NASA ORAL HISTORY PROJECT
EDITED ORAL HISTORY TRANSCRIPT

JAMES A. HARTSFIELD
INTERVIEWED BY JENNIFER M. ROSS-NAZZAL
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ROSS-NAZZAL: Today is May 16, 2025. This interview with James Hartsfield is being conducted for the NASA Oral History Project at the Johnson Space Center in Houston, Texas. The interviewer is Jennifer Ross-Nazzal. Thanks again for coming in.

HARTSFIELD: My pleasure, my pleasure, and I know, as we pick up the second part here, I was thinking about it, and you had asked questions about NASA communications, public affairs during the early years of my career, the late 1980s, early 1990s, just in general. There were a couple of things I'm sure that you have talked to other people in depth about from a history aspect of JSC, but I wanted to mention it, which was just a sea change for us. Primary among those was Space Center Houston coming into existence.

When I started, there was no Space Center Houston. I've talked to you a little bit about this. There was a walking tour, but even more so from a function of the NASA communications office here, we didn't do a lot to facilitate visitors. In fact, we didn't really do anything. We just maintained the exhibitry, the Apollo 17 Command Module, all that was over in Building 2, the Teague Auditorium Building in the back of it, and then gave them literature for a walking tour. But we did have to do maintenance of those exhibits, so we did have a staff that worked all that.

We manned an information desk in Teague, so there was a part of communications that did that function, and we had a million visitors a year that came through. Even without really any proactivity on our part, it was a million people a year. Always crowded here, always packed with

visitors in the cafeteria because they all ate in the cafeteria, it was tough. They would stop by, they would look in your windows all the time, which you just got used to, and you felt like an aquarium. You didn't want to wear your badge when you went from building to building because you would get stopped by people and asked questions about what you're doing, what's NASA, and this kind of thing, or anything in the world. But it was always a dead giveaway anyway, even if you didn't wear your badge because almost everybody wore a tie.

ROSS-NAZZAL: Oh, okay, I was going to say maybe a polo?

HARTSFIELD: No, no, you had a tie on, and the tie was the accepted standard for work then. No visitors ever wore a tie, they were wearing shorts and everything, so you'd still get stopped, they would guess that you worked there. I do also remember distinctly, sometimes visitors would come and ask questions into public affairs, but the kind of questions they would ask you, which I'd said that people love NASA because one of the big reasons, in my mind, is that we persevere, that we don't quit. We continue trying, even if we fail, and even if we don't succeed, we continue to try. We don't let it make us give up, and thankfully, the taxpayers are the ones that enable us to do that.

But also NASA, for whatever reason, our history, our vision that people have, literature, we're the focal point of so many people's hopes and dreams for the future. That was very evident on a face-to-face basis with all those visitors who were always on JSC. They would come in, we had people that would walk into the office and ask us if there was people they could talk to about cures for their families who had terrible illnesses because a family member said, "I want you to go to NASA, I want you to ask them about it."

ROSS-NAZZAL: That's fascinating.

HARTSFIELD: They felt like we were people that achieved stuff that was on the cutting edge. We couldn't hook them up with NASA people, we would send them to the medical center or something of that kind, try to refer them. But it just shows the kind of power that people held in their thoughts, and I think they still do. Then we had a mail room, too, which no longer exists, for snail mail. There was no email, nothing electronic then. The phone and the fax machine, like I said, were the only big electronic items.

The mail room in Public Affairs was huge. We had a staff, I think, of five people that worked full-time answering letters from all over the world. Mostly the United States, but all over the world, really, and not just from kids, it was from everybody. It could have been the older people, younger people, anyone, every state, every country. In the letters, they were asking for information from NASA, but a lot of them just saying thank you and complimentary about us. We would send out information, they would send out information, we answered every letter, which was always remarkable, every single letter.

ROSS-NAZZAL: Really?

HARTSFIELD: This was hundreds of letters a week, and every one of them got an answer. A lot of times, the answer was a prewritten item about some information or general information on space or on JSC and just sent back to them, but they answered every letter.

I also want to say that I think that allowing people onsite to walk around anywhere, there was no restriction really. You weren't supposed to go inside the buildings, some buildings, and there were signs on the door saying, "Don't come in here, this is not open to visitors." People mostly respected that. But that kind of openness, and then the answering every mail, symbolic of, I think, a totally unique, open, transparent form of operations for a government agency. I don't think there's an equivalent of that in the government that ever did that kind of thing. Even before 9/11 and security became what it is today, I don't think there were really the ability to go walk around a science organization or a campus, and certainly not a devotion to answering every letter that you received and giving somebody a reply. It's been held up by kids that got answers from us, and some of them became famous people, and they talk about they got an answer from NASA, so I think it had a good effect.

I will say the one big thing, of course, too, symbolic of the change, when Space Center Houston opened and the back area of the Teague became available because we moved all the exhibits out of there. We were very fortunate to receive a go-ahead to turn that into a studio because we really didn't have a television studio before. We had a little back room that worked for Mission Control. When we were in the front, there was a room in Building 2 that had a producer and director that operated the remote cameras and things, that could operate a press conference, but it was all kind of strung out. We didn't really have a studio where you could do live broadcast from or even good, taped broadcasts. There was something in Building 8, but it was more an office with a camera in it. We had an opportunity to create a studio in the back of Building 2, which is a fantastic studio. We call it Studio A now, but it's been there now since the '90s. Shortly after Space Center Houston, we converted that space, the largest sound stage in Houston, actually

ROSS-NAZZAL: Really?

HARTSFIELD: Yes.

ROSS-NAZZAL: I did not know that.

HARTSFIELD: One of its kind. So those are just some comments. For some reason when you live through it, how dramatic the change is doesn't come to you right away. But that kind of a time with people coming in, and the mail and answering things, and all of that, and I think it's almost unimaginable to people working here today, younger folks.

ROSS-NAZZAL: Yes, yes, since I've been here, I don't remember this. I remember when I was an intern, I would go over in Building 2. I remember there was posters, and biographies, and patches.

HARTSFIELD: There was a library, and that's what used to be the mail room before it was the library. It had a big staff, and they answered all the mail from there, too.

ROSS-NAZZAL: Yes, I don't remember that.

HARTSFIELD: They were busy every day every hour of every day, opening letters and stuff. I would go over and look through the letters now and then just to ask them what they got that was cool because it was fun to hear what the public was doing. Part of being in communications, you

should know what the public is saying about you that are actually inspiring most of them, because people were so enamored with what we did.

Of course, when we had missions that didn't go well or problems, the public would send in suggestions for how to fix it real time. They would call us too, real time. Like Intelsat, we got so many suggestions on how to help capture the satellite while it was going on, that mission, and people would fax us diagrams and all these kind of things. We would thank them for their help. You also get nutty calls every now and then.

ROSS-NAZZAL: That's what I was thinking. When I was an intern, I sat with someone who was Sue [Susan H.] Garman's [Associate Director at JSC] secretary, and she was showing me some of the correspondence that Sue Garman would respond to.

HARTSFIELD: There's a lot of different people in the world. We were launching the Advanced Communications Technology Satellite; it was a new test of communications technologies for satellite, and the [Space] Shuttle *[Discovery]* was going to launch it. It's countdown day where the launch was within the last nine minutes, the final stretch toward liftoff. I'm in the newsroom, working in the newsroom, and I answered the phone, and this person is frantic on it, and they're going, "You cannot launch the space shuttle, please do not launch it, you can't launch it."

We're saying, "Well, we've reviewed everything. They've been very meticulous about the process, and we've been through all the thorough readiness reviews, and they have not seen any issues, and so we feel it's safe, and it's going to be a good mission."

He says, "You can't, you can't launch it," just kept on and on and on.

Finally, he's going, "Well, what is it, so what's the issue?"

He said, "I receive every satellite in my head, so I can't handle another one." You would get these kind of calls. There were a lot of calls that came in like that sometimes, not threatening. He said, "What can you do?" I told him he should call his doctor, but it was that way sometimes, right, some crazy calls, but a lot of calls.

During a mission like that, the calls you get were people earnestly trying to help you saying, "Well, how about magnets, have you tried to magnetize the thing?" They'd sketch it out sometimes and send you the magnets thing. Even school kids' classes would get involved, and they would send things, so it wasn't just people and other engineers would offer help just because they felt they were a part of us and wanted to help, which was—it was very inspiring.

ROSS-NAZZAL: Oh, I bet, yes.

HARTSFIELD: It should be inspiring to everyone at NASA, those kind of things.

ROSS-NAZZAL: Yes, do you know if Public Affairs saved some of those letters?

HARTSFIELD: Probably not, we're terrible about that and those kind of things. I did write a [*Space News*] *Roundup* article about letters that we got once. That's one of the things that got me into the library and then I started looking at letters. I would go over and ask those folks, "What have you gotten recently?" after that because they were so cool. I don't know when I did that though, I wish I could tell you.

ROSS-NAZZAL: Yes, I started looking at your articles, and I thought I'm just going to be buried.

HARTSFIELD: Yes, there's a lot.

So that was where I wanted just to go back a little bit with that because those were sea change things that occurred. Of course when the rise of the internet, rise of social media and email, rise of Space Center Houston, the walking and the face-to-face went away. I think all of us still go over to Space Center Houston periodically, and you can go undercover there. You don't have to show you're a NASA employee, and just to watch people look at things. If you ever need an uplifting day, going to watch people seeing and inspired by what this center and agency have done is always good for you. I did that fairly often, I would go do that, maybe because those early days, the same thing. Irritating and inspiring at the same time to have people staring at you all the time. Then the snail mail answering went away because of the rise of email and social media, and then the internet, people could get their answers on their own that they could not get before a lot of times. They still send us a lot of praise on social media. Social media is the gamut, probably different tone sometimes now than it used to be, but that's not really because of the agency, it's because of the methodologies, I think.

ROSS-NAZZAL: Yes, yes, attitudes have changed for sure, yes, that's interesting.

HARTSFIELD: Then I was going to go back, you were talking about commentary, so just one other thing, and this hooks in with the transparency and the openness. The real reason commentary came into existence, as I understood it from the guys in Apollo who started it and Shorty [John A.] Powers, who was the first commentator right from Mercury, that legacy. Because these guys worked with him. I never met him, but I met Jack [John W.] King. Jack King was an awesome—

he was the director of communications here, and "The Voice" for the launch of Apollo and was at KSC [Kennedy Space Center, Florida] for a long time, as a contractor even. But because NASA was committed from the start to broadcasting the communications between astronauts and the ground in full without time delay to the world, there had to be somebody to explain those. If you don't explain them, they're so cryptic and they're a bunch of acronyms, and it's AOS [acquisition of signal] and LOS [loss of signal], "flip switch A at 20:42." You have to say, "We're going to lose communications, we'll regain communication, they're going to change a heater on the fuel line in 5 minutes."

You had to have somebody to explain those because the cryptic was too unintelligible to people, the shorthand language that went back and forth, and too open to inaccurate interpretation. So that's really, I think, what brought commentary into being. Always have stressed that commentary, at its basic, should be just to add that kind of value, to explain the stories and our goals. They tell themselves to a large degree, but they tell themselves in a language that the public doesn't understand, so we just need to translate it mostly.

ROSS-NAZZAL: Yes, that makes sense. Yes, NASA's got its own language as many federal agencies do.

HARTSFIELD: Yes, and I will say, the openness continues today on open communications. It's changed a lot because of proprietary concerns with private industry changed a lot with international concerns from other sovereign nations who have their own policies and what they're going to do. With U.S. astronauts, we've always tried to maintain that kind of communications openness, and even on the [International] Space Station [ISS] today online, you can listen to all the space-to-

ground communications that the U.S. astronauts are doing. There are media that do, they listen to it, apparently, 24/7 because we will still get calls from them. They don't listen to it as much for station operations, which I hesitate to call anything in space quiescent, but it's not dynamic like a launch, or a landing, or an EVA [extravehicular activity], or a rendezvous, or a docking, or maybe even a major robotics operations. So it doesn't get the attention that those get, but there are still media that do monitor it, and we'll get calls when there's something on there that they don't understand.

ROSS-NAZZAL: During Mercury, Gemini, Apollo, ASTP [Apollo-Soyuz Test Project], early shuttle, they used to transcribe all that air-to-ground. Were you here when they made the decision to eliminate it?

HARTSFIELD: They did transcripts for a while, yes. For STS-26, I think, it was transcribed, and then there were Department of Defense missions right after that. There were transcripts for a while, but they quit doing that pretty soon.

ROSS-NAZZAL: Was it just cost?

HARTSFIELD: It was cost, it got really expensive.

ROSS-NAZZAL: Yes.

HARTSFIELD: But I can't tell you exactly when. I remember that they did it, it didn't last very long into my career that they were doing it.

ROSS-NAZZAL: Yes, I didn't think so.

HARTSFIELD: It was a transcription service that you had to send it off to.

ROSS-NAZZAL: Okay, not in-house.

HARTSFIELD: We recorded everything, and it's still recorded, but it's not all digitized.

ROSS-NAZZAL: Right, yes, there's a big effort in the agency—

HARTSFIELD: It's not digitized, you can't access it very well.

ROSS-NAZZAL: Exactly, yes, because it's all old technology?

HARTSFIELD: Yes, and they do need to digitize because the tapes will melt away.

ROSS-NAZZAL: Yes, I know there's quite a bit on archive.org.

HARTSFIELD: That's adding to it and that's because it's—as time is available, they've tried to do that, but there's not much time available to do it. So it's a very, very low priority for them, but

they understand that it's something that shouldn't be lost to the world. So we try to do a little bit, but you'll never get it all done because there's no priority to it, no resources for it.

ROSS-NAZZAL: Yes, I understand that.

HARTSFIELD: I think what they've done are the hot points of the missions, which are good, so maybe the most interesting things are out there.

ROSS-NAZZAL: Yes, well, I appreciate you adding those details.

HARTSFIELD: Sure.

ROSS-NAZZAL: Because that's something actually no one—I don't think—

HARTSFIELD: Well, maybe Hal [Harold] Stall, did you-all interview him?

ROSS-NAZZAL: He did not agree to ever sit for an interview.

HARTSFIELD: Really? Okay, because he was the mastermind of Space Center Houston.

ROSS-NAZZAL: Right, yes.

HARTSFIELD: It was his huge pet project, and it certainly changed the world, and, of course, what would we have done had we not had it. As the way the world evolved, it had to be created, something like that had to happen, so, and it's good that it happened when it did before it was a necessity.

ROSS-NAZZAL: Yes, well, I thought we would turn to ISS.

HARTSFIELD: Sure. I don't know if you're going chronological, but at some point, in the interview, I think you should talk about ALH84001, the meteorite.

ROSS-NAZZAL: Yes, we can talk about it now.

HARTSFIELD: I was the primary communications person on that in 1996. I thought one of the most momentous things of my career, actually, that I was involved with because it was just such a huge thing communications-wise. It was not my beat, it was not my assignment, I was actually working on tech transfer at the time, which was interesting. It was a short-lived assignment that I was there, but they were trying to really highlight space commercialization, and tech transfer was the thing to do then.

But I think I had a reputation in the office as a good writer, and so my boss, at the time, Steve [Stephen A.] Nesbitt, came down to my office one day and poked his head in. He said something like, "Hey, how would you like to write maybe the most important press release NASA will ever put out?" I'm going, "Okay, boss, you don't need to schmooze me, just tell me what you want me to do, it's okay." But he didn't really ever talk that way, he was pretty matter of fact, so

it was intriguing. He said that there was a group over in Astromaterials, which I was not really familiar with Astromaterials. I'd only known about the building because of Earth Observations, which I told you I'd done a release about and a *Roundup* story of things about, but I did not really know Astromaterials. I knew they had Moon rocks over there. But he said there was a group there that had been studying a meteorite from Mars and felt like they had found evidence, that it may contain evidence of ancient life existed on Mars at one time, so I was going, okay.

ROSS-NAZZAL: Yes, that's pretty cool.

HARTSFIELD: Yes. So I set up an interview to go talk with Dave [David S.] McKay and Everett Gibson, Kathie [L.] Thomas-Keprta over there. I actually did a couple of interviews with them, but I distinctly remember going over for the first interview, and I knew nothing. I knew nothing about it, which I guess was a good thing, like I said back when, to know nothing, you write it in a way that people will understand. They're great people, and of course, the late Dave McKay, awesome person. I think Everett is still out here occasionally as a consultant. I hope you've done an oral history with him, if not, it should be on your top priority list in my opinion. But great guy, a West Texas geologist. Most of them go into oil and gas, but he went into astromaterials, the Texas Tech [University] guy. Dave McKay and his brother Gordon [A.] McKay were both in Astromaterials, which is remarkable too, both geologists. All of these guys had trained the Apollo astronauts for geology, had been on those field trips that you see in the movies.

Now, Dave and Everett were studying this meteorite that was from Mars. I went over to talk to them about it, and their research was about to be published in *Science Magazine*, so they needed a press release, they understood that. They understood from a science perspective that

what they were going to say, they felt, was the most compelling reason for what they had found in the meteorite. They understood from a science perspective that that was going to be a big thing for the science world. I do not think they actually fully grasped how much impact it would make in the mainstream media.

I didn't know anything about it, so I started from scratch. I didn't even know that meteorites came from Mars, and that we could identify them from Mars. This one had been knocked loose from Mars millions of years before, drifted in space, and then fallen in Antarctica, picked up in Antarctica on an expedition to retrieve meteorites because Antarctica is a good place to find meteorites, apparently. Identified as being a meteorite from Mars because of the pockets of gas trapped in it that were identical in composition to the atmosphere on Mars as measured by the Viking landers, so there's no one way or another that it was from Mars. That's a fingerprint.

ROSS-NAZZAL: Yes, pretty cool.

HARTSFIELD: At the time before it had been ejected from Mars, it had been well beneath the surface of Mars at one point in the early formation, almost 3 ½ half billion years ago, early parts of the solar system. Water, there were carbonate minerals in it, there were shapes that looked a lot like fossils of nanobacteria. There were PAHs [polycyclic aromatic hydrocarbons], which are a chemical composition that can be left by life forms when they decay. They explained all this to me, it took a couple interviews, really long interviews with a group of people, but Everett and Dave were the most vocal and the best explainers, and Kathie was good too. They had worked with Stanford [University] on the thing.

Anyway, I went home after the interviews, and I did immediately recognize this would be a big deal. Maybe they knew that it would hit the mainstream or maybe they didn't, I don't think so from the way that we started working it, they knew it would be bigger. They were focused on the science, of course, because they're scientists.

ROSS-NAZZAL: Right.

HARTSFIELD: It was a big deal for the science world, of course, too. I went home, and, really, I stayed most of the weekend writing this press release. I locked myself in a room at the house, and my wife was going, "What are you doing, you're crazy." Whether it was true or not, whether the research was true that there had been life that existed on Mars 3 ½ billion years ago or not, whether that was borne out to be true, to me, just the fact that the United States government was going to say that was momentous for history. Because there's so many things associated with our fundamental being to think about, does life exist elsewhere. Religious, philosophical, it's so many implications to have a government come out and say that they felt that they had found—because when NASA says that, that is the U.S. government saying it, right, and always think of that from a communications perspective, that's a momentous thing. It's a milestone that had not occurred yet in civilization that I knew of.

So I felt it was critical and important, and of course, my job was to write up something that was going to be accurate and understandable, and it was a super complicated subject. I spent all weekend trying to get through the first draft, and got through a first draft, and took it back to them. Really important on that release were the quotes from Dave and Everett and from Stanford as well, because then we started working with Stanford on it. Really important was Dave said it so well.

His assertion that they weren't saying that it was necessarily true that life had existed on Mars 3 ½ billion years ago. What they were saying is that from their interpretation of what they had found, the most likely explanation for it was life had existed then.

What they wanted to do was put their research out to the scientific world to prove or disprove because he knew that nobody was going to accept their findings. It's too big, and so they needed the world to go look at it and continue the work. I think that has gone on continuously since, and there has been people that said it's disproven, people that said it's re-proven. It seems to me everything we find on Mars from landings there really lean into that theory, the same, it all seems very similar to me. I'm not a scientist, though, so my opinion is very unimportant. But I will say just from a communications standpoint, it was momentous.

We get back, there's a lot of discussion with *Science Magazine* back and forth. Because *Science Magazine* normally when they accept an article for publication, they will send out information to the media in an embargoed fashion, a week or two before the article is published, with the promise from the media that they cannot report the information. I knew immediately that wasn't going to work for this one. The media, they're good with embargoes, kind of, but not when it's a life-changing conclusion, and the biggest news in the space world to date, probably. So I was in a real argument with Stanford and *Science Magazine* about that. We managed to not do the embargo thing and to get people to understand and get that. We went back and forth with Stanford for a while to get things correct too.

Came up with a good draft of the release, and in my recollection on the timing, as soon as we had a draft, Headquarters knew what I was working on. We kept this super under wraps. I only had a team of maybe four or five people here at JSC that knew about it. We did not tell anyone, and we were putting together a plan for a press conference, we're putting together the

images that we were going to use. We put together a little video clip trying to explain the history of the meteorite. Did all this on the very down low so people can see and had the person at Headquarters I was working with, I remember telling them about it, it was pretty interesting.

The release was ready to go to Headquarters because that was the next step in the review process, to go to Washington. Sent it to Washington and I swear within a day or so—and there were other things going on too, right? I think Wes [Wesley T.] Huntress was working his thing, but I think the release spurred this when they saw the plain language in the release. Because the release started out with "meteorite yields strong evidence that life may have existed on primitive Mars," something like that.

Within a day, Everett and Dave McKay were called up to Washington to meet with the President in the White House. Had a session with [President Bill] Clinton, and [Vice President Al] Gore, and the [NASA] Administrator [Daniel S. Goldin], everyone in there, because it was so momentous. You need to talk to Everett about that if you ever get a chance because I think that was a pretty remarkable meeting. We had set the plan, I think it was for mid-August, to do a press conference with a piece of the meteorite available at the press conference. Put out the press release, do a press conference all in the same day, so there was no chance it would leak early. It was going to be two weeks from then or so.

I'm going to quote what I read in the media at the time because I was not a party to this and I can't verify for the accuracy, but you can look it up online, and you'll see all the media articles about it. Apparently, there was some advisor to the President that was in that meeting in the White House who then went, later that day, and met with his girlfriend, I guess, in Washington. In the process of talking to that person, had told them, "You want to know a secret that only six people in the world know? NASA's found life on Mars," and something like that. Then she

subsequently went straight to the *National Enquirer* to try to sell the story. We started getting calls from that to try to verify, and it leaked, and it leaked everywhere, it started to leak just like a wildfire, it leaked. So we accelerated the press briefing, rushed it up to within a day or two. Immediately when it started leaking that day, Clinton came out with a statement and a televised statement about it, and then there was a press conference in Washington very shortly afterward, and it was huge, worldwide news.

Now me, I had worked on this for a month or a month and a half to get it ready. This was always the plan because this had been the plan all along. So 1996 was a big year for me at NASA because of that, but also, it so happened that on August 7th, the day that that press conference was happening, I was going to be on a flight to Russia, to Moscow to go start three months there supporting Shannon [W.] Lucid on Shuttle-Mir. So I hopped on a plane and left and left it to everybody else, and I watched all the coverage unfold from Russia, which was very interesting, and didn't really deal with it again, hands-on until I got back. But I will say that whole scenario of writing that press release, and preparing that announcement, and then the twisting that it went through. And that rock, I said this in the podcast and I'll say it again, because later on, as you know, that rock was in the safe from Everett's or part of the rock samples from it were in the safe from Everett's that was stolen by the intern. They did all kinds of things with those materials. Crazy stories from that too, right?

ROSS-NAZZAL: Oh, yes.

HARTSFIELD: Then finally recovered, and an arrest made, and this kind of thing. But when you add all these up, all these weird twists that happened with this story, and whether or not it holds

evidence of life existing on Mars 3 ½ billion half years ago, it created a ton of life on Earth. There's a lot of things that happened around that rock on Earth, which is just crazy, and I think a really crazy, twisting story in NASA's history actually.

So that was a great—I'm proud of the release that we wrote and proud of the announcement that we put out. We'll see. I don't know that we'll ever know whether those findings—the most compelling conclusion that Everett and Dave came to about that meteorite, and I think Everett probably still believes it today, I don't know, I haven't talked to him. But I think there is some people that still feel it's true, some people that feel it isn't, but I don't know that it will ever be borne out until you have scientists on Mars to actually look. There's nothing that I see necessarily that says there's other explanations for why that's in the rock. Not that that's not a reasonable explanation that it could have been from ancient Mars, but that's probably the last explanation you should take. You should take all the other possibilities first. I think that's where it is now.

But I considered it one of the most historic things I was involved in. It's mostly faded away now. I don't know that people even remember what happened then. It was such huge, worldwide news there, and it really did reignite astrobiology for the agency, the study of the elements of life.

ROSS-NAZZAL: Yes, study of life.

HARTSFIELD: Really reinvigorated Mars exploration for a while, which now, as time goes, everything fades, and I guess that's faded. I don't even see that noted a lot sometimes as an occasion, but true or not, to me, it was a huge milestone for the country and for the agency.

ROSS-NAZZAL: Were you involved in any of the debates going back and forth? Maybe Wes Huntress was looking at this, questioning the conclusions?

HARTSFIELD: I was involved, yes, to—not listening to them. But yes, I was involved—everybody was questioning things, and Dave and Everett were not. They were careful scientists. I'm not going to say they're not bold because look at what they studied, but they were extremely careful and meticulous, and they understood. I never saw them get frustrated or upset with people who would ask them questions, me included, 25 million times. I was probably the worst because I was such a neophyte, but if a scientist is asking them a question, at least, they appreciate, it's on a peer level. But I do remember some of those things.

They were just careful and answered all the questions, and Stanford was supporting them too. It was not just a NASA study, and it was a team of something like 20 scientists that had worked on this that were all keeping the secret across NASA and Stanford. Then it had been peer reviewed at *Science Magazine*, which is really the thing that they wanted to be so careful with. In trying to discuss with *Science Magazine* about the release of the information to the media and the embargo and how that wouldn't work, they were extremely worried when I was trying to push *Science Magazine* to not do that embargo. They didn't want to upset *Science* in any way. *Science*, because they were the peer review, they added credibility to the work when they agreed to publish because it goes through a process to be published by them. They wanted to be very, very careful with it. So, yes, they were questioned all the time, they were then.

I think the remarkable thing about it was, if you read that news release, it is so clear in there that they expected it would be questioned forever. I think there was a hope that it could be proven or disproven in total by the scientific community. But I think, and I'm trying to remember if—I

think why it's planted in my head that the answer will never really be resolved until you have astronauts on Mars is because I think I heard that from Dave and Everett.

ROSS-NAZZAL: Oh, okay, so what sort of questions were you asking as a public affairs person to wrap your head around it?

HARTSFIELD: Well, mine were very basic, it was like, why, how do you know a meteorite's from Mars, how does that happen? I have my notes, I could send you my notes that I took of the interview. I actually saw the tapes; it's the only tapes I ever saved of an interview.

ROSS-NAZZAL: Oh, really?

HARTSFIELD: Yes.

ROSS-NAZZAL: You might want to donate those.

HARTSFIELD: Donate them, maybe I could copy them.

ROSS-NAZZAL: Well, you know what I'm saying, to an archive.

HARTSFIELD: Yes, yes, yes, yes, but I was asking all kinds of questions because I didn't understand it, and I didn't know what, and I still don't know, PAHs is what they call it, the chemical substances. They pulled out the pictures and showed me the pictures, which they were reluctant

to do, because the pictures are—I don't know if you remember the pictures I'm talking about, they look really like bacteria. But the pictures, to them, were the weakest evidence. To me, as a visual person, in communications they were the highest evidence, I thought, wow, okay. But the stronger evidence for them was the proximity of the chemical substances, and those visual clues, and other things in the meteorite. Yes, I had no understanding of any of that, so I asked them in depth about the chemical composition and all of these because I had to explain it in the press release. You should read the press release, you'll see it's very complicated, and I had to be accurate. The whole thing about boiling it down, that press release was not a sixth-grade-level press release. I couldn't get it down to one where it was going to be that good, and I don't think anybody can, but it was understandable, I think.

ROSS-NAZZAL: Yes, so I was curious, you said that you weren't there for the press conference.

HARTSFIELD: No.

ROSS-NAZZAL: When did you find out you were going to Russia?

HARTSFIELD: I knew I was all along. This was before Steve ever came to my office I was on because we were rotating over there, and so I'd been on for that assignment for a long time. My wife was pregnant with our first child, too, so I had to leave her, and she was in the second trimester. We had known that all along, and I had gotten approval to do it from her, which was the most important one back then. So I had known for a couple of months, at least, and I was

excited about it. I'd signed up for it and had the visas and all that, it couldn't be changed. Not like we would've changed it for that.

I will say this. So I get to Russia, and I'm looking at all the news because I'm obviously eager to try to figure out everything that's going on. I'm looking at the news coverage that I can see and everything on that, and I'm getting people at home to send me stuff because I'm interested in what they're seeing. Of course, it's hitting, it's all over like we knew it would be. Then I'm there, and I guess the Russians were looking at it too because it was worldwide news. Maybe they saw my name on the press release or whatever, but maybe it was just coincidence. I'm in the MCC [Mission Control Center], we work in the MCCM [Mission Control Center, Moscow] with the Houston Support Group, and we correspond. Every day, we sit, I would go meet with my counterpart in Russian PAO [Public Affairs Office], who was the PAO for the Mission Control Center in Moscow. I'd meet with him every day just to compare notes on everything that's going on, and with Shannon, and the operations and make sure everything's in sync. So we would have a 10-minute meeting usually every day or something.

I've been there a week, week or two, a week and a half or something. Story's been moving along and all this stuff, and I'm in the meeting and he—I forgot his name, I can't remember it [Valery Lyndin], but we all worked with him. But at any rate, I'm there, and he leans into me after we finished talking about the day and stuff, and we had an interpreter, so he said it in Russian, and the interpreter said to me, "James, can you tell me what is at Area 51?"

ROSS-NAZZAL: Oh.

HARTSFIELD: And I'm going, "I've never been there, I don't know, no clue, I can't answer you anything," and he left it. But I'm just thinking, he must have asked me that because my name was on this press release for this Mars meteorite.

ROSS-NAZZAL: Yes.

HARTSFIELD: That's my only Russian story dealing with the meteorite probably.

ROSS-NAZZAL: Well, I think you had told me that you put together news last time for Shannon, that should get a 25-minute, like this is what's happening worldwide?

HARTSFIELD: Yes, we did for every astronaut that was on board. Whoever the PAO is over there, we would do that.

ROSS-NAZZAL: Yes, and so what were your other responsibilities when you were over there?

HARTSFIELD: If there's media questions about what's going on, onboard the Mir, what she's doing every day, we would help put together the status of the research that's going on, and this kind of thing to put out to the media in a printed form. There were always questions, media were covering her flight, so we would be supporting those. Yes, that was primarily it.

ROSS-NAZZAL: What sort of things were they especially interested in?

HARTSFIELD: Systems, if there was a systems issue. I will say that the most dramatic moment on Shuttle-Mir was, of course, for everyone, two big ones. I think I was the station person or I was in—I forgot exactly what beat I had, but this was not when I was over with Shannon, this was after that. Shannon was early on in Shuttle-Mir. But I got a call from ABC News at 3:00 a.m. at home, and it's a correspondent on the line who I knew, and they're going, "Hey, what can you tell me about the cargo ship that just hit Mir and the depressurization that's going on? It's losing pressure," and I knew nothing about it.

We didn't have anybody watching things for communications overnight then for Mir or any kind of mechanism set up to hear about stuff. We were pretty naive about those kind of things from a communications standpoint about the need to do that. So I knew nothing about it, and I was going, "I'll get back to you." I started a phone tree calling everybody, and we came up—trying to figure out—we were in the office pretty quick to try to do what we could. Shannon was before that, but after that it was very heightened on the media watching how the health of Mir was, and then there was the fire on Mir that occurred.

Look, it was amazing what we were doing. I'll go back to the '80s and the '90s, the late '80s and the '90s, distinctly remember sitting all together, the group of us in Public Affairs, the public affairs officers, watching the Russian Buran land on CNN, watching the coverage of that, and all going, "Oh boy, they got that Shuttle Reference Book." It looked just like it. Of course, it was nothing like the shuttle on the inside but looked like it.

But if you had told us all then that in a few short years, pretty much every one of us is going to end up in Moscow, and that we're going to have astronauts on board Mir, we would have never believed it. This was before the fall of the wall and the dissolution of the Soviet Union, and so that change in the world certainly touched NASA, of course, always. It touched our

communications. Communicating partnership with the Russians was challenging, at best. In some ways, it might have been easier then than it is now because the Soviet Union had dissolved, and Russia was going to be very open. They called it the Wild Wild West, because the West was—it was acting wild. But the space community there was very tight still, and I think it's something that had to evolve. The media, the U.S. media was not very accepting that Russia did not have to answer questions sometimes, or didn't feel like they had to answer questions as much as NASA did because there's a U.S. astronaut onboard. So a lot of times, our job over there was just to try to run interference, to get what information we could and also work a good partnership, very respectful with the Russians, which I think we've done to this day in a communication sense. And, of course, it's a great precursor for when I was working International Space Station.

ROSS-NAZZAL: Yes, absolutely. Did you get a chance to speak with their flight controllers? In Mission Control, you talked about if there was an issue, maybe later, you'd go talk with someone whose system had a malfunction or a glitch?

HARTSFIELD: That was the only way you operated in Russia. We didn't listen to the loops real time. We had the Houston support group there, which was a tiny sliver of mission control, six or seven flight controllers of certain fields that were essential to monitor what's going on and report back. So they were always on top of what the systems were, neither one's actually talking to the experts in Russia, and we would talk to the Houston support group to try to get information.

ROSS-NAZZAL: Okay, so no contact with the Russian folks?

HARTSFIELD: Well, the Russian PAO, yes, I would work with them, primarily the MCCM.

ROSS-NAZZAL: Where did you stay while you were there for three months?

HARTSFIELD: At the hotel, the Pentahotel. That was before they got the apartment complex that they used later, so I stayed at the hotel the whole time, yes.

ROSS-NAZZAL: What was life like there for you while you were there?

HARTSFIELD: It was different because it was not that long. It was still young as not the Soviet Union. We took a bus back and forth to the MCCM. That's where I met Bill [William H.] Gerstenmaier because he came in to be a manager for them. So you bonded with people riding that minivan that was driven by a Russian person to the MCCM and back because they drove differently than—maybe not that much different than people do in Houston who were crazy, but yes, it was a bonding experience all the time for that. I met him on the van.

There was a McDonald's two blocks from the hotel, which was the McDonald's in those days in Russia, huge sensation, and it was packed. I never went to that any day or night that there were not probably at least a couple hundred people waiting. It was like a jam; it was just like a crowd at the front of a concert, and you just had to get pushed up to the counter eventually to make an order. There was no single lines or anything, it was jamming the stage, and you get moved by body mass up to the front eventually.

One interesting story is me and a couple of guys that were there, had been there for a while, and I'd probably been there two months at this point, and we heard rumor that a Kentucky Fried

Chicken had opened in Moscow. The first Kentucky Fried Chicken ever in Moscow. Man, I wanted chicken, and they did too, fried chicken, it was like home, you know?

ROSS-NAZZAL: Oh, yes.

HARTSFIELD: We spent really all day one Saturday because we couldn't—I didn't—I picked up a little bit of Cyrillic, but I couldn't read Cyrillic, so the subway was tough, and we didn't know exactly where this was. None of us were proficient, so we spent all day trying to find it. We found it about 30 minutes before closing. We bought so much chicken, and we ate, and then we bought so much chicken and took it back to the hotel. I ate chicken until I couldn't keep it fresh any longer. Moscow, the people, it's a different culture, of course. So no culture is like Texas where you say how you're doing; you keep to yourself.

But the space community, I will say this, as every engineer will tell you, they have the same belief that NASA people have always had at their core. That what they're doing is transformative for humanity and important for the future of all of us, which is a huge bonding mechanism as well, to believe in that and be pursuing it.

ROSS-NAZZAL: How did you stay in touch with public affairs here?

HARTSFIELD: I'm trying to remember if we had email in 1996. We had some transmission method, NASA mail or something, where I could send stuff electronically, and then phone calls. It wasn't email like we have now, there was a mechanism though, and I'm not sure exactly what it was.

ROSS-NAZZAL: I was just curious about that.

HARTSFIELD: Fax, maybe it was just the fax.

ROSS-NAZZAL: The fax machine?

HARTSFIELD: So I think we had more by 1996, I know we did because I sent that release electronically to Headquarters. I think we had our first email set of stuff by then, at least that could go within the agency back and forth.

ROSS-NAZZAL: Yes, were there even laptops back then?

HARTSFIELD: A derivative of NASA mail maybe. There might have been laptops back then.

ROSS-NAZZAL: Yes, I was just curious about that, I'm trying to think.

HARTSFIELD: You're pushing on my memory cells there. It's a blur on how things evolve so rapidly.

ROSS-NAZZAL: It's fine, and so you came back, and your wife's now in her third trimester?

HARTSFIELD: Yes, yes, yes, see, it's interesting, you want these details on my personal life. I will tell you this, the craziest thing in the world. I'm going to just go back up, and I don't know if this is for the recording.

ROSS-NAZZAL: You can decide when you see the transcript.

HARTSFIELD: So we had found out that she was pregnant because we planned this great trip. The internet was young then because we used the internet in its infancy to plan a great trip—there was not a lot of people using it, and you could find some great housing and stuff—to the Caribbean, a three-week trip. We did that earlier that year in the spring, early spring. We went so far in the Caribbean that we were on an island where they called another island the mainland, and we had chartered it. I lived on a sailboat when I met her, and I still had the sailboat then, we'd been sailing a lot. So we chartered a sailboat, we sailed around with a charter captain to some islands and things. It was just a great three-week trip off the beaten path; we loved it.

We're coming back. One thing, we're on this island, Saint Vincent and the Grenadines. Saint Vincent was the mainland, the Grenadines were the other islands we were on, and we're on Saint Vincent. I'm in the hotel there, which is just a tiny hotel, eight rooms, I think, and it's overlooking the airfield on Saint Vincent airport on a peninsula kind of thing up on a mountain. I'm walking through the lobby, and there's somebody going, "Well, it's NASA, and I have my NASA ID," and this kind of stuff, and I'm going, "What, why is NASA— ?" I go in and say, "Hey, are you at NASA?" It was Don [Donald] Savage, who was a public affairs officer at Headquarters, and he was in the Air Force Reserve, and he was doing his reserve duty there because they were training the Saint Vincent air force to respond to emergencies. It's so weird

because he's the science PAO at Headquarters. So within a few months later, he's the one I'm dealing with on that meteorite release, and I met him face-to-face there, and I never had met him before, so that was a weird coincidence, it's very odd.

Also, just you were asking about my son and my wife, so we're on that trip, and we're back at the last stop, and we go snorkeling on the beach. We're coming and walking back up on the beach, and she fainted, and she never fainted, and so we just said, "We've got to go see the doctor," just because she was pregnant. So, yes, we got back and shortly, a couple of months after I got back from Russia, I did take off for paternity leave for a few months. Then when I got back from paternity leave, they gave me space station as my primary assignment, so that's how I started in space station and kept that then through Expedition 2.

ROSS-NAZZAL: Would you talk about that? Early days, messaging, all those sort of things.

HARTSFIELD: Station had just survived by one vote. Everybody said communications needed to be improved because it just—I thought maybe, well, that's why it had survived just because communications helped it survive. There was a lot of things that went into politics in this kind of stuff. There was hardware being built, we had Russia fully involved, we didn't have much imagery of the hardware, so one of the first things that we implemented was to start a process. We tried to get Russia to send us a lot of footage, video and every—you can't get the media interested in what they can't see, they have to see it. People don't even believe things until they see it.

The station, we had been trying to tell them about it for so long with just graphics and depictions and animation, that now there was real things, so we needed to do that. So we put together an imagery team, and the program helped us fund sending them to Europe and then to

Russia a couple of times to shoot a video of all the modules and these things so that we could start putting that out to the world. The internet and websites were starting to happen, and the station was one of the very first places at NASA to have a website. Whether people know that or not, it got a public website that was aimed for the public. So we had imagery, stills, and video, finally, that we were starting to put out, which helped us out tremendously.

I don't want to get too early because of a huge, stupendous achievement for us and help in communications was when the crew was named. Expedition 1 was named, then we had faces to go with it. That's always huge, a crew, it just all becomes more tangible to people. People start to say, "Okay, it's not just cartoons that they're drawing, and they're achieving something, and something is starting to happen." Research was the justification for station, and it still is, and it rightly should be because it's a tremendous research platform that has accomplished so much over its lifetime already and is still accomplishing things day to day. That's a really hard thing to get the media interested in, in a prolonged way or in a way where they're going to write much about it.

Kept doing it, kept the messaging going out about it, but I always said this. I said, "The greatest laboratory on Earth," which granted is not the laboratory in space because it lacks a lot of the fundamental things that can be taken away in space to promote your research. But you put it in the greatest laboratory on Earth and say that laboratory absolutely does cure cancer, but what you're going to try to do is cover them developing that cure over a couple years live and keep the public interested in it. It's not going to happen because it's going to be boring as all get out. Fundamental research, it's just not exciting. The outcome of it is exciting, but the fundamental research itself will bore you to tears. A scientist, maybe, but I don't even think a scientist is going

to like watching another scientist. They'd like to do it themselves, they don't want to watch somebody do it.

The outcomes are important. We were very careful not to overpromise. That was always a mantra is we don't want to overpromise what the station can achieve. What you needed to explain were just how many basic fundamental characteristics of life change in orbit. How you no longer have convection currents, and how that affects materials processing and crystal growth, weightlessness can affect crystal growth. All of those fundamental things that can be changed and are now factors that can be controlled in an experiment in orbit that you can't control on Earth, right. You can't take them away on Earth as a variable.

I think instead of explaining what would be done, we would try to explain those things. Then always, and still is, and it has been a huge benefit was to explain how we can prepare for long voyages in space on the station. Because we can understand how the human body can adapt to space, how we can keep astronauts fit. If you are going to go to Mars the saying was always and is always that you don't want to just survive getting to Mars. When you get to Mars, you probably need to be in the best shape of your life because you've got a lot of things to do, and the same thing when you're coming back home to Earth. So station is crucial to be able to understand those things and to be able to develop those for astronauts.

I think what was a disappointment sometimes to a lot of the station program folks because people on station are very passionate then, and I was passionate about it too, we were all very passionate. One of the leading things they were passionate about was the way it's pulling the world together, that Russia is part of it, and Europe and Japan, and Canada and the U.S. That it's pulling all these nations together and creating the Star Trek of today, a worldwide community in space working together for the benefit of humanity. They wanted the public to love that as a goal

of station. Everything we ever saw in research about opinions, from the public opinions said that was the least attractive thing to them about it.

ROSS-NAZZAL: Really?

HARTSFIELD: It was disappointing to people, but it was not something that we didn't talk about because it's true, and it was there, and it was a huge thing, but it was just not the motivating factor for people.

ROSS-NAZZAL: So what was?

HARTSFIELD: Research, research was a big motivating factor, I think, for people. But actually, I think it was opening up a frontier. It was what has always been the motivating factor, I think, for people at NASA, is doing things that haven't been done before, creating a permanent place off of Earth, which we had not had before. That goal of understanding how to go further in space as a part of station. In fact, in the media coverage, what they were most interested in and what I really ended up devoting a lot of time to, and then just took because it was going to be what they were most interested in – so you needed something to bring them in with a huge interest, and bridge to the research, and bridge to the other messaging you wanted to provide – was assembly.

Because what was happening in spaceflight from pre-space station to the whole era of the space station assembly, launch and assembly is a total sea change. I told you Gamma-Ray Observatory, first EVA after STS-26, after we returned to flight, so cautious, so careful about it. We did go do an unplanned EVA, but just a single EVA that was going to be done on that flight

was just thought out to the hilt on process. Then by the end of station, we're doing EVAs to do assembly. The wall of EVA was there that they had on the graph, which was just so tremendous number of EVAs, it's unbelievable.

We had robotics, that we had a robotic arm on shuttle, but we never had two robotic arms work together. We never had a robotic arm that could inchworm its way across the surface of the spacecraft, like the station arm that could do those kind of things. We never launched bus-sized items in assembly. We never launched stuff from two different countries that had never ever met each other so that they'd meet together for the first time in space and have them work.

Assembly, to try to explain all those daunting factors of assembly to people, that excited the public. I will tell you they got excited by that, and the media got excited by it too because it's what they want NASA to do. They want NASA to go do those things that have not been done, that take things to the new level, and station did that with space. It took space from a foray now and then from shuttle into the frontier—essentially, it's a workplace in space. Construction site, another day going to work, got to clock in and go to work, and it did it on the ground too. We never operated a control center for 24/7 continuously, all kinds of challenges there with it.

I can't tell you how many times though, the assembly sequence for station was always changing, it was always delayed, always moved on. Mark [S.] Geyer, that's where I first met Mark Geyer, he was the integrator that was my primary spokesperson about assembly plans for station, and I used to joke with him. I love Mark, I miss him dearly, but I used to joke with him that I would take people over there every other week to get the new assembly sequence. He was always patient, always explained the new assembly. He was really good at it to the media so that they could report the new one as it was out and the changes, but it was a constant thing going over to explain assembly. That's really what station was like as we were moving up toward the launch.

A whole different factor when we got a crew, and I will tell you too, we got this first picture of the crew together in the Black Sea on a training mission where they had their hands together. They were in the water with a flare, but they had their hands together in unity. Man, that picture was such a gift. We use that everywhere because we had not had any pictures of them like that, and it was just great from then on to have the crew.

ROSS-NAZZAL: Is this—can I clarify—Expedition 1?

HARTSFIELD: Expedition 1, yes, and then, of course, we had the STS-88 crew, too, which Bob [Robert D.]Cabana and crew were a fantastic crew, and I will go into more with them, too. As we're moving along, like I said, I started this station, be it in '97 or so, and of course, there were meetings. They had to come in every Saturday to meet with [JSC Center Director] George [W.S.] Abbey. He did a lot of things to keep it going forward. Randy [H.] Brinkley, a very tough program manager. I would come in every day for stand-up, to listen in to stand-up that they had every morning at 7:00 a.m. over in Building 4.

But as we moved on, then we're getting to the summer there before first element launch and before STS-88, because the Zarya [module] launched a couple of weeks before, and then STS-88 launched in December. The plan I'd had, and this goes back to—remember I mentioned Intelsat, and we had the capture bar, and we're trying to have that, and I saw how that had affected the media to do hands-on things and to understand? Of course, there's a lot of concern that assembly may not work just like we had planned because this was something we'd never done in space. All the things I said, totally unprecedented. What we conceived was to put together a media workshop, which I don't think—of any kind—we'd ever had at JSC before. We did it that summer,

and we had, I think, something like a hundred different nations that showed up. Maybe it was 80 different, I mean everywhere, worldwide came, and we had maybe 200 media that were there.

Bob Cabana and his crew, STS-88 crew, Expedition 1 crew wasn't really available for it then. I don't know that Expedition 1 was named yet, so I got ahead of myself. Because they weren't named until after the assembly started. But we had Cabana and crew, and they agreed to a couple of days, a couple of extra days, beyond even a full day of press conferences, which we did. But the couple extra days where we set them at places around the site, over in the dome simulator. They would fly the shuttle up to dock Unity [module] with Zarya while the media could be in there and watch, and the media could go try the docking themselves. We had the EVA folks over, [James H.] Newman and [Jerry L.] Ross, maybe over in the NBL showing off all the tools they were going to use and the procedures they were going to do for the EVAs to do assembly between the two modules.

We had those stations around all around the site, and we divided the media up into smaller groups. We spent two days shuttling them around like a summer camp where you'd have a group here, and a group there, and a group there. It was a very complicated logistics. But we had the media go try everything hands-on and have that time with the crew to explain, the crew explaining how they were trained in this kind of thing. More insight into a mission than I think the media had ever gotten before, and definitely more international than ever before.

I think that went a long ways. They wrote stories about the workshop while it happened, but it was also homework. So they had these stories ready to go when we were going to fly the mission. That was a great workshop, and we did briefings, this normal pre-flight briefings we do too, we did those then as well. We've emulated that a couple of times for other things since, but that was the first time we did a big workshop like that.

Then come along shortly after that and before the launches, John [H.] Glenn was named to fly on the shuttle. Which, blessing and a curse for me working station. Suddenly, nobody cared about the station at all. I couldn't get somebody to come talk to me, it was a total wipe, everybody cared about Glenn, that was it, and that flight, and it was a flight right before STS-88 and Zarya. I said blessing and a curse because I couldn't get anybody interested. Blessing because nobody was interested, so I had some time to work on all the final stuff. I did the press kits and all this stuff, which was a lot of work, and it was single-handed it felt like, I didn't have much help working on it right then. Because everybody else was working on Glenn, and there was a huge media circus for that and a great flight, but it was odd circumstance. John Glenn's second flight was a great flight. It turns out the flight after that changed spaceflight forever, but nobody cared for a while.

Now as soon as Glenn's flight was over, everybody returned to work in station, but it gave me a chance to get the final preparations together. Then Zarya launched, and then STS-88, and it went flawless. It was a wonderful flight, and station was in orbit, and we had to figure out how we were going to report statuses, which we weren't—we did live commentary, of course, during STS-88—but we weren't going to do live commentary of a vehicle that didn't have any crew on it. So we just did written statuses about it periodically of everything, how it was going, which was very quiet, it really didn't have huge issues that I recall.

Then assembly began, and we had done assembly fact sheets, and again, it was trying to stress how the buildup—I guess that's a pun on words—the buildup of assembly was going to go, the buildup in complexity, the buildup in pace, the buildup in the unprecedented. Because you could always go find something that we had never done before that we were going to have to go do on every assembly flight, it seemed like, until you get to Expedition 1. Then Expedition 1 comes up and it was between STS-88, there were missions between there, right, leading up to

Expedition 1. But then we also had a tremendous meeting in Montreal, Canada at the Canadian Space Agency headquarters facility there of all public affairs reps from the partner agencies for station. That was designed to iron out our communications policies for having a crew on board and for operating station. The Russians were there, everybody were there, it was really cool, it was exciting.

Debbie Rahn was the public affairs person at headquarters who was the international affairs, public affairs person. She was instrumental in helping pull together everything. I know she and Rob Navias spent a late night in the hotel room, and I think Mike Braukus was another public affairs person from headquarters, ironing out all the agreements so that we could sign them before the last day of that meeting. Everybody signed, and I think those are still the foundation for today of how we do things with having events for people, our policies about if there's a major issue, we will be open about it. I think Russia has respected those, everyone has respected those at their core level. It's been refined, and there's been more meetings since then, but that was the most major first meeting of all those entities. The working group is what it was, the agency's working group for it.

Then Expedition 1, we put that all into practice. I will say our philosophies on Expedition 1, going into it, we also had to put the requirements in place for station. With Expedition 1, I don't think it was there totally because we didn't have all the communications capability, but station let us put in documents that basically said we do a couple of in-flight events with the crew, interviews with the crew, which was something that evolved over time, too. When I started in STS-26, we didn't do any in-flight events. We had a crew press conference just like they'd had during Apollo, one crew press conference per mission. Somewhere along the way, Jeff Carr was instrumental in turning that into more in-flight events where we did individual interviews with the crews. But

anyway, for station, we were going to do a couple a week, and the partners would get an allotment of those each month, and we would do an educational event every month with them as communications capabilities permitted it.

Commentary-wise for Expedition 1, our plan was to go with their launch and their reaching of the station. We'd be doing commentary and live coverage 24/7 with the air-to-ground going out 24/7 like always. We would maintain that 24/7 coverage until the media coverage reached a level that we thought we didn't need to, because we didn't know. We didn't know how much the media would follow, when they would start to slack off. Then we would not do the live coverage, and we would just put out a status report now and then, or daily, basically, and answer media questions, and have a way to interact with the control room so that we could understand what's going on. Then we'd have a commentator go over. We would do an hour update each day from the console about it.

So it turns out we got maybe three weeks into Expedition 1, and the levels had dropped to a point where we didn't think we needed to do 24/7 commentary anymore, and we could move to that. All of us at NASA had to adapt from what had been shuttle, which was short-term flights to long-term flights, so that was the communications adaptation of that. Three weeks or so I think as I recall that we were able to drop off and then just start doing an hour update each day. Then as station progressed, that moved on to not even an hour update each day, we're just doing a written report these days. But the communications between the crew and the ground still went out live 24/7.

ROSS-NAZZAL: Was someone still sitting on a console though?

HARTSFIELD: No.

ROSS-NAZZAL: No, you don't have anyone in MCC?

HARTSFIELD: No, but now, we don't have to, because also along that time when we got the new control room, and this was—hard to pin down the year though. But the year came where we could access on our laptops in Building 2 where you could be remote flight controller. You could do other things in your office, you didn't have to be in the control room, you could access data in your office, and you also, most importantly, had the voice system in your office so that if the flight director needed you, you could be called, and you could answer them, and you could listen to what's going on onboard. That was a huge productivity enhancement for us because you could take calls from media, you could do this kind of thing, but then you could also be listening to this.

ROSS-NAZZAL: So what might flight call public affairs for? I'm curious about that.

HARTSFIELD: Oh, just all the time. Well, an event that's coming up, if there's a media event coming up, they would call us for that. The crew might have a question about something that needs public affairs attention, so there's a host of things.

ROSS-NAZZAL: What are your memories of Expedition 1?

HARTSFIELD: My memories of it primarily are that it was a relief. All of my memories of those first flights, assembly flights of station and the first crewed flights, I know they weren't totally

smooth. But from the nightmares I had conjured up for myself in studying assembly and talking to people about assembly, and all this stuff about things that could go wrong, they were largely a relief. I guess my expectations were much more problem prone that we would have. So my overall amazement and relief at how smooth it was, how everything—I think engineers felt the same, to be honest with you. I know they knew, and they had measured, and everybody looked at that things would fit together, even though they weren't ever facing each other before because we didn't really do that prior to that. We had interface tests on Earth where the parts met and then it all worked, and obviously, the shuttle was a complicated machine, the most complicated machine to date ever. Station, of course, it wasn't at first, but as assembly continued, it obscures everything in complexity. The complexity of that vehicle, unbelievable amount of complexity there. Which makes it possibly more prone to problems, but it hasn't had them. It's been so smooth in regard to that. It has some issues here and there.

But it's been a great, great design by all the countries.

ROSS-NAZZAL: Yes, how did you get back to working on shuttle?

HARTSFIELD: So why did I get moved? I don't know, it was a philosophy in public affairs to move people around because I understood this as I moved into management, is that if you could reach the Shangri-la, which you never will, of having everybody having worked every job, then you got no problems on who you're going to assign to do what. You can surge all the time and all this kind of stuff, so it was just a regular thing that you moved.

So I did get moved back to working shuttle probably shortly after Expedition 2. It was 2001, something like that, I guess, that I went down—it was about the same time—so I worked

shuttle under several different program managers and station. Program managers I worked for in one capacity or another, and some of those programs were [Thomas W.] Holloway, Brewster [H.] Shaw, and [Ronald D.] Dittemore, I'm probably missing somebody. Leonard [S.] Nicholson, great, great guy. But when I took it on that point, Ron Dittemore was the program manager, and he was great to work with. He was a really good explainer to the media. He had a talent at being able to explain things to the media and very patient with them. He did rely on the communications folks to come up with what the media might ask him and give him what—he didn't call them talking points, what he wanted were thought provokers. So I gave him thought provokers before every briefing and before every mission, and he really appreciated those. I had to work to put together this because the thought provokers had what might be suggested answers to him, which he didn't always follow it a lot of times. So I had to go dig up the information on those.

One of the interesting things that he wanted me to work on heavily then too was a push, at the time, to extend the Shuttle Program's operations to see if it could be extended until 2020. Shuttle 2020, I think, was the terminology. I did put together a big fact sheet, and pamphlet, and a variety of communication materials talking about the shuttle and how it improved because it had improved over time. We had learned a lot. The glass cockpit, just a lot of redundancy added in a lot of systems. The safety record, actually, overall for the shuttle at that point, had gotten much, much better, the amount of problems between flights.

I'm not an engineer, I'm not enough to say whether that was because the problems weren't being pointed out or whether—but I tend to think that it was actually better. The one problem that resulted in [Space Shuttle] *Columbia* [STS-107 accident] was—we'll get into that in a second. So that was one initiative that we worked on a lot. The glass cockpit coming into being was a big thing then too because it was going to debut and fly, so people were super interested in that. The

public loves the shuttle, and I know now we have commercial crew vehicles, capsules, we're back to capsules.

I will tell you that this had always stuck in my mind. My kids, my son, kid, he's really the one. I would buy him Apollo capsule model at the [NASA] exchange store and this kind of thing. He would look at it and the Saturn V, and he'd play with it a little bit. But I'd get him a shuttle, he's running around the halls of the house, all up and down the halls making noises, airplane noises, flying it for weeks on end. There's something about wings, and it enchants people, and so shuttle certainly had that enchantment of folks. I'll send you this story because I did dig it up is I interviewed Dan [Daniel C.] Brandenstein. I think this was before the time frame we're talking about, but he had commanded more shuttle missions than anyone else at the time. I interviewed him about what it was like to command a shuttle mission and ended up really having a great story just about shuttle overall. To me, it embodies the spirit of what was felt by many of us at JSC about space shuttle as it flew. I'll send it to you.

ROSS-NAZZAL: Yes, I'd love to read it.

HARTSFIELD: So that's where we were when we got to *Columbia*, and I was still doing commentary, of course, supporting Shuttle Program and also doing commentary for missions. So everything you did was punctuated, even the station operations. You never got to just focus on that because you were punctuated by every couple of weeks having to go or every couple of months or so, having to go do a mission and being engrossed in that for 11 days, or 16 days, or what have you.

ROSS-NAZZAL: You were part of 107, so talk about that mission.

HARTSFIELD: So I was part of it from the outset, and just preparing for every other mission, and working with the Shuttle Program to prepare everything for 107. Because every mission, I had things I did to prepare for the briefings and what was going to happen. It was an interesting mission because it was like a laboratory flight, which we were not doing many of them because it was all assembly flights, maybe it was going to be the last lab flight. It wasn't going to station, so that made it interesting because every mission was going to station then. Of course, an interesting crew, too, with [Ilan] Ramon on board and others. So really, the first part was just that standard preparation, and then coming up on the mission, I actually coincidentally happened to be assigned to do commentary for it. What we were doing those days where the rotation was such that you would do a landing, and then you would do the next launch or the next two launches, then you'd do another landing or something. We had people rotating in and out, and somebody assigned me, but I wasn't assigning people, I was just assigned.

So I was assigned to do the landing, and the so mission starts, and I am the Shuttle Program person. So pretty quickly, Kyle Herring was the PAO that was going to the MMT [Mission Management Team] meetings because Kyle was on a special assignment then if he was at JSC, but he had taken an acting position as the headquarters public affairs person for Spaceflight Mission Directorate because they needed somebody to stand in for a while. It was great because Kyle and I had worked together for years and years and years. But he was going to MMTs, and I distinctly remember him coming back, and I guess it was the one after launch where they did the imagery analysis, and showing the video to me. We saw the foam hit, and we both were going, "We've never seen anything quite like that," and that was that. We were just going to follow it in the MMT

and listen to the discussions because we don't know what to make of anything. There's lots of stuff you haven't seen before. In fact, that's one of the things about the job.

Then I do recall that we got a question from the media about it, and I think it was before that, but the decision was made that I should do a response to query about it, about the foam strike. That is a thing where we anticipate questions from the media, and we go try to find out all the details and the factoids to answer those questions, and we work with the program to do it. I worked very closely with the program and Ron to develop that response to query, and it was essentially what everybody knows is that they did not believe that it caused any significant damage or hazard to the crew.

It may have caused some tile damage, but not something that would have been significant. It was used, it was asked about in a press conference, and we actually gave the crew a heads-up because we thought that. Because I would tell them they need to tell the crew, our astronaut PAO could send messages to the crew about it because it was making news here, so they need to be ready. But, again, that it was not a concern for landing or for safety. So that's what happened during the mission and tracking it that way. It was a discussion going on in the MMT, but it was pretty much resolved and put to bed.

So then I come in for landing, and then when you come in to do landing commentary, you come in the day before with the team. The landing team comes in, the entry team. Some of the entry team members are on orbit one shift the whole mission, but some are special just for entry and we treated it as that for communications. We got a special shift for them to do entry because we were training who were on orbit one to advance in their commentary and become launching and landing commentators, which is the final pinnacle of it.

So I came in the day before landing, normal shift. The most intriguing and interesting thing about the landing was that it was going to go across the whole continental United States in the early morning and be visible to a dozen states, and actually go straight over my hometown, Waxahachie. So I spent a lot of time plotting out when it would be where, so that during the commentary, I could report to people, and in advance, we could report to people when you could watch for it, when you could see it. I actually sent a note to my mom, too, to tell her because she was living in Waxahachie still and say, "Hey, it's going to be going over there about 8:00 a.m. if you want to go out and watch it," because she was my biggest fan. She had tapes and tapes and tapes of me recording on CNN, doing commentary and things over the years.

ROSS-NAZZAL: Oh, that's great.

HARTSFIELD: She ended up sleeping in, which she never did, but I'm so glad she did, and she didn't get out to see it, but it went right over my hometown. Then the next day, come in, and really, it's that focus. Of course, it was a Saturday morning, too. So I already knew from experience, because I'd done a lot of landings by then, I don't know which, I guess, 18 or 19, because that was the next to last landing I did maybe. I knew it was going to be quiet from a media standpoint because the media don't cover stuff on Saturday morning. The only thing they cover less is Sunday morning, you know?

ROSS-NAZZAL: Oh, I can see that.

HARTSFIELD: It was just a really quiet Saturday morning. At 2:00 a.m., I show up for the shift or maybe it was 1:00 a.m. Just another shift in a very quiet Saturday, and everything normal, exciting stuff about it going over the continental U.S., so I'm calling out all of that. I always did the same thing that I always tried to do, too, as I talked about on launch commentary, landing commentary the same, to just explain the complexity involved with the landing. The shuttle transitions from spacecraft to aircraft in a very subtle way, and there's no other machine that's ever done that. It's an amazing thing that it does, and to explain that and to explain the way it dissipates speed as it enters the atmosphere and all those things, it's just really—if you hear my commentary, it's what I'm trying to do, you can hear a lot of it.

But it's crossing the coast, and it's over the continental U.S. and the Midwest, we get the call about the sensors in the landing gear well, I think it was. And immediately, of course, in my mind, and I'm sure everyone's mind in that control room flips back to the debris hit and the tile damage. Even though it was not a concern, of course, you're going to think about what could that be, what's going on. Even more so as LeRoy [E. Cain], who was a magnificent person to work with, and I had worked with not just as flight director. On all the times of working in shuttle, 80 shuttle missions, he was in the trenches. A large number of leadership came from the flight dynamics officer, and trajectory, and trenches. They would call it the trench down there, the first rows there at mission control. But anyway, I worked with LeRoy a lot. He's asking all the questions as they do, and he goes, "No commonality." That really is a trigger of, wow, okay, that's very intriguing that there's no commonality. Still not thinking there's a big concern, of course, though, but your mind does go back to that.

I had prepared because we were concerned that there could be tile damage that would be visible on *Columbia* after landing, and I was going to have Linda Ham on after landing to ask a

couple of questions about—we always did this. Instead of having a press conference, what we've gotten to is having a Shuttle Program representative on console after landing to ask a couple of questions about the flight, to give the media what they needed in a final quote. In the questions for her, if there was a tile damage visible, I'd put, "I'm going to ask this about it," and she can answer that it was not a concern, we'd had that as a possibility. But, again, there was nothing to really trigger that this would be an issue, but immediately, it came to mind.

I'm still going through landing activities, and then you have the communications cutoff, which is not necessarily unusual, that we were in the middle of a role reversal. A bank by the shuttle is when you lose comms [communication] at that time from the plasma, it's very big, and the antenna changes direction, so you lose comm. It's a sharp cutoff usually, especially if the crew is saying something, and it just goes like that. To somebody who's not in there all the time, it could be unnerving, but you hear it all the time in the MCC. So standing by, and they're calling the comm checks after a while.

Then really the trigger was that we were within just a minute or two of moving into range on the Merritt Island [Florida] radar. Because radar tracks the shuttle during its descent too from the ground communication stations and use it as verifying that the on-board navigation is accurate, that you're getting in telemetry. So it's moving, and you're going to pick it up on radar. Whether you have communications with it or not, the ground radar will pick it up and tell you where it is and how fast it's going. It didn't show up on ground radar right way, it was delayed, which does not happen, and then the GC [Ground Control] said to LeRoy that the ground radar was picking up multiple targets. That's when it triggered for me that this is a very bad day.

I just had a job to do, I had to keep doing the job, and there was no conclusions yet, I couldn't say anything, I wouldn't say anything there about it. All I could do was report the last

status. Where it was the last time we had communications, the altitude, the velocity, the geographic location, which was above North Texas, really above my hometown, pretty much. And then keep that up until we got to the point where it's obviously not in sight at KSC, and we know things are going.

Then at one point—our PAO console is right next to the management console where mission management sits in the room at that time, which was a really handy thing because we could confer, although I would not have conferred it. They came to me and said, "You need to maintain that," that LeRoy declared a contingency. So then I reported that we declared a contingency in the room, and that the doors were locked, and that we were going to seal off data, which is all part of the normal contingency plan. Very quickly, the management came to me and said, "You need to also start telling people that debris is falling over East Texas, and it's really important to tell people not to approach the debris." Because it didn't happen, but it's a miracle in my mind that it did not happen because the propellants on the shuttle are just about as toxic as anything can be. So people could easily have approached a piece of debris that could have killed them or made them very sick. So it was to tell people to stay away from that.

Maintained that regimen for quite a while, and didn't really give any forward plan for a press conference or anything. I was in communications with the newsroom back and forth, Kyle is sitting in the newsroom. This is something I need to point out, too, is while this is happening and while we're losing comm, Kyle calls me on the loop and says he's seeing on CNN footage from Dallas of the debris entry in multiple parts, so we knew certainly then what's going on. We worked up a statement together because that's the contingency plan for communications, a statement, that we put out a first statement that just said really what I was saying on commentary about the last status of the vehicle when we lost communications.

He got a call from CNN, and he got put on live, so he had to work through that interview. I didn't talk to him anymore after that because he was busy. But we did confer that we need to call everybody in because there was only like one or two people in. It was a Saturday morning, the media was asleep, and we knew everything was coming down.

ROSS-NAZZAL: Were you updating LeRoy as you were hearing this?

HARTSFIELD: No, I didn't talk to LeRoy during this time. That's one of the things when there's a situation and—not a situation, that's drastic—any situation where the flight control team is concentrating on a problem, I'm not going to go bother them while we're in real-time ops. I'm going to talk to LeRoy later that day or later on, but not while it's in the moment. Because we need to know enough about our job that we know what we're doing, and we don't have to bother someone, because the public and what the public's thinking and what the public's doing matters not at all at that point. What they need to pay attention to is the vehicle issue that they're trying to work.

Now this one is unlike anything you had trained for, because they make it a very big point in simulations to not train for a scenario that you can't win. It's negative training is what was always explained to me to do a sim where there's no way to succeed. So flight controllers are always trained that you're going to find a way out. There's the grief and the devastation of that; it's your responsibility that they should come home safe.

Now, I was not a person that matters in that, but you're so connected to the team that you feel all those things just the same. You can't let them show, I've still got to talk. It's the training I would say is [the reason] I was pretty calm that day. I don't think people are trying to pick up

stuff in my voice. Sometimes in the past, maybe there's a little bit of crack here and there, but not much, and I give that credit to the training, going through all this stuff. Like I said, when they're piling on problems, and you're talking about them, it creates that atmosphere. Also, you've got a job to do, and there were people on the ground that needed to know things to be safe.

So anyway, we get to the point where we sign off commentary because it's there. Ron is in the room, he comes to talk to me, and he said, "This is our worst nightmare," and I think that's what he said. I said, "Yes, I know," and he said, "I'm going to need you to help me with some plans for the press conference, which I had not thought about until he said that. That was a whole other layer of thing to it.

So we're in the room for a while, we had to secure all our notebooks and all the stuff that you do for that, and they get confiscated and taken away. Then they have the first MMT meeting, which was a recovery meeting, and at the time, the meeting is right across the hallway from the MCC, and the MCC, the room was right across the hall. So I go over to that, I'm going to be the rep in that. Kelly Humphries was with me on console, by the way, because he was training for a landing the whole time, so he was helping me some, too. He would talk back to the newsroom. I don't want to forget that.

ROSS-NAZZAL: I thought I could see him in photos.

HARTSFIELD: Yes, yes. But I went to the MMT, and he went back to the newsroom or went back to talk to the newsroom. I'm in the MMT, and it's about recoveries, it's about setting up stuff in East Texas and trying to handle all of things you have to handle there. What was most emotional

for me probably, probably the biggest emotional moment of that day was—I distinctly recall that in the room, it had the tube televisions back then, you know?

ROSS-NAZZAL: Yes.

HARTSFIELD: There were no flat screens up, in the corners, and they usually had like the MET [Mission Elapsed Time] clocks on them or something, but they had the news on them, they had CNN or something. The President came on to announce the crew's passing, the loss of the crew, and they stopped the meeting. They turned up the sound for everyone, and it was just so silent and so somber. That was probably the most emotional part of the day because I didn't have much time to think until then because that was a difficult time.

Shortly after that, Kelly comes back and just comes up to me with a message. He says, "Hey, before you give any points or guidance to Dittemore, headquarters wants to see everything you're going to tell him." I told Kelly, I said, "No."

ROSS-NAZZAL: May I ask why?

HARTSFIELD: Because there wasn't time for that process, number one, and I said no, and I said, "Tell headquarters that what I'm going to tell Ron is to tell the world everything he knows."

ROSS-NAZZAL: Wow, okay, to be transparent, yes.

HARTSFIELD: So you don't need to say anything, because that's what he's going to do, and I knew he would, and he did. I put together some points, and I did make it a point there to talk about the debris and the things from East Texas. There were things that he might not remember to do. The foam strike, there was a foam incident previous to that, just to mention what he knew about it. He pretty much followed all of the things. It was obvious what he was going to say if he was going to talk about everything.

They asked me if I wanted to moderate that press conference with him and Milt [Milton] Heflin. We didn't want Ron to go up there alone, so we were struggling with who should go. Milt's a wonderful person, and we thought that would be perfect to represent. Because what you would normally have had—maybe that was the flight director—but LeRoy, we're not going to do that. So Milt to go with Ron, and that was a really good combination, and you're not going to put somebody alone there. They asked me if I wanted to moderate it. I was too drained, I didn't want to do it, so I asked Kyle to do it, so Kyle moderated it. I left, I'd been here like 12 hours by then, and I couldn't go home, I wasn't going to go home. I said, "What can I do?" So I went to Sonic, and I sat there, and I listened to the press conference on my car radio, the whole thing.

I remember Ron's first words saying, "We are devastated," which could not have been a better word to use. There's a lot of criticism about, did we know what was the cause of the accident from the minute it happened, and that's not true. We knew that the foam strike had happened, but they had analyzed it, and the foam did not seem like it would have been the problem. In hindsight, everything is obvious in hindsight, everything is always obvious in hindsight, that's the devil, right, is if we all had great hindsight, we'd all win the lottery. The media love that, the media love hindsight, they play it to the hilt and basically use it as blame that you weren't as accurate in foresight as you are in hindsight, which is totally impossible.

But he said everything he knew at the time, so I thought they did a really good job that day, and we were very open. It was very different than Space Shuttle *Challenger* [accident, STS-51L], which was important, and I think there was a different reaction from the media and the world in large part because of that. I think that's a lot because of the communications honestly. It was a team effort on everything, but I do think the communications really helped us in that regard because, honestly, for that first week, we were very open. We had press conferences here with Ron for the first week until the CAIB [Columbia Accident Investigation Board report] really came together and took over everything as they were supposed to, which was a great thing to follow. But Ron was very open with everything then.

He had foam he passed around and showed to people. Some people have said that we shouldn't have speculated on things, but I thought speculation was important. Because actually, everything you know is the right thing to say, and that means even things that you could or could not have been the case. I loved one thing he said, and I don't think this was in the press conference, but in talking to me, which has always stuck with me ever since was—and it's something you hear a lot. But people were trying to blame certain people in the Shuttle Program, not going to names, but they were trying to pin it on people.

Ron had not been there, and this was the first time he was going to be out of town, I knew that. He told me he was going to be out of town during the shuttle mission. It was the first time, but he had a thing to go to, and he was going to go and leave it in other hands, and he did. But I don't think it would have been any different had he not, but they were trying to blame it on some people. He said to me as we were talking about things is, "We succeed as a team, and we fail as a team," and I think that was a great truth because nothing here is individual. Astronauts will tell

you that if anybody takes individual blame or credit, it's astronauts, but they know it's not them, and they point that out every time. The media doesn't like that; the media likes individual faces.

But that first week was very busy. We put together a little team of me, Kyle, Ed [Edward] Campion, Dave Drachlis from Marshall [Space Flight Center, Huntsville, Alabama] was here, Ed Campion from headquarters was here. Anyway, what we would do is we would go through all the clippings of the media from the day before early that morning. We would go meet with Ron in midmorning, having analyzed those clippings about what the big things were in the media of interest that day that they might come up with asking. We would meet with Ron, and he would tell us—and others there in the little meeting would tell us—this is specifically for communications, this meeting about what was evolving with the accident investigation, with the recovery, with this kind of stuff, and what notes, so that we could then pull together a plan for the press conference that would happen in the afternoon. We would go meet with them again about an hour before the press conference with information that we had assembled from all of that, combining it together, and then he would go do the press conference.

He was very open. We didn't allow anybody to speak to the media except Ron for a while, then we slowly started to add people. Ron was pretty much in charge of who could talk or who couldn't because headquarters had delegated that down to him for the time. So we had astronauts being spokespeople for a little while. The whole recovery effort was being set up in East Texas. Kelly ended up going to Lufkin [Texas] as one of our primary PAOs for all the recovery effort that was going on there because they were getting local media, besieged by everything, and that was very good. So we were in contact with them to help, too, because we had a big job of informing East Texas.

This is one of the things I've always said in contingency communications, is you need to tell all audiences the same thing. We had certain audiences that we needed to talk to the people in East Texas, we needed to talk to the general public, we needed to talk to the international public, the crew members that were on board this *Columbia*, and of course, to Washington, but really, you got to tell them all the same thing. You can't say anything different to anyone because, your credibility will go away.

ROSS-NAZZAL: Oh, yes.

HARTSFIELD: So we had a team, and that's the regimen we followed. I don't know who came up with that idea for that team that night after *Columbia.* We just pulled that together to go do that each day. It worked pretty well, and then the CAIB took over. Dave Drachlis became the PAO for the CAIB. They let NASA PAO be their PAO. Admiral [Harold W] Gehman [chairman] was constrained in his amount of communications he wanted to do because he had an investigation underway. Nothing was foregone conclusions in the investigation. Media were jumping to foregone conclusions, but the investigation didn't want to do that and shouldn't have done that, and it was absolutely wonderful the way they didn't do that.

So through that whole process, the foam was a leading suspect, but it was not convicted until the testing out at [Southwest Research Institute] San Antonio, [Texas]. Those series of tests, there were a lot of tests. I went out, we would send PAOs out there sometimes, because sometimes media wanted to go, and we'd let media go in sometimes for these, not all of them. I went out to one set of testing, and it was uneventful. The foam just shattered, nothing happened because they

were changing the velocities and changing what they were shooting at, tile, and then it reinforced carbon-carbon [RCC]. Kyle was out there.

I actually took vacation because it was quite a while later in the summer at some point. I think it was warm enough that I took a vacation because it was just my son and I. We went on a swimming tour of Texas to all the various swimming holes. We're driving in the middle of the country somewhere, and Kyle was in San Antonio at that test, and he called me, and he was breathless. He said, "They just shot the foam at RCC, and it shattered the RCC." So that was the test everybody knew, that was the most consequential one.

ROSS-NAZZAL: Yes, I remember that.

HARTSFIELD: Certainly a gut feeling, and I'm trying to remember if Ron was still up here by then or not. He left during the investigation. I think he left after that, and then Wayne [Hale] stepped in, and Wayne had been part of everything for a while anyway and a wonderful person, Wayne Hale, and also very good with the media and with communications.

At that point then, it was to wrap up the investigation and to do the communications we needed to do about that, and to develop what was going to change for return to flight. I know you know all that, so I'm not going to go into everything that happened there, but I will say this. That what has always struck me, and maybe it's because of my history, is the Rockwell book, the 800-page shuttle book that I read on the beach for the first time at Jack [John E.] Riley's bidding. I remember being struck right away by this, "Why do they have so many backup systems on the shuttle?" Because everything, everything is two-fault tolerant, I mean two things can fail, and you're still fine. Some things are three-fault, and some things are four-fault tolerant if it's critical

enough. I don't know, somebody has the number right, but it must be a million sensors that tell you temperatures, pressures, everything about every pipe, every piece of wire on that vehicle. All of this can be seen in real time, by the crew, by the ground, by everyone, except for the heat shield, there's no backup, and there's no insight.

I never thought about that until *Columbia*, and I guess maybe other people hadn't, I don't know. But it strikes me that a spacecraft like that, and honestly today, it's the same way with heat shields, and maybe there's no way to have insight. But you know what? What happened after *Columbia* and before STS-114 is we developed a way to have insight. Did we have a way to fix it? Maybe. Maybe. Fortunately, we didn't have to try it, but we had a way to have insight, and we had a plan to do something if it was a problem. So you never would have had a repeat of *Columbia*. That was definite after *Columbia* and after the changes made before the Return-to-Flight because we would know, we would know what the status was like. It wasn't that hard to come up with a way with the boom and with the inspection.

Of course, hindsight is so easy, we would look back and say, "Well, we should have had that all along," but you just—it's not fair to do that to yourself. But it has always amazed me that there's that level of insight and redundancy on everything in that vehicle except for the heat shield, which is the big blank spot in both regards of any kind of backup and any kind of insight into its health.

ROSS-NAZZAL: Yes, that's a good point. I guess they thought it was pretty durable, tough.

HARTSFIELD: I think some of the challenge is to have a good way to have insight into it without introducing greater risk of it failing. You can't really put sensors there, I don't think, there's issues.

The inspection process may be okay, but every shuttle didn't have an arm always and these kind of things. Then there wasn't a station, so the solution was certainly very situation specific that we came up with to the times would not have been good for the whole program, but still, it would seem to have been an engineer designer's nightmare.

ROSS-NAZZAL: Yes, well, I hate to stop here, but it's a perfect time.

HARTSFIELD: Okay.

[End of interview]