NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT
ORAL HISTORY TRANSCRIPT

WILLIAM W. PARSONS
INTERVIEWED BY REBECCA WRIGHT
NASA KENNEDY SPACE CENTER, FLORIDA – 1 JUNE 2007

WRIGHT: Today is June 1st, 2007, and we thank Bill Parsons, Director of the Kennedy Space Center, for speaking with us today regarding his experiences with the NASA Space Shuttle Program. The interviewer is Rebecca Wright, assisted by Jennifer Ross-Nazzal from the Johnson Space Center Oral History Project.

Tell us your first impressions of working in the program when you first came on board.

PARSONS: I was working for McDonnell Douglas [Corporation] across the river on projects for the Department of Defense [DoD]. We were supporting Department of Defense spacecraft that were going to fly on the Space Shuttle. So for a couple of years I was starting to creep into that Shuttle culture. The spacecraft that I was working on, processing and fueling and everything, eventually got put in the canister and went across the river.

So whenever there was a launch, I was there, because the thing I had worked on was in that payload bay and was going to get deployed, and I was very interested in what was going on. From 1985 when I saw my first Shuttle launch to when I started working on spacecraft that were flying on the Shuttle to eventually joining the program, I had already started becoming a Shuttle geek. They were winning me over every day.

But when I was with McDonnell Douglas, from a contractor's standpoint I was reluctant to come to work for NASA, because our impression was the contractor does all the work and NASA just does the oversight, so why do I want to go? I love doing the work. I like the hands-

on stuff. Why do I want to go do the oversight part of it? So I didn't have a good appreciation, I think, of what NASA really did. Like I said, I was very reluctant to come on board.

When I eventually came on board, the first place I went was the payload changeout room. It was STS-38. I had put the spacecraft in that canister, closed it up, and it started working its way across the causeway to the launch complex. I went in and checked in with NASA, got my badge, and then the next thing I know I'm out at the payload changeout room working STS-38. Because I had all the clearances, I could go out there and do that.

It turned out that it wasn't really oversight as much as I thought it was. You were involved in solving problems on an hourly basis. I was on the phone trying to remove roadblocks so that our contractor and our customers could get the work done that they needed to get done, and I was just as busy as I've ever been, really. At a different level doing different kinds of things, but all of a sudden I was involved in, again, removing of those roadblocks, because of the bureaucracy of a program that's so large, the bureaucracy of the government and contracts and the number of people you have involved in a program like this.

What NASA did here at the Kennedy Space Center, what we were always doing was trying to find ways to get it done. That's actually one of the things that I say at the conclusion of my implementation plan. Looking ahead, I basically say [reads], "But most of all I see a team continuing Kennedy Space Center's heritage of finding a way." So what I found out for the Kennedy Space Center is our job is to find a way, to find a way through the maze of all the things that happen in a program this large.

So my first impressions were that the NASA team that worked on Shuttle was a team that always was looking for ways to overcome obstacles, whether they be technical obstacles, as the hardware's not operating the way we want it to operate; whether it be paper obstacles about

closing out the paper or getting a signature or getting an inspection; or whether it be something that happened like spilling hydraulic oil that might cause contamination to a spacecraft that you then have to go figure out how you're going to get cleaned up and convince the spacecraft community that it won't harm their spacecraft, that we have cleaned it up in the right manner.

We were always trying to find a way, and so my impression was that of a team that was high-performing and looking for solutions, and that was great, because I didn't want to work for a team that was looking for ways to say you can't do something. They were always finding ways to say they could, we can, we'll find a way for you.

WRIGHT: During your first ten years with the agency you worked in a number of areas as well as a number of [NASA] Centers. Share with us some of the major changes in the Shuttle Program during that time that impacted day-to-day operations.

PARSONS: Well, here we were. We had separate contracts at every Center. You had a contract for MOD [Mission Operations Directorate]. You had a contract for the program. You had a SPC contract, which is the Shuttle Processing Contract here at the Kennedy Space Center, which was Lockheed Martin [Corporation]. You had [NASA] Marshall [Space Flight Center, Huntsville, Alabama] elements and everything. So you had all these separate contracts, and NASA did most of the integration. There was a huge workforce, a NASA workforce, at Johnson Space Center [Houston, Texas] with, I believe, Rockwell support, that was doing the integration of the Space Shuttle Program.

So in, I believe it was 1994 or somewhere in that time frame, we started, Chris [Christopher C.] Kraft, Dr. Kraft, ran the Kraft Committee looking at how could we find a way

to have an integrated contractor to do the Space Shuttle Program, and really looking at making the program more operational. That was the goal: to make the Shuttle Program more operational.

I was the person that went and got the coffee on the Kraft Committee, because at that point in time I was Jay [F.] Honeycutt's intern. So I was just there. I was just GS-13 [General Schedule pay scale], just sitting there kind of getting to observe, and I watched Dr. Kraft bring in a very high-level group of people that sat down and decided how they thought that could be done, and really overall created SFOC, which is the Space Flight Operations Contract.

But really what they did was they brought in each contractor and said, "If you were king for a day, how would you run this?"

Lockheed Martin came in, and Boeing [Company] came in, and Rockwell [International Corporation] came in, and McDonnell Douglas came in—well, I think it was Martin Marietta [Corporation] came in—Morton Thiokol [Incorporated]. Each one of the contractors came in and told them, "Here's what I would do if I was in charge."

In the end, some magic happened in the back, because I don't really know all the politics, and there were probably conversations that I'm not aware of. Eventually Boeing and Lockheed created this consortium called USA [United Space Alliance]. USA came on board and we gave them the contract. We JFOCed [Justification for Other than Fair and Open Competition] it to them or whatever you call it. We novated other contracts, put that together, and USA was created to integrate the Space Shuttle Program.

That was a huge cultural change, not only for the program but for the folks at the Kennedy Space Center. There were a number of people, old-timers, that said it will never work; it's not going to be safe.

Then there were the young people like myself and Jennifer Kunz and "Pepper" [Philip E.] Phillips and people that are doing great things here at the Kennedy Space Center today. They were the ones that jumped out there and said, "Okay, let's find a way," and they did. They said, "Here's how we can turn this over." Here's how we can turn traditional NASA-government roles over to the contractor. "Here's the qualifications that USA personnel need to have to take that role on." They evaluated them, got them the skills, trained them, and turned it over; turned a lot of that work over to USA.

That went along, and then we went to [Russian Space Station] Mir. That was a huge effort that the Shuttle Program had to undertake — to go dock with Mir and get ready for the International Space Station. Then we started launching International Space Station hardware and docking with the Russian segments that were up there and then the American segment. We were in full swing with building the International Space Station. And we were in full swing with SFOC.

SFOC was working as well as it could. I think the one thing NASA did not do that it intended to do was to bring in the external tank project and maybe SSME [Space Shuttle Main Engine], but we stopped short of completely integrating these projects and programs into USA. Right, wrong, I don't really know. It just stopped short of what the vision was, and we never really got there.

Then, of course, with the [Space Shuttle] *Columbia* [STS-107 accident] came a huge change in the Space Shuttle Program. They told us that our culture had gotten ill; it had changed, and we weren't paying attention to the right things. It pointed out shortfalls in Systems Engineering and Integration, where maybe we thought we had turned it over to USA, and maybe USA hadn't really picked it up at the level that was necessary.

Columbia proved to us that maybe NASA had backed out too far and that we had turned over things that we really shouldn't and couldn't, and that we needed to reengage. They also talked about our culture and how we were relying on experts and we weren't doing our analysis and we weren't doing testing anymore, and we needed to do more testing and understanding and evaluation of issues that we saw on the Shuttle Program for each flight.

We also realized that the Shuttle wasn't operational. I think that we had really embraced, from SFOC and our successes—and then we'd had huge success—that the program was operational. Therefore NASA could back out more; we were dealing with an operational program. All of a sudden *Columbia* happens. We realize, "Wait a minute. This isn't an operational program. This is a test vehicle, and we do have to treat it in such a way." Our culture had started changing to an operational vehicle, and our culture needed to change back to "This is a test vehicle requiring a different approach."

I would say that it was the angst involved in losing a vehicle and a crew. I had a chance to observe the people that had to do the recovery; that had to take the criticisms that were being lumped upon them by the CAIB [*Columbia* Accident Investigation Board] and the public, by our own Agency, people within our own Agency. Knowing that these people only had the best of intentions and were trying to figure out how to make this thing fly in the best way possible, but did we then go too far the other way? The pendulum always swings too far. Should it have taken two and a half years to return to flight? Probably not. But the pendulum had swung so far to the other way that it was going to take us two and a half years.

So I've had an opportunity to kind of watch. I can't give you specific blocks of time when all that happened, but all that was tremendous change from when I first came in the program to where we're at today. I think it's a better program today.

I still think the more you know about the Shuttle, the more you realize it's a complex and difficult vehicle to fly; that it's seventies technology, and if we could redesign it, we would design it a different way. But we can't, and this is what we have, and we have to make it work; it requires extreme diligence on the engineering community's part to understand this vehicle, the Orbiter, the external tank, the solid motors, the Shuttle main engines. Everything has to work perfectly for this vehicle to operate the way it needs to operate.

I think right now we are probably as good at engineering as we've been in quite a long time because of Return to Flight, because of what we went through after *Columbia*. It has developed skills that we had lost years and years ago that we had to reenergize and redevelop. We have those skills today, and that makes us a better Agency. Once we retire the Shuttle, those people that were involved in all of this are going to be tremendous assets to the exploration vision and the Constellation Program.

WRIGHT: Well, we've talked about *Columbia* for a moment. If you don't mind, we can stay on that. Where were you when you learned about the accident, and then how did your job duties start to change from that moment on?

PARSONS: It was a Saturday, and I was driving to Pensacola [Florida] to visit a friend of mine. I have a friend that I met in the eighth grade and we went to college together; we've been close, close friends our whole lives. About ten years ago he got MS [Multiple Sclerosis]. About five years ago he went into a nursing home. He was in the nursing home, and I was going to visit him.

So I was driving from [NASA] Stennis [Space Center, Mississippi] to Pensacola. My phone rang, and they said, "Are you listening to the news?"

I said, "No, I'm not."

They said, "Turn on your radio."

I turned it on, and they told me *Columbia* didn't make it back. I was pulling into the parking lot. I made two phone calls. I called Bill [William F.] Readdy, a stupid phone call, because I called him at home and later realized he was here at the Kennedy Space Center. I got his wife, and she was crying, and I just said, "I'm sorry I called." What I was going to tell Bill Readdy is, "I'm here. Tell me what to do. Tell me how I can help."

So I hung up from that and called Roy [S.] Estess, and Roy said, "Get your butt back to the Center and wait, and be prepared, because they'll call you."

So I ran in to my buddy, and he was watching it on TV, actually, and I gave him a big hug and said, "I've got to go. I'm sorry," and I ran out. I jumped in the car and drove all the way back to Stennis. In the meantime a couple of my folks at Stennis had already stepped up and done a couple of interviews. We were talking on the phone. We had impounded all the SSME data that we had. We'd done all the things that the contingency plan said to do. We got back to the Center and basically I made the phone calls, e-mails, and said, "We're here. Let us know what we can do."

Now, I will say it was a couple of weeks of us just dealing with the tragedy and us waiting to figure out what's our role going to be. It turned out that Dave [David A.] King was sent directly, as the Deputy Director, to Lufkin, to Texas, to set up the recovery operations, and Dave King's a great friend of mine. We were Flow Directors out here together. We worked

together for many, many years. So I was in contact with Dave, saying, "Tell me what we can do to help."

I flew to Lufkin. Dave had been there about seven days, and Sean O'Keefe, I can't remember why, but he was at Stennis for some reason, and I jumped on the airplane and went to Lufkin with him. I saw my good friend Dave, and I realized that Dave had probably slept two hours a night for seven days. He was wearing down. He had established something from nothing. Out of the ground rose this mass effort to do the recovery.

I went to Bill Readdy and said, "You know, he can only do this for so long." Mike [Michael U.] Rudolphi was my Deputy, and I said, "I think that we should have a fourteen-day rotation, and in seven days we need to get Dave out of there, and Mike Rudolphi needs to go and take over." We all agreed that Mike Rudolphi would do that, and he did.

So there began our role. My role was, as a senior manager, to try to see things like that and say, "Do I have people that can help?" In addition to that we had a group of folks that did Earth observation, and they were very, very competent in satellite observations of the Earth and flyovers with different instruments and stuff. My folks got involved in not only the World Trade Center [September 11, 2001], when that occurred, but they got involved with looking at debris and how to map that debris and stuff like that.

So I had people in the Earth Observation Directorate that ended up going out there—Science Mission Directorate—going out there and beginning to help set up the computer programs and things to map this stuff out. So we were doing things like that from a technical standpoint. From a management standpoint, Mike Rudolphi was involved and relieving Dave after fourteen days, and then Alan [George Alan] Flynt for fourteen days, and then Dave went back, and Mike went back. So they started rotating in and out of there.

Of course, through this whole time I was going to Bill Readdy, and we were trying to figure out who was going to be the next Program Manager. We had a list of names of people, possible Program Managers. By the way, my name was not on that list, and I was convinced that it was going to be somebody else, because I just felt there were some very, very qualified people that could go do that. Dave King's name would have been on that list. "Tip" [John J.] Talone's [Jr.] name would have been on that list. There were other astronauts that had left and went off into the private sector whose names were on that list.

I had a conversation somewhere along the way with Bill Readdy. At the time, we had General [Michael C.] Kostelnik as the PEO, Program Executive Officer overlooking Station and Shuttle, and General Kostelnik is a very strong personality. I said to Bill, "Well, whoever that is has to be able to deal with General Kostelnik's personality and not get their feelings hurt too easily and all this other stuff."

I guess what happened was Readdy approached a couple of those people on the list and they just didn't work out —there were roadblocks. There were things, whether it was personal reasons or financial reasons or professional reasons, they just weren't able to go do the job. Somewhere along the line he decided it was me. Without clearing it with me, he cleared it with Sean O'Keefe, who then cleared it with the politicians who had helped the Mississippi politics of who's going to be the next Center Director after Roy Estess.

I will tell you a conversation. I only know one part of this conversation, but we were at Lufkin for the closing ceremony. We were at a condo [condominium] where Sean O'Keefe was staying, and we had left the closing ceremony. We were sitting around talking. Everybody had walked out on the balcony, the deck outside, and I had walked inside to get a beverage. No one was inside, and Sean O'Keefe followed me in. The conversation kind of went like this.

"So, Bill, are you ready to step up?"

I said, "Sir, I'm here to do whatever you ask me to do." By the way, I had no clue what we were talking about.

Then he said, "Well, what does your wife think about that?"

I said, "Well, sir, when the President asked you to be the Secretary of the Navy, I'm sure your answer was not, 'Let me go ask my wife.'" I said, "I'm sure it was, 'I'll work it out.'" I said, "Whatever it is, I'll work it out."

He said, "Great," and he turned around and walked off. I guess he thought I knew what we were talking about.

I remember walking out and sitting—I was in the rental car with Dave King and Tip, and I said, "What in the world was that about?"

He said, "You're the man."

I said, "I'm the man?" Because they were outside talking about it.

I waited two days at the Stennis Space Center. I literally locked myself in my office. I was so nervous that I wouldn't even come out of my office. I wouldn't even talk to people, because I knew the answer, but I still didn't know the answer. So I kept waiting for that phone call. Finally I called up Bill Readdy, and I said, "Bill, what is going on?"

He says, "Well, you're going to be the Shuttle Program Manager. You agreed to it with Sean. Sean asked you."

I'm like, "Okay. I guess I'd better tell my wife."

So that night I went home, and my wife came in. This is no lie. I walked in the door, and my wife said, "Guess what? I got a job as a teacher."

I said, "Guess what? We need to sit down and talk." I told her I was going back to Houston to be the Shuttle Program Manager.

She said, "I'm proud of you. I'm not going."

I will tell you just as a side note, my kids, we were in Houston for three years. I had small children. They had what they called environmentally induced asthma. We rushed to the emergency room a couple of times each, both of them; they were on nebulizers and things like that. After we left Houston, they never had any other symptoms. So whatever it was, it was Houston.

So when I decided I had to go back there, it was quite understandable that she said, "I don't want to take the kids back in that environment. I have an elderly mother that can't drive and can't see. I think I need to go back to Florida and take care of that, and you need to go do what you've got to go do, because this is going to be all-consuming to you," which it was. So the personal story behind that involved a lot of different factors were taken into account for me to end up going to do that. But that's kind of the funny side of the story.

By the way, Dave King and Tip have the other half of that story that I don't know, and they just tell me that one day they'll tell me. But I think they want to make sure that they're not around — they may even want to do it over the phone, because they don't want to be too close. I think they played a part in what I consider throwing me under the bus to be the Shuttle Program Manager.

But it turned out to be a great experience. And, I'll be honest. I know there were better people to do that. I also know that it was something that probably I had been prepared for by all those people I told you about. Whether I was the right guy for the job or not, I had been prepared for it by the mentors and the different kinds of jobs that I'd had. So although I thought

it was going to be a huge stretch, it wasn't as big of a stretch as I thought it—it was still a stretch. It just wasn't as big of a stretch as I went into—I was scared to death.

It turned out, as I ran into problems and different things, that I had skills that I had picked up along the way that I didn't realize that were there that I was able to put against the problems that we were running into. And I had a lot of contacts within the Agency, which helped a lot, too. And, the Agency said, "Pick whoever you want."

So I got to pick the A-team, and so all around me, my gosh, I had the best of the best that NASA had to offer. So not only did I have a few skills, I had people that had all the skills in the areas that we put them in. So, you've got to consider all of that when you think of the team that was put together to go do Return to Flight.

WRIGHT: So you actually had two jobs, in a sense, because you were returning the nation back to flight as well as running the whole program. Do you want to share with us on some of those challenges that you had?

PARSONS: Time makes the pain go away. [Laughs] So, the challenges were political because of things that Sean and his staff would say in public and to the CAIB, and therefore became policy or direction.

The other challenge was the CAIB itself and the direct contact they had with the members of my staff, who, although we knew not to take direction from the CAIB—they were just to give us recommendations—I have to tell you that you take a lower level engineer, and you question him about what he does, and you make him reach conclusions. Even though it's a recommendation, he's reached conclusions, and he or she is then going to go implement. There

was a great deal of influence when the CAIB interviewed my folks and worked with them, they influenced the direction as well.

I'd say there was also an oversight committee, the [General Thomas P.] Stafford Task Force, that was overseeing our implementation of the CAIB recommendations, and Dick [Richard O.] Covey—it was the Stafford-Covey Task Force. We would explain to them what we were doing for implementation, they would also give us criticisms and recommendations and advice. They influenced the process greatly.

I had two bosses in [NASA] Headquarters [Washington, D.C.] in the form of Bill Readdy and General Mike Kostelnik that had views, and we had a—gosh, I can't remember what we called it now, but we had a group. Bill Readdy established this Return to Flight advisory committee within NASA that listened to what we did and gave us advice.

I had all that plus the day-to-day problems that just arose that nobody else had to deal with but the Program Manager and the program. So if my direction was different from the Stafford-Covey Task Group, the advisory committee that NASA put together, the CAIB recommendation, the direction from Mike Kostelnik and Bill Readdy, or the political policy statements that Sean O'Keefe and folks made out in public, then think of the ripple effect that that occurred.

So the biggest challenge was trying to coordinate and integrate and make sure that I was trying to do all those things and still do the correct technical thing to make sure the Shuttle was going to fly safely. I can tell you that that was a tremendous burden. That's all it was, a tremendous burden that all of the senior staff in the Shuttle Program had to deal with.

My job was to protect them from as much of that as possible. I can't say I protected them from it all, but that was probably the biggest task I had, protecting them from those outside

influences as much as I possibly could so that they could come to the appropriate technical decisions. I would say that we were marginally successful at doing that, but we were successful to a point.

WRIGHT: Do you want to share your thoughts when [STS-] 114 came home?

PARSONS: Maybe I ought to share my thoughts when I saw the PAL [Protuberance Air Load] ramp come off, because that was devastating. It missed, and I was relieved, but I remember—first of all, I remember the huge debate that was had amongst all of us about the PAL ramp.

The CAIB had said the PAL ramp is a big honking piece of foam, and we ought to remove it. Yet when we did all of the analysis on it, it said it never created a debris source, and so on and so forth. Hindsight says when we were doing the work on the bipod that we crushed that foam and probably caused that huge piece of PAL ramp to come off, but that's hindsight.

When I saw that come off, you can't imagine the despair, depth of despair I felt. But also I remember I picked up the phone, and I called Mike [Michael D.] Griffin. I said, "Tomorrow I'm going to do a press briefing, and we're going to take full responsibility for what happened."

He said, "It's about time NASA did that."

So in a lot of ways I can tell you that Mike Griffin was probably my greatest support, but also it was a difficult thing to go out and tell the press, "We screwed up." We didn't fix something that we probably should have and could have fixed.

But throughout that, the mission was unbelievably successful. I mean, the vehicle was clean. Eileen [M.] Collins and her crew just did an unbelievable job. Every aspect of what we did, the inspections and the hardware and how it operated and how the boom worked and all

these major design changes we had made. Even though the tank performed well, it didn't perform as well as we wanted it to, but still we learned so much from it, from the new cameras that we had put on there and the imagery we had gained from the ground and so on and so forth. I can't tell you how proud I was throughout the entire mission.

Of course, we had an MMT, a Mission Management Team, that had been revitalized, run by Wayne [N. Wayne] Hale [Jr.], and they were dealing with one issue after another, but that was because we set it up, and we were going to deal with in-flight anomalies, and the MMT was going to do their part.

To watch that team work and operate, as you're trained to do, was just impressive. I remember going into these MMT meetings, and I'm an observer at that point, because Wayne Hale runs the MMT; John [P.] Shannon does now on orbit. To watch that team operate, you're sitting there, and you just can't be more proud about what you've accomplished and how well this team is prepared to go do this mission.

Then, of course, then we wanted Eileen and her crew to come to Kennedy. I wanted to be able to shake their hand and welcome them home, and unfortunately, they ended up going to Edwards [Air Force Base, California]. But to see it on TV, to watch it land and successfully do the reentry and her crew to step off and come home safely, was mission success as far as I'm concerned.

There were things people say didn't go right – including the PAL ramp. But the fact is it came off after a point where it could have hit the Orbiter. But we didn't predict that. That was just luck. But we had all these observations and imagery and we had all these other things, these lists of things we needed to go work on.

For us to be able to then have the fortitude to say, "We're going to go work on those things, and we're going to fix them. We're not going to go fly again until we believe it's safe," proved our culture had changed, and we were in the right frame of mind, and that we were going to go do the right things. Like I said, I walked away kind of saying, "What a great experience and team and accomplishment," as far as I was concerned.

Again, maybe not everybody saw it that way, but that's the way I saw it. I was pretty proud of the Shuttle Program.

WRIGHT: Well, you certainly put enough time and effort during that time period.

PARSONS: Everyone did. A lot of people worked a lot of hours, and still are, by the way. It hasn't let up, to be honest with you. The Return to Flight effort is no less than the effort going into it today, really. It's that kind of effort that makes it a safe vehicle.

WRIGHT: Will these experiences from these efforts be refined and implemented with the Constellation Program?

PARSONS: Part of what you have to do with the Constellation Program is catch it in the design phase. There are a lot of lessons learned that you can use, and this is a different vehicle. It's not the winged vehicle and all, but you can design in operability, and that's what we are going to have to do. I don't think we designed operability into the Shuttle because of the experimental nature of the Shuttle itself, and the seventies technology and everything we did.

So what we have to do, I think, on the Constellation Program is design operability into the vehicle, and design a requirement and qualification of those requirements and then a test program that does bring this vehicle to an operational state. Eventually you're going to do upgrades and mods [modifications] to that vehicle, and as you fly, you're going to learn things from it. But make it operable and do block mods to that vehicle, like you might see on an Atlas or a Delta launch vehicle.

So I say that, yes, there's a lot to learn from what we've done, but probably the biggest part of what we learned is that you're going to have to catch problems early. It's not going to be operating the vehicle. Sure, there's some of that that's going to be there. We would prefer to have things like one problem reporting system. Right now the Shuttle has fifteen or twenty different ones.

You'd like to have one database where all the problems come in there, and you can evaluate and understand them and so on and so forth. So things like that, your avionics systems, your black boxes. Is there ways to design it to where they're integrated and easily tested? We've got a lot of things that we can say, "Do it like this. It will be easier to operate."

So what I say is design that operability into the vehicle and go fly that vehicle in a more operational sense in the future. I think that that's the mantra that I hear from the Constellation Program, and I think that they're trying to do that. Now, our limitations are schedule and money. Technically, we know how to do that, I think. I think it's just going to be a matter of having the resources to be able to do that.

WRIGHT: You've worked at three NASA Centers in upper management positions. Discuss for us how the three Centers differed in the methods to meet the goals of the Shuttle Program, and then how the Centers are the same.

PARSONS: Well, the Centers are the same in they are all committed. Every Center, the workforce is totally committed to supporting the Shuttle Program. You can't measure one better than the other in that commitment to ensure the safety of the Shuttle Program. They're all equally committed in that area.

They're different in the fact that they have different missions. Stennis is a very small Center, but tends to be a little more similar to Kennedy in that it's an operations kind of Center, does testing, fires main engines. The workforce, especially the technician workforce, is very similar in that manner. The Johnson Space Center tends to be the design Center with the engineering and the programmatics and the budget.

Believe it or not, I remember being at the Kennedy Space Center early in my career, thinking, "Why do we need the Johnson Space Center? What do they do? This is all about politics. Those guys don't do anything." Then I get assigned to the Johnson Space Center, and I realized we couldn't do it without the Johnson Space Center, that the engineering and design Center and the workforce there, again, made it possible for us to do the work here at the Kennedy Space Center.

The one thing I would say is the awesome responsibility of the Johnson Space Center employees felt about the engineering design of the Space Shuttle and the program and its safety. Those guys, again, I think the commitments are all equal, but they felt it was their total responsibility. The weight of the safety of that program, I felt it heavier at Johnson than I did

anywhere else. I don't know why. Those engineers and the problems that they solved, they would grind out the problems as far as they possibly could. They would just try to find the best solution they possibly could, and those guys would work many, many hours in doing that.

So in a lot of ways the operations Center just is more—we have a lot of engineers here, but a very technically oriented, hands-on kind of oriented workforce. Our engineers tended to look at it from a, "Hey, I know it doesn't meet print, but I know it will work," kind of aspect. They tend to have that operational mindset.

The Johnson guys tend to look at, "Hey, I've got the design. I've got the qualifications. I know why they did this. We've got to bring it back to print or as close to print as we possibly can, and I'm not going to do a waiver or an exception or give you a deviation. I'm going to try to hold you to the standards that it was designed by."

That healthy tension between the two was very important, and we always had, and I call it a "healthy tension" between the two Centers. And, again, Stennis tests their main engines. They just delivered quality hardware to the Kennedy Space Center to then fly on the Shuttle. We still have that same healthy interaction between us and Marshall and Johnson and Stennis.

By the way, Marshall plays a huge role, a very similar role that Johnson plays only for the propulsion-type hardware. So I would say from a cultural standpoint they're probably more alike. They're a little different in that a spacecraft versus the propulsion systems, and Marshall has a different look at what their responsibilities are. I think they have more of a German culture there than maybe Johnson did, even though Johnson just didn't have that heavy German culture that was the beginning of NASA and human space flight. Marshall did.

Johnson had the [NASA] Langley [Research Center, Hampton, Virginia] culture that came with [Robert R.] Gilruth and Kraft and those folks and the Gene [Eugene F.] Kranzes. It's

a wonderful culture, plus the fact that they operate that vehicle from the Mission Control Center. There's no better team, and that's an integrated NASA-contractor team that's just absolutely grade-A, number one. The way that Kraft and Kranz and all those guys established that, the training and the things that they do, it carries on today.

WRIGHT: In November of [19]'98 the first module of the International Space Station launched. So how did the dawning of the Station Program presence in space impact the Shuttle Program? We know that you had a specific role in Station back then.

PARSONS: Yes, I had worked on the Node and the two PMAs, the pressurized mating adapters. My job had been to go out to the manufacturing site and bring those pieces of hardware; work with the contractor to get that hardware as flighty-ready as we could, because what we found—and this was a lesson learned again from Gemini and the Krafts and the old guys that told us about it—is back in those days they sent people from Kennedy out to the manufacturing site to teach them how to get that hardware ready for launching at Kennedy, because the cleanliness requirement, the FOD [Flight Operations Directorate] requirements, and the different things that were important to us because we knew what it took to fly this hardware. If you could get it early, you could make the changes to that hardware as it made its way towards Kennedy Space Center.

So we sent a small team out. I was leading the Node and PMA team, and we went out and got that hardware ready and pulled it towards the Kennedy Space Center, working with our contractors and the other folks who had been in the International Space Station. Also the testing requirements, because we were going to test it here, and we knew what we needed to do, and we

were involved in setting up those test requirements out in the field. So that hardware, getting it here and then getting it launched, I felt like I was part of that.

But, again, we had started Mir, and we were doing fewer and fewer science missions, and we were doing more and more missions to Mir. Our biggest mission was building the International Space Station. When you looked out over the number of years—at that time the Space Shuttle Program was going to go to 2020 or whenever it was—a lot of it was dedicated to the International Space Station, and a lot of it was dedicated to the EVAs [extravehicular activities] that we were going to be doing to put all this stuff together.

In 1998, working at the Johnson Space Center again as the Deputy Director under George [W. S.] Abbey, the crews were getting ready to fly Shuttle missions to the Space Station. You also had crews that were getting ready to fly long-duration flights on the International Space Station. So all of a sudden now you had two different kinds of training regimes and two different kinds of crew that were getting ready, and you could see the differences in the two.

We were flying a lot of flights back then, and when I go back and think about it, it just seemed like it was so fast-moving, fast paced, with crews coming in and out. I got to be on the Astronaut Selection Committee for the 2000 astronaut team or group or whatever, and Duane [L.] Ross, he helped us with that. But now to see those guys starting to get assigned to flights and go fly, that's just unbelievable.

Back then we were going very, very fast and had a lot on our plate. They were starting to send space tourists—although I don't think that was a good term—with the Soyuz, and I got to go to Russia. I was there when [Dennis A.] Tito was there getting ready for his launch, the first space tourist. We were not very happy with that, from a NASA perspective. Well, the NASA Administrator wasn't very happy with that.

But yet down in the working group with the astronauts, we had to make it work. Even though our Administrator was not happy that the Russians were doing that, NASA at the working level, had to find a way to make sure that he got the proper training and he was going to be safe on orbit when he got there. And we had to do that without being too complimentary or too engaging with him. That was an interesting time.

WRIGHT: I can imagine. Being professionally and personally involved with the Shuttle Program for almost twenty years, tell us what you believe to be the most significant or unique accomplishments of the program in specific areas, if you could, scientifically, engineering, and just overall. What will be its legacy?

PARSONS: Well, reservicing the Hubble Space Telescope. Anytime you can go up and recapture a spacecraft, pull it in, and reservice it, my gosh, what an unbelievable engineering feat that was; and we still have one of those missions left. I think that you will never surpass that as far as the legacy of the Shuttle is to go up and capture the Hubble Space Telescope and fix it and reservice it and make it better. That's one of the big ones, I think.

I think the other one is building the International Space Station. What an unbelievable engineering feat that is. The number of missions we've had and how much hardware we've taken up there, and how much hardware we still have to take up there. Again, you talk about the program, but I include the people that fly on that vehicle get out and do EVAs and do the work outside, and the robotic arm that then attaches these pieces together, and all that hardware having to work the way it works. That, to me, is just, again, one of those unbelievable things.

We make it look easy, and there's nothing easy about capturing the Hubble Space Telescope and reservicing. There's definitely nothing easy about building the International Space Station and solving the problems we've solved throughout the years. And then flying the Space Station; this may be not part of the Shuttle Program, but flying the Space Station during Return to Flight without the Shuttle there to service the Space Station.

I go back and look at Bill [William H.] Gerstenmaier and the International Space Station team. You never heard them whine. They didn't go running around with their hair on fire. They did, but the public didn't see it. You didn't see them panicking. They flew that vehicle without having the Shuttle as a servicing vehicle, which they had planned for; and it was a requirement. They kept that vehicle going until we could get the Shuttle returned to flight.

That was huge to me in the overall picture. I never felt that these guys couldn't handle it. Gerstenmaier and [Michael T.] Suffredini and the International Space Station crew could handle it, and they did. To me that was big in the Shuttle Program Return to Flight phase, because I didn't have to worry about that as much as I had to worry about what I had to do to get that vehicle flying again.

WRIGHT: Well, kind of a final thought from my end. When the Shuttle Program does conclude, when you look back a few years later, what do you want people to think about when they think about what the Shuttle Program has accomplished for the space agency and for the nation?

PARSONS: Well, I guess first I would say think about the technology that was developed in the seventies that then we implemented and flew for thirty years. It's going to be thirty years, over. So, here we took technology that was—I'll just give you an example.

During Return to Flight my guys were trying to evaluate the reinforced carbon-carbon leading edge and trying to understand the aerothermal loads on that panel. They were putting things in wind tunnels and looking at it, and they were using CFD [computational fluid dynamic] models, and basically, I remember one of the times that one of the guys came back and looked at me, and he says, "How did they develop this without the tools we have today?" He says, "I'm having a hard time understanding this with the CFD—computational fluid dynamic—tools we have today, and they didn't have those kinds of programs back then. How did they do it?"

The people that developed that vehicle did it without some of the modern tools we have today. They did it with just good old engineering know-how, their engineering intuition, with great calculations, but not as many calculations as we can do with a computer today and the kind of supercomputers that we have. They did these things with, again, just the knowledge they had gained through the Apollo Program and their good engineering intuition and their good engineering skills.

So think about this vehicle that has flown for thirty years, about the way we developed that vehicle and the people that developed that vehicle, coming out of the Apollo era, with all their knowledge and skills they applied and put into this vehicle. And really, how much they didn't know. How much intuition turned out to be right.

I remember one of the things Chris Kraft told me when he came to see me. He said, "Bill, don't change the underbelly, the tile, the thermal protection system," he says, "because we didn't—." Almost like, "We developed it, and we almost don't know why it worked as well as it did." Almost kind of, "Don't mess with it, because you could change one thing and probably screw it up."

So I guess probably the thing I would say is the American people ought to be very, very proud that in that era, in the seventies, we built this vehicle that could fly for thirty years. I remember Walt [Walter] Cunningham saying something to me. "If we had flown the Apollo or the Saturn as many times as we've flown the Shuttle, I can't imagine what might have happened," meaning that even though it was a wonderful vehicle, it wasn't nearly as robust and as reliable as the Shuttle was, he didn't think, and he flew on the Saturn.

So again, I think even though we've had a couple of tragedies, this was a very robust, reliable vehicle that we've flown for that many years. So be proud of our technical excellence and the men and women that built and flew it for thirty years. What an accomplishment.

Then again, all those things that the Shuttle accomplished during its lifetime, just the list is huge, not only for national defense with our DoD spacecraft that we've deployed; planetary missions that we did and the science missions we've done with Spacelab; and then the telescopes we've deployed and instrumentation to look back at Earth; and the Space Station and going to Mir and creating this international cooperation. It just goes on and on and on.

WRIGHT: Are there any other thoughts you'd like to add about the Shuttle Program and your experiences?

PARSONS: Just to say that I couldn't be more proud to be associated with the Shuttle Program, the International Space Station, and human space flight in general. Who would have thought? It wasn't a goal of mine. I talk to people all the time, and they've watched the Moon landings. I was overseas. I didn't have a TV and I didn't see them. It was never a goal to work in this business, and then to get this opportunity to do this, I couldn't be more proud to be associated

with NASA and human space flight. And I couldn't be more proud that my son is involved in it as well. I get to carry that on. So that's it. It's awfully cool to do this.

WRIGHT: Well, thank you. We appreciate all your thoughts this morning.

PARSONS: You're welcome.

[End of interview]