

ORAL HISTORY TRANSCRIPT

G. MERRITT PRESTON
INTERVIEWED BY CAROL BUTLER
INDIAN HARBOR BEACH, FLORIDA – 1 FEBRUARY 2000

BUTLER: Today is February 1, 2000. This oral history with G. Merritt Preston is being conducted at his home in Indian Harbor Beach, Florida, for the Johnson Space Center Oral History Project. Carol Butler is the interviewer and is assisted by Kevin Rusnak.

Thank you so much for allowing us to come here today and talk with you. It's quite a pleasure for us.

PRESTON: Well, to get things rolling, I was born in Athens, Ohio, which is [in] the southeastern part of Ohio, in 1916, which makes me a pretty old man by now. I went to [Grade] School, high school and junior high, that same city, and then went to Ohio University, also in that city, for two years, taking electrical engineering.

I was attracted to an aeronautical engineering career because it was a new field and it looked at that time pretty promising, even though it wasn't too common. In addition, a degree in aeronautical engineering was required to be a Pan American pilot, and that was a really lush job. You also had to be a graduate of a military test pilot school... However, when I took the Air Force physical my senior year in...college, I had a broken nose, which I had gotten in football, and they didn't particularly like that. That was only months before the war broke out. I thought to myself, they certainly weren't in a very big hurry to fill up their fleet.

But anyway, it probably was a fortunate thing for me, because it put me on a career of engineering and with at that time what was NACA [National Advisory Committee for Aeronautics]. ...I left Ohio University and went to Rensselaer [Polytechnic Institute] up in Troy, New York, and enrolled there in 1936, which was my junior year, to get a bachelor of

science degree in aeronautical engineering, which was the first graduating class of aeronautics that Rensselaer graduated...

As an aside, some other people that graduated from Rensselaer are Chuck [Charles W.] Mathews, the project manager for Gemini but also the operations director for Mercury and then later successes, and then, of course, George [M.] Low, who you all know. You can't help but know him, and he also came from Lewis. [Edgar M.] Cortright graduated from there and Cortright originally was the center director of Langley, and then he became the president of Lockheed [Aircraft Corporation]. Others from Lewis were Joe [Joseph A.] Walker, the X-15 pilot, and Kenny [Kenneth S.] Kleinknecht, was the project manager at Houston for either the Mercury or the Gemini program, both of them, I think. And of great importance is Abe Silverstein. At the time he was the third in charge of NASA when it was formed, overseeing all of the space activity.

Sorry, I got off the track there. But at Rensselaer my prof was Paul [E.] Hemke, who was a former engineer at Langley, and he sort of talked us into taking the civil service exam, which happened to be the last civil service exam, written exam, that the civil service gave. From then on they just filed by experience to get a rank. I think that there were about twenty engineers in the country passed that exam, and four of them, I know, went to Langley.

However, when I went to Langley, I was not very impressed with the first families of Virginia. I mean, they didn't want to have anything to do with "those NASA nuts," as they called us. So I wasn't too reluctant to leave. And when the engine lab [Lewis Research Center] at Cleveland [Ohio] was formed, which was back in my home state, I figured I might as well go back there with them, and did so.

One of the biggest problems with the Hampton [Virginia] was that the people at [NACA] didn't pay much attention to people in Hampton and didn't have much to do with them, and, of course, it was likewise. But in several years after I left, [Floyd L. "Tommy"]

Thompson the center director, actually ran for city council, and then things sort of broke loose and became a little more friendly.

BUTLER: I guess that's a good way of doing it.

PRESTON: Yes, well, I think that, to me, it's always important for the prominent industry to take charge of the city or at least contribute significantly.

BUTLER: Certainly.

PRESTON: In fact, to that end, when I was here, one of the things I did was to be a chairman of the United Fund campaigns. Well, when I proposed I'd do that, I got a lot of opposition from the top side. I just flatly said, "I think it's my responsibility to do it." But they seemed to think it was going to hurt my work, but it didn't. And I think it did make a difference, because they do better now in that respect, and I think you have to be part of it. I know when we were in Cleveland, we were well integrated...I mean, Berea [was] right next to the lab up there, [had] about 5,000 people. Hampton's about the same size. But this was a college town and it was a wonderful place to live.

They assigned me to the full-scale tunnel [at Langley Research Center], which is a huge facility and one of the first facilities built at Langley. If I get the dimensions, it's about a thirty by sixty-foot throat. Now, that might be one out at Moffett [Field, California—Ames Research Center], but anyway, it was huge. One of the things I remember about that tunnel was that the test section where they put the vehicles, which they used full-scale, it was that big, was open, and we used to go up and service the model or whatever it was on what we called Annie, which was a platform suspended from a crane.

One day I was up there working on it and the boys down below were kind of playful and they started throwing plasticene, which is a little molding clay, at me. All of a sudden I looked up right above me and here was the center director standing up there watching this whole deal. I figured, well, that didn't hurt my career since I didn't fire back or retaliate. [Laughter]

But my boss there was Abe Silverstein, who was my boss almost all the time, except he got further away, until he went back to Cleveland. I think he and [Wernher] von Braun didn't [see] eye to eye. He was a tremendous person and one of the people that's responsible for me getting anywhere. He was a hard taskmaster, though, and I first initially didn't like him because he was so damn hard, but I soon learned that was wrong.

So I did get to Cleveland when they finally got it built. The first project that I was assigned to, altitude wind tunnel there. That first project that we had was the P-59, which was America's first jet aircraft. They flew it in and, fortunately, Cleveland airport was out in the middle of the country at the time, so nobody took much note of it. In fact, not even the people in NACA. We didn't take any particular pains to keep it quiet, but we also didn't let it sit outside.

That was followed by the F-80, which is the real good jet aircraft. Well, we had been working at Langley in the full-scale tunnel trying to increase the speed of these fighters. If we got two to three miles an hour increase, it was great. This came along and it went from about 350 to 500 miles an hour in one whack, and it was astounding that it did so well. It had one problem when it came. The F-80 has two inlets to the engine, and when it came it had a habit of one end stalling out and the flow reversing and going in one and out the other one. To my amazement, Lockheed, who's out on the West Coast, out in California, had a piece made and shipped to us the next day. It fixed it, and it's the one that's still on there.

BUTLER: That's great.

PRESTON: A very simple thing, but it works. This was all part of Kelly Johnson. I don't [know] if you are aware of him, but Kelly Johnson was a brilliant engineer. He actually built the first F-80 in a matter of weeks in what's called the Skunkworks. He designed it, built it, all in a matter of weeks with this little group. Subsequent to that, he also designed and built the XR-71, which is the extreme high-altitude, high-speed airplane, and the U-2, which is another one. He's also built a lot of other things like that, but he's sort of the forerunner of all the times. They called the place the Skunkworks, and it's accurately—I got to go there when we tested that vehicle.

An aside that interesting is that when Kelly came to Cleveland to talk about this test, he took one look at myself and Abe Silverstein and he said, "I don't want you two bastards working on this program. You tore up my [P-38] back at Langley Field when you tested it, and now you're going to do it to this one." But he calmed down, and he really was aiming his remarks at Silverstein. But that's the way we started.

I skipped ahead here.

BUTLER: That's all right.

PRESTON: Anyway, I don't remember the exact date, somewhere in the early forties, I was transferred from the altitude wind tunnel to become the chief of the flight research branch, the engineering group, and that was the beginning of that kind of business. Some of the notaries there were, Neil [A.] Armstrong was a pilot at Lewis at that time. Joe Walker was, and Howard Lily, who was the first pilot killed at Edwards in a D-558 way back. That was about 1940-something. No, it couldn't have been that early. Somewhere in the middle of the fifties, I guess.

In flight research, we were doing icing research where we flew deliberately into icing conditions to see how it formed and why it formed. A strange thing happened. We had a hard time finding icing when we flew in what was supposed to be the right thing.

We also launched vehicles from underneath the F-82, which is a twin Mustang joined in the middle. We used that to go down over Wallops Island [Virginia] and launch the vehicles for drag studies and ramjet engines which we ran. An aside on that one is that when we would run the ramjet engines, we usually fueled the vehicles in Mel [Melvin N.] Gough's hangar in Langley Field. He was the head of the Langley Field hangar, one of the original NACA workers, by the way, came to work in 1927. We dumped a whole load of fuel right in the middle of the hangar floor. He didn't take too kind to that. *[Laughter]*

We also flew a B-57 airplane with liquid hydrogen as the fuel. I don't think it's ever been done since. We had a little encounter in the last flight of that, or at least the last one I had anything to do with, in that Abe got kind of excited. He was a boss by then up at Lewis, and he decided we needed to fly. We were obedient, so we flew. The only trouble was the runway was covered with snow. We got off all right, and got up to altitude and couldn't get the engine started for some reason, so we had to come back with a full load. The fuel was in the two tip tanks, which were, oh, I'd say, twenty to thirty feet long, on the tips of the wing. He came in to land and the gear wouldn't come down. If he had to land without the gear, he'd be brushing against his two tip tanks. Well, the last time he was able to go around before he ran out of fuel, the gear finally came down, so nothing else happened. But that gave everybody a thrill, that's for sure. *[Laughter]*

BUTLER: Kept things interesting.

PRESTON: Yes, well, it'd have been an awful mess if he had landed.

In addition, we were running crash tests of airplanes down at an arsenal in Ravenna, Ohio, which is about fifty miles away. What we were attempting to do was to find out what caused crash fires and then devise some way of slowing it down. We did come up with a system, but it wasn't very practical. I mean, I'm sure if the airplanes would never get off the ground, it would be too heavy, but it worked. Despite the fact that the system didn't do anything, we did learn a lot of the what's so-called mechanisms that caused the fires, and that it would help in the design of future airplanes.

In fact, we received a Flight Safety Foundation Award, which is now the Institute of Aeronautic Science Safety Award. We received that back in that time.

BUTLER: Oh, great.

PRESTON: Let's see. Well, you all know that NACA evolved in 1958. At that time they created the Langley Space Task Group, but they also created a Lewis Space Task Group, which I headed up, and there were about twenty-five people from flight research that were assigned the responsibility to check out and prepare the vehicles for launch at Cape Canaveral [Florida]. At that time, at the beginning, I was sort of in between, I was really in Langley Space Task Group and my own Space Task Group, but we were essentially working for them. I was under Chuck Mathews and I was his assistant chief of operations. [Christopher C.] Kraft [Jr.] was the flight director, even back then. Well, I guess he wasn't flight director yet, but I mean, that was his position and that's where he was covering.

I might as well go on and finish up on what happened in my career. In 1961, they made me chief of the pre-flight operations division, which was essentially the same thing. But later that year, they made me manager of the Manned Spacecraft Center's Florida operation, which involved both the spacecraft and the launch vehicle and the range. In other words, everything concerned with particularly the Mercury program, because the Mercury

program was under the Manned Spacecraft Center and not with anybody else. Huntsville [Alabama] and what is ABMA [Army Ballistic Missile Agency] hadn't become part of NASA in the beginning of the Mercury program. In fact, there were several Redstone flights that were carried as ABMA as a contract for the Redstone vehicle, and not as part of NASA. They later became part of it during the early Mercury program, but not at the beginning.

Well, I was in charge of the Florida operations up until about 1965, when they transferred the organization to KSC [Kennedy Space Center], which was KSC's objective from the beginning, but much against our objection, but it didn't do any good. At the time it looked pretty promising, but it didn't turn out that way.

BUTLER: How would you have otherwise thought it might go?

PRESTON: Well, I didn't see any reason—you see, there were Goddard [Space Flight Center, Greenbelt, Maryland] people flying unmanned vehicles. There were my people flying manned vehicles, and ABMA was a Huntsville organization developing boosters and flying boosters. It had nothing to do with the other two programs, and so it made sense that they put it all together under NASA, that they would.

But one of the things that happened almost immediately, though, when [Kurt H.] Debus became part of NASA was that poor Mel Gough, who had been a member of NACA way back to 1927, was relieved of his job. He was titular head of NASA there, and he just sort of disappeared. He went on to work for the Bureau of Aeronautics to begin with after leaving NACA/NASA for, say, thirty years. But anyway, so it goes.

I keep getting off track. *[Laughter]*

BUTLER: That's all right. Actually, before we go much further, I'd like to jump back a little bit and—

PRESTON: Oh, yes, well, let me figure out where I am first.

BUTLER: Okay.

PRESTON: Yes. Okay. Okay.

BUTLER: You mentioned the formation of NASA and the groups at Langley and at Lewis. What did you think of the process of forming NASA and the manned spaceflight program?

PRESTON: I'm sure you're aware of Walt [Walter C.] Williams, who was the mission director for all the flights of Mercury and the first flight of Gemini. In the middle of Mercury, he came down to me and he said, "Preston, you've got to quit worrying about spending money." He said, "You spend it and it's successful, there's no problem. If you don't spend it and you're unsuccessful, boy, you're going to catch hell."

It was a whole different attitude. I mean, NACA was a very frugal organization, a very well-run organization, and an ideal place to work. I had a habit of pinching pennies. That was the nature of that organization. It took me a while to get used to that new attitude, particularly when you had to—our budget the year before NASA was about 10 million dollars. We had, I don't know—well, I'd better not say. I think it was around 7,000 employees. They were all civil service, no contractors, or very little. It was sort of an ideal organization. I'd say it probably was the best organizations the government ever had, but I might be prejudiced.

BUTLER: Well, we've heard that a few times. We've heard that from others, that it was a good organization.

PRESTON: Yes, well, it was. I mean, you had almost complete freedom, at least as much as anybody could give you. If you wanted to do some research, you just wrote out a work order or whatever you want to call it, describing what you want and how much money you need, and if they approved it, you had to do it. You didn't get that very close supervision. So it really made you grow up in a hurry and it was a lot of fun.

Now, of course, you get into a big facility like the full-scale wind tunnel, the boss did all that, but you follow along. It was a very good atmosphere, very good. I pity people that didn't get that opportunity, because you learned to think and create, being creative, and all that kind of thing which you're supposed to be. So NACA was a wonderful experience.

BUTLER: What did you think of the idea of the space program in general, having come from working on the aeronautical side?

PRESTON: Well, to be perfectly frank, before NASA the military were trying to fly these vehicles, and I wasn't paying much attention to them, except the fact that nothing seemed to work. I really didn't know much about it until NASA became an actuality, and then it wasn't very long before I was shipped off to—I was down here for a solid year on TDY [temporary duty assignment]. I'd go back and forth every weekend or almost every weekend.

We were building the Big Joe, the first spacecraft, that boilerplate spacecraft up in Lewis in the shops up there, the physical part of it. So I was in between, and then I'd go down to Langley to be where I really belonged, and I was thinking about—well, for instance, I thought I had to go to Langley, and I didn't exactly look forward to that, since I'd been there once.

Then they started talking about the Space Task Group had moved to Goddard, or where Goddard was, Greenbelt. So I went up to Greenbelt, and right across from the

academy there's the riverfront, and I was dickering with to buy... It must have been fifty feet above the water, just straight down. For some reason I didn't, but it was a beautiful spot. But I was always looking for waterfront and that's where I ended up.

Which reminds me that the same thing happened at Langley, when they finally said, "You've got to come to Langley," so I bought three lots out in Stonybrook. I don't think you know where Stonybrook is, but it's, let's see, it's north of Newport News [Virginia], about five miles, on the river. And started building a house...on a lot, and I got about halfway—no, I didn't get halfway, I got the foundation in, and then they said, "Well, wouldn't you like to go to Florida?" Well, I was really looking for it, so I said yes. I bailed out of that other thing, having to pay for the foundation, and went on to Florida. This house wasn't built until '60. The first thing I had to do was wait for my house in Cleveland to get sold, and then after that, to get this house built. But it was built around 1960, and my wife and family were here with me, which was a big help.

Now, where were we?

BUTLER: Well, one other question. You mentioned Big Joe and you mentioned boilerplate and along those lines. Can you tell us a little more about that program and how it came about and what it was to accomplish?

PRESTON: Well, Big Joe was what we called a boilerplate capsule, which means it was a black iron metal iron sheetmetal version of the spacecraft. It looked just like it. It was just like it, except it was just plain iron. Langley built the stabilization and control system. Lewis built the instrument telemetry system and the spacecraft itself. Langley provided the heat shield. Also Langley provided the parachute system. The main purpose was to see the stability of the vehicle and the capability of it to right itself and also to withstand the heat, which it nearly had a problem, because the Atlas boosters didn't stage properly, and so it just

drove the spacecraft back into the atmosphere and it made a very severe test, but it came out all right. That was essentially what was going on there.

It was all NASA-designed and built equipment. I think maybe we bought some, well, we bought the heat shield and we bought the telemetry equipment from—let's see, somebody over on the west coast, Florida. I know the company, but I've forgotten it [EMR].

BUTLER: I'm sure we can look that up.

PRESTON: But it worked. Another side, though, was that this crew that I had that came down was our first experience at Cape Canaveral. To start it off, before that when we made an excursion down here from Langley, which composed of, I think—I know Chuck Mathews was with us, and I think George Low was with us, but several people like that, came down here to meet the range, and [Major] General [Donald N.] Yates was here. First thing he said was, "Gentlemen, when you get your spacecraft ready, just bring it down here and leave it, and we'll take care of it."

Of course, that went over like a lead balloon. He persisted on that attitude, but he never succeeded, and he didn't take kindly to this new bunch not paying any damned attention to him. But he retired shortly, so we didn't have to put up with him too long.

Now, where were we?

BUTLER: Well, talking about coming down to the Cape and what you were first doing.

PRESTON: Where was I? Well, you asked me about Big Joe and I told you that.

BUTLER: When you did come down and obviously it was Cape Canaveral at the time and the Air Force base, and you mentioned the general. How did you make arrangements with the Air Force?

PRESTON: Oh, that's what I wanted to tell you about. Of course, we were flying off an Atlas, and as I said, started to say anyway, we didn't know [anything] about [the] range. They threw this big book about that thick, which was the countdown, and we had to create one. So the operations manager of Convair [Division of General Dynamics] took us under his wing, and I mean really, and his name was [Philip E.] Culbertson. By the way, he ended up somewhere in the hierarchy up in headquarters, pretty high. But he was very helpful and he led us through that process.

Of course, being young whippersnappers up in Cleveland, we just didn't know what was going on, so we just had to follow his guidance and did, and got through it. But that was very helpful, one of the people that really helped us out. That, besides the fact that we were all, I don't know what—it wasn't in awe. In fact, were the opposite from being in awe, but watching that Atlas fly, or try to fly, which was what it was doing back in those days, I mean, Walt Williams and I stood on the top of the range control building one day during one of their vehicle tests for the Atlas program itself, and the thing got off about 1,000 feet and just exploded. It was in the middle of a blinding rainstorm, and here we were about two months away from flying. It didn't help. Even when we did fly, the adapter which connected the booster to the spacecraft collapsed, and it wasn't very successful.

So we started out with some pretty bad moments in that Atlas program and then I swear, I don't know what happened, but it all of a sudden [things] started working... I'm talking about the booster. We never did have that much trouble with the spacecraft failures. We had our share of failure, but not like that. But the booster all of a sudden started working. Of course, it was about time, because it had been about ten or fifteen flights that failed. But I

think the fact that they were new, they were getting into big trouble if they didn't, they sort of beared down a little harder. But I still haven't answered your answer.

BUTLER: That's all right. Building and learning from the failures and making it a success.

PRESTON: Yes. Well, it's almost like the crash program we had. This was a case where we let go of the airplane at the end of a runway and let it run down and crash, and we forever were finding else new that we didn't expect. When it finally got all through and he said, "Well, that's what we were trying to find out." And it's true, you learn by failure almost as much as you do success.

BUTLER: Absolutely.

PRESTON: But you have to go through some rather strange emotions, though.

BUTLER: You were trying to basically create from scratch all of these procedures.

PRESTON: Yes, well, we would have never have made it if it hadn't been for his help. He didn't exactly write everything, but he sure led us by the nose. He lives here, by the way, and he's a very good friend of mine.

BUTLER: Well, we might have to look at maybe having him participant in the project.

PRESTON: It would be a good idea, because he was the—I don't know his exact position in headquarters, but he was pretty high up, I think, and worked for the administrator himself.

BUTLER: Yes, I'm familiar with his name. We've come across it.

PRESTON: Phil Culbertson. He retired four or five years ago, but he had been with NASA probably since the end of Mercury or somewhere along in there, a long time.

BUTLER: And certainly involved with it beforehand.

PRESTON: Oh, yes.

BUTLER: Working with Phil Culbertson and the Air Force and the NASA people, as you were starting out, you were based in Hangar S at the Cape, is that correct?

PRESTON: Yes.

BUTLER: How did you start building these procedures and figuring out the safety as you went along?

PRESTON: Well, we finally learned what was expected and, of course, it turns out you just put down on paper what you know you have to do. I mean, in detailed steps. Before when we were flying up at Lewis, we'd just go out and do it, and that's not acceptable when you've got all this kind of business. But it was just a matter of writing down what's going to go on in detail. I mean extreme detail. Sometimes it gets a little annoying, it's so detailed, but that's the way it really has to be, so that everybody knows what's going on. That's the way they still do it. It wasn't hard— [*Telephone interruption.*]

BUTLER: You were talking about the details.

PRESTON: Yes, well, that's essentially what it amounted to. You just had to go by what you're going to do and how you're going to do it and put it down on paper. It wasn't difficult once you knew what was required. In fact, Scott [H.] Simpkinson, who worked for me, he was later at Houston, involved in flight operations, and I understand doing a very good job, he since has died, along with many of my cohorts. But he was kind of a stickler for that kind of thing anyway, and he sort of took over the business himself. Of course, we had McDonnell [Aircraft Corporation] as a contractor; that didn't hurt.

John [F.] Yardley, who was their base manager, was an excellent engineer. In fact, I would say he was the father of the Mercury design, outside of [Maxime A.] Faget, and he was very prominent all the way through Mercury and Gemini and even Apollo, which I'll talk about later. He was the base manager here all through the Mercury program, but went back to St. Louis [Missouri] for the Gemini program and was the designer of the Gemini spacecraft. The basic designer, anyway.

I talked to you about transferring of this Florida operations group to KSC, which at that time brought all the elements of NASA together under Debus, who was the director of KSC. He was serving as the launch director at the time that this occurred, and he made me his deputy. I expected that I would evolve into his full deputy, but I wasn't. But I kept busy with Gemini. We still had to fly, I think, it was VIII through XII Geminis after we were transferred. Prior to that, we were an isolated group down there and not part of [KSC].

We, in the Gemini program, [also] had to do the checkout of the factory. Chuck Mathews came up with the concept that to reduce duplication, which is the opposite way I wanted to reduce it, he said, "We'll cut back on the Cape checkout and you do it at the factory." Well, the same people were doing it and it did help, but I still think it would have made sense to cut back on the checkout of the factory and do it at the Cape where you had to be. But that didn't work that way. But it did help.

Which reminds me, way back in the Redstone program we started out going through Huntsville [Marshall Space Flight Center, formerly ABMA] with the spacecraft to mate it with the launch vehicle and conduct those tests up in Huntsville. I was the one that was saying that is pure duplication, and they kept fighting it. We finally called a meeting in headquarters, between Silverstein and the Huntsville people. Von Braun himself didn't show up, but during the discussion it became very obvious that Abe was going to side with me, and I think I sort of had an advantage anyway.

So he did, and he ended the meeting, and the guy from Huntsville who was the branch chief in charge of the facility where they were going to run this test, says, "If you don't do that, we don't want any part of the program." To Abe, who was the third command [of NASA]. I think he got a little upset and he just slammed his fist down and left the room. The next day we got the decision, and we never went back.

There was another little side he showed on that same trip. I was up where the spacecraft was during the night, and here comes von Braun walking in. He wanted to get in the spacecraft and I says, "Well, I've never been in it and I don't think you should," and he didn't. I've often wondered maybe the traffic in that spacecraft was more after I quit being in charge, I don't know. But my reason was that every time somebody strange got into the spacecraft, they broke some wires, and it was an infernal nuisance, besides the fact that it was dangerous. But we weren't running tests with the oxygen like they were later, so we didn't have that particular problem.

But anyway, at the time that we were transferred over to KSC, as I said, we were all busy with the end of Gemini, and in addition to that, my group was doing the same thing at the factory checkout for the Apollo more in design review than the checkout, because it wasn't ready yet. I was scheduled to be transferred to be director of design engineering at the end of the Gemini program, because Rocco [A. Petrone] and I just plain didn't hit it off. In

fact, I never even participated in one of Rocco's meetings on Apollo at any time, and I was busy with Gemini and I was very happy with that.

So I was scheduled to transfer the day of the Apollo fire. Well, that put the squash on that, and I spent about the next two or three months working on that investigation committee. Then they transferred me. It was a new challenge and I really enjoyed it, and I think I made a contribution with the DE [Design Engineering Directorate], and the people in DE liked me, so what more do you want?

BUTLER: It's always a good thing.

PRESTON: But Petrone worked on the Apollo and I worked on the Gemini, and that way we never had a problem.

After design engineering—well, before I leave, when I moved over to design engineering after the fire, it was a tremendous impact. Everybody wanted to make changes, and the spacecraft was going through a complete review, but they were doing the same thing with all the hardware, the launch hardware. Quite frankly, the design of the launch complex was what I called a civil engineering approach, which was not the same as aeronautical engineers had in all these reviews that they go through, failure analysis and single-point failures. There's five or six of them that you go through searching for trouble before it happens. They do that on the spacecraft, but they'd do that on this. But we went through all that and eliminated a lot of very potential hazardous situations. We spent about the same time that the space task did getting straightened out, and that was the big job in design engineering.

After design engineering, though, I became the director of center planning and programs, where I first ran into the Shuttle program. The Shuttle program went through what's called Phase A and B studies, first, to just sort of set the pattern. One of the things

that came out of those studies was the predominance of McDonnell-Douglas [Corporation] and particularly [John] Yardley. They came up with the eventual configuration of the Shuttle, but when it came to the contract bid, they just plain and simply flunked the course. Nobody ever understood it. I mean, here was the irony that the originator of the concept, but his bid was terrible compared to what we knew he was capable of. I don't know what happened.

But they didn't win, as you all well know, but Yardley stayed in manned spaceflight, becoming part of headquarters and very effective there. Yardley's an awful good man. He and I, back in the beginning of Mercury, though, had a lot of fun, because we were down here by ourself and if we wanted to do something, we just did it. We didn't have to tell everybody else in the world; we just did it. They soon caught up with us, though. *[Laughter]*

I think that's enough about...my career. Well, incidentally, I retired from the program manager at KSC for Shuttle when it got evident that I was [not] going to...be around when the thing flew. At least I didn't think I was. I figured, well, better let the young guys run it if they're going to have to use it, and they did.

But we had had a different approach on the Shuttle program than we'd had in any time before. See, I'd been through the operations side of the house and I'd been through the engineering design of equipment side. So on the Shuttle I worked Thompson, Bob [Robert F.] Thompson, who is the program manager, to give KSC the responsibility for designing and building all the equipment used down here, which is only logical. Bob acquiesced right off the bat, but it made a big difference to the attitude of the people here. I mean, they had a fixed responsibility and they had to live by it, and they did a good job of it. This not only included the mechanical equipment, but it also the electronic equipment, which they designed the checkout system.

Fact of the matter is, the bunch that I had back in Mercury, and at the very end of the Mercury program, had designed the checkout equipment for Gemini, which was the use of

computers and the computer screens to present the data. My biggest impact on that was to try to hold them back from trying to perform miracles with the computer. I mean, I wanted them to make it simple, and they did and it worked very well. It's evolved and they're still coming up with new ones, really improvements on the old ones. It's fundamental. It's actually one of the first uses of computers, but remember that was back in the sixties, so the computers weren't between—well, Houston flight control is the one that really pressed the use of computers. I mean, they did a tremendous job.

I shouldn't go on, before not admitting to the fact that Kraft and his organization bailed me out of trouble many times by taking care of things that went wrong after it got in flight. He did that quite frequently.

Where are we?

BUTLER: Well, we've gotten a good overview of your career with NASA.

PRESTON: Well, that's my career, but there are some personal experiences that I might want to talk about.

BUTLER: Absolutely.

PRESTON: I got to look and see where I duplicated.

BUTLER: Okay. Well, a couple questions that—go ahead.

PRESTON: I was really going back to, I already told you about the first Atlas shot that Williams and I watched and it failed. The first Redstone was the one where the Redstone lifted off about six inches and then fell back on the pad. Everything in the spacecraft worked

perfectly, all the recovery gear came out like it's supposed to. Yardley was standing, both he and I were standing right at the door of the control center, and he immediately knew what was going on. I mean, it was kind of confusing, seeing all this stuff coming out, but he recognized that it was proper procedure.

Well, I don't know, maybe you've heard that story before, but as a result of that, we had to put in a booster development flight for the Redstone, which went in right before [Alan B.] Shepard [Jr.], and we missed beating the Russians by a month and that was that month. However, they were going orbital and we were just lobbing it. There's a big difference.

But what happened to the booster, in case you don't know, is that the cord attached to the vehicle dropped out early, which made the booster think that—wait a minute, I've got that backwards. It didn't drop out. When it did pull it out, it thought the flight was over, so it shut down. It's only been thirty-some years, I'm a little confused. *[Laughter]*

BUTLER: That's all right.

PRESTON: It was the fault from the booster lifting off, and it shut down when it was six inches off the pad. An aside from that...our spacecraft [was] fueled with these hyperbolic fuels and not exactly the safest thing in the world. Walter [F.] Burke, who was the, I think he was chief engineer of McDonnell, decided he wasn't going to let his people safe the thing, so he, himself, went up there and safed it. He just wouldn't allow his own people to get involved.

BUTLER: I guess that's an example of good leadership, if you're not willing to do it yourself then—

PRESTON: Well, that's for sure. He came down quite frequently, and it was obvious that he was more in favor of the Mercury spacecraft than he was anything else going on at McDonnell, because he was spending more time on it.

I think I told you about going through Huntsville.

BUTLER: Yes.

PRESTON: Well, there's not much to say about Shepard's flight, except that the day of the launch I was in the block house as usual, and I went over to see how Shepard was doing with the medical people. One of them looked up at me, he just grabbed my arm, took my pulse, and I was worse off than Shepard was.

BUTLER: Well, I think that's understandable.

PRESTON: Yes. Well, truthfully, though, that is about the last time I ever did get too excited when it happened, because it just didn't do anything for you.

BUTLER: Well, after that you had done it.

PRESTON: Yes, I was extremely nervous on that flight. But in the case of [Virgil I. Gus] Grissom, you've heard enough about the flap about the hatch, so I don't need to bring that up. I do side with his wife in that this whole business of recovering the spacecraft is a little bit unnecessary. Quite frankly, I think before it's over they're going to blame Grissom for the whole affair, and I don't know how in the hell they can, but they will. I know we tried to figure out who it was, and finally said, "What's the point anyway?" They redesigned that

hatch anyway. It doesn't make any difference. But I think that's the newspapers or what they're after.

But Grissom didn't make himself any easier on himself because he had his flight suit full of pennies, which weighted him down, and he just came within an inch of drowning.

As a rather coincidence, my priest over here at the local Episcopal church...the last one, not this one, was in the flight crew of the helicopter that picked him up. I found that out years later.

BUTLER: That's an interesting coincidence.

PRESTON: Yes, absolutely.

Well, we might as well go on to the [John H.] Glenn [Jr.] flight. There's nothing much new there. The repeated weather problem got kind of old after a month of it, but we finally made out, and, of course, you've heard about the reentry problem and how it was solved. Here it was again Yardley's input that did that. He was always coming up with something like that, a very creative thinker.

Another incident in the Atlas program was when [the chimpanzee] Enos flew, when he got back to ground, he was just so mad he could—I mean, he was fighting mad. It turns out that he had a device in front of him, he was supposed to punch a lever to get some bananas, and he didn't get them, and he was just as mad as hell, [he got an electric shock instead].

About that time, I don't know the exact sequence, but President [Lyndon B.] Johnson, when he was elected Vice President with [John F.] Kennedy, before he took office, came visiting here, and he kept us up half the night waiting for him to come from down range and they finally got there about eleven o'clock. He didn't say a damn thing, except when we were showing him one of the monkeys in his couch, all he said was, "How long's he been in that

couch?" And that was it. He never asked a question, never said a word. Very brusque. I never had much of an opinion of him, and that didn't help.

BUTLER: Talking about the manned versus the flights with Enos, versus the unmanned flights, like the MR-1, were there major differences in what you would do to prepare for those missions, other than the fact of the—

PRESTON: Well, once we started flying, the astronaut himself participated. Before that, a mechanic would be in the spacecraft flipping switches, but once it started flying, the astronaut himself would be in there being the simulated pilot. So that was a big difference. As I recall, we didn't get in this position of having that oxygen-filled spacecraft when the man was in there. However, I think that's probably wrong, because we must have done it once or twice, but we didn't get that same experience. I think the difference was that we were extremely cautious about people being in that spacecraft and doing damage to it.

Joe Bobik was my chief inspector and he came from Lewis, a very competent inspector, very precise and very persnickety. Yardley used to complain all the time to me the fact that he was holding them up. I invariably would back him up, because you can't break those people's spirit or they weren't worth a damn.

BUTLER: Very true.

PRESTON: Anyway, it worked. We did have our moments of fear, but not as bad. I think I was the only one in that position that didn't end up with a fatality. Oh, wait a minute, though, whatchacall it. After Petrone. What's his name? [Walter J. Kapryan.] Came from Langley. That's terrible.

BUTLER: He took over from Petrone?

PRESTON: He was the launch director after Petrone. He was his deputy and then he was the—oh, my.

BUTLER: Oh, I can't think of it either.

PRESTON: He was in the tank at Langley. Well, that's beside the point, I guess.

BUTLER: We'll check the books and make sure we get his name.

PRESTON: Well, that won't help much, but anyway, I don't think he had a fatality. But a couple of times I came awful close. Like for instance, Armstrong's [Gemini VIII] flight, boy, they came so damn close it was terrible. He landed in the ocean. The odds weren't too red hot of picking them out there in the middle of nowhere.

But let's get back to—Carpenter's flight was the one after Glenn's, and he got so enamored with the scenery and the sparklers that he overshot by a couple hundred miles, and, of course, this is old news, probably an old story for you. But Walt Williams asked that we evaluate the astronauts from then on, you know, stability, because Carpenter, he should have paid more attention to what he was doing, but he didn't.

[Walter M.] Schirra [Jr.] was the next flight, and he came storming in the office, said, "You're going to tell me when I can fly?" He just blew his stack. Well, I finally told him that our crew thought he was the best manipulator of the control arm of the whole bunch, and that settled him down. [*Laughter*]

Everything in Mercury went along fine, considering. At the end of Mercury, we all went off to Washington and New York, quite an experience having a cocktail party at Disney's, and meeting the—who the cartoonist that just retired?

BUTLER: Charles [M.] Schultz?

PRESTON: Yes, Schultz was at that party.

BUTLER: Oh, how interesting.

PRESTON: Anyway, that was quite an occasion, but had nothing to do with the space program.

BUTLER: No, but an interesting opportunity that came because you were involved in the program.

PRESTON: Yes. One of the advantages of this job is we were continually meeting people from hierarchy, I mean, presidents and kings and things like that, and having state dinners with them. That was just a sideline of our job. But they'd come parading through here. The Shah of Iran [Mohammad Reza Pahlevi] was here several times, and I guess people don't think too much of him, but he's a pretty impressive guy.

BUTLER: An aspect of the job you never expected, I'm sure.

PRESTON: Well, it was interesting.

BUTLER: Talking about Mercury still, were you involved at all with discussions or the setup of the network, the communications network?

PRESTON: Not too much. Of course, the original control center was here in the beginning of Mercury, before they went to Houston, and that was the center of that network. Then later on, the network station here at MILA, is what it's called, Merritt Island Launch Area, was one of the prime ones of the whole network. But I never had too much to do with it. Never actually worked on the [unclear] or anything like that. That was essentially done by Goddard and a man back at Houston, Barry. Barry [Graves]. I got that far.

BUTLER: Well, that will give us a lead. We can find him in the paperwork, I'm sure.

PRESTON: I had enough to do without messing with that.

BUTLER: You certainly did. You mentioned the MR-1 flight that had had the problems and then having talked about the individual missions, and, of course, with the manned missions the abort system became a high priority. Were you involved in any of the work on that?

PRESTON: Do you mean at Wallops? No, I wasn't involved in any of the tests at Wallops or White Sands [Test Facility, New Mexico], except I went out there once, I can't remember why, but it was some test that they—John [R.] Bailey, who was here as a NASA safety guy, sort of independent safety guy, who was a brilliant engineer, too, from Langley Flight Research. I went out there to review what they were doing, I guess, but I don't remember what it was.

BUTLER: That's all right. You certainly had a lot of things you were involved with. I wouldn't expect you to remember everything.

PRESTON: Yes, but most of it was between here and the factory. Graves. [G.] Barry Graves was the network guy.

BUTLER: I'm familiar with his name.

PRESTON: Some I remember, some I don't.

BUTLER: There was a lot of people.

PRESTON: Well, there was an awful lot of people that I got involved with between the beginning and end of my career.

Now, right after—I think it's the first flight of Gemini, manned flight, Walt Williams retired, and Chris Kraft and I sort of split the jobs. I'd taken over what might be called—well, I was titled the launch mission director, and Kraft was still called the flight director. Kraft was nominally the head of the missions, but he delegated all this business down here to me, so that that was a change.

One of the things that happened, I think it was on [L.] Gordon Cooper's flight in Gemini when it started raining and Gordon informed me through the net that raindrops were on the windshield. About that time Debus called me up and says, "Why don't you...scrub?" I had Ernie Ames [phonetic], the weatherman, sitting right there beside me, and I sent him out to see and he says, "It's still out there." So we didn't scrub. Then about four or five minutes later, the lightning struck pad 34 and that was the end of that, because the lightning

would strike, but the transit that it caused in the power system shut down all the computers, so we didn't have any choice.

BUTLER: That's a good reason.

PRESTON: But Debus was all excited about it, but, quite frankly, he didn't have the authority to stop me. I'm surprised he didn't try, but he didn't. Of course, the real experience in the Gemini was the [Wally] Schirra-[Thomas P.] Stafford shutdown on [Gemini VI]. I mean, if you really want to get some thrills, that about takes the cake. Schirra, who was the commander, I don't know how he managed to not pull the cord that set the escape system off. Of course, he'd've probably been crippled. But he didn't. The thing shut down, right back on the pad. Again, it was thought to be something to do with the umbilical attached.

However, a more serious problem occurred that we discovered after we stopped and looked at the data. So they sent me down as the lone NASA Air Force guy at the press conference, and I closed them off because I was known as a spacecraft man and the booster was not exactly predominant, so they just took my word and didn't ask me a bunch of questions. I think the logic was pretty good that they wanted to shut off the debate, because it couldn't have only gotten worse.

But it was remarkable how we recycled that thing. At first, I just about threw up my hands, "We can't do that," and here again, Yardley prevailed and pointed out how reasonable it was. It turned out fairly reasonable, and, of course, it took off and rendezvoused with Gemini VIII, or VII, I guess it was.

BUTLER: Yes. That must have been quite a challenge to turn it around that fast.

PRESTON: Well, that was. We didn't even take the thing off the pad.

Then, of course, the next real thing in Gemini was Gemini VIII with Armstrong, when his spacecraft spun up on him. I don't know how he ever got out that one, but he did. When he did abort and land in the ocean, here he was out in the middle of the Pacific, and I don't know how they found him, but they did. Actually, right after the launch, I went home since my job was over, and George [E.] Mueller, who was the head of manned space flight, was here and he had gone to the airport to go home on his airplane. All of a sudden he called me up to tell me what was going on and told me to pick him up, so I went back out to the Cape with George.

Let's see, we're getting close.

But as you well know, Gemini was unusually successful, is one thing I would say.

BUTLER: That's a good way to put it.

PRESTON: They did a lot of things that were necessary for Apollo. I don't think it really is appreciated, but a long-duration flight it took care of with the—

BUTLER: Frank Borman and Jim [James A.] Lovell?

PRESTON: Yes, Borman and Lovell. I mean, they had a miserable time, but the rendezvous techniques were developed, the docking techniques, the using a target vehicle for propulsion. I mean, all these things are things that were going to happen in Apollo, and, of course, the extravehicular activity, which was necessary. So Gemini was a very necessary part of getting to the Moon.

I don't know whether anybody ever talked to you about the fact that during the middle of the Gemini program there were thoughts of sending it to the Moon.

BUTLER: We've heard a little bit about that.

PRESTON: Yes. Well, you aren't going to hear too much more about it. *[Laughter]* But McDonnell, of course, was proposing that, and so was the Gemini program manager before Chuck Mathews. I believe it was the Canadian engineer.

RUSNAK: [James A.] Chamberlin?

PRESTON: Chamberlin, yes. Yes, he was hot after that, too. But it didn't, but there was that thought and it probably would have worked, but it needs a lot of changes from what it was, and it would be kind of miserable conditions flying that damn thing all the way to the Moon and back. I mean, it was bad enough in the Apollo, but that was terrible.

Of course, we flew twelve flights of Gemini in twelve months and that was a smart contrast to what we did in Mercury. We really got with it about that time.

BUTLER: Had really developed the skills and the techniques.

PRESTON: Well, we had a feeling of confidence in the hardware, which McDonnell gave you. They were a good contractor. On the last flight, though, I got the pleasure of going out to the recovery ship which was on the carrier, and made a carrier landing and then a carrier takeoff afterwards.

BUTLER: Oh, how interesting.

PRESTON: What amazed me was that during the night we ran into some big waves, and I mean big waves, and that whole damn carrier would shake, and, hell, that thing's tons, so I wouldn't think it would bother it, but it did.

BUTLER: What an experience.

PRESTON: Yes. It was really surprising. I think that was just a bonus for the success of the Gemini program. Mueller and I were the only ones that went out, and I certainly enjoyed it.

BUTLER: Well, if we could pause here for a moment. [*Tape changed.*]

You mentioned that toward the end of Gemini that you had then been going to transfer into—

PRESTON: DE [Design Engineering]. Yes, well, I was transferred at the end of Gemini and as I've said, my biggest job there was trying to constrain all the requests for changes, because they were just going crazy, and a lot of them were just nice to do and convenient. So actually, I ended up serving on the Change Board just to keep them throttled down. Towards the end, after we had flown Armstrong and [Edwin E. "Buzz"] Aldrin [Jr.] and—shame on me, don't remember the name of the third.

BUTLER: [Michael] Collins.

PRESTON: Yes. Pity he had to take that position. But anyway, after we'd flown them, I figured now all the equipment on the ground worked, now let's leave it alone. They kept wanting to change the damn stuff and that's just when you make trouble for yourself. So I got rid of half of my contract people, which they didn't like, but it's one way to shut it off,

because these people had a way of making you do things you didn't want to do and didn't think you should do, so I just didn't have the capability anymore. Fortunately, Debus agreed with me. But it caused a perturbation in the atmosphere around here, as far as business is concerned, I have to admit, but it was necessary. I mean, here we were, I think I had 10,000 people working for me at one time and that just didn't make sense.

Anyway, one thing that happened to me while I was still the deputy director of operations was one of the first Saturn IB flights, they scrubbed the launch and then Andy [Andrew] Pickett, who was the launch vehicle mechanical engineer, or propulsion engineer, convinced them they should unscrub it because he knew what was wrong, nothing, and they said go ahead. The ABC newsmen had already gone back to the hotel. He got mad. [Laughter] But I never heard of anybody unscrubbing a launch before, but he did.

BUTLER: That is unique.

PRESTON: But he was right. They went on to a successful flight.

BUTLER: Were you involved with several of the unmanned Saturn launches before you transferred over?

PRESTON: I was when I was the deputy director. I was in charge of all launches, but I can't say that I was very active with that. I mean, I was their boss, but from afar. At that time, that crew from Goddard, like my crew from Houston, was combined with KSC, and they were pretty damn independent and well should be, like we wanted to be, too. No, they were quite capable, and the same people, at least the same people that worked in that organization are still in charge out there. But they're the ones, Vanguard, with all its miseries, went all

through that, and then they were in charge of all the unmanned launches, here and at Vandenberg, and still are, so they were quite capable.

I was more or less like Walt Williams was; I was supervising from above. [Laughter] That's one thing, one thing Walt pulled on me that I didn't particularly like, but it turned out all right, way back in the middle of—I think it was Gemini, we moved from inside the hangar building to the new building out in front. At that time, Walt says, "You're bearing down too hard on Yardley." And we were giving him a hard time, because that was what my inspectors were doing and the engineers, but they were making sure they were doing the right thing, and it wasn't always the pleasant thing involved, and most always held up the program for a couple of days.

Of course, Walt knew that Yardley was very talented, so he wanted me to put a little more trust in him. We got along pretty daggone well. As I told you earlier, back in the beginning of Mercury, we just did what we wanted to and told everybody else afterwards, but they put a stop to that.

BUTLER: Talking about John Yardley and McDonnell, of course, on Apollo they changed over to North American [Rockwell Corporation]. Did you have any thoughts at the time on the difference between the two contractors and how that would affect things?

PRESTON: Well, you see, fundamentally McDonnell, not McDonnell, but North American was the designer and developer of the X-15, and that was a very forward-looking piece of equipment, and so it came to a certain amount of confidence. Stormy—what was his last name? [Harrison A.] Storms, I guess—was real talented, but he didn't stay with it too long. I can't remember how long. He was president at one time, wasn't he?

BUTLER: I believe so.

PRESTON: I think he was. But he didn't stay there that long. I never had a bad feeling about North American, although I had a very good feeling about McDonnell, because I'd been working with them so much, and particularly Yardley. But outside of Stormy, there wasn't anybody like Yardley. I mean, nobody stood out like that, and it would be unusual if there were. Stormy was good, but I don't know what happened. Do you know what happened to him?

BUTLER: I think after the fire, I think is when he moved on.

PRESTON: No, I don't think he lasted that long.

RUSNAK: I think that's right.

PRESTON: He was?

RUSNAK: Yes, because North American didn't want him to leave, but other people at NASA felt that it might be more appropriate that he did.

PRESTON: Well, the president was not Stormy then, it was a guy that I was most—well, I shouldn't—turn the thing off. It's not appropriate to talk about.

BUTLER: Okay. Not a problem.

Were you very familiar with the differences between the Block I and then the Block II spacecraft on Apollo? You mentioned that you had been involved with the investigation.

PRESTON: Yes, not intimately like—if you want to know something about it, Joe [Joseph M.] Bobik could tell you. But the basic difference was the care with which it was built. Now, as I said, I'd never been in those spacecraft myself and made a point not to get in, but my impression was that McDonnell bundled up their wiring like you do in a production airplane, all harnessed together. I have a feeling before the fire got there that these wires were just strewn. Now, I might be wrong, but that would be a problem.

Of course, that was all cured after the fire. There was, what, a year or two, over a year elapsed between that flight and the next one, and they went through detailed assessment of every single component in that vehicle that determined how it could fail and what and if it would fail. We did the same thing on the ground. There was a very soul-searching review of the design, both the spacecraft and the launch vehicle, and then the launch vehicle and the ground.

So there was a tremendous change, but not in what you might think is a big way, but it was many, many little changes that made it safer. But by then, see, I wasn't paying much attention to Apollo at that time. In fact, I wasn't even involved in Apollo, so I wasn't too aware of exact—I sat in on the investigation board meetings, but I didn't participate in them, and heard all this discussion. But Max Faget was down here and he's very competent in that kind of thing, so we didn't figure I had to worry too much about what to do.

All I was aware of was the tremendous amount of changes, and, of course, we were doing the same thing. It was the whole attitude. I did get to the feeling that they were overdoing it, but I guess that's better than underdoing it. Because we spent an awful lot of time and money on those revisions both on the ground and—

BUTLER: Certainly understandable that they would want to be safe.

PRESTON: Oh, yes. One point I might make is that [Joseph F.] Shea was not an airplane man, he was a computer man, and then I guess he had something to do with missiles, but there's a difference flying manned airplanes and some of these other kind of equipment. So his experience, he was an extremely talented engineer, but he lacked a certain sense of knowing about manned flight. I think Rocco [Petroni] initially was the same problem, because they never had any—I mean, Kraft and I both came out of the flight research, flying airplanes and not exactly safe airplanes while we were at it, either. However, nobody will ever really know and don't how I can—I think I better not say any more about that.
[Laughter]

BUTLER: That's perfectly fine.

PRESTON: Some people might get excited about it.

BUTLER: You moved into the design engineering directorate.

PRESTON: Yes.

BUTLER: Can you tell us what your duties and roles were in that, what you were responsible for?

PRESTON: Say that again.

BUTLER: Can you tell us when you were in the design engineering directorate, what did you do?

PRESTON: Well, it was responsible for designing KSC, period, everything, but that included all the launch complexes, plus all the equipment in them, plus all the checkout gear to check out both vehicles. We were successful in doing that job for the spacecraft end of the deal, but Marshall, in its usual fashion, never gave up all its authority, and still hangs on to some of it.

But it was a pretty neat job, actually. I was there, I don't know, about three or four years, but it was right through the critical part of the Apollo, from the fire on to the end of the Apollo program. I wasn't there for Skylab. I probably was in future programs by the time Skylab came along, and, of course, the Shuttle I was involved in as a project manager.

BUTLER: While you were in the design directorate, were you involved at all with the missions themselves, or did you help in any of those when—

PRESTON: Well, the only real involvement is that all the senior staff participated in what was called the launch readiness reviews. So I was always involved in those, but I think when I became involved in the Shuttle I didn't spend too much time on that. I was busy enough taking care of the Shuttle, so I didn't. Of course, the design reviews, I mean, the launch reviews were also considering of the ground equipment, so I was there for the fact that they were covering my equipment, too. But as far as the flight hardware, I didn't really have much to do with it except the mate between that and the ground equipment.

You know, I was amazed, though, when after I'd been a designer and it came to the first Saturn V launch, and I stood there and watched those massive swing arms move, but not only move, but the instant of liftoff. I mean, while liftoff was going on, and, boy, I'm telling you, that gave me as big a shudder as Shepard's flight. I mean, that really thrilled you, because, boy, that could have ruined the whole day. I think there were eleven of them, and, boy, those things were huge. They still are, or what's there. But they worked. I had my moments.

BUTLER: Must have been quite remarkable.

PRESTON: Yes. People tend to think only of the flight hardware, but I soon learned that those kids and boys were doing a big job.

BUTLER: Certainly everything on the ground and all the people are required to make the missions happen.

PRESTON: Yes.

BUTLER: You mentioned the first Saturn V launch. Was this an unmanned one or was this the Apollo 8 launch?

PRESTON: No, this was the unmanned one before Apollo 8. But even Apollo 8, though, you just couldn't believe that they were going to do that. I didn't have any input into doing it or not doing it, except wanting to get on with it, but, boy, I'm telling you that was a huge step. I wonder how the three astronauts really—they must have gone into that with a certain amount of destiny in their thinking, because the odds were greatly unfavorable. I mean, hell, how in the world could we expect to do that? But we did.

BUTLER: Luckily it was quite a success.

PRESTON: Oh, that was a tremendous success. You know it changed the whole environmental attitude of the world when they saw that picture of the Earth. I mean, it did more than to advance the environmentalism than anything that ever happened.

BUTLER: Certainly gives you a whole new perspective.

PRESTON: Oh, it did that.

BUTLER: Talking about the missions, even though you weren't directly involved with them, Apollo 8, of course, was a very big step and then Apollo 11 was, of course, the landing. Did you watch that one and then do you recall where you were when they landed on the Moon?

PRESTON: Oh, well, I was—when you see the next launch, you'll see a plexiglass cage over behind the launch director. That's where I was. That's where almost, well, all the senior staff that weren't down on the floor were located in case a problem came up. Then I came home and watched it on TV, of course, and stayed up until the middle of the night. In fact, what time did it land? I've forgotten.

BUTLER: It was pretty close to the middle of the night, I think.

PRESTON: It was pretty late, I remember that. But anyway, that's my normal procedure, anyway, even when I was involved, because once it lifted off, there wasn't a damn thing I could do, and they knew where to get me if they had to.

BUTLER: That's right. Must have been good to see it all come together.

PRESTON: Well, as I told you earlier, Kraft bailed me out quite often, but I'd sit here, I never was comfortable until the thing landed again, because something could go wrong and it could

be something we did and usually was. You know, that's where Kraft did me a big favor in fixing them.

We'd better get on. We're getting close.

BUTLER: Okay.

PRESTON: Well, we've already gone over that.

BUTLER: All right.

PRESTON: [*Referring to notes*] Hey, we're on the last page. On the Shuttle program, KSC participated more intensely in the design of the spacecraft than it ever had before. I mean, it was heavily involved, not the spacecraft, the Shuttle, and it was there mainly to give operational aspects of design. I had developed a team from throughout the center of probably twenty to thirty people, specialists in each area that would go out to design reviews, and then when they got around to start cutting hardware, that group would go.

Bob Thompson and I were old friends from Mercury, all the way back to Mercury, and we understood each other. That's where I got him to assign the responsibility for all the ground equipment to KSC to design and build, which was a big boost to KSC. KSC sort of felt like an orphan child and that's the way ABMA treated them. But we participated in the selection of the Shuttle contractor very heavily with, I guess, fifteen people that were out at Houston for almost—not almost, a month, at least, at Houston while that review was going on, and had some very strong comments about the design so that we were really involved in that program.

As I said, I don't know if I'm bringing it up again, but I was disappointed in McDonnell and Yardley not getting that contract, but it later turned out that it wasn't that bad.

But you had something that you knew and trusted that you all of a sudden had to give up. Besides, Yardley was really the father of the Shuttle in the configuration as it ended up. I still don't know what he did.

BUTLER: The Shuttle was so different from the earlier programs.

PRESTON: It was really an airplane, still is, and we treated it as an airplane. They're just now getting around to the point where they're treating it like an airplane. You see, one of the big differences is you're flying the same piece of equipment all the time. Now, you can overdo that, but every time you fly it, you become more acquainted with it, you know more about it, and you know all these idiosyncrasies it pulls up.

The only thing you have to be concerned about is you're not wearing it out. Airplanes fly for thirty and forty years. They don't fly in the same environment, but if it was supposed to have been designed for a hundred flights, what is it, about sixty now, or something like that? I don't know the number. It's quite a few. But they keep improving it, keep rebuilding the thing. So the only thing I see wrong with the Shuttle now is it's too damned expensive.

But we had all those great ideas when we built the Shuttle first. It was going to turn around in a week's time and we even had schedules that showed it turned it around at two weeks' time, I think. There was one difference, and that was that my first proposal—and that's the reason some of these cost numbers are wrong—is that we proposed that the Shuttle be conducted by a complete government group composed of a military Air Force and NASA and the military doing all the technician work and NASA doing the engineering work and that's it. That's the way the cost was costed out. Of course, that's what they like because the numbers were low. Never got close to it, but that's the reason.

But the Shuttle concept was great, except that there's too many pieces thrown away. It was real hard to get the old flight hardware people, like the launch vehicle and spacecraft

people, to change their attitude, because, after ,all they were going to fly something over and over again, compared to that thing you threw away. They had to check it out different, and, boy, they were extremely cautious with the original hardware, but they didn't need to be that cautious. We took people down to the American Airlines maintenance hangar and showed them how they did it and all this stuff. Didn't help much. I had more control over the spacecraft people, because they knew me better, but the launch people, their people just ignored me.

BUTLER: Well, you worked with the Shuttle Program for a while and then you mentioned that in 1973 you retired.

PRESTON: Yes, I decided maybe I'd better get out of here. Really it was because I wasn't going to be there when they flew, because that was several years off and I left it in competent hands. Andy Pickett was my deputy and then Bob—oh, boy. He's the old unmanned operations guy. One from Goddard. Bob. He'll kill me for not remembering his name.
[Laughter]

BUTLER: We'll look it up in the records and we'll slip it in the transcript so that—

PRESTON: You slip it in so they won't know who it is?

BUTLER: Well, we'll put it in the transcript. We'll make sure his name gets in there.

PRESTON: I know him as well as I know anybody. You get old, you have these lapses. I'm surprised I remembered as many as I have.

BUTLER: Oh, I have them, too. You're doing very well.

PRESTON: I think I'm about done, at least from—if you want to ask some questions.

BUTLER: Well, did you do any other work after retiring, or did you just retire and relax?

PRESTON: Yes. I got the brilliant idea—my son was going to the University of Florida, taking building construction, which is really learning how to build buildings. It's not a civil engineering course, but it's more business oriented, plus engineering oriented. He still is building buildings, commercial buildings mostly, and being fairly successful at it, not as his own company or anything, but he's a part owner, small part, I might say.

But anyway, I just got the idea that I'd retire and help him out. Well, it didn't me long to realize—I love building. I built part of this house, I built my house in Cleveland. It wasn't that, but when we were in the building business, I was constantly in fear of getting involved in a lawsuit of something that happened that I had no control over. Unfortunately, if I got involved in a lawsuit, I'd lose my retirement. I just finally said it ain't worth it. Besides, the people that you work with in that industry are deplorable. They have no scruples. I'm not talking about everybody, but many of them will lie, they'll cheat, and they don't know what a schedule means. When you try to put a schedule in the building industry, you're barking up the wrong tree.

I remember one case I was doing a lot of free labor for like the art museum. I supervised the construction of the new museum and actually participated in one building. But you just never knew what those workers were going to do next. I tried to, for instance, overlap crews to make sure one was ready to go in when the other one moved out. You can't do that. You've got to wait until it's done, then you call up the new crew and when they get

ready, they'll come. So there's consistently two weeks' gap in the program. My scheduling attitude from space just didn't work.

So it got just plain downright annoying. My first thing I'd built under contract, I did subcontracting. I subcontracted with a guy to do the cement work. Well, one of the worst things he did is, around a house there's a concrete lintel and normally on the first story you'll bucket the concrete up to pour it. Well, it got over to this office building I was building, the boss said he'd do it. He showed up the morning and he says, "My people won't work. They won't do that. You've got to get a crane." Here I had about ten yards of concrete sitting there waiting. Fortunately, the concrete man says, "Well, I can take care of it. I'll take it to another location," otherwise I'd been stuck with it. But that's a typical thing they do. I remember in building a house—is this recording?

RUSNAK: It is, yes.

PRESTON: Okay. Anyway, in building a house I'd bought all the hardware, the door knobs and all the locks, and I had them in the back of my truck. I came out that night and they were all gone. I found out the brother of the contractor had taken them. I mean, that's the kind they were, so I just didn't enjoy it. I mean, after working with NACA and NASA, those are different people.

BUTLER: Very different. Very different.

PRESTON: I never saw anybody with that attitude in that time frame.

BUTLER: Well, if there had been anyone like that, the space program wouldn't have been the success it was.

PRESTON: Well, I just don't think there were. I think they were motivated to be better than that. Even the mechanics and that type of people, they were real high-grade people.

BUTLER: Certainly had a good goal to be shooting for, and people really wanted to make it happen.

PRESTON: Well, they were proud of what they were doing.

BUTLER: Definitely something to be very proud of.

PRESTON: But you know when you're flying airplanes, you don't goof off like that either.

BUTLER: No.

PRESTON: Because your life's at stake.

BUTLER: A couple just final questions. Looking back over your career with NASA, what do you consider your most challenging moment or the biggest challenge that you had?

PRESTON: Most challenging moment. It can't be one, but one of them, of course, was the Gemini turnaround and launch in 76. The Shuttle program was a big challenge, and then, of course, lunar landing, they all three were tremendous challenges.

BUTLER: They certainly were.

PRESTON: I was more heavily involved in the Gemini and the Shuttle than I was in the actual flight of Apollo, which is what probably gives you more challenge. But it was a challenge to make all that damn stuff work out there on the pad.

BUTLER: Absolutely.

PRESTON: But, you know, I started out extremely fortunate. I ended up in the first job with one of the most talented persons in the NACA, Abe Silverstein. I went from there to Lewis, where he followed me, by the way, but at a distance. I ran into Irv Pinkel, who was my boss at the flight research. He was a very talented engineer, too. He had quite an influence on me.

Then George Mueller and Kurt Debus, both in the space flight business, had a good influence, George in a lot of negative ways, because I think he personally was responsible for my not being appointed director of launch. I don't know that, but I suspect that. But he did in the Shuttle program involve me and he involved me pretty heavily, and I think had confidence in what I was doing there.

Of course, I could go back to college where Hemke was my prof, and he had a talent. He would go off on these lectures that you absolutely didn't understand what he was saying at all, and then all of a sudden the light would shine and you were understanding everything he had said. I don't know what his technique was, but it worked. But I never took notes in his class.

Rensselaer was a tough row to hoe, I mean, you had a daily quiz on the blackboard where everybody could watch you, and you had a weekly quiz, and then every two weeks you had an exam, and then after you go through that, you'd go through two weeks of another program, and then at the end of the semester you'd have an exam. This is the same system

that the military academies have, and, boy, it's rough. I mean, you knew every day your grade was posted on the board. You didn't get behind there without knowing it.

BUTLER: Well, it certainly kept you on your toes, it sounds like.

PRESTON: It sure did. It's an awful good school.

BUTLER: It certainly is.

PRESTON: It's different than the other technical schools in that this was fundamentally an undergraduate school, whereas MIT [Massachusetts Institute of Technology] is basically a graduate school and so is Cal Tech [California Institute of Technology]. They do have undergraduates, but I don't think they're as good as Rensselaer, and there are a lot of good undergraduate engineering schools. I had a hard time making up my mind about [University of] Michigan and Purdue [University] and Georgia Tech [Georgia Institute of Technology]. My dad finally convinced me to go to Rensselaer because a former resident in our hometown was from there and he happened to run into him and he talked him into it. I sure was never against that decision.

BUTLER: I guess you have to have some factor that outweighs all the others.

PRESTON: Well, he was the one that was going to pay the bill, so I couldn't argue with him. Back in those days, I think when I first went to Rensselaer it was 200 dollars a semester. Now, boy, it's something like 10 or 12,000. I don't know, maybe it's even higher. Terrible.

BUTLER: It's pretty expensive now.

PRESTON: The second year they raised it to 400.

BUTLER: You've certainly seen quite a few changes in everything from finances to technology over your career.

PRESTON: Oh, yes. When I was in high school, my friends were all taking pilot training in [Piper] Cubs, if you know what a Cub is. Most of them were soloing in a matter of four or five hours, and most of them didn't do anything about it. So I never got around to it, mainly because I thought it was too damned expensive, because it was expensive even back then, particularly in light of what the economy was then. In the middle thirties things weren't running too hot.

BUTLER: Certainly not.

PRESTON: I was surprised my dad could send me away to school, but he just the year before got the job as county treasurer, which gave him an income. Before that he had three department stores, which the Depression took care of all three of them, one at a time. So things were a little rough, but could have been a lot worse.

BUTLER: Certainly could have. It sounds like it worked out pretty well in the long run.

PRESTON: It did for me.

BUTLER: Again, looking at your career with NASA, is there any one point or a couple points that you feel you made your greatest contribution to the program or your most significant accomplishment?

PRESTON: Well, the latest would be the Shuttle program. I made a fairly significant contribution mostly in the design of the Shuttle and design of the ground system to go with it. Yes, we made a very big contribution for that, and participated pretty well. In all the previous programs, KSC's input was sort of incidental, but ours became, particularly with Thompson's appreciation and recognition, involved us more heavily and more rigidly than before. So that we did make a very significant impression. But of course, all the programs. Gemini, I think, was more, I was more responsible than Mercury or Apollo. More self-satisfying. I think we accomplished an awful lot.

BUTLER: Absolutely.

PRESTON: But the longer the space program went on, the more diluted it got, as far as people were concerned. It started out there weren't very many.

BUTLER: The program certainly grew a lot.

PRESTON: Yes. I can't remember how many was in Space Task Group. I remember there were only about twenty-five in this organization down here, and it grew to about five hundred before it went into KSC. Some of that might have been more than necessary.

BUTLER: But you were able to accomplish the goal and bring it all together.

PRESTON: Yes, I think we did. Did you get a chance to answer any of your questions?

BUTLER: I got most of mine covered. I'd like to ask Kevin real quickly if he has any to tie things off.

RUSNAK: I just had a couple. First, it's more sort of a general question. When you first got down here, you know, in the first few weeks, what was the atmosphere like? What was it like being down here, how were things being run, and what were the big tasks you had to do?

PRESTON: I told you about the general saying, "Just go ahead and leave the spacecraft, we'll take care of it." That was the atmosphere. See, you got to understand that the Air Force had the MOL [Manned Orbiting Laboratory] program, and it got canceled because of Mercury. Well, they didn't take very kindly to that. I still have friends that were MOL astronauts that live here. I think he's by now gotten over the grief, but it was a shock to them. I mean, they were pretty far along in that program when it was canceled, and I don't really know exactly when it was canceled, but I know it never got very far. So the attitude was not very welcome. I mean, very negative, particularly with the general himself. Fortunately, we had a colonel that was the base doctor who could see our point of view. I don't think he—whether he talked to the general in the off hours or not, but it seemed to ease up a little bit. That was a rather strange attitude.

Another thing that might be well to mention, when we came down here, the four or five of us that came, stayed at the Tradewinds Hotel down in the middle of Indalantic. I don't know what it's—I think it's gone, but it's an old hotel run by a local man who had four or five kids. Whenever we came and the hotel was full, he'd kick his kids out of bed and let us have the bed. I mean, that's the kind of guy he was. But the night we got here, he threw a party

for all the residents in Indalantic and for us to welcome us. I mean, that was the reception we got from him.

Unfortunately, we stayed there all the time we were just visiting, but when we came down here for the long haul, we just had to get closer to the Cape. It's too far out there, so we moved up to Cocoa Beach. Cocoa Beach was a wild town. I remember the first trip down here that we stayed there, we were staying at the motel and the balcony overlooked the swimming pool, and in the middle of night I heard a bunch of noise and I got up and here was a couple out there swimming naked. [*Laughter*] But that wasn't unusual.

I mean, I never had any thoughts about living in Cocoa Beach. The people in Cocoa Beach won't like that remark, but despite the fact it's a long way. I think parts of Cocoa Beach now have settled down, but it sure wasn't back in those days.

BUTLER: Certainly a unique time.

PRESTON: Your turn.

BUTLER: Well, I've pretty much got mine covered.

PRESTON: You got any more?

RUSNAK: We had heard stories about things like them bringing the first Mercury capsules out to the pads in the back of a pickup truck on top of plywood and mattresses and just having little roped-off areas of the hangar, those kinds of—

PRESTON: That would have had to have been Big Joe, if it was. I wouldn't be surprised if it's true, but I don't think we had any carrier vehicle. I really don't remember, but as I said, I wouldn't be surprised.

BUTLER: Just pulling things all together.

PRESTON: We had to do things rather differently. I imagine the people on the ridge got a kick out of that. *[Laughter]*

RUSNAK: Yes, that seems to be what they said.

PRESTON: Get it done, that's all.

RUSNAK: Right. That's why I was wondering how primitive were the facilities to get the technical job done here.

PRESTON: Well, when we first came with the real piece of hardware—Bob Gray is the guy I was trying to think of in charge of the unmanned. He used Hangar S for his unmanned launches and he had what was called a white room, which was about half as big as this house, where he did all his work in. Mel Gough kicked them all out of the hangar and let us in. I don't think that was right. I don't think Bob ever forgave him. We took over the hangar. I don't even know where he ended up.

But the hangar was our total—it had offices on each side built into the hangar, but shortly after that they built a lean-to sheetmetal building on the north side of that building. That was our first change. Then later they built a building out front for engineering offices. The further I got away from it, the further I got away from the intimacy of the work.

You keep losing track in the middle of a—go on, your turn.

RUSNAK: In terms of the other facilities at KSC that they were building really for the Apollo program, things like the VAB [Vehicle Assembly Building], did you have anything to do with those?

PRESTON: Not in the beginning. That was essentially—that's what Petrone was doing, as the, I guess, you'd call it the program manager of the KSC facilities. He wasn't a design engineer, he was more or less a project manager and did all the budgeting and the designs, I mean, reviewing the designs and all that. So back in the Gemini and Mercury days, I had nothing to do with that. But that's where Petrone got his start.

I remember back in those days Congress would send its...committee down here. We'd have to brief them, and so Petrone would start off and he'd spend about five or six hours briefing the Congress and wanting, oh, kilobucks. I mean, hundred million, something like that a year. I'd go in there with my little bit and I'd want about five million. They started giving me a hard time, you know, questioning and questioning, and finally I got upset. I said, "Now, you're just talking about chicken feed here. Why are you making such an issue out of it?"

Boy, I heard from— [*Laughter*] George Low called me up the next morning, he just gave me thunder. I realized, of course, as soon as I said it that I was in trouble. [*Laughter*]

BUTLER: Whoops.

PRESTON: I think I called it chicken feed. [*Laughter*] But they quit talking, they quit asking, but it was truthful. I mean, it was at least a hundred-to-one ratio between what I was asking and what they were asking. But they sure gave me the going-over.

I'm trying to think of the head of the manned space flight subcommittee. He's from Texas. He's dead now, but he was one of our best supporters. His nephew was a priest at our church, and now I can't remember his name, but anyway, he was one on our side, and fortunately he was the chairman of the subcommittee.

BUTLER: Olin [E.] Teague?

PRESTON: Teague. Yes. He was a great guy, particularly when he took care of us. But all through the Mercury and Gemini program he—I don't know when he resigned. I think it was probably in the Gemini program somewhere. I don't think he was in the Apollo. I really don't know. I have no way of knowing.

BUTLER: We can certainly look up the dates on that.

RUSNAK: Well, that was all the questions I had, so thank you.

PRESTON: Okay. You'd better get going. Oh, it's canceled [*referring to the STS-99 launch*].

BUTLER: Yes. But we certainly want to thank you very much for sharing your experiences with us.

PRESTON: I hope you're able to bridge the gaps and all that.

BUTLER: I think so.

[End of Interview]