NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT
ORAL HISTORY TRANSCRIPT

BROCK R. "RANDY" STONE
INTERVIEWED BY SANDRA JOHNSON
HOUSTON, TEXAS – 30 JANUARY 2007

JOHNSON: Today is January 30th, 2007. This is the fourth interview with Randy Stone, and is being conducted in Houston, Texas, for the NASA Johnson Space Center Oral History Project. The interviewer is Sandra Johnson, assisted by Jennifer Ross-Nazzal. I want to thank you again for joining us again for this fourth interview.

I want to start by talking a little bit more about the Shuttle-Mir Program. When we left off, we had just talked about STS-71 and the first docking. At that time you were in the Mission Operations Directorate still. Are there any other significant events during Shuttle-Mir that we need to talk about, in particular, maybe about the fire or the collision or those instances or any other memories you have during that time?

STONE: Well, it was a very interesting time, a time of real learning, especially for those of us in Mission Operations, learning really how to work with the Russians. It was different now than it was when we did the Apollo-Soyuz Test Project. That was very simple, very regimented, and it's still difficult in dealing with the Russians, because you had to build relationships before you could get anything done. But in the environment of Shuttle-Mir, we had more of an opportunity to build relationships, build long-term relationships with individuals in Russia that really built the infrastructure to have an operations team with the Russians to fly the International Space Station [ISS].

We struggled in the Mir Program operationally, because the Russians were in charge. It was their spacecraft. We were guests on their spacecraft, in their view, and just because we didn't think something was safe or we thought it ought to be done differently, it just didn't matter much to them that we disagreed. They had been doing it a long time. They knew how to do it. Furthermore, we hadn't been doing it. So therefore how could we have a more accurate opinion than they did? So that was kind of the environment we were in for Shuttle-Mir.

The fire on board was a terrifying experience, and the bits and pieces of it that we were getting down, because our flight controllers—we had no flight controllers here watching the Mir. We had a few people in the Moscow [Russia] Control Center. We had one individual called an Ops [Operations] Lead, I think, that was the American presence in the Mission Control Center there.

When they had the fire, almost everything initially broke down. All of the protocols we had on communicating didn't work very well, because they were, as they should have been, in high gain, being able to safe the vehicle, making sure the environment post-fire was a livable environment; we weren't putting the crew in any more risk than they'd already been exposed to with the fire.

But it gave us some lessons learned that we kind of filed away for ISS that we had to have a communications link that was not Russian-dependent, an independent way to look at data and communicate with the crew, because if you were just dependent on the interaction in the Moscow Control Center, they would share with you the information, but it was way later. You couldn't participate in the decision-making process.

When we got to ISS, the plan was for the Flight Director of the American flight control team to be in charge of the Space Station. Clearly, there was a very strong Russian presence,

because they had a lot of the hardware and a lot of the critical hardware that they had to operate. So Mir gave us those early-on indications of hey, it's going to be hard to communicate. We need to have good data, also, to have leverage to be able to negotiate with the Russians. So it was a true learning experience.

We saw that again at the collision. It took probably a full year to extract all of the data out of the Russians for what caused it; why did it happen; what could we have done differently. The Russian culture, and this is my observation; other people may have a different observation. But the Russian culture, when something like that happens, it is never a procedural breakdown. It is never an accident. It is always something that you blame on somebody else. So there's an immediate cover-the-backside response going on.

That's not to say that they didn't really work hard at getting to the bottom of it technically, because the technical people really did. But at the management political level they were always looking for somebody to blame, whether it was the designer of a piece of hardware, and in this case the guidance system that guided the Soyuz in, that was in question.

The crewman that had the final responsibility for aborting the approach, he took a lot of flak. Of course, they put him in a position where there was no way he could have done anything differently. He didn't have enough data early enough to know that they were in trouble and they were going to have a collision. He couldn't see it until it was essentially too late.

So that was a lesson learned, and so we kind of structured our negotiations for ISS based on what we learned from those two events, and it says we have to have a set of data that the Russians aren't telling us about. We could not be completely dependent on them for all the information. Those two events were the two driving events that committed Mission Operations and the Center and NASA to spending the money to have a Mir Control Center in the Moscow

Control Center, where we had flight controllers full-time, twenty-four hours a day, seven days a week, just like the Russians.

Now, we still do that, but at a much scaled-back—than we did in the beginning, because our communications have improved with the Russians. We deal with them every day. It's the same people we're talking to. We know who to trust. It's still difficult. I had lunch with one of the current Space Station Flight Directors today, and they had the same problems we had in the beginning. It is just not quite as acute. It's easier to pull teeth now than it was then, but you're still pulling teeth.

So that's kind of my remembrance of Mir, the difficulty in the daily tag-ups to coordinate and get the American methodology of planning and preparation into the Russian system. It wasn't that they didn't plan and prepare. They did, very, very well, but they just didn't share very well. So that, to me, what Mir was all about is learning how to work with the Russians, learning that, yea, verily, it's going to be very difficult, and it's going to keep being difficult for the foreseeable future, because of the language and because of the cultural differences between our two organizations.

JOHNSON: You mentioned in the last one that Tommy [W.] Holloway had made it easier and laid the groundwork for a lot of those negotiations as far as the Control Center was concerned and getting the Control Center in Moscow. If you would, share some more details about how you established that Control Center. You mentioned that it was more then than there is now, so how many people initially were working in it and what types of positions and what their situation was in Russia where they lived, that sort of thing.

STONE: Okay. As we moved into getting ready for Space Station, we still had what we called the Ops Leads. They were going to be almost a Flight Director equivalent in Russia to do planning with the Russians and to manage the flight control team. We didn't have real-time responsibilities in that Control Center. The Russians had the real-time accountability. We were there as advisors for the American segment.

At any one time we probably had six or seven full-time Flight Controller-Op Leads living in Russia, some on two-month rotations, some on three-month. Some Ops Leads stayed up to six months' rotation, just because it took that long to really become effective. That's after we got operating. As we were building the Control Center, there were clearly more people there all of the time that were negotiating with the Russians for facilities, to be able to do the networking between the computers in the Mission Control Center and the power requirements, that sort of thing. So we had a larger contingent of people.

We eventually had a senior manager that lived in Moscow full-time. Bob [Robert D.] Cabana was the last one that I knew well before I retired that was over there. We established living arrangements in an apartment complex, a high-rise apartment complex. We had a number of apartments, and I don't remember how many we had, where we rotated the people in and out. It was a much more homey experience than living in a hotel. You know, you had kitchen facilities, and they were actually pretty nice apartments. By Russian standards, they were excellent apartments.

But we also had a hotel that was fairly close to that apartment complex, where we took over one floor of the complex, and we had a central office complex on that floor where we had computers and copiers and fax machines and phones that had Huntsville, Alabama, area codes,

so people, while they were there for an extended period of time, could talk to the [United] States without operating in a huge expense, personal expense to either themselves or to the government.

JOHNSON: How did they manage to set that up?

STONE: I don't know. It's a fairly common thing, where you get one trunk line and you tie it into a central switchboard, which happened to be Huntsville, the [NASA] Marshall Space Flight Center, and then spread it out from there. So we were paying for a line, an international long-distance line that we used. Then as we had more and more people staying longer and longer, we even put those American phone instruments with the good phone numbers in the rooms where people were staying, and we had Internet hookup so they could work back with Houston and Huntsville and [NASA] Headquarters [Washington, D.C.], wherever they were based from, in that hotel.

So it got to be a pretty comfortable living arrangement, not like it was in the beginning, where everybody was trying to figure out how to live in Russia. It got to be a pretty well oiled machine. We had good translators, good people that helped coordinate on the Russian side of the logistics trail there. So it got to be fairly easy to live in Russia.

JOHNSON: You mentioned setting up the Control Center. Did you have your own technical people over there setting that up?

STONE: We did. We used American computers. We used our own technicians. We piggybacked on their networks in many cases. We allowed them to have a data node that was

coming down from our data lines, from our satellites, into our machines. We would share data back and forth with the Russians, and they would share data with us, both in Moscow and back in Houston. So we had a lot of our own technicians. But when we were doing facility work, electrical power work, we were using the Russian facility people there.

JOHNSON: What about the Russian presence in our Control Center here? Did they do things similar? Did they bring their own people?

STONE: They did, and almost because we requested it. Being eyeball to eyeball with an expert is always good. Being eyeball to eyeball with an expert from a different culture is just about the only way you can really communicate when there's a problem. So we helped them establish a Control Center node within our Control Center, just like they helped us establish an American node within their Control Center in Moscow.

I don't think there are a lot of Russians that participate regularly now, because the process has gotten so much better. But there are one or two all the time that are in the American Control Center, and NASA still has four or five people that are assigned to Control Center operations all the time over there.

JOHNSON: Well, in 2001 you were named the Deputy Director of JSC [Johnson Space Center, Houston, Texas], and shortly before that, just a couple of months before that was 9/11 [September 11, 2001], and some changes as far as security and those kinds of things were going on on the Centers. At that time when you transitioned over into that position, was there anything you were having to deal with directly as a result of 9/11?

STONE: Well, actually, I was the Deputy Center Director on 9/11. I had arrived on the scene a little before that, and I don't remember the month, but of course, 9/11 changed everybody's view of security. We did a real introspective look to look at the security of the Center. As you have driven on and off the Center since 9/11, you've seen certain barriers go up—big concrete barriers—certain new guard shacks that control entry into parking lots, which are principally the Building 1 and the Building 4 and 5, where the astronauts are and the Mission Control Center, to protect those as national assets.

That was the biggest permanent change is putting a second barrier around the critical assets, which are your people and the Control Center and the simulators. I know some people say, "Well, you don't like me. Well, I'm outside the barrier." Well, you're probably not the target if you're outside the barrier. That doesn't say you couldn't be, but that was the logic as we redid the Center.

One of the things that people may not recognize that we did as a result of 9/11, the crew quarters where we quarantine the crew before they fly, up until about a year ago that was out on the back side of the property close to Space Center Boulevard. You could take a rock and throw it over the fence from Space Center Boulevard and hit the roof of the crew quarters. Within a couple of months after 9/11 we recognized that that's probably not a good thing. So just in the last year a new set of crew quarters has been established on-site, far away from the fence perimeters and close to the simulation facilities in Building 5.

So those are kind of the big changes. Of course, there are more guards than there used to be. There are more perimeter warning systems than there used to be. If somebody tried to enter the site when it was closed through the fences, we'd probably know. Things like that were done.

But it's kind of settled down into some amount of normalcy. They still have to touch your badge. I guess that gives you a little bit more security if they look at it that closely. But things have kind of settled back down until you have another scare, and then we go up a notch.

JOHNSON: And, of course, we had Expedition 3 on the Station at the time of the 9/11, so was there any concerns as far as future crews and the safety as far as the launches? As you mentioned, you moved the crew quarters in, but were there any other concerns?

STONE: Certainly there were. We upped the security level at the Cape [Canaveral, Florida] way more than at the Johnson Space Center, because we felt like a vehicle sitting on the pad, one, it's more vulnerable than anything else that we've got. Two, it's the highest dollar thing in the inventory, and three, a well-trained terrorist with a high-powered sniper rifle can take out a Space Shuttle at a fair distance. So there were some computations done knowing all of the sniper rifles in the world, and KSC [Kennedy Space Center, Florida] now runs a very careful perimeter check at those ranges, just to make sure we don't have anybody that has slipped in there and would be trying to do us harm.

But that was a big change. The first launch after 9/11, the amount of DoD [Department of Defense] participation in the enhanced security was spectacular. There were gunships. We had fighter aircraft flying CAP [Combat Air Patrol] over the Cape area, out of the way of the launch. But we had a lot of additional security things that went on.

Of course, having the Israeli on [Space Shuttle] *Columbia*, [STS-107], that flight, before it launched, security with that crew was much, much higher, just because of the relationship to Israel to the rest of the world and the terrorist potential interaction there. And, of course, when

we lost *Columbia*, there were all kinds of thoughts that went on that could this have been some kind of terrorist act, and a lot of analysis was done to make sure we didn't get hit by some sort of ground-to-air device; we didn't get hit before we launched by a long-range sniper weapon. All of those things were thought about and talked about and wondered about for months and months until we actually put together all of the pieces to understand what happened to *Columbia*.

JOHNSON: Were there any other issues? Of course, you came in, like we talked about, at 9/11 time. Were there other issues before *Columbia* in your new position that you recall that might be worth mentioning here?

STONE: Well, it was an interesting time politically, and I say that because the Administrator was very focused on the business management of the agency and not so much on the technical management of the agency. He just flat didn't understand the technical part, so, by golly, we were going to do the accounting part. He is a brilliant man when it comes to that, but it was not a fun environment for the true engineer to play in, and it was certainly not for me. I am not a political animal; I never was. I got to several places within NASA where the political part was probably more important with the technical part, so I was kind of like a fish out of water.

So I collided with the political powers that be on a regular basis, because my priorities were technical excellence, and yes, we ought not to waste money, but we ought to spend the money we need to be excellent. So it was a difficult time. It was a difficult time for people like Tommy Holloway, who was the head of the [Space] Station Program at the time. He was the guy that really identified the cost overruns that happened before his shift and was working very,

very hard to fix them. But he and the Administrator just couldn't communicate. They talked past each other.

Probably the most difficult day I spent as the Deputy Center Director was in the time frame where Tommy was replaced as the Station Program Manager, and he chose to retire. It was a political event. It had nothing to do with the fact that he wasn't doing right or wasn't doing good. It was one of those things that never sat well with me. I hated to see really, really good people get cut down on the political battlefield.

But I learned; I learned long before that that once you get up to that level and get out of the foxhole, it is inevitable that when you operate in a position that is so accountable to the American public and so accountable to the political machine that you can't keep everybody happy all of the time. We called it "getting out of the foxhole." Anytime you got above the eighth floor, you were out of the foxhole, and chances are your longevity was three to four years. That's about it. Roy [S.] Estess and I had that conversation quite often, and "Beak" [Jefferson D. Howell, Jr.] and I did. Three or four years is about right if you go back and look.

JOHNSON: That's interesting. How did you decide to take that position, coming from, as you said, an engineering background and more interested in the technical?

STONE: There's probably nobody in this agency that I respected more or liked more than Roy Estess, and he came down and said, "I need help. I can't run this Center. I need you."

JOHNSON: And that's what it took?

STONE: And I said, "Yes, sir."

JOHNSON: In 2003 the *Columbia* accident happened, almost four years ago now. Shortly after that you were selected to chair the NASA Accident Investigation Team [NAIT]. But if we can, if we can talk about just for a minute where you were when you heard about the *Columbia* and what your first actions were.

STONE: Well, it was probably the most ironical situation and coincidence that I could imagine. I could not have put together the scenario in a more historical context than it was. I was in the viewing room in the Center Director's suite with Jay [H.] Greene, who was my Ascent Flight Director on [Space Shuttle] *Challenger*; [STS 51-L, accident] Lee [Alan L.] Briscoe, one of the other Flight Directors on *Challenger*; and Chuck [Charles R.] Knarr, the other Flight Director on *Challenger*. We were shoulder to shoulder, looking out in the control room, listening. When I started putting the pieces together, I poked Jay and said, "I think we've got trouble."

Briscoe said, "I don't think the vehicle's still there."

I turned to Beak, and I said, "This is going to be the worst day of your life." And clearly, just a few minutes later we all knew that what we suspected was true, and it was just like the moments after *Challenger*. You go on autopilot. When you've spent your whole life doing stuff like this, you go on autopilot.

Of course, as now a senior Manager of the Center, there are certain things that you have to do to get the Center ready to deal with this, just *administrivia* that's going to happen. You're going to have all kinds of press descend upon the Center, have all kinds of preparations to make for memorials and for funerals and for taking care of the families and moving families around.

One of the first things I did was just check on availability of all of our aircraft that could handle passengers, which included the STAs, the Shuttle Training Aircraft, so we could get families from where they were to where they had to be.

There's nothing that the people at that management level can do to help the flight control team. They had to deal with all of that. But we did lock down the Control Center. We essentially started gathering all of the data. The flight control team started gathering all the data.

Then we had the Shuttle Program Manager, Ron [Ronald D.] Dittemore was in the room. We started just talking through the things that the catastrophic planning guide would have us do, all the notifications that has to go on with the Administrator and then the Congress and the President, and all of that stuff was put in motion, principally by Ron, because he was the accountable executive for the program. Then Beak and I just kind of stepped back to get the Center ready to deal with all the things we were going to have to deal with over the next few days and then weeks and then months and then two years of working on the accident investigation.

JOHNSON: You mentioned the press, and I know when we talked before, you talked about how you learned to deal with the press. Did you have to run interference with them any during this time?

STONE: I didn't. A very, very low level; sometimes you did. Principally, when you have a vehicle accident like this, it falls on the shoulders of the Program Manager and the Administrator and the other higher-level people than Center management to talk to the press. So, no, I didn't

have much interaction with the press on *Columbia*, like I did on *Challenger*, being the Lead Flight Director.

We may have talked about this. I don't remember whether it's in the previous sessions or not, but I got so tired of being bushwhacked by the press, going from one building to another after the *Challenger* accident that I completely changed my appearance overnight so they didn't know who I was. I shaved off a beard I'd had for fifteen years and cut my hair real short, and they didn't find me for about four weeks.

JOHNSON: You were incognito. [Laughs]

STONE: Well, you know, it's not that the press is bad. It's just that they're always in a press for information, and oftentimes in a time of tragedy it's information they don't need to know, and neither does anybody else. It gets quite annoying.

JOHNSON: I can imagine so. Did you travel to East Texas?

STONE: I did, several times. I went up early on to survey the debris area; went twice with Beak. We went multiple times. For several weeks we were up there once a week just to interact with the team and find out what they needed and let them know that we really cared and to take people from Washington [D.C.] up there so they—you know, just to help with those logistics. So I went a number of times. Flew on the helicopters multiple times just looking at the debris field early on before we even started picking it up, and then I spent a lot of time down at the Cape, where we were reassembling all the pieces on the floor of a hangar down there.

JOHNSON: What were your impressions of the recovery effort going on in East Texas and the different agencies all working together?

STONE: It makes you glad that you're American when you see people just throw down all other cares whatever and sacrifice so much to help. We had local people that were helping out at the different places where we were housing volunteer workers, search workers, where they were providing food and whatever anybody needed. You could not find a person that was not compassionate if they found out you were up there working on the recovery.

All the petty political infighting between agencies were gone, at least for the first six or eight weeks. Now, they start to come back after a while, but for the first six or eight weeks there was just a—it was complex. Sometimes you had to arm wrestle on who was in charge on one thing or another. But there was nobody going to let bureaucracy interfere with doing the right thing to try to recover the vehicle and the crew.

So as tragic as it was, it really shows what people are made out of and that there really are a lot of good people in the world, and sometimes they just close up until there's something tragic that brings out the good in them.

JOHNSON: Let's talk about your assignment to the NAIT and how that came about and what your duties were in that position.

STONE: Well, I was assigned, and several of us were assigned to do this because in the first two or three days the Shuttle Program was running all of the recovery operations, all of the data

gathering operations, just all of the logistics. It was clear to many people that because of the personal involvement of the key people in the Shuttle Program and the heat that some of them were feeling and receiving from not only the press but the Administrator and the others, that it was in the best interest of some of them that we put seasoned Managers in there that didn't have a direct tie to the program.

So I took over the Deputy Program Manager's role running the day-to-day operations for the recovery effort and the analysis effort to start trying to figure out what happened. I replaced Linda Ham in her board, and that kind of became the focal point for the NASA part of the investigation. Frank [T.] Buzzard was assigned to be the interface to the CAIB, the Columbia Accident Investigation Board. They were the arms and legs for the board to get whatever they needed from NASA. The NAIT was really the management and the arms and legs of NASA to be able to deliver whatever was needed.

We had Frank [J.] Benz as the Director of Engineering at JSC, myself, and Jim [James W.] Kennedy from the Kennedy Space Center were the three Co-Chairs, kind of all equal, but one more equal than the others, as they said, because I was the Chair of the group. We each took one of the key areas in the CAIB, and we were the accountable executive to making sure that the CAIB—if NASA could do the analysis, we did the analysis and provided it for them. If NASA didn't have the capability to do the analysis, we helped them, through independent sources and our sources, to find organizations that could do that analysis and start putting it together.

So the NAIT went on for almost two years until we wrote the final report, and CAIB closed out, and we closed out our report in conjunction with their report. So it was kind of a blur. It was one of those things that you were working ten or twelve hours a day, six or seven days a week, for a long time, and you look back on it and say, "Well, what did we do all day

every day?" But in that two years we put our hands and our brains on every piece of the vehicle and everything that could have happened, may have happened, should have happened, didn't happen, and helped the CAIB put it all together into a report.

Of course, we did not have an accountability to write a like report. I took all of the analysis things and had them bound up into a single thing. The CAIB was the accountable group to interpret and decide what all of that meant. They came to an absolutely clear technical answer. I don't know that some of their people analysis was quite right, but anytime you're talking about the psychology of why people do things and what really happened and who's accountable, there's a million different opinions, and I would tell you that I probably have a different opinion than they do. But from a technical answer we came to the right answer. We know what happened.

JOHNSON: If you will, for a second just compare the *Challenger*, after the *Challenger* accident, and the recovery and the investigation to the *Columbia*, the same thing. Do you feel that they were similar in the way they were run, or were there significant differences?

STONE: They were similar in the way they were run. The big difference between the two accidents, within, I would say, seventy-two hours we knew exactly what took *Challenger* out of the sky. We didn't know why that joint failed, but we knew that joint failed, and there were hot gases coming out of the SRB [solid rocket booster], and it cut the fuel tank support structure in half with a blowtorch and turned the vehicle sideways, and that was the end.

It was literally months before we really could back our way into answering what we thought was the right answer. Yes, this piece of foam may have done it, because it ties together

right. But it was way more difficult to prove, one, that it was the principal culprit, and two, what happened once this breach occurred. Why didn't the breach do something during ascent? So it had to have been very tiny, because it wasn't affecting the vehicle aerodynamically, because it didn't get hot during the ascent, or very hot. So there were just a whole bunch more technical questions on *Columbia* than there were on *Challenger*.

One of the big things that happened on *Challenger* is that it became very, very clear that our flight readiness process was not rigorous enough, and it did not have processes that were repeatable and you got the same answer every time. So for two and a half years that's what we really worked on after *Challenger* is making everything associated with getting ready to fly a production-type event. That was not the case for *Columbia*. The processes were very, very good. What failed was the decision making and analysis judgment calls based on previous success.

Let me explain that a little bit. We were so successful so long even though we were shedding foam that it became, "Foam can't be a problem, because we've always lost it." That was probably the mentality that we had fallen into. You can't say Ron Dittemore fell into the trap. Linda Ham fell into the trap. It was a whole series of Program Managers and analysts that fell into this trap again and again and again over twenty-five years of operation. In my opinion, that's one of the things that CAIB kind of missed. It wasn't a NASA person or a group of NASA people that failed to recognize this as a problem. It was the entire community that accepted it again and again and again and again because we got away with it.

So they were the same in that it was an incredibly good group of talented individuals that were on the accident boards, non-NASA people that were on the accident boards, that came to the right set of technical answers. So it was similar in that vein, but different in the fact that on

Challenger we knew exactly what happened within about seventy-two hours. Why it happened took a long time. But *Columbia*, we suspected what happened, but we couldn't prove that that was sufficient to take the vehicle down.

JOHNSON: In January 2004 the current President [George W.] Bush announced his new Vision for Space Exploration, and I think we talked about before the previous [George H. W.] Bush's announcement and the different announcements by the administration through the years. What were your impressions of that announcement, and how do you think the reaction was as far as NASA was concerned?

STONE: Well, I think NASA was thrilled with the announcement, but they were a little bit cynical about whether or not you could really make it happen. We have become less and less cynical over the last couple of years, because people like Mike [Michael D.] Griffin are really doing the right things to give us a shot of making the vision happen. It's going to be a rough row to hoe, but the NASA and the contractor workforce out there believes it is a possibility; that we've got this opportunity; that we ought not to mess up this time.

So I think it's a wonderful thing if we can hold the line that America should be exploring space, should be exploring the Moon and the planets, and keep it moving forward. Even if it moves slower than we want it to, don't ever stop moving forward or we'll never, ever get there. So I think it was a wonderful thing. It's given people the enthusiasm to push on. It made me go back to work. So I want to believe it. I want us to have an opportunity to put humans on other planets. I'd like it to happen in my lifetime. I sure want it to happen in my grandkids' lifetime, in my kids' lifetime.

JOHNSON: You decided to retire from NASA, and then you just mentioned that this inspired you to go back to work, so when you first retired, what were your plans, and if you can share what you're doing now.

STONE: I can do that. I had made the decision to retire from NASA, one, I was just exhausted. Spending that much time on the accident team and looking at what my future was in NASA, it was clear politically that I was not going to be a Center Director. I'd been everything else that was fun. The Administrator asked me what I wanted to do next, and I said, "Well, I want to either be the Center Director at JSC or the Center Director at KSC." It was fairly clear to him that I wasn't going to be that, and he let me know that that was the case, in his view. That was fine; there's nothing wrong with that kind of interaction.

But I looked at what I had done within NASA, and I was reasonably content that I had done okay. So I decided to retire and just rest for a year, two years, or maybe stay retired. The day I retired, the actual day I retired, I found out my youngest daughter had cancer. So I now had something else to occupy all of my wife's and my energy. She's done quite well. She has recovered and even had a child since then, so we're very, very, very blessed with that.

But after about a year, once we got her through her problems and I got to flying model airplanes every day and fishing when I wanted to and doing exactly what I wanted to, it was fairly clear to me that I would probably like a little bit more structure. I would like to do something technical again. So I started consulting two years ago, I guess, two and a half years ago. I did a little bit here and a little bit there.

I had the opportunity to go work with a large company, Perot Systems—yes, it is the [Ross] Perot here in Texas—and try to win a NASA contract that they were going after. We didn't win it, but it was a great experience with really first-class people. But I decided that that was not the right thing for me, so I resigned from that company, I guess it was, last April, and I just was going to fish and fly model airplanes again.

A good friend of mine, who owns Cimarron Software Services, [Inc.] started calling me every day, sometimes twice a day, to see if I wanted to come work with him. So I had lunch with him, and I said, "Well, what do you want me to do?"

He says, "Well, I want to retire."

I said, "Well, does that mean you want me to take your job?"

He says, "Yeah, that's what I mean."

I said, "Well, I'll consult with you for a little while, and then we'll talk about it." And I consulted, and I would go into the office two or three days a week, and we'd work on strategic plans for the business. I still didn't think I wanted to run a company and take on that kind of accountability. Then he and his wife took my wife to lunch, and I don't know what happened. I ended up President of the company.

Actually, we all sat down and decided that it was probably a good thing. It's an exciting thing for me. I've had a really good time. I've been President of Cimarron since August of last year, so not even a full year yet.

JOHNSON: A little different than fishing.

STONE: Yes. I still get to fly model airplanes. Part of the deal was he took Friday afternoons off always to go play golf. I come in late on Friday mornings, because I fly every Friday morning if the weather is good.

JOHNSON: It's a good deal.

STONE: It's a good deal.

JOHNSON: A good job. Well, as I think we had mentioned before the interview, this is a week for NASA of a lot of remembrances, for Apollo 1, for *Challenger*, and for *Columbia*. In 2004 the Mission Control Center team held a special plaque ceremony for all three crews, and you were asked to place the one for STS 51-L, of course, the *Challenger*. If you would, just for a second tell us about that ceremony.

STONE: Well, it was one of those things that we felt it was time to hang the *Challenger* plaque in the Control Center for Flight Controllers to always remember that, just like on Apollo 1 and just like on Apollo 13, things can go horribly wrong, and you become accountable right now. Because I was the Lead Flight Director and had tried to get this done for quite some time, I was asked to hang the *Challenger* plaque. It was a very emotional thing for me, and unfortunately, it was just before we lost *Columbia*. So, you seem to relearn things again and again and again, and what you learn is space flight is unforgiving.

JOHNSON: Well, you've also worked over the years for a number of different Flight Directors and Center Directors, and they all had different management styles, as we've talked about through these sessions. [Stone laughs.] But do you have any other thoughts on some of the different people and how maybe their styles influenced your management style in what you're doing now?

STONE: Well, I think of course Gene [Eugene F.] Kranz had to influence every flight controller that ever worked for him, both when he was a Flight Director and when he was a Division Chief and when he was the Directorate Chief. He had a huge impact on a whole generation of people. Of course, we've got a lot of kids now that they just know him by the books and the movies.

Other managers that had a huge influence on me, Glynn [S.] Lunney. Glynn Lunney was always one who would—he always had time to mentor you. Even when he left NASA, I could call Glynn, and I could stop by his office when he was with USA [United Space Alliance] and get advice. So he had a tremendous impact on a lot of people, me in particular. John [W.] O'Neill; people don't know John as well as they know a Glynn Lunney or a Gene Kranz. John was probably the best Manager I ever worked for and I learned a lot from him. So did a lot of other people.

The Center Directors, of course, Dr. [Christopher C.] Kraft [Jr.] was and is one of a kind. He was one who could terrify, one who could inspire, one who you could always respect, and so he has had a huge impact on a lot of people in the space program. He and Gene, their legacy is they built flight control. They built the concept of team. It's too complicated for one person to do, so you've got to get a few smart people together and do it as a team. So that legacy will be with the space program for a long, long time, I hope forever.

Aaron Cohen, the consummate engineer, incredible individual, both as when he was the early Shuttle Program Manager and then the Center Director. He had a lot of impact on me just because he was the Center Director when I was rising through the ranks, and he kind of looked after my promotions.

So I have been blessed in working with a lot of incredible individuals, including George [W. S.] Abbey, who even though he's sometimes kind of difficult to communicate with, I found him to be brilliant, a brilliant tactician and strategist. Working for him was a very interesting experience. I used to, every time I had a meeting with him, after the meeting I'd call Sue Garman to find out what the meeting was about, because she was a good translator. I have teased George about that over the years. He and I have remained friends.

When I took over—I may have told this in one of the previous times—after I became Deputy Center Director, I was in George's office, because he never moved. When he became Center Director, he stayed on the Deputy side. So when I became Deputy Center Director, I had his office. I was afraid to even change the table and chairs in there because they had some significance. I wouldn't sit in his chair at the big conference table. People would say, "Well, why aren't you sitting there?"

I'd say, "That's George's chair." And I said, "You know, sometimes I even talk to the chair and ask it advice, and it tells me almost as much as George did." I told George that once. He has a tremendous sense of humor, and he just laughed. I thought he was going to make himself sick, he laughed so hard.

But I have never met anybody that has more passion for human space flight than George Abbey. You may not agree with him all the time. You may disagree with him sometime. But I

guarantee you, he was yanking the Center and the country along to do human space flight, and we owe him a lot for his passion.

So I've worked with all kinds, and I've learned a little bit from each one.

JOHNSON: Lots of different personalities.

STONE: Lots of different personalities.

JOHNSON: What would you consider your biggest challenge while you worked for NASA?

STONE: The twelve hours after we lost *Challenger*. The whole gambit of emotions. One is was it my fault? Did I do everything I was supposed to do? I think that was probably the biggest—it wasn't probably one of the biggest technical challenges. It was the biggest emotional challenge I had to overcome to move forward was in that first twelve hours after the accident, that accident.

Every day is a challenge when you're dealing with complex hardware and complex personalities that you've got to put together to operate as a team, so that was a fun challenge, to participate in something as important as human space flight day in and day out.

I guess the biggest managerial challenge, if we want to separate them out, was when it was clear that Space Station was unpopular, both politically, and it was at best neutral with the American public. So funding was lower and lower; the cost of building Freedom was higher and higher. The typical response is, "Well, you've got to do the same for less. It's got to be cheaper."

Figuring out how to do that when I was Director of MOD [Mission Operation Directorate] and the Associate Director of MOD was just a huge, almost a nightmare of if you cut this, what happens to that. But building that budget process for that three or four years in the early part of Space Station, where plans that had been in place for eight or nine years were now being thrown out, and you had half as much money as you thought you were going to have to build what—to build the simulators, to build the Control Center. So I guess that period of time was the most managerially challenging for me in my career.

JOHNSON: Opposite of that, what would you consider would be your most outstanding achievement or your proudest moment?

STONE: Two of them, I can give you two events where I felt like I was on top of the world. Now, a lot of things were wonderful, but two events stand out.

The day that George Abbey called me into his office and after a thirty-, forty-second interview told me I was the next Flight Director. That period of time after that when it's sinking in that I had been selected as a Flight Director, and of course, Gene Kranz was one of my heroes, and Glynn Lunney was one of my heroes, and Pete [M. P.] Frank [III] was one of my heroes. So I was going to get to be a Flight Director like those guys. I was on top of the world. It was an emotional high point. Then after two or three weeks I discovered it was the hardest work I'd ever done in my whole life, so high to hard work.

The second moment in my career that put me on that pinnacle of excitement was when John O'Neill called me and said, "Hey, I need to talk to you."

I'm thinking, "Well, he's going to tell me who the next Director of MOD is," because you never call the guy that's going to get it first.

When I walked in the office, and he stood up and shook my hand and said, "Where do you want to move your desk to?" Getting to be the Director of MOD was just a huge thrill for me, more so than being the Deputy Center Director.

So from a career standpoint, getting selected as a Flight Director and then being selected as the Director of Mission Operations were the two high points. Lots of other highs in there, you know, historical highs; just fun to be a part of it.

JOHNSON: If you don't mind, I'm going to see if Jennifer has anything that she has a question about.

ROSS-NAZZAL: Are you okay to answer some questions? I don't want to wear out your voice.

STONE: Hey, if I just collapse in the chair, you know it's over.

ROSS-NAZZAL: One of the questions I was thinking of as we've been sitting here over these past few sessions is about women. You started working in the Landing and Recovery Section. I'm wondering if you could talk to us about the women that you worked with, starting in the sixties and working your way up to becoming Deputy Center Director.

STONE: Sure. Sure. The first really important woman I worked with in NASA was Susan Golden. She was the Division Chief's secretary, and I've been married to her for thirty-five years.

JOHNSON: Good working relationship.

STONE: Very, very, very good working relationship.

For a long time, right, wrong, but just the times, the only women I worked with were secretary and administrative people. Probably one of the most influential women that I worked with in the administrative side was Maureen Bowen. She was in admin [administration] in MOD when I got to MOD. She processed me into MOD, and she processed me out of MOD. She has finally retired, but just an incredible person that loves the space program and loved the people in the space program and treated it with almost reverence for her whole career.

Several secretaries that I've had over the years that were way more than secretaries. They're partners in doing a difficult job. Alene Ganzer, a lady that came—she had worked in the DoD, and I think she was a Marine Master Sergeant or something, but she was a tough lady. She still lives here in Clear Lake City [Texas]. I see her now and then. She retired twenty years ago at sixty-eight, and she doesn't look any different. I wish I could figure out how to do that.

Then Janice [L.] Gray, who was my administrative assistant. When I took over Tommy Holloway's job, I inherited Janice, and really an incredible lady and helped me an awful lot. Then Mabel [L.] Cobbs, my secretary for the last seventeen years of my career, a true inspiration to me. She was a lady that came out of a rather poor section of Houston; had a high school diploma and was in one of these secretarial intern programs. She was a GS-2 [General Schedule,

pay level], but she had the best attitude of any human being I've ever met. I knew her when she came to work at NASA, and she went from a [GS-]2 to the Deputy Center Director's secretary in twenty years.

So from the administrative side, those are people that I remember very, very well. Of course, there weren't many women on the flight control team. I had several that were on my flight control team on STS-6, Mimi [Cheevon B.] Lau being the head Flight Activities Officer on my shift. She's gone on and done very well as an engineer here at NASA.

Susan [L.] Creasey, I met her as she was in training. She'd been here a week, and she was training me to be a DPS [Data Processing System] Officer, and of course, I'd been working DPS for probably five or six years getting ready for STS-1, but she was my training person, and she'd been here a week. Very, very bright lady. She's done very, very well. She's one of the executives in the Space Station Program today.

Linda Ham, I selected Linda as a Flight Director. Very, very good Flight Director, very intelligent lady. She was the first ascent female Flight Director, very good, one of the best that we've had before or since. So it has really, really changed, the flight control teams. Now you walk into a Flight Control Room, and it may be as much as fifty-fifty on some flight control teams between women and men.

I think it's great that we've, one, accepted that as the norm. But, two, our educational system has changed enough to give women those technical opportunities that oftentime they didn't have over the years. I went through my whole career without ever having—except for Carolyn [L.] Huntoon. She was the only female boss that I ever had until I left NASA, and the CEO [Chief Executive Officer] of my company is Roz [Rosalind] Doyle. So I now work for a lady who used to be an educator and is now the owner of the company.

So I think it's been an interesting journey to watch the workforce become more diversified between men and women, and other minorities. When you walk into a Control Room today, it's hard to think of women as a minority. You walk into the Flight Director's office, it's hard to think of women as a minority. There are a lot of women Flight Directors now. So times have changed, and it's changed for the better.

ROSS-NAZZAL: I just have one more question. One topic we're always interested in is exploring the way the Johnson Space Center or Manned Spacecraft Center changed the Clear Lake [Texas] area. I'm curious about your thoughts on that.

STONE: Well, it sure brought a lot of people here. When I first came here, there weren't many people. There were lots of wilderness areas around here. I hunted deer legally where Bay Oaks [subdivision] and places are years ago in the late sixties before Bay Area Boulevard was opened to the public. It was built, but it didn't go all the way to Red Bluff [Road]. It was blocked off. One of my friends was a highway patrolman, and he got one of his buddies, and they parked a car at one end and parked a car at the other end and had the road blocked off and let me drive my racecar up and down Bay Area Boulevard at about 140 miles an hour.

So NASA has changed the area, and it's interesting, over the years. This area has just now in the last seven over eight years has become more diversified in different economic groups living in the area. In the sixties all of these apartment complexes had professionals that worked at NASA or worked for the oil companies, and it was kind of an artificial world that NASA created out here, where the most uneducated person you knew only had a college degree. Almost, it was that sort of thing. So it made for a different environment that has slowly but

surely become more like the rest of the world as all of the population has moved out this way. But NASA obviously had a huge impact on the area.

JOHNSON: Is there anything we haven't talked about you wanted to mention before we go?

STONE: I can't think of anything. I'll probably think of forty or fifty things later.

JOHNSON: Well, we can always add them, or we can do another session.

STONE: But this has been very enjoyable for me. I hope I didn't spin too many tales.

JOHNSON: No, not at all.

STONE: I'm more of a storyteller than I am an interviewer.

JOHNSON: Well, it's amazing how much information can come out of those stories. But we appreciate you coming.

STONE: Well, it was my pleasure.

[End of interview]