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INTERVIEW

ANN MONTGOMERY

KENNEDY SPACE CENTER

MARCH 21, 2003

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UNKNOWN SPEAKER: Spell your last name for me?

MS. MONTGOMERY: M O N T G O M E R Y

UNKNOWN SPEAKER: And title?

MS. MONTGOMERY: Retired.

DR. LIPARTITO: Okay, it's March 21, 2003 and I'm here at the Kennedy Space Center interviewing Ann Montgomery. Ann would you start by telling us a little bit about your personal background, where you grew up, where you went to school, and how you eventually made your way to work for the Kennedy Space Center.

MS. MONTGOMERY: All right, I was born in Jefferson City, Missouri, 1946, post war baby boom. My Father got out of the Navy and I was born soon thereafter. We, he went back in during the Korean War so we moved around quite a bit for a few years. They had liked Florida and they settled in the Melbourne area, the one area of Florida that they really hated, and I grew up in the Melbourne area from third grade on through high school. Went to the University of Florida and graduated from there in 1968. At that point I needed a job, was interested in a young man I had met during a summer job and since he moved to this area I looked for a job in this area.

The one supervisor I talked to at NASA was the first person that treated me like a human being as opposed to worrying about me hearing dirty words and how they would protect me and not let me work any overtime and I'd be assured of having a lovely sheltered life and so I went to work for Harry Schultz.

DR. LIPARTITO: So you had been an engineering or math student at UF?

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MS. MONTGOMERY: I majored in math at the University of Florida and have a lot of physical science courses and a few engineering courses.

DR. LIPARTITO: Right.

MS. MONTGOMERY: And then after I worked for NASA, I got tired of people telling me how much I really was not an engineer, so I went back to the University of Florida part time and got my masters in Industrial Engineering.

DR. LIPARTITO: I see, I see. And the interviews that you've had that did not go so well, they were with aerospace companies?

MS. MONTGOMERY: They were with aerospace companies. There were also really several with NASA in various areas. They said that I should be in the computer department, because that was a good bit of my background, but it was certainly going to be the business computer department. I was going to turn out paychecks and do that kind of thing because that was the type of environment they really felt was appropriate for someone my age and stature.

DR. LIPARTITO: Just curious, what were some of the other parts of NASA that you looked into?

MS. MONTGOMERY: Primarily in the computer field, which would have been a logical, logical place to put me. Crew equipment they didn't have anyone working for crew equipment at the time, so they didn't really know what they needed. It was right after the Apollo 5, and Kennedy was taking a new role in the crew equipment area that had always been done by Johnson. So they offered me the job.

DR. LIPARTITO: Was that related directly to new safety concerns?

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MS. MONTGOMERY: There were safety concerns. There had been--the crew equipment--had been not the cause of the fire by any means, but it had been, it had spread the fire.

DR. LIPARTITO: I see.

MS. MONTGOMERY: They used a lot of materials that were combustible and so they was a new consciousness and a new level of oversight they wanted.

DR. LIPARTITO: Okay. And so what were some of your early first impressions about your first job out here?

MS. MONTGOMERY: It was really terrific. I read manuals for about two weeks and then they put me on second shift by myself. I remember going up to one of my older co-workers and saying, you know, what about this and he said I can give you moral support but you're going to have to figure out how to do it. And so I really thoroughly enjoyed it. They had told me I would travel and I would get to meet astronauts, which seemed very exciting at 21 years old, and I did, within a matter of a few weeks. I got to meet astronauts and within two or three months was traveling to California on my own, so it was a very, very exciting time.

DR. LIPARTITO: Could you give us a brief description of the type of work you that specifically you would be doing at this period?

MS. MONTGOMERY: Yeah, it was what was called the Crew Equipment Engineer and we were responsible for all of the small parts that went both in the command module and the lunar module, ranging from televisions to food, filling in their tools when they started landing on the moon. Some of the experiments that went on

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and we had to test them. Make sure they all functioned. Make sure they all fit together and then make sure they were all on board and the astronauts knew where they were.

DR. LIPARTITO: So you actually had to, you know, towards launch time, you would actually have to talk to the astronauts and say this is how we are doing this?

MS. MONTGOMERY: We actually had crew reviews, several before the altitude chamber runs, and before count down demonstration and yes, the astronauts would come into the lab, look at all the equipment on the bench and ask questions, make suggestions. We would then make any changes that were needed and have packed it into the vehicle, and usually we finished on the launch pad about, just about exactly twenty-four hours before a launch.

DR. LIPARTITO: Oh, is that right? Now you've already mentioned that this is '68, '69, so pioneering days for women engineers everywhere and even at NASA. Were there any conflict problems about gender in those years?

MS. MONTGOMERY: There were, really for every person who gave me some problems, there were probably thirty who were absolutely wonderful and made my life easy, but you wore dresses to work, and of course you didn't wear dresses and high heels in an altitude chamber on the launch pad, so you changed clothes a lot. There were people whose wives would not let them travel with you on a business trip. You were asked, you know, do you intend to get married, do you intend to have children. If so, how many and when. And there were opportunities that you were just told, you're a woman, you can't do it, but again, it all changed and for everyone that did that, there were dozens of people who were more than helpful.

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DR. LIPARTITO: Yeah, so were there particular mentors you think of back there, who were really instrumental?

MS. MONTGOMERY: Well certainly and my first thoughts Harry Schultz was just absolutely wonderful. Harry has been dead for a good number of years, but Harry gave me more confidence than you could imagine because he felt I was doing a good job. He let me do a good job. I think your going to talk to Ernie Reyes, who was certainly another mentor over time and there were dozens of them. I would go to meetings and people would say, come right up here and sit. I remember in California a black male supervisor who was one of the contractors, who again I'm sure felt as a minority, I needed a little help and he would always say come up and stand in the front row, you need to hear this. And so over time yes, loads of them.

DR. LIPARTITO: Okay. Who were some of the other people you worked with in this area, just some names.

MS. MONTGOMERY: Oh, Wayne Stallard certainly, Wayne's retired. Chuck Spurn who I think is still working with NASA. Bill Beiker. Howard Baxter, who I think just passed away. John Fraley, John Lake, Gary Allgeyer (phonetic), all of them were career NASA people. I worked with them off and on for thirty years.

DR. LIPARTITO: Right. Okay, now you did this equipment for about nine years?

MS. MONTGOMERY: About eleven years.

DR. LIPARTITO: Eleven years. Okay, okay, so during that time, of course the Apollo Program, you know, had its climatic moment; Apollo 11 in 1969, and then some more Apollos, but there is also a move to a sort of reorient the work

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of NASA and the Center. What were some of the changes you saw within the missions after Apollo?

MS. MONTGOMERY: Well of course we went to Apollo/Soyuz test program, which working with the rations, which was the attempt to do that and so that was fun. That was a one time launch. From there we went to Skylab and that was quite different because instead of giving people supplies for a week or two, we were putting up supplies for months in orbit.

DR. LIPARTITO: Right.

MS. MONTGOMERY: And it really, in the crew equipment area, it was, it was like going from a Model-T to a jet plane. It was really a totally different environment. And then as soon as they launched it there were technical problems and so the planning we had done for the subsequent missions, we had to change everything.

DR. LIPARTITO: Right.

MS. MONTGOMERY: So a very dynamic, dynamic program and then worked on into the early Shuttle years.

DR. LIPARTITO: Right.

MS. MONTGOMERY: Which is again a much bigger vehicle, a little different mission.

DR. LIPARTITO: Okay, what do you remember about the Shuttle, was it more of the same but on a bigger scale?

MS. MONTGOMERY: No, the Shuttle, we had always worked on zero gravity, and the Kennedy people were always interested, what was it like in one G, because you were putting equipment in orbit, it was very light. And the crew had certain

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needs, but when you were putting it in on earth, it was very heavy, very awkward, and so you had a different one. Well, the Shuttle program, you don't always have horizontal orbiter, in the orbiter processing facility, but you had to imagine a vertical orbiter at the pad. And so you had two different orientations, when you were working with the same equipment, so it always a way of thinking of things.

DR. LIPARTITO: All right. And you worked on, you left that part of Kennedy in about say '79.

MS. MONTGOMERY: Yes.

DR. LIPARTITO: Where do you go next?

MS. MONTGOMERY: Went to the orbiter processing facility. We had a major reorganization and preparation for shuttle. Shuttle arrived, I left crew equipment and went to the orbiter processing facility in January and the first shuttle left in March.

DR. LIPARTITO: Right.

MS. MONTGOMERY: And so we were finishing up with construction and just starting to realize that there might be some needs for tile and all the equipment that went with it. We were not fully prepared for the shuttle by any means, and so moved to the orbiter processing facility and stayed there about eight years and during that time we started out with one orbiter bay and ended up with two and the third under construction. The tile originally calibration was put in the second bay, all over the floor and we had to move it out to activate the bay. Built a new building, we used a terrible old building with dirt floors and all, renovated it, and had it ready for the second flow of the orbiter and then built the building across the street, that is now the tile facility.

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So it was a very active time for buildings. We were learning a lot about what needed to happen to make a shuttle land, making mid-course corrections.

DR. LIPARTITO: Right, right. Do you remember was there a sense of frustration about the amount of work that had to be done to get it ready, more maybe than people expected?

MS. MONTGOMERY: There was, there was, I want to say yes. Certainly frustration, almost panic. We had several thousand people everyday in a building that was meant, they had designed the building for the office space to be elsewhere.

DR. LIPARTITO: Right.

MS. MONTGOMERY: And expected the people to commute, so as they started bringing people and equipment from California, we went from a building designed for two hundred people, to one with over three thousand people a day in it.

DR. LIPARTITO: Oh really.

MS. MONTGOMERY: And we had, you know, just the day-to-day problems of people lined up outside the restrooms. We had no office space and we started installing trailers and port-a-potties. No-where for the people to eat. The parking lots were all unpaved, except for about fifty parking spaces.

DR. LIPARTITO: Wow, wow.

MS. MONTGOMERY: And so it was quite a challenge. That was the part I was responsible for. Certainly the part of getting the tiles on the orbiter.

DR. LIPARTITO: Right.

MS. MONTGOMERY: And getting them right was a big thing. I

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was busy taking care of the people on the machinery for the tiles.

DR. LIPARTITO: Right, right. Okay, very good. So again you only stayed there, well you stayed there?

MS. MONTGOMERY: About eight years.

DR. LIPARTITO: About eight years, so yeah, about the same amount of time and when you moved from job to job, was it because an opportunity opened up or an advancement?

MS. MONTGOMERY: With the move to service and crew equipment to the orbiter processing facility, I just felt I needed, I had been fighting the same battles program after program. I knew which ones I would lose and which ones I'd win and I said you know, when your heart isn't behind some of your battles because you know the outcome, you need to move and so yeah, I asked to be moved, and it was a great opportunity.

DR. LIPARTITO: Right. I'm getting the sense from talking to other people that, you know, it's very common for people to spend their whole career obviously to have a number of jobs and sometimes even move in fairly significant directions from what they had been doing. Would you say then that there is a sort of good mechanisms in place for supporting people, additional training, education?

MS. MONTGOMERY: Definitely. Both on-the-job training. A lot of times it was, you know, they put you in a job and you were expected to learn, but they would certainly bend when there was a breather, when there was time, they gave you the training you needed.

DR. LIPARTITO: Yeah, yeah.

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MS. MONTGOMERY: So yes, over time, I have had great training. Been sent to Carnegie Mellon and to Penn State. Had some wonderful training opportunities.

DR. LIPARTITO: Would this be something, let's say, like when you moved from the equipment to the OPS, that you had to learn on your own, or would it be a part of training and personnel people, or a combination?

MS. MONTGOMERY: A combination of the two. Frequently though with a move like that, you were so busy the first several years you were there, you learned most of it on your own. Then when there was a break you got the training, and again your supervisor, some of it was your own initiative.

DR. LIPARTITO: Right.

MS. MONTGOMERY: You spent time finding out what classes you were interested in, what kind of training you wanted, and had to be a little aggressive to ask for it.

DR. LIPARTITO: Yeah, yeah. I'm gonna stay on this topic and it is one that I think has not been explored enough in the history of NASA, and part of this I think, is also that especially you begin in the height of the Apollo Program and of course, maybe you were even, may not have been aware of it as a young employee, but in '68, '69, they already planning for, you know, downsizing is already about to take place, and wondering where to go next and how that's going to affect personnel. But one of the changes that takes place, is that the contractors begin to play more of a role, and civil servants, become more supervisors. Is that something you went through, or sounds like you had a lot of hands on experience?

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MS. MONTGOMERY: It varied over the years. Certainly after Apollo almost all of our contractors were laid off. We went from having, probably had, ten or twelve contractor counterparts and after that period, for the last mission or two, I actually did some of the contractors work because the person they had left was looking for another job, and they had a single engineer. Between programs we were the life line, we we're the only one that remembered how it was done before and were able to set up the next program. But yes, at some point, yes you do become more of a supervisor, a mentor, you do less. You manage more.

DR. LIPARTITO: Right.

MS. MONTGOMERY: And again, in my career the timing was absolutely excellent because about the time I was ready to do that, that's the way the government was going. Not everyone's that lucky.

DR. LIPARTITO: Right. When you were hired, you might not know this, I could probably look it up, but I'm thinking '68, I mean were there incoming classes of new people as it were?

MS. MONTGOMERY: That was, no, that was after the Apollo 5.

DR. LIPARTITO: Okay.

MS. MONTGOMERY: That was immediately – and we were getting ready for the Apollo 7 which was the next mission, to go into the altitude chamber and so there were a large number of people hired right about that time. Then it tapered off and there were a few layoffs and then long periods, as usual, of no hiring. So it was the typical wait period.

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DR. LIPARTITO: I am curious, were you the only woman hired in that period of time?

MS. MONTGOMERY: No, Judy Sullivan was in the biomedical area. Ruthann Stroge (phonetic), who is still a good friend of mine, was in a computer area, and another lady, Peggy Henry, was there already. There were a few, so.

DR. LIPARTITO: Did you all know each other?

MS. MONTGOMERY: Yes, well again, you knew each other, the people, there were subcultures. I was in spacecraft subculture. There was a launch vehicle subculture and then of course, there were the expendable launch vehicles, so you had groups of people you know and groups of people, so the people I mentioned are all spacecraft people.

DR. LIPARTITO: Okay, all right.

MS. MONTGOMERY: We were segmented.

DR. LIPARTITO: Segmented, right. In the sense that you obviously worked with them and shared common interest in what you specialized in.

MS. MONTGOMERY: Well, we worked in a common building. The spacecraft building were all in the Operations and Checkout Building. We ran, we had our own control room, so even for a launch the spacecraft people were in a control room in the Operations and Checkout Building, while the launch vehicle people were in, what would now be considered your Launch Control Center.

DR. LIPARTITO: Right.

MS. MONTGOMERY: We had communications back and forth, but we didn't even sit together during the launch, so there really was a definite... Our

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scheduling meetings were separate and only one or two people from the spacecraft went out and represented us.

DR. LIPARTITO: I see.

MS. MONTGOMERY: In the vehicle area.

DR. LIPARTITO: Okay, now we're up to about say mid-1980's and then again, a change in your career, you became a flow director.

MS. MONTGOMERY: Well, again, as I hired on after a terrible tragedy. In the mid-80's we had Challenger.

DR. LIPARTITO: Right.

MS. MONTGOMERY: And so during the time after that I worked a little on some of the committees that did some of the investigations. Certainly only the local committees, but changed some of the policies and procedures and applied, during that time frame, to be a flow director, which is the person that's basically the point person. The person that was in charge of the processing of a shuttle – getting it ready for launch.

DR. LIPARTITO: Right.

MS. MONTGOMERY: Your whole launch team reported to the flow director.

DR. LIPARTITO: So each shuttle would have it's own flow director?

MS. MONTGOMERY: Yes.

DR. LIPARTITO: Okay, and then you would all report to whom?

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MS. MONTGOMERY: At the time it was Jim Harrington, who was the head of Shuttle Operations.

DR. LIPARTITO: Shuttle Operations, right.

MS. MONTGOMERY: And so we, there were at the time, three orbiters. I came over as the junior person so I got the third orbiter in flow. I got Columbia.

DR. LIPARTITO: Right.

MS. MONTGOMERY: And at the time it had very few tile on it. They used all of its parts for the other shuttles. They took all of them out, and of course, the best ones went to the first orbiters to launch, and so we had quite a job. I often laughingly said that they never let me do a whole other flow because it took me so long to launch the one I launched. But for a long time we would just have five or six people a day actually working on it. There just wasn't any activity because the effort was elsewhere.

DR. LIPARTITO: Right. So in terms of getting a shuttle ready, what were sort of the key steps, as you remember them?

MS. MONTGOMERY: You test incredibly. Course the first thing we had to do was put back together, we had a list, an incredibly long list of modifications, because it was the oldest vehicle and we hadn't upgraded it, and so we were the last, not only were we doing the post-accident modifications, but we were doing some upgrades to get it in line with the other vehicles. Once everything's put together and we actually made bets on the day we would power up. I won several dinners and then they told me I cheated by powering up before everything else was done. (laughter) But that was

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exactly the advantage, I said you know, we're gonna call a halt here. We're gonna do it. I won my dinners. But then you test an incredible amount, and we had a lot of tile work to be done. There were, you know again, a lot of modifications from the oldest fleet, orbiter fleet, getting it up-to-date. And so then of course, you meet the other parts. You meet your external tanks and your solid rocket boosters and go to the pad and again, you test an incredibly amount.

DR. LIPARTITO: Right.

MS. MONTGOMERY: So, people used to ask me, you know, did it frighten me to launch something that had been pulled apart that much, but if you did all your testing and if it passed all its tests, then that was the best you could do. And no, it didn't really didn't bother me. I thought a lot of care had gone into it.

DR. LIPARTITO: Right.

MS. MONTGOMERY: But, a lot of testing.

DR. LIPARTITO: Any impressions about Challenger, obviously people were devastated by the loss, a lot of what people were wondering – did I do something – now you're coming into it sort of new, as it were, having not done that. What was your take on it?

MS. MONTGOMERY: Again, I always felt when you were out here, even though I was a Facilities Manager when something happened to Challenger, I even questioned was there anything I could have done differently in a facility. There wasn't. But an incredible sense of guilt – if I had done one little thing differently, even though I wasn't in a position of much power, could it have made a difference? There is a terrific

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amount of personal pride and personal life invested in those orbiters and so, every time something happens, good or bad, you feel the ups and downs of it.

DR. LIPARTITO: You mentioned in our conversation that the question about safety, and I know that's something you were involved in and, but yet you say really, safety is something that also penetrates everyone's work.

MS. MONTGOMERY: It really does, because while there are many layers of checking the hands-on people and the people that are writing the documentation, it can always be missed. And I think everyone feels a tremendous accountability for the safety and a good deal of personal pride in doing things right.

(THEREUPON THE TAPED WAS TURNED OVER)

DR. LIPARTITO: Let's see in '89 you make another change in career.

MS. MONTGOMERY: I had done my one flow and it was successful. We originally started out saying we thought we were six weeks off of the original plan, and we started really pushing to launch the vehicle. We launched, you know at just about six weeks after we had initially planned. So we were very proud of what we had done. It was a successful mission. It was a Department of Defense mission.

DR. LIPARTITO: Uh-huh.

MS. MONTGOMERY: And the next mission we were to do was the long duration exposure facility mission and I started on that one. I had a person come to me and say, you know would you be interested in learning something about budget and contract management and my reply was, well, it's something I don't know anything about, and so I moved to Logistics.

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DR. LIPARTITO: Was it a question of you feeling like you wanted to try the Flow Director and you'd done it, and there you could see that just kind of continuing, or yet had more of a plan in mind as to where this might ultimately take you?

MS. MONTGOMERY: Being a Flow Director was fun. In fact, when I stopped being a Flow Director my children, it really was a very, very demanding job. I went home and said, you know, I'll be working a little milder hours. My children actually cried. They really like me being a Flow Director.

DR. LIPARTITO: Really?

MS. MONTGOMERY: You were on the news, you got to do things and they knew this. They knew how exciting it was to me. But career wise, I also knew I need some of these other pieces to have, to make some of the next steps. So it was, there were not a lot of opportunities to do that. When I got one I took it.

DR. LIPARTITO: And this was in Logistics.

MS. MONTGOMERY: Yes.

DR. LIPARTITO: Okay, what did that involve?

MS. MONTGOMERY: Well, we started out with Shuttle logistics but it's all the spare parts of providing them and repairing the ones you already have to make an orbiter go. So, instead of worrying about what's happening in the next week or year, these are very, very expensive parts. They run well into the Millions, the Twenty Million dollar range. Some of them can't be made anymore because the technology has advanced so far beyond the designs, and so you started worrying about the five year and the six year range of what do you do if this breaks and you can't get another one.

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By this point in the program, we were building the last shuttle and so Logistics was no longer supporting a very robust vendor base. And so we were facing real issues. In fact, the program still faces some of those issues. They have certainly made a lot of changes, but how do you keep, either vendors interested, or how do you keep the ability to repair parts that haven't been designed to build in twenty years?

DR. LIPARTITO: Right.

MS. MONTGOMERY: And so you got a vendor base that's all over the United States. It's a fascinating business and then we expanded beyond the shuttle to the other parts – to the Center Logistics– we again reorganized on the center wide level.

DR. LIPARTITO: What part of the organization is Logistics common to? What part in the, sort of, organizational scheme of things?

MS. MONTGOMERY: Today?

DR. LIPARTITO: Well, when you were there?

MS. MONTGOMERY: When I was there it was a separate directorate, second line directorate and it moved to a first line directorate. Now it's changed back. After the leads have worked the logistics and have been redistributed at this point back out into the organizational elements. So it's changed twice.

DR. LIPARTITO: It's changed twice. I'm formulating a good question here. Logistics is obviously the problem or an issue for any organization that producing stuff or providing some continuous service and yet, as you said, the nature of this business is kind of unique as the issue of suppliers, when you're not going to be seeing more shuttles, much different say then, a car manufacturer that's producing a

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million cars. Was there something where you'd be able to sort of study other models of how to do it, or you had to kind of develop it more internally on your own?

MS. MONTGOMERY: It had to be developed and you certainly studied under the models and when I moved over there I read logistics books. I talked to logisticians, took some classes, but classical logistics just doesn't work on the shuttle program. The one we always laughed and told people, there's logistic rules up in the military, I believe it is, that says if something on the shelf hasn't turned over, in two years you get rid of it. Up on our top shelf we had this wonderful huge muffler for a crawler transporter. It probably is as big as about half of this room and it had never been used. It had been there since the 60's when the crawlers were built and we would have people do audits, military auditors, and they would say you know, you have parts that haven't turned over and you should be getting rid them. That was the wonderful example of, we hope we never have to use it, but if we ever needed one, we could never get another one.

DR. LIPARTITO: Right.

MS. MONTGOMERY: And so there were rules that the value of our equipment when we would use military models, which is where most of the logistics, most of the academic logistics are pointed towards the military or towards a commercial sector. And with Twenty-Five Million dollar pieces of equipment, you don't treat them like you treat washers and screws and nuts and bolts. We had those as well, and we certainly used those, and we used their models, but we had to develop and we had some really talented people who developed some models and some tracking in all that we used.

DR. LIPARTITO: Really.

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MS. MONTGOMERY: But this, and the Concord, because they were a small fleet, there are other similar areas, but we were doing it as well as anyone, although there is certainly, again most reports even now will say, Shuttle Logistics is an issue, because it always, probably will be.

DR. LIPARTITO: Right. Who were some of the people you worked with?

MS. MONTGOMERY: Well, Roger Enlow (phonetic) who has since passed away. Ann Galonski (phonetic) is still over in Logistics. Harry Heimer, Tim Bellow, James Brown, who has left the government since, so a very talented group of people.

DR. LIPARTITO: Yeah, yeah. Most of these have been people like you who have come through various ranks or hired?

MS. MONTGOMERY: Most of 'em had come through various ranks. Yes.

DR. LIPARTITO: All right. There are these stories you occasionally hear when you go on Ebay to secure parts, is that a slight exaggeration or?

MS. MONTGOMERY: I think there are actually were some parts that had been disposed of that, again because the vender base is so wide around the country, most of the parts we bought, in fact, bought most of them locally. There had been a lot in California, a lot of the various venders and because the venders we're going out of business, but they laughingly told us, but really we're serious that we were ten percent of their problem, and one percent of their profit.

DR. LIPARTITO: Right.

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MS. MONTGOMERY: And of course, the vendors are out there to make a profit. Other were raising their prices so much because we were the only customer they had left. So we ended up bringing most of the work down to the Kennedy area, but there probably were parts that somewhere had been disposed of and were found on Ebay. I have no doubt it could happen, but when you work with a number parts in the number of areas that we did.

DR. LIPARTITO: Maybe this is a meaningless number, but if you had to put a number on the size of the number of things you had to keep track of, what would it be?

MS. MONTGOMERY: Oh, it was hundreds of thousands. Yeah and we used to do how many parts we had, but each is unique, for instance, each tile on each vehicle is unique, and so we were tracking an incredible number of parts.

DR. LIPARTITO: Right, right. Okay, so you did that for about, I guess, about another decade, is that right?

MS. MONTGOMERY: Yeah, I think about eight or nine years, yes.

DR. LIPARTITO: And then you moved over into Quality. So tell me a little about that part.

MS. MONTGOMERY: Well, Quality by the time I moved there had downsized quite a bit, but at the time, we were actively downsizing, and so that was probably the main challenges there. The technical parts were probably done pretty well.

DR. LIPARTITO: Right.

MS. MONTGOMERY: The main challenges there were the people.

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Convincing those that were there, that they had a future, but that the future was gonna change. And ultimately, I was proud to say that we got to a point, we again did a model. One of the men at NASA Headquarters kept telling me I should do a model and so finally, I, we, formed a model on how many people were needed and in truth we we're able to convince NASA Headquarters that we needed to hire more inspectors. We presented them various options of contractors, inspectors and other federal inspectors, and in the end ended up bringing in more inspectors on board. The only significance to that is, your inspectors were really highly trained. Most of them with strong military backgrounds or non-degreed, and so their kind of a sub-culture in NASA. It's harder to convince anybody you need to hire a non-engineer and they just hire an engineer.

DR. LIPARTITO: Right.

MS. MONTGOMERY: Most of the inspectors know this.

(laughter) So, I think the people problems for the year or so I was in Quality, were the biggest ones because we were in a dramatic change. We were getting out of the government part of the business. Not getting out, but severely reducing it. We were changing the culture they were used to.

DR. LIPARTITO: What was driving this change?

MS. MONTGOMERY: Well a combination of things. First was the theory that the contractor should be doing more. But the reality was, our inspectors were retiring and leaving faster than there were jobs to do, and so we didn't have the capability of doing the kind of work we had initially done, without hiring a lot more people. So it was two fold.

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DR. LIPARTITO: Yeah, yeah. And then were you there when that changed to a different department?

MS. MONTGOMERY: At that point the inspectors went back to the programs, as logistics did. All of this happened at the same time. They felt that by having independent organizations that the managers of the line organizations didn't take responsibility for safety, and quality and logistics. That they felt that was somebody else's job, I'm gonna do my job and let them do theirs. By giving them all the elements that belonged to them, rightfully so, that they then took those on and were responsible for the whole product.

DR. LIPARTITO: Right, right. Was this part of the center wide change? And who was behind this?

MS. MONTGOMERY: Roy Bridges. And he had a committee that worked on it and I worked on one of the sub-committees and it was, you know, it was time for a change. There were those that were opposed. Those that were for it dramatically, and I thought they fell in the middle. It was really their time to make a change.

DR. LIPARTITO: Yeah, the best organizations get through this. You know, centralizing and then pushing them back, and of course, it's a balance.

MS. MONTGOMERY: It's a balance. It also makes people think about what their doing. I know that there's a right answer in the end. I think by making the change periodically you examine your beliefs and you go back and think about the things that are really important.

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DR. LIPARTITO: Yeah, very good point. All right, well, if you wouldn't mind answering or not even answering, just like your impressions on a couple things. We talked about the issue of woman and Kennedy and obviously a big change. Your perspective, important turning points, moments or people who made this happen, or was it just a kind of continual process of change?

MS. MONTGOMERY: Both, certainly when I started to work for NASA, the highest ranking woman on Kennedy was a GS 13. Over time that certainly changed, so it was pushing the envelope constantly. JoAnn Morgan certainly made a big difference because frequently Joann was a path finder out there. Once step ahead of many others, but we were all pushing. The other big step was Post-Challenger, when NASA started hiring again. By then there were so many laws on equal opportunity employees, and there were a lot of woman graduating in engineering and a lot of engineers coming out of college. So we got a bunch of very, very, talented young female engineers along with young male engineers.

DR. LIPARTITO: Yeah, yeah.

MS. MONTGOMERY: And it became a much more diverse group and those young women have been here, approaching twenty years.

DR. LIPARTITO: Twenty years.

MS. MONTGOMERY: And they are moving through the pipeline as they should. They are showing their talent. They've been given opportunities and they've taken advantage of them. And so Post-Challenger is when it really changed.

DR. LIPARTITO: Ok, very good and looking back, again you've had a variety of experiences in, with the exception of firing Redstones in the

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fifties, you've had just about every moment in Kennedy history! Things that strike you as being either a great source of the strength of the place or conversely, if you want, weaknesses of the place, or challenges that have been met. Something looking back that seems to tie together the whole set of experiences?

MS. MONTGOMERY: I think the team, Kennedy has always had a team structure. Frequently the person in charge of the team, for instance, when I was a Flow Director, not one soul actually worked for me. There were, not even assistant Flow Directors, but the team structure has been extremely powerful. And when you work with a team, you know, you then celebrate as a team, you probably grieve as a team too, but there has been a real cohesion over the years, and that's how the program has always been structured. It works for a launch. Probably if one aspect stood out, it was the team structure.

DR. LIPARTITO: Did you have the opportunity to observe differences in other centers in NASA that made this stand out?

MS. MONTGOMERY: No, it was that, they are actually part of, for those programs they work on, they are actually part of the team. I mean the Shuttle program extends to Marshall's and to Houston. Each has their own culture.

DR. LIPARTITO: Right.

MS. MONTGOMERY: But again, when you really come down to doing to job, they work as a team.

DR. LIPARTITO: So that cuts across then?

MS. MONTGOMERY: It cuts across. But when you're making policy changes, I can remember some fights as the Shuttle program changed.

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DR. LIPARTITO: Right.

MS. MONTGOMERY: And different tactics that each Center used, to make their point, but again when it came down to a launch, no-one fussed about the management structure, no-body fussed about anything. They were interested in the technical issues. And so the team structure, it's just something I don't know that you have, most places.

DR. LIPARTITO: Okay. Anything, since you're retired now, you can speak freely? Anything you think should be, you would have wanted to have changed during your time or has changed maybe in a positive way, another way of saying the same thing. Something you saw that you wondered, are they ever going to get over this and maybe they should of or had by now?

MS. MONTGOMERY: You know primarily, and we've talked about it, just accepting anybody being an engineer. It's black engineers, female engineers, less preconceived notions of what people should be when they walk in the door. More acceptance of them. No, I thoroughly enjoyed, I really don't have a lot of bad things to say about NASA. I don't have a lot of bad things to say about retirement either. (laughter) But no, NASA always tried. You know, and they were a good outfit to work for all those years.

DR. LIPARTITO: So you enjoyed it all those years?

MS. MONTGOMERY: I really did. The post Apollo years, we had about a year before a Shuttle really became a reality, that was the most boring year in my life. We really didn't have work, but that was the time when we were the only memory left, and when memory was needed a year later, we started working incredible hours, and

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I guess the year before we had been working twelve hours a day, seven days a week, so it changed from being way too busy to where you didn't have a personal life at all, to where you were truly bored when you came to work. With a cyclical program you sometimes have that.

DR. LIPARTITO: Right. So you have to have people who are pretty steady .

MS. MONTGOMERY: You have to have mentors, older mentors that say to you just hang in there, this too shall pass. And in fact, it probably lasted about six months. It seemed like forever when you go to work in the morning and think, what do I do today?

DR. LIPARTITO: Yeah.

MS. MONTGOMERY: How do I keep busy, and at one point they hired a consultant who came and questioned us about the things we knew and we went to our bosses and said; why don't you just let us write the report, we'd love to do it. I don't remember why they even hired him, but I would have just loved to have done the work, but as I say it didn't last. But as a young engineer, I wasn't so sure why I was there.

DR. LIPARTITO: Anything else you'd like to say about NASA, Kennedy, your experience?

MS. MONTGOMERY: No, I'm not a – somehow I'm not a big talker about it, so no.

DR. LIPARTITO: Well, it's been nice and fun. You've been a wonderful interview and I want to thank you.

MS. MONTGOMERY: I've enjoyed it.

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DR. LIPARTITO: Good.

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