# NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT
# ORAL HISTORY 3 TRANSCRIPT

FREDERICK D. GREGORY
INTERVIEWED BY REBECCA WRIGHT
ANNAPOLIS, MARYLAND – 18 APRIL 2006

*The questions in this transcript were asked during an oral history session with Frederick D. Gregory. Mr. Gregory has amended the answers for clarification purposes. He has also added a few questions for readability. As a result, this transcript does not exactly match the audio recording.*

WRIGHT: Today is April 18th, 2006. This oral history is being conducted for the NASA Johnson Space Center Oral History Project with Fred Gregory at his home in Annapolis, Maryland. The interviewer is Rebecca Wright. This session is the third part of a series of interviews with Mr. Gregory, and we begin today with the second Space Shuttle command, STS-44.

Thanks again for allowing me to come into your home this afternoon.

GREGORY: Thanks, Rebecca.

WRIGHT: This was your third flight. Your previous flight had landed in November of 1989, and within two years you set to command yet another crew.

GREGORY: Yes.

WRIGHT: Did you expect to return to space so soon? Tell me how this all happened and how your command took effect with your crew.

GREGORY: There were very few commanders, and just by rotation you could determine about when you would fly again. So I was pleased and, of course, very happy to be selected again and have the privilege of flying, flying Space Shuttle *Atlantis*, in this particular case. It seemed like a very good program, the Defense Support Program, or the DSP. It was a very large satellite, and so I thought it was going to be exciting as I watched it loaded into the payload bay, and then I realized how important the satellite was. So it looked like a great mission. I was flying one more of the Shuttles and I had a great crew. So I was pretty excited about it.

WRIGHT: Well, let's talk about the Shuttles for a moment. This is the third mission, and the third different Orbiter.

GREGORY: Yes, it would have been the third Shuttle. I flew the Space Shuttle *Challenger* first and then Space Shuttle *Discovery* and then *Atlantis*. Each of these ladies had slightly different personalities. You could get inside and hear things on one that you wouldn't hear on the other. But *Discovery* and *Atlantis* were very close to each other. *Challenger* was a little earlier, and so it had some slightly different characteristics.

But at this time I was beginning to think about how I would close out my career. At that time I was thinking that if I flew each of the five Shuttles, that would be a reason to stop flying. So this one just kind of fit right into the scheme, so I was pretty excited about it.

WRIGHT: When you're training and you know you're going to be on a different Orbiter, do they train you any differently, or is everything just the same?

GREGORY: The training is the same. There may be a few oddities between, or some very few differences, between them, but as far as training is concerned, it would have been invisible for us to determine which one we were actually on.

WRIGHT: This crew had many rookies, except you and Story Musgrave.

GREGORY: I know. [Laughter] Not only rookies, but we also had Tom [Thomas J.] Hennen on board, an Army Warrant Officer. We had never flown a military non-officer before, so this was pretty unique, and it was actually pretty exciting, because he was from the photo interpretation field. I know many had talked about what you can actually see from space, suggesting that there may be a battlefield advantage of being in space, and so with Tom on board, he was the one who was going to come in and use whatever small optical devices he had to determine whether it was possible to do a good amount. So we were introduced, the crew was introduced, to an entirely different community than we had been exposed to before, and it was great having Tom with us.

So he was just one more of the rookies, but I'll tell you, once the crew became one, or when it first met, there was understanding that there was a lot of preparation that had gone into the assignment of each of the people. So they may have been rookie by name, but they were very experienced when they got on board.

WRIGHT: What did you do as the commander to help pull this team together?

GREGORY: I always said that the crew had to have someone who was able to look at each of the individuals to determine what his or her strengths and weaknesses were, and then combine each

of the talents and fill the gaps by training so that you could cover each aspect of the mission. The commander is responsible for the success of the mission. That's a given. A secondary role for the commander is to assure that the crew has had fun.

The crew becomes a family. It's not a dysfunctional family. It's a family that accepts the strengths and weaknesses. It's a family that one person does not become so headstrong that he or she believes that the success of the crew is only dependent on one. It's that kind of thing. I said always that a good crew is like a ballet; it's musical in some ways, and it's very coordinated and beautiful. You stand back from it, and you watch it, and it appears perfect like an oil painting, even though there are lots of little flaws. [Laughs]

WRIGHT: You had a delay for a couple of days, and then you had a delay of thirteen minutes for an orbiting spacecraft. I thought that was kind of unique, that you had to wait for a spacecraft to fly.

GREGORY: Well, it's just that it shows you how the safety program works. They did not want to endanger the crew or the Shuttle, and they certainly did not want to—if it were a satellite of sorts, they wouldn't want to interfere with what that satellite was performing. Obviously, if it was a rocket body part of some sort, it was in a degrading orbit, and it would come home, and it would be terrible if it had ruined our day. [Laughs]

WRIGHT: Yes. You'd already mentioned that this is your second DoD [Department of Defense] mission. I know you can't say all the details, but were there a lot of similarities in this mission compared to the other ones that you did?

GREGORY: Well, the one in ’89 on STS-33 was a highly classified mission, and so the difference was we had a very small group of folks that we worked and trained with. It was a very closed community. The DSP (Defense Support Program) satellite on STS-44, was an unclassified mission, and so it was readily available to the press and the media, very different from STS-33 where there were a lot of secret activities always going on. So they may have been—and I won’t say there was [laughs]—but they may have been similar or dissimilar, but it was just kind of a different environment that we were in, one secret and one nonsecret.

WRIGHT: But still, of course, DoD missions. The length of the flight was shortened some when one of the three Orbiter inertial measurement units failed on orbit.

GREGORY: Yes.

WRIGHT: What impact did that have on your flight and your crew, with all those rookies? What was their reaction?

GREGORY: We had completed our primary mission, which was to deploy. We had done a lot of the other scientific and medical investigations. We had some follow-up to do, but once that IMU, inertial measurement unit, was discovered bad, the ground worked a sequence of events so that when we finally deorbited, we had completed, if not 100 percent, pretty close to 100 percent of all of the desired outcomes. So I think we went from ten days to seven days, but we accomplished everything that had been planned.

WRIGHT: When you landed at Edwards Air Force Base, California, in December of 1991, did you have any idea that would be your last flight?

GREGORY: I think that within a month of landing I realized that I had done what I had set out to do. I think that when I had the privilege of being the crew support person, the family escort, for the next crew, and I looked at the family, the relationships between the husbands and the wives, I saw a level of stress that had not been apparent to me before, because I had been in a very high risk career. My entire career had been filled with high risk activities.

I think that the encounter that I had and the realization that I had exposed my family to this level of stress and risk for many years, made me suddenly realize that I had been doing all of this for me, and I had not considered what the impact was on the rest of the family. So though I may not have recognized it in November or December when I landed, within a month I had decided that I had flown enough. I didn't need to do that anymore, and that I was going to have to move into something that was more normal.

So, as I mentioned earlier, I had considered flying the five different Orbiters. I had flown three of them. So I began looking for a goal, anything that I could use as my last hurrah. I looked at my flying time, and I was extremely close to 7,000 hours, and so I decided that I would fly to 7,000 hours. I flew on the 30th of May '92, 1992; I hit 7,000 hours, and I stopped flying. Kathy [Dr. Kathryn D.] Sullivan and I flew from Houston [Texas] up to Whiteman Air Force Base in Missouri. We had lunch. We came back. I stopped the airplane; left everything in the airplane, helmet, helmet bag, checklist, gloves, everything. I just left everything; got out of the

airplane and walked away. It was, for me, a clean break. So I left on a high. There was nothing negative about it. I just left and said, "Guys, enjoy it."

Now, what resulted was, since I had mentioned the very small commander's queue, a slot and opportunity for a younger commander, a pilot to move to the left seat. So I felt good about achieving a goal—7,000 hours—flying successfully, completing missions, and then opening up an opportunity for a younger pilot to move into the commander's rank. So I've had no regrets whatsoever about that decision, and have never looked back wishing that I hadn't made it. So it wasn't immediately after STS- 44, but was within a month of that time.

WRIGHT: When were you approached about moving to NASA Headquarters in Washington, D.C.?

GREGORY: [Laughs] Almost immediately. It was probably in May of '92. It was one of those things that just fell in place. How, why—it was a mystery. I don't know why it was. [Laughs] I was up giving a talk at the Department of Energy one evening. It was a Saturday evening. I was staying with my mom, and when I got back home, I had a call from Mr. George W. S. Abbey, and he said he'd like me to come in and meet the next morning at NASA Headquarters, and that the new Administrator, Dan [Daniel S.] Goldin, wanted to speak to me.

I said, "Sure, I'll do that. It does not seem to interfere with the plane that I'm taking back to Houston." [Laughs] And on Sunday morning I went down to NASA Headquarters to meet Dan Goldin. When he walked in and looked at me, he said, "I'm going to make you an offer you won't turn down." That's when he offered me the chance to move to Washington and run the safety program for the Agency.

WRIGHT: You entered that job about the same time that he was instituting his faster, better, cheaper era.

GREGORY: Initially it was "Carpe Diem—seize the day." A little later faster, better, cheaper came about.

WRIGHT: So at least let you get into the office for a little while before.

GREGORY: That's right.

WRIGHT: Dan Goldin, you said came in with the conversation topic that he was going to offer you something that you wouldn't refuse. So what did he offer you?

GREGORY: Well, he offered me the opportunity to become the Associate Administrator for Safety and Mission Assurance.

WRIGHT: What was his expectations of that role?

GREGORY: He wanted a culture that considered safety mandatory in order to achieve mission success. He was still working from the Rogers Commission, and he wanted not to fall back into the kind of complacency that we had, where we sometimes made choices without doing the risk assessments, and sometimes we did things that were inherently—well, I use the analogy if our

decision was flawed, would it be on the front page of the *Washington Post* [Newspaper]. So you'd do the *Washington Post* test on it. So what he wanted was a program that was safe and that we could be assured that it would be successful.

So I took the title of the organization, which had been "Safety, Reliability, Maintainability," and things like that, and changed it to Safety and Mission Assurance. I was going to make it Safety and Mission Success, but I believed that the mission success part belonged to the Program Manager, and that we could promise the Program Manager or Project Manager, or the Administrator, that we had done everything possible to assure that it was safe, and that there was a doggone good chance that it would have been successful.

We were pretty good at it. We went from '92 until Space Shuttle *Columbia* [STS-107 accident] without a major incident of any type, and we had a string of successes for that nine years or so.

WRIGHT: In '93 you had the first Hubble Space Telescope mission, which was at the time the most complex, having five back-to-back EVAs [Extravehicular Activities] with the teams.

GREGORY: The safety community, in conjunction with the Space Shuttle Program, did a very thorough review of as many of the aspects that we could imagine, the what-ifs. That not only included all the process leading up to the launch, the successful launch of it, but also the activities that would occur on orbit. In my particular case, I was also interested in all of the resources, and resources included the humans. So I spent a lot of time talking to the commander of the mission, the members of the crew, those who were going to do the EVA, to get a sense from them, their level of preparedness and confidence.

When I cobbled that assessment with the process assessment that we made, plus the technical assessments that we made, then and only then would I have given a safety "Go." We spent a lot of time working on it and preparing for it. So I think that the safety community participated and contributed to the success, but the success belongs to the Agency and the Program Managers who ran the operation.

WRIGHT: You had almost fifteen years in the astronaut corps. What could you bring from those experiences into this new job to help you ensure safety for the missions?

GREGORY: I had seen it. I had seen operations from the other side. I was thoroughly familiar with the selection process, with the quality of the candidates, of the crew members. I had run the training program for the Astronaut Office, so I knew the quality of the training that went on. And then I knew each of the individual astronauts and had a very personal relationship with each of them. I felt very confident calling each and every one of them to talk about concerns that they may have, or didn't have. So I think that's what I brought was the intimate knowledge of the other side, the person who's actually sitting on the end of the bullet. But most importantly I had staff that understood all of the technical aspects; could tell me about resistors, solid rocket motors, reliability, process robustness and all of those other very important things that minimize risk and increase success probability.

WRIGHT: That they are needed for. [Laughter]

GREGORY: And I learned about risk assessment and risk management. I learned about that from [Dr.] Michael [A.] Greenfield, who was my deputy. I never claimed to be the expert on all, but I did surround myself with people who I had great confidence in, who, if I asked them a very specific question, they could give me a very specific answer, and if they couldn't, then they wouldn't. They wouldn't fool me. They would go out and research it and come back with an informed answer necessary so that a credible decision could be made.

Sometimes we had to make a choice, because sometimes there were alternatives, You have to consider the best knowledge that you have at the time because if a decision is necessary for continuing, then you have to make one. The decision might be, "I'm sorry, we can't proceed any further." And we did that in several cases. But my staff and other members of the safety and mission assurance community were very good at running these issues to ground so that we could support the Agency and Dan Goldin.

WRIGHT: Because you had such a personal relationship and a working relationship with so many members of the crew and at the different Centers, did you have an opportunity to receive calls from them directly with their concerns?

GREGORY: Yes, I would get a lot of calls. It would be from the technical level all the way through the Associate Administrators. It was the full spectrum, and I considered each one of them as important as the other. It wasn't a matter of who they were or where they were or what their role was. I'd listen, and then I would inform them that, I understood everything you've told me. I would ask if there anything else and then let them know that their input would be taken into account along with every thing else but that I was responsible for making the decision. I

made certain that they understood that my decision may not be in agreement with their recommendation. I think the majority of the folks understood that. If I didn't, if I chose to go a different way, I would go back and, get back in touch with them and tell them why I made this choice as opposed to what they have suggested We did have a long history of success utilizing this philosophy.

WRIGHT: Yes. Yes, you did. What changes or programs did you implement when you came in there to—

GREGORY: In safety?

WRIGHT: —yes—to fulfill your mission? Did you make a lot of changes?

GREGORY: Well, we did in the safety world. I think the difficulty was getting official recognition by the program of the role that the safety community had. What I was attempting to do was to never give a Program Director or a Project Director the opportunity to say, "My program was okay; the safety people failed." I never wanted that to occur, because the responsibility for the success of the program, from my point of view, belonged to the Program Manager or Project Manager. So that's why the "Mission Assurance."

I would talk to them and say, "These are the concerns that I have. It's your choice whether you accept this safety recommendation or not. Be aware, however, that if you don't, I could call a "stop" as we work out the differences. Some heated discussions occurred. Most of these were official and open but I made quite a few calls during a review, where I would just get

on the phone and say, "Hey, we're heading down this path. I think we're going to run into a problem here."

I think, with very few exceptions, the recommendations that we made were accepted by the programs, and the safety community did have an impact. The unfortunate thing is that we were never able to officially become part of the process that the program had, and so we had to do it, in many cases, by influence or relationships. I believe now they do have it—I think now that after *Columbia* accident that the safety process has finally been included as a requirement of the program process of the mission life cycle.

The other thing that we added was peer review. I happen to like it and see it as an essential part of the success process. We called it independent assessment or IA.

WRIGHT: Right.

GREGORY: These assessments were not necessarily accepted by the operations community. The first real IA activity was initiated when the Space Station program moved to Houston and the program management was reformulated as an Integrated Product Team or an IPT. I had to get some insight into what was actually going on, what kind of processes were going on within the IPT. I got Hank [Henry W.] Hartsfield [Jr.], a former astronaut to put together an independent assessment group To be honest, it was not well respected, because it was a group coming in and challenging, or daring to interfere or impose their will. But that was okay.

Independent assessment is part of the processes now, and I think people have acknowledged that there is some value to IA.

Another thing was trying to raise the level and status of the safety folks. There was a perception that many of the folks working in safety were those who could not make it as strong engineers. I learned, however, that the folks in the safety world were very strong and technically well qualified to do just about anything. Part of my job was to raise the confidence and esteem of some of the members of the team.

WRIGHT: Sure. Change the perception, yes.

GREGORY: Yes, to change the perception that they had of themselves. So that was just another thing.

Since I was one who believed that the program was the one responsible for all of its down to the locations where the decisions were being made. It was met with some degree of skepticism. Sometimes I had chosen a uniquely qualified person to perform a significant role for a specific reason and that person also had other jobs and responsibilities. It didn't bother me that this person actually had two roles, but it did bother others.

WRIGHT: That was one of the questions I was going to ask you, because sometimes it's perceived that Headquarters is telling the Centers what to do, but yet safety encompasses all of the pieces together, and how are you able to build that connection with the Centers and the Headquarters, where there was a respect.

GREGORY: You try your best. There is a community. Different folks have different priorities, but I always held the trump card. I could always say, "I'm sorry. We're stopping this."

Willingly or unwillingly, we'd get things done. Whether there respect and acceptance from others or not, all I was after was to protect the crew and have a successful mission and stay off of the front page of the *Washington Post*. We avoided that, also.

WRIGHT: How did your direction and expectations from your office affect the contractors that were responsible for the safety?

GREGORY: What we did was establish a set of expectations, that if you, as a contractor, intended to do work with NASA, that you would have to comply with. This is the process that we have in NASA. You will, you must, conform to that. If you don't conform to that, then it will be reflected in one way or another. So what we did, I think, was create harmony between the public sector and the private sector. You could see that they would change their method of operation to reflect what we had done in NASA. So whether they believed in it or not they would mimic what we did.

WRIGHT: I'm sure, as you mentioned, some might not have been so receptive of some of the areas that you wanted to have attention to. Did they pressure your boss to pressure you to not be so—

GREGORY: Dan Goldin and I spent a lot of time talking about a subject, and the subject was who should own the safety community. Dan wanted me to own all of those folks who worked in the safety world, and I argued that's not right, because the safety and success belongs to the Program Manager. The Program Manager should be responsible for doing whatever he or she needs to do

to achieve success and safety, mission safety. My role was to assure that there were standardized guidelines, requirements, processes and oversight that assured that safety was paramount is all that we did. Dan and I had that discussion, perhaps, two or three times during his tenure. Again, he accepted my recommendation—whether he agreed me or not and I am most appreciative of that.

WRIGHT: During your tenure, NASA entered into a partnership with the Russians to do the long-duration flights on *Mir* [Space Station].

GREGORY: On *Mir*, yes.

WRIGHT: Tell us about your experiences working with those and any safety concerns you had, especially after the Progress [re-supply vehicle] hit the Spektr [module].

GREGORY: I had a kind of a double motivation there. I believe that America needed to participate in long duration flights in one way or another. I knew that we had the Station that was being built, and I knew that we had to do whatever risk management we could do. So for me, the *Mir* was an excellent vehicle for learning as much as you could. In fact, I think that even with the failures—we learned so much from the failures that we were able to impose and implement many of those things on the Station that would prevent a reoccurrence.

Having a Progress collide with a station, to me, was not a reason to stop. But it was a reason to try to determine what the problem was and whether this was a one-time event or whether this was a systemic problem that we had. There were problems with the support

systems inside the *Mir* also. They were having breakdowns of pieces, parts and major systems. So there was a vocal group that wanted to have America abandon the *Mir*. The Russians would never have abandoned the *Mir* until all recovery possibilities had been exhausted.

So I used a forum to determine the pros and cons of staying, from the safety point of view. It included high-level discussions of exactly what the risk was, what precautions had been taken, what kind of mitigation there was. But I also spent a lot of time on the phone talking to astronauts who had been on the *Mir* or who were preparing to go on the *Mir* or had an interest in it. It was my conclusion and my recommendation that the U.S. maintain its presence on the *Mir*, and I made that recommendation to Dan Goldin. He may or may not have already concluded that, but we stayed. We stayed there.

WRIGHT: Did your research and investigation take you to Russia to talk with the Russians and see their operation during this time period?

GREGORY: No I didn't go to Russia, but I had an awful lot of knowledge of the system, of their systems.

WRIGHT: Another memorable, not so wonderful, but a memorable time while you were in that position is September 11th, 2001. Can you tell me about that day and your responsibilities during that?

GREGORY: I was on my way to Seattle [Washington] on a plane, on the way to Seattle to lead a panel at the Society of Automotive Engineers, a SAE conference in Seattle. I had one person

from my staff, Pam Richardson, with me. We took off from Baltimore/Washington International Airport, (BWI), Maryland on time; about 8 AM EST. It was an absolutely clear day. Somewhat into the flight the airplane began a descent. Pam commented to me that there must have been some bad weather in our path or a conversation similar to that.

I looked out, and I said, "You know, I have no idea what's going on out there." We were too far from Seattle to descend at this point, because we had still another scheduled hour and a half, an hour to go. We just began to descend, and then the captain announced that the air traffic control had ordered all aircraft in this sector to land. That didn't make any sense to me, either, because I questioned why would they just do it in a single sector?

So I then began to rationalize that there was a bomb threat, and it was on our airplane, and that this was the way it was being transmitted to us. The captain said, "We're going to go into Minneapolis [Minnesota]." Okay, so we descended, and we began a low-level turn to land at Minneapolis, and I thought, "Well, I should see fire trucks and police if there is a possible bomb threat on this airplane." Nothing. Nothing at all. The captain said he knew nothing; he was responding to directions. We landed and taxied, and the only thing he said was, "We are going to go to a gate that this airplane is compatible with the Jetway, so there could be a gap." Okay. So we land, and they said, "Well, everybody is going to have to get off."

So we're asking the flight attendants whether we could leave our baggage on board. This particular one said, "I don't know."

So she asked the question in the front, and they said, "No, you have to take everything off."

By this time one of the passengers had turned on a little portable radio, and you could tell he was very intense in his listening. The captain then announced that someone had flown into

one of the World Trade Center buildings in New York City, New York, and so this guy was—you know, the captain says this, and the passenger is listening and says, "Yeah, yeah, I'm hearing that."

So we get off the airplane and go up the Jetway, and at the end when we got off the Jetway, there was a big television. We were looking at it, and as we were standing there, we watched an airplane fly into the World Trade Center. We didn't realize; we thought it was real. Then somebody said, "No, no, that's a repeat," that that happened about twenty-five minutes ago. And then we got the word about the Pentagon in Arlington, Virginia, and that a second airplane had flown into the other World Trade Center tower.

But we didn't know what to do, so they told us to go up to the counter and rebook ourselves. We went up and they rebooked us on a plane the next day at noon. Then more and more words were coming out, and so the airline, Northwest, took us to a hotel, and paid for it; paid for our meals. By this time we found out that it was probably a Middle Easterner who had done this. So it was kind of scary. We attempted to go to the Mall of the Americas but we learned for security measure that it was closed.

WRIGHT: Gosh.

GREGORY: We agreed, the next day we'd go to the Mall of the Americas. We had a dinner and we all sat around, almost stunned, watching TV that evening. Next morning we went over to the Mall of the Americas and wandered around. There were very few people there. Then we went to the airport, and we were sitting out there, waiting on our planes. We were there with the baggage handlers and the flight attendants and the ticket takers and everyone. We were all

sitting out on the curb. [Laughs] There were lots of people just sitting there. Nobody said anything. There was an expectation that the doors would be flung open, and we'd all walk in and get on the airplanes. Every now and then we'd hear an airplane rev up and then shut down.

We must have sat for an hour and a half, and then a forklift came up, came in with a porta-potty, and put the porta-potty down. So that was our realization that, "We're going to be here for a while." So all of us, at this point, everybody just kind of got up, and we went back to the hotel. I think maybe that's probably when we went to the Mall of the Americas.

Later we learned that we could rent a car, a National Rent-A-Car, and so myself and my partner from the office and a guy from NSA [National Security Agency], rented it and we drove home nonstop, seventeen hours. There was nobody on the road. Went through Chicago [Illinois] about two in the morning. Saw sunrise as we went over the Indiana-Ohio border. The whole trip cost $42 plus gas, because it was a Virginia car that they wanted to get back to the east coast, so there was no delivery charges or anything. We left it at BWI and got in our cars and left. We were still stunned. But that's what I did on 9/11. [Laughs]

WRIGHT: Was there anything that changed as far as safety issues are concerned after that at NASA Headquarters?

GREGORY: There was a lot of concern about terrorists, and so there was a lot of thought put into how you protect the Shuttle. Folks were considering how to protect the Space Shuttle from small arms fire from offshore and from above. We immediately increased security; SWAT [Special Weapons and Tactics] teams came down. We acquired radar from an Air Force, radar units that could look close to the horizon; could look for small aircraft. So there was a lot of uneasiness,

but it was uneasiness because the threat was an unknown. No one had ever violated this country before, so no one was able to scope out what the threat was or what the credibility of it was and how to react and how do you prepare for it. But, we recovered from that and then continued launching, but with significantly increased security in everything that you did.

WRIGHT: Did that come out of your office, those changes?

GREGORY: No, no. That would have been out of the security group. It would have been out of the Administrator and the security groups, and then implemented by the Centers and the programs.

WRIGHT: What do you consider the most important events during your time and your tenure as your first administration job, and I guess you had mentioned some, but if you can think about your most significant contribution to that office, that you felt really left a lasting impression and change that would help the Agency in its goals.

GREGORY: In that office, I mentioned three of them, the things that I put in place that I felt at this point were significant. Probably the most significant events would have been, from my point of view, the continuation of our stay on the *Mir*; the successful recovery of the Hubble; and the success that we had with our launches and the success of each of the missions. I would put that number one, that NASA was perceived as an Agency that could do extremely difficult things, make it easy, and be successful doing it.

WRIGHT: Were you able to go down for the launches?

GREGORY: Yes, I went to every launch. I've participated, gosh, in seventy, seventy-five, or eighty launches. [Laughs]

WRIGHT: Looking from the outside in, this time.

GREGORY: Yes. This was after I had realized how stressful it had been, being on the inside. But now looking at it from the outside, I could take that into account. There a case where once I was talking to one of the crew members, and he was saying that he didn't have time to go to church, Kmart, or anything like that; it was just rush, rush, rush. So we came up with a reason to delay the mission for I think it was a week, so that the crew could catch up. So I always had kind of a Kmart check. I'd just call and say, "When was the last time you were able to go to Kmart?" If the answer was, "Oh, I can't remember." Then we'd think about it. [Laughs] But what it did, I found that—and I did this with my crew—when you got within a couple of months of launch, the crew was really uptight, and I could perceive a falloff in their efficiency. I'd put the crew on vacation for a week.

It would upset the trainers. "How can you possibly do that? You know we've got only so many more days."

"Just deal with it."

You bring them back in a week. It's like they were at 110 percent. They had just recovered great spirits, and man, you could just run right into a launch, and I felt comfortable that they were prepared to do it, mentally prepared to do it. I knew they were physically able to

do it, but now mentally prepared to do it. So that's what I call my Kmart check, to see if the crew had had some time for self-reflection, whether they'd had time to sit with the family and enjoy them. Because there was always—I mean, there was a chance that they'd never come home again. I thought that was important, so I always put that kind of personal aspect into whether it was okay to fly or not.

WRIGHT: Well, I'd like to talk to you about your next post at the Administration for NASA Headquarters, but why don't we just take a break. We've been talking for about an hour. We'll just stop and come back.

GREGORY: Okay.

[pause]

WRIGHT: Your next position at NASA Headquarters was to be selected as the Associate Administrator for the Office of Space Flight. How did you learn that you were going to be moved into that office?

GREGORY: Joe [Joseph H.] Rothenberg, who had been the Associate Administrator of Space Flight, left, I believe, in November. Dan Goldin had left at that point, and Dan [Daniel R.] Mulville was the Acting Administrator for that very short time. I was at home, when Mulville called me, and asked if I would step over temporarily and be the Acting Associate Administrator for Space Flight.

I said, "Sure, I'll do that," with the intention of going there until the next one came in, and then of going back to Safety.

I went to the office, and it was just about Christmastime; it was in that time frame. I had my opinions about human spaceflight, but I studied for about a week, and then decided that I was going to make some recommendations on realignment within the office to more align it with my sense of how it ought to run, and I was going to do it before the next Associate Administrator came in. [Laughs]

I also became aware of a program called the Decadal Planning Team, or DPT. It was a study initiated by Joe Rothenberg and Ed [Dr. Edward J.] Weiler had initiated. It asked to questions "Okay, where do we go next, how we get there and what are we going to do?" I was just fascinated, because from my point of view, staying in low Earth orbit and doing the things that we had done for these many, many years was just—well, it wasn't something that NASA should be doing. NASA should be blazing the trail and then leaving the operational activities to somebody else. Well, this was, to me, an amazing study that had been done and it needed public exposure.

So I spent the time between Christmas and New Year's studying the limited papers that that described the challenge, and then reengaging my thoughts about what an organization should look like to run a program such as that. I conceptually created an organization to do this. By this time Sean O'Keefe had come in. He had come in right after Christmas. I went to him and suggested that this is the way we should think about a future organization. It was so funny, because I'd gone up to him with a package that was essentially in draft form, and I was just bouncing it off of him, and he signed it. [Laughs]

WRIGHT: Well, that was easy.

GREGORY: Well, yes, and I didn't know what to do with it, because I had a lot of people that were supposed to sign it before he got to it. Then very soon after that, or maybe it was just before, he said, "Why don't you stay on as the Associate Administrator for Space Flight." So then I began the implementation. I asked my friend Jay [H.] Greene from Houston to come on up and help me work out the details of it, and I also had Suzanne [E.] Hilding. Basically the three of us, plus maybe one or another two, came up with an organization that began by assuming that these were the things that we needed to do in the future and how we would organize here to do it.

I brought the combined Station and Shuttle under a single Program Director, and then hired Mike [Michael C.] Kostelnik to come in to be that Program Director. I looked at the advanced programs that John [C.] Mankins was running, and I looked at the acquisition and procurement part of it, the budgeting, the public affairs, the legislative affairs. So I kind of put all that stuff in a vision, and then translated it into an organization, and then began working to convince people that this is what we were going to do, even though they may not agree with it. There was a lot of inertia.

The other thing was to pull the program management from Johnson back to Headquarters, and I needed to do that, because I needed to equalize or balance the four Centers. So, of course, that was—

WRIGHT: Earth-shaking?

GREGORY: Yes, that was Earth-shaking. [Laughter] It was Earth-shaking. Then I began to meet informally with the Center Directors, and that was something, I guess, that had not been done routinely. It was basically over lunch, but we would just come in and sit and talk about things. I was really just beginning to get rolling, and at the same time Sean was attempting to identify a Deputy Administrator. Apparently no one would take the job and so, as a last resort, Sean called me up and said, "Okay, I want you to be the Deputy." This was probably four or five months into my tenure as Associate Administrator for Space Flight. So then it was, man, do I really want to do that? Do I want to testify? Do I want to be a presidential this and Senate confirm that?

One of my big hesitancies, my major hesitancy, to take the position was that I had to give up my slot on the alumnae board at the Air Force Academy in Colorado Springs, Colorado. It was a huge decision for me, because I absolutely adored the Air Force Academy, and I was a member of the Association of Graduates (AOG). Since alumnae organizations are principally fundraisers—though they certainly do that, they also perform many other activities not related to raising money —my association with the AOG would be a conflict of interest.

After a significant internal debate I decided to accept the appointment assuming Congressional confirmation. My tenure as the Associate Administrator for Space Flight lasted probably, as the real one, from maybe January or February 2002 until August 2002. So six months, that was it. [Laughs]

WRIGHT: How much that you started actually got implemented after you left?

GREGORY: The organization was pretty much as I designed it. I have not followed it since Mike's [Michael D. Griffin] appointment, so I don't know where the program management of it is anymore. But during my tenure I selected [William H. "Gerst"] Gerstenmaier as the Space Station Program Manager. A good man. He ran a lot of the support groups and working groups necessary to maintain the international Space Station community. When he was selected to be the Associate Administrator for Space Flight by Mike, I was tickled to death.

Gerst understands what the environment is that he has to work and succeed in. He is well respected in not only the community of spaceflight, but also in the international community, He participated in many of the decisions that had to occur for the continuance and support for the Space Station. So Space Flight was in very good hands.

WRIGHT: You said that you had met with all the Center Directors. What did you learn, or receive some good input from them that you could have used in that position, or maybe used later?

GREGORY: I think that when you met with Center Directors, Center Directors were different from Program Managers. When you listened to a Center Director tell you what his or her problems were at their Centers, you heard about infrastructure issues. These were day to day concerns. So what I learned from them was that you could have the greatest programs in the world, but if you didn't have an infrastructure to support it, the program failed. Or if you had a significant amount of infrastructure and no programs, there was no sense having the infrastructure.

What I learned from them was there had to be a balance. Immediately when I became the Deputy Administrator, I made a very simple office, and I had a person who was responsible for the infrastructure. That was Jim [James L.] Jennings. And I had a person who was responsible for the programmatic aspects, and that was Michael Greenfield. These two guys talked every day, but their object was to make sure that all this stuff stayed in kilter.

That's absolutely the first thing that I did when I became the Deputy, and put together that very simple organization. So all the programs worked through Michael, and all the infrastructure worked through Jim Jennings, and so the reviews, independent reviews—these guys had no dog in the fight—but they ran the independent reviews of each of the specific areas. They would work together to figure out if something was out of kilter. And they were the principals when it became time to run the budget.

The other thing I had in the office was a Space Architect. I brought Gary [L.] Martin in as the Space Architect, because I had been so impressed with this Decadal Planning thing. What I wanted was someone who could speak for the Agency on where the Agency was going as far as future space, but also one who could speak to the Agency to give direction on the steps that would be taken to achieve it. So Gary was the one who I brought in to do that.

So I had Michael and Jim and Gary, and then I had Suzanne Hilding, I brought her with me, too. I'm still confused about what I actually titled her, but it was like Assistant Deputy Administrator for Internal Operations. Suzanne was the one who could, if there was a little problem, could dig into it and find out what was going on. She was a person who could handle tasks and come up with some conclusions and remedy. She was much tougher than I was, so a lot of people would come in and say, "Oh, don't send me to Suzanne. Send me to Fred, because Fred will say yes." [Laughter]

What did I learn? I knew that I had to have balanced Centers. I knew that I had to have common things, and so, from Safety point of view, I needed a similar and complimentary safety program across the Centers. Of course, when I moved up to be the Deputy Administrator I had much more clout to implement what I thought necessary for success.

I also had to have a balanced infrastructure to support the programs, so that one doesn't overwhelm the other. I learned that from the Center Directors. So I talked to the Center Directors an awful lot to try to find out what the fundamental problems were. I modified the Program Management Council, the PMC. I changed it from Program Management Council to Program Infrastructure Management Council, so that when Council met, I wouldn't just have the Program Manager talk, I'd have the other side talk, too. It began, at least from my point of view, a dialogue between the individual elements that made a successful program.

WRIGHT: How was your role explained to you to be the Deputy? Was it something you expected? Was it more or less? Especially now you had a brand-new Administrator.

GREGORY: I had no idea. It was like my first—when Dan Goldin said, "You're here. I'm going to make you an offer you won't turn down." You know, it's a mystery. I don't know how any of those things happened. But it happened.

WRIGHT: Did you get to define your own role as the Deputy?

GREGORY: I defined my role as a Deputy. I carved out areas that included some limited program leadership and other duties usually identified as the responsibility of the Chief Operating Officer.

I mentioned earlier about the Program Infrastructure Management Council. For the every day control I established the Ops (Operations) Council. Within the Ops Council, we reviewed the daily workings of the Agency including the budget reviews.

WRIGHT: That must have been fun. [Laughs]

GREGORY: Yes the Ops Council accomplished quite a lot. One of the first assignments that we handled was the hundreds of open issues with the NASA Inspector General [IG]. With a simple declaration, "That's enough of that," the Ops Council would mediate a session with the IG and the non-responsive organization. Within two months, there were absolutely no remaining open IG issues.

WRIGHT: And mediators?

GREGORY: We took that 500 and some odd down to zero. So then any requests to extend a deadline would have to come through me and I generally would not grant it unless there was an extenuating circumstance.

I figured that we needed to solve these issues so we could do the challenging and difficult things that the country expected us to accomplish. That's the argument that used to justify our actions and urgency.

Six months after I assumed the role of the Deputy, we had the *Columbia* accident. Some had said, after the *Challenger* accident in 1986 that if we lose one more Orbiter and crew, we might as well shut down the program. Well, that was not an answer for me, so when we had

*Columbia*, stopping flying was not an option, and thank goodness, it was not the option for an awful lot of people.

So all we could do was to, as quickly as possible, organize ourselves to investigate, conclude, correct, learn and then move on. That took too long. It took too long. When you had a series of reviewers, and then reviewers who believe that the future depends on their—

WRIGHT: Their conclusions?

GREGORY: Yes, and so I would have liked someone to stand up and say, "Thank you very much. I have your opinion. I will use that and balance it, or use it and consider it along with all of the other opinions I have, but I will make the decision, and thank you very much for your service." I would have liked to have seen that. So I think these hiatuses that we're in now are not good for the Agency, and they are not helpful as we attempt to do this journey that was described by our President in January 2003.

WRIGHT: When we did talk for the *Columbia* Oral History Project, you mentioned that just within literally hours after the *Columbia*, that you had talked to Administrator O'Keefe and said, "Someone needs to continue running the Agency while one of us takes care of the investigation," and you took on the Agency as its leader at that time. What are some of the issues that you were dealing with, with the Agency, that wasn't attached to *Columbia*?

GREGORY: The spirit was good before *Columbia*. I think the confidence level was really shattered, and so what we had to do was maintain the excitement of it. "Yes, this is a tragedy.

We're going to solve that tragedy and we're going to move on. And by the way, these are new things that we're going to do." So what I was trying to do, what we did do, was keep the attention of the Agency; to not become so emotionally involved in the accident—which was a tragic accident—but that there are things that we need to do. We've got stuff on the schedule. We've got obligations to meet. We can't forget those. And, oh, by the way, maybe we're going to be able to expand outside of low Earth orbit.

So all of those things, all those things I was thinking about. So what I was trying to do was to keep the Agency together; keep the minds excited about the future; acknowledge that there had been a death, but that that does not bring to a halt the dreams that many of the people at NASA have. Get the right kind of leadership in there, motivational leadership.

So we had already begun to move people around, moving Julian [M. Earls] into the Center Director in that position at Glenn, Dave [David A.] King down in Marshall, and Jim [James W.] Kennedy to Kennedy, and moving Roy [D.] Bridges [Jr.], to keep the spirit up in Langley, because the aero (aeronautical) side really seemed to be suffering. Once the exploration vision came, the aero Centers seemed unsure of their future, so we were trying to get the right kind of motivators into each of these Centers.

We were trying to bring women up into Deputy Center Directors at first, and then promote them to Center Directors. I had a lot of problems doing that, because of a hesitancy or reluctance by them to move.

WRIGHT: Really.

GREGORY: Yes. It was hard to believe that—

WRIGHT: Physically move to another location?

GREGORY: Physically move to another location, yes. Physically move to another location.

But those are the many things that we were doing. We started the One NASA activity, where we were saying, "Okay, the entire Agency is the strength, and that it is not limited to these four Centers down on the Gulf Coast. So we began gathering the Agency leadership, folks who had never been to a particular Center and asking them to talk about what else the Agency does.

Ed Weiler, I remember I took Ed Weiler down to Johnson, so that he could tell the folks at Johnson about science. I can remember this to this day. I don't know how many people the auditorium holds—600 people perhaps "Here's 600 of the brightest engineers in the world. If you don't believe me, ask them." And I remember when we introduced Ed to speak, and you could see and feel this throughout the audience, "Oh, my goodness. Okay, can we get through with this so we can get back and do the real stuff?" Ed started talking about the origins, and I saw people go [demonstrates not excited] to [demonstrates excited]. It was amazing.

So that was a part of what I was doing, was trying to capture the entire Agency to make them part of this vision and activity that we had. At the same time, I was trying to revamp the aeronautics programs in the Agency, and I had a lot to do with generating the education, like the Educator Astronaut. I was a significant player in getting that program going and getting them selected and getting them into the Astronaut Program very quickly, because I knew it was only a finite amount of time that we had, and we had to act very quickly.

WRIGHT: Why did you feel so strongly about that program?

GREGORY: Because it has been my philosophy that I have to give the next generation more than what our parents gave us, and in order to do that, status quo doesn't count; that you have to continually raise the bar. To raise the bar, you've got to put exciting challenges out there that would make a person want to get there. To me, the exploration vision is one of those. There are very few programs like that that are initiated that will cause a person to rethink where he or she wants to head in their life. My effort is to try to get a third-graders to believe that they want to be part of this program. To do that, then they have to study these kinds of things.

It's more than that, though. You've got to then look at what kind of teachers do you have. Excellent teachers. How are they motivated? What are their incentives? If they don't come in with an incentive to support a program such as exploration vision, then they are not going to talk about that in a daily activity. Therefore a third-grader will never be exposed to this stuff. So the Education Program was an attempt to do a bottoms-up, top-down let's provide a reason why it's important for us to do these things.

When you do that, then that begins to raise the bar, because that's the thing that says, "Hey, these clucks that are running the program now, they are really limited, because they can't do this. I think that we will be able to figure that out." That's raising the bar.

The trip to Mars by a normal rocket will take you eight or ten months. Then you get to spend some time on Mars, and you have to wait until Mars and the Earth are aligned again. Hey, the object of the exercise is not the trip. The object of the exercise is the spending time on Mars. I want to minimize that trip, because with an extended trip, I have to worry about how do I keep your muscular capability, your cardiovascular, your skeletal system. And what do I do with this

time? I mean, you're going to get bored. What do I do, put you to sleep? Give you an [Microsoft] Xbox? What do I do? I care of that.

So I said, "Okay, there are two ways I know you can do it. You can move Mars closer to shorten the distance to minimize the trip duration. Or we can come up with a different propulsive system that will allow us to do this in weeks instead of months." Now you can concentrate on what you have to do on Mars, and you don't have to worry about what do you do, long duration, with the astronauts. And third-graders just, "Hey, we can do it this way!" Third-graders have not been taught "no." In fact, third-graders are probably the most positive people you will ever run into in your entire life. But that has got to be somehow encouraged, and so you do that by having a teacher who is willing to listen to that. Then as they move from the third grade to the fourth grade to the fifth grade, you would have to have that same kind of motivation.

So we worked on the Explorer Schools, and we did—what is it—fifty and then fifty, or maybe it's a hundred. I've forgot how many it is. Maybe it's a hundred each year. Then every third year, then you begin your new group out there. Now we thought, "Let's have an elementary school of motivated teachers and students. Now they go to middle school; they could fall into a black hole, because we haven't done that sort of thing for the middle schools."

So we were working on, well, how do you adopt a town and make it a NASA town, and have a grass-roots activity. As the Ford dealer supports Little League soccer and baseball, why doesn't that Ford dealer support the incorporation of exciting things into middle school or high school? So you get a community adoption of the vision, and the community then incentivizes all of this stuff like this. So instead of it coming from here down, it starts down there and swells up. So this is the groundswell. When you would drive into a town, it would say, "Kiwanis, Lions

Club, NASA" right here, and when you got into the town, you would find a town that was committed to making the next generation smarter than their generation.

So those were the education initiatives, and I thought the incentives for all of these things—I had the "exploration, discover, understand." You explore. Then you discover things. You get a greater understanding of it, which is the science, and then that leads to the next exploration. So it's a cycle that continues and grows on itself. So that was my motivation, and that my parents and grandparents were teachers has nothing whatsoever to do with it. [Laughs]

WRIGHT: Looks like they had a student that paid attention. I hope all those come true. So many times when we think of NASA, we think of it as just human spaceflight, but—

GREGORY: No, it's so much more.

WRIGHT: It wasn't too long after the *Columbia* that the rovers landed on Mars.

GREGORY: Yes, and we were hoping for success for just one of them. The first one, *Spirit*, was the one that went to the place where we knew we were going to find the stuff we wanted, an indication of water. The *Spirit* landed there. *Opportunity* landed in a location that was not determined, pre-mission, and it was a location that took into account the parachute issue that they had on *Spirit*. It landed where we never expected to find anything interesting. So where did we find this salt water, indication of the salt water? We found it with *Opportunity*. So it was unplanned. It was a discovery, unanticipated by anybody, because the first one was supposed to have gone to the perfect place.

Then here we have this very young group of people who had put—relatively speaking, very young group of people—who put this program in place. It was supposed to last ninety days. Heck. [Laughs]

WRIGHT: We're past that, right?

GREGORY: Yes, oh yes. I wonder how we screwed up to make it last longer? The interesting thing, though, is that there was a lot of initial interest in the landing rover landings. But as you know, there is always a very short half-life. Interest quickly wanes. If you now go out and you talk to Joe Bag-of-Doughnuts, he may know that there is a rover. He may not know where it is or what it's doing. Or he may not know anything all.

The Hubble, when spectacular images are displayed on the front page, everybody is aware of the Hubble. You get an excited Hubble crowd out there. Most of the images, though, that we're looking at, are images that were taken some time ago. Every now and then some new images are published, but most of them are part a huge archive. A lot of excitement, but unfortunately they are only one-time hits.

A lot of excitement with the Shuttle when it first launched. A lot of excitement with the Apollo 11 when it landed on the Moon. After that, interest wanes.

The next thing that happens is the *Challenger*. The *Challenger* accident, first flight after that, a lot of excitement. Interest wanes.

*Columbia*, a lot of excitement, and so the next with Eileen [M.] Collins commanding. Two years later, though, the excitement is gone. And we're talking about a program that's going to last decades, through multiple administrations, through generations. We've got to figure out

how you sustain interest in a program such as this, so that you don't have to worry about what kind of funding, or whether there will be funding in 2015 or 2020. People approach it from the brand point of view. NASA is an excellent brand. But that's not what it is all about.

Nobody actually knows what NASA does. What does NASA do? "Oh, they're the ones that put the man on the Moon," or, "They have the Hubble," or something like that. They are not really aware of what this exploration vision is, and we don't do a good job of telling anybody about it.

Everybody knows what the Marines do. It's a given. Hey, you don't have to push the Marines. The people out there are demanding that the Marines always be there. We have to somehow change from NASA being pushed out, to a public that demands that NASA do these exciting and scary and risky things. We have to move from a push to a pull.

I don't know how to do it. There have been many approaches. The way I would have done it would have been the grass-roots approach, where you develop this—we call it the education, but basically it is education of the country of the importance of things such as this, and how it will allow future generations to thrive and a nation to thrive. So that's kind a way we can accomplish this difficult challenge.

Then you would also do it by a very active Public Affairs group that would keep things above the fold, but those were things that were the challenges. Hey, this is where we are. These are the things that we're doing. This is where we hope to do it. We're not sure if we can do it. You always have to put that unknown in there, because if you look at history, those are the things that seem to get the attention, those things that are scary and risky, and that you accomplish it in spite of not being given a chance in hell to do it.

So that's kind of my education issue, and it's much broader than just going and having an Educator Astronaut or a school that is an Explorer School. It's just part of a much, much bigger system, where you try to incentivize this country to do things that only this country to do, with the people that we have. So it's the same kind of thing that we were doing with One NASA, except that's a microcosm, and what we're talking about is a macro activity.

WRIGHT: I believe NASA learned—although it was a tragedy—that, taking that grass-root effort when they were in East Texas and Western Louisiana, they had such a response, because people felt that NASA now belonged to them during the recovery time.

GREGORY: Yes, and there are memorials out there now, and people who were there will remember it. But I don't know whether they will know how significant that event was and how it has affected the future. I visited many of the sites where the searchers were staying. These were the guys who would typically work fires, forest fires. I gave a talk one evening in a tent, and I was amazed at the number of people who came to the tent. Here I am, a Deputy Administrator of NASA. "He's going to give a talk." Man, the place was absolutely packed.

We exchanged things. I was taking stuff off and giving them—and it was an amazing evening. But somebody asked if I could sign a picture, and I said, "Sure."

Then the Public Affairs guys, "Well, we have thirty-five hundred of these things."

So somebody suggested then, "Well, he'll sign them and send them back."

I said, "No, we'll go do it." So I sat there, and this line just stretched, not for miles, but—I'm signing, and this guy came up, and he asked—he was holding a picture of *Columbia* at lift-off—"What is that?"

I said, "This is the *Columbia* Space Shuttle."

He says, "Is that what we're out there picking up?" [Laughs] It just blew my mind. These guys are out here picking this debris up. They have no idea what it is they're doing out there. The assumption I made is everybody knows what we are doing. At least that guy didn't know it, and I would bet there were lots of other folks who didn't know it, either. He said, "I'm going to keep this with me forever," and he says, "I was a part of this program. And I hope you'll get back to doing this launch stuff again."

But see, that's the difference. We've taken him from "this is a picture of something," to somebody saying, "Okay, we're over this. We've got to do more." That somehow is must happen, but I don't know how it's going to happen.

WRIGHT: Let me ask you about return to flight [RTF] during your career, from an astronaut point of view as well as the safety and of course administrator. You participated in two RTFs. Tell us about how that affects the NASA community and everything that needs to be put into preparations to ensure that that's going to be a successful flight, and then actually what it means when it is a success.

GREGORY: We have a tendency to try to answer all the questions, not just for that particular accident—the cause of the accident—but to anticipate any other potential. It is my belief that you can get too much information, and you don't know quite what to do with it, and so you ponder it for the longest time. When you do that, you lose momentum, and from the stakeholder's point of view, it is, "Oh, goodness, they've found something else." You can't fault

the engineers, because they are doing exactly what they believe they need to do. You can't fault the people who believe that in order to maintain momentum, you have to keep flying regardless.

But this is where it's important that a person be able to stand up and say, "Okay, I cannot guarantee you 100 percent assurance that we won't have an accident. Can't do that. There is always a possibility. We have done as much as we can, and I am willing to accept the consequences. Me, personally, I'm willing to accept the consequences if I have overlooked something, if we've overlooked something."

Or we can drive ourselves into the—you know, we'll just never, ever fly again. The safest thing is probably leaving it in a hangar and not flying it.

So you get frustrations from one side—you actually get frustrations from all parties, but when you begin to see things that you've never seen before, people sometimes tend to think that it is a one-time occurrence; that this is the first time it's happened. It may have happened a hundred times before on each of the launches. But now you have this information, and you're not quite sure what to do with it.

So it's a heck of a trade-off that you have to run through, and whatever path you take, it will affect a community, either positively or negatively. "Oh, my god, I can't believe that they are actually going to go fly in that condition." The other half says, "Thank goodness, somebody's made a decision. We're going to go fly." You can't win in that.

But that's when it takes very decisive leadership to consider those alternatives and consider all of the other possibilities and decide, yes, we're going to fly; no, we're not going to fly. For me, it gets down to a black-and-white—there is a probability. It's always a possibility that you could have another problem. That has got to be part of the consideration, but it should not be a determiner of whether you go or not.

WRIGHT: Someone said the fault is of NASA's, because it makes it look too easy to the American public.

GREGORY: [Laughs] Yes. That's funny. I told Aaron Cohen, when he was Center Director at Johnson, and also Acting Administrator for a short period of time in '92—I think it was '92 or so—I said, "You know, Aaron, when the Shuttle comes in, our Public Affairs ought to say, 'Oh, my goodness, this is going to be a touchy one. The conditions aren't perfect. We've got this crosswind out here, and we're not too sure of those tires. The sun is reflecting into the commanders' eyes, and you've got all those other little problems to deal with." Then when it touches down, "Oh, thank goodness, they made it!" It is the most complex vehicle in the world, and nobody knows it. It's amazing to me that we make it look to simple. We make it look so simple it just then becomes routine, and it's just, oh, just another day. Those guys are out just playing around, and they come home. So what?

I was out at the Space Foundation Conference last week—two weeks ago—and we have a mockup of the CEV, Crew Exploration Vehicle. It has wonderful Public Affairs stuff, holographs of people floating and things like that. What we should have done was to have an Apollo capsule next to it and clearly describe what the significant difference is between the CEV and the Apollo capsule, the differences, the capabilities, how this works as part of the journey, the Moon, Mars, and beyond, so that when this crowd leaves, they go away with some knowledge that says, oh yes, that's what the Apollo capsule looked like, but CEV has much better technology incorporated within it and has a much greater capability and it's bigger, can

carry more crew members and is much more versatile. It can do better than the old stuff. It can do all of these things. No, it's definitely not an Apollo capsule.

So here you can leave with a core of people who have a clear understanding that, one, it's not an Apollo capsule, and that it is part of this journey. I just keep using the word "journey," but that's what it is. Then when you go out and you look at the concepts that the contractors are presenting—this was a NASA exhibit I was talking about earlier—when you look at their concept suggestions, they should talk about that the crew exploration vehicle as part of a system that begins with perhaps a trip to the International Space Station as a crew rescue vehicle; then moves to the Moon so that we can learn what we need to learn to move to Mars and things like that.

None of that is there, and so when conference participants go in, all they see are just individual little projects, and they have no way of putting it all together. So that ought to really be the job or NASA's Public Affairs or Strategic Communication offices. Our Public Affairs ought to scope it all out and put it in terms that Joe Bag-of-Doughnuts can understand. But when Joe Bag-of-Doughnuts leaves, he understands what each of these pieces is and how it differs from and how it participates in.

Again, that's the kind of a grass-roots thing that I'm talking about, and we don't do it. We've continue to fall on our own sword. So whether you make it sound difficult, "Oh, we've survived another one," or to provide enough information so that when you leave, you're a heck of a lot smarter and you begin to appreciate the complexity, and the capability, those are the kinds of things that I think need to be done to begin to grab people's attention so that they are pulling and demanding instead of NASA pushing.

WRIGHT: Some might not know that we've had a continual lasting presence in space for all these years in the International Space Station.

GREGORY: No, they wouldn't know that.

WRIGHT: What were your roles and your activities, involved as Deputy Administrator with the international community?

GREGORY: With the international community, I was the Chairman of the Multilateral Coordination Board, the MCB, the principal decision-making board for the international partners. Once the MCB had decided on a course of action, the chairman would present those findings to the chairman of the Heads of Agency [HOAs], and the Heads of Agency would accept—they generally would accept our recommendations. Once accepted, these decisions became policy and established direction for the International Partners, Japan, Canada, the European Space Agency and Russia

I spent a lot of time with the international community and learned an awful lot about the characteristics of the communities. In the bilaterals, you have to work in a certain way with an entity, but in the multilaterals when you have all of the partners there, you have to kind of use some ingenuity, in some cases, to get all of these cultures to come to a single conclusion. Because that's what we would provide, is a single conclusion to the Heads of Agency. Sean was the Chairman of the HOA.

I've learned an awful lot working with the international partners. I've learned that the Russians are just as excited about being in space as Americans are. Sometimes they are even

more driven. The Russians do not design something new just because it's the thing to do. The Russians, if they have a proven design, will stick with it for multigenerations. Americans don't tend to do that.

There are some few countries that are able to think big. Some of them have significant obstacles that they have to overcome. ESA [European Space Agency] represents many countries within Europe. It's about impossible for us to understand that for every decision that ESA makes, it must have the individual parliament agreement in those respective countries to allow them to come and speak as one.

Japan is a country that has been an amazing supporter of America, but Japan itself is in financial straits. But they have hung with us the whole time.

Canada has provided the robotic arm, but they are principally interested in flying their astronauts with us.

Every country has a different motivation. The Russians want to be in space. It's one of the stars that they have. Whether they would like to be there with Americans or not is independent; it's not part of the question. But they want to be there, and they have a very reliable system. We talk about launches, if we can get it done within the week we seem to be satisfied. They talk about it from a microsecond point of view. So they build their systems to handle whatever the environment is. We build a system and then wait for the environment to be acceptable for what we are attempting to do.

Russians won't cut grass outside of a building if it has no effect on the ability of doing work inside. So you'll see these places, and they look horrible. When you go inside, you find spectacular working areas in there, but outside, weeds. [Laughs] It's just different.

WRIGHT: You were able to go to Moscow to the TsUP [Russian Mission Control Center] for some launches.

GREGORY: Yes, for, rendezvous and dockings and landings. I was generally always in Baikonur, in Kazakhstan, for the launches. Then I'd come back to TsUP for docking, and then for undocking and landing, and then I'd go out to Star City [Russia] to welcome the crew when they came back five hours later.

WRIGHT: I imagined the landing was something to see, since it's—

GREGORY: I never went to it.

WRIGHT: I mean, just—

GREGORY: Yes. They always had simulation. They didn't have a live feed for the landing. [Laughs]

WRIGHT: I would imagine you were glad you came down in the Shuttle. [Laughter]

GREGORY: Yes, it was somewhat more civilized.

WRIGHT: And it works. It works. We were talking a little while ago about decision making and leadership, and with the last couple of years, there's some major decisions affecting NASA, one

being the fact that the Shuttle will be retiring, that there was not going to be a reservicing mission going back to the Hubble. Then, of course, the new division to go to the Moon and then beyond to Mars. How were you involved with those decisions, and when did you learn that these plans were being discussed?

GREGORY: I was in the beginning of the Vision, and so I was kind of ahead of it and had been working along with it. That was my interest. I had nothing to do with the decision not to go back to the Hubble. I was told about that, informed about that. But that was based on an interpretation of the [Admiral Hal] Gehman Report [Chairman of the *Columbia* Accident Investigation Board], and again, leaders there that make a decision based on the information that he or she has. Sean made a decision based on his interpretation of what the Gehman Report said. It was concluded that a human trip back to the Hubble, where there was no safe haven, was an inappropriate thing to do. So you can challenge the answer, but you can't challenge the right of a leader to make a decision. Then once it has been made, then you should support it.

WRIGHT: We were talking about the decision for Hubble. I also was going to ask you what you thought, since you spent some time in three of the Orbiters, what did you think about the Shuttle being retired in 2010? Your thoughts about that.

GREGORY: It's on two levels. My practical level says that it is proper to do that, because as long as you hang on to something like the Shuttle, you will never be able to do other things. The other side of me says it would be so great if we could have the Shuttle and do those other things, also. [Laughs]

So what I conclude is that in order to do—the transition should be financed such that the Shuttle is available to support the Station until the CEV and a cargo capability is provided to support the Station, if we're going to do that, and/or have the capability of carrying humans in space. I am not in support of gaps between the ability of America to put humans in space. So it's a right decision. We have to pull it down. It ought to incentivize or establish an urgency for whatever the next vehicle is, and if not, I would keep the Shuttle running until we had that capability, but it would require a significant increase in the budget, probably on the order of five to six billion dollars per year to do that. I'll bet what I just said is confusing, but I know what I meant!

WRIGHT: That's a big increase, with all that's going on right now.

GREGORY: It is. It really is. But then we've got to decide what's important. Yes. There's so many other competing activities out there for that dollar, we've got to decide what's important. So if you have that pull, then NASA is important.

WRIGHT: Using the word competing, some feel that China might be our next competitor in the space race.

GREGORY: Well, bless their heart. If they say they're going to put a robotic something on the Moon in such and such, and they're going to put a human on the Moon in such and such, that may establish the sense of urgency, because trying to justify spaceflight without a challenger out there has been extremely difficult.

WRIGHT: Did you ever have any dealings or information with the Chinese at all?

GREGORY: With the Chinese? No. No, I really haven't. No.

WRIGHT: Just curious, since moving into that area.

In February 2005 Sean O'Keefe left the Administrator post, and you became Acting Administrator. Then in April Michael Griffin was named. Tell us about that brief time as NASA's top leader.

GREGORY: [Laughs] I had tried to work the White House. I went over to OSTP [Office of Science and Technology Policy]—and talked to Jack [John H.] Marburger [III] to try to find out what I would be allowed to do. I was told that we should wait until the new Administrator comes in.

So there are things that I would have done. I would have quickly reversed the decision on the Hubble, and there were some other things I would have done. I would have opened it up for discussion, but I'm absolutely certain that I could have quickly reversed the earlier decision.

WRIGHT: Think you could have found seven astronauts to go on that trip?

GREGORY: Absolutely!

WRIGHT: More than seven?

GREGORY: Oh yes, I could have found them. But that's, again, one of these questions—okay, the Hubble is kind of like the Station. Hubble has been around for a very long time. It produces interesting information through its imagery. The James Webb Space Telescope is coming along, and they say, "Well, the Hubble has got to be there because the next great telescope will be the James Webb." Different spectrum. One's visual, and the other one isn't.

That argument that it has to be there as long as—until—is an argument that I wouldn't find palatable. If there is anything that the Agency is doing that creates excitement, I would keep it. But you would keep it while you were doing alternative things, other things.

So if it was possible to keep the Hubble up there, even though it costs a certain amount of money, until we got something that was as exciting or more exciting than that, I thought it was important that we do everything we can. I thought that if you created a Hubble mission, you've already established that it's dangerous to do it; it's scary; there's no safe haven. There's none of those kind of things like that, but NASA is going to do it. From my point of view, that's the kind of publicity that we need. You'll get the science community, "Yes! Man, I know. We taught them. They've finally realized how important it was." Because you need that community. It's a small community, but you need them. And you need the people out there to believe this is a dangerous mission, and they're really risking an awful lot by doing it, but they're going to go do it. To me, that's the kind of plus stuff that we need.

WRIGHT: One of the questions we just got through talking about was, of course, Michael Griffin was named NASA's newest Administrator, and had you any expectations, or did you have a desire to be moved into the Administrator position?

GREGORY: Absolutely not. No. [Laughs]

WRIGHT: That's pretty definite. [Laughter]

GREGORY: No, no, no. This was kind of like flying the Shuttle. I had done about everything I wanted to do, and it was time to move on and do something else. So I let them know that. I let them know that fact.

WRIGHT: And actually, it was a few months later you announced your decision to retire.

GREGORY: Yes. When Mike first came on, and I'd known Mike for, oh, fifteen years, twenty years, a long time, when Mike came in, he told me that there would be a new Deputy; that they did not know when that new Deputy would be selected, and there was a hope that I would stay until that new Deputy came. So that was in April. I think by the middle of the summer, since there was no one on the horizon, I began to initiate my retirement, or my resignation as the Deputy Administrator. So I began to create a letter that would go to the President, and I was told, "Hold off on it."

Then finally in August, I submitted a copy of it, and they came back, and they said, "Okay, you can use this, except you have to add the statement you will remain until the new Deputy Director is confirmed." So I modified that statement a little bit and said, "If appropriate, I will do that." I put a date, I believe, sometime in early October as that date when I would

resign. The third of October came and went, and we ended up kind of in the middle of October. So I figured, well, I think it's time, so I kind of packed up my office. [Laughs]

WRIGHT: Kind of gave them a hint, did you?

GREGORY: Mike offered I could move out of that office and then move into one near him, so I resigned as the Deputy probably sometime in October, but I reverted back to the Senior Executive Service. I announced that I would retire from the Agency after I used some of my leave. I decided that November 23, 2005, would be the date. I'm one of these people who must have a specific reason for doing something. I used the date that I became a government employee, November 23, as the bases of my retirement. Why? Just because.

WRIGHT: That's a good thought, yes. So now you only have to remember one date; just change the year, right? Well, you worked with a number of different Managers and Administrators, and you, of course, had your own style. O'Keefe and Goldin had such different management styles, and of course you had your own. Tell us what the strengths and weaknesses of those styles are, and what you perceive as what kind of management style that NASA needs to move into the future to accomplish its goals.

GREGORY: Let me start with the last question. What NASA needs is a visionary. You need a visionary leader who has the technical background, but also has a clear understanding of how you can accomplish it, accomplish something that is beyond just the technical engineering side of it. You need one who is decisive. You need one who is extremely credible, who does not

seek out, but feels very comfortable talking to, those groups of folks who have the power to make it work or not.

That person would have to have a staff that supports, clearly understands what their role is, how each of their roles supports the whole, and is capable of transmitting that down into the Agency, such that the Agency also knows what it's doing, what each person's or each group's role is in the support of whatever the activity is. So that's how I would define an excellent leader, the kind of leader that you would need at NASA. This person would also be aware of and sensitive to failure, but would consider that part of the process. It's just part of it.

WRIGHT: You wore so many hats and you learned so many areas in your career. What do you consider to be the most challenging aspect of everything or anything that you did? While you're thinking of that—because sometimes it works out that way—what do you consider the most significant accomplishment or the contribution that you made to the Agency while you were there?

GREGORY: From my point of view, it would be a sense of focus, not allowing the peripheral stuff to interfere with a set of goals that you have, and that the goals established were not short-term goals but long-term. That every step that you take has been well thought out, that it is not in isolation and that it somehow helps you accomplish the next well planned step. That failure is sometimes an option and that you learn more from failure than success. That the Agency's strength is its people and all of the people are mandatory in order to accomplish the great journeys that we have planned. That this country needs to remember that it only remains if it produces something of value that is recognized an acknowledge by independent assessors. That

this acknowledgment is demonstrated by support and increased budget. And that many are required to be part of the solution to everything that we do. It is very important that we have the ability to look way out and define and describe what it is that we are going to do and why it's important that we accomplish it.

WRIGHT: As we close the session today, are there some other areas or some other thoughts that we haven't covered that you'd like to mention?

GREGORY: I had mentioned earlier about the strategic communication, the strategic communication out and in. I think that for these programs to be successful, there has got to be an awful lot of information passed that defines why this is important, what are the consequences of not taking this path, and what are the great advantages of doing this, or something similar to that. I think if we could put that into the equation of the decisions that are being made—that it be taken under consideration—we would have a much better possibility of achieving whatever we're after. We have to continue to look for those events and activities that will continue to interest the people who have the ability to influence the future, and that's you and I, because we're the ones who actually run this country, because we can vote in or out people who are of like minds or not.

A lot of people don't realize that. They don't understand. They think they're just pawns. But people have the ability to shape the future. In fact, the future is based on what our image is right now. So I think if that could be taken into account when decisions are made, and that the importance of this be given as much as the actual event, that we could make significant progress. Now that I am retired, I can sit back now and comment or criticize. I'll never whine, but my

motivation is the future, and that's all I will be looking for. So I think the team in place, but they've got a lot of work to do. They've got some brilliant engineers in there. I know where their heart is, I know where their motivation is, and I wish them Godspeed.

WRIGHT: Well, we thank you for all the time that you've given this project, all three sessions, and especially all this afternoon, and wish you the best on your retirement. I know you'll be busy.

GREGORY: Oh, I am and on purpose. [Laughs]

WRIGHT: Well, thanks again.

[End of interview]