An Interview with

PATRICIA B. MYHRE

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Conducted by Thomas J. Misa

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Abstract

Patricia Myhre graduated from Creighton University with a mathematics degree, and then went to work for Sperry Rand Univac in St. Paul in 1976. She did software testing for several U.S. Navy programs, starting with destroyer warships for Iran and later the P3 aircraft. Myhre eventually moved from software testing to system testing, involving complex operational interfaces between Univac and other companies' equipment. The interview discusses work culture and environments in several different Univac office complexes in the Twin Cities metro as well as with the corporate reorganizations (first, the merger with Burroughs and later the purchase by Lockheed Martin).

Misa: My name is Tom Misa. It's the 23rd of November, 2015, [and] I'm here in my office at CBI with Tricia Myhre. We're going to have a conversation about her career in the computer industry. This recording is being done as part of a series we're doing for the Sloan Foundation to better understand women's work experiences and career experiences in the 1960s, 1970s, 1980s, and 1990s. So it's our pleasure, Tricia, to have a conversation with you.

Myhre: Thank you.

Misa: I'm wondering if we could begin with your childhood. Were there any points of particular interest or activities when you were growing up, maybe in high school or even before then, that might've led you toward a more technically oriented career? Things that you were particularly interested in or that you were good at in school?

Myhre: I guess when I was in high school I enjoyed math and science. There are always aspects that you don't like, but for the most part I liked those areas. So when I went to college, I decided I would have a math degree. And at the time my brother, who is four years older, graduated here from the university actually with a civil engineering degree, told me gee, Tricia, you should go into engineering. And I said well why is that? And he said because there aren't many women and you'd have lots of help with your homework.

Misa: Okay. [Laughs.]

Myhre: Well, as an 18-year-old, or soon to be 18, that was not any reason I could see to go into a field.

Misa: Help with homework.

Myhre: Yes, it's like I can do my own homework, who needs help? I don't need guys. And I had gone to an all-girls high school so I had a little bit of feminine independence nurtured in me.

Misa: Which high school was that?

Myhre: St. Margaret's Academy which is now Benilde St. Margaret's, but we were all girls at the time, Benilde was all boys at the time and they later merged. Anyway, so I went to Creighton University down in Omaha, Nebraska, and they did not have an engineering program, number one; if you wanted to go into engineering you did your first two years at Creighton and then transferred to University of Detroit or whatever, which was another Jesuit institution.

Misa: Oh, okay. That's not in Nebraska at all.

Myhre: No, in Detroit, Michigan. So you'd physically have to transfer schools if you wanted to get an engineering degree. I plodded along with my math courses, more and more deciding this isn't what I want to do largely, I think, because the math program at

Creighton was theoretical. [It was] a lot of theory and I don't do good with theory. I wanted nuts and bolts stuff that I could more easily understand. So when I decided that maybe math wasn't what I wanted to go into, I thought well maybe some kind of business degree, or something, and I started looking into that. When I found out it would've taken an extra year to left shift, to get a different degree, I thought no, I'm not going to do that. Actually, I graduated with a Bachelor of Science in Mathematics.

Misa: In math. Can I just ask, back in high school were there particular instructors, or classes, or clubs that you might have had access to, to nurture your interest in mathematics?

Myhre: No. Well, the teachers were all very dedicated; small Catholic high school. So they weren't making a lot of money but they were there because they wanted to be, so their interest was in the students. Just really dedicated people. And at that time, we also didn't have a lot of doodads, so to speak, in our science labs even. Our chemistry teacher fashioned a lot of things by hand. You know we had the standard microscopes and some of that kind of equipment, but there were things that she fashioned even out of a coffee can, as I remember. My physics class, when we were studying acceleration, we had like a little car device, a little piece of wood on wheels that we would scoot across the table. I can't remember exactly how it worked, but there would be a weighted device that would make dots on a carbon paper, and then you measured the distance.

Misa: Oh, so you could see the distance, got it.

Myhre: Wave theory, we were out in the hallway with Slinkys. So it was very rudimentary but it got the point across and we learned.

Misa: Do you think there were a number of girls in your high school that were also interested in science, a cohort interested in math and science?

Myhre: There were six of us that were very close in grade point all the way through, and we became good friends and I think we were kind of like female nerds. We didn't have boyfriends and stuff like that, so the six of us didn't know any better; we just kind of hung out.

Misa: Good supportive group.

Myhre: Yes. And so then again, coming out of high school, I graduated with only 120 kids, I think, and the thought of coming to the university was just totally; I didn't want anything to do with something this big. I didn't want to be just a number and so I was looking at private colleges, and that's kind of how I ended up at Creighton University.

Misa: At Creighton, yes. So you looked at the University of Minnesota?

Myhre: You know, I didn't even consider the U.

Misa: Oh, you didn't.

Myhre: No.

Misa: So it sounds like you had a pretty good experience though at Creighton.

Myhre: Creighton is a great school. And again, the math department was very small and so even though, as it turns out, it wasn't what I was looking for, the teachers were good and I had a great advisor. I remember having taken my three semesters or whatever of calculus, and the question I always asked my advisor was how does this relate to anything I might want to know? I mean, why am I solving these proofs, I hate proofs. And they never really had a good answer for me.

Misa: Engineering school would've had a good answer.

Myhre: Well right.

Misa: Theoretical math would've said because then you can move into higher realms of theoretical math.

Myhre: Yes. I can't remember if it was in my junior or senior year, I took a class called Mathematical Economics. And the class had all these calculus equations that I never knew what they did, and I was like, well now I get it. [Laughs.] It's starting to make a

little bit of sense. But there wasn't enough of that to really get me onto a path of where I thought I would after college. I knew I didn't want to teach. I didn't think actuarial sciences was where I wanted to go, so I was at a real quandary when I was getting ready to graduate. You know, think what in the world am I going to do with this degree?

Misa: This theoretically oriented math degree.

Myhre: Yes.

Misa: It sounds like the faculty would've been happy to have you do more theoretical math, but that wasn't your [pause]

Myhre: That was not my thing at all, and I was very jealous of my friends who were teachers. So they may not have known where they were going to teach, but they knew what that meant. I had several good friends who were in nursing school, one who was in pharmacy, you know, friends who were in pre-med and ultimately went to medical school. It was like okay, you've got a defined avenue you're going down; you pretty much know what you're end is. I had no idea.

Misa: Were there computers at Creighton at all?

Myhre: I took a half a semester of FORTRAN programming, and that was all they had. [Laughs.] And now I believe they have — they still don't have engineering, as far as I

know — but they do have computer science. But that came some number of years after I was there. I didn't even know what computer science was.

Misa: It goes in so many different directions, from very advanced theoretical topics to very practical things and more or less everything in between. So you said half a semester of FORTRAN programming. That didn't click or turn on a light bulb or some great source of inspiration?

Myhre: No, it didn't. We had to do some sort of rudimentary programming, but it wasn't even very analytical. I can't even remember what I did, that's how much it made an impression on me is I don't remember. [Laughs.]

Misa: So you were thinking you were envious of your classmates and in a bit of a quandary.

Myhre: I remember talking to my advisor my last semester, saying you know I've been going to on-campus interviews just all over the map; companies that were coming onto campus, insurance companies even though I didn't think I wanted to do actuarial. But I was thinking there's probably a lot of different things you can get into that don't necessarily have to do with your degree. And in 1976, which is when I graduated from college, not a lot of places were hiring. I don't know how many on-campus interviews I went to, and would get the nice little form letter saying thank you for your interest, we hope you find what you're looking for. You know that kind of wording without actually

saying it that way, but thank you for your interest but we have nothing at this time. I was getting quite a stack of these letters, and with no job, no idea of what I wanted to do, I came back home. Mom and Dad, here I am. But I remember talking to my advisor [and] saying, you know I have absolutely no idea where to look. And he was the one who said well you know, there's this company in St. Paul called Univac. You might — he was a math professor — and he says you might try sending an application in to them.

Misa: That was a good suggestion.

Myhre: So I came home and I sent in my resume, and almost immediately got a letter saying thank you for your interest but we have no openings at this time.

Misa: Oh no.

Myhre: And I added the letter to my stack. So this was in May, and we went off to North Dakota for my grandmother's birthday, and when we came home there was a letter in the mail for me from Univac saying please call for an interview. I'm going okay, only a couple of weeks have passed since these two letters. Well, once I was in a spot where I interviewed new hires as part of the interviewing process, I discovered that all these letters went into Human Resources and they probably just sent out letters. But then they would send the resumes out to different projects and departments and if there was somebody who thought yes, I'm interested in interviewing this person then you'd get the

second letter. So I had one interview, it was my only job offer out of college, and I stayed for 35 years.

Misa: Wow. [Laughter.] Okay, well that's a success story. What was Univac like in — that would be the summer of 1976?

Myhre: July 6, of 1976, and I remember it because it's 7/6/76. So the group I hired into, the program was called DD-993. It was an Iranian destroyer program. The U.S. Navy was selling, I believe it was four ships to the Shah, and we were doing the software for the command and control system. The group that I hired into was doing the software test, so we didn't program but we took the programmers work and we were the independent testing group. At the time I hired in there was one other gal, a new college grad, and there was a third gal who was a few years older, she'd worked somewhere before and came. So there were the three of us, and five or six guys there.

Misa: In the group.

Myhre: In my group. And you know, you talk about you learn to be one of the guys, the dirty jokes would fly and I discovered early on that if you showed that it was offensive, they just did it more to get your goat.

Misa: Kind of needle you.

Myhre: Yes. So I just smiled and you know, okay, just let it — like water off a duck's back, because sexual harassment was not a terminology at that time. It came onto the scene and I remember saying to somebody, you know when sexual harassment became a really big deal, I said you know I could be brought up on charges just as much because I dished it right back — or I learned to — and it was kind of if you can dish it, you should be able to take it. So I'd be flippant right back to these guys and after a couple of years, the other two gals quit Univac and went elsewhere. So I was the only gal in our group for another couple of years before we got a couple more women.

Misa: This is a group of something around 10, then?

Myhre: Yes. Very small.

Misa: So you're three out of 10, or something, but then down to one out of 10.

Myhre: Yes.

Misa: Which of the Univac plants were you working at?

Myhre: In Eagan, but not the main one that you would know on Pilot Knob. When I first hired in there were satellite buildings all over Eagan, and then of course, there was a big plant up on Shepard Road, there was a big one up in the Midway area. I worked in an office building just off of Lexington and Lone Oak, basically.

Misa: My understanding was that Univac had a bunch of smaller office space just scattered all over. They didn't have space enough to have everybody in a single facility.

Myhre: Yes. And they started consolidating the Eagan all back into the main Plant 8, what we called Plant 8 or Univac Park on Pilot Knob and Yankee Doodle. In 2000, is that right? No, it was 1990, they closed the office park where I was, pulled all the people over to Plant 8. It was very crowded at Plant 8 when I got there. I was put in a little cubicle that was maybe six feet by four feet, if that, and it had been used as somebody's storage area for boxes, and I could barely maneuver my chair around.

Misa: High cost office space.

Myhre: Yes. I didn't have a phone, and so I remember thinking I'm not impressed with this at all. I don't like this. I liked what we had over at Corporate Square and I felt like the country mouse going to the big city because I didn't really know that many people. At Corporate Square I felt like I knew everybody, because it was a small enough building. So like I said, the country mouse coming to the big city and I did not like it at all. But ultimately, I got put in a regulation cubicle with a phone and things were good. [Laughs.] So then I spent the rest of my time from 1990 to 2011— when I got laid off due to the plant or the facility closing — at Plant 8.

Misa: With software testing, was that considered to be a well-defined career path, or was that something that people more or less thought they might do for a couple of years and then transition to other work?

Myhre: Kind of both, but the group that I started out with, even though we — over the years — went into different programs, the majority of that group stayed in software testing.

Misa: Software testing.

Myhre: Yes. There were a couple of the guys that tried programming for a while, and ultimately, whether it was by choice or happenstance — I guess I never really asked them — but they ultimately came back to the test group. And I, in some regards, I got into system testing, as well. When I started working with the P3 airplanes, not the first program I was on, which was called CP-2044, and that was for the U.S. Navy. Then the follow-on to that was also U.S. Navy, and it was basically program and hardware upgrade of the first CP-2044. They did a big upgrade in the computer and the displays. So once I had been working there for a little while, my boss at the time asked if I'd be interested in becoming — what was the term? — a flight specialist, that was the Navy's term.

Misa: Flight specialist.

Myhre: Yes. And what that entailed was going through a four-day training session that the Navy put on. They did some classroom, but we also had to do some swim quals (qualifications). Get in a pool, full flight gear, [pause]

Misa: Sounds like you were two steps from becoming a pilot. It takes longer than four days, but [pause]

Myhre: And the Navy people, you know, real Navy, they went through dunk tanks and stuff. We didn't have to do a dunk tank like they do, but they had what I call kind of a tinker toy device. It was PVC tubes and it was in an L-shape, and you swam through it once sighted, and then they gave you goggles that they'd blacked out and you had to swim through it not being able to see where you were going. And the vertical PVC tubes, you went hand over hand to get you over this little L-shaped thing and if you came up before the end, you went back around, do it again. I don't remember how many chances you got.

Misa: It sounds like this is training for a flooded submarine or something like that.

Myhre: Well, it was for if the plane ever went down.

Misa: If the plane went down then you'd need to be able to pull yourself —

Myhre: You had to egress out of the plane, and it could've been sinking or sunken. And you know the biggest thing is if you're getting out of a plane that's in the water, you don't let go of a handhold, you know you make sure you have your next handhold before you move forward. We all, like I said, there was some swimming involved, just to make sure you could swim, you could tread water, you could float.

Misa: Tricia, it sounds pretty far from software testing. Was there some connection between the software work you were doing and this more physical [activity]?

Myhre: Yes, because the airplanes were going through modification because of all this new hardware. The modifications were being done down in Greenville, South Carolina, at a Lockheed facility down there. And so we went down — we being Eagan software and test people — went down to do ground testing, because the airplane was the first time that our software and systems met like the systems that Raytheon made for the radar, and you know, some other company made for something else. So we did ground testing. Well then they did some amount of flight testing out of Greenville, but then once the Navy accepted the airplanes, saying yes, the systems, software, and hardware are functioning well enough, they'd take the airplane back to Pax River, the Patuxent River Naval Air Station in southern Maryland, and they would do a whole boatload more of testing that they were in charge of. But we supported them, and that's where flight specialist, to be able to fly with them on the Navy airplane we had to go through their qualifications.

Misa: So you'd be there essentially as a troubleshooter or as somebody who's monitoring how the systems were behaving. If you were on the airplane they wanted you to be safe enough that you could get out if the plane had an accident.

Myhre: Correct. We were there mostly as observers, and if there was an issue, you'd take down as many notes as you could as to okay, what were the operators doing at the time of the software failure? Ultimately, our programmers wrote code that ran in the background of the operational program that recorded all button pushes and things like that, so that we could take off these error files, send it back to our programmers here in Eagan and they could go okay, here's where the error was and here's what was going on right before it. And because we had too many —

Misa: The systems were not deterministic at all when you've got all these possibilities and loops, from a software point of view that's very complicated. Then there's the physical system, so trying to recreate that in a lab is really a challenge.

Myhre: Yes. And I was there really as the eyes, and I could describe what I saw to go along with this error log. In the early stages, the error logs came about just because the Navy test people would write a problem report that basically said, 'It's broke.'

Misa: It's broken. [Laughs.] How did it get there, they had no idea.

Myhre: They had no idea.

Misa: And it's oftentimes very subtle interactions between two or three or five events that all come together then.

Myhre: Versus me, when I come across a problem in my software testing, I'd say I was performing this set of actions, I expected this to happen, but instead got something else. And then I'd go into kind of a troubleshooting [mode] to see if I could a) recreate it, or narrow it down, or things like that. I keep copious notes, and I'd put those notes into the description of the problem. I remember the software manager came up to me and I thought it's so long! But I read it through and there was like one phrase in that whole description that he said was the key to what the problem was. [Laughs.] I said I'm so glad I could do that for you. Sometimes I knew right away. When the program went boots up, you know, got the fault light or whatever. Those are kind of the easy ones, when the program physically would stop. But it's when the program keeps running but you get weird results and you try to narrow it down. What exactly was it that I was doing? Especially when we were in a lab environment, it was easy enough to reload with the simulator on the other end that was simulating the radar and other sensors. You could reload the simulator as easily as the operational program and go through the sequence of steps again, and hopefully get the same bad result. But when you had on the airplane all the other subsystems, it was more difficult because number one, there's a sequence of which programs got loaded first and just set up the interfaces, and since you were dealing with real hardware and real software of these other subsystems, was it really our program that was at fault? Or did we get bad data?

Misa: Ah, because you get many systems working together and you've got some responsibility boundaries in some fashion. Navy wants the whole thing to work, but from a company's point of view, it's like you have to figure out whether it's you folks or Raytheon or whatever.

Myhre: Exactly. So that's how I got into the systems side of things.

Misa: So I've got two lines of questions; it sounds to me like close observation and very careful note-taking, which is another way of saying observing but also recording, would be pretty important for software testing. Were there other kinds of things that made people really good at software testing?

Myhre: I think it was just logical thinking. And in retrospect, I think I probably would've made a good engineer because I married one, I have a brother who's one, good friends who are engineers; there's just a kind of logical way that engineers look at things. So I think in retrospect, I might've made a good engineer. What I liked about testing was where software people — at least the ones I knew — they had their own little module that they were responsible for; they were very tunnel vision.

Misa: Rather than big picture, they had their little slice.

Myhre: Yes. When we got into the testing of it, we were looking at how all the modules worked together, plus these external interfaces that were packed into our software, so we knew more about how the system worked than a lot of the programmers did.

Misa: That's right, because they had their little slice and you'd get a view from on high. Can you say a bit about how you made that career change, the evolution between the more restrictive software testing and the system testing?

Myhre: As the programs progressed, I finally got onto a program where, you know with the P3s, that it went beyond just the software testing. It got into the let's go test now on the airplane, and my boss at the time asked if I would be interested in doing that. I said sure, because I was kind of tired of going down in the basement in the lab, and on any of the other programs I'd never seen the end product, I'd only ever worked with it in the lab. So this was a real opportunity then for me to go see how it actually worked.

Misa: Meet out in the real world.

Myhre: Yes. So that's how I got into the system stuff. I still did a lot of software testing before the airplanes were ever ready. Every time we did major software modifications, I was a lab rat again, you know, back in the basement of the place.

Misa: Were there test protocols you'd need to follow?

Myhre: We wrote very detailed step-by-step procedures.

Misa: Could you say just a little bit about that because it's not just simply testing blind.

Myhre: We had a whole documentation cycle. We had test plans, which the high level said — well first of all, the software groups put out performance specifications that were varying levels of detail depending on who wrote it, and this also evolved over the years of how performance specifications were written. But basically what those documents were was the basis of the requirements that we tested to. So it's a description of a function and if there was a 'shall' statement anywhere in the description, that became a requirement. We had to prove that the software did what it was supposed to do. So if it said when you push button A, the button shall backlight; well, we're going through this sequence of events in your test procedures, you push button A and you specifically have an observation that says 'Button becomes backlit.'

Misa: There's a difference I understand between 'shall' and 'will.'

Myhre: Wills were not become requirements.

Misa: Can you help me understand the difference? Because in common language 'it will do something' sounds very close to being a requirement. It's a softer requirement, but not a requirement?

Myhre: I don't know how to really describe it other than the fact that I knew if it said 'will' it wasn't a statement that was going into our database of requirements, i.e., when I say that, we had a database that assigned a number depending on what — trying to think — we had several requirements databases over the year, and when they did requirement extractions they would scan a document and it picked out all the 'shall' statements. So anything else weren't what we tested to, and I don't know how to explain it any differently.

Misa: But suffice it to say that the 'shalls' were really the absolute requirements. On top of that the 'wills' may have been desirable, but the 'shalls' are being tracked.

Myhre: Yes.

Misa: 'Shalls' are being tracked in a database, they're being tested, and being meticulously followed.

Myhre: Yes. And even though it had a 'shall,' didn't mean you could always demonstrate it in the lab. By demonstrate I mean it wasn't something that had a visual outcome. There were 'shall' statements that we might say you had to verify by analysis versus demonstration. Analysis meant you went and probably sat down with the programmer and said show me in your code where it's going through this path. Some 'shall' requirements kind of led up to a 'shall' that was something you could demonstrate and visually who in the lab, like a button illuminating. But there might a sequence of

'shalls' right before that illumination; it's like it if didn't illuminate, then some of these 'shalls' didn't work. So there was always kind of a heartburn.

Misa: There's many more things about computing that don't necessarily have a physical light turning on. It's something in the program structure or some variable way, way, way buried inside.

Myhre: Right.

Misa: That must be a challenge and a difficulty.

Myhre: It is, and especially depending on who the Navy representative was who came to witness our testing. It's like how do you know that those other requirements are actually satisfied? They knew enough about the software as well, but most of the time you could say you couldn't have gotten here to point B or Z, whatever, without this chain having worked. As a test person, if something didn't work properly, it was my responsibility to write the problem report, describe the series of events that I had gone through and what my expected results were. Those went back to the programmers, so we didn't have to solve the problem; it went back to the programmers. Sometimes I got, after working with especially the P3 programs long enough, there were sometimes when I said you know, I'm not sure but I think this might be what wasn't working. Sometimes I'd be right, sometimes not, but like I said, I didn't have to pinpoint where the error was and actually have to make the software change to fix it.

Misa: Over time, you'd get some familiarity of how these programs were supposed to interact and at least have a hunch that would be worth passing on.

Myhre: Right.

Misa: What kind of training did Univac give people doing software testing?

Myhre: Totally on the job.

Misa: On the job, just picking things up on the job.

Myhre: Yes. The first program I mentioned was the Iranian program, that was the shipboard command and control system, but that was based on the U.S. Navy program. My supervisor had worked on that program so he was my go-to guy, if I didn't understand. We had access to test procedures and stuff that had been written for the U.S. Navy program, and they hadn't really changed that much. So I did a lot of — talk about cutting and well not pasting — but we did a lot of scissors and tape, you know, I can use these old test procedures and I don't have to write it long hand.

Misa: Write the whole thing, yes.

Myhre: That's what it was when I started. We wrote everything long hand, we had secretaries who typed it, if there was an error we flagged it, they'd get out their white-out...

Misa: Wow.

Myhre: Yes, things changed a lot in 35 years. We got to where we'd just use Windows Word and typed our own, ultimately.

Misa: At some point in time, this testing database came in. That must've had quite a consequence then for your work, even if you were just putting things that someone else is typing. That overarching structure must have had some impact on your work.

Myhre: Back in the early days when the procedures were literally typed by a secretary, we had to keep a matrix as part of the test procedure when it was delivered to the Navy for review. 'Requirement 123 is at step 6; 456 is at step 26.' Well, after you've been in the lab and you've been working with your procedures and redlined the heck out of them because you've found errors; and how you thought something was supposed to work, or you missed some crucial substeps in the sequence [so] the secretaries would retype it. You'd be adding steps or deleting steps, and then you had to say okay, instead of Requirement 123 being at Step 6, it's now at Step 10. That was all manual.

Misa: So you had a big process of versioning these test documents that must have required an elaborate filing system and some means of tracking where you were.

Myhre: Exactly. So once we got into word processing, we had a word processing group, but they still took our input and typed it. And like I said ultimately, as the years went on, we had desktop computers, we just did it all on our own. We could sort and extract a table with the requirement numbers, what step it was on, it became much easier. If things changed, you just did a new extraction. That fed into the requirements database, because when testing was all finished [and] by finished I mean we had done our formal qualification test for the Navy and they said yes verily we accept the software. And then, like I said, they had their own multiple layers of testing. But we'd have to write a test report, and as part of the test report it was going back into this requirements database and saying yes, Requirement 123 was tested on such-and-such a date, witnessed by [so-and-so]; that became the basis of the test report.

Misa: You mentioned earlier that one of the interesting parts was at the level of systems, where you'd have maybe a Univac or Lockheed system interacting with a Raytheon system or something, two different companies. Can you say something about the interface between those two, because the system was supposed to work as a whole and they're supposed to fit together?

Myhre: They are.

Misa: But of course, there's some interesting ways of getting that to work out.

Myhre: That was sometimes a real issue. We had on the first 2044 P3 program I worked on there were some real issues between the radar and Lockheed. I don't remember now the specifics, but it was we were not getting the inputs correctly, or we said we weren't and they said it's not our fault. To simplify what the problem was, it took a long time to get there. Somebody finally stumbled on the fact that the documentation from Raytheon that we were using, for their interface design, was a different version than what they had used to program their side. There were just some subtle differences, just a revision. We must've been one behind what they ended up programming to and somehow that information didn't get passed on to us. Our programmers would be looking at this interface document and say but we're doing it! We had that kind of issue with Raytheon. The acoustic system that deals with the sonar that listens to returns off of sonar buoys, that program, the acoustic program, was — I forget who they were at one time, ultimately they became Lockheed as well — but we had been adversaries because the interface had real issues. Interestingly enough, besides just interface problems, your hardware really plays a role and I didn't realize this for many years. Timing is critical and at various times, you know, they or us would upgrade hardware. That changed the interface timing-wise, how quickly messages went between the two programs. The last iteration that I worked on, our Eagan hardware had changed and it became a faster interface. We had to actually slow some of the stuff down.

Misa: Slow down the hardware.

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Myhre: Slow down how often messages are sent across the interface because it was going too fast for the older hardware on the other side to accept it. So things like that you don't think about, and I as a test person, all I knew is that it wasn't working. I didn't know why it wasn't working. So those kinds of things could be real interesting.

Misa: Were there various techniques that could be used to try to address systems problems that would've been different from more restrictive software modules? Obviously it's much more complicated, but did you have different strategies for testing or different protocols for testing?

Myhre: Not really. You know we still had very detailed step-by-step testing procedures. They grew significantly from the standpoint that now I had not just a simulator on the side that was all self-contained, by self-contained I meant it was another whole computer system in and of itself that simulated the radar and the acoustics, and anything else that our software talked to. But that was all kind of self-contained in a different software program. When you get to the airplane, now you have physical hardware subsystems running their own software and so the difference was I had to learn how to at least rudimentarily run these other systems that I had never seen before; at least learn to run them well enough to send the messages over to our software that I wanted to or that I needed. The biggest thing that came into play for me was until I got a little more familiar with how some of those subsystems actually work, I did not know enough to say yes, it's our problem, or no, it's Raytheon's problem. So I would write the problem report against

our software when it was up to our programmers to determine whether it was indeed our problem or on the other side. So that was the biggest difference, probably, is that I didn't know enough nor was I expected to.

Misa: It's a minor miracle that some of these highly complex software hardware systems work at all, because there are so many moving parts.

Myhre: Definitely.

Misa: Can you say a little bit about the kind of people that you worked with? You said you had been working in this area outside Plant 8, but then you were transferred into Plant 8, initially into this small cubicle area. Did you stay the rest of your career in Plant 8?

Myhre: Yes.

Misa: That same group of software and then systems testing.

Myhre: Pretty much. I worked different programs and I had a few little junkets where I worked. I guess this is when I was still over at Corporate Square, I spent three months down in Australia, supporting a program for the Australian Navy. I worked six months out at Mare Island Naval — it wasn't a Naval Station — Air Station, it was just Mare Island Navy Base, working program out there on a temporary assignment. But the main

group that I was working for was out of Plant 8. So yes, once the buildings were consolidated, there were very few things outside. They still had for a little while, the facility up in the Midway, because that had a big lab facility up there.

Misa: The original ERA plant?

Myhre: Up in that area. It wasn't even in that building but it was part of the bigger complex. It was called METC [Military Equipment Test Center].

Misa: Oh, METC. That wasn't Univac Plant 5, because that was also just across from the ERA plant but what you're describing doesn't sound like either one of those.

Myhre: Was it Plant 2?

Misa: Plant 2 was the original [ERA] plant, even though it was the original plant it got relabeled somehow as Plant 2 rather than being Plant 1. So 2 and 5, at least by the 1950s, were adjoining; they were right across from one another.

Myhre: I think METC was in Plant 2.

Misa: Oh, in Plant 2.

Myhre: I think. And see, other than Plant 8, I never called any of the buildings by their numbers because number one, I couldn't remember what they were, and it was easier; everyone knew what METC was.

Misa: Okay. [Laughs.]

Myhre: It was something, something tests center, can't remember what the ME stood for. Again, alphabet soup. Everyone knew what METC meant. So it's like well, I got to go to METC today. Okay.

Misa: So that's METC?

Myhre: Yes. The Shepard Road facility had a number although I don't think I ever knew what that one was; it was Shepard Road. That was more manufacturing and I had no reason to go over there at all. So, yes, ultimately things got pulled back into; they had done some remodeling, I think, and reshuffling of space I believe at Plant 8, to be able to bring all these little satellite places into the plant.

Misa: Did you notice any pronounced differences that you might comment on, with the different corporate ownership over the years?

Myhre: Oh definitely. When Burroughs and Sperry merged — and I use that term lightly, I think it really was a takeover by Burroughs of Sperry — there was a real

change. That was the beginnings of management people cycling through Eagan from elsewhere. Until then, the people up on Mahogany Row, the executives were all local people that had grown up in the culture. They knew the work ethics and everything of the Minnesota culture. Once it became Burroughs — and it just got worse from this standpoint — once Loral and then ultimately Lockheed, we'd get a new executive come through for three years, five years, and it was kind of a stepping stone for them. They didn't really have interest in; like I said, it was a stepping stone in their careers.

Misa: They were going somewhere else, so the details of this particular facility didn't make such a great difference.

Myhre: So yes, in that regard, and somewhere along the line, it became real obvious that although we knew we were putting out a quality product, I think the bottom line became money for the corporation. And that was when these programs — we bought in a number of programs at work and —

Misa: And when you say "bought in" do I understand it correctly . . .

Myhre: Underbid.

Misa: . . . you might've underbid so you were sure to land this . . .

Myhre: To get the work, yes.

Misa: . . . so it was useful to have the work but then not necessarily from a bottom line profit/loss point of view. May have actually underbid it, not had financials hoped to have been impressive, but useful nonetheless for the people who were working on the project.

Myhre: It kept us employed but it just made going to work harder and harder every day. Okay, we won the contract. We all knew what needed to be done but during the negotiation phase between Lockheed Eagan and the Navy, like well, do it in nine months instead of 10 for this amount of money, instead of what you bid, and it's yours. And it's like okay, we just got turned on to start work, we're already behind schedule and over budget and we haven't . . .

Misa: Started. [Laughs.]

Myhre: . . . put pencil to paper yet. So that became real frustrating. And you got beat up because you weren't working fast enough and hard enough, and test was always the tail of the dog. It's like yes, I'm behind schedule but it's because software's not done yet. I can't start anything until they give me a product to work on. So that was always real frustrating.

Misa: Right, you were about next to last in terms of getting it actually . . .

Myhre: Oh definitely.

Misa: . . . not in terms of priority, but just in terms of chronological sequencing, too, because nobody's going to be transferring, like contract's closed out until essentially you folks have passed off on it.

Myhre: Exactly.

Misa: So was there a certain amount of, I won't say pressure, but just expectation that this needs to get done and the testing needs to get concluded quickly. And if there's problems then it needs to be discovered as early as possible. So there's a time consciousness.

Myhre: Definitely.

Misa: Time pressure could've been involved with your work.

Myhre: Yes. Something popped into my head just a few minutes ago and I'm not sure why sometimes my mind works the way it does; you asked me about when I first started, the type of group I was in and — just a small vignette — almost all the programs I worked on through my career were Navy. I did work on Air Force and Marine Corps in there, but the majority were Navy programs. And the first one, even though the program was for the Iranians, it was a foreign military sales program, which meant our customer was actually the U.S. Navy. The Navy bought and then they sold to the Iranians. So our

customer was the Navy and so the people who came in were either generally — by coming in I mean when we did testing we got people from the Navy side of the house that came to witness testing — generally they were a company, a beltway bandit, who were contracted to the U.S. Navy and were their agents to accept our software. So the first time I was going through a formal test period, or getting ready to, we would have review cycles of our test procedures, and the Navy would've reviewed them and come back with a long list of comments saying this isn't correct or you missed this, or whatever, and you'd have to resolve the comments to the satisfaction of the Navy to go on. Anyway, I remember after one of these meetings with the Navy to do comment resolution, a guy that I'd met for the first time during these meetings stopped me in the hallway and said I owe you an apology. I'm like what? I had no idea why he would apologize for something; I didn't know what it was. I said what are you apologizing for? He said well, I got your document to review and the name of the author was Pat Bailey — I was known as Pat at work — I made the assumption that Pat as a guy. When I found out it was not a guy I thought this is going to be awful, these procedures are going to be just horrible. And he said I got to looking at them and they're quite good. And he says I'm sorry I made that [assumption]. And this is a big burly guy, former Navy — he hadn't retired Navy but he'd been in — and I just looked at him and I thought that took a lot on his part to apologize for that assumption, that because it was written by a woman they weren't going to be any good.

Misa: Did you have any other experiences where Pat was understood in one way or another, because it's not a gender marked name like Pat could be Patrick or Patricia, it's not clear.

Myhre: And yet I know a couple of guys whose names are Lynn.

Misa: Lynn, right. Of course.

Myhre: No, that was really the only one that I can remember. There may have been some that I didn't know overtly; there may have been things going on that I didn't know about. But that was the one thing that, you know this is 40 years later, that still I remember because it was just I need to apologize. For what, you know? What did I do? What didn't I do?

Misa: So when you're saying your tests were accepted by the Navy, your tests were actually being accepted by an agent of the Navy, not a Navy officer marching into your office.

Myhre: Right.

Misa: It was a contract on behalf of the Navy.

Myhre: Yes.

Misa: So this is yet another layer of complexity, or at least interaction.

Myhre: The first time I ever worked with anyone who was uniformed — now they might have sent a uniform, maybe, or whatever the service was to some meetings — but the first time I ever worked side by side with somebody from one of the services was a program I was working on for the Air Force. There was a major and a — I forget their ranks — but there were a handful of guys that were very hands-on and they were the ones who came and witnessed. But for the most part, with the Navy it was one of these contracting agents that could make decisions directly for the Navy.

Misa: On behalf of the Navy.

Myhre: Yes, that was their charter. With the P3 work, the first time I met any uniformed Navy people was when I started working on the airplanes, down in Greenville, because they would send a crew down plus some of the Navy contractors, so there was a real mix of uniformed Navy [and] Navy contractors down there. Ultimately, some of those uniformed Navies became, you know, they'd get out of the Navy, they'd go work for one of the contracting agencies.

Misa: And then would be an agent for the Navy. Tricia, you mentioned that when you first went to Univac it was more or less the expectation that you'd become one of the

guys. Did that expectation about how a woman in a technical role might need to behave, did that change over your career?

Myhre: I think it did, and I think a lot of it is just how corporate culture changed. Earlier I mentioned we started getting the training on sexual harassment and what does that mean, ethics, we had yearly classes — I don't know how else to say it — where once a year you had to go to ethics training, something like that. I think that with the incorporation of all that into just the overall corporate culture, you certainly had to still stick up for yourself, but I don't think the women who came in 20 years after I did — I never talked to them about it — but I don't think that they had quite that same feeling of being one of the guys. They could be a woman in the industry and be respected as a woman in the industry.

Misa: Not necessarily conform to some male expectations.

Myhre: Right.

Misa: Can you give me a sense, not an exact year, but was that connected at all with corporate management or was that more a function of greater awareness being a change across time? You mentioned the Burroughs Sperry merger was a marked change in culture, was that connected?

Myhre: Well, that was mid-1980s. But I think some of the ethics had come before that. I'm trying to visualize; okay, where was my desk? Where was I sitting?

Misa: What year, yes that's hard to sort through.

Myhre: It was probably later; no, it would've been Unisys by then. Maybe it all kind of happened, I wouldn't say simultaneously, but I'm not sure that one was totally linked to the other. I think that our corporate culture definitely changed with the Burroughs merger; corporate executive culture definitely changed. I think all this other stuff might've been not just our industry but over many industries, because I certainly don't remember that when we started getting ethics training and about sexual harassment, I'm pretty sure that was not just unique to Unisys or names that we had. I remember talking to people who worked elsewhere and they said oh, yes, we got the same thing.

Misa: We got the same thing, yes. I think that's really difficult. We did this paper looking at advertisements from the 1960s and it just makes you cringe. By the mid-1970s, you think okay now, there's both the cringe type of blatant sexism, and then a more positive view of women. And by the 1980s, then, at least the trade journal, *Datamation*, that we looked at pretty carefully, that shifted over. But that's in the space of 20 years, that's half your career and that's a pretty profound change, at least in that journal. The change, I think, across large, reasonably well-managed American companies was really quite marked and quite profound.

Myhre: Yes. One of the things that I remember talking to people about, especially sexual harassment, and I think I mentioned once I think I could be brought up on sexual harassment. It was focused on men saying sexually provocative things to women but I think I could be brought up on sexual harassment charges just as easily because I throw stuff back over the wall, you know? And I think that, for my personality anyway, came out of when I was 22 years old and starting out, kind of was a self-preservation mechanism. And I was like okay, I'm not going to put up with this. I wasn't confident enough to just say you know, don't say that to me, I don't like that. I wasn't confident enough and I don't know if it was encouraged that someone might come back at a guy and say don't talk to me like that. So I would just turn it around and throw it back, you know. I think one of the hardest things about that whole change in, you know all of a sudden people are talking about sexual harassment and it became more of a, well, you just don't say that sort of stuff at all; you need to respect your work mates, your peers. But it was as much of making people aware and I give credit to whoever started that whole thing; you know, this just isn't an acceptable way to behave. I think it was a lot harder on some of the old salts. Why should I have to watch what I say just because there's a woman in the room?

Misa: That's right. But that's part of our culture change, though, it's like we're not stuck in the 1950s or 1960s exactly, our culture has changed across time. Not perfect, for sure, in places you still see things you scratch your head about.

Myhre: So, yes, I think it was just as society evolved and society became more aware of certain behaviors are just not acceptable, that came into the corporate culture and we all evolved. None of us ever liked going to the training sessions; it's like, isn't this common sense by now? But for some people it never did become common sense.

Misa: Well, Tricia, this has been really an interesting conversation. Any topics that you might want to add to or speak to?

Myhre: Not that I can think of off the top of my head. I think overall, you know, as much as the last maybe 10 years were really frustrating at work, it was not because of dissatisfaction with what I was doing. Up until the day I got laid off, I liked what I did, I liked the people I worked with. I worked with some amazing people and we, especially having worked in the P3 environment as long as I did, almost 20 years, we became a little family kind of unto ourselves, and so I miss the people. I don't miss the corporate baloney, the pressures that they put on you, I don't miss that at all, but I do miss the people to this day, four years later, I miss the people.

Misa: Well that's the mark of a healthy and basically enjoyable work environment.

Myhre: And I think as far as working in Minnesota, we were all unique in our work environment. Just a little vignette, going down to South Carolina, a lot of the techs down there were hourly people and so working overtime they might gripe about it but they were getting paid a lot of overtime. I don't know how the subject came up but it was like

a Wednesday or a Thursday, and the subject of working overtime came up and I said I don't get paid overtime and I said I've already got my 40 hours in. And this tech said, and you're still here? Why? And I said because we've got stuff to do, we're not done. Yes, but you're not getting paid? And I said, no.

Misa: It's not exactly a 40-hour a week job, sometimes.

Myhre: And that was kind of eye-opening for me. I mean , I always knew that was there, but it was like oh man, if he was salaried, he would've been gone. But they were always amazed at how hard us Minnesotans worked. And I don't think that had anything to do with gender, I think that's just what we grew up with.

Misa: Do you have any idea of where that work ethic came from? It's hard to say.

Myhre: It's hard to say. I came from mostly Germanic heritage, but a lot of the people I worked with were Norwegian and I think that's maybe part of their ethic. I don't know how else to explain it.

Misa: That's puzzling, but people have made that comment, that work ethic here — for decades — was unusually strong. It comes from somewhere, but hard to trace it back to one thing. Well, Tricia, thanks so much for our conversation.

Myhre: Did we cover most of your questions in my ramblings? I rambled pretty well.

Misa: The question is how my questions fit in with your career, and I think it's really fascinating, the long block of work in software and system testing is unusual, I think, it has an interesting quality to it.

Myhre: You asked, I think the question was did people move on to different things? As I said, some of the people did and came back. I never did have a desire to program, and I think it was because I saw how narrow their [focus was]. After I was in test for a while and had really this kind of more overriding sense of what the program did as a whole, and I would see how narrow focused some of the programmers were — not all, but some — it was like I don't think I'd like that.

Misa: [Spending] 40, or 60, or 80 hours a week on a very well-bounded, teeny piece of code. It may be a large piece of code, but it's a very small part of a much larger system. So that goes back to your need to have something that connects outward into the world, rather than to a kind of narrow little pipeline, maybe.
[Laughter.]

Myhre: I guess so.