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**NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT
ORAL HISTORY TRANSCRIPT**

CAROLYN L. HUNTOON
INTERVIEWED BY REBECCA WRIGHT
BARRINGTON, RHODE ISLAND – 5 JUNE 2002

WRIGHT: Today is June 5, 2002. This oral history is being conducted with Dr. Carolyn Huntoon in Barrington, Rhode Island, for the Herstory Project sponsored by the NASA Headquarters History Office. The interviewer is Rebecca Wright, assisted by Sandra Johnson.

We thank you again for allowing us in your home today to discuss your career with NASA. Your career with NASA spans more than three decades, covering a number of positions and numerous responsibilities. But your first task for NASA started when you were a graduate student researcher. How did this project affect your decisions for the future?

HUNTOON: Well, you're right in the idea that my career with NASA started at that time. I was in graduate school at Baylor College of Medicine [Houston, Texas] studying human physiology, and my major professor had a contract with the Johnson Space—then the Manned Spacecraft Center, to do biochemical and endocrine studies on the astronauts that were flying in the Gemini Program. Actually, some analyses were made on some of the Mercury astronauts, because they had saved the samples.

He asked if I was interested, and I thought it was an exciting program because we were studying the reaction to space flight stress as the crews were getting ready for flight and after flight. So I began my work with him and on the very early Gemini flights, we made analysis on the steroids that are part of the stress reaction, as well as the catecholamines and various substances that you could measure, at that time, in the urine of the astronauts.

Then, as part of my master's thesis, we decided to study the salt-retaining hormone, [aldosterone,] because fluid and electrolyte balance had been a big issue with space flight. The crews were coming back in a fainting mode after they reentered. Their metabolism was not normal right after reentry, and we were trying to find out why. I set up an analysis for aldosterone, which is a salt-retaining hormone of the adrenal gland, there at Baylor College of Medicine, and that was for my master's thesis. I did the analysis on normal subjects and on astronauts and for the first time documented that people that go into space come back with a very high aldosterone level, trying obviously to conserve sodium which had been lost during space flight.

So that sort of was the enticement for me to get involved with NASA. After I received my doctorate there at Baylor, which I did on stress reaction, the control of the stress reaction in animal models, I applied for and received a National Research Council [NRC] fellowship at the Johnson Space Center, then the Manned Spacecraft Center, to study the metabolism of returning space flight crews. I graduated from Baylor in June of [19]'68, and I started down at the Center the day after Labor Day in 1968 as a NRC postdoc.

The studies that we were able to do at that time on the Apollo crew were mostly making sure they were in good health before they went and then making sure when they landed, they were in good health. We did no in-flight work at that time, because NASA had decided that the crews went through the whole Gemini Program, and we studied them quite a bit, particularly Gemini VII, which was long enough to go to the Moon and back, so we did not need [to conduct studies,] they were going to be healthy. That was sort of an edict: they were going to be healthy. And for the most part, they were.

But we were able to set up the laboratories, and our laboratories were in the Lunar Receiving Laboratory. The Academy of Sciences had told NASA they should build [a facility] in order to keep the astronauts, when they came home from the Moon, and the lunar rocks that they brought back, isolated until we made sure they weren't carrying something that would hurt people here on Earth.

So as part of that, we had to set up a medical laboratory, and that's where I worked for my entire career in the labs, there in that building. As you recall, after the Apollo 14, I guess, mission—was it 15 that was the last one that was in quarantine?—they stopped the quarantine, because we had found nothing wrong with the crews and nothing in the rocks so far. So they decided they would continue treating the rocks very specially, mainly to keep them from getting contaminated with Earth material. But they quit quarantining the crews.

We did do pre- and post-flight testing on [all] of the Apollo missions. On Apollo 17, because we were getting ready for Skylab, which was going to be a very long-duration mission, and because the Russian [cosmonauts] had had some medical issues, we decided to do more work in-flight in Apollo 17, and that was the first time that I got to sort of interface with experiments on the spacecraft and how we were going to collect urine samples. [I] became quite involved with not just the crew's pre- and post-flight, but actually getting things onboard the craft, getting procedures written, and that sort of thing.

That was a lot of fun. We were all getting ready for Skylab, on which I had an experiment (the one I proposed as an NRC postdoc, to go to the Johnson Space Center to do). It was the one that was accepted by the Washington science review to be on Skylab. So I was a principal investigator on Skylab, and that was really a tremendous undertaking. Skylab, as you know, was long-duration missions, nine crewmembers, and up to eighty-four days, the longest

one. The neat thing about it from our viewpoint was that there was a series of medical experiments. The investigators all worked together to make sure their experiments were complementary.

We found out a great deal by keeping things as constant as we could in their environment and the food, and then we could interpret the medical data much better. That was a tremendously successful [program], all three missions. We had a problem on the vehicle at launch, after they got that fixed, everything else was very successful. The crews did an outstanding job. They were on a complete metabolic diet for three weeks before the mission, the entire mission, and three weeks after the mission, which meant everything they put in their mouths, they had to record, and if they didn't eat it, they had to weigh it. [Laughs] They were on a [six]-day cycle of meals that had been analyzed. We knew in our labs exactly what the meals contained, and they collected all of their urine and all of their feces from that entire period of time, which we analyzed, and then we also had periodic blood sampling. That's an issue, because you didn't want to draw too much blood to affect the crews.

So when [Skylab] was over, we had in our possession the best data in the world on people exposed to weightlessness, not just my experiment, but all the experiments. And I will tell you, to this day, there is nothing that comes close to matching that [set of] data. Because we did such a good job and because the crews did such a good job, we had the opportunity to use that data for international negotiations with the Russians. The data are all a matter of public record because everything at NASA was anyway. But we went over the data with the Russian scientists, and because of that, they were more confident that their long-duration missions could go without problems and without endangering the crews.

We were hoping they would [extend] our data collection so that we would have a long continuum of the same kinds of data on people exposed to space flight, but the Russians were not able to do that [because] at that time, it was not a priority for them. They had the experience that we had. They had [our] data, and collecting samples and storing them and freezing them for return is not a small matter. It was expensive. It took up a lot of time from the crews. It took up a lot of power on the spacecraft. So those decisions were made by the Russians not to do what we had done, and that, to me, was always a disappointment.

As you know, our experience with the Russians began in the early seventies as one of the agreements that had been made by the president to exchange information with the Russians. I made [my] first trip in the [early] seventies. It was the first trip I had made on this exchange, [which I] continued until the time I left NASA, on a yearly basis, or sometimes twice a year, meeting with the Russians. This was an important aspect of the space medical program at NASA, because these were the two countries in the world that were sending people into space, and [although the countries] weren't always getting along very well back in the old days, the scientists and the medical doctors [were able to communicate]. We did exchange information and help each other interpret data that we did collect. I think that was an very valuable endeavor that we undertook, and I think the Russians believe that, too. I think they gained, certainly from our Skylab data, I know they gained quite a bit.

WRIGHT: How did the Russians accept you as a scientist?

HUNTOON: At first, in a suspicious manner, and I don't think the Russians were too different from Americans, when you first meet someone and don't know too much about their

background. After you talk to them and realize that they are technically competent and have technical information that they will exchange with you, and after you see them more than once you develop relationships. The relationships that I developed in the early seventies, I still have with several of the Russian scientists because we were working on similar projects, and I wrote a book with a couple of them, putting all of our data together.

So it's been a thirty-year history of working together and cooperating. Sometimes it was really friendly and warm, and sometimes it was really cool. But [we] made many trips to Russia, and they made many trips over here, as a group, in exchange. I think it was a good undertaking, and it served a purpose during a time when our countries couldn't exchange much information and the space programs were very competitive. The fact that the medical science aspects were not, also served a purpose to keep some doors open, and I think it was very valuable, and it still is a valuable exchange that goes on with them.

WRIGHT: Were you at any time in those early days told to not to exchange certain information, or was it a clear and open transfer of information between—

HUNTOON: All of the medical information was clear and open. Names of individuals were protected because of privacy. Even before the Privacy Act, we didn't go broadcasting John Smith's data as that. We talked about crew people. We were never told not to exchange anything. There was information that we knew was non-medical that we did not talk about, program information. But the scientific data, as I said, most of which is group data, and there's some individual without-name data, is in the literature. If you want to go find it, you can. So it's not a matter of us taking any secrets to Russia or anything.

WRIGHT: Do you ever feel the Russians were not forthcoming in all their information, or did you feel like it was as—

HUNTOON: No, early on we perhaps thought surely there's more here and they're not telling us. As time grew on, we realized they had many of the same problems we had. The priorities for funding went to things like rockets and oxygen and water on the spacecraft, things that were really vital. The scientific information, the medical, as long as they were healthy when they went and had the requirements for life, food, etc., they were healthy when they got back and with some medical changes, that studying the science of it was never a priority with Russia, and it wasn't with the United States.

We did the Skylab missions. But until that time, it was mainly to make sure you weren't hurting people and that they were healthy. And the Russians had that same priority. The cost of doing experiments in flight, the cost of the equipment, the cost of training the crew, the cost of the crew having to use their time on orbit for these things, was all taken into account and was prioritized. The medical research was never a very high priority, in either country.

... I think they certainly exchanged with us everything they knew, and, as I said, we helped each other on the interpretation of some of the data that could not have been done earlier.

[When] Dr. Charles [A.] Berry was head of life sciences in Washington [DC] [he asked me to work on a special project.] Because of my interest in laboratory work and my knowledge in that area, I headed a team to exchange [laboratory] procedures with the Russians. After we did that, we also exchanged samples and analyzed them in both labs. The value of that, of course, was so that we could [better] interpret the data. When you use different procedures,

[there are] different normal ranges. Sometimes it's difficult to make the interpretation. [This project] got us closer [to] the Russian scientists, because we were working on [a] specific project, together as opposed to sitting in big meetings and talking.

Following Skylab, there was a sort of dry period for space flight, because we were getting ready for the Shuttle flights. I got more into management, laboratory management, at that time. Also, we did a lot of ground-based studies. I think a lot of people don't realize that the scientists at NASA do quite a few studies of normal humans and bed rest, or we'd study some that were in undersea conditions, isolations. We studied head-down bed rest, because that seemed to be more indicative of space flight crews' results than just horizontal bed rest.

There's no way to get weightlessness on Earth, as you know, except for the zero-G aircraft, which doesn't give you enough time to [collect] scientific data [from human subjects]. So we were using the bed rest modeling and did quite a few bed rest studies. I have no idea of how many, and I'm not sure I want to know or if anybody else does....

I think a point should be made that a lot of folks do not realize that there is not a big database on normal individuals with physiological changes, which is what a space flight does. You know, there's a large database on people with various illnesses and all. The military would have the best collection of data on normal people of certain age, but the problem with that is that it's not terribly detailed in all parameters of physiology.

So NASA, with the data that we've collected with the crews and we've tried to standardize that, it really has one of the best sets of data on humans that exist anywhere, for the age group they are. We select healthy people, and then we keep up with it on a yearly basis as to how healthy they are. Then when they fly, we do a lot more work. So each individual astronaut

is tracked throughout their career. Then even when they go into retirement, [NASA] asks them to come back for their medical exams.

So we have medical exams on astronauts from the time they're selected till they die, in a lot of cases, not in every case. Some of them don't want to do it. But it really has helped build a database. We found out we didn't have, nor did anyone else have, data on women, that are like this. So we started collecting it. Of course, we did some studies with women, not near as many as we had done with men. Then we started collecting data when we were interviewing and selecting women to be astronauts. So now I think there is a better database on women that doesn't exist anywhere else, on normal healthy women being subjected to physiological stresses.

WRIGHT: You just mentioned about being part of the selection process. Could you tell us how you became involved in and what your involvement was as part of getting the Center and the agency ready for the new class of astronauts that were collected and selected in 1978?

HUNTOON: Well, it was an interesting time when NASA was building and getting the Shuttle ready to go, realizing that it was going to be a different kind of vehicle. It was going to have more space in it for the crews. It was going to have some of the conveniences of home that previous space capsules had not had. And the laws were changing in our country that women could no longer be discriminated against. The decision was made that we would select qualified women to fly in space.

The decision to work on the crew positions and the requirements for the various crew positions also led us to the decision that there was a pool of women who would apply. Now,

what I mean by that, the pilot astronauts had to have so many hours in high-performance aircraft and so many kinds of aircraft and test pilot schools.

At the time, in the late seventies, when we were getting ready, when we were making these decisions, there were probably few women, who had those qualifications to compete in that arena. That was because the Navy, the Air Force, [and Army] at the same time we were deciding to select astronauts, had decided they should train women for pilots. So we knew that at some point there would be, in the mill, women who are qualified to be pilots, but at that time, if there were any, as I said, that would be a very low number that had received that kind of training.

But for the other position, mission specialist, we were looking at people who had science and engineering backgrounds, who had some operational experience, who liked to do many different kinds of things, who had the right attitude and personality to want to be a part of a crew and go and do [what the job entailed]. And as I've said many times in speeches I've given around the country, it was not a matter of whether you want to be an astronaut or I want to be an astronaut; the idea is there were people who did want to be and there were people who wanted to be who qualified, women.

So they could apply and if they competed well in the selection process, they could be selected. That was the big issue, was to make it available for those who wanted to and who could. I have had many, many people ask me, "Who would ever want to be an astronaut?" Well, as I said, you might not. I might not. But somebody wants to be, obviously.

So we put out the announcement. We did not put sex in either of the announcements, pilot or mission specialist. We put the qualifications in, and we had a lot of people apply, as you know, for the 1978 selection. (I think we selected in '77 and they came onboard in '78.) There were 8,000 people applied to be astronauts. So there were a lot of people out there that wanted

to be, and most of the women we interviewed would say they'd thought about being astronaut when they saw the announcement that we were selecting and that women and minorities were going to be included (as they are in any federal job announcement). It worked out very well. We selected six at that time.

You asked how I got involved. During the period of time we were working on these announcements and making sure we were including people and doing surveys to make sure people would be applying, I was doing a six-month tour of duty in Dr. [Christopher C.] Kraft's [Jr.] office. He was the Center Director at the time. He had a process whereby he brought—quote, unquote—"bright young people" into his office as an assistant of some sort to see how the Center was managed and to see how the Center related to Washington and related to the other NASA Centers and all.

It was a big opportunity for me, because I had been so isolated in the science arena, and the only exposure I'd had to anything else at the Center was in operations because of the missions I had had experiments on. So to go up to the Building 2, it was at that time, and watch Dr. Kraft and others, good managers, manage the Center and deal with the problems and challenges in Washington and with the other Centers and all, it was a big opportunity, and I really enjoyed it.

We had at that time many issues. One was getting the Shuttle built, and I got to watch that from a very close position there. On a daily basis we tracked issues with the Space Shuttle, and so that's where I met Aaron Cohen and Glynn [S.] Lunney and people like that.

The other issue was this astronaut selection, and Dr. Kraft asked me, "Do you want to apply to be an astronaut?"

And I said, "No, I don't."

He said, "Are you sure?"

And I said, "I'm sure."

So then he said, "So then I want you to work with us to select and make sure that we select some good astronauts, both men and women," and so I did that. I then served on every selection board until I became Center Director. It was the first selection board I didn't serve on, because I had to do the selection. [That is, to accept or reject the board's recommendation.] But up until that time I was able to meet all of [the candidates] that were applying, that we brought in for the interviews and [medical exams].

We had to get things ready for women there at the Center. Attitude was the biggest thing we had to [work on].... When the women came and everyone saw they could hold their own, they were technically good, they were physically fit, they would do the job, people sort of relaxed a little bit and started accepting them. I think that was the biggest hurdle to get over, was just to get them there and get them in training. So it's been successful.

One of my disappointments is that we haven't selected more women astronauts. I don't know exactly why that is. But in '77 the big issue was that there weren't enough people in the pipeline that would qualify, because we wanted people with graduate science or engineering degrees who also wanted to be astronauts. [First it was,] "We've got to get more women into science and engineering." So we've done that, [then] "We've got to get more women with some experience." So we've done that now for twenty-some years, and yet when they select astronauts, they're still 90 percent men and 10 percent women or something. So there's still some issue there. I have been away from it long enough now, I look back on it, I'd like to work on that some, but I don't know what the issue is. I don't know if that is built into the selection process or if it's just the way things are in the country. I don't know.

WRIGHT: In preparations for this new class and the fact that there were going to be women offered the opportunity to become part of that class, were the evaluations for the physical aspects, or were there any specific studies done or anything changed in order because the whole class criteria was changing?

HUNTOON: Well, you know, NASA had not selected astronauts for ten years. The last group, I believe and I might not be exactly right about the date, but I think the last group came in in [19]'68, '69. It had been that long. So we used the information we knew from those selections, but then we sort of started over with current thinking, current procedures, using the information we had found out from previous space flights as to what was important and what wasn't. There were [selection] standards written for the first time, and I have to give kudos to my medical colleagues who did that.

WRIGHT: Go ahead.

HUNTOON: Okay. I was talking about the issue with medical selection. Until the selection for Shuttle crewmembers, NASA had not documented a [medical] selection process and what would be normal or what would be admissible as far as medical conditions. You know, everyone says, "Well, everybody knows the astronauts have to see," you know, "They can't have this." But now medical science has numbers on all of these things. They want people to see to certain dimensions. They want people to have blood pressure not over so and so. All these things that had never been written down. So they did, and they have a medical board, and they give all the

crew people the same physical exam, a couple of [tests] different in women than men, but everything else is all the same. Then the medical board meets, looks at all the data. Sometimes because something didn't look just right, they would ask for more tests, and then make decisions, and [the applicants] were in or out, based on [the] medical.

Then the selection board was able to make their selection from healthy people. This had not been done before in that order and with the certainty of in or out based on medical procedures or data. So that was a first and, I think, a very good thing that has happened. While I was still at the Center, this was adjusted on a five-year basis that went and looked [at the process and test], because medical science changes. Conditions once thought to be very serious [can now be treated]. So they went back and every five years after selection was over, they would go in and make sure that everything was still pertinent for today's medicine, and I think that's very helpful also.

WRIGHT: Were you able to input or provide input on some of those studies for that criteria, or was your position on the board one that didn't necessarily allow you to have the life science part?

HUNTOON: That's right. My position on the board was not in life sciences. My position on the board was as a board member for the interviews. The laboratories I managed in Houston were doing all the medical work, but I did not review the work in the laboratories. I left that up to the docs [doctors]. We made sure the data we gave them was good data, and the docs reviewed it.

WRIGHT: Let's talk about the time that you managed those labs. As we mentioned earlier, you started out when you were a graduate student, but you had a progression that came through that was very much a long list of accomplishments.

HUNTOON: Well, the progression came with changes at the Johnson Space Center also, because anyone that knows the Center, and I might say any government organization, but right now I'll just talk about the Center, knows that every few years there's a reorganization or an organizational change. I think they always think they're going to make things better by organizing it differently.

So we went through several of those, and time progressed, I managed the biochemistry portion and clinical chemistry portion of the labs, and then moved into being the Branch Chief over all of the laboratories, which included the environmental-type labs, toxicology and microbiology, as well as the medical, chemistry, and hematology, as well as the research labs. For a period of time that was very exciting, because there were a lot of technology, a lot of procedures being developed. We worked on all the devices that were going into the spacecraft, both the Skylab as well as the Shuttle, the medical equipment that was going on board. We were able to certify all of it.

We worked with specialists throughout the world on making sure that we were measuring the things we should be measuring and that we were using techniques that required the least amount of samples. We had quite a cadre of investigators working through our labs. A lot of postdocs came through there; [we] had a world-class laboratory, which at the time was the only government lab in the country that was certified by the American Society of Clinical Pathologists, because we were taking care of people's health also. [We] wanted to make sure

that there was no doubt that we were qualified. So it was certainly a lab to be proud of during those years.

It was while I was there that I did go up and serve the six-month tour in Dr. Kraft's office and then came back into the lab position. The publications we were able to get done at that time put out for the general community, the space community, the general public, as well as the medical community, the information that we had collected on humans in space. [This] did allow the investigators for the Shuttle flights and the Spacelab flights to have the foundation that we had created to make their proposals. I think that added a great deal to the complexity of some of the experiments that could go on board, because [scientists] didn't have to start from scratch. They could start with the foundation we had created and had published. So that was one of the reasons that, to me, publishing was such a high priority, was to get that information out so other people could use it.

After that period of time, I guess those years were spent mainly in doing the scientific work and publishing, doing our Russian exchange work, I was asked to be the Associate Director of the Center, and I went into that position for two or three years, I can't recall. It was a good time. I learned a lot about managing. The Associate Director at that time was a job that sort of ran the internal workings of the Center.

The Director of the Center did an awful lot with Washington. That was Gerry [Gerald D.] Griffin. The Deputy Director [was more involved in] managing the operations and the space flight operations work. So the Associate Director got to worry about the buildings and the grounds and the personnel, and every day a different problem. Pete [Henry E.] Clements was the Associate Director before I was, and he told me when I took the job that it was always BBs or basketballs. Every day someone would come in and hand you either a BB or a basketball, and

you had to deal with it, and he was right. But it was fun. It was rewarding. I learned a lot, a lot about management there.

It was during that time that we had the *Challenger* [STS51-L] disaster. So that put us all through some paces none of us predicted or would ever want to go through again.

WRIGHT: Can you specifically tell us what you were doing during that time and how your role changed and how your duties changed with all of the reviews and investigations that followed *Challenger*?

HUNTOON: Well, yes. They did, a great deal. I guess nothing ever happens at a good time. But our Center Director, Gerry Griffin, had just retired, and the Deputy Director was completely caught up in trying to get to the bottom of what had happened, on various boards and all. So for six months to a year, almost, I guess I was mostly running the Center....

As you mentioned, we had a lot of boards, a lot of reviews, a lot of new ways of doing business. We were in Washington a lot more, talking to people and having meetings about various issues. While the people at the Space Center, were, of course, we were all completely devastated, and the bad thing was that we could not put them all to doing active work at that time. We were standing down, and there were a lot of very smart, very hard-working, physically fit, mentally fit people wanting to do work, and it was very hard to find work for them to do because we were standing down. We were not flying spacecraft. We weren't preparing missions, and that's what the Johnson Space Center does.

So it was a big challenge to keep everyone motivated to stay there and work through these issues and get things right to get back to flight.

There was a big component of people working on return to flight, that was [the] priority, and on every issue of the return to flight. So that kept some people busy, but it didn't keep everyone busy, and that was sort of a hard thing to do. At the time I said, "I wish that we could get shovels for everyone and send them out to Ellington to build a new runway or something," you know, just put them to work, eight hours, ten hours a day or something, because people wanted so badly to contribute and yet it was very difficult. Not everyone could be on the boards and the reviews.

But it was a hard time. We put together the memorial service there at the Center that President [Ronald W.] Reagan came to, and that was put together, like, in two or three days. It was a very quick decision to have it there, and, of course, when the White House comes in to run something, you say, "Yes, sir. What can I do to help you?" and we did, and it worked out very well. But it was a very stressful time for all of us, because we couldn't do enough. That was the problem. We couldn't fix it, and NASA's used to fixing things, and we couldn't fix that [quickly], and that's one reason it was very hard.

Plus, we knew all the people. You know, it was like family, losing family, and that was hard, too. The combination of those things, that was a very stressful time for not just me, for everyone there. It was very hard.

We did get a new Center Director, Aaron Cohen, and he asked me to go down and take over Space and Life Sciences, which was the directorate that does manage all of life sciences, the space sciences, as well as the manned systems [engineering group]. I don't know how it's organized now. I did that for, I think, about seven years or so, and had a great time. Good people and good support from the Center management for the science program. We had a good

group in Washington that was helping us, and I think we accomplished a great deal. [We] got back to flying, and that was important. Of course, we had a priority on that.

Then we started doing the Spacelab missions, which allowed us, for the first time since Skylab, to do some in-flight experiments on humans, [we were] really getting more into understanding mechanisms now than we had been able to do before, so that was exciting scientifically.

WRIGHT: Were you able to cast your direction into the way that you would like for it to go for Spacelab, or did you let your scientists and your research people help form that?

HUNTOON: Well, I certainly had a lot of opinions, but everybody else did, too. Again, based on my responsibility, was the fact that there was a limited budget, and we wanted to make sure that what we [did] was [excellent quality]. We had quite a few [experiments] on each of the Spacelab missions, quite a few investigators from around the country and some of them were from around the world, depending on which flight it was.

So, dealing with making sure they got as many of their requirements as they could into the system, and then we had the hardware and the crew trained and all to support their requirements, that was a big issue, and that was part of my responsibility. Hindsight says that we did a pretty good job with it. It was not easy. It was difficult.

During that period we also kept our relationships with the Russians going and had an opportunity to collaborate a little bit more with them on some various things and got ready for the Shuttle-Mir Program [International Space Station—Phase 1], which was the opportunity to

take the Spacelab up and dock it with Mir and do some work there, because Mir had no room onboard to do [additional] analyses or [much] testing.

That was an idea that I had, and the Administrator bought, to do that, because [he asked] could we learn from having people onboard Mir for a long period of time? Well, yes. How can you say, “No, I can’t learn anything”? Well, what’s the best way to get to it? The idea would be to have a way to do some testing [before return to Earth]. Yet Mir was so crowded already. We thought that it was folklore or horror stories until our crews went up there, but there was literally equipment stacked in Mir that hadn’t been used for years because they didn’t know if it was broken or [not], or one person took it up and used it and no one else [needed to use] it and they never brought it back. [The results were] that the Mir station had a very small working space or crew space in it.

I wanted to have the other equipment available for us to do measurements with crews, and that’s when we decided to send the Spacelab up and dock it and do the analysis afterwards. I negotiated the science that went onboard.... Once Washington [Headquarters] decided they wanted to do this, then we had a very short period of time to get it ready. So we took experiments that already had passed a peer review test, and a lot of them had already flown in some form on another mission so we had [reusable] equipment, that had already been checked out, and we put together this flight.

The other issue is that we wanted to use the Russian crew members as test subjects also. We had to work with the Russian scientists and doctors as collaborators on these experiments, because it was going to be a joint mission. It wasn’t just [a U. S.] mission. The Academy of Sciences in Russia looked at the experiments. We had a special blue-ribbon committee over here look at the experiments to make sure everything was good. We were able to conduct that flight,

to do the analyses, and publish the results from it in a short period of time, and it was good, because it allowed [us] to open the doors [with the Russians] and really work together closely for the first time since Apollo-Soyuz [Test Project]. I think that was a very beneficial start to the International Space Station [relationships and] the work that's gone on there.

WRIGHT: You were very much involved as the Director of Space and Life Sciences when they did announce the Space Station Freedom and then, of course, now the International Space Station. What were your hopes for the science, and how were you involved in helping develop science for the Station so that that could be part of the initial planning?

HUNTOON: Well, that's always a big issue at NASA, has been since the first work that I ever did with them, and it's something that's very hard to explain to people not involved in the space flight community, as to why we claim to do things for scientific reasons, and yet getting the science onboard and accomplished seems to be one of the last priorities. If one thinks about the inherent dangers of space flight, all the things we have to make sure work perfectly before we ever launch anyone into space, one would understand that those are the priority issues, and we accept those as the priority issues.

The money that is available for any vehicle goes first for those life-challenging issues, hardware goes first for the rockets, goes first for the environmental control system, without which the astronauts can't live, goes first for the spacesuits without which they can't go EVA [Extravehicular Activity]. And then any money that's left over in the agency can go for science, and that's just the way it's always been.

So when we got ready for Space Station, here again, it was being created to do science, and yet it costs money to put a vehicle in orbit and keep it there. So the science money is present, but not at the amount that would be needed to really do [early] science on Station. I believe it's being developed now, and I'm glad to hear that some science is being accomplished up there. But the requirements [for the science] that we wanted to do onboard Station, we've known for some time.

It's just a matter, how do you get from the requirements to the hardware and get it on orbit and getting the crew time. That is always a big issue. If you have a small crew and they have to spend time doing the EVAs for operational reasons, they have to spend time taking care of the spacecraft itself, there's not many hours a day for them to do research. That always has to be worked out, so I worked with everyone else on trying to keep that balance, and I think we did a pretty good job of getting it laid out [in the past].

When I was the Center Director, which was the next job I took, the Space Station Freedom [was cancelled] and the International Space Station was born. It was sent to Houston as a program to be managed out of Washington. Houston was to be certainly a participant, but not in charge of the Space Station. I think we did a pretty good job of trying to merge the Station and the Shuttle, because that was one of the issues. The Shuttle was going to be [used to first build the station and then provide] the way to get to and from the Station. It had to be totally compatible with the Station....

The program itself was managed from Washington. It was an international program, [with many] agreements made with all of our partners, and those were all done out of [NASA Headquarters].

WRIGHT: Of course, at some point you had Station, Shuttle, and you had the Shuttle-Mir Office that was sort of in between. How were you able to communicate with all three of those as far as the sciences program?

HUNTOON: One of the issues, I believe, that has always made things at Johnson come out very well has been the relationship of the managers involved. Even if someone didn't report to someone else on paper, a large amount of communication occurred. I met on a weekly basis with the managers of all those programs as Center Director and what they could call status reports or whatever—probably Dr. Kraft started that years ago—to tell me what was going on, if there was a problem that I as Center Director could help them with, or if there was a problem that I could help them with in Washington or how they related to each other in the three programs, as you said, because they all were three related programs until Shuttle-Mir went away and it sort of eased into Station, I think.

Of course, one of the reasons they were all successful is we hired good managers. But good managers have a way of wanting to do things their way, so it was a challenge to keep it all balanced. But I think we did a good job, both of them. The open lines of communication, I think, is one of the big reasons that we were able to do that.

WRIGHT: Tell us how you learned that you were going to become Center Director.

HUNTOON: I talked with Dan [Daniel S.] Goldin [NASA Administrator] on two or three different occasions about the possibility. When he first brought it up to me—I never asked for the job—when he brought it up to me the first time, I told him I was reticent to take the job

because it was mostly engineers there at the Center. I mean, NASA was mostly engineering, and there had never been a scientist managing the Center. He said, “You know, there are a lot of engineers that work at NASA, and you have a lot out at the Johnson Space Center. You don’t have to be an engineer. If you can be a manager, you don’t have to be an engineer, and get along with people.”

He thought my background, my education, my talents for getting along with people in managing was what the Center needed at that time. I understood the priorities we had with the Shuttle and the Space Station. So he came back to me the second time, and I talked with several other people, including Dr. Kraft and Aaron Cohen and people whose opinion I valued, and they all encouraged me to try it, to do it, because it was a remarkable job. And I’m glad I did. I had a great time.

WRIGHT: Do you have a description or how would you describe the type of management style that you had while you were in that position of Center Director? Did it change from the way you had managed the Life Sciences Directorate?

HUNTOON: Well, in the broadest sense, no, because I like to deal with people. I like to get information. I like for people to tell me things, but to show it to me with numbers or graphs or something. I’m not into micromanaging, but I can’t understand magnitudes of things if someone doesn’t show me the before and the after or the effect something has and what have you. I guess that’s the science background I have, and that hasn’t changed very much through the years in the various jobs I’ve had. The idea that I want to go see things, I want to see how things work when something is an issue, that hasn’t changed.

The idea that it was a bigger job, certainly, and that there was more attention paid to budgets, I think because it was a bigger budget and it was spread over more and there were more issues, big issues, than I had had before, I think that was one of the big changes. There was more interface with [the various] political [offices] in the Houston and the Washington area that I had been exposed to before in Life Sciences. I had done some [work with them], but not a lot.

I certainly had given a lot of technical speeches in Life Sciences, and because of my involvement with the Astronaut Office and the astronaut training and selection, I have given a lot of more general speeches about the Shuttle Program and crews. But I really got into public speaking more as Center Director, because they're called upon to represent the Center, I mean, much, much more in Houston as well as nationally. So that was another aspect that was more, same sort of thing, but more of it, kind of issue.

I think the delegation [of work was also something I accomplished.] Again, because I am not an engineer, I had to depend on people that I thought were telling me the right thing, and I had to learn to depend on their judgment. But my intuition [about work and people] is pretty good, and I still stick with that a great deal.

I learned early on in managing in Life Sciences, you always wait until [you hear] at least two or three versions of the story before you act, because everyone has a different view of what an event has caused or done. People want you to make decisions when they come you tell you something. But the issue I learned was to sit and say, "Well, I'll look into it," and find out what the other side of the story is, or the rest of the story is. So that was something that, as I matured in management, I learned more about [not being too quick to jump to conclusions].

WRIGHT: Soon after you took that position as Center Director, you initiated a major reorganization at JSC.

HUNTOON: That's right.

WRIGHT: Could you explain why you felt that was the time to do that?

HUNTOON: Well, we had not had one for some time, and, as I said earlier to you here, NASA somehow—and I believe all government agencies, somehow believe that whenever you're going to manage something, you have to change the organization. We could have managed the Center with the organization that [was present], because, again, I've pointed out that it's the people that were so important to us and the people relationships, and that can be in almost any job [title] reporting mostly anyplace, if they're the right people and doing the right job.

What we tried to do was streamline it and make it so that there were clear lines of responsibility, because over time those sort of mesh together, who's responsible for what. We were really trying to clean up the lines of responsibility and take advantage of the timing, because the Shuttle-Mir [Program] was drawing to a close and the big issue was Station, and a lot of people had been so devoted to Shuttle, we had to sort of bleed some of them off to do Station work, because our focus then became more on building the Station. So it was just the right time to do it.

WRIGHT: What goals did you set for yourself when you took the job as Center Director?

HUNTOON: Well, the primary goals, I believe, were, of course, to run the Center in a way that the work that the Center is responsible for could get accomplished. So you say, “Well, what was that?” Well, it was operational human space flight and every aspect of it. The Johnson Space Center, as you know, has an element in almost any field of engineering or science that you can think of, as part of that program, because it was so important to have the right engineering work done, the right operations work done, and then to have a science input. Scientists, we always laugh about it, but they always have a sort of maybe a different view than a lot of people about things, but it’s a very valuable input. So the Center had always been formed with those three major contributors, and I wanted to make sure that that was a way that we continued our work with Shuttle and built the Station, and I think we did that. We did a good job of that.

We had to recruit people. One of my goals was to recruit some younger people into the Center with some qualifications, because we were losing people. People were retiring. That was the period of time when people who had been at their heyday, if you will, during Apollo were now retiring from the Center and leaving some voids. So we wanted to recruit some people, and we were able to do that.

We have an excellent personnel office there at the Center, an excellent business office, and I wanted to make sure we supported those people, because they’re the ones that kept our operation running [smoothly]. Often when there’s a tightening of the budget and the personnel, it’s our support offices, the Center operations, the personnel, business office, they’re the ones that get hurt the most. We had to rebuild some of those organizations.

So it was a period of assessment for the Center, of rebuilding some of the organizations that needed the attention and focusing on what the change in the agency was going to be with the Shuttle and the Station being the primary focus.

WRIGHT: One of the offices that you opened as part of your position was the Technology and Transfer Commercialization Office. Why did you feel that was an important new office to incorporate?

HUNTOON: Well, from the time I went to the Johnson Space Center, always the technology was a big issue, and the fact that we were, not just in science but [also] in engineering, doing a lot of innovative work that could be used other places, had always been a focus. There had not been a specific office for some years. I think maybe many years before there had been.

[NASA Headquarters] was paying more attention to [technology at this time], and we needed someone to not only interface with our scientists and engineers, but also work with the Washington office to make sure that money we were spending, time we were spending on developing things was being put into use wherever it was needed in the private sector or in other government agencies. So that's why we formed that office, and I think it was very successful.

WRIGHT: Throughout your entire career, there are lots of evidence that you have paid particular attention in forming networks and partnerships with community and with academic institutions and industry, commercial operations. Would you tell us why you feel that's important and maybe give us an example of one of the ones that you feel that you have founded so that therefore that impact can continue to do its work?

HUNTOON: Well, I think what I was just saying about the relationships with the work we were doing there at the Center, early on in my work at the Center—and others have talked to me about

it also—it's quite evident that we had a unique job and we were in a unique place in history in our country. We had unique funding to accomplish things, but we certainly did not have [all of the smarts] at the Center. We were rather isolated in lots of aspects.

So in order to reach out and get the best people in the country thinking about some of our problems and helping, we did form quite a few of these relationships with universities, had them in to help us. The first thing I did as a postdoc was [form an advisory] group [of people from] Mass [Massachusetts] General Hospital [Boston, Massachusetts], one from Miami Medical School [University of Miami School of Medicine], a couple from California, all outstanding men and women in the field that I was working in, endocrinology. [They came] to the Space Center a couple of times a year. They would look at the work I was doing. They'd make suggestions, or they would go home and do things to help and all. That was a sort of a model I used even after that, to reach out across the country and sometimes internationally, to get people to address problems we had.

We also sort of did that in a technology sense. When we needed a piece of equipment, we would call on everyone who was working in that area and tell them what we needed and see who would propose. Then we would keep them on to help us evaluate it and the results, even after we flew it the first time. That was always very helpful in a small sense, and what we needed to do was expand that.

When I was Center Director, I wasn't the only one at the Center doing this, but it was not a coordinated effort, and so we expanded it into an office, where the engineering aspects as well as the science aspects [of technology] could be managed and taken into account.

WRIGHT: One of the facilities that was opened while you were there as Center Director was the Sonny Carter [Training Facility] Neutral Buoyancy Lab [Laboratory]. Could you tell us your experience with that, and how you were involved in making that idea become a reality?

HUNTOON: We had what they called the WETF [Weightless Environment Training Facility], the water immersion facility that had been built, I think, about the time of the end of Apollo. They took the building [which] was a round centrifuge building, took the centrifuge out, and built a big tank in it. All of us thought that that was probably as much as we would ever need [for EVA testing].

As we were preparing for the Space Station, and actually a little bit before, when we were doing things like the Hubble repair [mission], we realized that that facility was not enough. It was being used a lot because there were so many EVAs on the Shuttle, but also it wasn't big enough. So several studies were done, and the first people that came forward, I was still in life sciences, [were] the folks from the Manned Systems Division. [They] came in and presented this thing that the WETF was not going to be enough to support the Shuttle flight and the Hubble repair and build the Station [and we needed more capacity].

Well, they did the Hubble repair EVA work over at Marshall [Space Flight Center (MSFC), Huntsville, Alabama] because they had a neutral buoyancy lab of some sort over there, and that took that load off, but still we did not have the time or the space in the tank to do the Shuttle and Space Station training and to build the Station. So they presented all this to me, and I laughed them out of the room the first time. I said, "You know, this agency is not going to build another tank and certainly not one that size."

So they left and went back and got their data calculated some more and came back in again and convinced me, and so I took it up to the Center Director, who at that time was Aaron Cohen. The first time we told Aaron this, he [reacted] the same [as I had] and told us we had to be smoking something, because there was no way the agency was going to buy or build another tank.

So we went around the country and looked at everything you could think of that might be big enough for that work. People say, because they don't know, "Well, they make movies where they have ships that turn over in the water and all. So they must have big tanks out there." Well, they don't. We found out in Hollywood they flood a parking lot when they need to do an ocean scene, and that's how they have enough water.

Anyway, we also found there were large concrete tanks that had been built in, I believe, West Virginia or some place like that, that were for radioactive [work] but were never used for that, so we could flood those and use them. We went there and looked, and they were not the right size.

So we went to look at what the Russians were using, and we went to various countries that had some facilities, because the idea is, if it's just a matter of needing a big area with water, we don't need to go build that; we can find it. Well, we could not. The idea of using the open water in the Gulf of Mexico was considered, and the amount of the equipment and the down-time because of weather and [salt water], that was put aside.

So finally the idea of we needed the facility and we needed to build it, which happened about the same time that one of the very large facilities out at Ellington [Field, Houston, Texas] that had been built, I believe, for the Space Station Freedom work was going to be vacant. It was a very large facility, and so we examined why we could not do in that facility what we had done

years earlier in the old centrifuge facility, and that is put a swimming pool, if you will, inside it, and that way we wouldn't have to build the outside structure.

But it was certainly something that I don't know of anything, perhaps other than one of the big Shuttle or Space Station Programs, that was examined that much by that many people. I recall there were so many folks who were against it until they saw all the numbers, and we ran the numbers so many times of how many crews you could train for how long on what missions. I mean, there were many, many models, and there was just no way to get it done without a larger training facility. So it got [built] and got opened, which was very good.

WRIGHT: Scientific data used for determining that a facility needed to be needed.

HUNTOON: Yes, they had to use the models and the predictions and all this, mainly because, you know, for every hour of EVA at that time they were using six or eight hours of in-the-tank time for it. So it was just multiplied out, and realizing we were going to use the crew to assemble the Station was the big issue.

WRIGHT: While you were Center Director, you were asked to lead the development of plans for the Institute of Biomedical Research. Could you share with us the reasons you decided to do that so soon after you had moved into the Director's position?

HUNTOON: Well, the issue came up that there was a continuing problem with having the visibility and the funds and all to fund the next level of medical research that needed to be done. Several models were looked at. The Administrator decided to look at forming institutes for all

the science areas within NASA, and I was asked to be on that committee, which was run out of Washington. It was one of those good NASA committees. We looked at every kind of institute that the government already was involved in, government-wide. Then we looked at difference sciences—space science, Earth science, microgravity, and life sciences—how they would benefit from an institute or not.

The committee [concluded] that the life sciences would probably benefit the greatest from having an institute formed, because it was having the hardest time attracting investigators into the program, and that's another issue that I will speak to in a moment. But because of that, that's when the Administrator asked me to head that effort, and that's when I went on leave from being Center Director and then transferred over there full-time.

I did lead that effort, and it was a sizable effort to consider why we would do it and how we would do it. We finally decided that the only way it would be successful would be to make it in its initiation paperwork, to make sure that it was in the proximity of the Johnson Space Center. So that was one of the criteria for funding it. The other was to make it the broadest science involvement that we could, and so we encouraged the institute not to be just one school [or medical center] but to be a large group. There were two groups proposed, I guess, and the one that's down at Baylor [was selected] as the one to fund for this effort.

I think it was important to do it at that time. I mentioned I had trouble recruiting [scientists]. In the life sciences community, the biggest funding source is the National Institutes of Health [NIH], and their budget used to be nine to ten billion. I think it's doubled in the past five years or so. But they fund most of what goes on in medical research in this country. Therefore, we did not have the opportunity to have a community that was solely a NASA medical community that was looking at NASA problems.

Most of the medical funding, ninety percent of the medical funding, in this country comes from the NIH, and so, therefore, most medical investigators apply to the NIH for money, particularly the top ones, and are funded mostly from the NIH. The NASA community that was paying attention to the medical issues, and I'm not speaking of health care of the astronauts, because we have certainly put some priority on that, but I'm talking about research in life sciences and research in problems that we have, we could not get a consistent group of high-level people to pay attention to it. It's logical when you think of it. Our funding source was small.

The biggest funding source was NIH, so they paid attention to NIH issues, which were mostly diseases, studying diseases or the mechanisms of diseases or how to treat diseases and what have you. We certainly did not have anything that critical with our crews, but we do have some issues that particularly for long-duration space flight, needed focused medical attention of duration and not just sort of hit-and-miss when the budget could afford it.

So the decision was made to form this research institute, and the research institute would then be a long-term issue that would follow experiments and the investigations for over years and not just be short-sighted as far the funding goes. They have been in existence now, I believe, five years. In fact, next week I'm going to look at the review of what they've done in the five years, so that'll be kind of fun to do that.

WRIGHT: And how did this affect your tenure as [Center] Director?

HUNTOON: As I was [addressing] that issue, I got involved in work [at NASA Headquarters], and the Administrator wanted me to come be an assistant to him to do this institute, as well as some other issues in Washington. So I moved from Houston to Washington and got an offer

about that same time to go over to the White House to work in the Office of Science and Technology Policy, to do policy work that affected the science in the whole nation. So I had the opportunity to do that and took that opportunity, which was really a [great] job. I worked for two or three years in that job.

WRIGHT: Did you find that to be more of a consulting position, or—

HUNTOON: No.

WRIGHT: Could you share with us some of the duties that you had then?

HUNTOON: Oh, yes. It was very broad in the interests, because if you think about the whole nation's science program, that is very broad. I worked on almost everything that came into the office in some way or the other, but several specific issues that I managed myself. One of them was a study that we did across the entire federal government about research into issues that affect children and talking about health care as well as education, as well as well-being, general well-being, psychological as well as physical, and found out that although a lot of money was being spent on children in our country, very little was being spent on research for children.

So why would that matter? Well, if you stop and think, we do lots of programs like Head Start, we do lots of medical programs, vaccinations, that sort of thing, and yet no one was [studying the results in a scientific fashion]. So we had nineteen federal agencies that fund something about children altogether and came up with a list of priorities for research that we then presented back to the government through the agencies, and got a program started so that there is

a bona fide research program about the effects of various [programs] on children as they mature and how that affects their growing-up, and as members of society. We published a report and it was taken seriously [by the administration].

I had several other [projects. One] where I worked some on the [policy about the] disease that the soldiers got in the Gulf War. I was reading in the newspaper recently that it still is not a decision that has been made as to whether people in the Gulf War really got a disease or not, because the statistics do not bear it out, but yet people have gotten sick. [It] was a psychological as well as a physical condition, and I was able to work some with the commission that established to [consider the basis of this problem].

I worked [some projects] with folks in the Department of Energy, and that was when I was asked by the Secretary of the Department of Energy at that time to [consider] a job there as an Assistant Secretary [responsible for nuclear waste]. Again, that was one of those times when I said, "This isn't a field that I have an expertise in."

It was [United States Department] Secretary [of Energy Federico F.] Peña at the time. He said, "We need someone who can manage, can build an organization, and who has experience in managing large contracts [and experienced in project management], because that's what this job is. There are lots of people working there that know about nuclear waste." So I talked to him two or three different times before I agreed to [having my name sent to the White House]. It was a presidential appointment, so I had to go through all the White House clearances, and then had to go up to the [United States] Senate for confirmation hearings; that was an experience.

I had that job for two years. It was fun. Before my name was even submitted by the White House, Secretary Peña left and Secretary [Bill] Richardson came onboard, so we had a little hiatus there while everyone (several other nominations) met him to make sure he wanted us

on his team, too. So we did that, and he said, "I guess you're my man then. I'll tell the president you're my man."

I said, "Well, whatever, if that's what you want to tell him." [Laughs] So I did that, [I] worked for him. Then when President Clinton's administration was over and President Bush came onboard, he asked me to stay in the job because there were so many changes being made, they were trying to keep some continuity. Because I had been a federal civil servant for thirty years, although I was a political appointee in that job, I had a government background. So they asked me to stay.

My husband had already moved here [to Rhode Island], and I said I would stay until they found someone, which they did last summer, and I retired.

So now you know everything I know.

WRIGHT: All these years that you've had all these different positions and opportunities, is there one that you wish you could have stayed just a little bit longer to accomplish a little more?

HUNTOON: Well, sure, every job.

WRIGHT: Every job?

HUNTOON: Every job. [Laughs] I wasn't ready to leave any of them. I would have stayed running the laboratories. I would have stayed as the Associate Director. I would have stayed as head of [Space and] Life Sciences. I would have stayed as Center Director. But, you know, there's times in your own career where things change, external factors change, your own

priorities change, and each time that it just seemed like it was the right thing to go do, and I haven't regretted any of it. Had a great career. I hope to still make some more contributions.

WRIGHT: Looking back on those times, are there specific contributions, or is there a time of that career that you feel like you have made a lasting impact on the benefits for the space agency or for the people that have followed you?

HUNTOON: I would hope so. [Laughs] I hope there are many examples of that. I think that we'd have to sort of ask them if they used what we set up. I think talking in the "I" part is hard for me, but it's also hard for anyone that's worked an organization like NASA, because it isn't an "I." It's always a "we." There's always a lot of people involved, a team effort. You form relationships with people that last, that move on into the next phase, etc. So I think it's sort of hard to take credit for rights and wrongs in the [major decisions we made].

I think the relationship between the Station and the Shuttle that we set up when I was Center Director, I think that has grown into a good way of doing business down there. I think some of the people that we were able to [recruit and] retain certainly have contributed greatly. I think the methods that we set up for external involvement in our science [and engineering] programs has lived on, so I think there's been quite a few contributions.

Some of the contributions that I made to try to get women [and minorities] into the system and as part of contributing members of the staffs, I think that caught on to a certain degree. Maybe it would have happen anyway, but I happened to be there at that times that it did happen.

In the Washington jobs, of course, the one at the Office of Science and Technology Policy, I made some contributions. Everyone that goes in those jobs, which are all two or three years, makes contributions. The one at the Department of Energy, I think we did a great deal to get the communities involved in some of the decisions that were being made around the complex for this nuclear waste that was being stored, and I think that's something that will live on, that contribution.

We also got a stable budget and convinced members of Congress that we were using the money wisely, and I think they have a real good foundation for the next Assistant Secretary to build on. [I put emphasis on science and technology because it was obvious that we were not going to deal with the problem without new ideas.] I was proud of our accomplishments there.

WRIGHT: As I was compiling my information so that I could use it for research for the session today, I noted a lot of titles for you, one being the leading authority in space flight, in endocrinology, that your standards have become the fundamental space medicine standards. You were the first female Center Director. You were the first Associate. As a female, lots of firsts. I also found one that someone said, defines you as "a person with a sense of purpose." So if you had to describe yourself through your career with NASA, is there a description or a title that you feel like you're most associated with or that you would describe yourself?

HUNTOON: I'll have to think about that one. I think the idea of accomplishing things and finishing things that you start has always been a big issue with me, and that is one of the criticisms that many scientists get, is that they do not finish things.

I have a very large list of publications, and part of the reason is because I always use that as a signal. When a project was over, I wrote up the results, and that was sort of tying the ribbon on the package. I think that to have accomplishments that you can look back on that even though they were [initial findings], they were building blocks for the next experiment or the next space flight or the next project. They were still steps along the way that accomplishments got highlighted, published, talked about nationally and internationally.

To me that was a way of doing business that if we could convince more of our scientists and engineers to do that, NASA would not have as much criticism as it does now for keeping things internal and keeping things close. [NASA scientists and engineers] don't mean to do that. It's just dissemination has never been a priority for most people, and I had a priority on dissemination.

WRIGHT: You do have a long list of firsts associated with your name, and some of them are associated with gender. Did you ever feel sometimes that the gender issue was overemphasized or possibly shadowed the fact that you were an accomplished scientist?

HUNTOON: Oh, I think so. I accepted that because that was the community at the time, and I really didn't have a choice. You either accepted the ground rules, or you didn't play in the game. So I accepted that. The NASA program in general did not discriminate, and the NASA program in general was very good to me as an individual, as it was to many people.

There were individuals in the program that did discriminate, did make life hard for me and other women. Luckily, they moved on. I outlasted most of them. So I think the idea of women not being just like men, some people can't get over that. They would [hire] women [to]

do jobs, and the fact that they didn't behave just like another guy would do, meant they couldn't do the job. [Some managers] weren't willing to give them a change to develop their own way of doing things. I ran into that several times. Other women have, too. It's not unique to me.

But I decided that what I was accomplishing and what I was able to get done in spite of all that was worth it to me to stay there and do it, and that's why I did. A lot of women did not, would not do that. A lot of women have left, not just NASA, but other places at mid- or high-level careers because they just didn't want to put up with what you had to put up with. To me, it was worth it, and, as I said, in general I was treated very well by most people. There was a few that did not, but [that's life. It's not always good].

WRIGHT: Well, before we close today, I was going to ask Sandra if she had a question for you.

JOHNSON: Just a quick question. I wonder if you could explain the role with the Manned Space Flight Education Foundation and the formation of Space Center Houston.

HUNTOON: When you said Manned Space flight, I was thinking, what is she talking about?

Well, yes, I don't remember what year it was. You'll have to find the year.

JOHNSON: I think it was [19]'86 or something.

HUNTOON: The idea that people were coming to the Johnson Space Center to see things, and yet it was a very difficult situation to manage, because we had no official program. We had one

museum that was the right size on Wednesday morning at ten o'clock, but the rest of the week it was not the right size. [It was just too crowded.]

One Labor Day I went over [to the "Visitor's Center"] because I had some guests from out of town, and I was just aghast. I had never been there on a holiday before. I realized it was just, I mean, it was totally ridiculous, as a lot of other people had, too. So that all occurred about the same time that Mr. [Harold S.] Stall was the head of Public Affairs. So he got started doing some studies and having some studies done about what we could establish at the Center and all that.

So as it turned out for, I believe it was for legal reasons, they formed this foundation that would oversee the building of the Space Center Houston. I was on the founding board of directors and stayed on it until I became Center Director. But we had a lot of decisions made. You know, the fact that the Johnson Space Center is unique in the world, but [also] unique certainly in NASA and in Texas, it certainly is a draw for people to come to see it, and it certainly deserved more than the attention that we were paying at the time.

But we could not get federal funds to do anything about it, to make a larger area or to take care of some [deteriorating] displays. So we decided to raise public funds to do that, and we had to form this board and this foundation in order to do that. I don't know how it's doing today. I know it got started off to a [slow start]. It's a beautiful facility, and certainly meets all the expectations we had then. Financially I don't know how it's doing. But it's certainly something that I suspect in time will be just fine. It's going just to take the time.

But we certainly had people making that an all-day part of their visit to Texas and to the Gulf Coast area. It was less of an embarrassment than it had been because there was actually something for them to see and do while they were there. And we got the information about

space and what we had accomplished at the Johnson Space Center to the public in a better sense and it was able to offer the IMAX Theater. [This allows the showing of the wonderful space films that IMAX has made.] So from that viewpoint I think it's very successful.

We went through a lot. I skipped from the beginning then to the end, but in that period of time, which was about three or four years, we did an awful lot of hand-wringing and meetings with bankers try[ing] to find out ways that we could raise this money. It was a big issue at the time, and I guess it still is, because we had nothing to give them for collateral. The artifacts belong to the Smithsonian; they don't belong to [NASA]. The land we wanted to build on belonged to the federal government.

So if we [were] not able to pay [back the] money we were borrowing to build the facilities, they had nothing they could do to use. They could not take the land. They couldn't take the artifacts. So it took a very unique way to raise that money, and we were able to do it. As I said, I think it's successful.

WRIGHT: Well, our time with you is about to close. Before we finish, I wanted to ask if there was any other aspect of your career that we didn't have a chance to visit with today, or if there's any other thoughts that you would like to add. Looking back, you certainly have accomplished so much from the day you walked in as an aerospace technologist until your White House work and, of course, the work that you did as NASA.

HUNTOON: I can't think of anything. I think you covered most everything that I would have.

WRIGHT: Okay. Well, we thank you again for spending time with us.

HUNTOON: Okay.

[End of interview]