ORAL HISTORY 3 TRANSCRIPT

ROBERT C. SEAMANS
INTERVIEWED BY CAROL BUTLER
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BUTLER: Today is June 22, 1999. This oral history with Dr. Robert Seamans is being conducted at his office at MIT [Massachusetts Institute of Technology, Cambridge]. This oral history is being conducted by Carol Butler, assisted by Rebecca Wright, for the Johnson Space Center Oral History Project.

Thank you for joining us today.

SEAMANS: I'm happy to be with you. Thank you for coming all the way to Boston, or Cambridge, rather.

BUTLER: Our pleasure. Our pleasure. It's been interesting. To start with—and this is the third in a series of interviews—but to begin with, when you first came to NASA, you expected to come in for a couple of years, and this was early in the program. This was before Alan [B.] Shepard [Jr.] had gone up. What were NASA's plans at the time? [President John F.] Kennedy hadn't yet made his challenge to go to the moon. What did you come in expecting?

SEAMANS: That's a good question. I had been following NASA somewhat from afar. I was at that time working for RCA [Radio Corporation of America], running a laboratory for them up in the Boston area, out in Burlington, actually. I can remember well when Sputnik went up and I was sort of chagrined that we didn't put up a satellite first, because even before I left

MIT, we were conducting courses in satellites, so it wasn't a brand new thought at all. [Many there] knew it was coming.

Then the question was, what were we going to do about it. The first thing I heard was that Jim [James R.] Killian was going to be President Kennedy's science advisor. And that was a new idea. Presidents never had a science advisor up till then. I knew Jim Killian, and I thought, "What's he going to be able to accomplish?" What he actually did was to take a look at the various laboratories that we had in the country to see whether we should start a brand new one, or whether to make over some kind of existing organizations to do more in the space area.

The decision was made to take the NACA, the National Advisory Committee on Aeronautics, and convert that over into the National Aeronautics and Space Administration, NASA. I'd been a consultant for the NACA for at least ten years at that point, so I knew quite a bit about the laboratories. Even though NACA was run out of Washington, what they used to call the mother lode, sort of the heart of the old NACA was down at Langley Field [Langley Research Center, Virginia]. That's where it all started in 1915. Then various groups were spun off—the Lewis Lab [Lewis Research Center] in Cleveland [Ohio] and the Ames Lab [Ames Research Center] for high-speed research out at Moffett Field [California], south of Palo Alto. So I knew these groups, so I knew what to expect there.

As to what the program was, the astronauts, the first seven had all received tremendous amount of publicity. It was very exciting, and not surprising that *Life* magazine had a contract with them. When *Life* magazine in those day had a contract with somebody, you know darn well there would be a lot about it, pictures of the astronauts on the cover and all this.

As to what some of the other projects were, some of the unmanned scientific and so on, as well as the details of the lunar Ranger unmanned program and some of the planetary, I

just knew in a general sort of way at the time I joined NASA, which was the first of September, 1960.

[T.] Keith Glennan, who was the [NASA] administrator under [President Dwight D.] Eisenhower, was wonderful to me. I think he was a wonderful administrator. He said that I should take the month of September, a good part of it, and just travel around to all the centers and find out what I thought was going on and where things weren't going well. He gave Dick [Richard E.] Horner a consulting contract to help me out. Dick Horner was the first associate administrator of NASA, and in those days what it meant was general manager, the general manager of all of the programs, be they the research programs or the old NACA labs or the Mercury Project or whatever.

So I started off at Langley Field at [mid-week]…and one of the first things I did [when I arrived] was take a look at the Mercury Project. There was a simulator you could pile into that had the instruments located…just like the Mercury capsule. You could pull the [hatch] down. So John [H.] Glenn [Jr.] fastened me in and turned the simulation on for a while so I could see what was going on. I remember that very clearly. I think we're going to talk about John [C.] Houbolt a little later, so I'll save discussion of my meeting with him.

I went and looked at some of the wind tunnel work and some of the control work, which happened to be my field, automatic control, that I was already familiar with and that I had been consulting on, got into that.

Then came back to Washington [D.C.] for a day or two…[My family were moving down from our home in Beverly, Massachusetts. We'd bought a house by then in Delaware, but the furniture hadn't come, so we had to spend the night in a hotel. Then the next day we borrowed mattresses from friends and spent that night in our new house. The van arrived with our furniture just as the car came to pick me up to continue my center visitations.] The Goddard [Space Flight] Center [Greenbelt, Maryland] was just getting under way, which was the old Naval Research Lab group that was in charge of…the Vanguard Project. Eventually I

took myself out to JPL [Jet Propulsion Laboratory, Pasadena, California], which was just then being transferred over to NASA. That was the only part of NASA that was not civil service; that was a contract with Caltech [California Institute of Technology], Bill [William H.] Pickering and the people there.

Then I guess it was somewhat later I went to the Marshall [Space Flight] Center [Huntsville, Alabama], even though officially Marshall had not been dedicated. It was agreed that it would become part of NASA, taken away from the Army over their dead bodies. I had the interesting experience of appearing there in their conference room with Wernher von Braun's major captains or lieutenants, the heads, the chiefs of all of his laboratories and so on, and he was often late. I remember he came in just a little bit late and shook hands all around. It was very interesting to have him and his lieutenants explain rocketry and take me around later and look at all the test stands.

One thing that impressed me very much was there was one test stand with still construction work going, so I had to have a hard hat on in this elevator. We were about to step in when Wernher sort of stepped back, and a big, husky black construction worker was sort of holding back, recognizing Wernher, and Wernher said, "You get in first. We'll wait for the next time up, because you're doing the real work here."

So at the end of a month I became reasonably facile [with] what was going on, and knew that I was going to have to meet with Congress right after Christmas, so I was starting to put together material in some kind of a logical way so that I could study it and feel that I was really pretty well grounded in all of the projects and what they were costing and so on. So that was my early experience.

BUTLER: Just jumped right into things there.

SEAMANS: Had to. Keith Glennan was sort of a bulldog of a man. He'd say, "When are you going to really grab hold of things?" He'd make sort of a fist like this, like I was supposed to go out and grab a hold of all the reins and have directors at all the centers that are pulling on the traces, you know, to get everything moving ahead. It was a pretty exciting experience.

BUTLER: I bet. And to have to prepare right away to be able to go and talk to Congress about all of it in such a short time frame, just a few months.

SEAMANS: Keith took me…over to see Maury [Maurice H.] Stans. He was then what was called Director of the Budget, now called the Office of Management and Budget [OMB]. There were two things that Keith wanted added. The budget stood at just a slight bit over a billion dollars, the authorization that we were requesting for the following year—you know, [1,009,000,000] or something like that. And Keith wanted to add in ten million dollars for communication satellites, because we didn't have anything at that time other than the Echo balloon that you could call a communications satellite. That was just a balloon you bounce signals off it and receive them somewhere else.

At that point there had been…an agreement with the Department of Defense [DoD] that they had some so-called active communication satellites under development. One of them was called Advent. And Keith thought that NASA should have ten million dollars for that purpose, to get something started in the civilian, or non-defense, side of things. Maury Stans gave a little ground on that. He said we could show ten million in the budget, but another place in the budget we had to show the reimbursement for it. In other words, we could put one up, but it had to be paid for, let's say, by AT&T, and they would put in the ten million and we, in effect, would do what they wanted for the ten million. That was not very satisfactory.

The other was that Keith felt very strongly that in the course of a year, things would come up pretty rapidly and you didn't have a chance to go up to Congress and all that, so he wanted a fifty-million-dollar contingency fund. When Keith presented that, Maury Stans just laughed. "Come on, Keith." And Keith was a person who got exasperated pretty easily, and he said, "What do you really want? What are you really looking for in the space area?" And Maury said something like, "What I want is a bargain basement figure, in dollars." So anyway, that was [my first budget].

The next experience was maybe a few weeks later, to go to a Cabinet meeting where there were two presentations. One was by [George B.] Kistiakowsky. He was the President's science advisor who had replaced Jim Killian, who had come back to MIT, where he was the president… Kistiakowski presented a study that PSAC, the President's Science Advisory Committee, had carried out on the possibility of a manned lunar landing. You could tell the Cabinet members were not just about to accept a program like that. Then he ended up by saying their cost estimate was something between twenty and forty billion dollars. And people sort of went, "Oh," like this and sort of sighed. Somebody said, "I suppose if we give those scientists forty billion dollars to go to the moon, the next thing you know, they're going to want another forty to go to the planets."

Then Eisenhower said something like, "I wish somebody could tell me what is the best space program, the best balanced program that costs no more than a billion dollars." Of course, that was the figure that Maury Stans had worked out for him. And Keith came along after that, presented the budget that actually had been arrived at.

So, anyway, there were other interactions with President Eisenhower on communication satellites, for example, but I'd say those were sort of the highlights, to me, of the tag end of that administration, because by then there had been an election. [Vice President Richard M.] Nixon had not been elected. We didn't have any direct tie with the new [Kennedy] administration. That's pretty much par for the course. It's also par for the

course to have some kind of committee put together for the President-elect to come up with specific ideas for his new administration. Such a committee had been put together under Jerry [Jerome B.] Wiesner, who later became the president of MIT.

BUTLER: As you were going along working in both administrations, and then especially in the Kennedy administration, as the program began to grow, not only was it involving NASA personnel and then government, but it also involved different contractors around the country for all of the programs, and especially Apollo.

SEAMANS: Right.

BUTLER: In the earlier interviews you talked about the interactions between the Department of Defense and the NASA centers and so forth, but how was it between NASA and the contractors?

SEAMANS: Obviously, selecting contractors is a fine art, or it can be, or you can do it very badly. But there was already in place, in the Eisenhower administration, the mechanism for letting contracts, but it was refined to some extent under Jim [James E.] Webb when he became administrator.

I'll just give you a little flavor for it. The first thing that has to happen is that whoever is running a project, whatever it may be, say the Apollo Program, to take a big example, those that are running it have to come up with a plan that divides the project up into pieces, and you divide it up and you have to select a bunch of contractors, or you can decide you want to have a single overall contractor and then it's up to them to divide it up and subcontract.

At any rate, the first thing is, you've got to have a procurement plan, and the general manager in both the administrations, mainly myself, was responsible for approving the plan. It gets into a lot of detail as to (A), what it is you're going to put out on the bid request, what are you going to specifically ask the competitors to bid on. And then before—perhaps not before you put out the bid, but certainly before the bids come back, you have to know how you're going to evaluate the proposals and what kinds of teams of people are you going to pull together. I'd say, in general, the project people are going to put together in detail what it is they want. They're going to be working with the procurement office, the functional office that oversees procurement, to make sure that all the Is are dotted properly and so on. And that's all folded into what is really quite a detailed document, that is the procurement plan.

Then there has to be a notification that this bid request is going out. Oftentimes you'll have a bidders' conference, where they come in and this package is presented to them and questions can be asked at that time. Then there's a given period of time when they have to submit their proposals. If during this time one of the contractors comes in with a question about some specific aspect, they have to realize that you're going to give them the answer, but you're going to give everybody else the answer, too. You can't play cozy with one contractor who's in competition with the others.

Finally, all the proposals come in, and you have a team of people which now is not just the project people, but you pick teams of people, some from headquarters, some from the labs, some are technical people, some are more administrative procurement-type people, and they have to go through and evaluate the proposals according to a plan that is approved by the general manager before they've seen any of the proposals. Now, they may find afterwards that it didn't quite turn out the way they expected. They may want to change the way they do the scoring, in which case when they present their findings, they have to explain why they changed it.

On all the projects over—and I forget what the level was, over a billion or something like that, they had to come to the administrator for a final selection. In some cases it was felt that even though the dollar amount was not that large, that the administrator should be involved. There could be some policy issue that was very important.

The evaluation team made their presentation with the center director present, with the key project people present, but actually the presentation was made to Mr. Webb… Hugh [L.] Dryden, the deputy, and I were both there. A lot of questioning of how they went about the evaluation, as well as questions about their findings. It wasn't quite as clear in the Eisenhower administration whether they thought they were making a selection or just evaluating. Jim Webb made it clear that they were not involved in selection; they were involved in evaluation.

He did a rather novel thing, I think, which was, after all of this, there would be sixty people in the room or something, we'd go into his office and he'd bring in—say it was something to do with Apollo—Bob [Robert R.] Gilruth, who was the head of the Manned Spacecraft Center [MSC], Johnson [Space] Center [JSC, Houston, Texas], George [E.] Mueller, and probably Sam [Gen. Samuel C.] Phillips, were the two headquarters people. I would be there, and Hugh Dryden, and a member of the so-called secretariat, who took the notes and so on. He would ask the question of the center people and the project people, "Is there anything that we ought to know about that hasn't been covered in the presentation?" And it could be anything. It could be some matter of policy. You never quite knew what it could be.

After that, Hugh and Jim and I would stay in his office and discuss it a little bit. I was the junior member, so he'd usually [turn] to me and say, "Okay, Bob, how do you feel about it? What do you think ought to be done and why?" So I'd give my reasons, and then Jim and Hugh would discuss it. I won't say they'd always agree with me. And we would agree as to why we were making the decision. What were the determining factors?

A guy named Larry Vogel [phonetic] was there, at least for quite a bit of the time, who was from the secretariat, and he would put together two things. He'd put together a one-page document that the three of us would sign, which said, "Why?" And he'd also put together the news release, "NASA today has selected" and so on. And both Hugh and I would review that before it was sent out, but that was all done in a matter of maybe two hours or something like that, very quickly.

We were dealing with pretty large sums of money on some of these, and we never got tripped up. The closest we ever came to a real issue over the selection was after the Apollo fire, and the question came up as to why we had selected North American [Aviation, Inc.] when the [Glenn L.] Martin Company, in the evaluation, had scored higher. By then, Dr. Dryden was no longer living, and I was a deputy. This was a big political football at that point.

Why had we picked essentially the number two? Well, even in the discussion that we had had particularly with Bob Gilruth during the sequence I've described, concern was expressed by him about the Martin Company, because they were no longer making airplanes, and it was felt that the experience of cockpit design and a lot of things of that sort with a human pilot or astronaut interaction was a skill that was going to be very important in the design, and Martin really didn't have it.

Just saying that, when Congress really got hot on this issue, was obviously not enough. In going over my files, I found a piece of paper in Hugh Dryden's handwriting—and Hugh's handwriting was very distinct. It was very small and very precise, and there could be no question in anybody's mind if they looked at a letter he'd written, they'd look at see that he'd written it, even though it didn't say so on it. And he had written down the work that had been done by North American, the X-15, the fighter planes that they'd built and so on, and just having that in his handwriting and indicating that this was an important consideration really stemmed the tide, as it were, so that we never were forced to make a change.

A guy named Bobby Baker had been a real political animal, and he was sort of close to Lyndon Johnson. There was a lot of talk that we at NASA had bent to that kind of pressure, for example, which we had not.

BUTLER: It paid off.

SEAMANS: [Yes, the procedures we followed] paid off.

BUTLER: And North American did get the Apollo Program to the moon.

SEAMANS: That's correct.

BUTLER: And all of the subcontractors and everyone did their part in making it all work. Looking at subcontractors, too, and being here at MIT, Draper Labs was involved heavily in the Apollo Program. Can you tell us a little bit about their involvement, even though it didn't directly go through you?

SEAMANS: Well, it did, actually, because they were not subcontractors. I'll double back on that a little bit, because I used to work in that lab. Dr. [Charles Stark] Draper was my boss for fifteen years. I knew him very, very well… One of the great [good] fortunes of my life, was [that] I ended up working with him for fifteen years.

Just before I went down to Washington, I told Keith Glennan I just had to wrap up what I'd been doing and get ready to move, I was going to have to have a few weeks. While I was in this interim mode, I got a call from Doc, and he said, "Before you go down there and get involved in [every]thing, how about spending a half a day over at the lab so we can tell

you what we're doing, that we think ought to be at least considered by NASA as part of the space program."

So I went over, and they had some work going on in connection with the moon, mostly lunar and planetary kinds of equipments, instruments, and so on. I said, "Shouldn't this be tied in with JPL?" They said, "Well, maybe it should be, but they don't seem to be very interested in having us involved."

So when I was out at JPL, I inquired as to what extent they had looked at the Draper Lab as a resource. People in laboratories are very competitive. You tend to think they're wonderful scientists and very objective and never get emotional. That's not true. And you can sort of tell that the Jet Propulsion Lab was not about to give the Draper Lab a piece of the action that involved high intellect. They might give them some [equipment] to build or something like that.

So I talked to Abe Silverstein about it, who was in charge of all programs at that time, who worked for me, and he agreed. So at the time, right after Kennedy announced that now was the time to take greater strides and go to the moon and so on, and we were getting our organization squared away for it and were obviously thinking about, as part of the organization, who the contractors would be, he actually came in with a suggestion that we ought to get Draper involved in the sort of man-machine guidance system that we're going to need to go to the moon—the telescope and the computers and all of that. And that came very early on at just the time we were putting together the so-called bid package for the Apollo capsule. If you're going to take a big piece out of a major contract, people have to know that when they're bidding on it.

So I think the first action that was taken in NASA for the Apollo Program was to give the Draper Lab a sole-source contract for the guidance. I brought this up with Jim Webb and Hugh Dryden. I said, "I know I'm prejudiced. I used to work in that laboratory. But if we want to have the most imaginative, innovative work done on that very key piece, I think it

should be the Draper Lab, and that's what Abe Silverstein and Bob Gilruth have recommended."

Hugh Dryden said, "Jim, you know Doc Draper. He used to build equipment related to the Sperry Gyroscope Company when you, Jim, were vice president of Sperry Gyroscope Company."

And Jim Webb said, "One of the important things, when you're contracting, is to know what you're going to get, and the best way of knowing is to know who the people are." And he said, "You shouldn't look at yourself as being prejudiced. That's the kind of information we need." And so we did go with a sole-source contract.

Now, if you talk to Doc, later on—and some of the people in the laboratory, they would say that the decision was made in quite a different way. They will say that Jim Webb thought it probably would be a good idea to have the Draper Lab involved in the guidance, and Jim Webb got in touch with Draper, invited him to his house, and they sat around the house, and finally Webb said to Doc Draper, "Can you build a guidance system to go to the moon?" And Draper said, "Sure, I can build it," and that's how the decision was made. Now, I think both stories, or both accounts, probably have some truth in them. I know mine does. [Laughter] And Jim Webb was one who…didn't just take the information that his organization provided; he oftentimes reached out, got advice outside of NASA, and he could very well have invited Draper to come over and…put him to the test.

BUTLER: What a better way to find out than by talking to him right there.

SEAMANS: We had a funny time right after that. I got a letter from Doc, and he said—and I knew this anyway—he said, "You know, every device that I've ever developed (and there were many of them), I've always wanted to be involved in the first flight, to make sure

everything worked properly. I'd like to have you and your boss Jim consider me as an astronaut."

I took it in to show Jim Webb, and he got very excited. He said, "Isn't that wonderful, one of our scientists is interested in going and being directly involved." He said, "I think I'll take it over and show it to President Kennedy tomorrow when I'm with him."

And Hugh Dryden said, "Wait a minute, Jim. Doc Draper is over sixty years old. I'm not sure his health would permit it. We can get in a terrible mess if we start selecting astronauts that way."

And Doc Draper never let me forget it. He said, "You never acted on my suggestion. I was all ready to go to the moon and you wouldn't let me go."

BUTLER: I'm sure he would have done a good job at it.

SEAMANS: Yes.

BUTLER: I'm sure he would have.

SEAMANS: Well, let's see. Where do you think we are?

BUTLER: I think we're moving along. As we're talking about the contractors for Apollo and you were talking about having to review the contracts as they came in and knowing something about what it would be doing, but when the first contract for Apollo, for North American, was put out, a method of getting there hadn't fully been decided yet.

SEAMANS: Absolutely right.

BUTLER: Lunar orbit and earth orbit and direct descent. When did you first hear about that, and how did that all go?

SEAMANS: Well, I've already mentioned that very early on I went down to Langley to learn about the effort there. I don't know who arranged the schedule for the day. Tommy [Floyd L.] Thompson was the director. So I went from project to project, and one of the projects that was discussed was not really even a project at that time; it was a small study. We went into a small conference room, and I think there was one chart at the end of the room, and I was introduced to John, John [C.] Houbolt, and he had a couple of people with him. He said, "You know, we've been thinking about what's the best way to get to the moon. You start off from the earth with everything it takes. Then you go and land on the moon, and then you have to go back home with just what you have already on the moon." He said, "It's not a very efficient way to go." That was in those days called direct ascent, which was already being discussed, even though the possibility of a lunar program under the Eisenhower administration was felt to be after the year '70… It didn't say whether that might be after '80 or '90 or the year 2000.

So it was being discussed and being studied to some extent with contractor studies. He said, "The problem you get into is, you have to have this tremendous big booster to do it, and… [when you] return [into] the atmosphere, you have to have a lot of heavy heat shielding… So the question is, why bother to take a lot of that heavy stuff down to the moon and take it back up into lunar orbit." He said, "To do that, when you're going around the moon, you're going 4,000 feet a second, and you have to slow it down. That takes energy. Then you have to speed it up again. So why not leave the return vehicle in orbit around the moon and that will save tremendously on the energy required," he said, "by a factor of 2." So you could have a launch vehicle that would be half as big or half the capacity.

It made a lot of sense to me at that time. He got some numbers they worked out on the computer and so on. It was about a—I don't know, maybe it was a forty-minute discussion or something like that, and on to the next item.

Well, even before Kennedy was sworn in, we were starting to do lunar studies. Things were sort of in ferment. Kennedy had indicated even during the campaign that he felt not enough was being done in space and not enough was being done by the Department of Defense with missiles. A lot of it was political, obviously. Your opponents are very conservative, and the country needs to be more aggressive and forward-looking and so on. But we really didn't know during that interregnum what might happen. We even discussed whether or not the new administration, from sort of rumors we were picking up, might even want to abolish NASA. You know, you have to consider all—of course, I personally had to wonder whether I was still going to have a job or not with the government.

But in any event, we did start studying a number of possible ways to go, including the direct ascent and the so-called earth orbit rendezvous, where you sling stuff up into earth orbit and then put them together and then go from there the same way. That got us into a lot of trouble when we tried to do it in detail, whether you could take up two packages, each weighing half the amount, and put them together, but have it come out so the packages were sort of neat and tidy, because you can't take an oxygen tank and cut it in two, for example. But we were already thinking a lot about it, and then finally in May 21, whatever it was, when Kennedy went to the Congress, we were already thinking about all the things that needed to be done. There were a long raft of things that had to be considered. One of them was, what would that mode be.

I guess the first letter I got from John Houbolt was some [time in the summer.] I [can't] tell you exactly. You may have copies of those letters. But the first one was a fairly mild letter. He said he hoped that in all the different reviews that were taking place, that lunar orbit rendezvous was being considered. I think I sent him a note back, saying it [would

be]. But, in fact, it really wasn't. I recognized it as a possibility, but when it came up for discussion in the various committees that were studying it, various groups, they were really not considering it.

So [D.] Brainerd Holmes then was in charge of the manned spacecraft programs, and I discussed it with Brainerd. His background was running big projects, but they were primarily electronic in nature. He was involved in putting together the so-called BMEWS, ballistic missile early warning system, with massive construction up in northern Greenland and things like that. This was right in my area of interest…guidance and control was my business, and that's what this is all about. So I told him that from my background, this [was] something that not only John Houbolt thought we ought to think about it, I thought we ought to think about it.

But then not much happened, and it was never really discussed openly, and nobody seemed to be talking about it. When I got the second letter from John—and I've got a copy of it at home—again I can't quite remember the date, but it may very well have run into the following year. It might have been in '6[2]. When was Kennedy sworn in? In '6[1]?

BUTLER: '61.

SEAMANS: He was sworn in '61, so it might even have been in '62 [Nov. 15, 1961]. But it was a hot letter. It said, "I know you're not supposed to write letters like this, and I'm a plain-spoken person. I've just got to speak my mind on this." He went on and on and on. When you get a letter like that, your first reaction is to say, "Get this guy off my back." The question is, should I call Tommy Thompson and say, "Get this guy to hold off. I'm sick of getting these letters." But I really thought he was right. Also, my style was to try to go to people's offices and get out to the centers rather than expect everybody to come into my office.

So I called Brainerd and said, "I'm coming right over. I want to talk to you." I brought the letter along. He said, "As a matter of fact, we're starting to think that this is not a bad idea." He said, "It's not all settled yet." Then you'd have to find out from Brainerd or somebody, all of the ins and outs of it, but by about then, Bob Gilruth felt that this was the way to go, that there was another advantage that John really wasn't aware of or hadn't thought about, and that is, by going this way you could design a vehicle to [descend] to the moon that was designed for a vacuum. It never had to come back into the atmosphere. It could be very light, it could be very maneuverable. It would be much more stable on landing; it wouldn't tend to tip over.

SEAMANS: On the other hand, the German team, they liked to think of building the big rockets, and they tended to want to go that way, until, to everybody's surprise—and I don't know why Wernher shifted his point of view—at one of the meetings—I wasn't present—Brainerd's management team, which included Kurt [H.] Debus from the Cape [Canaveral, Florida, later renamed Cape Kennedy] and Bob Gilruth and Wernher von Braun himself, the overall management team, at one of those meetings, Wernher came out and said he thought that was the right way to go, the lunar orbit rendezvous. And his own people couldn't believe it, because they did not agree with that.

Then a very strange thing happened. I thought it was very strange. At about that point, Joe [Joseph F.] Shea came into the organization, and he worked for Brainerd before he went down to Houston. He tells me—and I don't even remember this, but he told me several years ago before he died that I had said, when he came in, he had already worked things out with Brainerd, but I think he came around to see me and he said, "Now, what do you hope I accomplish?" And I said, "Your number-one job is to sell lunar orbit rendezvous."

In any event, it was lucky he was there, because right at that point the White House said, "This is the wrong decision." Jerry [Jerome B.] Wiesner had working for him

somebody named Nick [Nicholas E.] Golovin, and Nick Golovin had worked for NASA, was working for NASA when I came aboard. He'd been hired by Dick [Richard E.] Horner. He was an expert on reliability and safety, and it was done by the numbers, statistical analysis, and he came to the conclusion that his analyses showed that lunar orbit rendezvous was the most dangerous way to go.

So it took about three months of time to work through this impasse, and Jerry Wiesner was putting pressure on Webb to reverse me and the team running it. He was doing it by saying we hadn't studied it enough and we had to do more studies. There was a lot of correspondence. I've got some of it, letters back and forth on this subject from Webb to Wiesner and so on.

It finally…reached a boiling point at a time when Kennedy said he wanted to see what was going on in the program, and it started off with Lyndon Johnson in one airplane, because he was in charge of the Space Council [as]Vice President, and Kennedy in another airplane, going from place to place. We went down to Huntsville and we went down to the Cape, then we went over to Houston, and then we went to McDonnell-Douglas [Corp.] and so on. Webb said to me, "I want you to be with the President, because you're about his age, you're young, and I'm going to go with Johnson. I know Lyndon Johnson, and we're sort of old politicians together."

So I can remember we got on the floor there of the big assembly building at Huntsville, Kennedy saying, "Now, hasn't there been some discussion as to the best way to go to the moon?" And Jerry was there, and we were all sort of in a huddle out in the middle of the floor. The press were held in the back. They could see us all. They couldn't tell what we were talking about. We got into a real argument there, right in front of the President, of the best way to go to the moon. Afterwards, of course, the press wanted to know, "What was going on? What was being said there?" Of course, they were able to start putting the pieces together. It became a hot political issue.

Finally, the President himself had to make some kind of a decision, and he finally, in effect, said, "Look, Jerry. It's you and Nick Golovin versus NASA and 30,000 employees. Which way do you think I ought to go?" Anyway, he backed us up.

BUTLER: Made the right decision.

SEAMANS: Yes, he did.

BUTLER: That's interesting to look at lunar orbit rendezvous, how at first very few people even thought about it, and yet at the end that ended up the right way to go. Shows a lot of that for just Apollo in general, there was so much that had to be learned and figured out along the way in a short time frame.

SEAMANS: And it's really interesting if you take a look at what the Russians were doing. We knew during the sixties that the Russians were building a very large, large vehicle. We got overhead photographs of it. We really didn't know what they were doing as far as the capsule and things of that sort, and it wasn't until '93 or somewhere in there that Jack [L.] Kerrebrock, who's a professor here, and two others from here, faculty members, were over there. This is now after things had really started to change in Russia, but people were still not quite sure what the rules were, but they were showing these three faculty members here around their laboratory. They walked by a lab in which our guys could see some space vehicles, and they said, "What's in there?" And the guy sort of wasn't quite sure he ought to tell. He said, "Well, some things we were doing in space."

So they went in, and I guess one of them knew a little bit of Russian, and said "lunar lander." So he said, "Is that the lunar lander?" And the guy said, "Yes, it's the lunar lander." "Mind if we take a picture of it?" The guy didn't know quite what to do. They took a picture

of it, and it ended up on the front page of the *New York Times*, that snapshot. They were using lunar orbit rendezvous. Whether they went that way on their own or whether they were copying us, nobody will ever know, because they had—what was the guy's name, who was in charge of design of all their stuff? I'll think of it in a minute. But anyway, he had an appendix in '67 or '68 and died on the operating table.

BUTLER: [Sergei] Korolov.

SEAMANS: Korolov. Yes. Why they were going that route I think only he knew, probably.

BUTLER: That's interesting that it ended up being the same, even though they didn't actually go.

SEAMANS: They had an additional wrinkle to it; they also had [earth] orbit rendezvous. They were going to put everything up in earth orbit, without their cosmonauts aboard, and then take the cosmonauts up separately, rendezvous and dock, then go to the moon, and then up there again have, I think—I forget whether it was one or two cosmonauts go down to the moon, but leave one up going around, in orbit around the moon.

BUTLER: Slightly different approach but very much the same.

SEAMANS: Very similar.

BUTLER: Interesting. How much were you aware at time of the Soviet progress?

SEAMANS: We were aware of everything you could see. A small group of us at NASA were cleared for the overhead photography that was available. It was very closely held at that time. But we had one room at NASA that was built so that we could actually have somebody come over, chained to their wrist, and take it out and show it, then rechain it to their wrist and leave, and all that kind of business. It was a glass room inside of a room, so that there was no window to the outside for people to get the vibration of the window and intercept the conversation that way, and all this spook stuff.

BUTLER: Interesting.

SEAMANS: So we had briefings from the CIA [Central Intelligence Agency]… (A), when anything exciting happened, and, (B), quarterly, their estimate of what was going on. As I say, we tracked the big vehicle, because they had to have a big vehicle if they're going to go to the moon, and their big vehicle, instead of taking things out to the pad vertically, they took the things out horizontally. The first thing we saw was a great big long building with a track going out to where the pad was. Well, that was the first clue. Then we caught the thing on the track on the way out, and then we had got a picture of it sitting there ready to take off. Then the next thing we got a picture of was a big hole in the ground; it exploded. Then we saw another one coming along, and that one also exploded. So we had a pretty good feel for it, pretty good. We were also picking up conversation, with satellites, because Korolov at the time was using his car phone, and we were able to intercept some of that.

BUTLER: That's interesting. As the program was moving along—and this is actually jumping back a little bit—and once Kennedy had announced that we should take this challenge and go to the moon, and the program was going to have to grow and have to change, and the

decision was made to move down to Houston, how much were you involved in that decision process?

SEAMANS: That's a good question. Our overall thinking on it, I was involved in the overall, but this is one decision I was not involved in specifically. I'll tell you how it was done. We felt that [the program] was going to [require] the movement of pretty large vehicles, large enough that the only real method was going to be by water, and that if we were going to put together a big first stage of something, for example, we ought to pick a place that was on a waterway. We finally did pick the Michoud [Assembly Facility] plant, which was down there in New Orleans, which is right on a waterway, obviously. We had to also figure out what kind of vehicles, a water vehicle, we were going to use. We went to something called a roll-on, roll-off system, where the stuff actually could go up a ramp and get in the vehicle. We worked with the Navy on that and we worked with the Maritime Commission. That was sort of a headache, but we finally got on top of that.

Then we weren't too sure, when you got through with the boosters, how big the equipment might be, what we thought of as the capsule and the things Houston was doing, we thought that might be some pretty large stuff there, too, and we might want to use a waterway for that. So thinking in those terms, you're talking about the Gulf area. We also thought that we were going to have to do some things outdoors, so we didn't want to have, say, Minnesota, even though it might be on a waterway, or Boston; we wanted to be down in the southern part of the country. California would fit, on the coast. That's where the second stage of the Saturn was made.

Anyway, we knew we had to get out of Langley. We had 1,000 people working on the Space Task Group on Mercury, and we knew that was going to have to grow substantially. There was no infrastructure in that Langley area. You'd have to move in the

workforce and so on if you're going to really expand there. So we were looking for a place where you would have a lot of technical engineering, scientific, administrative talent.

From there on, obviously you're getting into a political area. I think in part to protect me, Hugh Dryden was given the job of making the study. I'll leave it to your judgment as to whether you think it was purely coincidental that the chairman of our appropriation committee in the House…namely Congressman [Albert] Thomas, and were where the chairman of our authorization committee, [Olin E.] "Tiger" Teague, happened to have their two districts right there. Now, some people think that might have been a political decision. I'll leave it to everybody's judgment as to whether that's so or not. [Laughter]

BUTLER: Well, whether it is or isn't, that's where the center is now.

SEAMANS: It proved to be a very good decision from the standpoint of attracting lots of competent people, of getting tremendous support from that area. Rice [University] was there, of course, and that kind of support. The property that we used there was actually given to the government. It wasn't all altruistic. They didn't give all their property, and all the property around it they still own[ed], and it appreciated in value by a very substantial amount.

BUTLER: Quite.

SEAMANS: But I would say that it was a good decision, and it did not meet with any political head winds. A lot of talk by the Republicans, but they [didn't] do anything about it.

BUTLER: It's worked out pretty well. It has. We've heard from several people that talked about the reception coming down there, that it was—

SEAMANS: Magnificent.

BUTLER: Absolutely.

SEAMANS: And for a civil service team to be moved that way is very unusual. I think we only lost one person in that move. It had to be optional, whether people wanted to move or not.

BUTLER: Certainly.

SEAMANS: But the spirit in that group was so great that everybody wanted to be part of it. I think a few people moved even though they realized that they were probably risking their marriage in the process.

BUTLER: It's quite a move to go from Langley to Houston.

SEAMANS: There were some similarities. They're both pretty hot in the summer, a little hotter down at Houston, but the bayous and so on are sort of like the tideland area down in the Chesapeake. Anyway, it worked out wonderfully.

BUTLER: A lot of the in-between areas were covered in your first couple of interviews, so now we'll actually kind of jump forward some. You mentioned earlier the Apollo fire, and that was a tremendous tragedy. How did you help work through that with NASA? How did that affect you and your career and help NASA come back on track and make the moon landing successful?

SEAMANS: I think the history of that day is pretty well known, but just for the record, it was to be a really big day for NASA. Gemini had been completed, and that was an extremely satisfactory program. I guess there were nine manned flights, nine or ten, twelve flights in all. It finally ended up on schedule, and so much was done that was important to the Apollo success, including learning how to rendezvous and dock.

It was going to be a celebration for the contractors who had been in charge of Gemini, including the McDonnell [Aircraft Corp.] people and Mr. [James S.] McDonnell [Jr.] himself and so on. It was to be, at the same time, a start-up or a reinvigoration, you might say, for all the Apollo contractors, [the Boeings,] the North Americans and the Grummans [Aircraft Engineering Corp.] and so on. And it was to be tied in with a big White House affair, the signing of a space treaty at the White House, and there was going to be a big dinner afterwards.

Now, I'd already arranged to have a dinner party at my house with Don [Donald F.] Hornig, science advisor, and Doc Draper, and about twelve of us, and Jim Webb said, "Why don't you stick with that." So when I left the White House, I went home and I opened the door, and my wife was on the phone and she said, "He's coming in the door now." So I picked up the phone. This happened quite often. And it was George [M.] Low, and George said, "They're all three dead." Those were his first words to me. And I said, "What three?" And he said, "The three astronauts." …They were having a test run that day of the Apollo that was going to be the first to be launched… So I said, "George, rather than talk to me standing up here at the phone, I want to get much more information on this from you and from others. I'm going to go back to my office."

I'd had an experience maybe a year before, when we had trouble with Neil [A.] Armstrong on a Gemini flight, where he had rendezvoused with an Agena vehicle and he started to spin. But this was the first rendezvous, and I thought it was very important. I stayed home from the dinner, one of these big Washington dinners, until we'd docked

successfully. I then drove over to the hotel there, I forget which one of the big hotels it was, the Shoreham, I guess, and I was met, when I came up the driveway, when I came up to the curb, by somebody with a long face, saying, "We've got real trouble." But I said, "Okay, let's go in a room here somewhere. Tell me about it." I found out that Neil Armstrong was spinning very rapidly and the question was what was going to happen next, and whether he was going to make it or not.

Well, the mistake I made was to feel I ought to brave it out and go into that dinner. I was sitting next to Vice President [Hubert] Humphrey, who was going to be the principal speaker. But I arranged with somebody right behind the curtain there at the head table would be kept informed from Mission Control and kept letting me know how things were going. I think I made a mistake of leaving at one point to talk to Walter Cronkite on the phone and I guess Jim Webb was biting his nails back [at Headquarters]. This was all on live TV and everything.

Then Hubert Humphrey started to speak, and I was going to tell him—I told the whole audience what was going on, because I knew it would be leaking around. People were stunned, and they thought I was joking, and then they realized this was for real, we had an astronaut up there who was in serious trouble.

I was able to say to Humphrey—even he was starting to have trouble continuing with his speech, even though he was a very gifted speaker—that it appeared that Neil Armstrong and Dave [David R.] Scott were okay. I caught hell from Webb for doing that. He said, "You took a tremendous risk."

…After that happened, I looked over the rules we had for serious accidents, how to handle them, and we rewrote them. Then this happened about a relatively short while after that, after we'd rewritten the regulations and so on. So, in effect, I got going on it, got back to my office and did a little more phoning with George and others as to what happened, and then I started making calls. I obviously checked with Jim Webb right off the bat and made

sure he knew all about it, which he did. I got a call from [Secretary of Defense Robert S.] McNamara's office. They wanted to know what was going on.

Right in the middle of that, an operator cut right in on my phone call and said, "This is an emergency." The emergency was an NBC commentator whom I knew, who said, "The country is desperate. You've just got to come over to the studio to calm everybody down." What was the guy's name? [Peter Hacker, NBC News]

I said, "That's ridiculous, anyway. I don't know exactly what the facts are now, and the last thing I want to do is to go over and speculate on it."

So anyway, the things that had to be done, of course, were to make a governmental decision as to who was going to carry out the accident investigation. Should it be within NASA or external to NASA? Everything that I had conceived of beforehand indicated that we would do it. I had never conceived of a presidential commission being set up. Jim Webb was ahead of me on that. He realized that might happen, immediately went to President Johnson and said, "I want a handshake with you, Mr. President, that we, NASA, will carry out the investigation." And he got that agreement.

My job was to figure out who…[should be on the accident review team]. George Mueller was by then head of the program. Obviously there had to be an astronaut involved, for example, so Frank Borman was an excellent choice for that. We thought so at the time, and he turned out even better than we imagined. We wanted to have an expert on fire, for example, so we got somebody from the Bureau of Mines for that. We wanted to have somebody, if the Air Force or military had experience with [this] kind of [fire], we wanted the benefit of that, and we got the colonel who had been in charge of an investigation of an explosion in a silo that had killed people. We had to cover all the…[factors involved]. Wanted to have a legal person.

Then the question was who should head it up, and everybody seemed to agree that Tommy Thompson from Langley would be ideal for it. Then there was the question of

calling Tommy and telling him that he'd been selected. I guess by then it was maybe one or two in the morning, and I told Tommy that the airplane would be picking me up at six in the morning and I'd pick him up on the way and we'd go down and get started. And wrote out the directive that set up Tommy Thompson as the only person who could touch anything. Nothing was to be removed, touched, destroyed. It was entirely up to this accident committee, and that Tommy Thompson was in charge of it. Sent it out as a press release right out of the Cape. I went down to the Cape for that.

At the height of the review, there were 5,000 people working on [the review]. We made available a sister ship, a capsule exactly the same as the one that was destroyed by the fire, or nearly destroyed, and then they took the one that was destroyed apart as they took the one that wasn't destroyed apart, so [they] could figure out what [they were] looking at as [they] went along. There were all kinds of analyses and so on that were made, as well as taking a look at the procedures that were being used, etc., etc.

Then [the question of] how the results were going to be presented was a big issue. The press were just as eager as they could be to find out who made the "horrible mistake." We decided we did not want to get the committee, the accident committee, in a situation where they would say one day they believed that something had happened this way, and then they'd find out a week later that it was some other way. Then in trying to explain away the first release, [they'd] waste a lot of time, and it [might spoil] the credibility of the group and so on.

So I was commissioned to go down there, in the beginning, once a week and observe myself what was going on and write my own assessment of where things stood as I flew back in the airplane to Washington, turn that report over to Webb. And the first time I did it, there were parts he didn't like, so I rewrote it. Then he would take it to the White House immediately. They could have it for two hours before they would release it to the principal

committees and the Congress, and they, in turn, could hold it for, I think, half a day before it went to the press. This did not satisfy the press one bit…

BUTLER: I'm sure.

SEAMANS: But if you followed the Challenger, what happened then when they had [a Presidential] commission and they were releasing stuff all the time, and they were tending to incriminate people, even though later it might prove that these people had nothing to do with it, it was a big mess. I have since taken a look at the length of time it took us to get going again on Apollo versus the time it took the Shuttle to get going again, and it was a factor of, I think, either two or three…

BUTLER: Quite a difference between the two.

SEAMANS: Yes. It was still no fun at all, and I made a very large blunder, which I think [is] in [my] book. I did think that Mr. Webb was somewhat paranoid about some of the issues. To explain that, we were testifying before a Senate committee when Senator [Walter F.] Mondale started asking questions about a report. He said he understood a report had been written about North American, that they were doing unsatisfactory work, a report written before the accident, and how about it. Mr. Webb referred to George Mueller to answer the question. He said he didn't know of any such report. Sam Phillips said he didn't know about any such report.

We had had a tiger team go in and look at North American about three months before the accident, because we weren't satisfied with what they were doing. As a result of that, Sam Phillips had come in with some viewgraphs to explain some of their findings. With that in the back of my mind, I said, "I myself don't know of any specific report, but I do know that

from time to time we do study a contractor performance and so on, and we have made studies of North American."

Well, after the hearing, people tend to rush up, and people were sort of rushing up to us. Webb yanked me by the arm and said, "Come with me." We got in his—he refused to have a limousine in the sense that you'd call a limousine, but he got a black taxicab. [He] could crank the window up so the driver couldn't hear what was being said. He really gave me hell. He said, "You don't volunteer information like that." He said, "There can be millions and millions of dollars in litigation involved in what's happened."

I said, "But the thing I'm concerned about, Jim, is that Mondale may have the results of some of these studies and he's calling them a report."

He said, "Well, just don't bring up things like that."

So I got back to my office, and I was steaming mad and sitting in my office, stewing away when [Paul G.] Dembling, who was our general counsel, who was also in the back of the car, came in with exactly what I was afraid of. It had all the viewgraphs stapled together or bound together, and then there was one paragraph that was right at the front, that said, "This report shows the results of a recent North American review," but it had the word "report."

So I said, "Paul, I can't bear to do it. You take it in and show it to the man." As I say, I felt that Jim was overly concerned about the press and the things that were going on.

So about a week later, I'd already made my first report, I'd been down there to the Cape, and Julian Scheer, who was in charge of public affairs, came to me and he said, "A couple of the press, the media, whom you know," and he named them, "thought it might be a good idea just to have a simple lunch today and just sort of talk over what's going on, [call it a background discussion]." I said, "Okay." And I never should have said okay.

So we were talking about it, and I was trying to be careful in what I said, but also sort of explained to them the scope of what was going on and the fact that all these people were

doing this study and everything. And they said, "Why didn't you just haul those people right out of there when the fire started?"

And I made the mistake of saying, "You couldn't do it, because as soon as the fire started, the pressure built up inside and the door opened inward. So we couldn't open the door because the pressure was there." This is supposed to be not even a [full] backgrounder, but just giving them some feel for what was going on. Well, of course it got in the newspaper the next day, and Webb was really mad with me. That was the beginning of the end of a beautiful friendship, which is discussed in the book.

But before it was all over, it ended on a positive note with Mr. Webb, which I can mention right now, perhaps just talking about this. I could tell that it was going to be very difficult for the two of us to work together running NASA, where the feelings are really running pretty high. He really sincerely felt that the engineering, the technical people and the project had let them down, that what happened was inexcusable. He at first, when I'd go to see him, would say, "I just don't understand how George Mueller could have made such a horrible mistake," and I'd try to explain that George Mueller had been doing a wonderful job, and all of the things he had done of a positive nature. He said, "Yeah, but look at this mess."

Then I found out that he was talking to some other people and saying, "How could Bob Seamans have let this mess happen?" and so on. I just felt that after a while the best thing to do, since I'd only planned to be down there two years, that it would be best if I just got out of the way. And I wasn't quite sure exactly how to do it gracefully, so I got my brother, who's a lawyer, to come down. I got Walter Sawyer, who had been our general counsel for Paul Dembling, to come down from New York, because he knew NASA well and knew Jim Webb well. So first I told him the whole situation. They agreed that I should resign. Then we composed a letter and my wife typed it. I took it in to Mr. Webb, and he took one look at it and he said, "How do you think your peers are going to look at the job you've done here in NASA?"

I said, "Jim, I think they'll feel I did all right."

He said, "I'm going to take this right over to the President."

I said, "That's fine." So it was announced that afternoon. But I did stay on for three months, and I still had a role to play. When I left, I was made a consultant.

But I did have an exit interview with Gene [Eugene M.] Emme, who's a historian, and I made it clear to Gene at that time that some of that interview was going to be [privileged,] not to be opened for twenty-five years. Well, all of a sudden Jim Webb was calling me, saying, "Don't you think it would be a good idea if the two of us did some kind of a history of NASA together?" And I said, "I'm not so sure, Jim, that your views and mine will coincide on it."

But then as time went on further, and particularly after I became administrator of ERDA [Energy Research and Development Administration], I could see more clearly some of the problems the administrator has of dealing with the press, dealing with the President, dealing with the Congress. I realized that he'd done a wonderful job for NASA. Then he became ill, as you know. But I used to go around and see him when he was quite ill, and he'd always have something for me to take home and read. He'd say, "I'd like to have you read this and just drop me a note and tell me what you think of it," just as if I was still working for him. So we ended up on good terms.

BUTLER: That's good. The Apollo fire was a rough time for everyone.

SEAMANS: It was rough.

BUTLER: Your friendship was strong enough to come through.

SEAMANS: It was terribly rough on Joe Shea, because he was to be in the capsule, to make things even worse, and at the last minute his headset didn't work, so he thought, "Well, there's no point in lying there in the capsule if I can't hear anything," so he went and got in a plane that was flying back to Houston when he got the news. I guess the doctor in charge of all of the medical stuff associated with the astronauts was—

BUTLER: [Dr. Charles A.] Chuck Berry?

SEAMANS: Chuck. I talked to him quite a bit during this period, because he was helping the astronaut wives and he was helping all kinds of people who were deeply distressed by all of this. He told me that people would come to Washington to testify and do various things and they'd be sort of sobbing all the way to Washington. I mean, it was a very emotional time.

BUTLER: Let me pause here for a moment to change the tape.

SEAMANS: Okay. He [President Kennedy] said to his friend Senator [George A.] Smathers would probably come with him, senator from Florida, and, "We'll call you back in half an hour." So anyway, this is a model of what he was actually pointing at of the real thing sitting there on the pad. It was a Saturn I. This second stage was going to be used for the first time. It had liquid hydrogen [as a fuel,] which we were going to use for the first time in a Saturn… It was going to put the [heaviest] load in orbit…[up to that time.]

So anyway, we showed [the President the vehicle. This is Wernher von Braun in the photograph, along with the President and myself. Then] we got in his helicopter and flew over the ground that was being prepared for the vertical assembly building…and then, still staying in the helicopter, flew out and saw a Polaris [launching]… We [flew] in the helicopter with Senator Smathers and with an admiral [Gallatin] whose name escapes me at

the moment. It was a half-an-hour flight out, a half back…[so we had ample time to chat.] That was on a Saturday, and…he was shot the following Friday. And by the following Monday, I guess it was, the very same plane [that brought him to the Cape] was flying over the cemetery, Arlington Cemetery, where he was buried. All in a very short period of time.

BUTLER: Something like that can happen just so fast and unexpected.

SEAMANS: I'll say.

BUTLER: Very unfortunate. Very.

SEAMANS: Let's see. How have we done on this list?

BUTLER: Doing pretty well. We're a good ways through. Just a few more questions, and we should tie off in some pretty good time.

SEAMANS: Okay.

BUTLER: I guess the next question is, you talked about how you had then resigned from NASA and you had initially said, and even then you repeated that when you'd come on it was for a short-term job and ended up being long term. What had prompted you to stick with it?

SEAMANS: Well, I think it's pretty easy to answer that. I mean, it was exciting, you know, and it was probably the most exciting job you can imagine for me, because it tied in so well with my previous work both here at MIT and then for RCA. It was sort of a natural sort of extension of it, but obviously with a lot more at stake, obviously with a lot more public

interest and a lot more excitement. It was just the greatest job that anybody could have. But it was fortunate that I had…written [my acceptance] letter [stating, "we are thinking in terms of a two-year period for family planning purposes,"] because I could make use of that in resigning.

I was asked by the [*Washington*] *Post* to come over not long after it was announced that I was leaving, and they started grilling me on, "Why leave at this time when you're just about to go to the moon? Why would you want to leave now?" And I said, "Well, you know, I think we have corrected the design flaws that we had. I think things are in good shape. The time to leave is when you have things in good shape. And I have been down here for seven years and I really only intended to stay two." And I was never really questioned beyond that, so it was a nice way to exit the scene.

I thought a lot about…[my] relationship with Jim Webb…because we were really so close together. I used to stop in at his office every day when I'd be leaving, assuming he was there and I was there…maybe that was half the time, and tell him, try to bring him up to date on the problems that had come to my attention, and he'd tell me about some of the problems that he had. He'd usually say something, as I left, like, "Well, you'll have to admit it's interesting," even though it had been terrible. So it was just great until this fire came along. And probably we wouldn't have gone to the moon in the decade if we hadn't had that fire, because we did have some incipient problems…

Also we brought [The] Boeing [Company] in to be the integrator of the whole vehicle, and that was very fortuitous. It's a question of whether that [effort] would have been done properly if we hadn't had Boeing's capability. They were already working on the first stage, so it was a natural growth for them to take on all of the mechanical, electrical, hydraulic, and other issues you get into when you bring all these different elements together within the structure that takes off, as well as with the ground.

So whether the gods were kind or whether they were unkind, who's to say, but it did come off. By then I was in the Air Force, so I was able to get down and see the liftoff, and I was there at Houston when they landed, so I had the thrill of seeing that happen. By then I had a whole other set of problems I was working on for the Air Force, who were deeply involved in Southeast Asia.

BUTLER: New problems and new challenges, very important ones, too. How did your work at NASA benefit you then in working with the Air Force and then in ERDA?

SEAMANS: Well, again I think I was pretty lucky. My first experience with complex groups of people was here at MIT. I worked with Dr. Draper during the war, where I was one of the technical members of his team, working on fire control, how to aim guns to shoot down kamikazes, those kind of problems.

Then right after the war, there were some issues relating to fighter planes and their ability to follow the controls that were putting them in the right maneuvers for air-to-air combat. This was a project of about thirty-five, forty people that I ran, but where I had to have not just aeronautical people working with me, but I had to have electrical and hydraulic and all the different engineering disciplines, or not all of them, but a lot of them.

As a result of that, in 1948 I was asked to be the technical director of something called the Meteor Project, and it involved seven departments here, three different schools, the supersonic wind tunnel, other sort of major facilities. And that had a lot of elements that were very difficult to bring all these things together at MIT and at the same time working with Bell Aircraft Company that wanted to build [the so-] called Meteor, a missile, and there were a bunch of other contractors involved, and the Navy pressing us and so on. I learned quite a few things that you don't want to do, as well as some things you do want to do. I learned from making…[some] poor mistakes [myself], but it was very educational.

That was very helpful in getting a little feel for how you get nine government centers to work together and what you need in addition, the glue you need to get them working together. That, in turn, was helpful in the Pentagon. We had 35,000 people when I left NASA, working for NASA. When I joined the Air Force, we had a million and a quarter people, which 900,000 were military and the rest civilian people, operating in thirty-three different countries and so on.

So there were problems there that I had never dealt with before, and the research and development issues of what I'd been addressing in NASA, but in addition you had the problems of the command and control on the operational side. Although the service secretaries are not in the chain of command, the chain of command is…from the President [to the Joint Chiefs]. You don't even have to go to the Secretary of Defense. The President, if he wants, can go directly to the chairman of the Joint Chiefs [of Staff], and there…to what's called the unified commands. One's the Atlantic Command, one's the Strategic Command, Tactical Command, and so on.

The chief of the Air Force, in my case…General Ryan, worked for me on issues relating to men and material, research, development, but when it came to fighting a war, say, in Vietnam, he wasn't in the chain of command either, except as he was a member of the Joint Chiefs. So it's a much more complicated organization—it has to be—because of its tremendous size and so on than NASA was. But it was fascinating, first of all, to be involved in so many activities in so many countries.

I did a little traveling when I was in NASA…For example, I went down to Africa, where we were working with the Italian Government on a live site pretty close to the equator. Let's see. We got down to Mombasa and then up the coast a ways, and they had what they call Capabasa [phonetic], their base camp, which actually the operations were out on a platform out in the Indian Ocean. Let's see. Another time I went to—I guess the same trip, I went through New Delhi, talked to the Indian Government about their desire to put up some

satellites for educational purposes. Then to Australia, where we dedicated a tracking station that was going to be used on Apollo. I cut the ribbon with Prime Minister Holt, the prime minister of Australia.

But compared with that, in the Air Force you had to deal with U.S. personnel who were in thirty-three…[or more] countries, [with duties] including such esoteric things as flying all the supplies from New Zealand down to McMurdo Bay in Antarctica…or [to] the stations that we had in northern Scotland, northern Greenland, and northern Alaska. I tried to get to every place in the world where we had Air Force personnel, and that was exciting. And just great people, men and women.

I went into Southeast Asia, not just South Vietnam… A lot of flying was done out of Thailand. There was a whole clandestine operation out of Laos, where we were working with tribesmen. Got up in there, which was sort of a never-never land, where in that little country you had the government in Vientine, where you had representatives from Russia and China and Vietnam and the United States, and they'd go to embassy parties together, and where you could look out and see planes fighting. Then *sub rosa*, we had aircraft flying there where the U.S. personnel involved had to take their uniforms off and leave their identity behind and go up there and fly, and if they were killed in action, their families would be told they were killed somewhere else… And we were working with the Mao tribesmen. I met the general, General Van Pao [phonetic]. He had five wives, because there were five subtribes of the Mao. He didn't want to hurt anybody's feelings, so he had a wife from each one. You go all the way from that kind of an operation to the sophistication of, say, NATO or meeting with our ambassador to England, who wanted to know about our bases there, you know, there were all different kinds of levels of things going on that were real exciting.

BUTLER: You probably would have never imagined, when you first started out as a student, or even as a youngster, where your career could take you.

SEAMANS: That's true. No, just a country boy from Boston, and all of a sudden. [Laughter]

Let's see. What else you got? Anything else?

BUTLER: You've worked in both government and in the private sector. What are your thoughts on how private and industry and the relationship with the space program and the government—for example, USA, United Space Alliance, working with the Shuttle Program now? Do you have any thoughts on that or how that relationship will grow or change?

SEAMANS: That's a really good question. The relationship between government and industry is one that I tried to describe to some extent earlier perhaps in my previous meetings, where there's…some kind of government effort that everybody agrees the public, the Congress, [the President.] This is [a program] that the government's responsible for, but it can't do it all by itself.

One of the issues we had right in the beginning of Apollo…[was the extent] NASA [should] grow versus the amount of contracting… We decided that we would grow NASA as little as possible, and we went from something like 18,000 to 35,000. It about doubled, but the amount of effort that we took on went up by over six times, went up to over six billion dollars. I think I understand that relationship pretty darn well and how to make it effective and how you can bungle it. I've seen some bad projects as well as a lot of good projects.

But then there's the issue of the [responsibilities] once you privatize… I'm for privatizing when it's appropriate, but if you have something where the funding is coming almost entirely from the government, I don't think you can completely privatize. I think if it's government money that's involved, the government has to have responsibility to see [that the] money is used wisely and correctly, and you can't abrogate that by having a

company…[accept the funds] and saying, "Now it's private." I think wherever there is more than the government involved, where there are other companies that need the service, say, of a communications satellite, then you can privatize it. Then it can be truly something that's done competitively. But I think there are times when we try to privatize when it's really not appropriate.

To just repeat, if the money is coming from the citizens of the United States, through the taxpayer, and going to the government to run a government program to accomplish some objective, then the government has got to see that it's properly run. So, in other words, you can't just turn it over to some company and say, "Here's the money. You go do it."

BUTLER: The challenge is to figure out the proper balance for each individual thing.

SEAMANS: I think so. And I think as we've been going along in time, there have been more and more uses for space activity. When we first started remote sensing, it was first done for reconnaissance, highly secret, and then all of a sudden when we started looking at these images from space, it was obvious that there were other uses than just reconnaissance. But you had to have people become familiar with it in order to use it—geologists and agronomists and all the different disciplines that could make use of space photography. But for a while we couldn't make it available because we weren't even supposed to have it. But then we put up satellites, multispectral kind of satellites for this purpose. We kept having a terrible time getting the money for it, because they'd say, "Who needs it? If there's a need for it, the money would be there." And you'd say, "But there's no need for it now because people don't even know that such a thing exists."

We were gradually able to get these satellites out, the ATS [Applications Technology Satellites] satellites, and now it's starting to be big business. You put satellites up and get this data, and you can sell it, to the point where the French are ahead of us on it, you know,

for example, selling stuff. I guess it's Motorola [that] has got their system…[in space, a system] that involves sixty-two satellites, all put up there by private money, and that's great because [there's] a commercial use for it.

BUTLER: Absolutely.

SEAMANS: But it's pretty hard for me to see the commercial use for having a man in space. Maybe there will be in time. If there could be, say, very special manufacturing which might include pharmaceuticals, there could be the pharmaceutical industry might have an interest in performing certain developments in space, something like that. It's possible.

BUTLER: Even just tourism. [Laughter]

SEAMANS: Yes. Believe it or not, I've got a student, a thesis student, going to be working on his thesis this fall on this very subject.

BUTLER: Oh, really. Interesting.

SEAMANS: Which I'm going to supervise. Yes. I've told him, at the start, I'm very dubious, but I'll be happy to supervise his thesis and it will be done without prejudice.

BUTLER: That should be interesting to see what his arguments are.

SEAMANS: Yes. If you could take somebody in orbit for $100,000, why, you could probably sell quite a few tickets.

BUTLER: I'm sure you could. It's all that excitement around it. I know I'd love to go up if I could afford it. [Laughter]

SEAMANS: Exactly.

BUTLER: Looking back over your career with NASA, what was your greatest challenge?

SEAMANS: I don't know. You had it on [your list of questions,] too, and I should have thought about…[it so that I could] give you a good answer right now. There certainly were some pretty interesting challenges. But I guess I'd have to say that the Apollo fire was the greatest challenge, dealing with the Apollo fire as…a specific.

…[In] a more general…[way], what's the most difficult, I would say…involve[s] people…an attempt to judge whether or not an individual is doing their job properly. In most cases they were, but in some cases questions would arise, and then the issue of how do you determine whether the person should stay in the job or not and if it's [necessary] to make a change, how to make the change without ruining somebody's life. Those kind of issues are pretty tough.

BUTLER: Very tough. Very tough decisions. And important, too, because it does affect—

SEAMANS: And you have to, I think, bear in mind that your responsibility to the whole is more important than the individual, yet the individual is very important, too.

BUTLER: Again a place for balance. In reflection, what would you consider to be your most significant accomplishment?

SEAMANS: At NASA? [Laughter]

BUTLER: At NASA.

SEAMANS: Oh, I don't know.

BUTLER: Or most significant contribution.

SEAMANS: Yes. Well…there were a very large number [of projects] in the seven and a half, whatever it was, years I was there, we had a whole bunch of projects, manned projects, Mercury, Gemini, and then the start of Apollo before I left. And then there were [missions] like the Ranger and the Surveyor [and the lunar orbiter to the Moon] and the Mariner going out to the planets, [plus] all the projects that involved [satellites] going in orbit, communication, [weather forecasting,] and various [others]. I think the role I had working with the project teams responsible for all these activities on the one hand and working with Jim Webb and Congress and the OMB [Office of Management and Budget] and so on, on the other, to match up the resources that were available with the projects and to help keep that whole machinery going was my greatest accomplishment.

BUTLER: That is certainly significant. Not everybody could do that, and not everybody could do it as well as you did.

SEAMANS: Well, I don't know, but anyway, you could try to single out one specific thing like, say, the lunar orbit rendezvous. I personally feel that if we had not gone the lunar orbit rendezvous [route], we'd never have gone to the moon. I think it [was] that critical a decision, and I think it [was] a pretty close call, and I had a role in it. But John Houbolt had

a big role in it, and Brainerd Holmes had a role in it, and a lot of other people had a role in it, so I think that my role was to—let me just say one more word about my accomplishment. My experience had been in RCA and then at MIT that you can't run things by sitting at a desk. Yes, reports are important, but you only can run things by dealing with people, and that you not only have to meet with people who come into your office or if you have a project status room where you can look at a lot of material and have people here, you've got to get out in the field.

As soon as we had a simulator for Gemini, where you could practice rendezvous down at Houston, I went down there and sat with Neil Armstrong, side by side, and went through the maneuvers. Before Ed [Edward H.] White [II] went out into space in Gemini IV, extravehicular, I went down again to Houston where in two dimensions you could try it out by standing on a steel bed, where you had air flow flotation, in effect, and you could move around friction-free, holding this gun and maneuver yourself.

Then I came back, and the question was whether or not we should have that particular project on Gemini IV. Hugh Dryden was absolutely dead set against it. He said that [Alexei A.] Leonov had a space walk, so called, to the Soviets, and here we were just copying them, and we weren't ready for it. And I argued for doing it. Jim Webb didn't want to go ahead until he got agreement from the two of us. So I wrote a memorandum where, in effect, I said, "There's high risk in every flight that we make in space for the astronaut involved, and our role should be to accomplish as much as we possibly could on every one." I felt that we were ready for this. I've been down and I've tested it myself, and I thought we should go with it.

And Hugh Dryden, finally, I think somewhat reluctantly, signed off on it. So it wasn't just a question of getting dollars for these projects; it was a question of understand[ing] them enough that you knew whether to really support it or not. I mean, there was a case at one time where the German people felt that we were going to have trouble moving the big boosters around the country fast enough. This is…before we'd decided to go the southern

route using ships. They wanted to use dirigibles at one point, and they came in and wanted to get some money to take over Lakehurst, where, you know, dirigible towers and stuff. Well, there's one where you had to just say, "Come on. Quit wasting my time. Cut it out." Then they wanted to build a special airplane to do it.

So it wasn't always a question of support; it was a question of trying to figure out which were the right things and which didn't make sense, and then helping the project groups get the resources to do it. To me, that's my accomplishment.

BUTLER: That's quite an accomplishment. That certainly is a challenge to help that whole program come together and make all those pieces work. Definitely, definitely an accomplishment.

At this point I'll see if Rebecca has any questions.

SEAMANS: It was Bill Hines [phonetic], not Bob. He was not only my nemesis, but he was a very difficult person to deal with, and for some reason he had a real vendetta against NASA. He was syndicated and he got a Thursday night column in what was then the *Washington Star*. This is somewhat apocryphal, but I would come home and the *Star* would have already been delivered to our house, and instead of waiting for my wife to say terrible or—the rule was, if it was really bad, she'd have a dry martini ready for me when I got home. [Laughter]

BUTLER: That's a good arrangement. Worked well.

Wright: And so did you have one that afternoon?

SEAMANS: I had to drink a lot of martinis. [Laughter] Do you have any questions?

WRIGHT: I think just one, if you'll share with us. This year makes the thirtieth anniversary of the first manned lunar landing, and you helped set that foundation for that to happen. Can you tell us were you were and what you were doing at that time, when all the eyes of the world were set in one direction?

SEAMANS: I'll give you the sequence of events. When I left NASA, I didn't know exactly what I was going to do, but it didn't take long before I got a call from Howard Johnson, who by then was President [of MIT], and he said, "You know, we want you to come back to MIT. Once you come up here, to begin with we'll get you a joint appointment with Sloan School of Management and the Engineering School."

So I came back here. My family was still left down there because of schools and stuff. This was in the wintertime. In the late spring, I definitely was going to stay here at MIT, and I was going to end up in this department, the aero[/astro] department, with an appointment more specific than the first one. So we had to figure out where we were going to live. We kept our house in Beverly down by the ocean, but I felt that if I were going to be here at MIT, I wanted to be closer by, so I actually did something very unique to me. I went and bought a house on my own, without my wife seeing it. I asked to look around for houses here with a real estate agent, and he showed me a lot of houses that were not very attractive. Then he showed me one that had just come on the market, where I was the first one to look at it, and I knew it was exactly what my wife would like, nice and sunny inside and everything. So this was a Friday. I said to the real estate guy, "I'll call you Monday." I get to the airport and I thought, "Gee, if he shows that to somebody else, this is Friday, maybe it will be sold by Monday," because it was a really nice house. So I called him from the airport and said, "I'll buy it."

Then in the fall, we got our children in school up here and we were making fairly extensive renovations to parts of the house, to the point where my wife—a lot of dust and so on—she got a serious asthma attack. So by the middle of December, she was in the hospital.

I got a call from Mel Laird, and he said, "By any chance are you going to be down in Washington in the next few days?" Well, the truth of the matter was, I was going down the next day, which I think was on a Friday, to get on a NASA plane to go down and see Apollo 8 take off. So I told him that. He said, "I'd like you to have lunch with me." So I had lunch with him. I couldn't imagine what he wanted to talk about. He had a suite there. He finally ended up by saying, "Look. I've got Dave Packard going to be the deputy secretary of Defense." Dave Packard, you know, Hewlett Packard, a tremendous appointment. He told me how it was going to be possible for a man of his wealth and so on to get rid of all the conflicts of interest. Very complicated and very interesting. It boiled down to the fact that any appreciation in the value of his stock while he was in the Pentagon, he would give to charity. So when he left the Pentagon, he gave away 18 million dollars.

BUTLER: Oh, my.

SEAMANS: Among other things. And then he said, "I want to have one holdover from the previous administration," which is really a unique thing to do, a wonderful thing to do. "I want to get Stan Resor, Secretary of the Army, and I want to get one political person, John Chafee, who had been three-time governor of Rhode Island, to come in and be Secretary of the Navy, and I want one technical person, and that's you."

And I said, "That's insane. We've got a house and we're still renovating it. My wife's in the hospital."

He said, "You can't say no to me today. Are you going to be back here next week?"

I said, "As a matter of fact, I'm coming back on Monday to sign the papers on our house." We just finally sold our house in Washington.

So I saw him on Monday, after going down to see the Apollo 8 liftoff. So the men were going around in orbit, you may remember. No, they weren't going around in orbit; they were still on their way to the moon. I said, "Christmas is three days from today. My wife's in the hospital. I can't make sense out of this thing, but [if] you…give me till the 26th of December and I'll give you [a thoughtful] answer."

So I had a chance to talk to all my kids, and I said, "I know how you all feel about Southeast Asia and the Vietnam War. What would you think of your father being the Secretary of the Air Force?" I thought they'd be so horror-stricken. I talked to them separately, though they may have caucused by themselves. Anyway, they all said they thought I ought to take it. My wife, all she would say is, "It's up to you."

So I picked up the phone on the 26th of December and I still wasn't quite sure what I was going to say on the phone, but I did take it. Then I did get a slight stay of execution [so] that I [did] not have to come aboard on inaugural day, that I could have an extra couple of weeks to finish up what I'd agreed to do here at MIT.

Then all of a sudden I was immersed in a zillion different things going on in the Defense Department, so I didn't have too much time to think about the manned program until about May, when Nixon wanted to put together a special committee, decide what to do in space after Apollo. He wanted to have the Secretary of Defense and Administrator of NASA and his own science advisor, and I guess the head of OMB on it. Well, Laird said, no, he'd prefer to have me on it.

So I ended up on that committee, and this got me sort of reinvolved and thinking about NASA and what to do in space. I guess I disappointed NASA, because I felt that there was not the support for [sending] men to Mars immediately. NASA was really hot to trot… They brought Wernher von Braun into Washington to be the spokesman and all of that. Vice

President [Spiro T.] Agnew was head of the Space Council. He liked it, boy, he liked the publicity. He'd already said down there [at the Cape at the time of] Apollo 8, I think, "After we go to the moon, we're going to go to Mars."

Then all of a sudden it was July, and I was invited to come down the night before. [For] President Johnson[’s]…small dinner party… By then [we] had the fire in Washington. We'd lost Kennedy, we'd lost [Martin Luther] King, the shooting. Things were getting pretty violent. So Abernathy was down there, [too,] with a team of mules to see the launching. Then there was the countdown and the liftoff and everything went just perfectly.

[I] came back to Washington and then went down to Mission Control for the landing, and obviously there was tremendous holding of the breath at the very end. Was it going to be possible to land or not? We were almost running out of fuel. Then we had six hours before they were going to egress, so we all went out to get something to eat. I went out with Doc Draper, who was down there. Let's see. Who else? Jackie Cochran. Did you ever hear of her?

BUTLER: Yes.

SEAMANS: Jackie was there. She joined us for dinner and a few others. We came back, and lo and behold, damned if an astronaut didn't come—sort of a silhouette of an astronaut came out and stepped on the moon and jumped on the moon and made the great statement, "Small step for [a] man, large step for mankind," or whatever it was.

It was very interesting to see whether they could walk or not, because we'd done a lot of work at Langley Field, for example, simulating the moon by having somebody suspended so they were almost horizontal, and you could generate in [the inclined] plane…the same gravity, in effect, that you have on the moon. And sure enough, they could sort of jump around like kangaroos.

We actually took off the next morning to come back to Washington before they lifted off, but I heard…over the radio…[from the airplane] that they carried out their rendezvous and their docking and so on.

Then I had to be in London for the next liftoff, and Nixon went down for it. It was a thunderstorm, you might remember. In fact, all the [electricity] went out when they went through the thunderstorm. They probably generated their own electricity. That was really, in a way, a close call… One of the smaller technical decisions [early in the program] had to do with what kind of memory to have in the guidance computer. It was decided that—Draper was pretty insistent that it be a wire-wound system with a basic memory. You have magnetic cores and the wires go through, so it's a permanent memory. That memory held up, even though this great charge of electricity had gone through. It was conceivable this whole thing could have toppled over… [Perhaps] they really should never have gone, even though the President was there.

Then the next one was 13, and I happened to be at a luncheon. About halfway through, I guess they were on their way back all right. It was a small luncheon given by the British ambassador, and he was making a statement which I think was quite correct. He said, "We in Great Britain feel that if you can bring 13 back, it's an even greater achievement than landing on the moon, because obviously you hadn't anticipated it was going to happen."

A lot of the reprogramming that had to be done—or not a lot of it—the programming that had to be done to bring them back as fast as possible was done by the Draper Lab, a guy named [Richard E.] Dick Battin, and he's two offices down from right here, was responsible for it. It had to be done quickly, because the longer you waited, the more time it would take to recorrect and come back. So they had to [re]write the computer [instructions] and so on here in Cambridge. It had to be telefaxed down to Houston and sent up to the astronauts, that permitted them to change their course. That was a really great achievement.

BUTLER: Very.

SEAMANS: So that was all three of those flights. Then I don't remember about 14, but 15 I remember well, because there were three Air Force. Dave Scott was in charge. There was two commander conferences a year where you got the sixteen four-star generals in the Air Force together with the Secretary and the assistant secretaries, and we were holding it out in Colorado Springs at the Air Force Academy, and used that occasion to give the Air Force Distinguished Medal to those three astronauts.

Then number 17 was particularly exciting because it was the only individual who had not [originally] been a pilot…went up, Jack [Harrison H.] Schmitt…[who had a doctor's degree from] Harvard in the Department of Geology, and he had a lot to do with the protocol for the geological work on the moon on all the missions, and he went himself on 17. So that was a particularly exciting one for that reason.

Then, unfortunately, two things had happened. One was that the Electronic Research Center, which we'd set up here for NASA, was canceled by President Nixon, and it was all going to be closed down. The reason was political. It was looked at as a Kennedy repository. Then Nixon was not too pleased to carry on the Apollo either, so the last planned flights for Apollo were canceled. When I say planned, we had the hardware for it, and now that hardware sits down at Houston. I guess it's down at the Cape, some of it.

So it's a lot to reflect on.

BUTLER: It must have been very rewarding to see those missions that were successful, to see them land for the first time, then so many others after that.

SEAMANS: The scientific community were not very pleased with Apollo, of course, because it looked to them—it's very easy to say, "Gee, if we only had that money for scientific work

that's really important," you know, all of that money. People don't realize that the money isn't sitting there ready to be used for something else. I mean, if you cancel Apollo, it didn't mean automatically that any of that money would go into these other projects. But that's the way people tend to look at the budget. They couldn't see any real scientific merit in going. Jerry Wiesner himself had a lot of trouble with that. He was the science advisor to Kennedy, and he kept saying to the President—and I think [he] was right—that the reason for going to the moon was not really for scientific purposes. But as it turned out, there was a lot of scientific value in going to the moon. A lot was accomplished scientifically.

BUTLER: Absolutely. It may have started as more politically oriented, but the scientific return was very good. Are there any areas that we didn't cover?

SEAMANS: I think you did a pretty good job. Let's see.

BUTLER: I think we covered most everything that I had and certainly have covered quite a bit in your previous two interviews, too.

SEAMANS: There may very well be some overlap.

BUTLER: Any last thoughts or anything like that? Of course, if you come up with anything, too, we can always add that in at a later point.

SEAMANS: Let me say, I personally think it's great that you're doing this. Here I'm showing my education at the foot of Jim Webb. He felt very strongly about the value of history. I don't know to what extent you're familiar with the [National] Air and Space Museum program. Sometime after our relationship had not only cooled down, but we were really

starting to enjoy being together again, he said, "What would you think of having a program, we could call it the Glennan-Seamans-Webb Program or something of that sort, to try to have good interviews with the key people on Apollo, and have it done by the Air and Space Museum." By then he was—what was the right word—maybe a trustee of the Smithsonian [Institution]. And they wanted to do it, but they didn't have the money for it. I thought it was a good idea and I thought we could raise the money for it. We raise[d] about $60,000, I think. He said, in effect, "Will you help me get Keith Glennan involved?"

Keith was always very wary of Jim, and a little bit vice versa, so I was sort of the intermediary. Keith agreed to do it. He was one of the first to be approached for an interview, and he called me. He'd had something like three interviews. He'd spent a lot of time and he called me on the phone, he said, "Bob, this has got to stop. I've had three half-day interviews, and I'm not yet married to my wife." [Laughter] I said, "Why don't you tell them you want to get on a little more rapidly?" Anyway, that was done.

But then it ended somewhat abruptly, because the then-head of the Air and Space Museum didn't want us to go and raise any more money, because he wanted to raise money for their new big museum out at Dulles, and he thought this would interfere. I couldn't see how raising another 20 or 30 thousand dollars could interfere with raising 136 million, but anyway, that's the way he looked at it. So there is a lot of that material there now, which is somewhat lying fallow. I don't think it's being used to any great extent.

BUTLER: I believe it is to some extent.

SEAMANS: Martin Collins is the chief honcho there. So I'd like to think that what you're doing will be done somewhat in collaboration, if you want to call it that, with them.

BUTLER: We did try and look at what they had, and, of course, they did spend many, many hours with you.

SEAMANS: This book here, to some extent, rests on that. I've told some of these war stories about my meetings with Johnson and other people, sort of interesting stories, and people say, "Have you ever thought of writing a book?" So finally I heard of a person who was helping people write their own autobiographies, named Webster Bull, and so I called him on the phone. He came over and I showed him some of the material that I had, and asked him if he'd be interested in working with me on it. Signed a contract to make up to fifty copies. It was rather a specific contract. He took this material I gave him, and we talked some. He sort of took my words but put it in the form of what he thought might make a book. He did it remarkably well, but it didn't satisfy me … So then that got me really going to do a lot of the additional writing.

BUTLER: We're certainly glad that you did, and I'm sure that your family is glad that you did.

SEAMANS: So that's about it, I guess.

BUTLER: We want to thank you for sharing all this with us. We really appreciate it.

SEAMANS: I guess I ought to ask you, what are you going to do with all this material?

BUTLER: That's a very good question. Right now we'll take it back and transcribe it, and again send it to you to let you review.

SEAMANS: I thought the first came out very well.

BUTLER: Wonderful. We're glad to hear that. Thank you. It came out well because you spoke so well. We are hoping with this to make it available to the public and hopefully on the Internet, is what we're hoping to do.

SEAMANS: Okay.

BUTLER: In the short-term future. We worked last year, part of our project included talking to some Shuttle-Mir participants, and that project is now in the next stages and we're actually working on a web site with that one in particular. So we're seeing how that goes, and we may be able to use that as a stepping board for what we can do with this one, so with this we're talking to more people over a longer period of time. But we're hoping the Shuttle-Mir one will come out this summer, and we'll certainly let you know on that.

SEAMANS: Good.

BUTLER: Right now these are being taken over to the Scientific and Technical Information Center at JSC, and archived there and processed there and put into the system so that people can have access to them, but we do want to try and get more access. That's the immediate hopes.

SEAMANS: Okay. Good.

WRIGHT: Johnson Space Center now has a historian in residence, who is in close contact with [NASA Chief Historian] Roger Launius and another historians through the centers. They trade lots of information when they know people are doing special projects, and they

tend to send each other materials. For instance, if somebody's doing some of the early days and looking for information on you, we're able to pass that on to them. Then it keeps them up to date on what you're doing. At the same time it doesn't take another half a day of your time to go back. And if they need to ask you questions, they can be more specific. So it's a way to route the information and get it out there for them.

Then also for just, again as Carol said, on the web, we're hoping that everyone from junior high students to Ph.D.s will be able to get on that site and look for the information that they can find and help fill in all those blanks that they might have questions about.

BUTLER: And to be able to hear it from you yourself. That's one of the things you mentioned earlier, that your job was a great opportunity and just so exciting, and ours is, too, because we're able to hear directly from you that we're involved in it. So we're hoping that by putting it on the web, we can help others that weren't able to see it, to be able to hear it first-hand.

SEAMANS: Good. That's a great program. Did [JSC Center Director] George [W. S.] Abbey come up with the idea? How did you happen to do it, do you know?

BUTLER: George Abbey came up with the idea, or in talking with people came up with the idea, and thought it was very important, thought there were a lot of important people that we needed to talk to, and started it in late '96, and came up with a list of names. It was him and a couple of other people who came up with a list of the first names that we should talk to, and we're still talking to some of them, and our list is growing. Every time we add a new name and find new information, every time we talk to somebody, we hear something new. So that's wonderful. He's been pleased with it so far.

SEAMANS: Good.

BUTLER: I think now we've talked to—I think it's about eighty or ninety individuals now that we've had a chance to talk with.

SEAMANS: You've talked with some people at Huntsville?

BUTLER: Yes. We're trying to talk to as many people as we can, and we're going all over the country doing it.

SEAMANS: And you're becoming pretty knowledgeable yourselves, I'd say, from your questions.

BUTLER: We're learning quite a bit. It's fascinating and fun.

Wright: And what makes our project a little different from some folks' is that we do research and we compile the materials [unclear].

[End of interview]