Oral History of Jerome Svigals

Interviewed by:
Dag Spicer

Recorded: June 19, 2007
Mountain View, California

CHM Reference number: X4067.2007

© 2007 Computer History Museum

Dag Spicer: Okay, it's June 19, 2007, in Mountain View, California at the Computer History Museum. This is Dag Spicer, senior curator of the museum and we're here with Jerome Svigals, who's an IBM veteran and someone who's done several interesting things related to computing. So Jerome, I want to start with some of the major events related to the history of computing that you were involved with, and then we can go back a little bit if it's appropriate to the earlier formative experiences in your life, let's say going to school, or if you were in the services during the war, those kind of things.

Jerome Svigals: I think my earliest computing experience was working on ENIAC at Aberdeen Proving Ground. I went there as an assignment at the beginning of the Korean War, and I became one of the first 50 programmers of the ENIAC computer.

Spicer: Back up a year or two before you started working on the ENIAC and tell us how you got that job.

Svigals: Where I actually got it was through the military. I was in the tail-end of World War II, and I was in Army Ordinance. They're responsible for weapons and weapon systems. And I signed up as a lieutenant in the Reserve, and then went to college. When I got out of college in early 1950 along came the Korean War, and I got recalled. I had never served as a lieutenant, and they said, "Okay, come on in, and you can serve." They sent me to Aberdeen, and by sheer accident, I was assigned to a thing called the computer lab, among other things. And in the computer lab I was assigned to doing ballistic trajectory computations on the ENIAC, and the reason was I was acting as an army ordinance proof officer. We basically took all the ammunition, which was being manufactured for the army, and we tested its trajectory. And we then also computed its theoretical trajectory on the ENIAC and we compared the two. So I really got into computers by virtue of my military experience in World War II, which got me into Ordinance. And I got into Ordinance by accident. I can tell you that story, but that's a whole different story.

Spicer: So that's an application that makes sense, but which you often don't hear about. We often hear, for example, that the firing tables-- is that what you were working on?

Svigals: The firing tables, the ballistic tables, were much different. Every lot of ammunition produced for the military has a different set of trajectories. And they actually had some 4,000 WACS who were employed at Aberdeen to hand-compute the trajectories, and they produced a table, and that table went out with the ammunition in order to allow the gunners to properly aim their weapons.

Spicer: Are you saying that this varied by lot, like a certain batch of the same ammunition is the same...

Svigals: Every batch has its own trajectory tables. And particularly with heavy artillery, where they can differ pretty significantly.

Spicer: So even though this artillery is mass-produced, there's still an element where it has to...

 © 2007 Computer History Museum

Svigals: Variations basically in the barrels, variations in the ammunition, variations in the powder that's put in and so forth. So there's always enough variations in it that if you're gonna come anywhere near the target, you better use the trajectory for that batch of ammunition. That was actually computed. So that's where ENIAC came along. ENIAC basically came along as a way of substituting for 4,000 WACS. They were just running out of people to basically do that trajectory. Well, it was-- I also used ENIAC as an assignment to work on the ballistic trajectories of weapons. I happened to be testing what we call on-carriage radar, in which we basically had an anti-aircraft gun, which had a radar, and we were basically computing the theoretical trajectories of that and comparing it. Actually went up in a plane several times to test the trajectory computations. We actually had an optical system in which we tracked the ammunition, the theoretical ammunition direction, and then compared that against the computed trajectory which we computed in the ENIAC. That's how I got started in ENIAC computing. Interestingly enough, that taught me an awful lot about army ordinance, and my first job out of the military was working for RCA who had an army ordinance contract for a database machine, called the BIZMAC.

Spicer: Just before we get to that, what was the I/O like, what was it like to program ENIAC?

Svigals: Well, most of the IO was IBM equipment. It was punched card readers, punched card output, and tabulators. The other interesting thing was that ENIAC was not a stored program machine. The way we programmed ENIAC was they had large panels of ten-position switches. It was a two-address machine. And if you wrote a program of say 200 or 300 steps of computation, you had to take one of the large panels of ten-position switches and adjust all the switches to the program and then plug that into the computer. And that's the way we programmed the ENIAC at the time. So I spent an awful lot of time turning switches.

Spicer: Oh, you did? Okay, because a lot of the times you just see women turning those knobs, but there were actually guys that did that, too.

Svigals: Whoever wrote the program turned the switches.

Spicer: So you not only wrote out the program flow-chart and instructions, you know, on paper, but you...

Svigals: You actually had to enter it into the computer.

Spicer: You had to go do that work yourself.

Svigals: Right.

Spicer: So for a typical problem, let's say 100 steps long, how long would it take you to set that up?

Svigals: Oh, it probably took us a good half-hour by the time we got our board, this huge board of ten-position switches, unplugged it from where it was being used, built in a new separate section where we

 © 2007 Computer History Museum

could turn switches, and then go through a check of the switches that we had set, and then roll it back in and plug it into the machine when the machines was available. So there was a whole set of steps that were required to retrieve the board, set them up, check the settings, and then re-plug it into the computer.

Spicer: Is this the function table?

Svigals: No, this was the program.

Spicer: The parts that you wheeled off.

Svigals: That was the program. It was this big...

Spicer: Was this called the plug board?

Svigals: No, no. It was a large panel, it was about six feet across and six feet high, and it was just ten position switches.

Spicer: Just a wall of...

Svigals: Just a wall of switches, and that was the way we programmed it, set up those switches and took that wall over and plugged it in the computer. And that drove the program of ENIAC.

Spicer: So, as you know ENIAC wasn't finished until '46, I think. So new weapons were still-- just the Korean War, or was it...

Svigals: No, no. It was a continued stream of weapon design.

Spicer: Even after the war?

Svigals: Oh, even after the war.

Spicer: Was just because the economy was on a war footing, and things were...

Svigals: No, because you always had to keep the military armed.

Spicer: Busy.

 © 2007 Computer History Museum

Svigals: Essentially. I tested all sorts of things. I've tested hand grenades. I tested anti-aircraft guns, I tested army guns. So we had a whole panorama of weapons. And there was just a continued stream of weapons just for maintenance purposes. And again, every time there was an individual lot of ammunition produced, they had to produce the trajectory table for that lot of ammunition, so this went on all the time.

Spicer: That's true, that would be a continuing need.

Svigals: Yes.

Spicer: Right, I see. So, ENIAC, how long did you spend there?

Svigals: Of the two-year assignment, I spent half the assignment on working on ENIAC-related problems. I was what they called an army proof officer. And our job was to basically test the ammunition to make sure it met the specifications.

Spicer: Did you meet or work with anyone kind of interesting?

Svigals: At the time, no.

Spicer: At Aberdeen?

Svigals: There were. My teacher was a gal whose name was Ruth [Davis?], and I can't remember her last name who went on to be the Under Secretary of Defense. And she was one of the senior programmers. There were about a half-dozen women who basically were the senior programmers, and sort of took you under their wing to get you educated and moving. And Ruth-- I can't remember her last name-- was essentially the person who taught me. And she, as I said, went on to a very responsible position in the Defense Department.

Spicer: Tell us, about this time were you married?

Svigals: I was just married in December '49. Went to Aberdeen in June of '50. And we moved into army facilities, and the army had a married persons' quarters. And we had our first child at Aberdeen. Our first child is an army brat. She was actually born-- she's now a senior engineer with IBM, interestingly enough. And then from there, when I finished the two-year assignment at Aberdeen, we sort of elected to get out of the military, and we went to work for RCA. And RCA was working on an ordinance connected computer called BIZMAC. And the purpose of BIZMAC essentially was to maintain inventory control for army weapons, ordinance weapons, essentially.

Spicer: Would it be wrong to call it a database, probably?

 © 2007 Computer History Museum

Svigals: Yeah, essentially it was a large database manager.

Spicer: Tell us about BIZMAC, because I think it's probably not all that well understood historically.

Svigals: It was being constructed by RCA in Camden, New Jersey. It essentially was a stored program machine. As I remember it was a three address machine. A plus B equals C. And essentially alphanumeric, because it was also basically storing database nomenclature. That was used to basically produce the necessary output tables for the military. About the first year I was there, I came to the conclusion that if I was going to be in the database business, I ought to go to work for the primary database company, which was IBM. This was a very interesting experience. IBM had not [yet] decided to be in the computer business.

Spicer: Right, until-- at that time.

Svigals: At that time. This was like '53. [But what about the 701? D.S.] They were still debating whether the computers were real, and whether or not they should do it. And I was being contacted by a senior executive of IBM. R. Blair Smith. I remember him distinctly.

Spicer: How do you spell his name?

Svigals: Blair Smith.

Spicer: Oh, Blair Smith.

Svigals: First initial was R. Blair Smith. Don't know what the R. stood for; but he was the senior executive in the planning department under the vice president whose name was Jim Birkenstock. And Jim was sort of the key planner for the corporation.

Spicer: Before we jump to IBM and all the stuff that went on there, I'm wondering if you could just tell us about the BIZMAC a little bit more, because that's not covered all that well, and it's got kind of a mixed-- was that a success-- did it not live up to its specs?

Svigals: Well, it turns out, the time I left, it had not been completed. It was on its way to being useful, and we were actually-- I remember going out to army ordinance in Detroit many times just to check out the program, and to check out the data we were producing. So on paper, it looked like it was going to do the job it was required. But I wasn't there long enough to see whether or not that happened.

Spicer: Was there anything unique technologically about this machine? Did it push the envelope in any way?

 © 2007 Computer History Museum

Svigals: Not that I know of. It was pretty straightforward.

Spicer: They weren't using Selectron tubes?

Svigals: No, they were not. Selectrons were used in things like the RAND Corporation Johnniac. But to the best of my knowledge, it was a very conventional machine, and in fact, I'm just trying to remember whether we used cores. I think it was a core machine.

Spicer: So it says you were an engineer and programmer, so what did you do there?

Svigals: Basically the same thing I did at Aberdeen, I was programming sample programs of the type that the army ordinance would use the machine for.

Spicer: What did you program in?

Svigals: The answer was machine language. Everything at that time was done in machine language.

Spicer: There were no tools at all, like an assembler, or...

Svigals: Pen and paper.

Spicer: Just a pad.

Svigals: Pen and paper.

Spicer: And time.

Svigals: That was even true when I got to IBM. We got into some rudimentary assembly programs in the early days.

Spicer: It sounds like we can move on to IBM now.

Svigals: About a year later after I was initially approached in '54, I got a call one day from my friend, R. Blair Smith, he said, "Well, we've decided, we're gonna go in the computer business, and how about coming onboard?" I said, "Fine." And I was their first professional hire. I was the first guy who had programmed a machine outside IBM, got hired by IBM. And I was sent off to the IBM lab up in Poughkeepsie, New York.

 © 2007 Computer History Museum

Spicer: Now you mentioned Mr. Smith said that, "Hooray! We're into computers now!" So what led them up to that point?

Svigals: Well, the important thing that was taking place, there was a change in management. Up until '53, the company was basically managed by Tom Watson, Sr. And he was a punched card man from the Year One. And he'd built the company to where it was, very successful. And there was a transition to his son. He was just getting too old. In fact, he died in the mid-fifties.

Spicer: '56.

Svigals: Yeah. I remember that distinctly. That transition to [Thomas Watson] Junior, essentially was where they sort of opened up their mind and said "What should we do?" And there was sort of an examination by key executives that said, "Gee, we should really get in this computer business." And the reason was there were many manufacturers coming onboard with computers. Every major electronic manufacturer had a computer coming down the street.

Spicer: I think at some point you make the point that some of IBM's-- it's hard to call them competitors, but future competitors in electronic computing, but IBM was not quite ready yet. I believe it was...

Svigals: IBM was ready, but in the wrong way.

Spicer: I believe IBM lost the Prudential [Insurance contract for computer systems].?

Svigals: Yeah.

Spicer: I think, to Remington-Rand, and that was maybe more than ever, a real kick in the pants.

Svigals: That was a shake-- that was a real shaker.

Spicer: Yeah, and do you agree that that was a catalyst in some ways?

Svigals: Oh, yeah, absolutely. Let me tell you what was happening. IBM was a punched card machine organization from Year One. There were computers under development at IBM, but I think it's a highly-decentralized development organization. There were six computers under development, all different. Each one had its own language; each one had its own structure. Each one was geographically dispersed away from the others. So what happened, by the time I joined the company in the early '50s, this was like '54 or '55, what you had was an organization that didn't understand computers, certainly not the management. And those people that did understand computers, understood different computers. So of the six computers, you'd be lucky to find that the salesperson was at least trained in one of them. And the salesman next to him could've been trained in another one. So we had a very decentralized

 © 2007 Computer History Museum

organization. And that result was that very few people really understood computers, and those who understood them, understood different computers. So they weren't even coordinated.

Spicer: Can you give me an example of two or three of those? I'm imagining, business versus scientific, versus universal [ph?] or CPC.

Svigals: The famous small one was the 650, coming out of Endicott. That was a drum machine. I think you have one here in the museum.

Spicer: Oh, I wish we did! We're still trying to find one.

Svigals: Really?

Spicer: Yeah, a 650 is quite rare.

Svigals: Beautiful machine.

Spicer: Yeah.

Svigals: But, it was entirely different than the 702, which was basically an alphanumeric computer that was meant to be a commercial machine. Not to be confused with the 704. 701 and 704 which were scientific machines, and they were basically binary machines. So as you went down the list of computers, they were all different in that way. What language, essentially what structure, what programming, and so forth? And by the way, all the programming was being done essentially by primitive assembly programs.

Spicer: And the customers were very different as well. And the relationships you have to have were very different.

Svigals: As a matter of fact, what happened at that time is IBM developed a new set of salesmen called applied science representatives. Under-- can't think of his name...

Spicer: Cuthbert?

Svigals: Cuthbert C. Hurd

Spicer: Yep.

 © 2007 Computer History Museum

Svigals: Dear Cuthbert, he was a beautiful guy. Anyway, Cuthbert was trying to bring along the applied science guys, and they focused on the scientific machines; not to be confused with the commercial machines, the 702, the 705. And that was another group of people that were marketing those. That was under a group that [T. Vincent] Learson ran directly. Learson was the vice president for marketing. So we had too many different computers, and too many different sales groups, and totally uncoordinated. And the net result was along came competition, and there wasn't an electronic vendor that wasn't producing a computer.

Spicer: Everyone was getting into it in the late '50s.

Svigals: Exactly, and they really caused a lot of trouble inside of IBM. The problem that's taking place inside of IBM was this total lack of coordination between people, number one. Number two is a total lack of trained people, 'cause at best you could get an engineer or a system's person trained on one of the machines. So the net result was competition was coming on very strongly. But the most important problem at that time IBM was selling computer specs. We had so many bits of memory. We had such a multiplication speed, such an input/output speed. And every one of those characteristics could be beat by competition, but essentially no matter what we said was the internal speed, they said they had a faster one. Whatever size the memory was, they said they had a larger one. The net result was that IBM was being beat very severely in the marketplace, and it sort of reached a peak in the late '50s, when IBM was losing 80 percent of the bids it was bidding on, and that was unheard of, because in the punched card days, IBM routinely won two-thirds of the orders.

Spicer: Right.

Svigals: Of what they bid on. And now we jump to 80 percent of it being lost.

Spicer: Being lost to electronic computers?

Svigals: Being lost to computers. These were guys who were selling punched cards into computers, and they were losing their shirts. That's really the major problem. That's when things really blew up.

Spicer: Did it help that these new entrants to the field-- I mean, they were often established companies that got into computers, like RCA and Honeywell.

Svigals: <inaudible>

Spicer: Were they just more nimble in terms of being able to being able to announce things faster, and for example, like you mentioned sort of one-up you?

Svigals: The answer's yes!

 © 2007 Computer History Museum

Spicer: In little incremental ways.

Svigals: They understood electronics better than IBM did, number one. And number two, the way IBM worked was that individual salesmen can't design their own electronic machine, they've got to take what's announced by the company. And what was announced by the company was punched card equipment at the time, and just starting with the 701, the 702, the 650, just starting into computers. So IBM and the sales force, it wasn't trained at all on computers. And it reached a peak in about '59, when we were starting to lose about 80 percent of the orders.

Spicer: Wow.

Svigals: By the way, I was in charge of the computer statistics by that time at headquarters, so I can prove the statistics.

Spicer: So when you say you lost 90 percent...

Svigals: 80 percent.

Spicer: 80 percent-- but you said by the late '50s, it was almost 90?

Svigals: No, no, no, 80 was about it.

Spicer: Okay, so this is IBM offering an electronic computer, so it's electronic computer versus...

Svigals: These were all bids by IBM, including both punched card equipment, and computers. And in the early days, it was mostly punched card equipment. IBM had been trained. Let me take you back a little bit. When I came to the company in '54, I worked up in Poughkeepsie on computers, and I got moved to headquarters, and it became pretty evident at headquarters that we were losing, because people just didn't understand what the competition was bidding. They [IBM] were basically selling punched card equipment, and the competition was bidding computers.

Spicer: That's what I was getting at.

Svigals: It was a terrible mismatch.

Spicer: Right. So in a way, IBM wasn't even offering the same thing.

 © 2007 Computer History Museum

Svigals: Exactly! It started to reach a peak. I guess T.V. Learson, who was in charge of marketing, really got angry because he could not find a salesman that knew more than one of the six computers being built by IBM. They were all different, essentially. So he really blew up.

Spicer: Now in a way, one has to ask how these six different machines arose?

Svigals: By decentralized engineering development.

Spicer: But didn't they have to account for their budgets and...

Svigals: No. They did, but they were totally autonomous.

Spicer: So they could come up with their own?

Svigals: They could come up with their own...

Spicer: They could come up with their own machines?

Svigals: They could come up with anything they wanted. You name it.

Spicer: Don't they have to have a marketing okay from headquarters?

Svigals: No, they did not need a marketing okay. They were autonomous groups. That was a real problem which I'll explain in a few minutes, that they continued into the 360 days, was that autonomy. And when the company decided to go to the 360, and gave a common blueprint to everybody, engineering management thought that was the end of the world. They were not longer autonomous, they were no longer basically capable of exercising their engineering judgment. So the company had to go through quite a transition. In fact, it was two years after the 360 was announced, I was still fighting compatibility. Now I've given the museum a copy of a film.

Spicer: This was within IBM.

Svigals: This was within IBM. Within IBM we're fighting. I gave the museum a film on compatibility. And the reason was there was total un-acceptance of compatibility by engineers, and this was for like two years after the 360 was announced, and I actually had to put a story together so that people like Bo Evans, who were against compatibility, could take something to his senior management and say, "See, we really should be compatible." It was still a fight going on for a couple of years after the announcement of the 360.

 © 2007 Computer History Museum

Spicer: Was this tradition of development of independence _____?

Svigals: Long established.

Spicer: I was just gonna ask, all the way back to unit record (punched card) equipment?

Svigals: it started with unit record equipment Essentially, if you look at punch card equipment, you have a series of individual machines. And the way you assemble a system is you bring in so many of each type of system. So many sorters, so many punches, so many tabulators. So all of the equipment came from different factories, it got assembled into configurations at the site of the customer. So there was no coordination inside of IBM other than perhaps general specs. It was a highly decentralized company. And that continued into the computer. Each of these decentralized groups, the group at Endicott, the group at Poughkeepsie, the group in Germany, each was basically producing its own punched card equipment,a dnthey said “Okay, let’s produce our own computers.”

Spicer: With all this punch card equipment made from decentralized laboratories, there was still some unifying force, wasn’t there that tied it together?

Svigals: The punched card.

Spicer: But in terms of setting up a customer?

Svigals: The punched card...

Spicer: Doesn’t matter where the stuff comes from, right? Where it’s made? What I’m getting at, for example, is would IBM allow, say, two sorters of essentially identical specs to just go ahead and be developed?

Svigals: They drew a line there. There were multiple sorters, there were slow-speed sorters, and there were high-speed sorters.

Spicer: But not the equipment machines being _____.

Svigals: But not identical specs. They did draw a line there. They would not produce the same specs in different labs, or different development centers. And except for that, it was totally uncoordinated.

Spicer: So it was up to the salesman then to integrate?

 © 2007 Computer History Museum

Svigals: The salesman had a sales manual in which all these machines were listed, and he pulled out the speed sorter he wanted, the speed tabulator he wanted, the speed keypunch he wanted. And he assembled these boxes in the company's location. And that's the first time the system came together was on the customer's site. So you had all these different plants, each developing their own equipment, and they said, "Okay, let's develop computers!" So they all went off and developed their own computers. And that's really how the problem started was that decentralization. And the management wasn't strong enough to coordinate it. In fact, the management of the company was-- they were marketing people. And they had no ability to talk to the engineering people. All they could do is say, "I want a machine with a certain set of characteristics." And that was about the way they coordinated it.

Spicer: USA or World Trade? What's the-- is there a balance?

Svigals: The answer was on a punched card basis. They integrated the same way the US equipment integrated. Beyond that, they started to produce their own computers. In other words, there were about two decentralized sites in Europe, and they each produced a computer. So everybody was producing their own computer.

Spicer: Wow, yeah.

Svigals: It was quite a mess.

Spicer: It sounds like several companies almost in a way. So tell us what-- we see the problem now. So tell us what steps IBM took.

Svigals: Well, Learson, who was the Vice President in charge of marketing, decided that this would never do. And it what really irked him the most was that he could go to a salesman, and the salesman could only talk to him about one of the six computers IBM was offering. He knew nothing about the other five. So the Learson said, "That's it." So Learson said, "Look, I'm gonna get one product. The whole spread of the computers, I'm gonna put in one family. That's where the name Spread Committee came from."

[T V Learson was the senior marketing executive for the data processing portion of IBM. His executive assistant was Don Spaulding. TV would make a decision but Don had to implement it. Hence, the decision to create the 360 Spread committee was followed by Don's assembly of the people and statement of their objective. Don was the vital implementer. The other vital person was the DPD director of marketing, Clark Garrison. Clark was my boss at the time I served on the Spread committee. During the Spread committee deliberations, a vital question arose. Implementing the 360 plan would take 3 years. It would require stopping all other product activities. IBM could not discuss unannounced equipment with customers, as a result of the antitrust decision. I put a plan together using the three years for education of customers on future computer needs. I took the proposed plan to Clark. He reviewed the plan, fine tuned it, and Clark agreed that marketing could contain the marketing situation for three years. I took that key decision back to the Spread committee for inclusion in the final presentation to IBM management. Material added by Jerome Svigals on March 24, 2011.]

 © 2007 Computer History Museum

Spicer: Say that again. The Spread?

Svigals: The effort was called the Spread Committee. And what it said essentially was, "I got this spread of computers and I'm gonna bring them all together."

Spicer: Or maybe you were spread out too much? Something like that?

Svigals: Exactly. Take your choice, but either way, it was a mess! And Learson said, "That's it! I'm gonna bring them all together." So he got his lieutenant, I can't remember his name." A very capable guy, and he turned to John Haanstra. John Haanstra was a development manager, who I first met in San Jose where he was working on the first RAMAC, another one of their computers.

Spicer: Yeah, right.

Svigals: And he said, "Okay, John, pull a committee together, and let's come up with one family that covers the whole spread of the IBM computer family."

Spicer: This is Learson to Haanstra?

Svigals: This is Learson to Haanstra. And John pulled a committee together. I think there were 12 or 13 people. And I was asked to join the effort as the competitive expert. By that time, I had a reputation. I was in charge of commercial analysis, which was the competitive assessment part of the marketing organization. And John said, "Come on in, I need your help." I sent Gabby [ph?] a copy of the letter.

Spicer: Yeah.

Svigals: In which he said he was delighted we were able to do that. But the answer was we met for two months in a motel up in Connecticut and we basically battled through all of the issues. And the first issue was, "Can you have a machine which does both commercial and scientific in the same machine?" That was the first big battle. _____ did that one. They were adherents to the binary model that said, "You can't do anything without being binary!" Then we said, "How about Fortran coming along?" "Is that binary?" "No, that's alphabetic." "Oh, really?" "So, any alphabetic capability in a science machine?" "Yeah!" "Oh! Let's build a machine that handles both!" So for about two months, we fought through all these issues to get engineering to be convinced they really needed a combined machine, both binary as well as alphanumeric.

Spicer: So you're saying that the person you really needed to convince the most within IBM was Engineering?

Svigals: Oh, yeah. Engineering development.

 © 2007 Computer History Museum

Spicer: Okay. Aside from the customer confusion, there was also the risk to the company.

Svigals: Never even talked to the customers.

Spicer: Oh, okay.

Svigals: We were doing battle among the engineering groups all the way.

Spicer: By the way, not to lose the track, but did you survey customers?

Svigals: Well, I was in charge of commercial analysis for the domestic division. And I worked closely with World Trade. So I had a very complete picture of what was being bid and what we were losing to, and why we were losing. So I was brought into the meeting for that purpose, essentially, was to add a sense of reality of what are we fighting in the marketplace? And you saw that letter from John Haanstra saying, "Thanks for bringing it into the meetings." So we fought through these issues, and binary versus alphanumeric was one of the biggest ones. There were some issues in engineering, for example, we were starting to lose to communication based systems, and I could never get Brooks or Evans to agree to add communication capabilities to the 360.

Spicer: Can you explain what you mean by that?

Svigals: Well, essentially, these were computers that spoke to telephone lines. It was that simple. And both Evans and Brooks said, "No way! We're not going to do it in the 360. We got too much to do. We'll put that off later." And I said, "But we're starting to lose orders to computers that're specializing in dealing with communications systems."

Spicer: Like teleprocessing?

Svigals: Yeah, essentially. We didn't win everything, but we did focus on the commercial and the scientific applications, and we did get a single machine to cover both. And that was a big battle that was won.

Spicer: Feel free to...

Svigals: The 360 models?

Spicer: ...jump back and forth here. Yeah, how did you position these in marketing terms?

Svigals: I gave you a copy of the Spread Report, and there's a whole section in the Spread Report.

 © 2007 Computer History Museum

Spicer: I know, but just for our...

Svigals: Oh.

Spicer: I mean, for our viewers, if it's a quick thing-- I don't want you to spend an hour describing it-- but just generally if you can explain what the general market chunks were that IBM was going at with its initial models.

Svigals: Well, essentially what we did is we took the six machines and we said, "Okay, that's the spectrum. Now let's divide the spectrum, and what are the characteristics of the _____ spectrum." And the characteristics were separated more by speed, and capacities. So that's what got us from the examination of what was happening in the marketplace by size and by capacity, and got us to focus on the models which differed by speed and capacity.

Svigals: So we basically took that spectrum, and we could see what change, or what configurations of machines we had in various types of locations, and then based our models on each of those categories. So we basically assembled a set of four or five categories, punched card systems and said, "Okay, what would that look like with computers?"

Spicer: A lot of customers at this time obviously were also moving generally from punched cards to computing.

Svigals: It was starting to happen, yes.

Spicer: And so IBM would've had an educational role with customers to convince them, you know, for starters...

Svigals: The reason I'm laughing is we were busy educating internally.

Spicer: Yourselves, yeah.

Svigals: We were busy educating...

Spicer: But they [customers] didn't know.

Svigals: One of the first things that I was asked to do when I came into DP headquarters was essentially to run a class for management, marketing management, and explain what a computer is. So we actually pulled in everything from the Senior Vice President for marketing down into a meeting in Poughkeepsie and we spent two weeks educating them on what the dickens a computer was. You know, what it did. They were all punched card experts. They spent their whole careers on punched cards. They got

 © 2007 Computer History Museum

promoted on punched cards. So we came in and said, “Hey, guys, let’s tell you what a computer’s all about.” And we spent a couple of weeks educating the management. That was the way we started.

Spicer: What about educating the customer, let’s say, in the transition from punched cards to magnetic tape, which I understand was kind of traumatic for some?

Svigals: It was very traumatic. And essentially what we did was we derived from the management education a set of experts and we developed a set of systems experts. And the purpose of the system expert was to bring this knowledge of computers into the application solution. And that’s really how we got over that hurdle was to educate this group of people. And as a matter of fact, most of my titles in IBM were Systems’ Managers.

Spicer: And these are sort of industry- or sector-specific areas?

Svigals: That was secondary.

Spicer: Like banking or airlines?

Svigals: That came a little later. The banking specialization, the insurance specialization, the manufacturing of the petroleum and so forth. Those came later. What happened first was just ensuring people understood what a computer was. Literally, that basic. And once we got over that hurdle, then we could specialize the individuals by industry. The marketing had been specialized by industry. That was one of the early things that was done was to specialize in the punched card days was to specialize by industry, but that came secondarily in the computer area.

END OF TAPE 1 / BEGINNING OF TAPE 2

Spicer: So, Jerome, just during the break, we were chatting about the...

Svigals: Impact of the 360 on the IBM marketplace.

Spicer: Thank you. <laughter>

Svigals: Well, the point I'm trying to make is the 360 was a fantastic move but there's a lot of things that happened with an announcement like that. Key number one is you had to give engineering a chance to develop the machines and that was a period of three years. So what you agree to do in going to the 360 is you agree not to make any product announcements in the marketplace for three years and, in a marketing type of organization like IBM, that's a killer. So, essentially what we had to do in marketing was to put a set of programs together which would educate people on the requirements for future computers. In other words, what we did was we started to educate the marketplace on what do you really need in future computers and, of course, what we were driving towards were the specs of the 360. Now,

 © 2007 Computer History Museum

by the way, this was the same tactic we used to fight competition in the early days when they were proposing higher speed machines and larger memories. What we did was we changed the subject from don't talk machine specs, talk about support. When you put a computer in, you need people to install it, you need people for education, you need people for programming so what you really ought to be looking at is not the machine speeds but you ought to be looking at the support requirements and that's the way we started to turn around the marketplace at a time we didn't have the right computers.

Spicer: I wanted to ask you a couple of things. One was what was the usual product cycle in IBM? So they're not going to make an announcement for three years. How many product cycles does that represent?

Svigals: That's at least two product cycles.

Spicer: Okay.

Svigals: In other words, a typical product cycle was 18 months from announcement to delivery.

Spicer: Okay.

Svigals: But three years was longer.

Spicer: Okay. Can you tell me about the role of the 1401 in moving people over to 360? Because that really seems like an important machine.

Svigals: Well, there were a couple things done with the 360 that were pretty important. One was to basically provide a transition program which would take something like a 1401 program and basically automatically rewrite it for the 360. Those translators were extremely important marketing tools and where the customer had a library of programs which they were highly dependent on, they had a tool which would enable them to very quickly and efficiently move that to the 360. So that became a very important marketing tool and there were a number of those translations translating the programs available and the 1401 is probably one of the most important ones.

Spicer: Right. How about the role of the 1401 in moving people from punched cards to magnetic tape?

Svigals: Basically, that was a very important tool for that purpose.

Spicer: Yeah.

Svigals: Let me tell you, first of all, you know how the 1401 name got picked?

 © 2007 Computer History Museum

Spicer: No.

Svigals: It was the size of the memory. The memory of the first machine was 1401 characters. In other words, core memories were so expensive and so difficult to produce, they could only put 1400 characters...

Spicer: That's a really odd number, isn't it?

Svigals: Yeah, but that's essentially how the name came about. It was the size of the core memory of the machine.

Spicer: Getting back just a sec to the six [System/360] models announced in 1964 because I'm trying to understand the impact of how much the market shaped how you divvied up the 360's product line into six models internally. There was probably some horse trading going on in terms of who got to develop what.

Svigals: Well, the way we're looking at it was, we looked at the punched card configurations and we let them dictate what were the configurations that the customer needed, the size, you know, the capacity, how fast it processed, how fast it punched, how fast it printed and that started to drive the characteristics of the early machines like the 1400 series. Essentially, it was driven by the characteristics of the punched card equipment. The characteristics of the 360 were then driven by the computers that were in the marketplace, essentially the 1400 series, the 7000 series, 701, 702, 704, 705; the 7070 was an interim machine. Those basically, the specs of those machines were what drove the target configurations of the 360. So we tried to recognize there was a real transition issue here and, by starting with what the customer now had, we basically could pinpoint here is where we're trying to get to and this is the transition we need to go through.

Spicer: So how far ahead did the Spread committee's recommendations extend?

Svigals: Well, just to announcement was three years.

Spicer: Right.

Svigals: From the time we announced it to the time we actually announced the first machines but there's a lot of education going on and, as I said before, we started to educate the sales people on what do you really need in a computer? So we started to interact with the customers on what were their required specifications for the future? We weren't announcing any equipment. We were just talking about future specification requirements. And that was allowed to basically-- so the discussion going on between the marketing people and the clients and that, in turn, hopefully, would match what we were bringing along with the 360.

Spicer: Now, just to play the devil's advocate here, but would there have been may be some-- cautions in the way IBM announced machines at such a preliminary stage?

 © 2007 Computer History Museum

Svigals: Well, the answer was you had to be damn careful.

Spicer: But-- yeah, but never does or until...

Svigals: The answer was you had-- you were carefully warned to be very careful and that-- not commit that this would be the specs of what we were coming up with and in no way would you basically say, hold it, no, wait. You had to avoid any implication that you were distorting the market sales position. So the answer is you had to be very careful how you did that.

Spicer: Right. Was there, at the time of the Spread committee and its report, was there a look beyond 360 and what might follow for the company?

Svigals: The answer was yes, in a very scanty and limited way. We were so concentrated on making that set of computers happen, there were some real breakthroughs there. The fact that they were all alphanumeric- and binary at the same time. The fact they were all program compatible. There were some very hard, you know, commitments being made on the machine so we were so damn busy trying to live up to the commitments we made of the 360, we didn't spend an awful lot of time going beyond the 360.

Spicer: In the development, I know every model probably had its own unique challenges but if you could divide the whole family just on the date of introduction, the first six models, what took the most effort, the hardware or the software?

Svigals: I would say the software took the most effort. In theory, the programs would-- a program would work on all six machines. In practice, though, it didn't work that way so we had to tailor these programs to work on the characteristics of the machines being built. So we-- instead of ending up with one program, we ended up with three programs, essentially small, medium and large.

Spicer: I see.

Svigals: So that was a major challenge: to basically satisfy the commitments we were making in terms of software and the answer was we had-- we could not keep it to one software package. We had to go to three packages, basically, to cover the spectrum. We had another problem and that was the salesmen were getting pretty clever and, since all these six machines were all compatible and the customer would say it was a mid-range machine, they would bid the low-end machine and they'd say, "Well, that gives us the lowest cost and, if we have to move up, we're compatible anyway."

Spicer: Right.

Svigals: So what we found were situations in which the salespeople were deliberately bidding the low end machine so as to get the lowest cost in the marketplace, knowing that machine could never perform to the level required. So we had a hell of a problem.

 © 2007 Computer History Museum

Spicer: Yeah.

Svigals: Which we solved in a very simple way, interestingly enough. What we said was, "If you're going to bid the lowest two machines, you had to give us the complete program and design. You could not do it the way you ordinarily sell machines, which is just announce the specs and bid it, you had to give us the detailed design."

Spicer: The application.

Svigals: To prove that the two low end machines could do it. As soon as we put that requirement on it, the answer was no one could do that. They threw up their hands and they bid the mid-range machine. But it was a hell of a problem to keep the marketing people under control. Compatibility gave them...

Spicer: Would they have, I mean, I assume that technique worked quite a lot and then they would just sell the customer up to the next model and...

Svigals: Essentially.

Spicer: ...by that time, it was too late, they were locked in.

Svigals: Essentially.

Spicer: Yeah.

Svigals: And of course the customer was pretty angry about it at the time.

Spicer: Yeah. In the long run, it's probably not a good...

Svigals: Exactly. So that's the reason we stepped-- we put a program in called Systems Assurance and Systems Assurance required that any bid had to be reviewed before it was made to the customer to show that it was adequate. And that's when we got to the point, okay, on the two low-end machines, not only do you have to give us a paper design, you got to give us the detailed specs. And that's the point at which we won the battle with the marketing force.

Spicer: Yeah.

Svigals: There were problems on the marketing side almost...

Spicer: Sure. Tell me about the model 20 because-- was that almost-- was that a real machine or...?

 © 2007 Computer History Museum

Svigals: <laughs>

Spicer: I mean, obviously, they made some but did it sell?

Svigals: The answer was that was really designed for low-end punched card installations so it did sell but it sold in that narrow area where we had punched card system configurations that were small and where the customer was just trying to migrate into computers. Again, that was the most delicate place we had because we-- what you were trying to do was prevent the salesmen from selling low. So the model 20, we had that problem in spades.

Spicer: I'm sure, yeah, because that was the entry level...

Svigals: And that's the reason we had this System Assurance program and that's the reason for the two low-end machines, we had very stringent requirements for what the salesman had to show us before he could be allowed to bid those low-end configurations. That was a real balancing act.

Spicer: Yeah, right. And you don't want a machine being-- a customer telling you to take a machine out. That would be quite bad.

Svigals: And you don't want to basically the week before he installs is, say, "Oh, by the way, we're going to put a machine in at twice the rental." You know, that was a real problem so we had to protect ourselves.

Spicer: Right. That's interesting that, you know, the battles in the marketplace are just as fierce as the ones inside IBM. I don't think I would have thought of that.

Svigals: That's a good way to look at it.

Spicer: Well, okay, the 360, you know, is such a huge chunk of computer history and we could easily spend a lot more time but you've done a lot of other interesting things and why don't you tell us, well, first of all, let's just wrap up the Spread committee and the report.

Svigals: Yes.

Spicer: The results of that and what you did once that wound up.

Svigals: Okay. Well, when the Spread committee wound up, I essentially decided to move my family. I wanted to give them a feeling for the world so I decided to take an assignment in World Trade. It turned out to be in Japan and I got blasted by a lot of people in DP headquarters who said you can't leave us, you know, and I said, "Oh, yes, I can." And I knew the head of World Trade, he was an old buddy of

 © 2007 Computer History Museum

mine, and he agreed to let me take this systems manager position so I became systems manager for Asia Pacific.

Spicer: That was in Dick Watson's office?

Svigals: No, no, no. Dick Watson was the senior executive at IBM in charge of World Trade. But Gil Jones was the guy who had taken over World Trade as the implementing senior executive. And I picked up the phone and said, "Gil, I want to go to Japan," and he said, "Okay, I'll get you there." And it was over the objection of a lot of people in DP headquarters, who wanted me to stay there.

Spicer: Yeah.

Svigals: In fact, corporate marketing wanted me, also, and I turned down a job there. That's almost unheard of, to turn down corporate marketing. So the answer is I just turned them all down and said, "I'm going to Japan." And my kids were, you know, young teenagers and I said I absolutely had to get them overseas and they went to the American school in Japan, which is probably the best school they ever went to in their life. But, anyway, we basically went to Japan. I covered 15 countries and it turns out what I was really doing was introducing the 360. In other words, I got to Japan at the time the 360 was just being announced and I walked into the middle of a major battle in Japan. There's an organization in Japan called MITI, [the Ministry of International Trade & Industry], and they were trying to develop computers as a major export product like automobiles, like cameras, and along comes the 360 that just blows their plan. So, essentially, what happened was the Japanese put a one-year delay on the import of any 360 into Japan and they had the ability to do that, they were controlling, you know, the import licenses and everything else. So I had the problem of holding the line for another year in Japan. So we did an awful lot of marketing, a lot more talk about requirements and support and so forth but we were able to hold the line. The other problem, though, in the process was we had about ten Japanese vendors, all of whom were getting ready to announce machines in the United States and we knew that, if that happened, we would really have considerable trouble because since they had now seen the 360 plan, they weren't, you know, announcing machines in a vacuum. They knew our 360 plan and they were about to basically put products on the marketplace directly competitive...

Spicer: Is this '65, '66?

Svigals: Yes. Exactly. So my problem was, how do you compete with all the Japanese vendors and keep them from basically launching an onslaught into the U.S.? And we decided the best way to do it was to do what we did in the 'States, which is basically to change the subject from machine specs to support specs. That was the key way we changed it. So we educated all the salesmen in IBM Japan into what's required to make a computer system happen? What's required to implement it? So we educated them all intently on the support requirements. Well, most of the vendors in Japan were like the computer vendors in the U.S., they were machine guys. They were basically pushing memory sizes and speeds and so forth and hadn't really looked at support requirements. So what we did essentially was fight a battle in Japan in which we were fighting support versus machine specs and we won the battle.

 © 2007 Computer History Museum

Spicer: Do you think that represents-- the need to do what you're just describing represents a new kind of customer whereas, in the '50s, they were pretty technically sophisticated? I'm thinking of the aircraft industries and the weapons industries...

Svigals: In the early days of computers, everybody was technically tied-in.

Spicer: Yeah, I mean, they could almost design-- some of the users could probably design the machines they were using whereas now, to make this, you know, a real business machine, it has to move from that to service.

Svigals: Lots of support requirements.

Spicer: And support, right.

Svigals: Lots of service requirements. The answer was education, education, education.

Spicer: Right.

Svigals: Well, it turned out that we got two benefits out of the education. One was we won the battle in Japan basically in which they wanted our support requirements and they really beat up the Japanese vendors but more important is they decided perhaps it wasn't a wise idea to move into the U.S. with Japanese computers and you don't see Japanese computers in the U.S. market today.

Spicer: No, right.

Svigals: Essentially. You know, your pocket watches and things like that.

Spicer: I wanted to ask you how-- when you were making-- when you were working in Japan and, you know, showing IBM, whereas how important was software, the promise of software...

Svigals: Software was exceptionally important...

Spicer: ...to the sale?

Svigals: Exceptionally important and we were back to the specs of what was being offered on the 360.

Spicer: Can you give us an example of maybe the top two programs?

 © 2007 Computer History Museum

Svigals: Well, the two biggest ones, of course, were Fortran. John Backus and his group just did a fabulous job of producing a very usable package so, essentially, anyone who had scientific applications had to use Fortran. They thought it was the cat's meow. Okay. The second one was essentially word processing or data processing, essentially, or database processing. So the major programs being offered in the 360 in the database area related to things like COBOL and basically offered numeric programs, which spoke machine language, which spoke commercial language essentially as the interface. We had several packages. I can't remember the names of them but we had several packages, all of which were designed to accommodate two things. One was transition from earlier machines and two was basically a design of database machines. So database languages were essential. We had a whole laboratory, you know, down in San Jose, Santa Theresa, that was devoted to the database languages and that was a major part of the selling.

Spicer: And was Share at this point...

Svigals: Share was effective for scientific machines, essentially.

Spicer: But not for business users?

Svigals: Not for business users. And IBM, of course, was very active in Share and Guide-- essentially the organization for commercial applications--and IBM was very active in both of them. I remember going to many meetings in which we basically made presentations.

Spicer: They were fairly raucous affairs, weren't they, some of the Share meetings? <laughter> I think I've heard a few stories.

Svigals: Well, some of the Share customers were really very staunchly independent guys. I remember <laughs> I remember one time I got beat up at a Share meeting by the...

Spicer: Which was common for IBM.

Svigals: Which was common...

Spicer: I think coming to Share meetings.

Svigals: But there'd been a design improvement in the output printer and it allowed it to-- basically, you could exchange-- they used to use printer chains. It allowed you to change the chains to put different characters and we were hesitating to announce it and I got asked, "Why doesn't IBM announce it?" And I said, "We got a serious problem." They said, "What's the problem?" I said, "We're trying to decide if a screwdriver can be a rental item." <laughter>

Spicer: To let you change the chain.

 © 2007 Computer History Museum

Svigals: You need the screwdriver to change the chain. The answer was, that wasn't the real problem. The answer was, we eventually got it announced. We were always beat up at the Share meetings.

Spicer: Yeah.

Svigals: It was the popular sport.

Spicer: Sure. Well, okay, so you're in Japan and you're battling two things, one, Japan's reluctance to take IBM in.

Svigals: Right.

Spicer: Which is not surprising. It's not personal. They did that to all companies.

Svigals: Yes.

Spicer: And then also...

Svigals: Their attempt to move into the U.S. marketplace...

Spicer: And then, on the other hand, yeah, you were trying to work with keeping them out of the U.S. market.

Svigals: By the way, interestingly enough, so you don't forget it, '64 was the summer Olympics in Tokyo and you know who Japan came to for the summer Olympics?

Spicer: To IBM?

Svigals: IBM.

Spicer: For their timekeeping or...?

Svigals: For-- it was the first complete automation of a summer Olympics by computer. We did everything.

Spicer: Can you explain a bit about that?

 © 2007 Computer History Museum

Svigals: Well, that's a fabulous-- there's a lot of applications. You have what you have in a sports venue, sport associations. One of the things I learned was, in an Olympics, the sport organizations can change the rules during the Olympics. Literally. If they see something that's- a characteristic of a particular field or venue, they could literally change the scoring technique at that time to reflect the actual site. So we had the problem of not only producing the programs for the scoring and the timing and the display of the characters, you know, on the screens but we also had to have the capability of changing them in case the sports organization decided that the venue required something different. It was a real challenge.

Spicer: Fudge factor, yeah.

Svigals: Exactly.

Spicer: Yeah.

Svigals: But, anyway, we did the program. We had a group of about 40 programmers from IBM Japan and they just did a fabulous job. And it was the first time it'd ever been done for the summer Olympics.

Spicer: How did IBM get that contract?

Svigals: <laughs> Very simple. The Japanese government wanted it to work and they decided the scope and size was so big that IBM Japan was the only organization with enough resources to make it happen. So when it came, you know, to making decisions, the Japanese government recognized...

Spicer: It's a compliment.

Svigals: Exactly. The size and the support capabilities of IBM Japan. It was a fabulous organization.

Spicer: Had IBM done that before with an Olympics or...

Svigals: Yeah, the winter Olympics.

Spicer: Of?

Svigals: We had done the winter Olympics up in Squaw Valley, for example, was the one that was done before that and that, of course, contributed a lot to...

Spicer: Your experience.

 © 2007 Computer History Museum

Svigals: And reputation for being able to get it done under adverse situations.

Spicer: Right.

Svigals: But those were huge programming problems. We had guys literally living in the facilities for about six months.

Svigals: It was really a challenge.

Spicer: Tell us, because it wasn't only about Japan but I notice you were also responsible for over a dozen countries...

Svigals: 15 countries.

Spicer: Yeah. Tell us a bit about that.

Svigals: Well, the first thing you have to-- did I travel a lot? I traveled a hell of a lot. The first thing you have to recognize is the number one application throughout the Orient is banking. Banking is the major application so I spent most of my time basically calling on the major banks of the Orient, the Bank of Thailand, the Bank of Japan, Commonwealth Bank in Australia, Bank of India. I went to every major banker in Asia and I got one hell of an education in banking, I'll tell you, which then led to my later work in banking, which we will talk about later. But I spent most of my time traveling to the banks throughout Asia. You travel so much that IBM had an unwritten rule that an average trip out of your home location was six weeks. You got-- we had jet planes had just come into use so-- but it literally took six weeks on a typical business trip and the unwritten rule was your wife could go with you on company expense on the trips, which was fabulous. So my wife got to every place in the Orient.

Spicer: That is nice when you're going away...

Svigals: The only place she couldn't get to was India because there was a war going on between India and Pakistan and they said, "No, no wives allowed."

Spicer: Yeah, right.

Svigals: And I was in India during the Indian/Pakistan war and that's another whole experience which I can explain to you.

Spicer: So banking was your main...

 © 2007 Computer History Museum

Svigals: Banking was the major application.

Spicer: And what did IBM have to offer in banking?

Svigals: Essentially knowhow. We had applications and equipment installed in most of the major banks in the Orient so we were essentially not selling new, we were basically growing installations and that was a tremendous aid...

Spicer: Were these computers-- electronic computers or...

Svigals: These were early-- yeah, these were pre-360 computers, essentially. We had 650s, we had 1400s, 1410s, and the 7000 series. So we had a large stable of earlier machines installed in the major banks of the Orient and we used that as a base for evolution into the 360.

Spicer: So obviously IBM is already quite busy in Asia?

Svigals: Yes.

Spicer: With this installed base of...

Svigals: Oh, yeah, yeah. Had...

Spicer: Pretty good foothold.

Svigals: I had a huge group of systems. I was systems manager for Asia. I probably had a thousand or 1,500 systems engineers located in the 15 countries. The system engineer was the backbone of marketing in the Orient because everyone was so demanding about system support. And I actually ran the first system symposiums in Asia. We had the first ones at Mount Fuji. We brought all the systems managers in from around Asia, all the systems engineers, major systems engineers, and I invited several major systems managers from the domestic company over to speak to them for about three or four days about how to get ready, how to use it and so forth. So the largest problem I had was education, upgrading the education.

Spicer: About IBM's products?

Svigals: IBM's coming products. Okay.

Spicer: What about the language barrier?

 © 2007 Computer History Museum

Svigals: The first thing you learn is poor English is the universal language.

Spicer: Oh, okay.

Svigals: Everyone spoke English.

Svigals: A lot of-- most of the key executives of the banks had gone to school in the U.S. They went to banking schools in the U.S. They went to get a college education in the U.S. So language was no problem. I can't think of a time I ever ran into language as a problem in the Orient because of this universal use of English as the banking language. It worked like a charm. And it's true in IBM, too. Now, occasionally, I'd go into these, like in IBM Japan, among the sales people and we'd tell them, look, you go ahead and talk in Japanese and we'll get a translation on the side. So there were times when we encouraged the natives to speak in their native language but we were sitting on the side with a translator just to understand what was being talked about.

Spicer: Okay. Well, we're in 1965 and then...

Svigals: Then I came back.

Spicer: Yeah, so...

Svigals: I came back to the ‘States and I went to a little lab in Los Gatos, California.

Svigals: Advances in development.

Spicer: Tell us-- that's kind of a famous laboratory.

Svigals: Very small but very famous. That's where they developed the original RAMAC. The RAMAC technology, which was developed in San Jose, actually came out of that lab. The universal product code used in retail and supermarkets came out of that laboratory and magnetic stripe media came out of that laboratory. Essentially, I was asked to run a program called Value Exchange, which, as IBM knew, we were going to an electronic transaction era in banking and the question is what media should we give the customer? So the big issue at the time was, should we go to magnetic stripe or should we go to some other technology? I got to tell you a funny story. I took that assignment in '66 and the head of ASD [Advanced Systems Division] decided, hey, if we're going to announce magnetic stripe credit cards, we have got to tell the people on our board. We had 21 bankers on the board of IBM and we had to tell them what we were doing so that they would not be concerned that we were going in the credit card business. So Tom Watson, Jr., said, do it. We had a board meeting at 590 Madison and, of course, the big issue is, you can't describe anything confidential to your board. I don't know if you know that but, in a large corporation, the board is not entitled to hear confidential information. They're outsiders, essentially. So I made this presentation about what the industry was doing and the industry was going to magnetic stripe cards so we basically said we'll probably follow the industry. And, when the meeting was over, Tom

 © 2007 Computer History Museum

Watson, Jr., came to me and said, "Jerry, I know we've got to do this but I've got a problem." I said, "What's the problem, Mr. Watson?" He said, "My mother hates credit cards." <laughter> And she was the power behind the throne. That was Mrs. Watson, Sr., and she was the real power behind the throne. He says, "But you got to do it so let's go to work."

Spicer: I'm curious about who had the vision for, you know, ATMs or, I mean, where did this all come from? This is going back much farther than I ever thought...

Svigals: Well, ATMs started really-- they really started-- you got to watch the nomenclature. There are cash dispensers and there are ATMs. The original machines were cash dispensers and you had something like a punch card that you put in the machine and out came cash. With the ATM, you went to a machine that had multiple currency as well as accepting of deposits. So an ATM really is much higher function than a cash dispenser. The cash dispenser started in Europe and the U.S. We were actually building cash dispenser-- our Raleigh plan was what we called RPQ equipment, special design equipment, and we were selling it to banks like Lloyd's Bank in London we were installing initially.

Spicer: So what's this punched card that you stick in the machine that...

Svigals: They actually had a stub card. The early machines...

Spicer: But where do you get this? Because...

Svigals: It was mailed to you.

Spicer: It's equivalent to money, right?

Svigals: Yeah, it's a one-time use. And when you use it, they were mailed back to you so you had some more to go to the machines. And I used to go in Japan and they used to have these machines in storefronts and essentially you got one of these punched card stubs and you put it in and you got so much cash out.

Spicer: So they're sort of like travelers' checks but...

Svigals: No...

Spicer: Not really...

Svigals: The stub was a pre amount-- pre established amount like 50 bucks...

 © 2007 Computer History Museum

Spicer: It's like a debit card almost loaded with...

Svigals: It's not quite a debit card. It just literally is a prepaid card.

Spicer: A prepaid card.

Svigals: Essentially.

Spicer: Yeah.

Svigals: And you got these stubs and they were good for a package of currency, usually 50 bucks, and you put it in and you got 50 bucks and walked away. That was the original cash dispensers.

Spicer: Okay. I got it.

Svigals: And then it migrated from there to the automatic teller machines. Now, I actually produced the first automatic teller machine for IBM. It was called the 3614.

Spicer: Okay. Do you know who came up with the first ATM? Was it IBM or someone else?

Svigals: No, no, no. It wasn't IBM. It was a vendor. I have it back in my history books but...

Spicer: That would be good to know.

Svigals: It was another vendor.

Spicer: We're trying to find that out.

Svigals: ATM's, by the way, a very important product.

Spicer: Oh, yeah.

Svigals: And they're migrating very rapidly to much higher capabilities. I have the information. I'll dig it out for you.

Spicer: Okay. Thank you. So let's see, the 3600 banking system, that's obviously a really big...

 © 2007 Computer History Museum

Svigals: 3600...

Spicer: ...major solution.

Svigals: ...was designed in the Kingston laboratory. Essentially, it was a sub-system and what it consisted of was a 3600 controller, which basically was a small computer and that ran the input/output equipment and the database equipment. It was a standalone, subsystem designed to work in a branch bank. That was the 3600.

Spicer: And connect via?

Svigals: By communication lines to some central...

Spicer: To a mainframe somewhere?

Svigals: Yeah. So it did most of the local work and went to the mainframe on an exception basis or on an update the program basis or on a download the end of the day transaction basis. So it really became a complete subsystem. I developed that for IBM. It was called the 3600 and I did it on an absentee basis. I lived in San Jose and I worked in Kingston and I used to go to Kingston for two weeks, go home for a weekend and two weeks and Jim De Rose was the executive manager of that. He was fabulous. Unfortunately, he has died. But essentially that's where we produced the 3600.

Spicer: How did that work as a product?

Svigals: Fantastic. Exceptionally successful, very good product. And those were sold throughout the bank industry, U.S. and worldwide, essentially.

Spicer: Where would you like to take us after that?

Svigals: Well, I went back. I was told to produce this magnetic stripe card and essentially we had a problem, that no one had-- there was a magnetic stripe media produced by IBM in the late '50s. It was produced in the Minnesota plant, Rochester, Minnesota plant and it was used for magnetics on paper for machine readable baggage tags. They were working on something for the airlines industry but we came along and said, "We can't have paper, we have got to get to plastic." So the question is, how do you put magnetic stripes on plastic? So our key design problem...

Spicer: Sorry, that was just for durability it needs to be on plastic?

Svigals: Well, because the plastic card was the basis of the bank industry program.

 © 2007 Computer History Museum

Spicer: Credit card?

Svigals: The credit cards, debit cards and so forth.

Spicer: Okay. Thank you.

Svigals: Well, the way we turned out, it turned out we looked at it. I don't know if you look at a bank card, you'll see there's a signature panel.

Spicer: Yes.

Svigals: Well, how's that signature panel get there? What they do is they hot stamp the signature panel. They have a continuous stream of tape and on the tape is the signature panel and then you hot stamp it and it actually integrates into the surface of the card. We said, let's do the same thing with magnetics. So we literally built equipment that hot stamped magnetic stripes into the surface of the card and that whole industry then picked up that design.

Spicer: Those prototype that you showed me, the card such as that...

Svigals: Magnetic tape wrapped around a hunk of card.

Spicer: Was literally a piece of magnetic tape?

Svigals: Magnetic tape wrapped around a hunk of cardboard.

Spicer: Nine track or seven track...

Svigals: Because that's the way we started.

Spicer: Which is, I'd guess, about as simple as you can get.

Svigals: Well, it turns out it was simple but the question was reliability.

Spicer: Yes. So tell us about...

Svigals: And reliability and producability.

 © 2007 Computer History Museum

Spicer: Yeah. Tell us about the security being in the system versus in the card and that big decision there.

Svigals: Well, first of all, when we produced this thing, we worked very carefully with banking and airlines. We worked with Chase in New York and we worked with the ABA Bank Committee, (the American Bankers Association) Bank Committee, and we also worked with the airlines industry. The big problem we had was the 747 was coming along for the first time and the airlines industry didn't know how to cope with it. So we basically had to come up with some method of organization and mechanization that allowed them to cope with the passenger flow on the 747.

Spicer: Passengers and baggage, too, maybe or...?

Svigals: Tickets.

Spicer: Ticketing.

Svigals: And, at that time, we developed the magnetic stripe transaction card and the magnetic stripe ticket, both of which are in use today.

Spicer: Right.

Svigals: If you look at the back of your airline ticket, you'll see the magnetic stripe on it. Well, we developed both of those in the Los Gatos Laboratory in the late '60s and the first test we did was the first quarter of 1970 at O'Hare Airport with American Airlines and American Express.

Spicer: Tell us about that. That sounds interesting.

Svigals: That was a fabulous experiment. We actually produced a self-service machine. I've given you pictures of those units.

Spicer: Yes, actually. Okay. How does American Express fit into-- I see how American Airlines...

Svigals: American Express was the prime advocate of using credit cards in the airlines industry. They were in the travel card business. So they were hot to get anything that would further endear the airlines industry to their card.

Spicer: Did they have an idea of their card itself becoming...

Svigals: Yes.

 © 2007 Computer History Museum

Spicer: ...part of the chain?

Svigals: Oh, yeah, absolutely. I mean, the vice-president of American Express, who has since died, was the guy who was the driving force behind all of this and he's the one-- I went with him and got the director of marketing for American Airlines, we had lunch in New York and the whole purpose of the lunch was to convince American Airlines to test this American Express.

Spicer: Do you remember the fellow from American...

Svigals: George Waters.

Spicer: Waters?

Svigals: Waters, W-A-T-E-R-S. Fabulous guy.

Spicer: Okay. Great.

Svigals: He pushed hard. He was the driving force of the marketplace.

Spicer: The American Express fellow?

Svigals: Was the director of marketing whose name I can't remember.

Spicer: Well, we've got another tape done so we'll take a break.

Svigals: Okay.

END OF TAPE 2 / BEGINNING OF TAPE 3

Spicer: Jerry why don't we just pick up where we left off with the magnetic stripe card trial at O'Hare and what you learned from that.

Svigals: That was exceptionally successful, we had people, obviously with O'Hare, but we had a machine installed in American Airlines and United Airlines was at the opposite end of the airport and we used to have smart travelers who would walk from United down to American, pick up the ticket and walk back to the airplane at United, which was quicker than waiting to get to the counter.

Spicer: This is because your tickets ...

 © 2007 Computer History Museum

Svigals: We had self service ticketing machine.

Spicer: Tell us about that because that seems decades ahead of anything else at the time.

Svigals: Yes it was, that also led to the design of our ATM because essentially it was an interface and I've given you pictures of all that equipment and the layout of the boards but essentially it was primitive, it basically said you pick a destination it displays the next available flight and asks you what class ticket you want and then tells you if they have that class and if the answer's yes, put in your card and out comes your ticket, it was that primitive.

Spicer: Did it allow for picking your seat?

Svigals: The answer's no.

Spicer: Not quite yet.

Svigals: It hadn't reached that level.

Spicer: That's pretty sophisticated yeah. So a person would just use a regular credit card like at the time, Charge Ex or?

Svigals: No, no, they used a magnetic stripe credit card that we issued, we issued like 250,000 magnetic stripe cards to potential users of the equipment.

Spicer: So explain how the actual money part worked?

Svigals: Well it was an American Express card, it was just a conventional American Express card to which we had added a stripe so that the transactions were captured and then processed against your American Express account. So by having American Express plus American Airlines we were able to cover both parts of the transaction, the payment as well as the ticket.

Spicer: So they would (not to get too detailed) but would this be done at the end of the day, they would debit your account or was it in real-time?

Svigals: It was a batch transmission of the transactions and you had up to like 20 days to get it in, we used to do it I think once a week, move a batch of transactions over to American Express and they would just process it in the normal American Express card transactions. But it worked like a charm.

 © 2007 Computer History Museum

Spicer: Well that's pretty good, the fact that people would walk across the terminal and back is a great recommendation.

Svigals: Everyone was the delighted, the trouble was the airline industry ran into a recession at the end of the test and the demand went away for the equipment because of the recession. So the next thing we did, we said okay lets use the magnetic stripe in other equipment and then we went to the 3600, the banking sub system being developed in Kingston, which I also was the manager of and we said "Where can we use magnetic stripe?" We could use magnetic stripe on passbooks, we could use magnetic stripe on ID cards for the employees, we could use magnetic stripe on customer cards. Essentially we did all three of those on the 3600. Well it came to the announcement of the 3600 in 1973 and all the powers at IBM objected, Corporate Engineering objected because they said there was no security on the stripe, anyone could read the stripe and we said yeah but that's not where the security is, the security is in how you process the transaction inside the banking system and we had ways, we described that in detail. So the net result was that it got to be a big battle. Marketing objected and the reason marketing objected is because Citibank had a technology that they were pushing called the magic middle card and the magic middle card was just a punch paper tape inside clear plastic, very low density, very slow and the answer was that marketing objected because their key customer had their own solution and we objected because it was a lousy solution, we being new development. So here we were with a big battle going between, marketing, engineering and us and it got pushed up to a corporate management committee with Frank Carey who was then Chairman of the Board. He said "Okay let's have a meeting and discuss it" so we had an hour meeting with Frank Carey in which we discussed the issue back and forth and the net result was that Carey agreed with me and said "Yes we should announce the mag stripe." So we went ahead on the 3600 and announced the magnetic stripe cards, the magnetic stripe employees and the magnetic stripe passbooks and that's when it all got officially announced. Mag stripe's done fantastically well, the security in the system essentially where we check all transactions like where are they coming from and who are they for and so forth has been exceptionally good. Losses with mag stripes card they're worldwide, with 80% of the world using mag stripe tickets, mag stripe cards losses are less than 7% of the gross sales and 80% of that are people who you know, owe it to you but won't pay their bill.

Spicer: If you're not familiar with the industry that can sound like a lot but it's actually not, 7%, what's the usual?

Svigals: Actually the loss is about 2 to 3%, if you take out of that the people who have legitimate transactions but won't pay for them that quickly brings.

Spicer: Oh I see, they're not paying their VISA bill or whatever.

Svigals: Yeah, about 5% of the 7% of that and the rest are all sorts of other problems, counterfeits, duplicates and so forth, so it's been exceptionally successful and it's worked like a charm and the world's gone magnetic stripe. Even the next card which is a smart card has a requirement by standards to have a stripe on it and the reason for the stripe is transition. You can't change the whole world overnight, in fact in some places it'll never change so as a transition device you need the magnetic stripe in order to use the current equipment.

Spicer: Tell us why the smart card was developed.

 © 2007 Computer History Museum

Svigals: Well the smart card was developed in Europe and Japan and essentially the chip was coming along very quickly and some very smart developer said gee whiz, why don't we just put a chip in the card, well that was a little unheard of at the time, because chips were too thick and then there was a concern that if you bend the card, the chip would break, so a couple of very clever people, Professor Aramore in Japan and Detlef in Germany basically said well we can do the following, we can reduce the size of the chip, so it is inside the bending moments of the card. In other words if you bend the card the allowable way it still not is enough to break the chip. So they figured out that the chip breakage was not a real problem and they basically then got into the manufacturing, if you reduce the size of the chip to where it's within the substrate of the plastic card, basically it doesn't take any additional surface and it's flat. So these guys basically, independently, basically came up with a design that was capable of handling the chip inside the card.

Spicer: What was the larger goal of the chip, enhanced security or more memory?

Svigals: Well it started out as being memory, it was to carry more data, carry descriptive data, carry database data, carry multiple application data, that's the way it started, later on though it became a portable computer, it had encryption built into, had multiple credit cards built into it and it had a whole set of other functions and features, which came from the programmable microprocessor. I don't know if you knew the smart card but there were really three memories inside a chip.

Spicer: Can you tell us about that?

Svigals: Yeah one memory is non-volatile, that's the program, no matter what you do, take the power away, erase it, you can't erase the program. Second is a scratch pad, which essentially just allows you to do arithmetic during the transaction process and the third memory is actually the database, it's carrying a portable database, which is re-writeable in the card and it's under control of the security system of the card, the smart card actually has an encryption based security system.

Spicer: So the non-volatile segment of memory is read-only?

Svigals: Read-only and it's for the purpose of the program.

Spicer: But how was this conceived of as part of a larger system?

Svigals: Well essentially what it is, is a portable database essentially; that's the way it started into use.

Spicer: For example early customers of the smart card, who were those?

Svigals: Well the early customers were basically memory cards that was the first use, was memory cards, just to carry an extensive database. For example a medical application, one of the most important early applications was in medicine where you actually carried a record of customer visits, customer

 © 2007 Computer History Museum

inoculations, different patient's characteristics such as the diseases they had or the period of time they were in the hospital and so forth. So it really became a portable memory.

Spicer: The reason I ask is this and the mag stripe question isthat they're point technologies that require a big network behind them, a network spanning all sorts of things, technical, social, engineering, marketing, economic and so on and I'm wondering, it's clear to me what the impetus of for the mag stripe card was, but not so much for the smart card other than well we can do it so let's do it.

Svigals: The primary purposes of the smart card were twofold, one was multiple applications, that is you could carry enough data to be a credit card and an identification card and an access card and all the other applications you use magnetic cards for. All could be in one card with their own independent controlling programs and controlling security.

Spicer: Where are these things used, like with the mag stripe, it's clear American Airlines and Avis were kind of the founding customers?

Svigals: There are now 3 billion smart cards produced annually, there are two or three major applications, one happens to be in television in which it basically carries the access codes for encrypted television programs, it's an access card to allow satellite TV signal decoding, that's a very large application. Second very large application is in the identification access, government identification access to basically a secure card, which can be carried for identification purposes by government officials. The United States has a very large program in the military and in government and a lot of countries around the world use it as a secure access device, so those are the two major applications. There are all sorts of other applications which are in the card, I could enumerate them all but they're basically conventional card applications, but those describe the two biggest ones and notice the elements there are security encryptions in the card, you can actually have an encryption engine in the card, you can program it.

Spicer: Would you say they're more popular in Europe the smart cards?

Svigals: They're popular every place but the United States, every place.

Spicer: Which you sound a little upset about.

Svigals: I am upset because shall I tell you the story?

Spicer: Tell me the story yes.

Svigals: Well I became a very strong advocate, I became first chairman of the US Standards Committee for smart cards and I became a very strong proponent and I ran into a problem I hadn't anticipated. VISA had decided that they had large networks and if you're ever gonna give everybody in the world a card, which is capable of making 85% of the credit card decisions within the card and do away with 85% of the

 © 2007 Computer History Museum

traffic on their networks, they're gonna be stuck with a large investment and nothing to do. So they objected strenuously to the smart card because of its impact on their network.

Spicer: That's a strange way to look at it.

Svigals: But that's the way they looked at it, the guy was Roger Pearce specifically. Pearce sent a letter to IBM management saying we don't want Svigals to be an advocate of the smart cards, get rid of him and if you don't get rid of him, we're gonna get rid of our IBM equipment, which was a big threat. Well it turns out the IBM Vice President in charge of my area said "Okay Svigals you're retiring early" and he actually retired me, cost him a fortune, he gave me a six figure bonus for retiring early, they improved my retirement benefits, I did great.

Spicer: No complaints?

Svigals: Yeah no complaints but the answer is they got me out of the way, they're just coming around. There are two reasons they have to come around, one is security, the biggest problem they're having in Europe is security, people are counterfeiting cards. The only way you can fight counterfeiting is with the properties of the smart card, that's the first problem. The second problem is people are demanding because of the price of these cards, that they want multiple applications and you can't have a multiple applications with magnetic stripe cards, not economically. So it's used extensively throughout the world, outside the US.

Spicer: Phone cards are they used as?

Svigals: One of the multiple applications.

Spicer: Yeah that's a very big one obviously.

Svigals: Yes so anyway I retired early, I'm enjoying retirement.

Spicer: Yeah well you don't seem retired.

Svigals: I'm actively consulting, I have smart card clients who are basically installing smart card systems.

Spicer: I was gonna ask you about Eric Drexler, do you know him, he does the laser card, any comments on that?

Svigals: Laser card essentially is a database card, it's a high density storage device and it's been accepted in a number of countries where it's been used basically as a portable database device.

 © 2007 Computer History Museum

Spicer: I think it's used on green cards.

Svigals: Yeah could be.

Spicer: The new green cards.

Svigals: My guess is it could be, it's a portable device and as such, carries a lot of data. I think it's been very successful.

Spicer: A couple of things as we wrap up, one is: what's it been like to watch computers go from, you know, the primordial ooze relatively speaking, to such advanced systems in such a short period of time for all of us.

Svigals: Fifty years.

Spicer: Yeah and then what kind of advice would you give sort of inspiring the next generation of people?

Svigals: First question, it went by awfully fast and you always end up saying the same thing, my god why didn't I invest in that? The answer is it's just moved so fast because it's basically taking the best of creative talent of people and showed them how to use it effectively. So I think we will continue to see changes and improvements in card-based transactions. I'm gonna tell you a story that I think addresses it. IBM never patented the magnetic stripe and the reason was that we were really system sellers, we were selling computers and the purpose of the mag stripe was to generate transactions which would increase the demand for systems and it worked like a charm. But everyone says why didn't you ever patent it and the answer was because that wasn't the business we were in, the business we were in essentially was selling systems. You're gonna see the same things with smart cards, the question is not what the about the card, the question is what applications and the applications are unbelievable and today medical applications, transport applications, communication applications, database applications. The answer is we're just gonna see a continued proliferation of the use of these cards as they develop other applications so that's gonna go on. The second question was what do you tell people?

Spicer: Yeah what do you tell youngsters who like computers and might think oh isn't it all done, isn't it all invented?

Svigals: The answer is, I'm involved in that problem every day, I have clients and we're currently working on new inventions and new patents for smart cards, things that had not been thought of previously for the application of smart cards. There's an infinite number of potential applications for these cards and what's missing is the creative talents to say gee whiz, here's the problem and here's how I'm gonna solve it and here's how I'm gonna use the smart card, so the answer is there are an immense number of potential applications and what it requires is people who are observant enough to see the application and to visualize the solution. I'm working on two patents like that right now for clients, essentially which do things, which had never been thought of before. We're going through searches to confirm that but

 © 2007 Computer History Museum

basically I would encourage anyone who really wants an opportunity to, you know, develop new techniques and new applications, the answer is jump in there's lots of room. The patent office isn't gonna close very soon and the smart card gives you the tools which give you the flexibility to go after these new applications and we're gonna see em, they're just immense.

Spicer: Are computers unique compared to other things that men make like a car or a plane?

Svigals: I don't think computers are unique at all, in terms of the potential to bring to mankind certain capabilities. The challenge is to find the people who have the insight to sit there and to find the applications to marry with the computer capabilities--that continues to be the challenge. Well the same thing is true with trucks and cars, you're looking for new applications, new ways to design cars so they can better use the roads. Well there are an immense number of applications which are waiting for people to come along and say gee whiz look how I can give you a better solution and the smart card's gonna be a big part of that.

Spicer: Thank you for speaking with us today, Jerry.

END OF INTERVIEW

 © 2007 Computer History Museum