SWE GRASSROOTS ORAL HISTORY PROJECT

Anita Gale Interview

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TROY ELLER: Okay, today is October 26, 2013. This is a SWE Grassroots Oral History Project interview with Anita Gale. The interviewer is Troy Eller. We are at the Society of Women Engineers Annual Conference in Baltimore, Maryland. Anita is a senior project engineer and associate technical fellow in commercial crew vehicle cargo integration at The Boeing Company. She is an associate life Fellow of the American Institute of Aeronautics and Astronautics and a Fellow life member of the Society of Women Engineers, from whom she is receiving the Distinguished Service Award this evening. Thank you for being here today.

ANITA GALE: You're welcome.

TE: To begin with, can you tell me where and when you were born?

AG: Born 25 November 1950.

TE: Okay. And where did you grow up?

AG: Oh, I didn't say. It's Seattle, Washington, I'm sorry. You did say where. I kind of have—. [00:01:00] Yeah, Seattle, Washington is where I was born. I'm sorry. And where I grew up was mostly in the Seattle area through kindergarten, in an area of Seattle called White Center. And then my father and mother decided—I think they wanted to move away from the family in the city, so they moved over to a—we moved over to a suburb named Bellevue. And first grade on, all through the University of Washington, I lived in a house in Bellevue, Washington.

TE: Okay.

AG: Right across Lake Washington, from the city of Seattle.

TE: Okay. Can you tell me about your parents and your family?

AG: Parents—well, first of all, I had no grandparents. Well, no grandfathers that I remember. They both passed away before I was born. One grandmother, I don't even—well, I have a dim memory in a kitchen maybe when I was four years old,

so I never really knew that one. [00:02:00] The other one lived until I was in my mid- to late teens, didn't know her very well. I mean, I met her, but there was never any real bonding with grandparents. So it was mom and dad and aunts and uncles. Only child, spoiled rotten. There were people in the neighborhood who never thought I'd amount to anything. (laughs) Shows how much they knew.

Dad worked in the Rainier Brewery—which no longer exists—in downtown Seattle. And interestingly enough, the brew master of the Rainier Brewery also lived in our neighborhood, just kind of around the corner and across the street from us. And gosh, I want to say he looked nothing like the commercials, but if you didn't live in Seattle at the time you wouldn't know what that meant. (laughs) And after getting his watch at twenty-five years—he called the place Walla Walla, which is a prison in the state of Washington. He worked in the bottle shop of the Rainier Brewery, and he just—he didn't like it at all. At twenty-five years of service, he got his watch and retired from there. [00:03:00] And then he proceeded to a second career in real estate, and probably put twenty-five or thirty years in that. So basically a workaholic. He just worked. He wanted to do right for his wife and his daughter.

And my mom had been a secretary for a financial institution, and then when they met and married—well, I don't know when they met. But my mom had been raised on a dairy farm in Dodgeville, Wisconsin. She's 94 now. She's still around. She was born in 1919, born on a dairy farm in Dodgeville, Wisconsin. When World War II broke out, her brother immediately joined up—actually lied about his age so he could join. He loved big machines, so he joined the Navy and worked on steamships, and actually he was—that uncle was in the Merchant Marines. My mother's brother was in the Merchant Marines and he was doing things like—in the Vietnam War he was on an ammunition ship, which he liked because he got extra hazard pay for going up the Mekong River with an ammunition ship. [00:04:00] And one of the stories he told is that the oil tankers had priority over the ammo ships, and they get to the Mekong River, the delta. They're ready to go

up the river and an oil ship, an oil tanker shows up. The oil tanker has priority and gets blown up. Apparently, that was intended for his ship, the ammo ship. But he got hazard pay, so (laughs). Weird uncle. I had a rather strange family. So Mom—let's see, one of mother's sisters went to Seattle, basically to follow the brother. And then, that sister lured my other aunt and my mother to Seattle. [00:05:00] So it was basically—it was Uncle Red and Aunt Alice causing my mother to migrate to Seattle around the mid-1940s, so World War II.

And my mom and dad got married in 1947. And they were—I was kind of a late baby. My mom was in her early 30s, which was very unusual at the time. And mom and dad were separated in age by, I guess, about twelve or thirteen years. I could count—but twelve or thirteen years, so. But Mom was a full-time housewife. Dad made enough that we were comfortable. And, it was interesting growing up in the 1950s, because probably by today's standards we were kind of either lower-middle class or upper-lower class. And we really didn't know, because everyone else around us was the same. There was enough money to have a black and white television. We weren't the first family to have color when it came. In fact, we were kind of late getting color TV, and the neighbors all had color. And I really didn't realize that we really didn't have that much money. [00:06:00] But Mom and Dad always had plenty of food on the table, and the house was adequate and clean.

And I went to public schools. In fact, I think part of the reason they wanted to move to—my parents wanted to move to Bellevue after kindergarten is the schools were known to be better in Bellevue. So I went through the whole school system there. And it was interesting—. Well, actually you asked about my parents, but I'm thinking about schools. They moved me there for the school district. It was a growing community, this Bellevue area was. I think it's now the fourth largest city in the state, but at the time it was just a bedroom of Seattle. And it was enabled by a floating bridge across Lake Washington, so you could commute on four lanes of highway. And and that's where my dad was selling real

estate, after he retired from the brewery. So that worked out really well. But because the community was growing, in first, second, third, and fourth grades, it was a different elementary school every year because they were building more elementary schools. [00:07:00] So it would be closer, closer, closer, and finally there was one in the neighborhood, and I could walk to school, only thirteen blocks. I could walk—uphill both ways. (laughs)

TE: Right.

AG: In the rain. That's what they said. (laughs) Then, junior high, I think the school was brand new the year I got into it. High school, I went to a school named Newport High School. And the school district was building a new school, so my freshman year—what would be freshman year was actually part of junior high school in that school district at that time. So in my sophomore year I was at Newport High School. And because the school district was expanding, Interlake High School was built at the north end of the school district. Newport was at the south end of the school district. Interlake opened for my sophomore—I'm sorry, my junior year—and that meant all the school boundaries, the high school boundaries, went south. [00:08:00] So instead of being in the Newport area, our little neighborhood was in the area for that school in the middle, named Sammamish. And the parents got into an uproar because there was a great deal of rivalry between the football teams at those two schools, so they didn't want the Newport football players having to merge with the Sammamish team. They wanted us to stay in Newport. And instead what happened—and this is, since this is history, this is an indication of the times in the 1950s in a growing community. So what they did instead is they let the seniors stay at Newport. We juniors were bused up to Interlake High School, and the sophomores went to Sammamish, which was—. So, there were some families that actually had three kids in three high schools.

TE: Wow.

AG: Yeah. But we had a long bus ride, and I don't know if that was formative. I guess if anything, for me it would demonstrate—you just roll with it. You don't complain. You just roll with what happens. It was an excellent high school. [00:09:00] It was kind of weird. It was like having two senior years and no traditions, because it was a brand new high school, and the policy in the district was that seniors graduated from the school they'd been in their junior years. So we had no seniors around when I was a junior because it was—. It was weird. So I guess in a way that would prepare me for having unusual demographics around me in college and career.

TE: Right.

AG: All right. So you had asked about parents. I have answered enough on the parents?

TE: I think yes.

AG: Actually, I should also say Dad's family had been in the state of Washington. So Mom's parents—let's see, Mom's mother came from Oslo, Norway. Her father, I think, was born in the U.S. but of Welsh roots. Dad's family came from what was then Yugoslavia. So I grew up with a lot of Yugoslav speaking women around, older women. The men all died off, but the women were around. The relatives I didn't really know very well. Had a couple of cousins. [00:10:00] I was very close with an aunt and uncle, my father's sister. Dad's father emigrated from the Austro-Hungarian empire, apparently before World War I.

TE: Okay.

AG: And, I'm not sure why he went to Seattle. The uncle that my dad's sister married, my aunt married—Aunt Mary, in fact—actually came over from that area, from the Dubrovnik area, actually, to help build the Ballard Locks in Seattle, which is between Puget Sound and Lake Washington.

TE: Okay.

AG: So interesting history, and that cousin now lives in a house that is on property that the family acquired in 1922—

TE: Wow.

AG: —and overlooking Puget Sound. So you got a nice history, roots. Okay, so that's enough on family? [00:11:00] Okay.

TE: So how did you become interested in science and math and technology?

AG: What I became interested in was space.

TE: Okay.

AG: Just pure space is what interested me. And the roots of that, I'm not sure. I did read the Buck Rogers comic strip, but that was clearly a comic strip. When the Mercury program started, I was absolutely fascinated. And the rule in my house—. Now, we're on the West Coast, and most of the launches happened early in the morning on the East Coast, three hours' difference. The rule was I could not set an alarm clock for two in the morning, three in the morning, four in the—you know, whenever it—well, normally not at two—but three or four in the morning when the launches happened. So if I could wake up in time, then I was allowed to watch the launches on television. And I watched most of the scrubs—a scrub being a launch that doesn't happen, that's scheduled and doesn't happen. [00:12:00] And I watched all the launches, all the Mercury, all the Gemini. And I just—I paid attention to who the astronauts were and what they were doing in space. I wanted to be an astronaut.

The first time I saw the words aeronautical and engineer together was in ninth grade. I knew I wanted to get involved with space. I didn't know how. I was in junior high school—well, in elementary school even—but in junior high I didn't know how. We had a ninth grade career exploration kind of thing, and they give

you a test at that time, and they test your aptitude for different subjects. And I scored really high in the things that boys are supposed to score—I mean, that was then, in the sixties. So I scored really high where boys are supposed to score high and really low where girls are supposed to score high. So I was kind of weird, anyway. [00:13:00] In fact, I remember in seventh grade I was one of very few girls who took a course in—gosh, what was it called? It was an elective. We actually had electives in junior high school. I remember Mrs. Stutsky (sp?) was the teacher. It wasn't really a pre-engineering course, but it was a science course, elective science course. So I was heading that direction very, very early, and watching the space program. And then, in the ninth grade, what they would do is, based on your scores and your aptitude, then they would say, "These are suggested careers that might suit you." And that's where I saw in the list aeronautical engineer. I was like, "Okay, I guess that's it. That's where I'm going."

TE: Okay. What did your teachers and parents think about your results and about that suggestion?

AG: My parents just—as long as I was going towards something that was a good career, it was okay with them. [00:14:00] They didn't care. That teacher, Mrs. Stutsky, was—well actually, that was seventh grade so they didn't know where I was going. The teachers in junior high school—I mean, I was just doing a project, so they didn't care. In high school, I knew enough to not tell the high school counselors what I wanted to do. I mean, I had already decided. I knew what I was going to do. I didn't need to talk to a counselor to get any advice. And just because it was the times—I graduated in 1969, so I'm in high school from '66 to '69. And I knew that they would tell me that girls don't do that, and they would try to steer me somewhere else. Why should I put up with that? It was a waste of their time and a waste of my time. I wasn't going to do that. So I basically didn't tell anybody. [00:15:00] And my parents knew.

My mother had a little bit of history. She encouraged me all the time to not intend to just get married and be a housewife. She always—I think subtly, I don't ever

remember it being really overt—but subtly wanted me to know that I had to be able to take care of myself, because she grew up in farm country. There were relatives who—the husband falls off the roof of the barn and dies, and the wife is left to take care of the kids and run the farm. Her father died. My mother's father died when she was a teenager, so that family was in the same situation where the kids and the mother ran the farm. And she married late, so she had provided for herself as well. Incidentally, neither one of them attended college, so I'm the first person in the family to—. Well, let's see. One of my cousins completed an architecture degree. [00:16:00] I was the first in my immediate family—Mom, Dad—to get a college degree. I'm the first in the whole family to get a master's. Still the only in the whole family to get a master's. (laughs) It's a small family, actually. It's not many. So, see, did I answer that question?

TE: You did.

AG: Oh, okay, good!

TE: You did.

AG: All right. (laughs)

TE: So how did you choose the University of Washington? Was it just proximity?

AG: It was. That was part of it. And also, they had an extraordinary aeronautics and astronautics program. One of the things they did in high school is they did—. Well see, in high school it was clear to my teachers. I was taking the science electives, and there was also something called engineering concepts. There was a class called engineering concepts. I took that. So it was clear that the teachers just—they embraced this idea. It was the counselors who I would not go talk to. But the teachers thought it was great. So I'm still answering the last question. [00:17:00]

And one of the programs that the University of Washington was doing is reaching out to local schools and actually busing us over to the University of Washington. And I remember getting to explore around the engineering department a little bit at University of Washington. And they have one of the best aeronautical and astronautical engineering departments. It's called aeronautics and astronautics, is the name of the department. I mean, astronautics, space—that's where I want to go. It was right there. It's a state school. It's cheap. I could commute from home. What's not to like? There was no reason to go anywhere else when there's this extraordinary school and this incredible program. And aeronautics and astronautics—that department was backed up by Boeing. It's basically Boeing prep at University of Washington Department of Aeronautics and Astronautics in Seattle, was Boeing prep, so. You'd see that there was equipment in the lab, you know that came from Boeing. (laughs) [00:18:00]

Now, on the other hand—we may get to this, but on the other hand, growing up there were aeronautical engineers, lots of Boeing employees in the neighborhood. I saw what The Boeing Company did to them. I saw The Boeing Company laying them off, transferring them suddenly. No kinder, gentler—. It was the sixties and it—. I knew I did not want to work for Boeing, even though I'm going to Boeing prep. But I'm studying astronautics, so I'm taking orbital mechanics, and propulsion, and structural analysis, and as little aerodynamics as I could. But basically going through the curriculum, getting through in four years.

And actually—another part of the history of the times—I get my bachelor's in 1973. You may have heard that around the early seventies, there was actually a billboard. I didn't personally see it, but there was a billboard in Seattle because Boeing was losing contracts with the federal government. The whole engineering industry, especially aerospace, especially Boeing, was going down the tubes. [00:19:00] My recollection is engineering employment, or Boeing employment in Seattle or the Seattle area, between about 1969, 1972—so right when I'm in college, right when I'm in college studying aeronautics and astronautics—Boeing

employment in the area drops from about 103,000 to 39,000. There's a billboard next to one of the major freeways that says, "Will the last person leaving Seattle please turn out the lights?" There was a saying in Seattle—Seattle then was basically a one-employer town. It's not now. There are lots of employers. There's Microsoft, there's Pacific Car and Foundry, there's Kenworth, there's a lot of big employers there. Starbucks is headquartered in Seattle. But then the saying was, "When Boeing sneezes, Seattle catches pneumonia." And we had a big case of pneumonia.

So I'm here in aeronautics and astronautics at the University of Washington. I actually remember going to the University of Washington bookstore. [00:20:00] And I'm in aeronautical engineering section, and there's a person—probably liberal arts, we called it upper campus—who's stalking the books and looking at me looking at the aeronautical engineering books, saying—literally saying, "Ah-ha-ha! You're in aeronautical engineering. You're not going to get a job." So 1971 and '72, literally, graduates in aeronautics and astronautics were not getting jobs. I mean, we were hearing of the classmates—the class in front of us, I'm sorry—the class in front of us, they're graduating from college and making candles in Tacoma, which is a town south of us. And in '73, when I got my bachelor's, the job market was improving but not there yet. I could see it was going to get better.

So University of Washington aeronautics and astronautics has a one-year master's with no language requirement. A master of science versus a master's [of arts]. So I figured it's like another senior year. [00:21:00] I'll just do another senior year, and then I'll have a better degree and a better marketing strategy. I didn't think of it as marketing then, but that's what it was. I knew when I get out—. And so I went for a master's, and I thought it would be another senior year. Man, was I wrong. Stupid! (laughs) But anyway, I actually got through it in a year. I got through the bachelor's in four, and the master's in one.

In college it was a time—I'm sure you're going to ask, I know there's a question coming: were there many—actually, were there any women engineers is really

the more appropriate question. (Eller laughs) So when I was at the University of Washington, engineering enrollment of women passed 1 percent. So when I started, it was way below 1 percent. Passed 1 percent probably around—it was probably around '73 passed 1 percent. [00:22:00] It doubled each year after that for a few years. You know, 2 percent. (laughs) 1 percent, 2 percent, 4 percent, 8 percent. It kind of stagnated around 12 to 16 for a while, and I think it's up around somewhere between 15 and 20 percent there now. I do keep touch with the University of Washington. There wasn't any problem with the students, being one of the lonely women. I mean, there was more than—I just made it a point to be ignorant of that kind of stuff.

The teachers were learning by that time, by the mid-seventies. The teachers were learning—and this is probably why I didn't have a problem. The teachers were learning that the girls who were really committed— the girls who chose engineering were really committed and really intended to do it, and we were the hot shots. I was the one pulling down A's. [00:23:00] Not all A's, but a lot of them. I was pulling down A's. The women—and some of them were my friends—the women in engineering who were not pulling down A's were literally told—and it was not illegal at the time, and this happened to one of my very good friends—literally told that, You're making Cs, you're not making it. You should get out of engineering so a guy can come in and make something of it. And there was nothing illegal about that at the time. So fortunately, I had always gotten good grades in high school. First time I ever got a C was in college. I was devastated. (laughs) I thought, That's so awful. I think it was in chemistry. I don't remember. Anyway, but I pulled A's and Bs, and mostly A's. And I was one of the hot shots, and the teachers appreciated the hot shots. So that was good.

TE: Okay.

AG: I didn't realize it—I realize it now. [00:24:00] I didn't realize at the time I had one of those resumes to die for. I was active in student organizations. I was active in the engineering students' council. I actually ran on a—let's call it a campaign

ticket for the university. What was it called? Gosh—it was the student council of the entire university. And it was actually a ticket, almost like a party, that was arranged by some business students. So it was a ticket of business and engineering students, and we had almost a full slate of eleven candidates. And I ran for—it was board of control, is what it was. Board of control, University of Washington. I ran for board of control position number seven and won, and served in university—campus-wide, thirty-three thousand students on this campus, and I'm one of the twelve board of control members. So what's not to like about that resume? (laughs) Plus, pulling down the good grades. [00:25:00] When you're hiring, you don't want a grade-producing robot. You want someone who is well-rounded. So I was doing all this other crap, plus in Tau Beta Pi, plus the first female president of the Tau Beta Pi chapter at the University of Washington. So, I did a lot of first things. Yeah.

TE: Right, right. How did you manage to balance all of those activities with your coursework?

AG: I didn't think about it. I just did what I had to do.

TE: Okay.

AG: You just do it. I don't know how I did it, just did it. Which is still how I operate now. Probably you want to know how I got involved with SWE. Okay, and SWE actually was the entree to all the other stuff. And there was a course, Engineering 101, basically every freshman takes it. You take it your first quarter. Three hundred students, or maybe more. I don't know. Anyway. [00:26:00] And there was an announcement in this class: at the end of class, all the women go to the back of the room. At the time, we didn't take offense. You know, "Okay, I guess we're supposed to go to the back of the room. I don't know what's going to happen." And there were a few of us, maybe twelve out of the three hundred-some. (laughs) There weren't many of us. And there were a few older students there, and we were told about Society of Women Engineers and invited to join.

So we were actually recruited right in that class, and the professor of that class was I guess in a way thinking enough about the importance of student organizations and engineering organizations to invite Society of Women Engineers—or welcome Society of Women Engineers. I don't know if the students suggested it to the professor—but invite SWE to recruit us in that class. And I got active in Society of Women Engineers.

TE: Okay. [00:27:00]

AG: And actually, how I got involved in AIAA is the professor, actually department chairman—AIAA, American Institute of Aeronautics and Astronautics—the department chairman wanted to revive the section. This is a time, remember—"The last person leaving Seattle, please turn out the lights." We're in aeronautics and astronautics, and the junior year is when you declare for your engineering major. I think there were forty-four of us starting in the junior year. We graduated with twenty-one because they were dropping out of aeronautics and astronautics because people weren't getting jobs. The AIAA chapter was deteriorating, so the department chair actually fingered myself and two others to be officers. You know, "You, you, and you. You're going to be the officers of the AIAA chapter. So do it." "Okay." (laughs) We did it. And I don't know how I handled it. I know it wasn't from smarts. Actually, I do know how I handled it. I put in a lot of late nights and some all-nighters. [00:28:00] But I started putting in all-nighters in junior high school, working all night.

TE: Okay.

AG: So yeah, just driven. And my parents probably, again subtly, instilled that, because if I didn't bring home all A's they asked, "What's wrong with you? (laughs) You're not supposed to get any Bs. What's wrong with you for not getting all A's?" So okay, I guess I've got to get A's. (laughs) They didn't nag me as much about that in college.

TE: Right.

AG: But it was subtle influence, and you strive to do what the people around you expect of you, which is a technique I use in work also.

TE: Okay.

AG: Okay, so have I answered that one?

TE: You have.

AG: Oh good.

TE: What activities did your SWE section in college engage in? What—

AG: That's interesting. [00:29:00] Okay, I wasn't one of the major officers in the SWE section. I was a representative from SWE to the engineering students' council. I do remember that. But I wasn't as active in SWE as in AIAA and in Tau Beta Pi, the engineering honor society. But what I remember of SWE then—it's stretching, this was early seventies. (laughs) But what I remember is the Pacific Northwest Section was very active in tapping into the college section, University of Washington—I'm sorry, the chapter, section? Were we a chapter? I don't remember what we were. I do remember going to the—I think it was the 1972 Seattle convention. There was actually a discussion about whether it was "chapters" or "sections," and "presidents" or "chairs." That was interesting. I actually remember that, and participating in that discussion. But I remember the women in the local section reached out to us, invited us to their homes. [00:30:00] We might have done some industry tours. But we would do dinners, stuff like that. So there was a lot of contact with the professionals, which I think helped also, knowing that there is really a life beyond college. There are not many of us, but there are some. There's a support system out there.

TE: Okay. Did you have any female professors at that time?

AG: Not in aeronautics and astronautics. There was one on campus in engineering. Her name was Irene Peden. Famous name in SWE, Irene Peden. And Irene Peden knew and nurtured all of us. Interestingly enough, I didn't have a mentor, and it may be—. You know, I've wondered. Even at work, I never really had a mentor, and maybe—I don't know if I effuse this aura of incredible competence, that I don't need—. [00:31:00] But it would be nice. But I don't ask because I'm stupid. I don't ask. On the other hand, to survive going through engineering at that time, I had to be fiercely independent. I had to be ready to be completely, entirely, totally self-sufficient, regardless of what happened. It was come hell or high water, God willing the creek don't rise—even if God ain't willing, I'm going to do it. Just fiercely independent and determined—had to be. Really thick skin to survive it. So I just—the water off a duck's back thing happened a lot with me. I just ignored a lot of crap that went on.

TE: Okay, Okay. What were your career goals at that time? What did you want to do?

AG: I wanted to work on spacecraft. [00:32:00] More importantly, I wanted to work on spacecraft with people in them. That's what I wanted to do. So I was following Mercury, Gemini, Apollo, Skylab. I was following all of that. I was watching the lunar landings when they happened. I was watching the walks on the moon when they happened, I mean yes, I was into all of that. That's what I wanted to work on.

TE: Okay. Can you tell me about your job search?

AG: The job search was easy. I didn't even search with a bachelor's, because of the job market at the time. Didn't even try. I figured I'm going for the master's, we're just going to take care of that. University of Washington had an engineering career center where the companies who were interested in engineering employees come to the center and set up interview. Now I guess I did interview for summer jobs. I got a summer job between my junior and senior years. [00:33:00] That was at Proctor & Gamble in Sacramento, California, working in

cake mix packing. Fabulous company, amazing company. And then, another summer job between my senior and graduate years was with Hughes Aircraft in El Segundo, California. Which it was good that I got the exposure to California, or southern California, because I could go home to sane Seattle and analyze what was going on in Los Angeles and why it was so weird. So that when I came back later, I didn't get weird with it. That's a whole different thing. (laughs) So anyway, so I had those two summer jobs. So I guess I must have gone to the career center to find the summer jobs.

But they had this career center, and you'd just sign up for interviews. I did interview with Boeing, even though I saw what Boeing did to my colleagues. But some of the people hiring were my friends from Society of Women Engineers, from the local SWE section. [00:34:00] So that was interesting, but I was—they were looking for airplane people, and I wanted to be a space person. And Rockwell was looking, Rockwell International. I interviewed with McDonnell Douglas. And I remember during spring break I scheduled a trip where I visited five companies in five days. I remember visiting Lockheed in Sunnyvale. I forget who I visited—Monday and Tuesday were in the San Francisco area. Flew down to Los Angeles—all by myself—flew down to Los Angeles, visited Rockwell, McDonnell Douglas, and General Dynamics.

I ended up from, between the visits—the visits were all with companies. I guess I must have interviewed with them. But I ended up getting thirteen job offers without really even trying. Now probably the fact that I did site visits was more like trying than I thought, but—. [00:35:00] You know, here's this overachieving stuff, so I didn't realize I was trying. But I went to the interviews. I visited the five companies I was most interested in. I remember Rockwell offered me $1,130 a month, and McDonnell Douglas offered $1,157, and I knew I wanted to work for Rockwell because Rockwell was working on the space shuttle. That's where I wanted to work. I wanted to work on the space shuttle. The space shuttle is starting. I want to be in on space shuttle. That's the biggest thing with people in it

going to space. I want to do that. So I called—there was no tweeting, internet, email. It was mail and telephone calls, but telephones worked really well. Actually better than cell phones work now, sometimes. It didn't drop out. (laughs) So I remember calling the recruiter at Rockwell, saying, "Well, you know, McDonnell Douglas offered me $1,157. You guys only offered me $1,130." And I wasn't going to say, "And I want to work for you guys." And he said, "Well wait a minute." [00:36:00] And he came back and said, "We'll offer you $1,160." So I started at $1,160 a month with Rockwell in Downey [California].

One of the things I remember about the interview—that spring break interview in Downey when I visited—I remember even the guard at the gate, when I was waiting at the gate for someone to come out and get me and bring me inside, even the guard at the gate, knowing that I was coming for an interview, talked enthusiastically about the company and what they were doing. Which really made a big impression on me.

TE: Okay. Okay. Can you tell me about your primary work assignments when you first started at Rockwell?

AG: When I first started at Rockwell, I was in a department called structural dynamics, and I was in a group called pogo analysis. And pogo was a relatively new phenomenon that had been first noticed on a French rocket. It had been noticed on the Saturn rocket. [00:37:00] I think it was on the S2 stage, it had been noticed. And it's basically—you know what an organ pipe mode is, you know, what makes the sound in an organ? There's a wave, a pressure wave in the pipe. And that same phenomenon will happen in a liquid oxygen feed line. That same phenomenon, that pressure differential, doesn't make sound but what it makes is water hammer. It's like water hammer in your plumbing. You know, sometimes you turn on the faucet and it goes bang, bang, bang. Well, that happens in liquid oxygen or oxidizer feed lines on launch vehicles. And the effect is not so much noise, as you get an oscillating thrust. And that oscillating thrust can be so severe that it shuts down engines, which actually did happen on one of the

Saturn launches. You never heard about it in the news, but they did have an engine shutdown. [00:38:00] They just burn fuel through the other four engines long enough that they made up for it, but big deal. So pogo is a big deal

Back in those days—it's probably still true to a lesser extent. But especially in aeronautics and astronautics, you get into industry and you're taught how to think like an engineer, and not how to be an engineer. I advise college students this and young engineers of this all the time. College teaches you how to think like an engineer. Now, civil engineering, probably different. You learn how to design roads and bridges. You go work for the highway department, you design roads and bridges, and you can do that right out of the box. But in the aero biz, the astronautics biz, the tools that are being used in industry are a decade and a half beyond what's taught in school. Pogo analysis is not taught at universities. That's something you learn about when you're in college—I'm sorry, in industry. You learn about pogo analysis when you're actually on the job. [00:39:00] You don't learn that in college. So you learn how to think like an engineer. And being one of the junior engineers, I don't think it was so much because I was a girl. I think it was just because I was junior that I was getting the scut jobs, but that's what happened.

One thing I did get to do that was very interesting is we had a test set up to test accumulators. Now, an accumulator is something you put on your pipes to make the water hammer stop. And we were experimenting with accumulators, and one of the equations that govern how accumulators work with cryogenic flow. So, we had a liquid nitrogen feed line—because nitrogen is a lot less hazardous than working with liquid oxygen—liquid nitrogen feed line. It was 80 feet long in a U-shape, and we'd try to induce water hammer or pogo in it and try to stop it with an accumulator. [00:40:00] And I don't know if it was a flash of brilliance or just nobody else wanted to walk over the test setup. It probably was the latter. "Oh, just something simple, Anita can do this, monitor how the techs are doing."

But, what was interesting—I was a very unusual phenomenon. We were 1 percent in college but way less than 1 percent in industry. I was the first woman engineer that most of the guys ever worked with. There were a few of us around—not many. And you're just busy trying to survive. And literally at this time—so this is, now we're in 1974, mid-seventies. This is a time when there are no guidelines on how women should dress. There are no guidelines on how male engineers should behave around female engineers. What do you do when the elevator door opens? What do you do at a door? Literally, these were things that weren't understood. They knew how to behave around the secretaries, but how do you behave around an engineer? You're equal, but a female. And I felt sorry for the guys. [00:41:00] I really did, because they just—they didn't know. They were just puzzled.

So now all you can do is be friendly and cordial and do your job. That's just what you do. And be friendly and cordial and do your job. (laughs) And one of the things I did to endear myself to the locals is—I like to bake. I've liked to bake since I was a kid. So on Sunday evenings I would bake something and bring it into work. And so the guys would come over to my desk to see every Monday what I'd brought in. That got to get a little old when they expected it every—every Monday. They're wandering by from all over the building. People that don't even work with me, they're wandering—"Oh, what did you—." Sometimes it was gone by ten in the morning. And when they started expecting it, then I realized I'm being used here. When I switched jobs after three years, I quit baking on Sunday nights. (laughs) [00:42:00]

But let's see, so I talked about this test setup. I didn't get completely distracted. One of the things that I could do uniquely as a female—because females were so rare. And I was young, and I looked younger than I was. So I looked really—I looked like a kid. And I got friendly with the technicians who were setting up the test setup and taking the data and all these kinds of things. I was female, so they'd pay attention to me differently than the guy. They dropped their guard

down. Literally, they dropped their guard down. I could get information out of the technicians, because not only am I a female, I'm paying attention to the technicians. I paid attention to the technicians more than the engineers. And the technicians would tell me things that they wouldn't have told a guy engineer, like when there are problems with the test setup that they wouldn't want to reveal. So I could go back to my group, I could go back to my manager and say, "They wouldn't tell you this, but they told me—." [00:43:00] And I'd tattle. (laughs) So, it was—you could use that. You could use being a female. I mean, it was a disadvantage and, if you played it right, there was an advantage. I mean, so you could mess with the guys. (laughs) It was a different time.

TE: Right. Did you have any negative experiences, like specifically negative experiences, or—?

AG: Yeah, I think I suppressed those. I know there were a lot of them, but I don't really remember them really, if I could dredge them up. Well, part of it was—I remember they'd just, they'd kind of yank your chain. You know, subtly try to yank your chain. And I learned very, very early if I didn't react, they wouldn't do it anymore. So it's like a dog. If you reward it, it'll keep on doing the same thing. If I rewarded it by reacting, they would keep on doing the same thing. [00:44:00] So I just learned when they were yanking my chain, just ignore it.

Now one I suppose negative in the overall scheme of things, no one ever stepped up to be a mentor. I had no mentors, no advice. I'm basically going it alone. And I think the reason that no one stepped up to be a mentor is—well part of it, we were just working our tails off on the space shuttle in the early days. But part of it is it was probably considered risky to mentor "the girl." They just—they didn't know what to do with a girl. I came in with this fantastic resume, and that's what got me hired, but I was still a girl. But I tried to blend and work with the guys and be fun around the guys as much as possible. I think that helped a lot. So for instance, in the pogo group most of the guys were Chinese, and a tradition they

had before I arrived there is they would order—you know what dim sum is? [00:45:00]

TE: Um-hmm.

AG: They're like teacakes, for lunch. They would order dim sum at several restaurants in downtown LA. Well, actually Chinatown, LA. They would call in the order and then one of the guys would drive to downtown LA. And the manager was part of this, so you'd do it on company time. (laughs) It was so different then. We didn't have flex time, so you start at 8 in the morning, you end at 4:42, and you have a 42-minute lunch. And so I ended up—and it made more sense to have the junior engineers not doing really important stuff, doing this sort of thing. So I ended up being one of the people who drove to downtown LA. And it was myself and a young Chinese guy. I learned that I could not call in the orders because of my American accent. (laughs) But I learned all the names of—Chinese food names. [00:46:00] You know, cha siu bao and gai bao. And I knew what those were and which ones I liked. So I would go make the dim sum run at lunch. That made me a valued member of the group. (laughs) I was doing something very, very useful to the group when I did that.

TE: Okay. Did you have a feeling of what you wanted your trajectory, your career trajectory to be at that time?

AG: Well it was interesting. Back then—it's an interesting question that made more sense then than now. Because back then they used to advise, you know, plot your whole career. If you want to be a vice president, plot everything you're going to do. Now I advise young engineers and students—especially students—the job you're going to have twenty years from now probably doesn't exist now, and you're probably going to invent it. And I honestly thought I wanted to go all the way to a VP. I really thought I wanted to do that. [00:47:00] So I didn't so much—I really didn't plot a trajectory as just try to do the best job you can and let management know I wanted to be management.

So how it worked, I spent three years in the pogo group. And I don't remember if I got an offer for another group or I just got really—I didn't respect the manager. In fact, I guess I did notice there were times when a group of us would go out to lunch for more than forty-two minutes, the guys who took me to lunch didn't get called into the supervisor's office for spending more time at lunch than forty-two minutes. But I did. So that was another one of those, you know, I'm so obvious—everyone knew my name because I'm the girl. It's really easy to remember my name. There's a whole bunch of guys, and then there's the girl. (laughs) So they all knew me, and I didn't know any of them. And I still have trouble remembering names. [00:48:00] Anyway, so three years with the pogo group, and then I went to—what did we call it? Was it system integration? Structural integration? I don't remember. Working for a guy named Jim Wolfelt, and his manager was Bobby Johnson, a female. Barbara Johnson, an [SWE] Achievement Award winner. Barbara Johnson. I worked for Barbara, Barbara Johnson, Bobby Johnson.

So I guess I need to tattle a little bit on Bobby, which is unfortunate in SWE. But Bobby was known in the group to have her favorites, the people she would protect. And I wasn't one of them. So I started in the company, because I had a master's, as a member of the technical staff, level two. And by all accounts I was doing good work. I was getting good performance reviews. I got into this new group. I'm doing good work. I'm getting good performance reviews. I'm performing at least—I'm doing everything I'm being asked, and I asked my boss, "When can I be looking to MTS [level] three?" [00:49:00] And I remember he had me talk to Bobby, and Bobby tried to explain to me all the reasons why it was better to be a two. And that did not make sense to me. After four years being a two, it did not make sense to me why it was good to still be a two.

By this time, I was active in the Los Angeles section of Society of Women Engineers, very active. I became president of the section in—when was it?—'76, '77. It probably says.

TE: Seventy-six.

AG: Seventy-six, Okay.

TE: Yeah.

AG: Yeah. And I was president for two years. So very active, and I know what's going on in the industry. I'm hearing it. And I am visible to recruiters because I'm an officer in the section. And a recruiter calls, and it's one of these offers you can't refuse. And I left Bobby's group because I just—I didn't understand this, why it was good to stay a two with no indication of what it would take to be a three. [00:50:00] So you asked about plotting your career path. Here's the stop sign right here. Bobby sets it up. Stop, you're stuck. And I think a little bit of that—again tattling on Bobby—is what we call the queen bee syndrome. I had to work my ass off to get here, and you will too. Which is still around in some areas. But there was some of that going on.

So I went to Aerojet for two years. Interviewed, they offered a salary increase. They offered me senior member of the technical staff. Well, that sounded better than two out of six levels—a senior member of the technical staff. And interestingly enough, within probably four days, I knew this company—. This thing about corporate cultures, which was just being studied at that time, it's real. And the corporate culture at Aerojet is not for me. [00:51:00] Great company doing great things, fun work. And I had learned the Rockwell habit of just running ninety miles an hour. And I go to Aerojet, and they're going at about thirty, and my habit is ninety. (laughs) This was noticed at Aerojet. I probably could have risen far at Aerojet. Within a year and a half I was promoted to project engineer. A lot of fun. I was project engineer, but Aerojet just—. You know, I put in enough time to justify the money they put into hiring me. But I managed to get a job offer to return to Rockwell, to Rockwell in Downey, and I did. So two years at Aerojet, and by 1980—so I was at Aerojet from '78 to '80, two years—and I'm back at Rockwell in 1980.

TE: Okay.

AG: Did I answer? What was the question? (laughs)

TE: I think you answered it.

AG: Okay, we're telling stories, we're having a blast. [00:52:00] Anyway, I joined payload and cargo integration in Downey, and ended up staying there. I'm still—well, payload and cargo integration shuttle—and I stayed there, with increasing responsibility, until the shuttle program ended, until the day it ended. I was in payload and cargo integration. I ended up being the longest duration payload and cargo integration engineer.

TE: Okay.

AG: On the space shuttle.

TE: Can you tell me about some of the projects that you worked on during that time period?

AG: So, projects? That would be payloads. That first part—I'm going to wet the whistle here. [drinks] Boy, this is fun. Thank you. (laughs)

TE: Thank you.

AG: So, I started out with payload manifesting, and traveled to Johnson Space Center a lot. [00:53:00] I was the Rockwell liaison to a group called the flight assignments working group. It's a NASA working group, had representatives from all of the payload stakeholders, from the various NASA offices involved with payload and cargo integration, other companies involved. So I would travel to—it was flight assignments working group, F-A-W-G, FAWG—FAWG meetings. I went to FAWG meetings four times a year—and wherever they were scheduled, all over the country—representing our interests and also—. I didn't do the analyses—but, this was a project office. Payload and cargo integration was a project office, so I wasn't doing the analyses, but I was managing the work that came from the customer into our technical areas. So the project office was like a

buffer between the customer and the people actually doing the work. You don't want the customer bugging the engineers all the time. They're trying to do a structural analysis, and the customer is calling with nothing else to do but just ask for stuff. [00:54:00] So the project office is literally accepting the tasks from the customer and meting those out to the engineers so they don't get overloaded, so that we set their priorities.

One of the things we would do in the FAWG is there would be candidate payload assignments. So Johnson Space Center, JSC, had a crude tool—and their tools got better, but still, it was what we call a top-level tool for assigning payloads to flights. And sometimes they couldn't make the manifest work, and what that meant is they couldn't arrange the payloads. And this was basically a cargo bay, so we have fifty thousand pounds to work with. We have fifteen feet diameter, sixty feet long. And there's a limited amount of power. The limitations are volume, weight, power, and also interaction with the vehicle and interaction of payloads between each other. [00:55:00] Then you get into the structural analyses, thermal analyses, that kind of stuff. Sometimes they couldn't make it work. They couldn't get the center of gravity to work out. Problem with the space shuttle is the allowable CG [center of gravity] of payloads was aft in the payload bay. It wasn't in the middle of the payload bay. So the heavy stuff had to go in the back. And, if you didn't have enough heavy stuff—. If you see pictures of the space shuttle with the front end completely empty, it's because there wasn't enough really heavy stuff in the back end of the cargo bay. So we're wasting part of the cargo bay, but it was because if you put stuff up there you couldn't fly home. You were aerodynamically unstable, not good.

So I would then bring the candidate manifests back. and we were manifesting out several years in advance. [00:56:00] And I would bring the troublesome manifests back and get them to the engineers, and we would literally solve the latch—you had bridges between the ribs. So you only had twelve—well, I guess if you count the bulkheads, you know, fourteen solid points to mount stuff in the

space shuttle cargo bay. The side walls were really wimpy. If you put fifty pounds in the wrong spot in the space shuttle cargo bay, you would need to do a complete integrated vehicle analysis with the external tank solid rocket boosters and everything. Fifty pounds in the wrong place, because the thing was so optimized. There were very few solid points, and how we mounted payloads is bridges between the ribs. So we didn't have a full ship set of bridges for every orbiter, which means—. Bridge nine, I remember, the bridge for bay nine—almost every flight wanted the bridge for bay nine. So you want to allocate the bridge for bay nine to put a latch on it for a payload, and that bridge is flying on another vehicle, or still sitting on another vehicle. [00:57:00] So we were allocating resources, and it was part of our group's responsibility and part of my job to help solve those problem manifests. How can we manifest this flight without needing the bridge for bay nine? Do we have enough of the right kinds of latches? Where are the latches going? All that kind of stuff.

So I helped on manifesting with the FAWG until 1986. Specifically, shortly after January of 1986 when the Challenger accident happened. And we had a stand down for two years. We weren't flying for two years because we were solving that problem. The problem wasn't with the orbiter, with what we were doing. The problem was with the solid rocket boosters. But we used that time to improve our tools. So, for instance, I worked very closely with the structural analysis guys.

And actually, another funny story I've got to tell you. [00:58:00] So okay, so now I'm thinking of two of them. I'm getting them confused. (laughs) So, working with the—oh, I'll tell you the funny story I was going to tell you, and then maybe the other one will come back to me. One track mind, easily derailed. So, one of the things I would do with the structural—oh, I know. No, let me go back to the other one.

Okay, so, yeah, 1986. One of the things we did during that stand down is the structural analysis tools we were using needed improvements and we knew it. Actually, this ties in with the other story, so this is good. We knew we needed the

new tools because we literally did not have enough employees to do all of the integrated structural analyses, and it was like a six-week process. We were running out of, literally, man hours, at the increasing flight rate. [00:59:00] So when Challenger happened, we flew, in the twelve months ending with Challenger, we flew eleven flights. We were on track to a flight rate of twenty-four flights a year. And we were barely hanging in there, getting the structural analyses completed. And it was in that horrible situation where you don't have enough employees to get the work done, and your employees are too busy to train more employees to get the work done. So during that stand down, not only did we train more employees, but we did improvements to our thermal analyses, our structural analyses. Everything that needed improving, we were working on during that stand down, because we weren't flying. We weren't doing the analyses for the—well, we were doing it for the next few flights that were going to come along when we got thirteen months out, away you go.

So the other story that occurred to me that happened during this time, is one of the things I was doing as a project engineer is as the liaison—I was the liaison from the structural analysis group. [01:00:00] And we would do what we call change requests, CRs. And a change request was extra budget to do extra work. So the structural analysts would come up—and especially there was a very senior structural analyst guy named Jim Meisel (sp?), and he would come up with, "I can make this improvement to the process, and I need $80,000 to do it." So he and I would write up the change request. He wouldn't go to the meeting unless we thought there might be some questions that he could answer. Or if he was interested, "do I get my $80,000?" But I would present the change request to ask for the budget for the $80,000 to do that task. He'd get the budget, he gets a charge number, he does the task.

And somewhere during that time, he told me—or maybe even after we started flying—he said, "Now, I think we can automate this analysis." [01:01:00] So how the structural analysis worked at that time was you'd—the structural analysts

would run an overnight run. In fact, actually pogo analysis, I would do this. So on that feed line—telling you about the seventies, going back to the pogo analyses—we were running analyses on this test setup that I described with the liquid nitrogen. And it basically was a whole box of cards, and I would run the—it was using NASTRAN, which is a NASA FORTRAN tool. And I didn't do the whole program, but there were certain cards that indicated certain conditions on that test setup. So, literally, you'd have color codes on the cards, and to run a new run, you'd pull out the cards with the blue edges and put in the red ones, and make a note that we're running new pressure or something like that, and I'd bring the cards downstairs and, literally, it would run overnight, 15-hour run to run this box of cards and have the computer chunk through it. [01:02:00]

So that same process is what was being used in the structural analyses. You do an overnight run. We might even have been renting a Cray by this time, a Cray computer. So they'd do an overnight run, they'd get the results. And there was a week of hand manipulation of the results to prepare data for the next run. And you'd do another overnight run. You get the results from that, a week of hand preparation of data. Now this is tedious stuff fraught with mistakes. Tedium breeds mistakes, even if it's easy. And there would be five or six of these overnight analyses separated by a week of preparing the data. And Jim Meisel told me, "I can automate that. I think I can automate that. I think I can make it run in one run."

So, we brought this concept to my boss, who had been the structural analysis guru on Apollo, a guy named Shoji Yahada (sp?), Hawaiian guy, obviously Japanese heritage. [01:03:00] He had some funny stories, too. And so Jim and I go to Shoji—and we also called him Joey—and Jim describes what he thinks he can do. And Shoji says, "It's not possible. You can't do that. It is simply not possible. There is no way that can work." Now, I think what Shoji was looking for is, if it takes a lot of handwork, then he's got a bigger empire, more people working for him. This is a problem we still have today, where you can have great

process improvements and—. Anyway, so Jim and I concocted a scheme. He invented a task that he could do in fewer hours than we claimed, but it was still worth the money that we claimed. I don't know, $40,000, whatever it was. We said, we've got this $40,000 task, and it was worth $40,000 to do what it was. That was a cover. [01:04:00] Jim and I were conspiring. I was helping Jim cover the fact that he was really using those hours—he could do the thing that was worth the $40,000. He could do really quickly and really easily, and he was making the milestones on that one, and he delivered on time, and it was great, and the customer loved it. It was worthwhile. But, what he was really doing is that budget was cover for automating that analysis process.

TE: Okay.

AG: And one day he ran the whole analysis, start to finish, in one run. There it was. Shoji was proven wrong. Jim, of course—now he's working in a functional organization. I'm in the project organization. Jim is a hero. He's getting the accolades and the awards and all this kind of stuff. Shoji didn't give me a raise that year. He didn't say a word, but I didn't get a raise that year because I had disobeyed. But, you know what? That sometimes is what integrity is all about. And I tell that story to my mentees. Now sometimes you just do the right thing if you know it's right. [01:05:00] I knew if Jim thought he could do it, that he could do it.

So I was working with Shoji through—this would be through the eighties. So at first, I started with the flight assignments working group, and then after flight assignments working group—because the Challenger thing happened, so we're no longer doing the manifesting support—then I'm working the project engineering mostly with the structural analysis people, with several other people. I met my husband in that group, actually, a workplace romance. And I think it was 1989, Shoji was getting very sick—congestive heart failure. He'd go on medical for weeks, and my office was right near the men's bathroom, and I would hear him go in there and just sound like he was coughing his insides out, just cough,

cough, horrible. [01:06:00] And his feet hurt, so he was wearing bedroom slippers at work. And finally, he just had to go on permanent medical.

And there was a complete reorganization of the management in the department. And I was asked if I was willing to be a project manager, and I said yes. They said, “Don’t tell anybody in the department yet about this. There’s this big reorg, we’re completely changing the organization. Don’t tell anyone that you’re going to be the project manager,” for verification analyses, was the group. And I kept mum. And the rumors starting flowing around the department that there was a reorganization. And they could figure out, because other people weren’t mum, they were starting to figure out who was going to be what, and they couldn’t figure out who was going to be the project manager for verification analysis until it was announced. I was good. (laughs) Now I didn’t share. They said don’t talk. I had a security clearance, I wasn’t going to share. [01:07:00]

So I was project manager for verification analysis. I had responsibility for structural analyses. Well, I knew those guys. Thermal analyses, mechanical installation—so that would be the bridges and the latches and all that kind of stuff. Avionics installation, wire harnesses, all that kind—. Again, this is project office. We’re not doing the technical stuff, but we’re reviewing the drawings. We’re asking for—oh, I’m sorry, they weren’t called change requests. They were delta tasks, I’m sorry, goof. Delta tasks. Long time ago. Delta tasks. Anyway, and also safety analyses.

So I’m getting this overall viewpoint: structural, thermal, mechanical installation, avionics installation, safety analyses. I’m signing off on drawings. I’m signing off on reports. I’m reading thermal analysis, structural analysis reports, safety analysis reports. Safety analysis arguments are happening in my office. And I did that for, I guess it was about three years. It probably says on that sheet, about three years. [01:08:00] And by this time my husband and I were taking a curriculum for doctorate of business administration with United States International University. They actually had classes in the plant. The university

was in San Diego, and then you started taking classes in San Diego. And I figured I'm going to be a manager for the rest of my days, and my folks loved me. They taught us about empowerment. I empowered my folks. I took it to extremes. They just, they loved working for me. Seventeen people working for me. That's where my signature got messy, from signing all those timecards. It wasn't electronic then.

And then we had another reorganization, whatever it was, 1991, '92, and all of a sudden I'm not a manager anymore. (laughs) I'm senior project engineer now. So then I started working proposals. [01:09:00] And 1986, I worked a proposal for—what do we call it? Gosh. It was basically the Air Force, manifesting Air Force payloads on space shuttle. And I remember on that one—proposals are hard work. Actually, this is the one I worked the hardest on, this proposal. I was working eighty-eight-hour weeks for six weeks at a time, Sundays, sixteen-hour days, and it was—. But that's a blast, working proposals. It was a lot of fun.

And I remember someone else was responsible for the management section. I was responsible, with another guy, for the executive summary. And somebody had written the management section and wasn't upgrading it. [01:10:00] So we go through red team, and it's not very good. And we get to gold team, two weeks before submitting the proposal, and I'm reading the management section. It's crap, and it doesn't match the executive summary. And I ask, "May I work on the management section?" I literally wrote the management section from scratch. I think it was—we were allowed twenty pages. I wrote nineteen. And, it really—it's a management contract. You win it on the management section on this one. And wrote it from scratch, and we ended up winning the proposal, winning the contract. I didn't work on it, but we ended up winning the contract. And we actually got accolades from the Air Force. This was the best written proposal they'd ever seen, and it's a management proposal. My management section just won us a few million dollars of contracting, so that was fun. [01:11:00]

Let's see, also—earlier than this, really where my career went in payload and cargo integration is I became known for emphasizing standardization of interfaces and containerization of cargo, and that's eventually where I ended up. And that all started when I first got back to the space shuttle program. And I was assigned to work with a guy named Bob Sparks, and he had—and so this is 1980. It's before we have even flown—first flight, 1981—before we've even flown. And he has this realization that even though the latches are standard, the bridges are standard, the avionics interfaces are standard, how we allocated them was not standard. So we had, it turns out, months of literally tearing everything out of the cargo bay and putting it back in. And months of doing drawings and analyses, which is what I was working on as a manager. [01:12:00] And he proposed standardizing how we manifest payloads in the cargo bay, using those standard interfaces, but how you use them in a standard way.

And I remember going over to Johnson Space Center with Bob, and we're introducing the standardization concept to a guy, a NASA manager named Larry Williams, who was known to have an evil disposition. (laughs) And we briefed him on the concept and literally, verbally, were thrown out of the office. "The space shuttle is standard. The latches are standard. The interfaces are standard." Anyway. So, that's where I started on standardization. Now, I don't know how much of this history you want for the history. I'm giving history of technology, so.

TE: It's fantastic.

AG: Is this okay?

TE: Absolutely.

AG: So it does show that females—we can find our niche, basically by working your backside off. Now, I was recruited for proposals because I could write. [01:13:00] I call myself sometimes a wordmonger. My first job ever at the University of Washington was a summer job proofreading, proofreading a text on—gosh, not

even—I ended up working on a statics text, but the drafting text I was proofreading. So I knew how to proofread, and I knew how to write, and that was very valuable on proposals because the guys didn't, and I did. So it proved that, even in those days, when there were so few women, if you proved that you had a skill, it didn't matter if you had seven fingers on each hand and your skin was purple. It didn't matter. The important thing was, we're working on this program where the whole world is watching, on space shuttle. For a while there, we were called the "problem-plagued space shuttle program." And it was what you could contribute, is all that mattered at that time. [01:14:00] Nothing else mattered. It was what you could contribute. If I could write and that's what they needed, then that's what I did.

So, let's see. So, you got the standardization. Another proposal I worked was National Aero-Space Plane. I do not know why. That was actually—another division of Rockwell at the time worked National Aero-Space Plane, an aircraft division. I do not know how they knew about me, but they specifically, from all the cargo integration team, they asked for me to join on National Aero-Space Plane. That was actually about the same time as the manager, so about 19—when was that? I'm sorry, that was—yeah, about 1990 or so. Actually, yeah, late '90s. Late '90s, early 2000s, was it? [01:15:00] I think so. Yes, yes it was. Yeah, National Aero-Space Plane was about that time. And I remember putting together a tiger team, so a little group of experts, and asking if we had it to do all over again how would we redesign the cargo bay on the space shuttle? What would we do? And that was the meeting—oh, I remember when that was. That was 1987. I remember exactly when that was, because it was within two weeks after the Whittier Narrows earthquake in October of '87. (laughs)

And how I remember that is this brainstorming session that I conducted. It was in a conference room in a corner of Building 290 that abutted Building 6. And during the earthquake—so, they kind of shared a roof line. Literally, Building 290 was built with three sides and butted up against Building 6. [01:16:00] And during the

earthquake they oscillated at different frequencies, so they basically ground up the roof line in between, and it leaked. You know, in the summertime it doesn't matter in California, but in October is when the rains start. And I remember it was raining in the conference room. We had a waterfall in a corner of the conference room, literally, from the roof being eroded away from the earthquake, while we were doing this brainstorming session for two hours. And that's where we first came up with this idea of containerizing cargo on spacecraft.

Now, weight is—that's gold in a spacecraft. It's cost per pounds to orbit. If you are carrying pounds to orbit that are not paying cargo, that's pounds you don't want to carry. So on NASP, however, we had an Air Force customer. [01:17:00] And what the Air Force liked about cargo containerization is, first of all, you assign that weight to the vehicle. The vehicle is designed to have a cargo container. The cargo container has standard interfaces to the vehicle. Doesn't matter what's in that cargo container as long as it looks the same on the outside to the vehicle, in terms of weight, CG [center of gravity], and the actual mechanical interfaces. Remember what I did as a manager? I was handling structural, thermal, mechanical installation, avionics installation, safety—the five factors that count. This all plays into the containerization of cargo.

So we developed this containerized cargo idea for National Aero-Space Plane. The Air Force loved it because, literally, they didn't have to decide what cargo was going on the next vehicle until that vehicle rolled up, ready to accept a cargo. They loved it. Whereas, even expendable launch vehicles are tailored for their payloads. [01:18:00] If the payload designated for a particular launch vehicle isn't ready, that launch vehicle doesn't fly with another payload. It waits. Now, standardization is becoming more common in the industry. Remember, Larry Williams had thrown Bob Sparks and me out for daring to speak that word. But by 1990, at least in NASP—which was considered an airplane, National Aero-Space Plane, considered an airplane even though it goes to space—but our Air

Force customer loves this idea of containerization. So we start this idea with the Air Force.

One of the ideas they really, really liked is you could have a closed container sitting in a warehouse, and there's a lieutenant with a clipboard who knows what's in each of those containers but nobody else does. And the Air Force likes it when you can't see what their stuff is, okay. They like it. So you can have cargo integration of this vehicle completely out in the open. You don't have to run it with secret clearance. [01:19:00] Now the technicians operating the vehicle cannot see what's in that container, do not know what's in it, do not need security clearances, can operate the vehicle with top secret payloads. The Air Force loved it. It was great.

But we didn't fly NASP. When the reusable launch vehicle concept came along in the mid 1990s, we were competing against McDonnell Douglas. We were Rockwell, still competing against McDonnell Douglas and Lockheed Martin, so we're competing against the [Lockheed Martin] VentureStar and [McDonnel Douglas] Delta Clipper with our RLV [reusable launch vehicle]. Again, I'm doing containerized cargo. I'm upgrading that containerized cargo from NASP for RLV.

We had what we call the big dog and pony show in the—we called it the DEI room. We had a full-scale space shuttle mockup in the—DEI was Design Engineering Inspection. [01:20:00] It was called DEI during Apollo. And we had a full-scale mockup, minus the port wing and part of the tail, because the space shuttle was really big. I remember doing speakers bureau engagements, and you walk people in the room and they look at it, "The real one isn't that big, is it?" And I went, "Yep, that's the size. It's that huge. It's that big." Anyway, so reusable launch vehicle would be smaller.

But we had a dog and pony show with customers from all over the country. I had interviews or reviews with the—basically some, "this is what we got, what do you need," sessions. We literally were telling the payload customers, "We're from the

launch vehicle, and we're here to help. We want to know what you need, and we want to do our best to provide it." Which was a foreign concept to them because always, even now, payloads are inflicted with whatever the launch vehicle wants to give them. [01:21:00] So we were saying, "We're from the launch vehicle. We really care. What do you need?" Because inside that container, because we're not impacting the flow of the vehicle, the vehicle doesn't care. You can configure that container for two years. We can send it to your site. You can put stuff in with bubble gum if you want. We don't care. Whereas when you're putting stuff directly into the vehicle, you have to reconfigure the vehicle, and the vehicle does care. If you happen to have an accident inside a container and it stays in the container, the vehicle doesn't care. You damaged the container? So what? Jettison it. Who cares? More space debris, not good. (laughs)

Anyway, the payload customers absolutely loved what we were doing. I actually remember, after this two or three-day big review, somebody from one of the payload customers standing up in the audience and saying, "Rockwell, I don't care if you win this contract or not. You have to build this vehicle. [01:22:00] We want this vehicle. You're going to make money off of it." Of course, Lockheed got the contract and we didn't build the vehicle. That vehicle would be flying today, and all of this stuff about Americans not being able to fly Americans to orbit, that wouldn't happen now. But we didn't build that vehicle, but we had a great concept for containerized cargo. Disappointment. Oh well, shucks.

That led, however, to—how we doing on—we doing okay?

TE: Yeah, we're doing okay.

AG: Tape time, everything okay?

TE: Yep.

AG: Getting what you want?

TE: Yes.

AG: Okay.

TE: Yes. (laughs)

AG: Good. You're staying awake, so it's got to be okay if you're staying awake. So the patents came from an expansion of that project. We're flying the space shuttle. It's not containerized and of course that's extra weight. But we are reconfiguring this vehicle, incredibly time consuming, expensive. [01:23:00] Every time you land, you're taking out all the bridges and latches and all the wiring harnesses and everything. You're redesigning for the new payload and putting all that stuff back in in different places. It's huge. There are errors because people step on connectors and then—you know, the technicians at the Cape—all this kind of stuff. And the containerization would resolve that.

So this idea of standardization is starting to float around the industry. Remember, NASA didn't like containerization or standardization. And they weren't saying the "S" word, standardization, in the late 1990s but, in the late 1990s—oh, I'm sorry, 1996. Literally this is announced while we're doing that dog and pony show in the DEI room, it's announced that The Boeing Company is going to buy our division of Rockwell, because Rockwell had become an automation company. [01:24:00] They had bought a company called Allen-Bradley, and then basically became Allen-Bradley with a Rockwell brand. So they didn't want to do spacecraft anymore. They didn't want to do automotive anymore. They didn't want to do water meters anymore, which was the baseline industry that started the company. So they shed us, sold us to Boeing. We were working for an aerospace company. Wow, it was great. I mean, suddenly we were no longer the cash cow. Nobody's putting fertilizer on the pasture. We're in an aerospace company again.

And I remember the first thing Boeing did that was visible that told us we were working for someone who cared is—they realized our buildings leaked. These are old buildings, okay? Downey was so funny. There were buildings dating from the 1930s. It was a World War II manufacturing plant for a trainer called—it was Consolidated Vultee, was the company that was in that place. [01:25:00] Government-owned facility, rented to contractors—I think they said a dollar a year—but running it was expensive because of all this old infrastructure, and old, leaky buildings. And we had leaky roofs. In southern California, it doesn't rain very often so, as soon as it starts to rain the trash cans know where to go—well, we got them there. In the building I was in, they would try to repair the roof, and all it would do is move the leaks. So you may not have a leak the last rainstorm—they repaired the leak, and then the leak is in your office because all it does is move. And Boeing comes through, and they issued us nice, bright green rain buckets (laughs) so we weren't using our trash cans. Here is obviously somebody who understood us. It's funny—it's the little things that you remember.

So the Boeing and Rockwell cultures melded really beautifully. It was a match that was intended. It was really, really good. [01:26:00] Whereas McDonnell Douglas—that was different. McDonnell and Douglas never truly integrated into one company. I don't remember when McDonnell and Douglas were merged, but decades after they merged, they would still point fingers at those Douglas guys or those McDonnell guys. They remembered who which ones were. It was like, get over it! You're one company now. They never did. And now after Boeing bought them—so, Boeing bought McDonnell Douglas. Or you could say McDonnell Douglas bought Boeing with Boeing's money, is another way we thought it happened. It was hard to not say Rockwell Downey, especially when we're in Downey, but now we know we're Boeing. Let's see, McDonnell Douglas was bought six months later. So, okay, so where was I going with this? Sorry, I'm on three different tracks again. (laughs) [01:27:00]

Anyway, so I know that happened in 1996. So the late 1990s, this idea of—we'd been looking at these standardized cargo bays for proposals, and the managers are saying, Why can't we do that on shuttle? There are so many advantages. The turnaround would be so much better. We could save so many hours in the orbiter processing facilities if we could do this. Why can't we do it on shuttle? And the first thing I said is, "Because of that CG problem on shuttle." A container is going to have, basically, the same weight per foot, per linear foot, along the whole cargo bay, which means it's going to have its CG on the center, the geometric center, which means you have to have even more heavy stuff in the back end of the vehicle. And it's just not going to work. So I'm the first one that says, "Eh, shuttle's not it." [01:28:00] And I remember us doing a research project, an internal research and development project to try to see what we could do to move that CG forward so we could containerize. And actually, it started as a "let's containerize in the space shuttle," and then I said, "You know, I'm the advocate for it, but just no. Sorry. CG is a problem." So, then we're looking at how can you move the CG forward. And an aerodynamicist came up with the most amazing, incredible design. You know what the SR-71 looks like, where—

TE: No.

AG: Okay, the SR-71—it's a supersonic aircraft. They don't fly them anymore. But it's called the Blackbird. And on the front end, it's like the wing, the edges of the wing come up the way up to the nose of the aircraft. Okay? We call that the wing glove. It comes all the way up to the nose of the aircraft, which is needed for supersonic, hypersonic flight. An aerodynamicist came up with an extended wing glove on the space shuttle that brought the edges of the wing all the way up to the nose of the vehicle which, he calculated it moved the allowable CG of the payload bay forward six feet. [01:29:00] Six feet. That's 10 percent of the length of the payload bay, would enable us to containerize. Unfortunately, it means changing the outer mold line. And outer mold line changes on a vehicle, a launch

vehicle—extremely expensive. You have to redo all of the analyses. So we never implemented that, but that was a fun project.

What ended up falling out of that is—we ended up coming up with a containerized cargo system that would have worked for space shuttle. We had more research and development. And the container was basically just in the aft end of the cargo bay. Solves that CG problem, aft end of the cargo bay. There are some large payloads that are supported on the back end, but they stick out the front end, so you have an open front on it, on the container. [01:30:00] So you can have payload hanging out over, beyond the front of the container. So we could have standardized interfaces for almost anything. We ended up looking for, how can you build this as lightweight as possible? And our original calculations of our original design were saying the design case didn't close, which means you needed to beef it up somewhere, and then you added more weight, and then it just—then you don't fly, it didn't work. So we looked around for—actually, part of this we did under internal research and development. Some of it we did for United Space Alliance, customer research and development. We had a USA manager. We were looking at developing it out of aluminum because you just do things out of aluminum. He said, "Why don't you look at composites?" [01:31:00]

So, okay, we identified a composite group at what used to be McDonnell Douglas in Huntington Beach, and basically gave them an RFP—well, actually, we gave them a design spec. We didn't give them the request for proposal. We gave them a design spec, and we need it to do these things. And also, just on a whim, we gave that same set of requirements to Scaled Composites in Mojave, California. Scaled Composites, which is known for—they do the composite wings of the Pegasus launch vehicle. Gave it to them as well. And the McDonnell Douglas folks basically did the aluminum design in composite. Saved some weight, but it was very expensive because the way you work with composite materials is you make your design specifically to take advantage of the advantages of composites instead of trying to pretend it's aluminum. [01:32:00] So it was very expensive to

use the same design as aluminum. Scaled Composites said, “Okay, what you wanted to do was this.” And I was very careful—I wrote the requirements—I was very careful to not constrain them into our ideas, to just say, “This is what we want it to do.”

And we got a tour of Scaled Composites. And the engineers were very interested, but Burt Rutan himself had to approve it. So Burt Rutan comes into the room, and his engineers have briefed him. We hadn’t seen him until the end of the day. And Burt Rutan was known for shuttle bashing. You know, “It’s too expensive to operate. You guys are stupid. You’re wasting the government’s money.” So here we are, space shuttle people, the enemy is in Scaled Composites’ nest, and Burt stares me down and says, “Why should I do this for you? Why should I do any business with you?” And he starts going through this shuttle bashing, and we just—my whole team, there are four of us there—and we just sit there and take it. [01:33:00] And then I say, “Mr. Rutan, the reason we want your help is because we want to change all of that. We want to completely change the way the space shuttle operates, at least in the cargo bay, and we think you can help us with that.” He said, “Okay. I will let my engineers work with you.” (laughs) So that was pretty cool.

And they came up with this most incredible design, which—one of my favorite experiences in my career—since that was the question probably, I haven’t looked at my watch, but a half an hour ago—one of the most incredible experiences. We trotted that design around to United Space Alliance, Rockwell, NASA. I remember going out to ATK [Alliant Techsystems Inc], built the solid rocket boosters. So Bob Crippen was, at the time—who was an astronaut on one of the first space shuttle missions—was their president. We talked with Bob Crippen. And everyone loved what we were doing. It was going to work. We could standardize interfaces and containerize in the cargo bay of the space shuttle. [01:34:00] We could save 10,000 hours in the orbiter processing facility, which are worth—every hour in the OPF is worth 40 hours somewhere else. Amazing

what we could do. And everywhere we went said, “That’s a great idea. I want you to do it, but we’re not going to pay for it.” So United Space Alliance says, “You should have Boeing pay for it.” NASA says, “You should have USA pay for it.” Boeing says, “You should have USA pay for it.” Thiokol says, “As soon as you’re doing it, we want to be part of it.” But no one would pay for it. And what it turns out—our USA manager figured it out. What it turns out is we were threatening rice bowls, okay? So there are rice bowls associated with having a big staff at Kennedy Space Center, and we’re proposing something that will reduce the hours required. We are not only threatening rice bowls, we are threatening empires. (laughs) So we never flew it, but we ended up getting three patents out of it. So, that was pretty cool.

TE: Okay.

AG: Yeah. So, that kind of takes us up to 1999, year 2000. [01:35:00]

TE: With the end of the shuttle program, what projects are you working on now?

AG: Let’s see—actually, I’ll add, there was another bump in there.

TE: Okay.

AG: And that is 1999, the Downey plant was closed. And we were moved down to work in the Huntington Beach plant. It used to be McDonnell Douglas plant, Huntington Beach. Funny story there. Remember the movie *Space Cowboys*?

TE: Yes.

AG: Fun movie. All filmed at Johnson Space Center, except most of it was filmed at Rockwell Downey. So the cafeteria was Rockwell Downey, the track was Rockwell Downey, that was our rec center. The executive conference room was Rockwell Downey. [01:36:00] There were some sets, some offices that were supposed to be Johnson Space Center that were actually sets in a high bay facility that used to be used for Apollo. And I had an office with a window in a

building that had no windows. My window looked out over a different part of the building, and actually people would come to my office because you could see the filming going on in the high bay, and you could see through my window. And there's a scene in *Space Cowboys* where it's looking down a hall outside the executive conference room. And you can see—you can't read it—but, there's a door that's kind of elevated. There were three or four steps up to it. And there's a piece of eight and a half by eleven paper on that door. And that was the door that belonged to the president of the division, but you can see it in one of the shots down this hall. It's kind of off to the right. And what that piece of paper said is, "The president of the division has moved to Huntington Beach. This is his phone number." (laughs) So I know exactly when *Space Cowboys* was filmed in Downey.

So we were moved to Huntington Beach, and then 2002 we were moved to Houston. [01:37:00] Remember the Enron crisis? Where electrical power was generated in California, shipped out of California, sold back into California at inflated prices. Well, by this time we're in the elderly part of the space shuttle program. NASA is trying to cut costs to do space station and other things. And literally, the electrical power is making our contract too expensive. So our ex-military executives decide, "We're all moving to Houston." They expected 80 percent of us to leave. It was more like 18 percent. We did a lot of training. We did a lot of hiring. And one of the things I was asked to do was to put together a procedures documentation system for the entire cargo team. So I write, or I literally invent it. Here's one of those examples where I will tell my mentees and young engineers, and I even said it in a panel yesterday—that the secret to success in industry is to make your boss's job easy. [01:38:00] Nobody likes to work on procedures, but my bosses needed procedures so I said yes. I'm competent. I'm a senior engineer. If you're willing to pay me to do that, I'll do that, okay, because it's what you need. It's not about my pride about what I'm working on. It's about what you need.

And I ended up coming up with a document, a process documentation system, that actually—. When we had an ISO audit—it's a quality audit, an ISO documentation audit—we used these procedures so that we could do all this training. So we developed the procedures in Huntington Beach, brought them with us to Houston, and that's how we trained our engineers in Houston, is with this procedures documentation system. And when we had an ISO quality audit, our little payload and cargo integration document procedures—procedures documentation system—passed the ISO audit better than the standard procedures system that had been invented by space station in Houston. [01:39:00] So pat on the back to Anita for inventing a document system.

But that experience—working with the structural, thermal, safety, installation analysis people—worked because those were the groups I was working with to document their procedures. And I remember there were some groups—I had a numbering system that I wanted to use where the number actually indicated the topic. And some of those groups had trouble figuring out what should their numbering system be. So I would say, "Okay, if you don't know, I know your business well enough. Use these numbers. And if you like them, that's fine. We'll go ahead, and you'll start writing procedures with these numbers. And if you don't like them, well, come up with something different. If you can't come up with something different, use mine." And that was just a matter of making things more efficient.

Okay, so, end of shuttle you asked about. So that was like interim shuttle—moving to Houston, not liking Houston. [01:40:00] I went into a little bit of a grump because I knew from traveling a lot to Houston, it was more of the worst kinds of weather of any place I'd ever seen. You know, rainy, humid, hot, ick, ick, ick. But my husband just accepted, "Okay." Accepted that's where the job goes. And I realized from the experience of seeing what Boeing had done to my aerospace engineer neighbors when I was a kid growing up—now I'm going into the aerospace industry. I know that layoffs and transfers happen. I was extremely fortunate. I could live in the same house for twenty-six years. So what inevitably I

knew would happen in my industry, it finally happened. So deal with it. So I was in a grump for three days. Hubby got me out of it, and I realized, it's just—the inevitable happened later. So we moved to Houston, got a huge house—it was my husband's idea to get that house. [01:41:00]

Anyway, so we ran shuttle out to the bitter end. I was employed there on the last day. And now I'm working on commercial crew. Again we are in competition. We've gone through several proposal and contract processes, and each time it whittles down a little bit more. There are now two and a half contractors. So Boeing has our CST-100 vehicle. We are still in the design phase. We're doing some testing, but test and design is where we are right now. I'm working cargo integration on that. It's a crew vehicle. I'm cargo. There's people, cargo, they're different. Of course, I think of people as just a different kind of cargo. People are movable cargo. But, that's just me.

The original baseline of the vehicle was designing it for seven people. And occasionally, if you only fly five people, you carry some cargo in place of people. Or if you carry three people, you carry more cargo in place of people. [01:42:00] And this is designed to go to International Space Station and other orbital destinations like Bigelow [Bigelow Aerospace Commercial Space Station]. And it was maybe a year ago our managers realized nobody wants seven people delivered to an orbital destination at any one time. So the baseline changed. Instead of seven people usually, and cargo occasionally, the baseline changed to five people baseline, fewer sometimes, cargo always. So I get to play with every CST-100 flight.

We're in competition with SpaceX. They have a contract about the same size as us for this phase of the program. And we're in competition also with Sierra Nevada, which has a completely different concept, not a capsule. Their contract is about half the size. And we're in the proposal process. Remember, I did proposals? Still doing proposals. [01:43:00] Writing a proposal now for the next phase, which will take us through flight tests, actually flying the vehicle. The first flight actually will

be all cargo, (laughs) so I really get to play in it. And then it will take us through the initial operational flights. So if we win this phase, then we'll get to play in commercial crew and participate in American launch vehicles, bringing Americans to the American—well, it's not all American, ISS [International Space Station], but space shuttle launched most of it so it's ours. We operate it out of Houston. So that's what I'm doing now, and I'm working for a great boss, having a good time.

TE: Excellent.

AG: Yeah.

TE: I'm wondering if we can jump back and talk about SWE some more. So you became—you were the president or the chairman of the Los Angeles section in the 1970s. And then you took on a leadership role on the—I believe it was the executive committee at that time, in the 1980s. [01:44:00]

AG: Yeah. And in between there I chaired the 1981 National Convention. We called them conventions then, yes. So I was chair of Los Angeles section the same two years that Minta Harness was president of SWE. And she's right there in the Los Angeles area, so we're getting scrutinized. (laughs) We're her section, and she's president. And we ran some leadership conferences then. We were putting in a bid for the 1981 National Convention when I was section chair. I don't know if I'm—I think it was one of those things where just the section had the idea that we would go for convention, because sections literally ran the whole show then.

One of the things that I did as section president—the section was struggling a little bit. The meetings were in a big, tall office building downtown. [01:45:00] It was inconvenient for everyone, not convenient for anyone. So the section was surviving, but not really thriving. And I'm young at this point. I mean, I was born in 1950. We're talking 1976, and in that '76—'77, I'm section president. And I decided that part of our problem in the section is—in Los Angeles the commutes

are so long. When you get home, you don't want another long commute to get to a meeting. And that's what was happening. Well, a lot of us were just coming straight from work to go to downtown LA. And I realized people have families, and if we had meetings close to home they could go home and then go to a meeting. So I started scheduling, or setting the monthly meetings for the section all over the Los Angeles basin and Orange County, from one end to the other. I attended them all. [01:46:00] And we actually had a little rubber stamp made by zip code. We literally would put together the mailings by hand. And by zip code, if a meeting was close to a zip code, we had a little rubber stamp and on the front right next to the address we'd say, "Next meeting close to your location, in your area." And that's kind of like a tweet to someone. If you get this stamp on your newsletter that says that—or the meeting notice—and says it's close, that means we went out of our way to make it easy for you to be part of SWE. We grew the section.

One of the things I did in that section that made a lot of sense at the time and kind of grew out of the time, and I would like to see happen in SWE again, is I saw that SWE—and I still see that SWE kind of missed the boat nationally, so I'm going to press for this, but that's just because I'm a renegade and I always have been. [01:47:00] SWE has an opportunity to be the interdisciplinary engineering organization with no constraints on membership except that you're an engineer. There's Tau Beta Pi—interdisciplinary, but that's the engineering honor society. If you weren't in the top 20 percent or one-eighth or whatever it is of your class in engineering, you're not in Tau Beta Pi. Then there's the National Society of Professional Engineers, but if you're not registered, and if you're in a discipline that doesn't usually register like aerospace, you're not in NSPE. What's left that's interdisciplinary? It's us. It's us, and men can be members. So what I did is I brought in speakers on topics I wanted to hear, and I thought our members wanted to hear, and I didn't care if it was a woman or a guy. It didn't matter. Just as when I entered engineering, I didn't want it to matter that I was a girl coming into this male bastion. It shouldn't matter. It's all about what you're doing.

[01:48:00] So I had guy speakers, I had gal speakers. Husbands started coming because it was fun to go to our meetings and get this technical stuff.

Although we also, to satisfy the nurturing side of SWE, we ran some—what we called career development conferences. And I understand—and I was instrumental in making those happen, which is part of this Distinguished Service Award. And we partnered also with AIAA and some other technical organizations and brought in speakers, brought in executive speakers. We recruited executives from the local companies. Had a weekend retreat. One was at Coto de Caza, which is a resort kind of southeast—Orange County, Los Angeles. Another one up in Oxnard up near Ventura. So we picked nice, resort-type areas. And you basically come in on a Friday, leave on a Sunday, and had a program of speakers. [01:49:00] It was like a mini convention. Really fun, informative, career-building events that the guys enjoyed too. This wasn't just girl stuff. This wasn't how do you balance being pregnant and being—it was appealing to, what's it like to be an executive? Do you really want to be an executive? And it was great. We used those as practice sessions for running a national convention. We knew what we were up to.

And in Los Angeles Section, when we won the bid for the 1981 National Convention—so my terms are over as president in 1979. I'm the convention chair. I'm not even thirty years old yet in 1979. I'm the convention. And this is when the sections ran the whole deal, all of it, with supervision by the national officers, directly by the national officers. [01:50:00] Telephone conferences with the national officers. And my bosses were incredibly tolerant of probably not putting in the entire forty hours a week, but they knew I was working hard and doing my best. But I'd have to go talk to the hotel. I learned about concepts like drayage. A drayage company is the company that designs the exhibit hall and arranges for the trucks to come, so I'm still fascinated by exhibit halls because I designed one. (laughs) And, the drayage company actually had a standard booth layout for the exhibit hall at the Disneyland Hotel for the 1981 National Convention. And I said, really, "No, no,

no, let's change the traffic pattern." [01:51:00] I actually had them redo the entire exhibit hall layout that they'd done for a bajillion conferences before because I wanted to change the traffic pattern to basically feed people past the booths on the way to the conference rooms. I didn't want people surrounding it, going around the edges. I wanted them going down the middle, which helped our—I think we had eighty exhibitors. Not 280 like now, but that ended up being the biggest national conference of its time.

And in those days we had a student conference and a professional conference. So the students came first, did their thing, and that was all integrated with the conference. Many of the students stayed into the professional conference. But some of the students just did the student conference, didn't even stay. We had separate registration for the students versus the professionals. That was just how you did it. We did it in June back then, right after the school year. Things have changed a great deal. And that was also a time when the conventions had personality. We made it a point to infuse personality. [01:52:00] So you knew, no matter where you were, you knew you were at the Disneyland Hotel. The theme was "Engineering: Applied Magic." The logo had the Disney castle in the logo, with Disneyland approval. We worked with the Disneyland folks to have that approval. We were using at the facilities—the facilities at the hotel, and one of the things we did is we arranged for the incoming president and the past president to have a race, and they had these little pedal boats. (laughs) So we had these women pedaling these little boats across this big pool where you (laughs).

TE: I have the photos. (laughs)

AG: Good, okay! So, you know about that!

TE: Yes.

AG: See, it's part of SWE history. Well, I was part of instigating that. We had a mariachi band out on the lawn. I remember there were some bones of contention about, you know, can you really afford to pay for a mariachi band. The national officers were not pleased with Anita, that would dare to hire a mariachi band. I'm sorry, we're in southern California. There had been personality in every convention. So dang it, you're in southern California. You are going to have a mariachi band. (laughs) So it's possible I annoyed the national officers enough. They wanted a little bit more control. I hope I wasn't the reason back in those days where the locals didn't have as much control.

But one of the things that happened in those days is a section would run a national convention. They put everything they had, every person they had, every ounce of energy they had into the convention. And when the convention was over they didn't have the infrastructure, the officers, and the meetings and all that—and the section had trouble. What we did know—Los Angeles section, we knew that. We knew that would happen. So the officers at that time were forbidden from participating in the convention committee. The convention committee was a committee of the SWE section, so the officers were completely aware. [01:54:00] We were keeping them informed, but it was a completely different officer structure. I was the chair. We had our vice chairs. We had our treasurer. We had our secretary of the convention committee. And there were the similar officers in the section, and basically working parallel officer systems.

We ran, I think, $225,000 through that budget. That was 1981. That was a lot of money. Almost a quarter of a million dollars running through. I think, between student conference and regular convention registration, we were somewhere between seventeen hundred and eighteen hundred. I think it was about six hundred students, twelve hundred professionals, the largest convention of its time, amazing convention. And most of the sessions were technical. Feeding on that—what I had done in the section, where I don't care who the speaker is, I want the topic there. [01:55:00] Our keynote speaker was Ray Bradbury. Ray Bradbury!

We had Ray Bradbury. The national officers at the time were very unhappy with that. “You’re having a man as your keynote speaker.” Well yeah, because he’s a futurist and this is a symposium on the future. “Engineering: Applied Magic, a Symposium on the Future.” That’s our logo. And they said, “Find a woman who thirty years ago was predicting what today would be. Find a woman to do that.” And we said, “Who?” “Find a woman!” “Who? We’re sticking with Ray Bradbury because he can do the job.” It was great! It was fabulous.

And literally, I was just looking for topics. We had a great set of topics. And then we had an area—there were conference facilities in several different buildings in that—my phone is buzzing, that’s [the recorder’s] probably sensing it. You can hear it, yeah—there are different buildings, and the conference rooms in one building were allocated strictly for what we now call the professional types of things. [01:56:00] And they were kind of overflowing, and maybe that was the start of SWE going more for the professional topics. But we had so many more technical topics than professional topics. And it was a blast. It was so much fun in those days to be able to go to topics on completely different disciplines than what you saw in your technical society, your non-SWE technical society, or what you saw at work. Completely outside your discipline. You could go see topics on anything. It was fabulous. It was a lot of fun.

TE: Could you tell me about serving on the executive—

AG: Executive committee—that was the year after. Basically, my year on the executive committee started when the convention ended. I mean, it started at that convention.

TE: Right. [01:57:00]

AG: And I was vice president of engineering. And I remember going to [executive] committee meetings. Probably just because I was a very busy kid and because I was so fiercely independent, I probably expected more independence from

people. So I had responsibility, for instance, for awards. So there were [awards] chairs reporting to me. And probably because of my experiences, I expected a little bit more proactivity, so didn't nag and nurture and do as many things as, at that time, perhaps national officers were expected to do.

Also, something else that I know was renegade in my being a national officer is, the national officers at that time were expected to be so busy being national officers you couldn't pay attention to your section. And my attitude was, it's still my section. My section has a conduit to the national officers. [01:58:00] I'm remaining active in my section, and I don't care if the national organization needs me. My section needs me, too. And my section needs to know that when there's an officer living in this area, they have a connection to the national officers. The national officers should not be off in some grand, lofty ivory tower, completely isolated from the sections. And, of course, I had seen some of that isolation from the section priority in the interactions between the national officers and the convention committee, because that all came down on me. I wasn't even—well, no, I had just passed thirty years old when I was running that convention. (laughs) So renegade.

So actually, at the end of my term when the nominating committee was nominating again, they had one candidate for VP Engineering. I was not a candidate for anything. They had one candidate for each position and said there were no other qualified candidates. So I knew what that meant. [01:59:00] It's, "Anita, you're stupid, so you can—." So, and actually, that probably led to my choosing to put more effort in the AIAA at that time. Because the nominating committee had spoken, that my style was not SWE's style. Not long after that is when SWE is accepting male members and rebranding itself as the outreach to students, the helping with the career promotion. The main topics at the convention are life balanced with career, and dress for success was big then, and all these touchy-feely topics—and going away from the technical topics. So SWE was migrating away from me.

Still active in my section, all the time I was in southern California. I was the technical program chair for the 1991 San Diego convention, so we would go down there and work with them. [02:00:00] Helped with—well actually, every anniversary we had, every five years had an anniversary. Actually, the twenty-fifth anniversary was when I was president. Twenty-fifth anniversary of Los Angeles Section was when I was president. And Judy Resnik actually was on the panel. And we didn't say this last night [at the WE13 awards banquet] and we need to remember to get this in the script—that the medal for the Resnik Challenger Medal was actually designed by Minta Harness, who became a sculptor after she retired. It's a beautiful medal which, it would have been great to show it and have the cameras zero in on it. Gorgeous medal, but at least [2013 Resnik Challenger Medal recipient] Christine Geosling got to see it.

TE: Right.

AG: Gets to enjoy it forever. And let's see—so yeah, Judy was one of the speakers at the twenty-fifth anniversary for Los Angeles Section. So we had big deals every five years, I was involved in those. [02:01:00] Backed away from section officership. I had been president, did very well, and changed the section. Well actually, around that time also, Orange County Section was chartered. And what was happening in Los Angeles Section—it had grown so big. You could have one section representative for every one hundred members [up to four representatives total]. And we had over four hundred members, which means our members did not have as much representation per person. We had fewer than a hundred members per section representative at that time, and that was my impetus for wanting to found Orange County Section, because it was just a matter of fairness. We deserved the same amount of representation as SWE members anywhere else in the country.

There were some philosophical differences between some members in Orange County and some members in LA Section, so there was—there was admittedly a philosophical split. [02:02:00] There was some enmity between, bad feelings

between the two groups. I made it a point to never be part of those bad feelings. I wanted the split to happen. I wanted Orange County Section to be founded on the basis of it made sense for serving the members. Also traffic was getting worse. It was harder to go from Orange County all the way to San Fernando Valley for a meeting, because the meetings were still bouncing all over the area. So it was just getting harder to do those long distance commutes. So it made sense, again, for serving the members to split out the two sections. So I tried to make that split as amicable as possible.

And then the region structure happened, and it was Provisional Region B. So I was head of Provisional Region B when it was a region, but a provisional region at the time. So helped, literally, to figure out how Region B would work. I remember chairing the meeting where we decided that Sonora was the name of our region. [02:03:00] So there was a lot of activity.

But by this time I was doing a lot in AIAA. I considered SWE kind of a side thing. I was doing a lot, but I wanted the younger members to have more opportunities to lead. I see SWE—especially SWE, but really any technical society—I see the technical societies as an opportunity to learn management techniques, teamwork skills, interpersonal. The work skills—how you learn work skills without risking your job. If you fail on a meeting and nobody comes—you arrange the meeting and nobody comes—all that happens is you didn't have a meeting. If you're not a good manager and people get annoyed and leave the section, well you have a smaller section but it's not like you blew it on a proposal and you lose a billion dollar opportunity for hundreds, thousands of people to have a job. [02:04:00] And it's not like you're losing your income. So I see the sections as just this fabulous way to learn management techniques, and I'm at a stage in my career where—leave that to the people still learning management techniques. I know those techniques.

So when I was transferred to Houston—not wanting to go, but going to Houston—when I was transferred to Houston, I made it a point to keep my section membership in

Orange County. So I'm still a member of Orange County, even though I live in Houston. And I did that so that the local section, then Houston Section, would know I'm not eligible to be a committee chair or officer. Even though I've done all that kind of stuff, I could do it, it's more important for the younger folks to have the advantage of that opportunity to learn. You don't need me to lead. You need to learn how to lead. And when a group of women in the NASA Johnson Space Center area decided to start what ended up being the Texas Space Center section, I helped. [02:05:00] I'm available. I helped with how to put together the chartering process. I probably helped in more ways than I realize. And, I probably—it's one of my minor activities now, is SWE. But I'm always there for the section. So if they have questions, I'm there. If they want a speaker, I'm there. The annual Christmas party is at my house. I'm there. I'm there for the section, and they know it and appreciate it.

And, let's see, along the way—excuse me, more tea. It's getting cold. Along the way, there are other volunteer activities that I do. And I'll drag SWE members into some of those. It was in 1980—well, actually, there's a SWE national connection to this one. So, 1983—no email then—1983. [02:06:00] I don't remember if it was a letter or a phone call, but what had precipitated whichever it was, was the—you know what a Boy Scout Jamboree is? Well, the Explorer Scouts have a national exploring conference every two years. Same idea as a Jamboree, except it's the Explorers. So it's a place where, for a week in a location, the fire protection explorers put out fires, and the police explorers learn about crime mitigation, and there's a science and engineering cluster. And the science and engineering cluster was putting together—in 1983—putting together their program for the Exploring conference in 1984 at Ohio State University. And they decide on Thursday they're going to do something cool all day about space. Okay. Space is cool. And they're looking around the room, and realize nobody knows anything about space. Nobody's in the space biz. Nobody knows anything about it. [02:07:00] The closest anyone comes is Evelyn Murray-Lenthall is there, then president of SWE. Evelyn is there and she knows me, which precipitates the

phone call, or the letter, whatever it was. “If you had Thursday, all day, to do something cool about space at a national Exploring conference, what would it be?”

Who’s a member of the L5 Society—in the 1970s a guy named Gerard O’Neill, Gerard O’Neill at Princeton University popularized the idea of space settlements, people living in space. Timothy Leary—the drug weenie guy, Timothy Leary, the LSD guy—Timothy Leary did talks about living in space. I saw one of them. He was amazing. He was cracked out of his mind, but he was amazing as a speaker. (laughs) He was the LSD guy. It didn’t seem to affect him. Affected everyone else, but anyway. He was just, he was hyper. He was amazing. But by the early 1980s, the interest was falling. Part of it was the Carter administration came along and NASA didn’t have budget to look at great, big things in space anymore. [02:08:00] Just 1976, the budget went away. Anyhow, so I said, just instinctively, what could be more cool than designing settlements in space? So I said, “Have them design space settlements.”

So there were letters and phone calls that bounced back and forth for a couple of weeks. And I got a call on a Sunday afternoon from a guy named Rob Kolstad (sp?). Both of us remember the call. He was sitting in his house, then in Dallas, Texas, and I was sitting in my den in Huntington Beach. And you’re on the phone with a cord. You’re not wandering around with a cell phone, because we didn’t have them then. So we’re sitting at our desks in our respective places, and we map out this idea for a space settlement design competition. It wouldn’t just be designing something. It would be a competition. We would arrange it like the kids are in companies. We would have volunteers to be CEOs. We would have a management structure. We would teach them management. [02:09:00] We would have technical sessions to teach them how they do their parts. We would guide it so it would be just like being on a proposal team in industry. We would write a request for proposal, and they would do a design, do a briefing, panel of judges.

The first time we did that was at the National Exploring Conference, 1984, Ohio State University. The Explorer Scout executives thought that was so cool it had to continue. We had seventy-five kids. Astronaut Story Musgrave stopped by. Seventy-five kids. Explorer Scouts decided that was a really cool thing. And they literally conned the Jet Propulsion Lab post, Explorer post to do one. And the Explorer post said, Look, we're already busy doing our weather balloon thing and this and that and the other thing. We're already busy doing our things. But the national officers who had been involved in that competition at Ohio State University just literally said, Just try it once. [02:10:00] Try it once. We want you to try it once. They might have threatened them; I don't know. We tried it once, it was great.

And shortening that story, my big volunteer activity right now is design competitions for high school kids [International Space Settlement Design Competition]. That now is an international competition. I travel to semifinals. We have a structure of semifinals and qualifying competitions. I tell the regional coordinators all around the world, "If you pay my way, I'll come to your semifinal." I go to India every year. I go to India every year. I go to the UK every year. I send materials to Australia every year. My husband and I traveled to Australia for a few years, and then—they were Aussies, they figured out how to do it on their own. But my husband and I built this thing up.

And actually a connection to my husband—he passed away. I look at my watch to see the date. Four years, four months, and 23 days ago. [02:11:00] And try not to cry. I still miss him. I may cry, it's okay, because I cry every day. After he passed away, the volunteers—and, he passed away two months before a finalist competition. And the volunteers at the finalist competition, the other volunteers—now, I was a wreck. I was just—we made it work. I do not know how I got through that, preparing the materials, organizing the teams. The volunteers helped a lot. And, the volunteers decided to name an award in my husband's honor. The Dick Edwards Leadership Award. He was the kind of guy who—even though he didn't

have an executive position, he wasn't a high-ranking manager—he was one of those guys who—his presence in the room changed the dynamics in the room so that decisions would be made differently because he was there. [02:12:00] He was kind of leading from the background. That was the kind of guy he was. And this award—the volunteers realized that about him—this award recognizes that kind of behavior.

In the design competition, we have now 192 kids. They are teams. They come from all over the world. We were doubling teams up and tripling. Now we quintuple teams, so teams from five different parts of the US and the world will be—five of them will be jammed together in a proposal team in this high-intensity weekend. Forty-eight kids per company. We call them companies. We give them company histories. We write future history. We tell them they're in the future, and they're designing space settlements. And we have volunteers as the CEOs of these companies. We have the same thing that Rob Kolstad and I outlined, with minor tweaks, and it's so much more sophisticated now. We are still doing, and it resonates with students. [02:13:00] It steers them into engineering careers. We have these incredible metrics on kids deciding to go into engineering.

And interestingly enough, it's not unusual for Dick Edwards Award winners, and there are four every year. Each CEO—one CEO for each of the design competition companies—picks a Dick Edwards winner. The person most exemplifying how Dick was in his or her company, that CEO's company. And it is not unusual to have three women and one guy—two women, one guy. It is not unusual for women to be that power, that force, behind-the-scenes force in these design competition companies. And we find the design competition imitates life. It is amazing. We structure it that way, and how the kids respond and behave is just like in a real aerospace engineering company. They have design arguments. They work late. They procrastinate. They have meetings. They argue. [02:14:00] They fight technically. People are defending their positions. They do stupid things. They make mistakes. They learn from mistakes. They teach each other.

Kids who are in the competitions for four years actually have a career progression path where they start in a department. That next year they're department head. The next year, they're a VP. Then they're president of the company. I feel like it's so fun. And actually, in the career fair in the exhibit hall yesterday, a young woman came up to me, one of the winners of the Dick Edwards Award who won it early enough she remembers Dick, which is very—we cried. And she said even now as a junior in college, that is on her resume and still making a difference in her life, to have won the Dick Edwards Leadership Award at the design competition. So that was pretty cool.

TE: Yeah, yeah.

AG: I remember one thing I was going to ask you to ask me.

TE: Okay.

AG: Was the three kinds of women engineers.

TE: Oh, you did. (laughs) [02:15:00]

AG: I did, yes. I don't even know when this was, but Judy Forbes and I were flying back from a—I think it was a combined regional conference of the San Francisco area and the Los Angeles area. I guess that's A and B, Regions A and B. We got the regions together. I'm sorry, it wasn't conferences, it was just—we were just having meetings. We didn't do the conferences so much then. So, combined region. Sometimes they would fly down to meet with us. Sometimes we flew up to meet with them. Judy and I are sitting on the plane coming back from one of those. So this was after the regions—early in the region structure. And we're thinking about the women engineers we've known.

Now I'm of a vintage where I met Grace Hopper. I knew some of these engineers, and I don't remember all the names, but I remember—gosh, I want to say Elise [Esther] Williams was her name. I don't know if that was her name. But I

remember talking to women engineers in LA and then Orange County section who remembered—. Gosh, there was one—now, I'm remembering so many of them. I'm remembering so many of them. But they talk about the old days where a woman literally could not get a job. Loring Nicholson in World War II served the military—I guess we say served the military as an engineer. And I think she said General Patton came in and is looking for the engineer, and she announces—she stands up, her little frame stands up to General Patton—"I'm the engineer, sir." (laughs) Which was unheard of, but it was World War II. [02:17:00] I remember a woman who graduated with a general science degree, even though she had earned an engineering degree from the Missouri School of Mines, because women didn't get engineering degrees. I remember a woman—maybe the same one—wildcatting oil wells with her kids in tow because she couldn't get a job. And she'd show up for an interview—her resume would have all of the qualifications. She shows up, she's a woman, they won't hire her. So these women are just surviving.

And Judy and I were thinking about those women. And we knew them then, they were around us. And not many of them, bless them. But those were the scouts. Those were the women who were out, they were blazing the trail, overcoming incredible obstacles. And Judy and I realized that up until maybe about 1969, 1970, that's the work environment that women faced—is bulldozing a trail where a trail never was. First woman anything. [02:18:00] Now I've done a lot of—I'm still a lot of first woman this or that or the other thing. And it's often that I'm in a meeting, I'm the only woman in the technical meeting, because I'm a senior female. Not many of us senior females around, because there weren't many of us then. If you ask why aren't there more women executives in an engineering company—because there aren't many of us who were from that time. And it's happening now, but there weren't many of us. So Judy and I looked at that category—like until '69, '70—those were the trailblazers.

And then there was a little interim period, where Judy and I graduated, between about 1970 or ’71 and probably 1976, where we’re kind of like the sodbusters. The trail has been blazed. When we were going to university, I think I mentioned, the professors had learned the women were the hot shots, okay, because we really wanted to be there. [02:19:00] We weren’t there because dad was an engineer and I’m a guy, and I don’t know anything else to do so I’ll go into mechanical engineering. That’s not why—we were there because we really wanted to be engineers. And before about ’69 or so, the professors hadn’t figured that out. Between ’70 and ’76 or so, yes, we were unusual, but we were accepted and becoming welcomed. So we had a completely different university environment, and Judy and I kind of figured that’s like the sodbusters or the settlers. The people are starting to settle in.

And then after about 1976, Judy and I realized at least in college women didn’t think of themselves as being anything different from the guys. And nobody on campus thought of them really as anything different than the guys. There were fewer of them, but 16 percent is a whole lot different than 0.6 percent.

And I was in—actually, this is a story I forgot to tell. [02:20:00] In most of my classes going through aeronautics and astronautics, especially after it shrank, I was the only female. There was a women in every one of my classes and I never saw her, because I was looking out from the inside. All of the guys saw a woman in class, but I never did. And I remember for some odd reason—I guess it was in my senior year—I wanted a class in column buckling. And aeronautics and astronautics didn’t offer that, but civil engineering did. So I signed up for the class in civil engineering. And I walk into the class, and I’m not the first one there because it’s not in my building. I have to walk over to the civil engineering building. And there’s something I had not seen in a class for two years. I saw a female in class! (laughs) Amazing! An amazing experience to see another woman. I had seen women in humanistic social studies classes, but not in engineering classes. And here was a woman in an engineering class.

And then by ’76, that experience was gone. There were women all over. [02:21:00] I was the only woman in my class, my graduating class in aeronautics and astronautics. I think there had been one two years before. There was not one in the class before mine. There was in the class after mine. And then it wasn’t unusual to have women. So we had a different experience. First in many things, but not quite the same experience. Definitely not the same experience in college, and the experience at work was mitigating. The guys knew that we would be there. We might be the first one they ever met. But we were in that category of going through that—how do you dress, how do you behave, what happens at the elevator door? You know, those kinds of things were happening with us. And then after 1976, it was just normal. Fewer, but normal.

I’m seeing at this conference, we actually may be starting to see a fourth variety of woman engineer. And that’s that apparently there are young women in college now who say, Why do you need SWE? [02:22:00] What’s different? Why should we be picked on differently? Why should there be a SWE? And maybe this is a time to go back to that model I saw for SWE decades ago of, SWE can be that one engineering organization where all you have to be is an engineer, and go back to more technical presentations. Because maybe it will come to a time where there’s not so much need for the—how to survive as a woman, how is the female experience different than the male experience? Actually, I’m hoping that will happen. I’d like to think that maybe I predicted that, I don’t know.

TE: Okay. Is there anything else you would like to add?

AG: Not that I can think of right now.

TE: Okay.

AG: Did we do good?

TE: We did excellent.

AG: We did excellent! All right! Thank you! I don't need the accolade, but I'm glad to hear that. Okay, we got what you wanted.

TE: Well, thank you very much for doing the interview.

AG: My pleasure.

[END OF INTERVIEW]