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ORAL HISTORY 3 TRANSCRIPT

NEIL B. HUTCHINSON
INTERVIEWED BY JENNIFER ROSS-NAZZAL
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ROSS-NAZZAL: Today is January 21st, 2004. This oral history with Neil Hutchinson is being conducted for the Johnson Space Center Oral History Project in Houston, Texas. Jennifer Ross-Nazzal is the interviewer, and she is assisted by Sandra Johnson and Rebecca Wright.

Thank you so much for joining us this morning. I know we've been trying to do this for about a year, as you've pointed out. We'd like to start by asking you what were your roles and responsibilities with regard to the Flight Operations Integration Office?

HUTCHINSON: Well, the flight operations, I was actually the Deputy in that office and [M. P.] "Pete" Frank was running the office. The Flight Operations Integration Office was an office composed only of Flight Directors. At that time there were only about a half a dozen of us. We were coming off of getting the Shuttle going for the first time, and that office's job, of course, was to lead the development of flight rules, which is something that the people in the control center use to manage the missions. The office also ran the flight techniques activities, which developed the ground and crew procedures and built checklists and the like for various phases of flight in the Shuttle.

The office had been put together—, I think back in pre-launch [era of] the Shuttle the first time, I think we just called it the Flight Directors Office and, in fact, it's really—even today, I think, there still is one and I think it's still sort of known as the Flight Directors Office, although it has some formal name, as you just said.

There weren't very many of us in there. It was not really a structure in which you managed the people in there. I mean, herding Flight Directors around is kind of like herding crewmen around. You don't really do that much. They all are kind of very senior people who are leaders in the flight operations business.

So my role there, I was the number-two guy in that office, but the fact is that I was more a member of the team of Flight Directors, of half a dozen of them that were doing business at that time as leaders of the teams that were flying the Shuttle. It was the last thing I did in—it's called MOD now—the Missions Operations Directorate, in which I had spent most of my career at NASA, starting way back in the beginning.

ROSS-NAZZAL: Then you later went on to work as an assistant for the Center Director.

HUTCHINSON: Yes, I did. In fact, I did that a couple of times in my career, once here and then once right at the end, just before I left. My job there—well, let's see. A couple of things. Chris [Christopher C.] Kraft was the Director of the Johnson Space Center at that time and Cliff [Clifford E.] Charlesworth was his Deputy. I had come off of about five years of very intensive work having to do with launching the Shuttle for the first time, *Columbia* for the first time, and then launching it for the first time for the second time. It was the first time we had ever reused a vehicle.

We started a concept called lead Flight Director concept on the third flight of the Shuttle. Again, it was *Columbia*, and I was the first lead Flight Director. By the time I got through that sequence, which started, really, in 1975, when we finished Skylab, and then we tried to launch

the Shuttle a whole bunch of times before we finally got it in the air, but [when] we launched it finally in April of 1981, I was ready to go do something else.

Chris, over all the years, had had a process where he had a—we called them "horse-holders." That's kind of an odd term. It's not meant to be a degrading term; it's kind of an affectionate term, in which they would take a person out of the line organization and move them up to the ninth floor of Building 1, and have him carry Chris' briefcase. And, of course, I'm not even sure I was capable of carrying his briefcase, but the fact of the matter was, I went up to that office to be a horse-holder. I was one in a long string of people. I actually reported to Henry [E.] Clements, who was the Associate Director at the Center at that time. "Pete" Clements. Everybody called him Pete. Pete Clements, Henry Pete Clements.

A couple of very difficult things happened. We had a structure at the Johnson Space Center where we didn't really have a formal succession plan of who was going to be the next Deputy and who was going to be the next Center Director, but rest assured, locally it had already been decided. At that time, Glynn [S.] Lunney, who is a former Flight Director and who at that time had just, I believe, gone up to run the Shuttle Program—I might not have his title exactly right, but he had taken over from Bob [Robert F. Thompson]. The original set of guys, Bob Thompson, Aaron Cohen, and that group of guys who worked the Shuttle Program as the vehicle was being built, after the first couple of flights, there was a lot of change, and they were all tired, too. Everybody was looking to get regrouped, me included.

I went up there to be Chris' horse-holder and some things happened that were very difficult. Jim [James M.] Beggs was the NASA Administrator, and they were working on a process that eventually resulted in Rockwell [International Corporation], who built the Shuttle, not being the company who was operating the Shuttle out of [Kennedy Space Center] Florida.

Chris and a lot of other people, me included, were very uncomfortable with turning over this very sophisticated, one-of-a-kind, hard-to-understand, complicated piece of hardware to a contractor, to turn it around between flights, who had not built it. I probably am not privy to the kinds of decision processes that went on, but Chris lost his job.

Chris had a process in place that was—I mean, Chris was a reemployed annuitant, and he certainly was ready to go not be the Center Director anymore, and Glynn Lunney was sort of the anointed one. Everybody knew it.

Unfortunately, my own involvement in that process was that Jim Beggs decided that he really was very determined that there would be a new structure in Florida to turn the Shuttles around and that it didn't necessarily need to be Rockwell, and they kind of parted ways on that subject. Again, I'm not privy to the intimate details, but in the end, Chris left NASA, and I got the unenviable task of being the Center Director's horse-holder when we changed Center Directors. And because of Glynn's very close relationship with Chris and obvious allegiance to a lot of the things Chris believed in and, of course, came up through the system—mine, too, by the way, which is kind of interesting. I was probably too low in the pecking order for them to worry about my ability to influence things. I got the job of introducing and reacclimating the new Center Director, who was not Glynn Lunney, and that was a very overt move on the part of the leadership of the agency.

The new Center Director was Gerry [Gerald D.] Griffin, who had been, and was and still is, a very close personal friend and a terrific guy, but Gerry was out of government. He had been the Deputy at Dryden [Flight Research Center, Edwards, California]. He had been the Deputy at the Kennedy Space Center, as the Deputy Center Director, and he'd left the government and I

believe he was out of the government at the time, and he was asked to come back by Jim Beggs and take over the leadership of the Johnson Space Center.

That was a very difficult time for all of us, because Glynn and Gerry were good friends. They grew up as Flight Directors together. There was a great deal of difficult feelings. I mean, you can imagine Glynn Lunney, who literally had been nurtured—nurtured is the wrong word, but he had grown up through the process and, there was no announcement that Glynn Lunney was going to be the Center Director or anything like that, but everybody knew that was the case. And all of a sudden, Glynn had to play second fiddle to a guy who had left the agency and who was coming back from the outside. And I was right in the middle of it.

ROSS-NAZZAL: Can you tell us about some of the challenges that you faced with this change of guard?

HUTCHINSON: First off, Gerry was not looking for a job. Gerry had to put his stamp on—anybody that's in that chair, I mean, "Beak" [Jefferson D.] Howell, Jeff Howell, who's there now, is putting his stamp on it. Anybody who's there has to be King and, you know, the King is dead; long live the King. Chris went to work for Rockwell, despite the fact that Rockwell was going to end up out of the Shuttle turnaround business, because, of course, Lockheed [Aircraft Corporation] was the successful person who ended up with that business at that time.

Gerry came in and exercised his appropriate leadership skills that you have to do in that job, and we had a really rough six months. I guess I'd have to say that a lot of the leadership, down one level, of the directorates of JSC, resented Gerry because they kind of thought he took Glynn's place. Glynn had to sit there in staff meetings as the head of the Shuttle Program and

take directions from Gerry. I mean, Gerry isn't ordering people around. But I can remember some very difficult meetings.

However, to the credit of that whole crowd, including—[Eugene F.] Kranz was still there at the time, Griffin, Pete Clements was there, although he was leaving. When that happened, Cliff decided to retire, because the obvious thing that Chris Kraft had set up, he put Cliff in the Deputy job to begin with. See, Cliff and Glynn, all the way back in Mercury, had been together their entire careers at Johnson. When Glynn was running the Flight Dynamics Branch, which was my first big job in Flight Operations, I worked for him, and Cliff was the Deputy Branch Chief, and they had just gone kind of stepping stone all this way. So Chris installed Cliff as the Deputy and then, of course, Glynn was going to be the King and they would continue on their relationship.

When Gerry came in, Cliff decided he didn't want to be involved in that kind of a framework and he left, and they brought a guy in from the outside, by the name of Bob [Robert C.] Goetz, I believe, was brought in as the Deputy, and he was from another field center, didn't have any human spaceflight experience and did fine, but mostly Gerry ran the show.

Eventually, to the credit of all those people, Glynn Lunney, Chris—of course, Chris was trying to advise everybody to calm down. And people, to be quite honest, resented—I'm sure you've interviewed him a lot of times and whatever, but he is what I guess I would describe as an idol, almost. Most of us, particularly the group of people who grew up as Flight Directors, not so much anymore, but back then, we all figured we owed everything we had to him, and it was very, very, very hard to see him kind of summarily dismissed.

Chris carried on. Chris never blinked an eye, to be quite honest. He went to work for George [W.] Jeffs at Rockwell and had more fun doing that than he had running the field center, and stayed at Rockwell till he decided he didn't want to work anymore.

So in the end it all worked out, but to the credit of the people who were still there and having to deal with it day to day, I have to say that eventually we all figured out how to get along. We all figured out how to carry on and keep the Shuttle flying. There was a lot of talk beginning about trying to get a [Space] Station started and so on and so forth. So it all worked out. I was probably better for the experience because I got to sit there and watch that whole thing unfold from the inside looking out, and I probably did a lot of fence-mending among the players over that time period that I certainly never would have had the opportunity to do if I hadn't been in the position.

ROSS-NAZZAL: What other assignments did you work on while Griffin was Director?

HUTCHINSON: I eventually ran the Space Station under Gerry Griffin.

ROSS-NAZZAL: As his assistant.

HUTCHINSON: Well, that's another interesting story. I didn't stay there very long. I can't remember the exact timing, but Chris didn't just walk out the door when I showed up. The transition between Chris and Gerry happened about halfway through my tour as a horse-holder, which those things generally lasted about a year. I did not do it for an entire year, because

Griffin, in his infinite wisdom, decided that one of the things that young Neil didn't have on his ticket was working at NASA Headquarters, [Washington, D.C.].

I don't remember the exact timing, but Gerry asked me to—well, there were several things going on at NASA Headquarters at the time. One is I'd gotten to know Jim Beggs in the process of this Kraft-Griffin transition. We had a guy running Code M by the name of Jim [James A.] Abrahamson, an Air Force general who used to be a MOL [Manned Orbiting Laboratory] astronaut—didn't ever fly because that program got cancelled. Jim—"Abe," as he is called by most people who know him well—needed help up in Code M and Gerry saw a chance for me to leave the field center for a while and go get another ticket punched, and so I did.

Once Gerry got installed and we kind of got the system rolling down here and he got into a comfort zone in terms of his—I mean, I wasn't necessarily responsible for his comfort zone, but we kind of got things back on an even keel. I left and went to NASA Headquarters. I packed up my family and rented out my house and I moved to McLean, Virginia, and went to work up there.

ROSS-NAZZAL: What were some of your main assignments as the Director of the Space Shuttle Operations Office?

HUTCHINSON: You mean at NASA Headquarters?

ROSS-NAZZAL: At NASA Headquarters.

HUTCHINSON: I went to work for General Abe and I had all the [Shuttle] divisions, since my background, I came out of Johnson and I certainly knew the Shuttle vehicle technically inside and out, because of my Flight Director tour. I had reporting to me five divisions at NASA Headquarters that comprised all of the piece parts of the Shuttle. It was a Main Engine Division and an Orbiter Division and a Level II Division and an SRB [Solid Rocket Booster] Division. So the organization structure that Abe had that ran the Shuttle Program—and "ran" [I] put in quotes, because the program's really run by people in the field, not by NASA Headquarters, but NASA Headquarters has a very big obligation to do budgets and so on and so forth.

So I was kind of the number-two guy to Abe. I was not an Associate Administrator or anything. I was a—I can't even remember—director of something. But I had all those divisions reporting to me. My big job up there basically was nontechnical, making absolutely certain that we had the budget processes sorted out. I went through two what's called POP's, Program Operating Plan Cycle, which is "NASAese" for the way you get the budget together for the next year.

There were a lot of things going on in the program in terms of we were still having troubles with main engines blowing up and [turbine] blades cracking, and we still had some fairly serious tile problems on the Orbiter. So I got involved in the budgeting, not so much in the technical solution, but making sure that the right kind of money flowed and we had the right emphasis on things that could hurt us badly in the program. I spent a little over a year up there.

I spent a lot of my personal time working on the Civil War, which was fascinating to me. If you live in Washington, D.C., and haven't paid attention to that, I think you're really missing something. Anyway, that's neither here nor there.

So I drove down to NASA Headquarters every day, and a couple of things that did for me, I got a much broader appreciation of NASA Marshall [Space Flight Center, Huntsville, Alabama] and NASA Kennedy, because both of those places are absolutely integral to the health and well being of the Shuttle. I made a lot of new friends. I think at the end, Abe was pretty unhappy when I left. He really, really, really—because he stayed on for another year or so before he went off and did the Star Wars thing— [wanted me to stay]. I, later in my career, ran into Abe, after I'd left the government, where he was still in the government and I was on the other side, a kind of interesting thing; it's not a part of NASA history.

But I really enjoyed my time up there mostly because it was so different than working at a NASA field center. It gave me a perspective that it's almost impossible to get unless you go do it. NASA Headquarters is a very strange place. Number one, and I don't mean this in a derogatory way, but all the brains in NASA are in the field. The field centers have all the technical horsepower, and it's very, very hard for people at NASA Headquarters to insulate—one of their jobs is to insulate the field centers from the Congress and from the administration. By insulate, I mean run interference for them, because when something goes wrong, the Congress raises its hand and it's going to have an inquiry or you want to reprogram some money because you need three extra SRBs and the Congress won't let you. And the idea of NASA Headquarters and one duty that it serves really, really well is insulating the real technical [work]—letting NASA's field centers get their job done without constant interference from the administration and the congressional interfaces.

One thing that that does do—I always felt like I worked fourteen hours a day, six days a week up there, and you kind of look behind you, looking for a trail of cookie crumbs and it's really hard to find it, because it's the problem *du jour*. Constant fire fights. Some congressman

doesn't like something that's going on in Mississippi and they call the Administrator, and it's a Code M thing because somebody asked Pratt & Whitney [Corporation] to take their engine people out of Mississippi or something. I mean, I'm making all that up, but it always seemed like everything was done not in a panic mode, but in a very reactive mode, very hard to get ahead of the power curve at NASA Headquarters. And after you were all finished, you asked yourself, "Well, now, did I accomplish anything?" And the real answer is, "Yeah, you kept the field center insulated from all that flak that comes into the agency from the outside."

But that answer's kind of hard to come by when you're there doing it and you're used to seeing technical progress or going and flying a mission. One of the things about Flight Operations that's very unique is that you train and train and train—and the same would go for a crewman—you train and train and train and then you go fly a mission, and if it's successful, you get an instant feedback, instant reward. You pulled it off and it worked and whatever. The reward system at NASA Headquarters is hard to come by. I could never, in a thousand years, would not want to work there as a permanent tour, because you just work your butt off and nothing seems to happen.

ROSS-NAZZAL: Give us a sense of how, if at all, working at NASA Headquarters helped prepare you to manage the Space Station Program.

HUTCHINSON: Many things. When I first went up there, I don't think Gerry had any Space Station thing in mind or anybody else did, for that matter. But several things. One is, you are in daily contact with—at least in the position I was in—you're in daily contact with the NASA

Administrator, the AA [Associate Administrator], everybody that is in the decision-making chain in that agency. That's one.

Two is, you get a much better appreciation for the budget process and the priorities that have to be played between field centers. Like, Code M probably runs—I'm probably not going to get this number right, but I'm going to guess two-thirds—50 percent of NASA's budget—five, six, seven billion dollars, is executed out of the Human Space Flight, Code M, framework up there. So, when the Kennedy guys raise their hand and say they've got to have a building fixed, and the Johnson guys say they need to test some RCS [Reaction Control System] more, and there's only money to do one, you learn how to work the priorities from a programmatic standpoint between those people that put demands on the system. Learned the budget cycle really well, and probably the biggest lesson of all, learned how to use Headquarters, when you're in the field, to keep the rest of the world off your back.

All that was all good lessons learned. At the time, shoot, I just plowed into it. I'm saying all this in a retrospective manner. I wouldn't have thought that when I did it, I was learning that stuff. But I did.

Another thing that was really good was, I had a lot to do with the leadership and the programmatics of the Marshall Space Flight Center, and eventually, of course, they had a major role in Space Station, and when that role started, I knew everybody in that food chain over there—the Center Director, who was Bill [William R.] Lucas, the deputy, who was [T.] Jack Lee, the whole food chain of the leadership of another field center, who was going to be a major player. And I obviously knew the people at JSC. I'd lived my whole life there, and I'd spent a lot of time in Huntsville in Skylab. I used to go back and forth every week to Huntsville back in the seventies.

But I got a much better appreciation. I can make the same kind of comment about Kennedy and what was going on down there in launching Shuttles and the way the OPF [Orbiter Processing Facility] worked and all those kind of things. You got a better understanding of that. So, getting a much broader, better picture of non-JSC pieces of NASA was of great value up there.

ROSS-NAZZAL: How did you become involved with the Space Station Program?

HUTCHINSON: I was at NASA Headquarters and people were starting to sniff around about Station. I'm not quite sure of the timing, but, in essence, Gerry—and I have to attribute this to Gerry. I'm sure a lot of other people had a vote. I mean, Jim Beggs had *the* vote. But Gerry decided that if we were going to stand up a Station Program, I'd be a good guy to lead it. So when I went back to JSC, very shortly thereafter the program was initiated. There was a lot of political maneuvering being done by Jim at the time, with the [Ronald W.] Reagan administration trying to home in on how much it was going to cost, which is another interesting story.

I went back to JSC and we almost immediately started to stand up the Station Program and, of course, it had some people at Headquarters, that again, people I'd gotten to know, like Phil [Philip E.] Culbertson, and they brought John [D.] Hodge back, who was an ex-Flight Director, one of the original three, by the way, who'd been gone from the agency for a long time. He worked at the Department of Transportation up in Boston [Massachusetts] for many, many years, had come back. Phil Culbertson was a major player in the Station leadership framework at NASA Headquarters.

And, of course, the Shuttle was rolling on and I had done the flight operations part of it and then I had done the headquarters part of it. Glynn Lunney was still here, still at JSC, running the Shuttle Program, although it was very obvious to everybody that Glynn was not going to stay at NASA. He was saluting and doing his thing, and he and Gerry getting along fine, and we were flying and whatever, but most of us knew that Glynn was not going to hang around. He never really got over the not being the Center Director deal.

ROSS-NAZZAL: Talk to us about establishing the Space Station Program Office, those first couple of months.

HUTCHINSON: That was really hectic. There are a couple or three characteristics. There was a lot of activity before we really got going in the establishment, having to do with relations between the program and the field and how the program would be structured. Conceptually, Phil and John—I think mostly Phil—and he had convinced Jim Beggs that this was the right thing to do. In retrospect, it was a very, very difficult thing to do, and in my personal opinion, looking back on it, although we did get some really good help, it was very wasteful in the early stages of the program.

In all our infinite wisdom—and I really have to admit I didn't have much of a vote in this—I was pretty much handed a construct that said, "We are going to employ the best and brightest across all of NASA, irrespective of the field center they're in, to try and get this Space Station going."

And furthermore, some of those field centers were going to have piece parts. In other words, we were not going to put it all in one place, from a leadership and a technical standpoint.

There was a really serious contest that went on about the time I started to get involved in it, in which the Marshall Space Flight Center really wanted the lead in Space Station and was very chagrined that Griffin outmaneuvered them.

And, as a matter of fact, when I got ready to leave NASA Headquarters to go back to JSC, Marshall [Jack Lee in particular] tried really, really hard to get me to go to Marshall. Mostly it was my family and the fact I had a house in Houston and I had little kids—well, they weren't so little—yes, they were still pretty little—and I kind of wanted to go "home." It was more of a personal decision than anything having to do with the agency.

But they already knew, and so did I, that I was probably going to end up being the PM [Program Manager], and they were having a really, really hard time with the fact that the Level II, the leadership, the head of the program and the leadership of the program across the agency was going to be placed at JSC. And, of course, that's the way the Shuttle was. That's what Bob Thompson—Level II program office, the Shuttle Program Office was at the Johnson Space Center and the Orbiter was just one of several projects that reported to that office, and, of course, the [External] Tank Office and the SRB Office, and those were all Huntsville, Marshall people. And here they were again, going to be beholden—that's really the wrong word, but going to be subjected to leadership that grew up and was anchored at the Johnson Space Center. At the time, I did not understand the gravity of that, because it later became one of the reasons I left NASA.

So let's go back to getting the thing started up. In our infinite wisdom—and I can't remember exactly where I entered this, but I know that from a decision-making standpoint, the framework of this thing was kind of decided before they said, "Okay, Neil, you've got the stick." It ended up, "Well, now, you go make this work," but the framework that had been put together was four field centers. One of them was not even a field center, because it was JPL [Jet

Propulsion Laboratory, Pasadena, California], of all people, and JPL, Goddard [Space Flight Center, Greenbelt, Maryland]—well, actually, let me leave that out. Let me back up.

JPL was a side player. It was Goddard, the Lewis Research Center, which is now Glenn [Research Center at Lewis Field, Cleveland, Ohio], Johnson, and Marshall. Those four entities were going to each have a piece of hardware that belonged to the Space Station. That piece of hardware [was] still kind of nebulous and undefined and, "Oh, by the way, Neil, you're going to have to sort that out, sort of." Of course, each one of those field centers had something unique about it, in terms of the skill base at the field center, and, obviously, that was meant to determine a bit about what piece of the Space Station they ended up getting.

The problem with that construct is that two of those four field centers think they are absolute equals. They believe that they have engineering expertise and brains—and they do, by the way. I'm not fussing at either one of them, and Johnson's no better than Marshall, and Marshall's no better than Johnson. And again, you've kind of got to go back to the history books and look at what happened. When Apollo powered down, Marshall didn't have a job and they were scared to death that the Center was going to get reverted back to the Army and that there wouldn't be a Marshall Space Flight [Center], so they started doing all kinds of maneuvering.

The Shuttle was kind of a gleam in people's eyes and, of course, they get themselves integrally involved in Skylab. And when we went from the wet workshop to the dry workshop, Marshall was in charge—I'll pick something. Nobody in history at that point had ever done an environmental control system for a spacecraft, except JSC. All the environmental-control brains in the world were at JSC until Skylab, and then Marshall did an environmental control system, and all of a sudden, here was a zero engineering set of horsepower and a maximum capability set of horsepower at Marshall and JSC, and, all of a sudden, Marshall now is up there where they're

almost equal, because Johnson was doing the command and service module, ECLSS [Environmental Control and Life Support System], and Marshall did ECLSS on the Station.

From that point on, Marshall felt like they had as much capability to do a human spacecraft as anybody else around. Period. And, in certain ways, they did. So when they started—here's this Station, which nobody knew what it looked like, by the way. We didn't even understand the configuration at the time. We were going to get these things called work packages put together, where each one of these field centers had a piece of the Space Station.

Two of the four field centers that were involved had pretty clear charters, and Glenn was the power guy; by the way, over Marshall's objections. They absolutely—they never got over that one either. As a matter of fact, later on in the program, when, in essence, the power system reverted back to JSC, when they closed—and this is past Neil. This is long after I'd left. In the end—and I'm not sure that it [did] revert completely back to JSC, because I think the batteries and stuff were still up at Huntsville—Marshall had a problem with that.

But Lewis had a pretty clear charter to do the electrical power generation for Space Station. Goddard—at the time, Station was envisioned to have some co-orbiting satellites flying beside it that did earth science. We called them the platforms, and the idea was to have another spacecraft, independent of the Station, flying in formation with it, and you could get on your backpack and fly over there and service it. I'm being a little crude, but in essence, the whole idea was to have a serviceable satellite that did earth science, flying in formation with the Space Station. Goddard had those platforms, or two of them.

Those, by the way, eventually turned into Terra and Aqua, which are not flying in formation. They actually were built and flown and are up there now, but they're at an inclination that is not commensurate with the inclination the Space Station's in, because we want them,

they're in polar orbit, we want them flying over more of the surface of the Earth, which any idiot would have known at the time, and I don't know why we didn't spend a lot of time thinking about that, but we didn't.

So they had the platforms, and that left the main body of the Space Station and who was going to get what piece parts. And here I was, this guy with "JSC" stamped on my forehead, back at JSC, with a partner at JSC who said, well, of course, a program office at JSC below me, run by a guy named Clarke Covington, who said, "Of course you will protect us and you will give us all the good piece parts," and a set of people up in Alabama who said, "You'd better give us the piece parts or we'll hang you by your thumbs."

I'm exaggerating for effect, but that contest between those two field centers is still going on to this day, and our job was, in essence, get a program office stood up, get it staffed, and basically get a configuration defined for the Station that could be used as a starting point for the private industry to go design the thing, and that process led to a thing called the Skunkworks, where myself, as the leader, and bunch of kind of wild-eyed engineers, and I can name damn near every one of them even today, guys like Al [Allen J.] Louviere, Mark [K.] Craig. There was a guy from Marshall that was there. We pulled from all four of the field centers. Ron [Ronald L.] Thomas was a guy from Lewis. Ken [Kenneth O.] Sizemore from Goddard. Charlie—oh my goodness. His last name is escaping me. Luther [E.] Powell was one from Huntsville, just to name somebody.

We moved off site of JSC in a building about two blocks from here, that Johnson rented, leased for a year or two. Locked the doors and went into a crash system engineering design process for the Space Station. And, of course, in that process, we also are beginning to formulate which field center has which piece part and so on and so on and so on.

We went through several design iterations, and I can tell you that the thing that finally came out the back end of that, which was a thing called the "power tower"—that was kind of an affectionate name we had for it—looks remarkably like the Space Station we have today. I mean, except for the fact that it had solar dynamic power and there was a slightly different arrangement of the—the whole concept of having a backbone truss structure, having solar panels and heat rejection devices on it, all the basic big design parameters of a Space Station were all originated in that team of people from four field centers and some guys from JSC who later became major players in the program office that I ran here in the ensuing years, a couple years; I'll name Al Louviere and Mark Craig, for a couple of names of absolutely brilliant people.

So, job number one was to get a first-order configuration established. Job number two was to, in the process, construct this office where we would have the Level II office and then all the subordinate offices at all four field centers and, by the way, several of the people who were in the Skunkworks, when the Skunkworks was over and we had a configuration, went back to their field centers and became the project managers, like Luther Powell and Ken Sizemore, to name a couple, Thomas, too. Thomas went back to Lewis and became the Program Manager for the power system on Space Station at Lewis, after spending six months down here, holed up in a building, coming up with the original design concept.

So, the first job was to get that design concept sorted out. Second job was to kind of stand up the program hierarchy around the agency, and the third job, which was just as important as the first two, was to run a competition in private industry of the folks who were going to end up building this thing. It turned out, we formed a Source Selection Board, which, by the way, had membership from all those places that I just described, including some of the people I just described. We put together an RFP [Request for Proposal], using the Skunkworks design as the

baseline and asked the industry to bid. We split the vehicle up into work packages, and that process, of course, defined what Marshall's job was and what Johnson's job was, what each one of the field centers' job were, and then we ran a single competition, with me being the Source Board chairman, and picked two contractors for each field center. It was the equivalent of running four major procurements, all at once in one big procurement package.

We picked eight contractors, two for each field center, to go do the Phase B Space Station studies, which, of course, would take that baseline and flesh it out with real engineering analysis. Most of the stuff we did in the Skunkworks was pretty back-of-the-envelope, although some of it—it's just amazing how much the real vehicle turned out to be like the one that came out of the Skunkworks.

That whole process took about a year. It actually took more than a year. I can't remember the exact dates, but it was a good year to year and a half by the time the competition was over. The source selection official was Jim Beggs. Work Package 1 and 2 were the most hotly contested because they had the big piece parts, like the truss structure, [crew modules], and so on and so forth.

We picked two contractors and the guys that lost—and I'll never forget being at NASA Headquarters in Jim Beggs' conference room, debriefing Lockheed about why they were not selected for Work Package 2, and having the president of Lockheed, who at the time was—I'm not going to remember his name—was a very unhappy man, because it was obviously the foot in the door in Phase B. And, of course, the idea was to run the Phase B studies and then run a competition to actually build the flight hardware, which, of course, in the case of Marshall, Boeing [Airplane Company eventually] won [Phase C/D]. In the case of Johnson, McDonnell Douglas [Corporation] won.

Of course, at the time we ran the competition, the consolidation in the aerospace industry and private industry had not taken place yet and they were all still playing as primes. You had Grumman [Aerospace Corporation]; you had Rocketdyne [Division of Rockwell International]; you had Rockwell; you had McDonnell Douglas; you had Boeing. They were all independent. General Dynamics [Corporation]. They were all independently competing for these. TRW [Thompson-Ramo-Wooldridge, Inc.].

For example, the power system awards went to Rocketdyne and TRW, were the two winners at Lewis, as an example. And Boeing and—oh, man, I'm not going to remember who the second one was, but Boeing was the big winner in Huntsville. McDonnell Douglas was the big winner here, although Rockwell—and later on in my career, I got to pleasure of leaving the agency and trying to help Rockwell win the Phase C/D and we lost. Yes, one of those things that happens in private industry. McDonnell Douglas eventually was the winner here, and of course, eventually got bought by Boeing. Boeing bought everybody out. They bought Rockwell, they bought McDonnell Douglas, whatever.

And as you know, Boeing and Lockheed have turned out to be the big mooses on the block. They're kind of—well, Northrup Grumman [Corporation] is still there, and they're trying very hard to get reentered into this fray, but Boeing and Lockheed are the big guns.

So I don't know. There you have it. So we did the Skunkworks and we eventually moved back on site and had our program office stood up. Then we spent the next two years trying to defend Jim Beggs' eight billion dollars to the Congress and other places, which was very tough.

ROSS-NAZZAL: Let me go back and ask you a couple of questions. You mentioned the relationship between Marshall and JSC. How were you able to soothe their bruised feelings at Marshall and yet keep people at JSC happy? How were you able to juggle those balls?

HUTCHINSON: Never did. You just kept juggling them, and you kept trying to be a leader, and you kept trying to do the right thing for the program from a technical standpoint, and when it ran amok of the philosophical or egotistical or charter principles of the players, you tried to cram it down their throat, as the leader. It was, and is, the hardest job I ever had, from a management standpoint, in my life. It was very unpleasant. I think I count most of those guys still as my friends. It'd be interesting, you ought to ask somebody from Huntsville who was there. I know you're doing a JSC history, but you ought to ask them what they thought of the scene. You ask a guy like Luther and he'd say, "I think Neil was fair, but, quite frankly, we felt he never got rid of his JSC bias." You ask Covington, Covington would probably tell you, "Neil feathered Marshall's nest too much." I don't think any of them were happy.

The thing is that the people who grew up in those environments had an awesome allegiance to their field center. NASA has operated in a stovepipe arrangement, and even despite all of the cross-pollination that's gone on today—and Sean O'Keefe's doing a wonderful job trying to force that to happen and whatever—you get down in the bowels of the ship and most Marshall guys don't like Johnson and most Johnson guys don't like Marshall, and it's because the technical horsepower exists in both places to do the kinds of jobs they do, and one would never concede that the other did it better or vice versa. Johnson's never done big turbo machinery, like Shuttle engines, like Marshall has. In fact, nobody in the world has but them.

You'd have to give them their just due there. But, quite frankly, when it comes to spacecraft and crew interfaces and that kind of thing, the two places have a lot of horsepower in both places.

We're coming up on a new—the big thing the President [George W. Bush] just announced, and I just spent some time with Jeff Howell yesterday discussing the contest that's going to take place about who gets what piece of the Moon-Mars thing and, believe me, it is just starting, because it's the very same kind of problem. You're going to let Marshall be in charge of a manned vehicle? Human vehicle? Well, maybe. I don't know. Thank God I don't have that problem; it's not my charter.

ROSS-NAZZAL: Another question I had for you. How did the Skunkworks get its title? Can you tell us the story behind that?

HUTCHINSON: We stole it. It's absolutely 100 percent plagiarized from Lockheed Martin [Corporation]. For many, many, many years in the classified world, the black world, Lockheed ran a facility out in California affectionately known as the Skunkworks because out of it came all kinds of incredible things, like the SR-71 spy plane, which nobody even knew existed for years after it was flying and doing real things. Conceived, designed, engineered, and—obviously not built in the Skunkworks, but it was very high [technology]. We didn't even used to be able to say the name, but reconnaissance satellites, another thing that came out of the Skunkworks.

The concept in the Skunkworks that Lockheed had and that we employed here was to get a really small team of really, really smart people and some absolutely arbitrary—*arbitrary* is probably not the right word, but forceful decision makers that would not dillydally and would

arrive at a design concept for something, be it a spacecraft or an airplane or a piece of ground equipment or whatever, fairly quickly.

So we stole the name. I don't probably even know where it is anymore; we actually had these little lapel pins of a skunk, that everybody wore around. It was kind of cool. But there was nothing original in the name. Didn't belong to us. Maybe that's one reason that the Lockheed guys were so upset that they didn't make the Phase B cut, was we stole their name.

ROSS-NAZZAL: After you came back from the Skunkworks, you mentioned that you spent the next two years trying to convince people to build the Space Station, this eight-billion-dollar Space Station. Can you talk to us about the budgetary problems that you encountered?

HUTCHINSON: Well, you know, the problem is probably not the way you would characterize that. I was not privy to the NASA Administrator's interfaces with the administration, but I can tell you that in the discussions that led up to putting the program together and getting it accepted by the administration as an initiative so that NASA could then go to the Congress and get money and so on and so forth, there was a fair amount of back-of-the-envelope pricing that came up with the eight-billion-dollar number. We, of course, hadn't run the Skunkworks or anything yet, but based on—I don't know. Maybe it was based on Wernher von Braun's concept of a Space Station back in the sixties, and he very definitely had one.

But that number was not grounded in real engineering analysis, and that's okay. I mean, that's how it had to be, but the number got put on the floor as a number that I think Jim Beggs—my sense would be that Jim thought that if the number was much bigger than that—I kind of think there was a big psychological barrier at ten billion, and if the number was much bigger than

the eight billion they settled on, he probably couldn't have gotten the program agreed to by the administration that the agency could go forward with. Now, I don't know that for a fact, but I've talked to him many times since about that number and, of course, the fact that that number was seriously flawed.

I guess one of the other things that I had hard personal time with, I testified two different years in front of the Congress about the program and about the costs and etc., and by the time we left the Skunkworks, we knew we couldn't even come close to this thing for eight billion, but we kept it under wraps. Now we didn't lie, but we did things like all of the assembly and Shuttle flights and everything to put it together were all bucketed in another set of money, and all the facility modifications that we knew we had to do in Florida were all in another bucket of money. We had more peas under the pods and moved them around so nobody could have figured out what the real cost was. But by the time we'd been at it a year or a year and a half and had the Phase Bs on the street and had a lot of feedback from industry, oh, boy, we knew that there was not a cat's chance of pulling it off for eight billion.

Of course, myself and a lot of other people—by the way, including the industry—I personally believe the Congress knew it, too, and I think they sort of sensed the nose under the tent kind of thing that NASA was doing. I'll never forget, there was a guy, who's a friend, a guy by the name of Dick [Richard N.] Malow. He wasn't really a friend then, because I was scared to death of the guy. He was the senior staffer on the House side. I can remember sitting in his office just being taken apart for not properly having all the piece parts accounted for. So I think a lot of the people on the Hill knew that NASA maybe had a bit of a shell game going, but even after I left, NASA did not 'fess up to the fact that they couldn't put it together for eight billion dollars.

Frankly, I didn't really probably appreciate the political sensitivity of the fact if the real number came out, we might lose the program. And even in the position I was in, I probably appreciate that more today, looking back on it in retrospective, than I did at the time. I had a really hard time. I was trying to get a very, very difficult technical job done. We had hundreds of contractors on board at all four field centers. We were trying to get the program baselined. We started with the Skunkworks configuration and were constantly modifying the piece parts.

All of those modifications had monetary ramifications to them, and yet we continually operated with a kind of an out-year constraint that "You guys have got to get this thing—." We were spending—I don't remember my budget, but it was in the hundreds of millions of dollars a year, trying to get this thing defined, knowing that what we were defining probably couldn't be built inside the budget that we had, and that really grated on me. It was like, think about building a new house on the ground and you and your wife figure out how much you can afford and what you can do, and you get an architect and he lays out a plan, and you realize that the plan is way too grandiose, so you start whacking around at the edges, but you don't ever go back to the architect and say, "You know, we really can't afford this place, so take out the third bathroom and," blah, blah, blah.

And we never did that. We just plowed on, and that really started to grate on me. I probably bitched at Gerry more than anybody else, and Jim Beggs, too. Jim was just adamant, "Neil, we've got to hold the line here for a while until we get this thing a little better defined, and you don't really know what it's going to cost you because you don't have this done and that done and this done." It turned out we knew a lot about what it was going to cost.

I'm not suggesting that the cost we ultimately paid today had anything—I, in my heart of hearts, believe we could have done the thing for under twenty billion, lock, stock, and barrel.

But the cost that we have incurred, which is way, way, way more than that, has nothing to do with the design. It has to do with the very fouled-up management processes that the agency used after I left.

The *Challenger* accident fouled Station up immeasurably, believe it or not. Just tore it apart. The four years that we operated after the accident—and I was not there, but I certainly looked [at] it from afar—was an absolute disaster, and you can ask anybody that was there, because everybody inside the program will tell you it was a disaster. And it got re-baselined again in the early nineties.

And isn't it odd that through all of those cycles and all of that stuff and everything else, the vehicle that's in the air is remarkably like the one that came out of the Skunkworks? If the thing had changed its complexion or it didn't have a backbone or we'd gone from photovoltaic to solar dynamic power, or you'd changed the configuration in the modules, or any of that stuff, you'd say, "Well, okay. We probably didn't have a pretty good handle on it back then and whatever." But the fact is, it's about the same.

ROSS-NAZZAL: Let me ask you about your involvement with the international partners. What was your involvement with the international—?

HUTCHINSON: That process was just really getting started and a lot of that developed as we went on. The three big players, ESA [European Space Agency], NASDA [National Space Development Agency of Japan], and the Canadians, were very much in the mix in the structure that I was leading. We tried really hard—and they all had offices here and they came to staff meetings, all those guys, Carl Deutsch and Tak Kato, who was the Japanese representative here.

But we tried really hard to kind of keep them out of the critical path. The Canadians were probably the closest thing to the critical path, because they had the arm and we knew, even back then, that we weren't going to be able to get the thing assembled without the arm. We would need that eventually.

The European and Japanese pieces were kind of like—I mean, my own thought process was, "If these guys never come through, we're going to have a Station anyway." And as evidenced today, neither one of them have their modules up there and we're—I mean, we're not doing just fine, but it's because of the Shuttle we're not doing just fine, not because of anything that's going on in the air on the Station.

They certainly were a player. They had a seat at the table. There was a pretty fair understanding on my part at the time that they were there as much for political reasons as anything else, and I don't mean that in any way to belittle their contribution, but what we had done with that process was get the United States as a government committed to building an infrastructure that if it didn't get finished or didn't get done correctly, would have political implications outside the United States, and that's a nice constituency to have, very smart move, and it's smart for another reason. It gets all the world pulling on the same oar and, of course, we still, despite a policy, is we had our hands out, big resistance to the Russian involvement. That all came after I left, which was another good stroke, by the way. I mean, I'll tell you what, if it weren't for them, we wouldn't have a Space Station, because since the Shuttle went down, people don't realize how beholden we are to the Russians, keeping the thing running. I mean, we might have been able to fly it unmanned, but, god, you'd better hope we don't have to. I sure wouldn't want that responsibility, because every day something goes wrong that those two guys up there are fixing.

So, bottom line on the international thing was obviously they were there; they were a big player. I got to take some really neat trips. I remember one time me and Griffin made the loop around all the players in Europe.

ROSS-NAZZAL: Can you tell us about those trips? What did you do?

HUTCHINSON: We had a really good time. [Laughs] No, I shouldn't make light of it. Gerry and I did, on a couple of occasions—we went to ESA in Paris [France]; we went up to El Spasio—I'm not going to get the name right [Agenzia Spaziale Italiana]. Anyway, the Italian equivalent of NASA. It's up in Turin, Italy, which is above the Italian Mediterranean, which is a really cool place. If you've never been there, you ought to go. Went to Paris, went out to Toulouse [France], went to ESA.

The purpose of those kind of visits was—we went to Germany and spent some time at Oberhoffenhoven, and Bremen and several other places. A lot of the leadership in those aerospace agencies, which were a little bit on the—certainly from a human spaceflight standpoint, were kind of the have-nots. They'd all put up some spacecraft and done some things like that, but none of them had ever been involved in a human adventure like this.

At the time, we really hadn't started flying a lot of internationals on the Shuttle, which we do all the time—or did all the time since. So we were kind of looked on—*hero* is not the right word, but they were really, really, really glad to see the leadership of the program and they were really excited about playing.

We went to ESA's place up in Noordwijk [Netherlands], for example, where they were getting ready to do some altitude-chamber testing and so on. The Germans at DFLR. Everybody

was excited about maybe having an astronaut in their own country, so I think the visits served a purpose. I don't think they served any really valid technical purpose, but they served a purpose in kind of solidifying the relationships among the partners. Of course, those relationships were really anchored in the NASA Headquarters framework, and I was merely being an executioner of the agreements that we had, because of the Level II program office framework. And the trips were a lot of fun, which I refuse to comment on.

ROSS-NAZZAL: At what point did you decide that you wanted to step down as Program Manager of the Space Station?

HUTCHINSON: When I decided to leave the agency.

ROSS-NAZZAL: Can you tell us why you came to that decision?

HUTCHINSON: Several things. I guess the two drivers, two or three drivers that I saw at the time, one was certainly the budgeting situation, where I felt like we just weren't 'fessing up to—there was going to be a day of reckoning sooner or later, where either the Congress was coming off the eight billion or we were going to have to cut the living—we were designing something we couldn't build. That really gnawed at me.

I've said before that the relationship among the team members inside the agency was difficult. I didn't mention the fact that I had help from two other places, from JPL and from NASA Langley [Research Center, Hampton, Virginia]. There were people from those two field centers on the Source Board and in the Skunkworks. I also had a lot of help from Kennedy.

Gosh, I'm not going to remember a name here. It's showing my age here. Ted—I'm not going to remember his last name. But there were people from those places helping.

Even a place like Langley or JPL, they didn't own a piece of the Station, but they were constantly trying to get jobs. A lovely lady that I know to this day, her name was Pivorotta then, but her name is Donna Shirley now—went on to manage, by the way, the '97 Mars landing at JPL—was the head Space Station person at JPL. And every time I saw Donna, she was spending more time talking to me about what JPL wasn't doing for us and could do for us than what they were doing for us, continual marketing from inside the agency to get this piece of work and that piece of work. And I could say the same thing about [W.] Ray Hook at Langley. Bless their hearts, they're all well intentioned, but they were almost as bad as contractors, in terms of pinging on you to [give them] things [to do].

But the construct that we had put together and the management of it was very, very hard. I think we were doing a good job and, we had a very strong system engineering integration team at Level II, headed by Mark Craig. We got a configuration together; we got it out to the contractors; we started modifying it; we put it under configuration control, but every time we had a Configuration Control Board meeting, there'd be some contentious issue about Marshall wanting to do that, or Johnson wanting to do this, or why didn't we—very hard.

Now you know Bob Thompson had my job in Shuttle, and he maybe had a perspective on forcing the players to play together properly that was a bit more forceful, or he may have done it better than I did. I struggled with that process. I used to go home at night and worry about did Marshall say that because they got a real technical problem with what we decided, or are they playing the political card again? A constant tug-of-war in that environment.

So, the money situation, in terms of the pricing. The very, very difficult management job. I also had some amount of—Level II, the program office here at the Johnson Space Center, was chartered from NASA Headquarters. We got our wheelbase by what they enabled. It's very true that he who has the gold, has the stick. I felt like a lot of efficiencies could have been introduced in the program by collapsing certain roles and missions and maybe apportioning money a little different and so on, and I felt very, very constrained; I was not really in charge. I was the puppet whose strings were being pulled, who got the job of "Execute it whether you like it or not."

Kind of a little bit in the middle, which, by the way, is the way Level II—I'm not fussing at this. I'm not fussing at the Headquarters guys or anybody else; I'm just commenting that I used to just cringe when I got a phone call from Phil Culbertson, because I knew that Marshall had gone around me, or Lewis, and gone up to Headquarters and said, "Hutchinson did—," or, "We want this," or, "We want that," and Phil's listening to them and he's calling up and saying, "You really ought to go back and look at that again."

And I'm saying, "Goddamn it, we did it. It's over. I've made a decision. Now you've got to back me up." So there was a lot of that going on.

I loved Gerry Griffin and he's one of my very best friends, but I never got over what happened to Kraft. Chris was in private industry and, believe me, I called him once a month and talked to him about the trouble I was having, the things I ought to be doing. I stayed in very, very close touch with Chris Kraft and Gerry. I didn't go around Gerry to get advice from Chris in any way, shape, or form. Gerry [also] stayed in touch with Chris.

Eventually I got the thought process that, "Gosh, I've been at this twenty-five years. I've about done everything but run a field center. Would I really want a field center." I'm not saying

I would have ever been a Center Director, I mean, but would I really want to do this? I kind of got a bug and started discussing it with other people and decided I would try my luck outside the agency, and I've never regretted that decision. The decision was made before the [*Challenger*] accident, and I almost reversed it. I came that close to saying, "I really need to get back here. This place needs big-time help, trying to recover from the accident." I didn't. I had announced the decision. I had stepped down.

That was the second time I was up in the Center Director's office, because Gerry left about three or four months before I did, and I was in the process—I had announced I was leaving. I remember watching [STS] 51-L from my office on the TV and we had a lot of the Station staff around watching the launch.

But Gerry had decided to leave, and that had something to do with it, too, because it was not clear who the next Center Director was going to be. It was eventually, and, of course, it turned out to be Jess [Jesse W.] Moore, who was a guy I got to know, a wonderful man. He was working in Code S at NASA Headquarters when I was there, but in the science side, but had come over to Code M and was a really, really great guy who I'm not sure ever recovered from the *Challenger* accident. I mean, he did, but—so the sequence of events was—and I admit that Gerry's leaving made me—I mean, every person in a job like that has a power base. You get it from the people above you, who, when the Marshalls and the Lewises go around you, which they do on occasion, back you up, and eventually you figure out who's really got the stick here.

I felt like some of my power base was leaving. Chris had gone and seemed to be having a really good time in private industry, so I decided to join Chris and Gerry. I announced and, of course, went back up to the ninth floor, and in the process of leaving, when Gerry left, a new Center Director was appointed, Jess Moore. He had just gotten here. I had gone through the

Kraft-to-Griffin transition as the horse-holder, so I was horse-holding again, transitioning from Griffin to Jess Moore, when the Shuttle went down.

I stayed on and, of course, Jess, he physically, literally, was right in the middle of—I can't even remember the exact sequence. He had been announced and he was still on TDY [Temporary Duty] down here, going back and forth between here and Headquarters. Beggs had gotten in trouble with the federal system because of something he did at General Dynamics, which, by the way, was one of the biggest witch hunts I've ever seen. He did nothing wrong and ultimately was proved that he did nothing wrong, but it cost him his job as NASA Administrator, which was one of life's—you know, nothing's fair. And by the way, nobody stood up afterward and said, "Jim Beggs really didn't do anything wrong," to this day, which is one of life's bad deals, because he is an honorable guy. But Beggs was under indictment, and a guy named [William R.] Graham was the Acting Administrator. I'm just going to leave it at that.

So the food chain in the human spaceflight world was very confused when *Challenger* went down and, of course, I think some people at JSC never got—I mean, Jess Moore was at the FRR [Flight Readiness Review] that decided to go ahead and launch. I in no way believe Jess Moore could have stopped, started, or anything else that process, but a lot of people at JSC put some amount of blame on Jess Moore. They put some amount of blame on the fact there wasn't a crisp Administrator in place who was in the middle of it. I mean, there's a lot of noise that can be put on lots of people's shoulders. I think most of it was just that; it was noise. But it was a very uncomfortable time.

Jess was the Center Director, physically, when I left. He, of course, kind of got drummed out of the corps shortly thereafter. Aaron took over, I guess. Aaron Cohen took over and that was after I left. But I did sort of try and help Jesse, as best I could, get himself on board here at

the Johnson Space Center, and that was the last thing I did here. And I did it with a bit of a wall in front of me, knowing I was going to unhook.

Of course, I want to make one more comment about Space Station. As most of you know—and a couple of these guys are good friends of mine—Dale [D.] Myers for one, Sam [Samuel C.] Phillips, who's passed away, for another, mostly Dale, who I still stay in touch with regularly, by the way, who's alive and well and living in southern California, not far from me. Sam Phillips ran the Apollo Program from NASA Headquarters and was in that chair when Apollo was being done. Sam had a concept, and so did Dale—and Dale, of course, was a major player in Rockwell and in NASA at a couple of times in his career.

When the Shuttle went down, you probably recall they brought Jim [James C.] Fletcher back and they brought Dale Myers back and they brought Sam Phillips back, and all three of those guys had a long history with the agency, and they're all really, really great men, but they made a serious mistake when they decided that a similar accident could probably be propagated in the Space Station because part of the failure in the Shuttle was there was not a strong enough leadership and engineering structure in the field, i.e., at JSC, and it needed to be at NASA Headquarters.

That started the process whereby the Level II program office that I had spent so much effort trying to build and get all the brightest people, and Griffin and Marshall, everybody had their best and brightest people in the middle of that, not only at JSC, but in the project structures at the field centers. They tried to reconstitute Level II (JSC Program Office) at NASA Headquarters. Back in the Apollo days, they hired Bellcom [Inc.] as an agent, a technical agent at NASA Headquarters, to try and provide a certain amount of technical oversight of the field centers. This is back in Apollo. This is a Sam Phillips special. He decided to institute exactly

the same—and Dale was right—they were all in the middle of it—institute a similar thing. In this case, they hired Grumman. Ex-crewman, Fred [W.] Haise, Apollo 13, Fred Haise was the head of that organization. They rented a building out in Reston, Virginia, and they tried to reconstitute the Level II program office with this big [support contractor], Grumman. I think Booz Allen [Hamilton Inc.] may have been involved. I don't know the details, because I wasn't here.

But it was an abject failure, and it was a failure because the field centers, who had work packages—let me back up. The only reason that Bob Thompson could force the Shuttle pieces to be integrated was because Johnson owned the Orbiter, and Bob Thompson had more influence over the configuration and the interface control documents and everything else on the Shuttle than anybody else because he had the Shuttle PM under his thumb and the Orbiter PM under his thumb. The Orbiter touched every other part of the stack. Therefore, Bob was in charge, because he could go tell Aaron, "Go do this," and Aaron could force it on Marshall because Marshall had to fit its gear into the Shuttle.

The exact same thing was true of Space Station. The JSC work package had the structure. Everything had to fit on the structure, and that's one of the prime reasons the Level II program office worked so well at Johnson, because I could twist Clarke's arm and his people's arm by walking down the hall and doing it. And in the end, the rest of them would have sort have to fall in place. And when they pulled that Level II office out of JSC, what they did was they set up a group of people that didn't have a piece of hardware in the fight. And you just thought there was a war between the Marshall and the Johnson Space Center. You have no idea what went on when they pulled that program office out of here and took it up there.

So the first thing they did was they took it out of the field center that had the muscle. Anytime I got in a problem with Clarke Covington, I'd go tell Gerry, "Gerry, Clarke has to make the truss four feet longer," and we'd beat it up right in-house, and Clarke would say, "Yes, sir," and he'd end up going and doing it. But they lost that capability when they took that Level II program office up there.

The second thing they lost is they couldn't get any—and they got some really good guys, but, in essence, they couldn't get any good people, NASA people, to go up there from any of the field centers. And, yes, John [W.] Aaron went. He was my Deputy and he was an absolute ace. They didn't make him the PM. They started rotating the leadership of that Reston office between the work package partners. It was a Marshall guy for a while, then it was a Johnson guy, and then it was—I don't know how many different guys held that job.

And what resulted was four years of chaos out of which came absolutely no progress on Space Station, and they spent $5 billion or whatever. I don't know how much they spent. And that was all a result of the *Challenger* accident and the fact that the people that came back to resurrect the agency, or to get the agency back on track, employed a process that worked really well twenty years ago. Lord only knows how we manage to keep this thing together enough to get it in the air, because they wasted untold hundreds of millions doing that. And I would guess if you talked to anybody at any place in that structure, they would tell you about the same story, and I wasn't even in it, because I had gone to Rockwell. I went to work for Rockwell and tried to help them win Space Station and fouled it up.

[Tape change.]

ROSS-NAZZAL: Is there anything else you would like to add about Station?

HUTCHINSON: I'm really proud of the fact that it's up there. I'm not proud of the fact it took us twenty years to do it. I'm an absolute advocate of—you know, it's interesting. The President just announced that we're going to make another try to sort of get ourselves re-pointed at the Moon. A lot of people look at Space Station as a way to understand human physiology, which it absolutely is. It's something that has to be done. In all my years in the human spaceflight business, I put an engineer's viewpoint on Space Station. I think it's important to learn how to support something that will support humans away from the surface of the Earth.

The thing that's neat about Space Station is, it has all the elements that will end up having to be a part of anything you do to go to the Moon or anything you do to stay on the Moon, and the logistics chain is a lot shorter. If something breaks on Station and it's life-threatening, you can get the crew out of there and get them back on the ground in forty-five minutes. If you need a part, you can get it up on the next thing, whatever it be, a Soyuz or a Shuttle or whatever's going up.

We are learning an enormous amount about how to keep a human-built piece of equipment that has to sustain human life viable away from the surface of the Earth. We started that process in Skylab, and to be quite honest, as a person who's spent a lot of his life working on Skylab, the damn thing was falling apart when we quit. I mean, if we'd have gone back one more time, we'd have spent virtually every waking crew minute keeping the thing flying. Maybe I'm exaggerating a little bit for effect, but the fact is, it was one small step along the process of trying to learn how to put a habitat—a place people can live and work in shirt sleeves—together and keep it running outside the surface of the Earth.

So, from that standpoint, I think Station is just giving us lessons learned every day it's up there, and it obviously has the added benefit of being able to work the human physiology thing. So, my concluding remark on Station would be, thank God we got it.

I know the President said we're going to kind of back away from it a little bit toward the end of this decade and whatever, but hopefully we will have gotten out of it what we need from both a how to maintain something away from the Earth and from the physiology standpoint, and we can get on this Moon thing, which is the next closest thing. Maybe [the Earth-Moon] L1 [Lagrange Point] is closer, but the Moon is a logistics chain that's like a couple three days long. The farther away you get from safe haven, the harder it is and the more redundancy you've got to have, which means, you know, translate redundancy into dollars, because if you're on the Moon and you have three life-support systems and one of them breaks, if you haven't got another one ready to ship up there instantly, you've probably got to take the crew out of there, because you're not going to let them sit with one point of failure away from dying. So it gets to be harder and harder the farther away you get, but we'll eventually get there.

ROSS-NAZZAL: Let's shift gears and let me ask you a couple of general questions before you go today. What do you think was your most challenging milestone while working for NASA?

HUTCHINSON: Launching the Shuttle.

ROSS-NAZZAL: The first mission or the second?

HUTCHINSON: STS-1. Of course, the challenge was in the preparation. Obviously, the flight went really well and we didn't really do too much in the flight in terms of saving the day or anything. I mean, it wasn't like Apollo 13 or anything like that, which I also worked on and was certainly very satisfying.

But in terms of my own personal involvement, we had never launched a manned vehicle—manned the first time, period. We launched lots of Redstones, lots of Atlases, lots of Titans, lots of Apollo, Saturn I-B and Saturn V. I was involved in both of the Saturn V unmanned launches, where we put a command module, with nobody in it, on top and took off. So the risk-gain ratio on the first Shuttle flight was absolutely enormous.

The flight itself, I guess I have to say—I mean, this is in retrospect, looking back—was a little bit anticlimactic, compared to getting ready. We started training for that in 1978. By the time we got to the real launch, I'd probably run—and I used to have this number in my head—well over 500 launch abort simulations, most of which never got to orbit. So we had practiced and practiced and practiced. We were flying a vehicle that was unsymmetrical. The Shuttle goes through a flight envelope in launch. If you get it pointed in the wrong direction, you can rip the wings right off. It's not like a pencil or a ballistic missile that's very aerodynamically benign, mostly.

There were just lots and lots and lots of things in the Shuttle, from an engineering standpoint, where we had not tested and had done a lot of simulations and computational fluid dynamics and you name it, using engineering models to simulate what would happen in real life and coming remarkably close to what really went on in real life.

I don't know. I think the risk takers—I'm not sure that we have risk takers in NASA these days that would take that kind of risk.

ROSS-NAZZAL: What do you think was your most significant accomplishment while working for NASA?

HUTCHINSON: Getting the Shuttle going. I think if we'd had an early accident of the likes of *Challenger* or *Columbia*, I think NASA would be a very different place today, because what we did with the Shuttle was keep the human spaceflight framework alive and well.

I worry a little bit about this end of decade backing away that the President has defined if we don't have really a lot of progress toward the next step before we start backing off of this step. I'm probably biased. I spent my whole career in the human spaceflight thing and my career now is about one foot in each camp. I have a fair amount of activity in the unmanned side of NASA, particularly in earth sciences, and even having said that I've been doing that for the last fifteen years, I would sit here and tell you that without the human spaceflight business, NASA probably wouldn't exist as an agency today, and I really believe that.

ROSS-NAZZAL: As we come to a close today, is there anything else you'd like to add?

HUTCHINSON: No, this has been fun. I hope it helps somebody do something.

ROSS-NAZZAL: We really enjoy these, and we know a lot of people use the material off of the web.

HUTCHINSON: Well, that's cool. You pay attention to who's in there sniffing around and doing stuff and guys writing books and Kranz writing another book.

[End of interview]