SCIENCE MISSION DIRECTORATE ORAL HISTORY PROJECT
EDITED ORAL HISTORY TRANSCRIPT

ALPHONSO V. DIAZ
INTERVIEWED BY SANDRA JOHNSON
WASHINGTON, DC – JUNE 6, 2017

JOHNSON: Today is June 6, 2017. This is the second interview with Al Diaz for the Science Mission Directorate Oral History Project, and it is being conducted at NASA Headquarters in Washington, DC. The interviewer is Sandra Johnson, assisted by Rebecca Wright. I want to thank you again for coming to talk to us for a second time.

DIAZ: Well, thank you.

JOHNSON: When we ended the last interview, we talked a little bit about your report ["A Renewed Commitment to Excellence: An Assessment of the NASA Agency-wide Applicability of the Columbia Accident Investigation Board Report," 2004]. You mentioned that you thought it did the Agency a tremendous service to go through that process, but you weren't sure if it was widely appreciated. You felt that it might have been misinterpreted as being overly critical of the Agency.

DIAZ: Yes.

JOHNSON: Let's talk about that report. Why you were picked by [NASA Administrator] Sean O'Keefe, maybe how the team was put together, and just go through that process.

DIAZ: If you remember, the principal reason for doing the report with the team that I led was because of the criticism in the [2003 Space Shuttle] *Columbia* [Accident Investigation Board (CAIB)] report of the culture of NASA. I think that there was quite a bit of difference in points of view about what role that might have played in the accident.

I think Sean was—it was insightful on his part to recognize that it would probably be worthwhile to have a conversation in the Agency to see if we could come to some conclusions about what the elements of the culture of NASA were that were causing this difficulty. One school of thought that we encountered there was that perhaps it was a technical issue, but there was nothing wrong with NASA. That's what we ran into. I think having the conversation was widely appreciated, but there were a lot of people out there that were sensitive to the criticism.

I do think that it was a worthwhile exercise, because I do think that it did a couple of things. One, it did focus our attention on some assumptions that we were making, that we needed to be careful about in the future, that were an extension of the discussion in the *Challenger* report [Report of the Presidential Commission on the Space Shuttle Challenger Accident, 1986] about the normalization of deviance—the whole idea that somehow you could develop confidence in taking action on the basis of the aggregate of past experience, as opposed to always going back to first principles and comparing your performance to what the standards were when the systems were designed. I think there was some misunderstanding or misinterpretation of what our report was saying as a criticism, as opposed to simply a documentation of what we heard.

The other thing that I thought was helpful is that when we first went into it, there was some feeling that whatever the problem was, it was localized to the human spaceflight program. One of the things we found was that wasn't true. We found it in discussions at [NASA] Goddard

[Space Flight Center, Greenbelt, Maryland], at [NASA] JPL [Jet Propulsion Laboratory, Pasadena, California], and so forth. There was some evidence that it was clearly more widespread than just the human spaceflight program. I think that was a good thing to find as well. I hope it helped to mend the differences that might have been felt between the two parts of the program. That was just the way we saw it.

JOHNSON: Talk about the formation of that team, and who the team members were, and how those particular people were picked, or why.

DIAZ: Well, Sean was the one that picked them. I think he tried to make a group that was representative of the leadership of the Agency, and really concentrated it on people that had significant field experience. The main criteria were to keep it people that were, to a large extent, leaders in the field. While I was from [NASA] Headquarters [Washington, DC] at the time, I had spent a lot of time at Goddard.

I think he wanted it to be a product of people that were recognizable, that we had experience that was worth sharing, and that it might be respected in the end. I think that he had his doubts going into it whether or not there were specific enough characteristics to define what the problem was that people were talking about that was part of the culture of NASA. That was it.

JOHNSON: How long of a process was it?

DIAZ: It strikes me it was six months or so, I think. We were all pretty much full-time for that period. We had a support team that was made up of a mixture of NASA folks as well as contractors. The contractor helped mostly in terms of organizing and producing the report, and keeping us on task. But yes, it strikes me it was about six months, and we met fairly often and traveled around the whole Agency.

JOHNSON: When you went to the different Centers, who were you talking to at those Centers, and what was the reception?

DIAZ: We talked to both the leadership team at the Centers, as well as town hall meetings at every Center. So we talked to everyone at the Centers that wanted to talk to us. Then we had separate sessions for anybody that had something that they wanted to say, but didn't feel comfortable talking about it in a group.

JOHNSON: Were they fairly receptive to talking to you?

DIAZ: Yes, I think especially the employees. I shouldn't say "especially the employees," because I think everyone was receptive to it. It was pretty widely accepted that the Administrator wanted this done, and I think everybody was supportive of doing it. I didn't find any place where there was any particular reluctance to have the discussion.

Some of the general sessions were pretty wide open in terms of people's experiences. That's where we encountered the feeling among many of the people that the rituals that NASA had, that we thought were processes that disciplined decision-making, were actually inhibiting

dialogue in some instances. Because people were sometimes reluctant to have discussions in a large meeting that might, in some instances, be considered career-threatening. So it was quite a good experience, and I thought it was well-received.

JOHNSON: But they were willing to open up if they felt like it wasn't something that was going to reflect back on their career?

DIAZ: Right, right. Everyone recognized there wasn't going to be any attribution, and so yes, everybody was really wide-open, frankly.

JOHNSON: Were there any surprises when you were going to the different Centers, or anything that surprised you about any of the information that you were gathering to put this report together?

DIAZ: To some degree, I was surprised at how widespread the feeling was that there were issues in the way we conducted business, and that they were more widely felt than just locally. I was surprised that the characteristics that we found were as widespread as they were across the Agency. So I guess that was my biggest surprise.

JOHNSON: Even though the Centers focused on different things, they had the same overall worries?

DIAZ: Yes. I talked about it the last time—at the beginning in the Agency's history, we were beneficiaries of technology advances, people looked forward to working with NASA on new technologies. And then later, it wasn't so much that they avoided working with NASA, but they didn't care as much. If you wanted their product that would be fine, but if you didn't that would be fine, too.

One of the things I think that led to was some feelings at times that things weren't going to be as reproducible and predictable as we had always hoped they would be. To some degree, I think that led to some people assuming that sometimes things happen, and you need to move on. That was something that we saw pretty widespread in the Agency, and had made a contribution to some of the major issues that we encountered.

JOHNSON: When the report was released, how was it released? Did you have to go to each Center and then talk about the report with each Center? Or was it something that was just released from Headquarters?

DIAZ: That's an interesting question. I don't actually remember how the report was released. I don't think that the rollout had us going back to each of the Centers, but I don't remember. I can't say that I remember.

JOHNSON: And you were already at NASA Headquarters again at this point?

DIAZ: At that point, yes. Yes.

JOHNSON: When you went back to NASA Headquarters in August 2004, you actually traded places with Ed [Edward J.] Weiler [Associate Administrator for the Science Mission Directorate].

DIAZ: I did, yes.

JOHNSON: Let's just talk about that transition—how that came about, and how you traded places.

DIAZ: Well, I don't fully understand what was in Sean's mind when he did that. I had been completely open with him that I was reaching a point in my career where I was thinking seriously about retiring. I wasn't sure what I was going to do after I retired, but there was some chance that I'd end up working in the aerospace industry, and might benefit by maybe having some drying-out period where I wasn't making operational decisions at a Center. So I don't know how that contributed to it. I do know that Ed and I had worked together at Headquarters for a long time, and I think that there was a sense that either one of us could play at either end of the game.

It was a decent experience. I think there were always some pressures on Headquarters that were different than we had at the field Centers. The big issue at the time was what was going to happen to the Hubble Space Telescope. I think that there was a feeling in the Science Mission Directorate that we needed to move on, and not continue to focus on the continuation of the Space Telescope. At Goddard, though, there was some dedication to keeping it going as long as possible, and sometimes that created some difficulties.

I think when Ed went back—he wasn't there long, as I recollect, before Sean left, and I thought he handled the transition really well. We ended up, obviously, with the Hubble Space Telescope still operating. We ended up coming to some rational conclusion. I think it was at that point in time that the then-Administrator, Mike [Michael D.] Griffin decided to do one more mission to the Hubble Space Telescope. It was tough at times, but it wasn't because either one of us was incapable. It was because we just had different points of view.

But I always had a lot of respect for Ed. I had worked with him a long time. He built up the science program pretty substantially while he was Associate Administrator, so there is a lot of respect for him.

JOHNSON: We talked some about that Hubble mission and the thought about the robotic [servicing] mission, but I don't think we talked about the National Academy of Sciences panel that was calling for the reinstatement of that Shuttle mission to service the Hubble [Committee on the Assessment of Options for Extending the Life of the Hubble Space Telescope, 2005]. Did you deal with that panel and do you want to talk about the National Academy of Sciences?

DIAZ: Yes. That panel was actually headed by Lou [Louis J.] Lanzerotti, a guy that I had worked with throughout my career at NASA. Lou and I went back a long ways in collaborating in science.

I think the biggest concern that the science community had was that the robotic mission was, number one, not doable in time and not doable within budget. They would end up paying a big price, both in terms of the productivity of the telescope and in terms of the content of the program. There was pretty widespread skepticism coming from both the NASA human

spaceflight program leadership and the National Academy. Putting the two of those together, it was just a no-win situation.

But, I think as I said the last time, I was inspired by the attention that that mission had drawn, and frankly there were quite a few of us at Goddard—and to some degree at JPL—who believed that the mission could be transformational. We really were anxious to see it happen, and were disappointed that it didn't. But I think it's all worked out.

I think the course of the Agency would have been different if we had tried to do that mission, and, with all due respect, I still think we could have done it. On the other hand, it would have been different even if we were incapable of having done it. I think it would have made a big difference.

JOHNSON: During that time—it was after your report and after President [George W.] Bush's Vision for Space Exploration—that's when NASA decided to consolidate the Enterprise System that it had in place into the Mission Directorates. Of course, the Earth Science [Enterprise] and Space Science [Enterprise] merged into the Science Mission Directorate. You were involved during that time, so let's talk about that change and that merger, and some of the work you did then. I think you were responsible for paring down the combined organization into three broad divisions. Let's talk about those challenges.

DIAZ: Right, yes. It was a pretty volatile time, but in fact I think the reason that I—well, the publicly-announced reason for my coming from Goddard was because Goddard was an Earth Science Center. In the process of combining Earth and Space Science—I had worked in Space Science for so long, it would be something that I could do. I think because I had been around for

so long and was a known quantity, I was ultimately accepted by the community. But it wasn't an obvious selection.

I do think that the science community would typically have expected to see a scientist in that position, so there were some accommodations that had to be made. I had to have a deputy who was clearly recognized as a scientist, who could do the scientific program selections that were necessary. That was fine by me, because I was anxious not to make any major selections that might put me in a position where I'd have to avoid anything post-retirement. And so Ghassem [R.] Asrar, who was the leader of the Earth Science Program, became my deputy, and that was just perfect.

There was always skepticism that the ultimate objective wasn't somehow to reduce the size of the scientific enterprise, or to control the growth of it in the future. That made for some difficult discussions inside NASA at Headquarters, where some people thought that their identity was being compromised. I wasn't in it for very long. My sense is it was just about a year before I departed at that point.

It was a very difficult time, because we were going through change at the top with the NASA Administrator. We were trying to do something that the former NASA Administrator thought was important to do, but it wasn't clear that the feeling was accepted by the new Administrator. So it was a difficult time. Needless to say, it was probably one of the more difficult assignments I had.

JOHNSON: And again, you went to the Centers that were affected by this and talked to them about what was going to happen, trying to help them get through this fear that they had?

DIAZ: Yes. The problem was that there was just so much uncertainty at the time, so there was a lot of skepticism about what the ultimate outcome was going to be. Everybody was playing defense at some level, and that's a bad kind of a situation to be in.

JOHNSON: I read an article from when you went to [NASA] Ames [Research Center, Moffett Field, California]. It was in their *Astrogram* [Center newsletter], and there is a quote in there that I thought was interesting. You said, "The scientists at NASA on average ought to be spending some appreciable portion of their time contributing a portion of their competencies to the development of projects to enable somebody else to do science. People need to search their souls and say if they are here only to do good science, there may be an opportunity that's better suited for them elsewhere." I thought that was interesting.

DIAZ: Right. Well, it was something that I really felt deeply about. The scientists at NASA were entitled to do science largely to maintain the competencies that were necessary to help others do science. Otherwise, we had no reason for existence. We were here to help people do what they couldn't otherwise do. So I felt very strongly that every NASA scientist needed to be doing some kind of service for the community.

In fact, when I was at Goddard and we were going through this transition to full-cost accounting, one of the things that we were insisting on was that every NASA scientist had to have some component—we had picked numbers like a quarter or a third, some were a half or more. To give you an example, John [C.] Mather, probably one of NASA's most notable scientists. National Academy member—which we have very few of—Nobel laureate [Nobel Prize winner for Physics, 2006]. He is the project scientist for the Next Generation Space

Telescope [James Webb Space Telescope]. That's the kind of thing that NASA scientists need to be doing.

It was always a mystery to me why we had to deal with situations where the dialogue with NASA scientists was, "Well, we really need to be competitive, and we need to be able to spend our time doing research." Yes, that's great. But you can do that somewhere else. That was the discussion we had during the institute study, too. If what you want to do is do research and not provide support, you ought to be part of an entity that isn't NASA.

Now, maybe NASA needs those kinds of entities to provide, in the aggregate, the kind of support that's necessary, like the Space Telescope Science Institute [Johns Hopkins University, Baltimore, Maryland]. The scientists at the Space Telescope Science Institute, in the aggregate, provide support to investigators who want to use the Hubble Space Telescope, but they spend a lot of their time doing research. Maybe the NASA scientist that didn't care about doing project work ought to think about doing something like that. I didn't think it was ever disputed very widely. I think people accepted it, but they found it difficult to deal with on occasion.

That was a quote, though, huh?

JOHNSON: Yes, that was a quote from the article.

DIAZ: It sounds pretty good.

JOHNSON: It did. That's why it struck me. I thought, "Well, that's an interesting way of putting it."

DIAZ: Well, it's a little bit more diplomatic than I might have remembered saying it, but okay.

JOHNSON: Well, that's what the *Astrogram* said that you said. They quoted you.

DIAZ: I believe I would have said that, yes.

JOHNSON: It sounds like something you would say, right?

DIAZ: Right, yes.

JOHNSON: You mentioned during that time you had been dealing with that full-cost accounting and management change with Sean O'Keefe. Do you want to talk about that for a little bit, what that was like, dealing with that change?

DIAZ: Yes. That was an interesting thing, because that actually started while I was at Goddard. The guy that started it was the then-Director of the OMB [Office of Management and Budget], Mitch [Mitchell E.] Daniels [Jr.], who I ended up working for at Purdue [University, Indiana] when he became president at Purdue. I actually thought that it was another exercise that was worth doing, but there were too many people that knew the answer and didn't have a lot of appreciation for what needed to be in that accounting pool. The things that we needed to account for were both the support functions as well as the competency maintenance functions.

In competency maintenance for the scientists, we needed the Agency to provide some level of support, or a contribution to that, so that the scientists would maintain a competitive

position relative to their peers and wouldn't need to carry the weight of the institution. If you look at university scientists, they have some contribution that they have to make to their institutions, but the institution actually does provide some level of support for them from the money that they get.

We tried to build that into the process, that is, some level of support out of the overhead structure so that our scientists got some relief from needing to bid full-cost when they did their proposals. Now, we encouraged them though—not only encouraged them—it was structured so that every one of them had to have some component of service. They were collecting money from a project, and the projects had to have the money to pay the scientists their support.

The one that was even more difficult to deal with, though, was the competencies that were necessary for the engineers that worked on the projects, because that always involved a discussion about doing work in-house. People just were not inclined to accept that in order to maintain the competencies that we needed to manage large projects, we had to have ongoing projects inside the Agency. That was probably even a bigger issue, but it was a big issue. It all came to light in this discussion about full-cost accounting.

The biggest challenge we had was that people already had the answers, they knew. They were going to pay for projects, and those projects were going to be done by contractors. Well, that's terrific, except that Centers needed to maintain the competencies to be effective in managing those. Both on the science and engineering side, that meant some contribution from the projects and the Agency to supporting those competencies. I think we persuaded quite a few people, but not everybody. One of the ones that I think was persuaded that's interesting is the guy that was at the OMB at the time, a fellow named Steve [Steven J.] Isakowitz, who is now the

president of [The] Aerospace [Corporation]. Steve was one of the people at OMB that we worked very hard to get him to understand what it was that we needed to do in that process.

It was more than just an accounting thing. "What are we accounting for, and what are the cost components of projects, really?" What was happening was the projects were only showing the cost without the institutional cost, and the institutional cost was being contributed by the Agency supporting the institution. Once the decision was made that the objects were going to be these projects, and that all of the money that was necessary to do those projects was going to come through the projects—well, that's great, except that let's talk about what all of those elements of cost are. They are way more than what had been, apparently, in the projects in the past.

JOHNSON: That's interesting, because I had read—and you never know when you read if it's true or not—that when Sean O'Keefe came in, he was surprised that you couldn't just pull something up on a computer and see where the costs were coming from, where the money was going. And that's where this full-cost accounting came from.

DIAZ: Yes, or what the real cost of a project was.

JOHNSON: All those hidden costs, things you don't account for.

DIAZ: Right, yes.

JOHNSON: Talking about money, over the years you were here, you dealt with budgets as a Center Director and Associate Administrator. Let's talk about that for a while. I thought it was interesting when we talked last time about Galileo [mission to Jupiter], and you said that the team gave you a framed sign to remind you your job was to get the money.

DIAZ: That's right.

JOHNSON: Missions are expensive, and somebody's got to get buy-in. Other people have described it as a sales job. You have to go out to sell people and tell them, "These things are going to be wonderful." Well, why are they going to be wonderful when it's something that's almost abstract for a lot of people, especially the exoplanets and all the different things that not everyone can get their head around? Talk about that, trying to get money for science.

DIAZ: This is where the NASA and non-NASA participants in these projects or programs tended to act differently. We were always trying to inspire the administration to support missions or programs, and the scientific community at one point in time might have cared about—in my recollection, always cared about OMB—but they cared more about their congressional supporters. The people that were on the science committee, their own congressman for the districts that they were in.

So we were always selling. And working budgets the way we were, where you were working three budgets at a time, it was always some level of challenge to keep things moving through these budgets. Occasionally, they didn't keep moving. That always created some difficulties between the scientists outside the Agency and those of us inside the Agency, because

their immediate reaction was to go and protest, while we inside the Agency had to support the administration's program.

So yes, one, it was always true, we were always selling. Two, it was sometimes difficult, because not all of us had the latitude to do what others could. But it was mainly the scientists in the end, because those of us that were the technologists and the institutional leaders, we really didn't have a lot of aptitude to inspire people about what was going to come from a great mission. So the scientists were the ones that did much of it, yes.

JOHNSON: There are a lot of Agency decisions about budget and other things that have affected science missions adversely, positively, and everything in-between. Is there anything that comes to mind, while you were in any of these positions, that you felt that the Agency decision really made an impact one way or the other on any of the missions? Maybe some of the ones you were working on?

DIAZ: Oh, yes. I think all along the way. There were decisions that were made that dealt with issues on the basis of something was getting too hard, and obviously the budget was not going to be able to support it. When the Agency decided to eliminate a high-energy hydrogen/oxygen upper stage in the Shuttle, that had a huge impact on the science program. But we were able to recover from that by changing the mission designs and coming up with missions that could be supported by the new capabilities, including the solid rocket motors that were to launch from the Shuttle [Inertial Upper Stage], as well as Expendable Launch Vehicles. Those kinds of things were kind of normal, and however big the problem was that led to it, we always seemed to recover.

I think the one that I remember as being so difficult to deal with was the decision to terminate the ISPM mission, the International Solar Polar Mission, where there were two spacecraft. One was going to be the European [Space Agency] spacecraft, and the other was going to be the American spacecraft. That decision was actually made, as I recollect, overnight, and none of us saw it coming. All of a sudden, we had this big international incident on our hands. That one was tough to deal with.

Ultimately we did deal with it, but I don't think we ever recovered from it. The people that were working on it in Europe really never forgot that, and always seemed to want to maintain some level of security that went beyond just NASA's commitment to do something. But there were always issues to deal with, either driven by budget or driven by the difficulty with getting something done, like in the case of the upper stage for the Shuttle.

JOHNSON: That Solar Polar Mission, like you said, did cause some international problems. Let's talk about how important those international partners are to NASA and to the scientific work for planetary exploration and Earth System Science as far as Earth obs [observation] and everything else. Talk about all those international partners, and what the importance is to maintain those relationships.

DIAZ: Well, in the science program they were absolutely essential. There were two elements that almost always showed up in every mission. One was an international component, and the other was an educational component. We consciously went about the process of determining countries that could make essential contributions to our missions and tried to collaborate with them.

In some instances it was pretty straightforward, because the Europeans, for instance, and the United States were planning very similar missions. And it was clear that collaborating—taking the best of the technologies from one side and the best from the other side, putting those all together and then going through a common selection process to select the payload—was the right solution. That was the case in Galileo, and that was the case in quite a few other missions.

I think in the case of the Earth science, it was even more obvious that we needed the international collaboration. That had to do more with the fact that the Earth belonged to all of us, not just the United States. There were going to be some observations made that, frankly, needed to be dealt with by the countries over which we were flying. So I think it was pretty well understood that virtually every one of our missions, more or less—some a lot more, some less—would be international in nature.

It's kind of interesting, because in all my years in NASA, it wasn't until Cassini [Huygens], when the probe entered Saturn, that I was sitting at a console in Germany where I could actually say the Europeans led a mission that NASA participated in, as opposed to, at best, us working together on a mission. I remember saying it at the press conference. It was really quite a milestone to be in a situation where NASA was actually a participant in a European-led mission. We took them there, but it was completely their mission. We had part of the payload, but other than that the only interface we had was just letting them go.

JOHNSON: NASA also deals with other entities. Not just the international partners, but they have to deal with NOAA [National Oceanic and Atmospheric Administration], DoD [Department of Defense], Department of Energy, OMB. Do you want to talk about the relationships with some of those other agencies?

DIAZ: Yes. We always had a pretty decent relationship with NOAA. Especially when I was at Goddard, I spent a lot of time with NOAA. We had some difficulties with the Geostationary [Operational Environmental Satellite (GOES)] program development, and we had some difficulties with our ongoing Polar [Operational Environmental Satellite (POES)] program.

In the case of the former, we were having difficulties getting the instruments developed to fly on GOES NEXT [GOES R-series]. And in the case of the latter, we had that incident where we dropped one of their satellites [on factory floor at Lockheed Martin Space Systems Company in Sunnyvale, California]. Not only was it a problem in both instances because of the hardware, but it was a problem in terms of the continuity of coverage. It was pretty significant.

But we always worked pretty well with NOAA. There did come a point in time when NOAA was feeling a little bit vulnerable, I would say, that they had such a great dependency on NASA. I think they were anxious to develop their own capability to buy satellites. We would always get into the discussion of how many competency centers can the country afford to maintain in terms of the procurement of those kind of satellites? If you subscribe to the feeling that the competency comes from actually participating in the development of these satellites, then we really can't afford to maintain those competencies at more than one place. I think it would always come down to that. I don't know how it ultimately developed, but I do think that there was that level of difficulty.

The DoD—we never had very much agency-to-agency dealing with the DoD in science missions. I think there was always a technology discussion going on, but I don't know that there was ever any appreciable [cooperation]. There were a lot of reasons for that. One was keeping

the military and the civilian programs separate. There may have been more discussion on the human spaceflight side because of the launch vehicle discussions, but I wasn't involved in that.

OMB—it was a different kind of thing. I don't think we ever viewed OMB as a collaborator. OMB went through cycles of having more or less understanding of the NASA program. I think the height of it, for me, was when Steve Isakowitz was at OMB. I thought that they really, really understood our programs. They didn't always like the consequences, and they didn't always support our programs, but I thought that they had as good an understanding as I think they ever could have.

JOHNSON: Department of Energy?

DIAZ: Yes. We had a pretty strong relationship with the Department of Energy for nuclear power sources. There again, early on in our relationship they were happy to do what they could. Later on, it became clear that they were having their own difficulties maintaining the competencies that were necessary to produce the power sources that we needed, and were looking for NASA to contribute.

That created some level of tension, but I think it was all driven by the same kind of discussion about what it takes to actually maintain the competencies to produce the products that each of us was doing. It was a good relationship. Our relationship was mainly with the Germantown [Maryland] folks. We had some discussions at the [DOE] Headquarters [Washington, DC] level, but mainly with Germantown.

JOHNSON: Throughout your 40-year career with NASA, and once you got into the management and the administrative part of it, you dealt with a lot of Administrators. The decisions that they made, their personalities, their management style—let's talk about them for a while. Did you see a big difference? Some of them had science backgrounds, some of them were engineers, some of them were more MBA [Master of Business Administration]-type people. There was a variety of people that have run NASA over the years that you were here, so if you want to talk about some of their management styles, maybe issues you found positive or not positive?

DIAZ: Yes. Well, I think there were enough positives that I can concentrate on the positives. How is that?

JOHNSON: Okay, that is good.

DIAZ: There were really only three that I spent a lot of time with. Dick [Richard H.] Truly—but in that case I actually spent a lot of time with J. R. [James R.] Thompson [Jr.], his deputy—then Dan [Daniel S.] Goldin and Sean O'Keefe. Those three were the ones that I dealt with mainly.

They all had different strengths. Truly was—I mean, Truly was Truly. Truly really understood what human spaceflight was all about. He understood the people, he understood the culture. He really appreciated the cultures of the Centers, he knew the people that were running the Centers. So, I think that his strength was just the fact that he was part of the Agency, he was from the Agency at a very, very critical point in time when we needed to more integrate the astronauts into the leadership of the Agency, rather than to simply have them viewed as the pilots

for the vehicles. I thought that was a huge transformation that Dick led in a very, very effective way.

He brought people in that I came to know and really appreciated knowing—Sally [K.] Ride, Bob [Robert L.] Crippen. Those two probably more than any. In the post-termination of the high-energy upper stage, Crippen and I worked together on a daily basis, coming up with strategies for replacing that capability and making sure that our satellites got launched on schedule, including the Earth science satellites. And I really, really believe that was probably one of the greatest transformational moments for the Agency, when the astronauts came out of hiding, if you will, and really took over the Agency. That was a great moment.

Dan—he had different strengths. Dan's strengths lay largely in the fact that there wasn't anything that we could imagine doing that he couldn't imagine getting done, and doing it quicker than we thought we could, and cheaper than we thought we could. But he also introduced, I think, a transformation moment to the Agency, because he did press this issue of "quicker, better, cheaper" to the point that we actually saw things change.

Now, I think some of it has eroded over time, but there was a dramatic change to the programs—including the Mars exploration program—when he came in and said, "We can't spend all of our time just building things. We have got to be doing more, and we have got to do more incrementally, and do it cheaper." I thought he was terrific.

Sometimes he was pretty hard to work for, and I remember him taking me aside one time. It was in a meeting where I thought he might have been a little bit more critical than he needed to be of what I was doing. I think he sensed that that was my reaction, and he took me aside after the meeting and he said, "I'm doing this for your own good."

That was kind of a typical discussion with Dan, because he really did care about people. He really tried hard to motivate the people that he thought could make a difference. And he wanted to make a big difference. He didn't want to make some kind of incremental change, he wanted to make a big difference. He wanted to see the program become way more productive than it had been, and I think he was successful. Again, another transformational moment.

Sean—I think his main skill was in managing a large organization and somehow getting us all to work together. I think in working for Sean, we spent a lot more time together. That is, the leadership spent a lot more time together than I think we had in the past. He really did work very hard to get us to come together.

He also did another thing, which was encouraging the young people in the Agency to take control of the Agency. He was the one that encouraged this "One NASA" activity that I think was also somewhat transformational. I don't know whether it's been sustained, but I do think that it offered people some motivation for continuing to work through a very difficult time in the Agency.

I think the three of them that I worked closely with all had some specific strengths. I don't remember Truly being difficult at all, and I think Sean O'Keefe—I don't remember him being difficult. I do remember Dan being difficult at times, but I will tell you, to this day, I think the world of that guy. I see him occasionally in Washington, and he is just—he remains inspirational.

JOHNSON: Yes, we have heard that about him. People may have had issues on a personal relationship, but he did dream big and he felt like he could get things done.

DIAZ: Yes. And the interesting thing about him was that he really did care about people. You could always tell that. And as long as he felt that your motivation was correct, he would work with you. But he would also take the opportunity to take you to task if it was appropriate.

JOHNSON: As far as your management style, did you have any mentors, or any leaders throughout your career that you looked at and admired as far as something you felt like you could use in your career?

DIAZ: Yes, I think there were a lot of them. I can't say that I could identify with any particular one. I'd like to believe that I was a people manager, so at some level I was a student of the way O'Keefe managed the Agency. I think in some ways he organized and worked with the people in the Agency probably better than anybody I have seen. I spent a lot of time with J. R. Thompson, and I really enjoyed working with him, and liked to believe that, at some level, I could be like him.

I guess the one guy that probably never ended up with the same profile, but Gus [Angelo] Guastaferro from Langley [Research Center, Hampton, Virginia]. I think he was probably close to being a mentor. I worked for him in various capacities when I was growing up in the Agency, and he taught me a lot. Gus always had a saying for everything, although I don't know that I remember what they were. He always had some interesting advice about things.

I think he is probably as close as I have come to a mentor. I worked for him at Langley on the Viking [mission to Mars] project. When he went to NASA Headquarters, I ended up going to NASA Headquarters to work for him on the planetary program. Then he moved on to

do something for a while, and I ended up working for him again. I've forgotten exactly what it was, but I always admired him and learned a lot from him.

NASA was a great place for being able to learn things from others. I learned a lot from Bob Crippen, too. I still see Bob, and enjoy talking to him. It's interesting. None of us reminiscence very much, but like to get together and see how each of us is doing.

JOHNSON: After 40-plus years you had plans to retire, but then your retirement was actually announced before you were ready to announce it. Do you want to talk about that?

DIAZ: Yes, there was a pretty widespread reorganization that was going on at the time. I was fine with stepping out of Earth and Space Science, because as I said, that was a difficult time and a difficult assignment. I had told the Administrator and his staff that I was going to be retiring, but that I needed some time to figure out where I was going to go and what I was going to do, because it wasn't immediately obvious to me what I wanted to do.

There was some media attention on what was happening and who had been reassigned to what. I think I was off on a European trip. In fact, I think it was the Cassini trip. I remember coming back and seeing that among the people leaving the Agency, I was one of them. To this day, I am not sure exactly how it happened, but when the reporter called I told them, "Yes, I am. But I told the Administrator I was going to be leaving, so I don't think it's any big secret."

The process we were going through was a typical reorganization one, which was everybody was being assigned a new responsibility. I was offered something, but I, frankly, told them at the time that I wasn't interested in another assignment because I was going to be leaving.

JOHNSON: I thought that was kind of interesting the way it happened.

DIAZ: Yes. I did have about six months to talk to people. I ended up in academia because the people that I talked to and the people that I trusted ended up being university presidents. I ended up realizing that that's probably where I wanted to be, so I benefited by having the time. I wasn't quite ready when it was announced, but it was okay.

JOHNSON: You mentioned that challenging time right before you retired. Would you say that was the most challenging part of your career? Or was there something else?

DIAZ: It was the most challenging in the sense that I never did see my way to the goal line. I never could quite figure out how it was all going to come together. So yes, I think it was probably one of the more difficult things. For instance, the Goddard Space Flight Center Director was a difficult job, but it was so much fun. I don't think I had as much fun in any other job as that one, so there were some compensations.

In that last job, there really wasn't any compensation. I could never figure out what it was that we were going to end up having to do, and people were so skeptical. It was a lot of turmoil and a lot of anxiety, and it just was very uncomfortable. So as I said, I was kind of happy that it was time to go.

JOHNSON: What about something that would have been your most rewarding, or something you are most proud of throughout your career?

DIAZ: I think playing a role in the Hubble Space Telescope was probably the most rewarding piece of work in my career. In general, being the Goddard Center Director—I thought I'd died and gone to heaven. It was a tough job at times, but working with those people out there—to this day, I remember how excited I was to go to work every day, because you had just all kinds of wonderful people. I had a great team that were there with me because they wanted to be, and it was great.

But I think from a single-event standpoint, being part of the recovery of the Hubble Space Telescope was probably the most rewarding thing.

JOHNSON: Before we end, you have been away from NASA for a while, but the direction that NASA's science is going, or possibly could go in the next budget cycle, do you have any thoughts on that?

DIAZ: The one thing I have done religiously since I left is not reflect too deeply on what's going on, because frankly I don't want to be in a situation where I am becoming an expert on what other people ought to be doing. So I don't really know too much about what the directions are.

I will say that I am concerned that the Agency is still struggling to find its feet. I think it's sad to be in a situation where we don't have the kind of mandate that we had when I worked in the Agency. There was always something externally expected that was motivating us to do what we did. I think this whole process of internally generating a reason for existence and then trying to sell that, it's really tough.

I think, to some degree, you have got to wonder whether or not the NASA that exists now is something that the nation needs, and I worry about that. That's one of the reasons why I think

that the kinds of things that we thought about or the kinds of things that we were doing when we talked about the robotic Hubble repair mission might have made a big difference. It also might have made a big difference in the sense that if we weren't able to do it, it would have been a bad day.

So I don't know. I knew when I went to academia, there were a lot of reasons for doing that, but one of the ones that I really relished was the fact that I wouldn't be watching what NASA was doing on a day-to-day basis or being part of it, and being critical. I've always wished my colleagues the best, and to the degree that I can be helpful, I try to. But frankly, I don't have a lot of insight into what's going on.

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

DIAZ: Not really. Maybe in closing, just say that I really feel like I came into the Agency at exactly the right time, and I left at approximately the right time. I think when I first came into the Agency, there was no limit to the excitement that I had, and the excitement that I saw around me every place I went. And the only thing that I was really sad about was when I left, I didn't see that same excitement anymore. Maybe that's why I left at the time that I did, although I was getting old enough and they needed some youthful leadership. But I cherished every minute that I worked in the Agency. I don't think I ever came to work regretting that I was at NASA. I always felt good about it.

JOHNSON: That sounds like a good place to stop, then. Well, thank you.

DIAZ: Yes, great.

[End of interview]