ORAL HISTORY: Robert Baim

About Robert Baim

Robert Baim was born in Baltimore in 1937 and showed his early interest in technology by jobs with his electrician father and working during high school at GE. After graduating high school, Baim went to the University of Maryland, but left after two years to fulfill his military service in the Army National Guard. After leaving the military, Baim began working at Westinghouse Baltimore in September 1959. He started taking night classes at Johns Hopkins University, later completing his engineering degree at the University of Baltimore. Baim began his long career at Westinghouse as an engineering aide in the Test Equipment Design Group, but he quickly was promoted to test supervisor in 1962 and Quality and Reliability Supervisor for the Molecular Electronics Division (MED) in 1964. This in turn led to positions in sales engineering and program management, and ultimately to his final position as Director of Business and Technology Development in 1996. He worked with or for many departments at Westinghouse – including Marketing, Weapons Systems and Processing – and on many important projects such as BOMARC, Minute Man Missile, Univac, F-15 radar, APQ-120, MIFASS and Comanche. Baim retired from Westinghouse in 1999, and has remained active by contributing to the National Electronics Museum and to a forum for retired Westinghouse and Northrop Grumman employees.

In this interview, Baim discusses his long career at Westinghouse Baltimore – a career only interrupted by a brief position at Transitron in the late 1960s. He talks about the various projects he was a part of, and the move from his first positions in technical aspects to marketing and contracts, along with the progression of radar during his career. Baim discusses the differences in external versus internal sales, and how his department needed to remain competitive in order to maintain its in-house contracts, along with his experience in external competition for contracts and his work with proposal writing. The early years, innovations and difficulties with integrated circuits are also covered, as was the switch from analog to digital. Baim talks about changes at Baltimore over the years – although one constant was the excellence of his colleagues – and the acquisition of Westinghouse Baltimore by Northrop Grumman. He also discusses colleagues including Bob Rudesill, Bill MacCrehan, Jerry McKindles, John Gregory and Bud Forster.

About the Interview

ROBERT BAIM: An Interview Conducted by Sheldon Hochheiser, IEEE History Center, 12 April 2010

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Copyright Statement

Interview

Interview: Robert Baim

Interviewer: Sheldon Hochheiser

Date: 12 April 2010

Location: The National Electronics Museum, Baltimore, Maryland

Background and Education

Hochheiser:

This is Sheldon Hochheiser of the IEEE History Center. It's the 12th of April, 2010. I'm here at the National Electronics Museum in Baltimore with Robert Baim. Good morning.

Baim:

Good morning.

Hochheiser:

Okay if I start with a bit of background? When and where were you born?

Baim:

Well, I was born in Baltimore in February of 1937.

Hochheiser:

Were you also raised in Baltimore?

Baim:

I certainly was.

Hochheiser:

What did your parents do?

Baim:

My dad was an electrician, and my mother, when I was young, worked in a war factory, Second World War, and later just became a homemaker for the rest of the time, with a part-time job at one of the department stores, working in the children's department.

Hochheiser:

Were you interested in technology and science growing up?

Baim:

Yes, always, always.

Hochheiser:

Help your dad out?

Baim:

I did. I actually worked with my dad for some time just before I was able to get a job in the summers. I worked with him, doing his electrical work. As a matter of fact, we actually wired the big Lexington Market Food Emporium in Baltimore to provide all the fluorescent lighting for some of the stalls. So I did all the work in the basement. It was interesting, cutting and threading pipe, pulling wire and stuff.

Hochheiser:

What did you do upon graduation from high school?

Baim:

Well, I worked many years during high school with General Electric in Baltimore. I worked in the motor and generator repair area, not to mention transformers. We also repaired transformers. And I did that for six consecutive years, including a few years after high school. But immediately after high school, I worked that summer with General Electric. And then went to college at the University of Maryland in the fall.

Hochheiser:

And did you leave Maryland before getting your degree?

Baim:

Yes, I worked. I paid my way through college. So I worked part time every semester. And I ran out of money after two years. I was an engineering and physical sciences major. I liked chemistry a lot, so I took extra chemistry courses, I should say, in addition to

engineering. I left and went into the service to get rid of my obligation. And I came back out, and then that's when I got a job at Westinghouse, 1959, September. And then I went to school at Hopkins at night.

Hochheiser:

What branch?

Baim:

Army National Guard.

Westinghouse, Test Equipment and Management

Hochheiser:

What led you to Westinghouse upon leaving the Army rather than some other employer?

Baim:

I was looking for a job in the technical area, and I'd asked around, and I'd heard that they were hiring at Westinghouse. Went down for an interview, and they offered me a job. You know, I intended to go to school at night to continue my education. So, that's why I got the job.

Hochheiser:

What was your first position, as an engineering aide?

Baim:

Yes. It was a very good job, by the way. I worked in the Test Equipment Design Group, the group I was assigned to was a small group of people - two engineers and a couple of us aides, I think, working on the BOMARC Missile Radar Test Set, the DPN-53. I really got to know a lot about the radar function by working on the system test set. That was my first assignment, and it was really interesting.

Hochheiser:

What was the test set designed to do?

Baim:

Test the system itself, the radar system, radar system test set. When you work on the system test set, you get to know almost every aspect of the radar because LRU, by LRU, you have the capability to test the whole system. That was also my first experience with microwave plumbing.

Hochheiser:

[Laughter]

Baim:

That was interesting.

Hochheiser:

And who did you report to in this first position?

Baim:

Well, I worked for a guy named Moore, but it was in Irv Maki's group. And Irv Maki was a terrific manager. He was one of my mentors, and a great guy.

Hochheiser:

As an engineering aide, was that a union position or -?

Baim:

No, no, it was not.

Hochheiser:

I wasn't familiar with that particular title so I was curious.

Baim:

Yes. It was junior engineer, I guess.

Hochheiser:

And you were going to school at night while you were doing this?

Baim:

Yes, at Hopkins.

Hochheiser:

And I assume Westinghouse was very supportive of your doing this?

Baim:

Oh sure. As soon as you passed, they would reimburse you for your money expended.

Hochheiser:

Well, that's a good incentive for passing, I guess. [Laughter]

Baim:

Yes. It was a very hectic period of time because there were a lot of other projects going on in the test equipment area at the time. And we had a lot of equipment in the shop being fabricated to make these test sets for the missile test, for the radar test set. And we couldn't get enough people to manufacture the parts fast enough. So one of my first assignments that really broadened my scope a little bit was, in addition to running the changes that we had to make on the designs and things like that, is I was asked to be a subcontract manager for some radar test set parts that had to go out of the factory and into a subcontractor. We subcontracted to Aircraft Armaments Incorporated. I used to take the kits that we were going to have them assemble, and the drawings, to Aircraft Armaments and talk to the management out there and get them to do the work. It was wiring and assembly work. And then when they completed that, I would go up and pick them up [and] get them through our inspection and put it into our system. I actually did that subcontract management work I think a year or two after I joined Westinghouse in the 1960 time frame. I was working as a supervisor of subcontracted parts at AAI, and shortly after that assignment I was promoted to a test supervisor.

Hochheiser:

Where were they located?

Baim:

Cockeysville, Maryland, up north of Baltimore City.

Hochheiser:

So this was just an easy drive.

Baim:

Not so easy at the time. It was before the beltway, so I had to go through the city, straight up past Hopkins, by the way. Up through Charles Street North into Cockeysville. So I was familiar with the drive, but it was a long drive.

Hochheiser:

I guess if you're doing it on the city streets, it takes a while. You were telling me about becoming a test supervisor in '62.

Baim:

Irv Maki had tapped me to supervise the area that we had a need for at the time, which was calibration and repair of test equipment that supported all the tests that went on within the Air Arm Division. And by doing that, he also got me into a pre-supervisory training program. I attended classes for weeks. My memory doesn't tell me exactly how many weeks. I think it was something like six weeks.

Hochheiser:

And was that program here at the Baltimore facility?

Baim:

Yes, at the Defense Center. I think it was three times a week, several hours a day that we would take out of work and go over to classes. It was quite interesting. It was a good eye-opener for me, because even though I had, I think, natural talent toward

management, I'd never really taken any courses because I was always in technical courses. So it was good. And then I made supervisor.

Hochheiser:

So he sent you first to the courses to get some training in how to be a supervisor. And then when you finished the courses, then -

Baim:

Then he promoted me to supervisor. It was quite an experience. I had a large group of technicians that I was responsible for. Fifty people, I think, was the total. It was quite a large number.

Calibration, Unions

Hochheiser:

Wow. Going from not being a supervisor to having fifty people - that must have been an enormous -

Baim:

Yes. The plan was to split that up eventually, you know, shortly. And I took calibration. Another guy who went with me to classes, took repair. So I had that for awhile. Until 1964, and then, uh -

Hochheiser:

Well, let me ask you one or two more things. So you're in charge of supervising the calibration of the test equipment?

Baim:

That's correct.

Hochheiser:

And what did this involve?

Baim:

Well, it had about twenty technicians that had to go and perform calibration on commercial equipment that we had purchased, power supplies and signal generators and things like that in accordance with the specs and manuals for those products. You can calibrate them to make sure that they're performing accurately. And that's what I did. The one interesting thing I did in there was a mechanical thing, which was unusual for me, because, other than microwave plumbing, I'd never really been involved with mechanical stuff. But at that time, the Gemini program was in the shop and we had the base plate, which was a sort of state-of-the-art base plate. It was a real challenge to make sure that the accuracy of the base plate was maintained over the full length of the base plate. We had specialized equipment that had to be used. We had subcontracted the machining, because the machining capability was very precise. We had to take a technician up to Cherry Hill, New Jersey, to a subcontractor where he used the equipment to check the Gemini base plate. And that was my first exposure to something mechanical that had required accurate testing. And as you well know, Gemini was a very successful program.

Hochheiser:

Right.

Baim:

And the base plate really did its job.

Hochheiser:

What does the base plate do?

Baim:

The plate that actually holds the radar antenna - it was actually a passive system, but it was mounted on that base plate.

Hochheiser:

Now, are we dealing with union people?

Baim:

Yeah, they're union, IBEW. Yeah.

Hochheiser:

Right. So did that require an additional amount of training to learn how to deal with the requirements of the union and the contract?

Baim:

We had some exposure to that in the pre-supervisor course, but it really was an on-job-training thing. You had to get a feel for how to deal with that. And it was not that difficult. They were all good men.

Hochheiser:

Yes.

Baim:

A couple of my guys were very superior technicians, and wound up getting engineering assignments in later years after I left the organization. A couple of them went into the Standards Lab in high positions.

Molecular Electronics Division

Hochheiser:

And were you continuing to take night courses towards your Engineering degree at the time?

Baim:

Yes. I did. In my next assignment I got overwhelmed with time and had to take a hiatus for awhile. I transferred when I found there was an opening at Molecular Electronics Division at Westinghouse, which was a non-defense organization in 1964. I transferred to MED, which is just across from here, by the way, by the BW Parkway. It was a building out in the middle of a field in those days. It was the first building in the world constructed solely to make integrated circuits. Prior to that time, Motorola, TI, and all the ones that were into semiconductors were making integrated circuits in a lab, in a

semiconductor area. But Westinghouse decided to build an entire building dedicated to integrated circuits. A first!

Hochheiser:

Right.

Baim:

And I was very interested in it for a couple of reasons. My cousin, who was a PhD student at the University of Maryland, worked at Westinghouse and was showing me some of the work we did in Solid State Lab. In my spare time and lunch time and stuff like that, he would show me some of the work they were doing in the Solid State Lab, working under Gene Strull. And when I heard about this, I thought, 'Well, I might give that a try.' So I interviewed for a job as a Quality and Reliability Supervisor. And I was hired by a fine man named Bill MacCrehan. He was a great guy. He was a good boss, a good man.

Hochheiser:

What was your cousin's name?

Baim:

Dr. Peter Dobson.

Hochheiser:

So you interviewed for and got a position in the MED.

Baim:

MED, as a Quality and Reliability Supervisor.

Hochheiser:

Well, I can see the relationship between the sort of work you had been doing. What did you do as a Quality and Reliability Supervisor in MED?

Baim:

The people I supervised did all the incoming inspection of the products that we took into the operation for use in the lab, in the different manufacturing areas. They also did the final inspection for the product before it went out. And they were also responsible to oversee the government requirements for burn-in and other operations, other environmental tests. We had inspectors that were out on the line that would do samples of product as the girls were assembling the parts. We had all female assemblers because of the dexterity and the hand-eye coordination. It was very close to things like sewing and other things that made them very, very capable of doing that.

Hochheiser:

And I gather that your supervisory responsibilities were, to say the least, full time?

Baim:

Oh geez. We worked terrible hours, especially on the end-of-month pushes. When things came out of burn-in and had to be shipped at the end of the month, it was long, long hours. But it was a great group of people. And the camaraderie was just excellent. So we worked hard.

Hochheiser:

What, in general, was Baltimore like as a place to work in the '60s?

Baim:

Well, we worked so many hours at MED there was very little time to really talk to people about their social life and other things. But we had a group of guys from all over the country that came into MED that were hired from Motorola and other operations to work there. And we did have a few outings - mostly beer drinking and the poker playing. But that was about it.

Minute Man Missile, Marketing Department, Finishing Degree

Hochheiser:

Were there particular products coming out of MED that were going into Westinghouse at this time?

Baim:

Not at Westinghouse. But we made products for the Minute Man Missile. That was my next assignment, by the way. I took a field engineering assignment to go out to live for a year in Anaheim, California. I actually lived in Santa Ana, worked in Anaheim at a North American Rockwell's Autonetics operation. They were making parts for the Minute Man Missile and they were having difficulty with some of our products. So I went out there to make sure that we would have good communication back to our engineers on what exactly was transpiring out there.

Hochheiser:

Okay. Now, were these integrated circuits that Westinghouse was supplying for Minute Man?

Baim:

Yes.

Hochheiser:

So that was the connection. You had worked on the integrated circuits here.

Baim:

Right. So I went out to California and stayed there for just about a year working [on] that program.

Hochheiser:

What was it like to be a Westinghouse employee but out at the customer on the other end of the continent?

Baim:

It was very interesting. They, for the most part, treated me very well. They provided me with a desk and a secretary to help with the communication and all. I communicated mostly with engineers on the assignment out there. But once a month, I came back here with their contracts people and engineers We had meetings on schedules, and technical problems, and things like that once a month. But it was very interesting. Those people

were good people, too, the people at Autonetics. But I keep saying, going back to the Westinghouse group - almost every group I worked with, the one thing that comes out is the people were just outstanding. They were just top notch.

Hochheiser:

While you were in this field engineering assignment, who did you report to back here?

Baim:

Bill MacCrehan.

Hochheiser:

So you still reported to him.

Baim:

Still reported to him. And he entered my life in a good time, because I was trying to collect all my credits from different organizations and colleges and things.

Hochheiser:

Right.

Baim:

He was a part-time instructor at the University of Baltimore. I think Johns Hopkins, too, if I'm not mistaken. And when I came back, I was offered a Sales Engineering position by John Marous who later became President of Westinghouse and I actually transferred to another assignment into [the] Marketing Department. Out of Bill MacCrehan's organization. But he was able to help me get all my academic stuff together and start back into night school again at the University of Baltimore this time where I got my degree.

Hochheiser:

When you came back from the field engineering assignment, you were able to resume your night studies.

Baim:

Yes.

Hochheiser:

But you resumed them at the University of Baltimore rather than back at Hopkins.

Baim:

Exactly. I finished there and got a B.S. at the University of Baltimore. MacCrehan was a big help. I was getting irritated with the inability to transfer credits. [Laughter] It was terrible in those days. In the '50s and '60s, the colleges were not that accepting of other college's credits and things. I had a big argument with Johns Hopkins over something. It was one of my technical courses that I took at Maryland, I think. They wouldn't accept it because of some technicality. And I said, 'That's it. I won't go back.' So I went to McCrehan. And he said, 'Well, I think we can help you. But', he said, 'At the very least, you may have to take a qualifying exam, but -'

Hochheiser:

Right. To show that the material that's on your transcript from this other institution you really do know.

Baim:

Exactly, exactly.

Hochheiser:

That makes sense.

Baim:

So I said, 'Okay, I'll go that far.' So I think I did have to take a qualifying exam on something that was not a very difficult thing to do, so I did it. He was a big help. He was a good guy. When I came back, I was promoted to a job in the Marketing Department. In a commercial division that job was a combination of sales, marketing, contracts management, and program management - all in one job. It was a Sperry Programs

assignment. I was responsible for all Sperry programs in Westinghouse MED, the biggest one of which was Univac.

Hochheiser:

So Westinghouse MED was providing chips for Sperry's Univac computers?

Baim:

Yes. It was very clever what they did with our chips. We provided a dual nand gate and a quad nand gate. That's the only two things, I mean, we made other things, but can you imagine, this is now 1965 time frame, and they were making an entire computer out of dual nand and quad nand gate. It's hard to believe. But they had a very clever way of packaging these 1/4 by 1/4 packages. Now, the Autonetics devices were 1/8 by 1/4. They were very tiny integrated circuits. But this Univac computer was packaging in 1/4 by 1/4 inch packages, which is a little bit easier to handle. They actually had assembly lines set up. They made this computer for the Navy. It was a classified computer.

Hochheiser:

So this is for a specific military computer for the Navy.

Baim:

Yes. If you can visualize a 1/4 by 1/4 package with leads coming out both ends, they put a Mylar insulator on it and then fold the leads over so you have a little plug-in like module; I guess it would be like a module. They had an excellent cooling design. They stacked them so close, they got a computer in a very small package back in the mid-'60s, if you can believe it.

Hochheiser:

Yes.

Baim:

It was quite interesting.

Hochheiser:

And, of course, if you're putting things in a ship or a plane, the size becomes -

Baim:

Size and weight is a driver. Right. So I did that for awhile at MED. Worked for a couple of excellent people, Bob Rudesill was one of my managers and I associated with a couple of other guys that were really good guys, George Walker, Ken Dussinger, and others.

Hochheiser:

Yeah. And, now, did you also have people reporting to you? Is it also a supervisory position?

Baim:

No, I went back from supervisor into engineering, really. I was really a sales engineer, I guess was the classification.

Hochheiser:

How did you find that transition?

Baim:

It was fine. It never really bothered me and as you can imagine, later in my career I had a lot of people, too.

Hochheiser:

Right.

Baim:

But it didn't bother me. I really liked the challenge. I liked the work and the challenge. I focused on that. I didn't focus on the accoutrements.

Hochheiser:

Yeah. And where was the Sperry operation based?

Baim:

Oh geez. That was Minneapolis-St. Paul. And that's another thing. I'm glad you mentioned that, the location, because I've been there many times. In fact, there was a period of time when I was up there about every week or every other week for a period of time with different problems, and I have never seen Minneapolis and St. Paul. Never have seen it. I'd work all day, fly up at night, get there, go to the hotel, and meet the sales guy. We'd have dinner maybe. And go to a hotel, go to bed, get up and go to Univac for a meeting, have a meeting all day, and then rush to the airport, and come home. [Laughter] So I've been to Minneapolis-St. Paul airport about 30 times and never seen the city, which I regret because I should have at least taken a little time to look around. I was working long hours and I was into it. That's what I did.

Hochheiser:

How did you combine being a Program Manager and a Marketing Representative at the same time?

Baim:

In a commercial division there really aren't a lot of other people to do things. So basically when the contract comes in, the person, the so-called Sales Engineer, actually, takes the contract and makes sure that we get the paperwork into our system. Then you're actually managing the contract, or managing the program or project. And then, of course, you're the marketing guy, too. You've got to try to sell - my objective was to make sales and sell more products to Sperry in general, and Univac in particular.

Hochheiser:

So you, so at the same time you were managing this ongoing program for this Navy computer, you were trying to sell Sperry on additional uses of Westinghouse products and services.

Baim:

Yes. That's correct. And we had a military version of the dual nand and quad nand gate and we had a commercial version. And, unfortunately, the yields came out just the opposite of what we really needed. We needed many more military types than we needed commercial types. And we had, spec wise, a lot more commercial types than

military types. So I was really trying to find business for our yield, which was commercial-graded product.

Hochheiser:

Why was the yield lower on the military product?

Baim:

Well, because of the test requirements. They had to pass burn-in and other specs were a little tighter for the military than they were commercial.

Hochheiser:

What were the commercial chips going into?

Baim:

The same thing. They were used mainly for computer applications.

Hochheiser:

And, of course, Sperry had commercial customers as well as military customers.

Baim:

Right. So I did that for probably a couple of years.

Defense Center and Internal Sales
And then we reorganized and I wanted to take the assignment for sales to the Defense Center, Westinghouse Defense Center. Here I was in a commercial operation now, and I want[ed] to take the sales to the Westinghouse Defense Center, because I knew the operation. I came from that operation and I worked there for four years.

Hochheiser:

Right.

Baim:

So I was given that assignment.

Hochheiser:

So this is what? About '67 or so?

Baim:

'68, I think.

Hochheiser:

So now your position is internal sales instead of external sales?

Baim:

Exactly. It was a real challenge, because sometimes your own organization is more skeptical of you than the outside commercial operations. But I got every division that I could into the engineering departments, talked to the people about our products - what we had and tried to convince them that they should design our products in. Basically, I was working with components engineers and design engineers.

Hochheiser:

Can you compare the challenges of external marketing to internal marketing? The concept of internal marketing's interesting. People tend not to think about that as much.

Baim:

Yes. Well, it was just another customer to us if you get right down to it. We're a commercial operation and relatively small. We were part of Electronic Component and Specialty Products Group at Westinghouse. And the Defense Center was separate. So it was similar, very similar to outside marketing. It wasn't that much different. I don't think people had any special favoritism toward us.

Hochheiser:

So who did you report to in this internal marketing position?

Baim:

I still reported to Bob Rudesill. He was an excellent guy. He was another one of my mentors in my career. He was a good guy. I was working with a guy named Jerry McKindles, who was also another mentor of mine, a guy I really enjoyed working with. When I took the assignment to work Westinghouse Internal Sales, Jerry McKindles was able to mentor me. He was a Westinghouse grad student. So, in his early days, he was able to help me. It, I think, turned out to be very fortuitous, because my next step in Westinghouse was with Jerry McKindles.

Hochheiser:

One more question before we go on to it. In this internal sales position, were you competing against external suppliers?

Baim:

Oh yes.

Hochheiser:

And who were the external suppliers that you were competing against?

Baim:

Mainly Motorola, TI, at the time. Intel hadn't really made an impact yet. There were a few others, like Fairchild.

Hochheiser:

Did being an internal choice give you any advantages or disadvantages versus the external alternatives?

Baim:

Yes. [Laughter] I think sometimes it's a disadvantage, but - No, I think that the bottom line is that if you had a product that was equivalent to the other guy, you were pretty certain to be able to win the order. If there were any edge on the other, for the competition, you were not going to win the order no matter what. They're still that way, I think, within Northrop Grumman.

Hochheiser:

Was there a problem ever with the relative price between you and the external suppliers?

Baim:

Not so much. Everything was high in the early days in integrated circuits. Yields were so poor. And the technical problems were still being resolved. You know, purple plague was still there in those days.

Hochheiser:

Purple plague?

Baim:

That's a processing issue that integrated circuits all had in the early days until they got the process controls down proper. It was a corrosion type of incident that occurred inside of the packages. I'm sure you'd find it if you did a web search on it. It was one of those transient spikes that we have in new developments. And they got over it and solved it. They had a lot of other problems. The biggest problems were in the photolithography area in those early days. And, if you can believe this, the wafer size in those days was probably [an] inch and a half. It was a big deal to go to something bigger than an inch and a half diameter. I forget what they're doing now. Sixteen inches or something in silicon wafers. We were in the infancy.

Hochheiser:

Mm hm. And then did you have to take the internal customer's requirements back sometimes to MED?

Baim:

Oh yes. I had to take it back and work it. In my mind, I can't recall any specific thing that we resolved because in those early days the yields were still very, very low. And getting new products into a design was a very long and arduous process, and I think it still is today. Because when a company like Westinghouse and Northrop Grumman commits to a product or a radar, that's a big commitment and for a lot of units. So they're very

cautious about how they do that. Nothing sticks out in my mind about a particular device or circuit that we had. There was interest in a lot of different ones.

Transitron, Returning to Westinghouse and F-15

And then in 1969, MED shut down. Westinghouse closed that down.

Hochheiser:

Why did Westinghouse close it down?

Baim:

They were tired of making the investment. They couldn't turn the corner on making a profit. And we were in a commercial division, so they just shut it down.

Hochheiser:

After that did Westinghouse rely exclusively on external suppliers for chips?

Baim:

Yes. What happened is the MED became a part of the Defense Center. The Defense Center took it over.

Hochheiser:

Okay. So it wasn't that it was shut down, but it stopped being a commercial division.

Baim:

Right. But if you visualize - from our standpoint, it was shut down because we were all not Defense Center employees. So there were a lot of people interviewing for Defense Center jobs. And I just didn't. There wasn't anybody left there that I knew. So somebody came to me and offered me a district sales manager job at a company called Transitron. And I took that job.

Hochheiser:

So you actually left Westinghouse in '69 when MED was shut down as a commercial division?

Baim:

Yes, right. So I didn't really seek a job within the Defense Center. I was semiconductor guy now. I didn't know anybody in the Defense Center that had an idea for that. I just ignored my background, I guess, working with the radar system test set and the other things. I never made an effort to find a job within the Defense Center. So I took the job as district sales manager for Transitron with offices in downtown Baltimore, and covering two or three states. And I only lasted there about eight months because I got an offer from Jerry McKindles to go back to Westinghouse. I was very close to being vested anyway. So, from a career standpoint, it was a smart thing to do. It didn't take me long to think about it. I cashed in and went back to Westinghouse. I think it was about an 8-month hiatus. I was hired specifically to help Jerry in the marketing team for the F-15 radar competition with Hughes. We went through that program together. It was another one of those long hours, and lots of travel, and interesting people. The technology was just amazing that we were able to bring to bear on the F-15 at the time. To me, it was.

Hochheiser:

And this was for the radar system for the F-15?

Baim:

Yes, for the radar system. And, of course, we lost that competition. I thought when we lost the competition that that was probably the end of my short career in radar marketing.

Hochheiser:

What can you tell me about the competition itself? How did that work? Was this against Hughes?

Baim:

Yes. Both companies actually built radars to have a fly-off in St. Louis and we -

Hochheiser:

So this is in St. Louis, then the prime contractor was -

Baim:

McDonnell Douglas. So we took our radar out there, and we thought we did fairly well with our approach. Our approach technically was basically an enhancement on the AWG-10 pulse Doppler radar. And we had a high-low PRF radar that we targeted for that job. And the customer wanted medium PRF. And our guys, the technical guys, basically resisted going to medium PRF for technical reasons, mostly having to do with processor. And they made a calculated risk, and lost.

Hochheiser:

They made a calculated risk that their approach would be technically superior.

Baim:

Yes. And it was, by the way, in the fly-off, according to our data and whatever we were able to get. We actually, I guess we say, checked more blocks in the fly-off than the competition. But I think the competition showed the promise of that Medium PRF approach, and Hughes wound up winning.

Hochheiser:

Who are the people you worked with as a marketing manager on this project?

Baim:

Well, Jerry McKindles was the marketing guy that I worked with. There were two of us working it. And he was the senior guy to me. We worked mainly with the Westinghouse program office.

Hochheiser:

Right.

Baim:

I've got to take a break.

[Tape stops, then resumes]

Hochheiser:

So though the Westinghouse program people were confident that their radar approach was superior, the customer chose the other approach.

Baim:

Yes, definitely.

Hochheiser:

How did it feel to lose a contract like that?

Baim:

It was the most devastating thing I've ever experienced in my life. I never thought about my career at all. I was thinking about all the work that everybody put into it and everything. But after the loss actually set in and I began to think about it, I thought, 'Oh, this might be the end of my career.' I mean, I was on a losing team and it didn't seem like I'll be able to stick around.

Hochheiser:

But you did get another assignment.

Baim:

But I did. Yes. Right after that loss, we had a lot of post-mortems and things like that that I still have fairly vivid memories of. I was asked to do a write-up on it for a post-mortem, and deliver it in private to the General Manager, which I did. It was quite blunt and to the point, and it was well received. And we went on from there.

Hochheiser:

I guess you can learn a lot from this sort of experience.

Baim:

You do. In addition to humility, you learn a lot.

Weapons System Department and APQ-120

I was offered a couple different assignments. And the one that I really liked was the one to go into the Weapons Systems Department to negotiate the final settlement for the APQ-120 radar reliability demonstration tests, RDT&E. I took that, and I went in there. It was a combination of marketing and contracts organization. And I took the assignment to finish off the APQ-120 thing. I became pretty involved in the APQ-120 final negotiations, Once we got all our paperwork together, which probably took another three or four months, I spent three months going back and forth to St. Louis to negotiate the final settlement of our reliability demonstration test and the ECPs that were surrounding the testing and things. And the only interesting thing I can think about on that - other than the fact it was [a] very lengthy and arduous tough negotiation, which I learned a lot about by the way was when it was over we had a contract that was worth about $12.4 million that they were going to pay us. And I was checking back at the plant, and they finally said, 'If there's any way you can bring that check back with you, we would appreciate it.' And I'm sure it was needed, I was talking to a controller. Right? I'm sure he had a need for that particular amount of money at that particular time. [Laughter] I don't think we had broken the $100 million mark at that point in terms of annual sales. So I would imagine it was something they needed. And I requested the settlement be paid to me so I could take it back. And they did. So I actually carried a $12.4 million check back with me from St. Louis, and gave it to the controller.

Hochheiser:

I bet you were very careful with that check.

Baim:

I think I actually took a photocopy of it just to prove that I actually had $12.4 million in my hand. I don't know where it is anymore. I threw it away, I guess. But it was nice. It was an interesting thing.

Hochheiser:

What system did the APQ-120 go into?

Baim:

F-4E and F. And I had been familiar with the APQ-109 (another F-4 radar) because of my time in Calibration Repair and Testing and Checkout. But this was my first real experience with learning a little bit about the APQ-120, which led to my next assignment, which was to try to work with McDonnell Douglas on a mod to the APQ-120 to add a digital computer to do all aspect air-to-air and air-to-ground weapon delivery.

Hochheiser:

So the APQ-120, when you were negotiating the contract, was using an analog computer?

Baim:

Exactly.

Hochheiser:

So now we're talking about the transition to digital.

Baim:

Yes. This is it. I became very interested in that, obviously, because of my background. What made it more interesting was that this digital computer that we were interested in adding, the Navy had already developed a digital air combat maneuvering capability for the F-4J, which was the same basic thing that we were looking to put onto the F4E, in the APQ-120. And the Navy F-4J had the AWG-10 radar. It was a different radar, but they still used that digital computer. And we developed the software to make the aircraft able to fire missiles in a combat environment as opposed to a fixed canned environment. Prior to this time, they (F-4's) were basically interceptors, long-range interceptors. So our engineers had developed the capability to make them capable of all aspect air-to-air missile fire control. A guy named Ed Ellis was the brain power behind that, and he had a team of guys.

Hochheiser:

And as the marketing engineer, how closely did you work with Ellis and his team?

Baim:

Well, there was a little interval near when I worked with another group until we actually got ourselves to the point where we could get a contract. And that was an arduous, long and difficult project, I'll tell you. I just can't imagine how many hours we put into trying to get the modification to the Air Force F-4Es into the budget. And we got it in two times, and it got scratched out at the last minute. So finally, I think about the third time, we finally got it into the budget, and it was very complicated exactly how we won that job. But it was tied into the fact that the Germans actually wanted this capability in their F-4Fs. And now we had the F-4F which also had an APQ-120 radar in it. So I don't think I could really state in simple terms how it happened. It was sort of serendipity in a way, I guess. The Germans had really pressured the U.S. Air Force, they really wanted this capability. The U.S. Air Force finally kept it in the budget, and then we got started on it. I knew as soon as we did that we had something big, because this was 1,030 computers. This was the largest single one-time computer order that anybody at Westinghouse had ever gotten. We made more computers for different products over years. But one buy of 1,030 computers was a sizeable order. It was around $100 million with the other aircraft mods and things that went with it. So when we finally won the contract, that's when we called in Ed Ellis to be the Program Manager. He was named program manager when we won the contract and that's when I started working with him and his team to do an international program at the same time we did a program to modify the F-4s for the Air Force. I was the business operations manager for that.

Hochheiser:

So this involves the F-4Es for the U.S. Air Force and the F-4Fs for the Germans?

Baim:

Exactly.

Hochheiser:

So did this take you to Germany?

Baim:

Many times. We had several meetings over there. I might digress a little bit. We were so determined to have this program be a success that we actually teamed up with some people and went over to Germany and made briefings - Ed Ellis and I went and made

briefings - a year prior to the time the Air Force actually put it in the budget. I got to meet all of the Pentagon people that dealt with foreign sales and the German people that were interested in this product. So I was deeply involved, and I helped them prepare all kinds of documents and everything else for - I've never, never done that before. But I sort of worked my way through it with some help from different people. And so we were able to do a marketing job, I guess is the way to say it.

Hochheiser:

Sounds like there were a lot of different parties involved.

Baim:

Oh man, it -

Hochheiser:

You've got the American military. You've got the German -

Baim:

German Air Force, GAF.

Hochheiser:

German military, German Air Force. You've got -

Baim:

German civilian government, German contractors. We had three major contractors in Germany that were going to be involved in our product. It was like many F-16 radar developments; I worked on a proposal of that, but I never really worked on the radar team. But that was a multi-nation effort, too. And this, of course, was a little simpler; in it were just Germany and the United States. But we had many trips to Germany, many trips to Hill Air Force Base, to set it up initially, because they were one of the technical leads.

Hochheiser:

Where is Hill Air Force Base?

Baim:

Utah. We also went to Wright-Patterson a lot because they managed the foreign military sales contract. When the contract actually came in, Wright-Patterson Air Force Base took the technical lead. Our technical coordination meetings and all were primarily with Wright-Pat. But Hill Air Force Base was still involved in it, because they were a big logistics center. They were actually going to do the mods for the USAF. But that was the first program in my career that was not only a successful program, and not only were the people - the program manager was Ed Ellis - who are brilliant people, but the whole entire program was a pleasure to work. All the staff worked hard and were all focused. Ed Ellis was a joy to be around and work with. He was so smart. I learned a lot about different aspects of how developments are done within the military and ARPA and Pentagon development. One of the things that was surprising was that the Navy was more advanced in developing future combat systems, air-to-air combat systems, than the Air Force was at the time, because the Air Force seemed to have other priorities. To simplify it, the Air Force was more interested in providing the air frame with more agility. And the Navy had thought about it. And I think they said, 'Well, I think we can sacrifice a little agility from the air frame if we can get a missile out there on a target.' Because a missile can pull maybe 20, 25 Gs, but the air frame is limited to around 6 G's by the pilot. So they were very anxious to get an all-aspect air-to-air missile fire control capability. I think the program might have been classified when it was developed. But by the time I became involved in it, it was not classified. So it was, but it was developed prior to the Air Force. [Laughter] So you think the Air Force would do this development, but they didn't.

Hochheiser:

But the Air Force eventually came aboard.

Baim:

They came aboard, and by the time the F-16 came around, the F-16 did have that capability, but the F-4s did not. I guess they learned a sad lesson in Vietnam. There was a gap between that and when the F-16 came in. We were trying to fill that gap as quick as we could in the Air Force. We just had a hard time getting it in the budget. But we did.

ACM/Peace Rhine

There were two programs in my career that stand out. The ACM/Peace Rhine, that was one, the first big program that I hold in my heart, because it was hard-working and successful. And the other one was Comanche, and we'll get to that in a minute.

Hochheiser:

Okay. So you moved from the APQ-120 radar mods next to the ACM/Peace Rhine Program.

Baim:

Exactly. And we took that up through, I think it was close to '80, '79 or '80; we worked that program with a lot of good people.

Hochheiser:

So the ACM/Peace Rhine Program is what you've been talking about, working with the Germans?

Baim:

Yes, the Germans. That was an excellent program.

Hochheiser:

Who were the German contractors you were working with?

Baim:

Messerschmidt, MBB, and a couple other documentation companies that I don't recall the names offhand. I would have to think about it.

Hochheiser:

So Messerschmidt was manufacturing -

Baim:

Aircraft.

Hochheiser:

So these radars were going into McDonnell Douglas planes for the U.S. and Messerschmidt planes for the Germans.

Baim:

Well, yes.

Hochheiser:

Do I understand this correctly?

Baim:

Messerschmidt took over the design modification responsibility for the F-4Fs after they were delivered from foreign military sales, they were F-4Es that were designated F4-Fs. So they were foreign military sales. And then Messerschmidt became the air frame responsible company. So anything that has to do with anything in the air frame, the radar, or the wiring, or anything else that was Messerschmidt['s] responsibility. So they took that. And there were a few document companies that we dealt with that had to do the documentation for them. And one other, I think they were in Ulm, but I don't remember - I think they were more associated with test set mods and things. I can't recall the name of the company. In this program, by the way, we had a rep in Germany, technical rep, an E&S guy. And that was a very successful program.

Hochheiser:

Now, do you speak German?

Baim:

No, but had to take German in college. I scared them a couple of times, I think, when I recognized a word or two.

Hochheiser:

[Laughter]

Baim:

They would just look at each other and say, 'Oh, does he know what we're talking about?' And then they'd go and they'd caucus.

Hochheiser:

[Laughter]

Baim:

But, you know, I can pick up a few words. It was a pleasure working over there with those people. They were good people.

Program Management and MIFASS

So for the next assignment after ACM/Peace Rhine, I was looking for a program management slot.

Hochheiser:

Okay. So now we're into the early '80s?

Baim:

Yes, about '80. I was looking for a program management slot. My friend Jerry McKindles, who I'd worked for on the F-15, called me up and said they need somebody with integrated circuit background, marketing and contract skills, and program management skills to do a job for him. And he thought of me. I said, 'What is it?' He said, 'Well, it's called the MIFASS program.' And I checked it out with a number of people, and I was told not to take the assignment, because it was probably a very difficult, technical assignment, because the MIFASS program was built around a thing called block-oriented random access memory, which we were attempting to make at the division that used to be MED which was now ATL. So BORAM is the acronym for block-oriented random access memory. And MIFASS was attempting to use that, because -

Hochheiser:

Could you spell MIFASS?

Baim:

M-I-F-A-S-S, Marine Integrated Fire and Air Support System.

Hochheiser:

Thank you.

Baim:

And by the way, if you look at any of the video now on the stations - I saw one last night and I told my wife, I said, 'It looks exactly like what we were doing in 1980.' It was a computer-controlled situational awareness station for the Marines. And what they're doing right now with the Predator. They have video you see on news that you can talk about. They show these stations where people control the battle space. Well, that's what this was.

Hochheiser:

So you took this assignment even though you had people tell you that you shouldn't. It was problematical.

Baim:

It was problematical, and I knew it. I knew it going in that the device was problematical. It was, but it was one of those things that our division was committed to try to do something with that device. It had been developed by Gene Strull's operation, and Gene Strull apparently got Dick Linder to ordain - it would go into one of the radar programs. I think that's one of the versions F-16, I think. And this program was like - how to explain this. It was almost like an adjunct to an R&D effort. It was taken at a cost that would just barely be able to make it cost wise, and I knew it going in. But the technology was very important to us, so we were going to give it a good shot. Well, it turned out to be a very difficult program, and we were able to get the product out that we wanted, after a lot of problems. But the product itself, it was determined sometime later that over time the process used to make it was not viable. So basically the MIFASS program was completed after a long and arduous task. I read some of the notes in preparation for this that we were thanked for spending most evenings of our lives from, after work hours, from I think 6:00 to 8:00 at night, something like that; I can't remember the exact time. But it was after work hours until late at night. It seemed like every evening, but it was three days a week, with a whole crew of people, including the general manager and all the senior technical people to try to work our way through the technical issues that we were

faced with in this product. And you know, I took that product and packaged it on boards and shipped it to Norden to use in the Marine Integrated Fire and Air Support System. It was basically a huge memory. And we were able to get our boards, our product out eventually. And the F-16 was able to use some of this product for a period of time. But I think they decided - there were a couple things [that] happened. First off, it's very difficult to keep up with production because of yields and things. And the second thing is that the memory developments were happening so fast that it was overcome by events. It was basically designed out shortly after, so it never became a real major contributor in any way. But it was an excellent opportunity to learn how to manage technical programs under duress. That's because it was a lot of stress.

Hochheiser:

And in addition to program, were you also managing people?

Baim:

Yes. In our organization at that time, I had no direct people reporting to me, but all the people on my program reported to me from a programmatic standpoint.

Hochheiser:

A matrix thing.

Baim:

It was a matrix. That's the way we operate, matrix. And so I was able to get through that with, like I say, a lot of stress. It was a stressful program, but I learned a lot. It was really an education.

Proposal Manager

So after MIFASS I went on to a period of time where I did a lot of proposals and things.

Hochheiser:

Okay. So in your next position after MIFASS you're now dealing with proposals rather than specific projects that are already developed?

Baim:

Right. It's fuzzy in my mind exactly the sequence of events. But I think it's safe to say that initially I was involved in classified radar proposals that we went after for a period of time. I also was involved in trying to win a flight data recorder, which I was nominated for by our GM. We had developed all the products that you need to make a flight data recorder, we had [them] within our capability. The only thing, we had never made a flight data recorder. So we decided that we would give it a college try. And I was nominated to be the program manager, proposal manager. So we developed a small team, and we went out and developed a capability that we could visualize being successful, and we had critical parts fabricated and tested so we could prove that we could meet some of these test requirements that were rigorous. And, we put together a proposal and we didn't win. And the people that won the proposal bid such a low number that we knew that they were going to be in deep trouble, and they were. They won the proposal. I don't remember the name of the company, but they went under. They couldn't perform for that low amount of money. So I don't know eventually what happened to that flight data recorder, but it was not -

Hochheiser:

The company that won the proposal went under and therefore never delivered the product.

Baim:

Never delivered, they didn't. Somebody else might have, but they didn't, because they squeezed the price so high, I mean, so low that it was just impossible.

Hochheiser:

I suppose that happens sometimes where you can't win a contract even if you have all your technical ducks in a row.

Baim:

That's the truth. And we did a very systematic job in trying to take the weak areas - we knew our strengths - take the weak areas and offset them with tests. And we spent R&D money and developed some techniques. And it just wasn't good enough. So that's another loss. But you learn a lot.

Hochheiser:

Yes, you can learn a lot from the ones that don't work.

Baim:

Those days, we were putting together proposals, and we had gotten one step past typewriters. We were using Wangs by that time. And I remember my proposal - I had a technical volume manager, a circuit breaker tripped on him and he wound up in the hospital, I guess from the stress. There was nothing wrong with him. And this was the week before we were supposed to deliver our proposal. [Laughter] But that made me appreciate the Wang capability, because we were able to really construct the thing ourselves with our own little team. So we got the proposal. That was an interesting time.

Hochheiser:

During this period, were you working on multiple proposals at the same time?

Baim:

Oh yes. Well, no. That one was a dedicated proposal for about six months. But others I worked multiple - especially in the classified - we were working two and three, I think, at the same time.

Hochheiser:

And are those things that are still classified today?

Baim:

I think so.

Hochheiser:

In that case, I won't ask you about them. It was funny. Sometimes things that were classified -

Baim:

I know. I'll get to one of them.

Hochheiser:

Okay.

Baim:

I have one that -

Hochheiser:

That are no longer classified and then you can talk about them. So how long were you doing this position that involved dealing with a variety of proposals?

Baim:

You know, I'm not really sure on the timeline on that. It's in the '80s.

Hochheiser:

Are we in the second half of the '80s now?

Baim:

Yes.

Comanche

The next real assignment that I remember is the LHX.

Hochheiser:

What is the LHX?

Baim:

Light Helicopter Experimental, became Comanche.

Hochheiser:

That's the Comanche program.

Baim:

Yes.

Hochheiser:

Okay. So perhaps, now, this is a distinct position on the Comanche program.

Baim:

Yes, I don't remember the exact year. I think I put it down.

Hochheiser:

According to what you sent me, you moved from this proposal assignment to the Comanche program in '89.

Baim:

That's about right, yes. And it might have been a little earlier than that. But what happened was one of our GMs, Wally Hoff, came to me and said that the Army has a budget line for an advanced helicopter R&D project that could be a major project. And would I be interested? And the reason he did that is because I had a conversation with him about two months prior to that and [I] said that if I look at my career and what I've done, I would really like to manage a major program that uses multiple divisions to implement it, because I've had experience with all these different divisions, and could take advantage of the state-of-the-art technology that I am familiar with. And so he kept that in his mind. And a couple weeks, maybe a couple months later, came back and said that they had this project. Would I be interested in it? And I said 'Yes, I would be very interested in it.' I had never worked with an Army project in my life, but I'd be interested in it. So we started into that. There were competitive teams, air frame teams, and we were actually trying to court a couple of different teams at the time I came aboard. And within weeks when I was onboard, the Hughes team was solidified and we were excluded. So we were on the Boeing/Sikorsky team, and they were glad to have us. The Boeing/Sikorsky team formed up to compete in the LHX.

Hochheiser:

And who was Hughes allied with? Do you recall?

Baim:

They were using their own in-house capability for the items that we were interested in providing.

Hochheiser:

And what were the items that you were providing to the Boeing/Sikorsky?

Baim:

Well, we were after everything we could get, but basically the computer and the signal processor. That was the key. And then we were after the automatic target detection classification system, which is software. We were after electronic warfare items. We were after the forward-looking infrared and radar, if they had one. So it was an excellent team. It was the best corporate team I've ever been associated with in my life.

Hochheiser:

Who were the key people?

Baim:

Boeing and Sikorsky. Uh, Lou Cotton from Sikorsky and a guy named Marsh Hurd from Boeing were the two top guys. But the team under them, the level that I worked with mostly, were just excellent people. Bob Moore, Boeing, and Hal Linden, Sikorsky, I mean, top notch -

Hochheiser:

And these were people across all three companies, including Westinghouse.

Baim:

Yes, we're working with them to win the job. We're supporting their proposal effort and solidifying concepts and working out shares of who would do what. And it was very, very interesting. It really was. As it turns out, they gave the FLIR to Martin Marietta. We had a close association with them. We tried to actually team with them. We were unsuccessful. They were interested in it, but they really, on the bottom line, they just

didn't want to share any future production with anybody else. They just wanted to keep it. We were willing to work something out with them on the computer signal processor and automatic targeting. But anyway, that worked out really well, and it was an excellent win. It really was.

Hochheiser:

So the Boeing/Sikorsky team won a competitive fly-off against the other team?

Baim:

I don't believe they actually had the fly-off prior to the win. I think what happened is that it was too expensive for them to do [it] that way. So they did a paper fly-off, if you will. And it was a clear winner. Boeing/Sikorsky was the clear winner. They had an excellent air frame. It was state of the art. They got the contract from the Army. Then we had to negotiate our part of that contract. And it was another $100 million-plus job for us for development.

Hochheiser:

So you're then negotiating with Boeing/Sikorsky after the win -

Baim:

For our share and for what we would actually do for the team. We won that contract. Then we staffed up. I was the programs manager. We had basically three major parts. We had the processor part of it. We had the automatic targeting part, which was the software. We had the electronic warfare part. So we had three major parts. Prior to the Boeing/Sikorsky - right around the time we were looking at our share of it, I also tied in a Westinghouse division that made power systems out of Lima, Ohio, because a friend of mine was a GM out there, Vic Marone. And we actually won the award for the power system, too. So we got that. But we staffed up and we ran it with a lot of visibility. We had a lot of people coming in for tours and demonstrations, and it was just an excellent program. It was so well run by Boeing/Sikorsky, I was impressed.

Hochheiser:

It was interesting that you carried this through from the proposal and the contract stage into the actual production stage.

Baim:

Yes, I did. That was another interesting part of it. I really liked that. I was able to do that, and stayed with it for quite awhile. I was programs manager and ran that program for a period of time. And then I got another promotion to - we took that program into the processing department, we called it. We were after other digital processors and digital computer applications that we wanted. You know, one thing I forgot to say in all this is that there's a thread in all this from way back in the APQ-120 computer days. It's a little thing called millicomputer, and John Gregory - if you haven't talked to John Gregory, you have to -

Hochheiser:

We did.

Baim:

- you have to talk to him, because he is instrumental in that millicomputer. And that thing was used everywhere. Another program I had along the way, I was responsible for when I was a programs manager, was the Harpoon program. And the Harpoon program, I can't tell you how many millicomputers that program used. It was unbelievable.

Hochheiser:

What was the Harpoon program?

Baim:

We did a computer for the Harpoon missile launch for the Navy. And well, the core of it was the millicomputer. And that's John Gregory again. And I had, at that point in my career, the program manager reported to me. And on the Harpoon program, that was millicomputer and the APQ-120, millicomputer. The F4J for the Navy, that mod, millicomputer. A lot of the EW stuff that we had, millicomputer. I mean, it was tremendous. It was a building block that we just used forever. But when we got to the Comanche, it was not, it was just, technically, we just went leaps and bounds with Comanche further than we did in the millicomputer days. But, of course, when millicomputer started out, they were using magnetic core memories. And I remember when we first did the ACM computer, our memory that we were originally trying to give them was 8K magnetic core, and they insisted on 16K.

Hochheiser:

Which, at the time, was quite challenging.

Baim:

Oh, it was challenging, and it was big. Now I don't even think you could get the controls into that little bit of a memory. But anyway it was interesting. But Comanche, the proposal we made was taking a very major leap in density of our products as far as processing power per cubic inch or whatever.

Hochheiser:

So by now you're using the solid state memories, chips.

Baim:

Oh man. Yes. I think we were, at that time, this is now the late '80s. We were looking at 1 giga flop per board, which was unbelievable in those days. And we were able to make the density because we had actually designed a concept using R&D that would eliminate the area and space on the board that you would normally have to use for leads by using what we called a solder-free interconnect system. And it was a risky technical thing to do, but it was proven in our research and development that it could work. And we went with it in our proposal, and that's what we did. We built the Comanche research and development systems using solder-free interconnect. And it was so unique that I told the marketing guy that I wanted an artsy photograph of our board, using solder-free interconnect. And we paid a handsome sum of money to a fancy photographer to take a picture. And we offered it to Av Week. And lo and behold, they used it on the cover of Aviation Week. And I donated that to the museum. They gave me the cover on a plaque. And that's one of my donations I made when I left Westinghouse, or Northrop Grumman. And I actually have a copy of that, I think, in my files that I kept all these years. It was an honor to get a cover on Av Week. [Laughter]

Hochheiser:

Certainly well worth whatever you paid the fancy photographer.

Baim:

Yes. If I remember, it was $2,000 or $3,000. It was for the lighting, and the lasers, and all that, the effect that they got. But Comanche used some pretty good technology. And the technology that impressed everybody, unfortunately, [was software] more than the hardware. I'm a hardware guy. The software we were developing for automatic target detection classification is just phenomenal. And we had a demonstration where you could take a human being and let them go through a scene of a battlefield - infrared, or FLIR scene - and pick out targets, separate targets from hot rocks and things. And you could time them, that was one part of the demonstration. Then you could turn it over to the computer. [Laughter] And, of course, the computer can do it in a tenth of a second - I mean, it's just ridiculous - and with very, very high probability of success. We had a General Officer come in one time and I tried to explain to him that it's just going to be demonstration - the computer's very, very fast. But if you'd like to take a shot at it, well - And this guy started studying the screen. And we used to time people if they took a minute or two minutes. I think he took more than that. And I was always hesitant to turn the computer on to do it. But anyway, it created quite a buzz around when somebody would take 2, and 3, and 4, and 5 minutes looking for targets. And you turn the computer and it goes ta-da, there it is. So the guys that did that development are pretty sharp cookies.

Hochheiser:

And at what point did you move on from the Comanche program?

Baim:

Well, when I got the promotion to move up to the next level, which was the Processing Department, I turned the Comanche programs over to the guy that ran the processor part, and that's Dick Frediani. And I moved up a notch.

Hochheiser:

So now is Dick reporting to you?

Baim:

Yes.

Hochheiser:

So basically you're moving just up one level. You now have Comanche -

Baim:

Comanche and other things.

Hochheiser:

- and other things reporting to you.

Baim:

Yeah, right.

UAV

Now, I might have had 15 or 20 people reporting to me then. That was a period of time when we were in a state of flux in our particular department, and they needed other things done too. Like, for instance, unmanned aerial vehicles (UAV) were coming into the fore. And I think that's the point where I took over a newly-formed department right after that. That was within a year or two, Unmanned Aerial Vehicle Department.

Hochheiser:

I was about to ask you, what is UAV?

Baim:

Unmanned Aerial Vehicles. Now, that was an area where, when I started out, most of the things were classified.

Hochheiser:

Right.

Baim:

And now most of the things you see on TV!

Hochheiser:

These are the drones you hear about all the time and -

Baim:

The Predator drone is the one you hear about or see on TV every day. That was classified in those days. And we were providing a radar for that UAV. The obvious advantage of radar is you could do your thing through clouds and rain and all that. And then where the EO systems you see on the television today - most of the images are using EO. They don't show many radar images.

Hochheiser:

EO?

Baim:

Electro Optics. They have an electro optic capability and a radar capability on most of the airplanes. TESAR is an acronym, too. That's Tactical Endurance Synthetic Aperture Radar. But it was a classified program in the beginning. And we did other classified items that are no longer - the images of those things are no longer classified, but they're unmanned aerial vehicles. I guess that's all I can say about them. But TESAR was a very, very interesting program. And it was a challenge to get the first one, like almost all these highly-technical programs, mostly for software reasons. When we finally got it, everybody was delighted with the imagery. It's just absolutely fantastic. And if you walk around the museum here, I donated two images. One of Washington, DC and one of Baltimore. You can't believe they're radar images. It really looks like a photograph, but it's a radar image. I had a program manager assigned to that eventually. Then there are other aspects of that that are still classified that I can't talk about. It was a great program when I had it. And when I left, retired, I kept tabs a little bit on it. I did get a phone call one time about two or three years after I retired or so. And somebody said, 'Have you watched the TV news today or lately?' I said, 'No, why?' He said, 'Well, turn it on. You might see an interesting photograph of an item they call Predator out there firing a hellfire missile and knocking out an enemy pickup truck with a bunch of Al Qaeda people on it.' And I said, 'Oh, really?' So I did, I turned the TV on, and sure enough, later that day, I saw the images come on of Predator. This surveillance aircraft has a real slight little capability to fire a hellfire missile attached to it, which we always knew, because when I first saw the Predator and talked to the people that ran it, that's one of the things they mentioned was that the wings had hard points. And hard points are an indication it wants to carry something. So I figured it wouldn't be long that they'd have something on there.

Northrop Grumman

Hochheiser:

Now we're getting around to the time when the division was sold to Northrop Grumman.

Baim:

Yes.

Hochheiser:

Can you give me your recollections of that whole chain of events?

Baim:

Yes, I can. I participated in the due diligence part of it. We knew that somebody was going to, something was up. And we were a little apprehensive. Northrop Grumman, I had experience working with them, because on one of the classified programs - I guess I can say what that is. It's now Global Hawk. I worked with the Northrop Grumman team to try to win the Global Hawk. We were going to supply them with radar. And turns out the other team won Global Hawk. There were other teams, but we were on the Northrop Grumman team and the other team that competed won it. Burt Rutan had been the designer of the air frame, the air frame concept. Not the detail design, but the air frame concept. And I had a chance to meet Burt Rutan in these classified meetings out west somewhere. The Northrop Grumman team had lost. And then a few months later or whatever, Northrop Grumman ends up buying Westinghouse Electronic Systems. I was not too disappointed that they had selected to buy Westinghouse. I thought that it was a good match for them. Our only apprehension was that they would come in and make too many changes too quick and destroy what was a jewel, in my opinion, in the defense operation of the United States. And they didn't. They actually did a very, very smart thing. They came in here and basically nurtured the environment we had, and were just great. It was a good merger, and taking on this type of capability. They did some other things after that. I have to say that I was a part of an ad hoc committee in Northrop Grumman after it was put together to talk about unmanned aerial vehicles, because I had TESAR on the Predator.

Hochheiser:

Right.

Baim:

The Predator thing. And we had lost one project together. I told them when I went out to LA headquarters that we're doing a good job with Predator. We have the radar, TESAR. But the real long-term major potential for our type of business, the electronics side of it, would be Global Hawk. It's a shame that we can't do something about that, because I mean, personally, I'd like to see Northrop Grumman buy the company that makes Predator and buy the company that makes Global Hawk. Well, I retired in '99, and a few years later they bought the company that made Global Hawk. [Laughter]

Hochheiser:

[Laughter]

Baim:

So I'd like to think I had something to do about that, at least sparked some interest on their part. I was talking to the vice president. We had a high level meeting on unmanned aerial vehicles.

Hochheiser:

So you did not find that the sale to Northrop Grumman really changed things much around here?

Baim:

No, it was great. From my experience, it was great. Well, 35 years with Westinghouse, it was tough to see the circle bar W disappear. And I still have a lot of circle bar W memorabilia that I can't get rid of, 35 years with it. But it was surprisingly well done when Northrop Grumman bought it.

Business and Technology Development

Hochheiser:

Now, about this time in '96, you moved to I guess what was your final position.

Baim:

Yes. That was in the Army department, Director of Business and Technology Development. By this time, TESAR was taken over by that department. So I [was] somewhat familiar with that. And I had gotten to know Dr. Bud Forster, the GM for that department. I knew he had an opening that was coming up. And I told him that I would like to take that opening. I was already a corporate guy, and I wanted to make a change. And I thought I could offer him some experience from all my different programs and help out, especially in the technology development area. He took me in, hired me in. He's really one of the smartest guys I've ever worked with, Bud Forster. He's a real brilliant guy. I enjoyed that assignment a lot. His IRAD ideas were managed by me. The money was managed, and the people, and the plans were managed by me. And then, of course, the development programs we had were managed by me, under me. At that time, I just, I don't know how many people I had [to] direct, but it was maybe 10 or 15 or something like that [to] direct. And, of course, they all had people working for them. But it was a good assignment. I think that it was mutually beneficial for him and me.

Hochheiser:

Any particularly notable programs that you can talk about?

Baim:

One of our efforts was to design some technology that would go into a low-cost radar. And we spent a fair amount of IRAD funds trying to come up with a technology that would reduce the cost, I guess is about what I could say. And we also spent a fair amount of IRAD technology looking for the next generation of missile seeker, because Westinghouse and Martin were joint manufacturers, joint owners of the seeker for the Longbow missile. So we were looking at that in a lot of detail. They were the two biggest projects. Although we also had, within that department, a remotely-piloted vehicle operation in Oak Ridge, Tennessee. I had a chance to go down there and look at what they were doing in technology. It was interesting.

Retirement, Evolution of Baltimore Operation

Hochheiser:

Then you retired from this position.

Baim:

Yep, I sure did, 1999.

Hochheiser:

And what led you to retire at the time that you did?

Baim: Well, it's one of those things. My dad had said something to me that stuck in my mind. He said that he retired when he was 68, I think, 68 or 69. And he said that he would recommend that I retire as soon as I could, but to start doing the things I want to do. And I decided that that would be a good time for me. And I wanted to spend time with my mom and dad. They were getting old. And I retired so that I could go down to Florida and spend some time with them. And it was good that I did, because my dad passed away in 2001. So I was able to spend [a] good solid three months a couple times a year with him.

Hochheiser:

In what ways, if any, have you remained active since your retirement?

Baim:

Well, I volunteered here at the museum to help with panels. And I also made contributions to the museum. We have a WX forum of retired Westinghouse Northrop Grumman people, and I read on that every day. Talk, sometimes, other than politics, it's technical, which I enjoy. And I do office work for my son's business. That keeps me busy. I keep in touch with some retirees. We have lunches together every couple of weeks. And we formed a crew after I retired in about 2000, we formed a core group that likes to visit museums. And we've started making a list of all the museums in this area that we could drive to in a day and visit. And we've hit just about every one of them, and some of them a couple of times.

Hochheiser:

[Laughter]

Baim:

The NSA Museum was one that we hit two times that was really interesting.

Hochheiser:

Yeah. That's a very interesting museum.

Baim:

'Cause we have a lot of things that are there that some of our team can relate to at the NSA Museum. Have you been there?

Hochheiser:

It's a wonderful museum.

Baim:

Oh, it's great.

Hochheiser:

In what ways did the Baltimore operation evolve or change over your long career here?

Baim:

Oh man, that's a lot of changes. Whew. It just seems - I'll give you an example. I was telling my wife the other day when we went to pick up my daughter at the airport, or my granddaughter, in the mid-'60s, we had a pass for a parking spot at the airport right next to the terminal. And I used to; if no one was using that pass - it was, you know, first-come-first-served. When I'd go out of town, I could get that pass, and go over there and park in a parking place and walk 50 feet inside the terminal. And there was hardly anybody around. Now you look at the terminal itself. You have to park half a mile away. It's so busy and it's enormous. And the improvements are so big. But the same thing with the Defense Center. Our operations were so simple and straightforward with the one building and then the other building, and then the central building and then then MED, what is now ATL, Advanced Technology Lab. And then the high-rise building over on Nursery Road. Some of the time we spent in the leased buildings, Airport Squares. I was in Airport Square 6 for a period of time, and then the neighbor of this building, which was Airport Plaza. I spent some time in that building when I was working the different programs and proposals. The physical machinery of the place has just exploded in the years, but the one thing that's constant, and that is the people. It just seems to be

a magnet for excellent people, and I always knew it. But when I retired and I just had a lot of time to spend outside of my environment within Westinghouse and Northrop Grumman, it's the thing that keeps coming back to me. It's just what a collection of smart and good people. That's very, very fortunate in this operation.

Hochheiser:

Looking back, how would you characterize your career as a whole?

Baim:

Too fast. It went too fast. I would say that it was really an excellent opportunity for me to be able to move from place to place and take advantage of experiences that I obtained in each area, and to have different challenging jobs. The people on the outside would tend to say, 'Oh, you have a desk job.' Well, there's no such thing as a desk job if you're willing to try different things and take on different challenges and assignments. And that was the one opportunity that Westinghouse afforded people like me. I can't speak for others, but I'm sure others have the same opinion. I was able to make big moves in my career that were beneficial to me, and my managers were always encouraging. The people that I talked to were not discouraging at all about the possibility of moving from a technical side to marketing or contracts. And without knowing it really - by seeking out these different things, I had been afforded the opportunity to go from a junior technical guy to a supervisor to a marketing guy to a sales guy to a field rep, contracts management negotiator, and a program manager - all in a short, a relatively short period of time. So it was really excellent. Aside from my own drive and my own desire to do these different things, it was encouraged by the top management, which I'm thankful for. Guys like Wally Hoff. When I retired, I singled out a number of people who were mentors and really encouraging. Irv Maki was the first. Bill McCrehan, who was an excellent guy, was the second one. Jerry McKindless and Wally Hoff, and there's probably one or two more. I actually had a lunch with each one of them that I could and separately thanked them for helping me in my career. I really appreciated it.

IEEE, Radar

Hochheiser:

Well, since I'm from IEEE, I'd like to ask you - were you ever a member of IEEE or otherwise involved?

Baim:

Yes, I was. In my time at Molecular Electronics Division, I was fairly active in IEEE. In fact, I have in my memorabilia, I had an IEEE - I had been to an IEEE meeting in New York City, which was a big deal for me, because I had only been there on holidays and vacations before that. So I went to an IEEE meeting there, and I think several others in that time when I was at MED. After that I wasn't so involved with IEEE, because I really was in the management side, the business side, and not so much in the technical anymore. But, yes, I was. And most of my senior engineering support people that I had were very active in IEEE.

Hochheiser:

Is there anything I neglected to ask or you neglected to cover that you'd like to add at this point?

Baim:

Oh yes. There's so much that happened over a large career like that. I looked at my papers I had kept and made a few notes about programs and projects. One of the things that I'd pulled was a document on Westinghouse radars, airborne radars chart. And it gives a time frame. I don't know if you've ever seen this. It starts with ASB-1 and the APS-6, and it goes into, there's two short blocks, then it goes into BOMARC. Now, I came aboard in 1959, which was toward the end of the DPN-53 time frame. I was involved in almost all the airborne radar development projects. Through, you know, a little bit with AWG-10 because of the ACM computer and the APQ-120. The APQ-100, 109, 72, because of my work in the calibration repair operation. The Peace Rhine is mentioned on this chart for which I, of course, did all the business operations management. And up into the APG-66 for which I did a little bit of work on the proposal. But it was quite an experience. But anyway, I enjoyed going back over my files that I hadn't had a chance to look at since 1999.

Hochheiser:

[Laughter]

Baim:

When I retired, I took some papers home. But there's so much. I don't know if I could think of anything else.

Hochheiser:

Well, unless you can think of anything else, we're finished. If there's anything else you'd like to add, you're welcome to do so.

Baim:

No, I think that pretty well covers it as far as summary is concerned. We could probably spend hours and hours talking about it.

Hochheiser:

Well, I thank you very much for your time.

Baim:

Well, thanks for asking me. I really appreciate that.