do it.

Langeler: Well, that too.

Bruggere: One of the things that we missed is we did not have the supreme technical leader at that point in time. In the early days, Steve Swirling was our supreme technical leader; smart guy. He could get so deep into the nuts and bolts of the product development that the engineers would get annoyed at him. But, he was the supreme technical leader and he could answer those questions. Sadly, he died from ALS and we didn't have that kind of individual to be able to tell us that, "No, we really should be doing a port. No, what they're telling you is really not right. There are options," and things like that. So to this day, is you bring that up with a group of old Mentor folks--

Fairbairn: It's still a controversy.

Bruggere: It still is a controversy and the engineers will still say, “No, we couldn’t have done it, couldn’t have ported it.”

Fairbairn: So, is the database you wound up with, I mean is that-- even though it took a long time, has that sort of proved itself in the long run?

Langeler: I have no idea. Wally?

Rhines: We gradually migrated off it. So, we sort of took a different direction, but it took many, many years to transition. So, we have almost nothing on the version 8.0 nowadays, a few PCB remnants.

Bruggere: The interesting thing on the question that you asked Gerry about semiconductor focus versus systems focus is we’ve only had one venture capitalist or investment firm ever say no to Mentor. It was probably our third round, when we did the $7 million or around in that period of time that John Doerr and Jim Lally from Kleiner Perkins came through and they, of course, have both been at Intel. We must have been seeking an investment because they actually said no. Their reason for saying no is they didn’t think we knew enough about semiconductor design to be able to be competitive in this kind of market.

Langeler: But, they also said that they didn’t think the semiconductor market was big enough by itself.

Bruggere: Yeah, it was small back then.

Langeler: Yeah. So, they were worried about our expertise, but they also worried about the scale opportunity.

Bruggere: So, that was probably though back in about 1983 maybe, something like that.

Fairbairn: Yeah, at that point, it wasn’t obvious what the size was or what the ultimate evolution. So, is there anything else you’d like to say in terms of wrap up or you accomplished a hell of a lot, grew a company, incredible business plan, one in 150 of the ones that you’ve been associated with, Gerry.

Langeler: I mean I think the thing that I find most comforting or whatever is that the company not only still exists under Wally Rhines' leadership, it’s gotten to more than a billion dollars in sales. We always dreamed about growing this company to a billion dollars in sales. It’s gotten there. It’s still here. It’s independent. It’s had its troubles with outside shareholders a little bit, but Wally’s survived that apparently, but it’s nice that it’s still here and it’s still-- I talk to people now, sometimes I run into them, who work here today and they say thank you, and they weren’t even here when I was here and Tom was

here. "Thank you for starting this company. It's a great company. It's a great company. I love working here."

Fairbairn: It's still a great place to work.

Langeler: Yep.

Bruggere: And their kids often we find will work here, which is a little scary.

Langeler: Yeah, it is a little scary.

Fairbairn: I'm sorry. Your kids what?

Bruggere: Not ours, but some of the employees' kids.

Langeler: Employees when we were there now have their kids working here.

Fairbairn: Oh.

Bruggere: We had a sales kick-off meeting. It might have been our first one way back in '82 or '83 or something like that and one of the things as we were kind of talking about the company and trying to get people kind of fired up and we were talking with the Japanese, we said that one of our goals was to have a company that would last for a hundred years, and that was one of the-- nobody would ever know in that group if we had a company that was going to last a hundred years, but the idea that there would be a company that would be around for a significant period of time. That was something that particularly the Japanese kind of carried through for a long time. I've learned since then as I'm in the pharmaceutical business that there are companies in Japan that have literally been around for 300, 400, 500 years and take a little different perspective on things. But, I agree with Gerry. The fact that the company now has been here around for what, 32 years is a significant accomplishment.

Fairbairn: You're already a third of the way to the hundred year mark.

Bruggere: Almost a third of the way.

Fairbairn: It's a hell of an accomplishment. So, let me just finish up with a transition. You left in '94. You then ran for the Senate afterwards. Was there anything--

Bruggere: Right. So, I left in 1994, in about April and then took some decompression time and whatever and then I had an interest in politics growing up in Berkley and being kind of around various things. What happened in 1995 was we had one of our U.S. Senators, Bob Packwood resigned and there was a special election for that. And then, it was widely thought that our U.S. Senator, Mark Hatfield, was not going to run again. And so, toward the end of 1994, I began exploring what that would be, and it was very much like starting Mentor Graphics. It was not knowing anything about it, not knowing anybody who was involved in political races, and it was meeting people in coffee shops and asking them this, that and the other and would you get involved and all of that. And then when Mark Hatfield decided not to run, then I decided that I would try. It was going to be an open seat. The Democrats were kind of lining up. I started at a two-percent name recognition and two-percent likelihood of winning, had a five-way contested democratic primary, had to go down--I was the democratic businessperson. So, I wasn't even allowed to go the union meetings. I had to go down to the AFL meeting and stand in the back of the room. I wasn't allowed to speak until finally somebody, one of the leadership said, "Tom's been standing back there for an hour. Why don't we at least let him say something at the union meeting?" So, I got up in front of it and I said-- I said who I was, said what I was doing. I said, my father dropped out of school in the eighth grade to become a traveling candy salesman and he would have killed for a union job. I just did things like that, and wound up winning the democratic primary with over 50% of the vote and then wound up running against Gordon Smith who had run for the Bob Packwood seat in a special election earlier, a lot of name recognition. We had a-- I wouldn't call it bruising, but we had certainly a contentious race. It was the 1996 election. He wound up winning after five days of counting absentee ballots. I guess it was November of '96 when the election would have been. It was the second Clinton/Gore election; an unusual experience.

Fairbairn: And you've retreated from that. Any promise of pursuing political career--

Bruggere: No. My next opportunity that I could have done would have been a gubernatorial election that came after that and to be honest, I thought that I had good name recognition. I got a lot of votes in the election and whatever, and I would have certainly been a contender for that, but I thought that the-- my kids were older. It's one thing to be in Washington, D.C. when everybody's in politics and nobody pays too much attention to you and another thing to be in a state, to be a governor and your kids under the spotlight having to move to a different place, having to have bodyguards and everything. And then being a governor in a state like Oregon I think is a really crummy job. You spend your entire time trying to balance budgets that are difficult to balance and working on environmental problems that have no easy answers. I wasn't interested in that. So instead, I chose to go on the local school board. That was my political fix. I've had nine years on the local school board.

Fairbairn: Okay. Gerry, you've been doing venture capital now for 20 years. Tell me what's your prime focus, where do you think the major opportunities in venture capital are now? What's your personal belief in terms of--

Langeler: I think there are a myriad of potential venture capital areas, the ones that I focus enough, on enough to sort of understand and therefore to be able to answer your question about. Clearly, the move toward wireless networks and all the things around mobility are really still early. I think with 4G technology and its follow-ons and much more high-speed Wi-Fi with AC, I mean you just get into a situation where a whole lot more can be done across wireless network and the applications that go with that and the opportunities that go with that, I think, are really quite large. Network security I don't think will ever go out of favor in that the bad guys are always one step ahead of the good guys.

Fairbairn: They seem to be several steps ahead of them.

Langeler: Yeah. And so, I mean I think that's going to be an ongoing race that no one will win except maybe the folks who invest in it. I think Tom is in the pharmaceutical space. I think the whole move toward personalized preventative predictive medicine is very, very powerful. I mean, again, one of the things we've invested heavily in is the genomics space and the fact that if you and I both have high blood pressure and we go to the doctor and the doctor gives us both the same medicine and it works for you and it doesn't work for me and they have no idea why. Within the next 10 years, they'll actually know why. And so, they won't experiment on us by giving us medications that may or may not work. They may not be right all the time, but they'll be right a lot more often and there'll be a lot more therapies that will work. So, both on the genomics side and the bioinformatics side, as well as the actual drugs I think there's a big opportunity. And then in the clean tech space and sort of environment space, I think there's an absolutely huge opportunity there. There are massive problems that will have to be solved and they won't be solved with one silver bullet, but with many little bullets over time and in a variety of spaces. I think there's going to be a lot of exciting stuff done there and that, not surprisingly, are the three things we-- those three platforms, IT, biotech and clean tech, is where we spend our energy.

Fairbairn: So, back when you started Mentor you were the first in a long time to be venture funded startup. What's the state of venture funded startups in Oregon? Are there other venture capital firms that you invest with locally? Do you bring in Silicon Valley or Boston?

Langeler: There are not many firms here locally. It's really almost none of any scale. We tend to partner with folks from Silicon Valley or the East Coast or to some degree Seattle where there are more firms up there. Actually, our headquarters office is in Seattle. I'm a satellite office of that group. So, venture capital in Oregon has become much more prominent and more sort of unremarkable, but still by sector. So, if you're doing things in the mobility sector here, a lot of software groups getting started; some semiconductor, not so much now. Biotech is really hard to get funded in Oregon. And so, it really matters by space to some degree, but there's a lot more money--

Fairbairn: So, do you invest mainly in northwest companies?

Langeler: About half our business is in the Northwest, about almost half in California and then a few strays elsewhere. We've got a deal in Boston, a deal in New York, but those are kind of one-offs. I skipped over one, which is sort of contained in the IT space, which is the whole big data area. We have actually a fair number of things in and around the fact that there's a whole lot of data that could be use productively if people could figure out how to do their businesses better.

Fairbairn: Okay. Well, thank you very much for taking the time and explaining the story of Mentor Graphics and some of your own personal stories along with that. I think it's extremely valuable, very interesting to me and very much appreciate your willingness to do that.

Langeler: Thank you for having us.

Bruggere: Thanks.

END OF INTERVIEW

