

# NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT

## ORAL HISTORY 3 TRANSCRIPT

JOSEPH P. ALLEN  
INTERVIEWED BY JENNIFER ROSS-NAZZAL  
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ROSS-NAZZAL: Today is March 18<sup>th</sup>, 2004. This oral history with Joseph P. Allen is being conducted for the Johnson Space Center Oral History Project, in Washington, D.C. Jennifer Ross-Nazzal is the interviewer.

Thank you again for coming to see me this morning, the second time this week. We appreciate it. I'd like to begin by asking you to describe your work with the ASSESS [Airborne Science/Shuttle Experiment System Simulation] Project.

ALLEN: All right. Remind me. When was that?

ROSS-NAZZAL: I've been looking at records, and I think you were appointed in 1974.

ALLEN: Right. The NASA was looking toward flying Apollo-Soyuz [Test Project]. The Skylab had flown successfully. Those [of us] involved in the last Apollo missions, however, really weren't so involved in Skylab, and a number of us were not even involved in Apollo-Soyuz. We were now looking farther downstream to when the Space Shuttle was going to fly, [even though Shuttle] was still very much in the throes of its engineering, design, development, construction, and all the myriad of details that go with [such evolutions. Space Shuttle] was to fly out on the horizon, [i.e.,] late 1970s, but we were a long way from its first flights.

[In the early 1970s], a decision was made by NASA and international parties to accommodate research persons aboard the Space Shuttle from nations other than the United States, and part of that negotiation, a very important part, involved the European Space Agency, [ESA. European scientists] had become an increasing force in scientific research in space as America pursued the Apollo Program. The Europeans were quite keen to participate with the United States, using the now-being-developed Space Shuttle if they could.

As their part of the bargain, [ESA] agreed to develop and build something that went by the term of Spacelab. Not an easy project, because it was to be manned—in other words, populated by people—so it had to meet all those requirements, and Europe had had no experience with humans in spaceflight at all. The Europeans asked for and were given some help in that regard by the Americans. As part of that [effort], I became involved in some teams of people that looked at the various Spacelab designs from the point of view of a flight crewman. Would [Spacelab] meet NASA standards? Would [it] meet the standards of good laboratory space, volume? Would [it] accommodate researchers [who would be working in the space environment]?

I made, I think, at least two trips to Europe, maybe three, as we looked at these evolving designs. Before joining NASA, in 1959-1960, I had been a student of physics and mathematics in northern Germany, and quite by coincidence, one of the major [Spacelab] contractors was in Bremen, northern Germany, which was not far from where I had been a student many years earlier, [thus] it was great fun for me to return, because I did have a skill in the German language and I thoroughly enjoyed meeting the German engineers and scientists [who] were becoming involved in this European-wide effort. I had some great times there.

An individual by the name of Klaus Berge was a principal engineer in that Spacelab effort, and he and I are still quite good friends today. [Klaus] had important responsibilities for European space efforts up to just the last few years. I think he's just retired from that. I made other friends at ESA, including I made the acquaintance of a man that was the head of ESA, [Reimar Lüst]. ...

NASA is very good at [inventing] simulations to try to understand how events might unfold later on. We simulate spacewalks by going underwater in weightless environmental test facilities. In using them, we really build the choreography for a spacewalk and we prepare the endurance of the astronauts that will do the spacewalk. We do many other kinds of simulations, [as well], and it occurred to us that maybe we ought to [simulate] doing research in a volume the size of a Spacelab, in conditions that were not unlike living aboard the Space Shuttle.

We set out to do this in a simulation called ASSESS, which I won't remember what [the acronym] stood for, but we used NASA research airplanes that were stationed out at NASA Ames [Research Center, Moffett Field, California], and we would confine research crew members to quarters that were similar to the quarters aboard what would later become the Space Shuttle, and we actually carried out real research, using airplanes [being flown to do] research. This had nothing to do with zero gravity, but it did have to do with confining research scientists in teams working for a period of about a week, eating and sleeping where you're working. I do believe some useful information came from [these simulations].

Let me now go back to the European journeys. I had worked in Outlook for Space with Max [Maxime A.] Faget, and it turned out Max, who was the Chief Engineer of the Manned Spacecraft Center, later to become the Johnson Space Center, had [finished] his major work as Chief Engineer on the Space Shuttle. The Space Shuttle was now in construction and testing,

and he turned some of his engineering attention to the development of the Spacelab, the engineering of the Spacelab, and he and I traveled in Europe to this end. So, once again, we're kind of traveling [and] working [together, he] as the engineer and designer, and I [as the] the operator of machines that would be operated [in space]. ...

This was always fun for me. It later became important for me, because when I left NASA in 1985, I very deliberately set about making an important decision as to where I would go next. I was [forty-eight] years old. I had time for one more profession, at most, and I wanted to be careful as to what I chose to do. I realize this is a bit of a digression, because I've gone around to the end. My choices [in 1985] were really go back into the university from whence I had come eighteen years earlier. I gave some thought to that. My feeling was I would have to go back to the university and refurbish myself as a physicist ... for at least a year, maybe two years. Financially, that would have been very difficult for me to do. I had a family by then and would have had no paycheck.

I [also] could step down from flight status and stay as an official at NASA, and I pursued that [possibility]. However, I had at one time been an assistant administrator of the agency, and so I thought it would be a step backward if I were to do anything less. Possibly I [could] have [become] a Center Director. There just did not seem to be an opportunity to do that though, [and] NASA [certainly] was not jumping at my suggesting [this career move]. ... So my stepping off of flight status pretty much means I would leave NASA, [and leave the world's best job title, astronaut].

[My] third [choice] was to go into the private sector. Flown astronauts were, in those years, still sought after; there was no question about that, rightly or wrongly, and I was pursued by numbers of big aerospace corporations, which I appreciated. But, I was worried because they

represented the business world and I knew nothing about the business world. I had a hard time imagining why they would put me in a position of some responsibility where I really didn't understand how business worked. I came to the conclusion that if I were to go into the business world, I should start in a small business—if not a mom-and-pop grocery, at least something that was akin to it and that had a technical element, because I was, after all, a scientist and a technical person.

Max Faget, in the beginning of 1985, had started a small space company called Space Industries [Inc.], and when he learned that I might be considering leaving NASA, [he] was waiting on my front door to hire me. [Max] was [very] keen on my coming with his company. [I thus agreed to join] Space Industries. I was about the fourth or fifth employee there. Again, this is outside the purview, maybe of the NASA history, but [it does involve NASA projects and former NASA workers]. We had an office in a strip shopping mall on Bay Area Boulevard, not exactly above a 7-11 [store], but very close to it.

One of the first meetings I attended was to determine such things as a logo, if we could, and we had to decide on what the address of the company would be, which seems peculiar, because we had a street address [on] Bay Area Boulevard. But as you yourself might know, the post office does not care if you [“place” Bay Area Blvd. in] Houston, Texas, [or Webster, Texas], as long as you have the zip code correct, 77058. Well, we were a space company, so all the [males], myself, Max, and the two other men, wanted [the address] to be Space Industries, Bay Area Boulevard, Houston, Texas.

Our colleague, the single female in the office, Beverly Braddy, told us that the address would be Webster, Texas, and [this decision] was not negotiable, because she was the mayor of Webster. [Laughs] Which she was. ... So Max said, “Beverly, you're exactly correct.

[Webster] it will be.” I like to think [Max’s accepting Beverly’s argument] set the tenor for our company going forward, because we worked like many other companies, except we weren’t as military and as autocratic as most companies—[a spirit we kept to the end].

Let me come back, Jennifer, to the acquaintance that I made at the European Space Agency. I had been in Germany as a student as a Fulbright scholar [in the late 1950s. As a consequence], I was called by a gentleman in Berlin [Germany] about five years ago, right at the turn of the century, and he asked if I could come back to Germany and give a series of fireside lectures to celebrate the fiftieth anniversary of the Fulbright scholarships in Germany. I was surprised to get that call, and I was also surprised to know that I had been one of the first Fulbright scholars there. ...

I would give [these lectures] in conjunction with a German who had been a Fulbright scholar in America. The German was the gentleman who had run ESA, [Reimar Lüst]. ... I had gone into the university in Kiel [Germany], Christian Albrechts University and studied physics. He had come to Chicago [Illinois] and he had studied physics, and he had continued for several more years [after getting his Ph.D]. Again, our paths had crossed [earlier] because he had been the head of ESA. Neither of us had any idea that we had [the Fulbright scholarship experience] in common.

[Dr. Lüst] was utterly charming and a wonderful person to be on a lecture circuit with. He was [then] retired, but very interested in NASA and very interested [still in space research]. I learned during that time that he had been very competitive [to win his] scholarship because he had a good command of English. He had gotten the good command of English as a seventeen-year-old boy in a prisoner-of-war camp in El Paso, Texas. [Ironically, Dr. Lüst] had been a submariner in submarines built in Kiel, Germany, where I had been a student. His submarine

was sunk by Americans, and he had escaped, floated to the surface of the ocean and was picked out of the ocean and taken to a prisoner-of-war camp. Obviously, he was very lucky to be alive. He had nothing but admiration for Americans and the way they treated him as an enemy soldier. He had learned English and [many years later] gotten his education in America, so [his] was really a wonderful, wonderful story. I mean, there's a history story to be told right there. ...

I think that's a sufficient thing to say about ASSESS and Spacelab.

Oh, I do have a thought about Spacelab. The Spacelab was successfully built by the Europeans. At least one, maybe two, I can't remember, three, were brought to the United States. It ultimately flew aboard a Space Shuttle, but it would have been [STS-9]. ... [Sadly, Spacelab] cost hundreds of millions, probably several billions of dollars, and I think it flew only two or three times. Very, very inefficient use of hardware, which is certainly not to NASA's credit. ...

Then NASA itself pursued other [equipment to use within the Shuttle]. Other than Spacelabs, it pursued something called a Spacehab, which [it] used [in lieu of] Spacelabs. European astronauts had trained to fly aboard [Spacelab] and they made very infrequent flights aboard it. That also was not an efficient use of very skilled persons, I think. I'm sorry for that. Then the NASA set off on this International Space Station and, of course, by then, Spacelab was completely archaic and not used again. ...

ROSS-NAZZAL: Can I ask you about your trips to Germany?

ALLEN: Sure.

ROSS-NAZZAL: You mentioned, briefly, a little bit about those trips, but are there any stories or anecdotes that stand out?

ALLEN: There's nothing that really pops into my head about those. They were hard-working trips. You know, you're in a foreign land. We spent some time in Holland as well, at Nordvik, which is sort of the combination Marshall [Space Flight Center, Huntsville, Alabama] and Johnson Space Center of Europe. It's kind of a god-forsaken place, but an interesting place to be.

There is an anecdote I have. It has to do with Max Faget. We were returning from one of these trips, and we went through an ESA Headquarters in Paris, and I wasn't really participating in this at all, but Max was involved in important discussions with high-placed Europeans. They were envisioning other things [beyond Spacelab] to go aboard the Space Shuttle, including some launchers that they had in their mind for scientific satellites, and the launchers were going to use liquid hydrogen and liquid oxygen. Max felt that the Space Shuttle [should] never carry liquid hydrogen and liquid oxygen in its payload bay. There was something about just the very explosive nature of those liquids that bothered him. He just didn't see how safety could be assured with [those propellants aboard], and he was very strong [in] his belief [such things] would never happen.

This [statement] came back into everyone's head as the Space Shuttle flew. [The Space Transportation System (STS)] was getting ready to carry a mission into polar orbit, launch from Vandenberg [Air Force Base, California], and some initial crews had already been assigned to that flight. One of those persons was Dale [A.] Gardner, with whom I flew in STS 51-A. [The STS] was going to carry a military satellite that had a kick stage that was liquid oxygen and



liquid hydrogen. [Another of my STS 51-A shipmates, David M. Walker, secretly referred to the polar orbit mission as “Death Star One.”] Prior to that flight, the mighty spaceship *Challenger* was lost, and decisions were made after that, that the Space Shuttle would never be launched into polar orbit, it would never be launched from Vandenberg, it would never carry hypergolics in its payload bay. So [still again], Max Faget was proven to be correct. Strange.

Let’s go to STS-1.

ROSS-NAZZAL: Okay. You had started talking about that on Tuesday, and you shared with us some anecdotes.

ALLEN: Oh, I had indeed. Well, I had left Washington, D.C., [in the summer of 1978], and I told my friends here in Washington that it had been a very interesting and quite enjoyable three years. I didn’t tell them [that my NASA assignment had been] the worst headache in the world. But I particularly told my friends and colleagues on Capitol Hill that I found [must] get into a less dangerous and stressful line of work, and so I was returning to the Astronaut Office. [The statement] sounds facetious; it’s not. [Work in Washington is] very stressful and not without its dangers. The danger[s are] high blood pressure and heart attacks. Those are not dangers of Space Shuttle flights; there are other dangers there, but I’m not certain they’re any more lethal than high blood pressure and heart attacks.

So I returned to the Johnson Space Center, and immediately was named onto the support crew of STS-1 and began to participate in the flight techniques meeting and actually flew some simulations myself of the Space Shuttle, so I had [a first-hand understanding] as to how it was going to fly. [I] participated in all the simulations that lead up to those flights, including the

integrated simulations, [i.e.] very clever inventions whereby astronauts are in simulators that look very much like a spacecraft, flying a “real” spaceflight.

This simulator is actually transmitting data from a “spacecraft” over to the mission control, and as far as the people in mission control are concerned, it’s virtually impossible for them to tell whether [the data they receive comes to them from] a real spaceship or a simulated spaceship, other than [what] they read [in] the papers that morning. That’s a terrific way to do simulation, and you’re exercising the whole team, those [who] are “flying” and also those [who] are the mission controllers.

There is a band of evil people involved in [these sophisticated simulations. They are] the simulation supervisors. [It is] they [who] cause various failures to pop up, and crew members have to deal with those failures and the mission controllers have to deal with them, [that is to say]: understand what [the failures] are and then build procedural work around[s] such that the mission can be saved. These are missions that can—typically they can run for four hours or six hours, but prior to a real mission, you may indeed run a simulation for two days or three days. I daresay before STS-1—you’ll have to remind me how long. What was the duration of STS-1 mission?

ROSS-NAZZAL: I think it was two, two and a half days.

ALLEN: It was about that. I’m sure that we had run several two-and-a-half-day integrated simulations [prior to STS-1].

Well, I’ve already described the few days prior to the flight [of STS-1] and then [John W. Young and Robert L. “Bob” Crippen] going to the Cape [Canaveral, Florida]. The mission itself,

it just goes by as a blur in my mind. I don't have any particular recollections about it, except for [our genuine] nervousness [about] the reentry. The launch itself was bad enough, but when they actually got to orbit and [the spaceship] seemed to be working, [we all began to worry about reentry].

I do have one anecdote that comes to mind. We were very worried about the spaceship losing tiles. In the mission control, the day after it was in orbit, [we were given] an image of the Space Shuttle that was [amazing in] resolution. [The photo showed the Orbiter and its underside clearly] did not have any little black places, [indicating] a missing [tile]. ... Nobody that I knew of in mission control knew where the image came from, but it was given to us and we had some conversations about it, and [we] could relay to the crew that we had indications that [the tile picture] was quite good. ...

Many years later when I was in the business world, I became involved with several companies. One was called the Environmental Research Institute of Michigan. It was a company that Space Industries, later to become Veridian [Corporation], bought, and with that [purchase] came access to certain classified information, and I discovered where that photograph had come from, and I met the people [who] had taken it. It was a very high-resolution photograph taken using very special methods. Some poignancy in that, because those methods are [still] available and had they been used, it's likely, to my mind, that human eyes would have noticed a rather strange-looking gap in the leading edge of *Columbia* [in the days prior to the tragic loss of this spaceship]. What would have been done about that is another story entirely, and history cannot know.

ROSS-NAZZAL: Let me ask you a question about STS-1. You served as a support crew member on Apollo 15 and then also for STS-1. Can you compare and contrast?

ALLEN: They were very similar, very similar. However, my main role as support crew on Apollo 15 had to do with science, very little to do with the spacecraft [themselves]. ... On STS-1, there was virtually no science aboard. Well, the whole thing was [in itself an applied-science] experiment, [i.e.] an engineering experiment, as to whether [STS] would work or wouldn't. I can't recall one other thing aboard that was just science, other than [the] machine itself.

[Prior to the STS-1 flight], a lot of the flight techniques meetings would have been very similar to the Apollo 11 and Apollo 12 flight techniques meetings. [Mainly], do we know what we're doing? ...

STS-1 was also a fairly short mission. The Apollo missions were two weeks long. Is that right? Yes, about two weeks long. So [STS-1] began and it ended, and I'm trying to think, [in about] two-and-a-half-days. I think I only had three shifts in the mission control, with the keystone shift being that [last one, with the key question], "Can [*Columbia*] come home safely?"

And, Jennifer, my recollection of that is looking at the engineering data coming back and, by the way, we came through a blackout on STS-1, which we don't do now, because with the TDRS [Tracking and Data Relay Satellite] above us, you can always track the spacecraft [without a blackout]. ... [On STS-1, when] we reacquired the radio signals and [saw] it was a beautiful flying machine, [we were thrilled. *Columbia*] was still hypersonic [and still with lots of speed and altitude to lose before we were safely on the ground], but [this new invention, the Orbiter], seemed to be performing absolutely perfectly, and it [remained perfect], all the way to the ground.

ROSS-NAZZAL: Can you describe what it was like in the Mission Control Center when the flight officially ended successfully?

ALLEN: Yes. I'll tell you my recollection. [When the wheels] stopped, I was very excited [and very relieved. As CapCom] I was supposed to say something very laconic and dry, but I forget even what I said. ... [But, I do remember that Donald R. Puddy], who was the [Entry] Flight Director, said, "All controllers, you have fifteen seconds for unmitigated jubilation, and then let's get this flight vehicle safe," because we had a lot of systems to turn down. So people yelled and [cheered for fifteen seconds], and then he called, "Time's up." Very typical [Don Puddy]. No nonsense. ...

Other images that come into my head, the people there that went out in the vans to meet [the Orbiter] wear very strange-looking protective garments to keep nasty propellants that a Space Shuttle could be leaking from harming the individuals. [These ground crew technicians] look [more] like astronauts [than the astronauts themselves]. Then the astronauts step out and in those days, they were wearing normal blue flight suits. They looked like people, but the technicians around them looked like the astronauts, which I always thought was rather amusing.

It was an absolutely extraordinary achievement, that successful flight. ... With its complexities, it was as extraordinary as Apollo was extraordinary. [STS-1 was complex, Apollo was] a bit more simple, because a sledgehammer approach was taken for Apollo. [Apollo] started with six million pounds, and we just [consumed propellant and discarded used hardware] along the way, [all] in order to bring back the several thousands of pounds of command module

on to the surface of the ocean. In the case of the Space Shuttle, what comes home is a flying machine, perfectly capable of flying again. [STS is without question] an engineering miracle.

[But there is also a sad aspect to the Shuttle's early success.] Parts of the requirements placed on this machine had nothing to do with its being reusable, [but] made it, in hindsight, an economic disaster. So, [an] engineering success; [an] economic disaster. And I can give you a nutshell description of what those requirements were. They were requirements that came out of a strange set of bedfellows in the political world.

Leadership in the early 1970s decided the only way the Apollo-victorious NASA would be given permission to build a reusable space transportation system is that there be identified other users for the system other than just the scientists. This nation's leadership identified the other users as the military. The Space Shuttle would be used to carry military payloads. The military has its responsibilities, and they said, "All right. If our payloads are going to go aboard [Shuttle], we do have one requirement; that is that your Space Shuttle be able to take the payloads to orbit, put them there, and land [back at the launch site after making only one orbit of the Earth]."

At face value, that [single requirement] doesn't seem all that difficult to do, but what it meant was, the shape of the Orbiter went from being a very simple lifting body-type shape, with very, very small wings, to a much larger vehicle with delta-shaped wings. I don't know the exact numbers, Jennifer, but the wings that go to orbit and come home again probably weigh half the weight of the vehicle, and they're never [fully] used; only the outermost wingtips are used. All that vast expanse, with all that tile, and all the carbon-carbon along the leading edge is never used.

It would be used if it were to go to space in a polar orbit and then come home. It would be used to gain the 1,000 miles of cross-range that one needs because the Earth moves 1,000 miles—no, 1,500 miles cross-range. It moves 1,500 miles in its rotation during the time you've gone once around. So you have to have some soaring ability. That's what [these large wings are for]. The Space Shuttle would have cost much less money. It would cost much less to refurbish each time. Still it would not be an economic wonder, but it would be economically okay, were it not for these huge wings. Of course, that requirement, in hindsight, was never used, was never needed, but the current Space Shuttle will forever be burdened with [these wings].

That [cross-range] decision and [the] decision to undertake an International Space Station that was permanently occupied, permanently manned, not just visited from time to time, those two decisions and commitments to them made many years ago has put NASA [now (2004)] in [a] very strange cul de sac. [Keep in mind, I am now just] an old-timer passing judgment on how my alma mater got into this rather strange position. ... [But I am harshly critical] as to where NASA now finds itself.

Can the agency recover? Certainly. But there are going to have to be some heroic things done in order to jerk it out of that cul de sac. Where are the Soviets when we need them? That's a facetious remark. We need a Cold War enemy worthy of—the Iraqis are not going to get us out of this cul de sac.

ROSS-NAZZAL: Let me ask you one question about STS-1 before we move on.

ALLEN: Yes.

ROSS-NAZZAL: There were splashdown parties at the end of the Apollo Program, at the end of each mission.

ALLEN: Right.

ROSS-NAZZAL: Were there parties at the end of each successful Shuttle mission?

ALLEN: There were.

ROSS-NAZZAL: Was there one for STS-1 that you recall?

ALLEN: There was. Oh, boy, was there. I don't know that there's anything particular to tell about it. But, no, there were some great parties. I actually don't remember exactly all of those things, partly because after STS-1 we were then working pretty hard on STS-2, and then I was assigned to spaceflight. So I was now not thinking so much about partying, but about getting ready. The date of STS-1 was what, Jennifer? In the spring of '81?

ROSS-NAZZAL: I don't have the exact date with me.

ALLEN: The spring of '81, something like that?

ROSS-NAZZAL: I believe so.



ALLEN: Because then I flew in the fall of '82, so we were a year and a half away and we were going to fly STS-2, -3, and -4. So they're going to come off pretty quickly in that year and a half. We had time for some parties, but not for a lot of parties.

ROSS-NAZZAL: Why don't you tell me about the day you finally heard you were going to be put on a flight.

ALLEN: I don't remember it. The first assignment of mission specialists we knew was going to be [STS]-5, because the system was going to be declared operational after the first four test flights if nothing untoward happened. We also knew that the next in line to be assigned were mission specialists, [i.e.], the scientists-astronauts. Those [who] had arrived earlier had already flown aboard Skylab, Jack [Harrison H.] Schmitt being the first to fly on the last Apollo, and then Joe [Joseph P.] Kerwin, Ed [Edward G.] Gibson, and [Owen K. Garriot] had flown on the Skylab. So there were just now, I think, nine of us [who] would be [considered]. I guess I never thought much about it, but I almost assumed that maybe they went alphabetically, because they put myself and Bill [William B.] Lenoir [aboard that first operational flight]. And I was thrilled, absolutely thrilled.

... And after I'd been there with the crew about two weeks, I made an observation to Mr. [George W.S.] Abbey that I knew why I was on the flight; I was the impedance matching device between the two Marine pilots and the MIT [Massachusetts Institute of Technology, Cambridge, Massachusetts] engineer. *Impedance matching* is an engineering term for getting very unlike electrical circuits to communicate, one with the other. I said it somewhat in jest. He did not find

[this remark] as amusing as I thought it was, and I suspect that there were elements of truth in this, because I was very good at getting different groups of people to understand each other.

With no scintilla of modesty at all, I would say that's probably my strongest suit, is understanding the way different individuals think about things and then enabling communication [between them, in spite of their differences]. ... I assert I was—I hope it's not overblown—very successful in getting scientists to understand what flight crew members needed, and getting flight crew members to understand what scientists needed, even though neither group spoke the [other's] language. All really had the same motivations, but with a lot of work, it was clear they all should be on exactly the same page, because you wanted the ultimate result to be a successful mission, and successful in later Space Shuttle flights and in the last Apollo flights meant scientifically rich in what was achieved.

So I was the impedance matching device [between] Bill Lenoir, an extremely smart, very well disciplined, very tightly wound individual [and] Vance [D.] Brand and Bob [Robert F.] Overmyer [whose] backgrounds were military [with] a military way of thinking about things, and they had a much higher tolerance for people being not quite so intense. And Bill did not have a high tolerance for that at all. Well, this sounds unkind. I don't mean it that way. But he's so smart, he just doesn't tolerate others not being very smart. That's the way it is. But I was thrilled to be assigned to that [first operational mission].

Jennifer, shortly after that assignment I got another assignment, which was, prior to the mission I was put into the pool to be used by newspeople during the STS-2 flight. NASA did that in those years. They selected just a handful of astronauts and said, "Okay, now you can be selected by the [TV reporters to join them on their live telecasts]."

I had gotten to know Jules Bergman during the Apollo flights, and Jules was a very caustic individual. He was a very hard-nosed reporter. Of course, there were some very famous reporters then, including Walter Cronkite, [whom] I also knew. But Jules was a much younger and much more in-your-face type of individual. I don't know if in my last interview I recounted for you the first news conference I had as the support crew member for Apollo 15. We had selected the [landing] site at Hadley Rille. [At that time] we did not have very high-resolution pictures of this area. Mr. Bergman asked in the press conference on that site selection, how we could be certain that there were no fields of boulders [at the site]. I had answered [his question by] saying that we had high resolutions of pictures of an area nearby and there were no boulders or serious craters there, and we had lower-resolution pictures of the Hadley Rille region, but the material was exactly the same, and through extrapolation, one presumed that the landing field would be safe.

Jules Bergman just said, "That's your answer?"

I said, "Yes, Mr. Bergman." [Later], during the press conference, a piece of paper was handed to me. I opened it and [read], "Extrapolation is the fertile parent of error," the last line in an accident report that had been written about an aircraft called the Comet, written in a very [serious] study done [in] Great Britain when [the British] had lost a series of [these] airplanes and they couldn't understand why. They discovered the reason. They had made an [incorrect] extrapolation [about metal fatigue] and they had just said, "Extrapolation is the fertile parent of error." [Jules had written the note to me and even] cited the date of the accident report and signed his name.

I took the piece of paper and I turned it over and wrote on it, "Nothing ventured; nothing gained," and I put in quotation marks. Underneath, I said "Evel Knievel, Caesar's Palace," and a

time of day, just before [Knievel] jumped the fountain at Caesar's Palace [Las Vegas, Nevada, on a motorcycle], where he [crashed]. I don't know if you remember that [strange incident].

ROSS-NAZZAL: No.

ALLEN: And I said, "Give this to Mr. Bergman." I later looked out, and he could not believe I had written that down.

I was still an active-duty astronaut when Jules Bergman died, and he died in a rather strange accident. He had been given to some brain seizures, so I won't go into it. I was quite overwhelmed to be called by his grown children, David and his daughter—I think maybe her name was Lynn. They asked if I would come up and speak at his memorial service, with several people. I was just flabbergasted to be asked that, because there were many astronauts. I agreed to do it and I went to New York City [New York]. They held [the service] in a temple in New York City.

The three persons who spoke at his funeral were his brother, who was a very high, important person in the television industry, Ted Koppel [(famous newscaster), Jules'] colleague at ABC, and myself. I was very flattered [but also quite surprised to be asked to give his eulogy], but [Jules' family] said that he had such a fondness for space flyers, and that I was amongst his very favorite. They had found on his desk that piece of paper [reading "Nothing ventured, nothing gained"]. He had it in a small frame so you could see both sides of it—when they were going through his things the day after he died. It's pretty amazing, [but to get back to my story].

I was put into this pool, and the one person I didn't want to get selected by was Jules, because he just was such a pain in the rear end. You know how it came out. I then had to be on television with Jules Bergman at the launch in Florida [Kennedy Space Center] and then later at the landing out in California [Edwards Air Force Base], and it wasn't my cup of tea. But in spite of myself, I became very fond of the man, very fond of him, and made a number of friends in the television industry that are still quite good friends today. One of those, by the way, [is] Lynn Sherr, and I don't know if you even have a recollection of her. She's still on *20/20* or something, but she's not on TV too much.

When we lost the *Columbia*, I had so many people calling me that were television people, [all of them wanting on-air interviews], most of whom I did not know. ... One call came from Lynn. She said, "Joe, this is Lynn Sherr. I'm calling just to say how terribly sorry I am. I'm doing the story, but I'm not going to ask you to be any part of it. I know you don't want to be." I thought that was as nice a phone call as I've ever gotten from a newsperson, because that's not the business that they're in. Very classy lady. Actually, she was on television with Jules Bergman when STS-3 landed in the dust storm out in White Sands [Missile Range, Northrup Strip, New Mexico]. There's some very funny footage of the two of them wearing sand goggles out there, trying to do their commentary.

STS-4 flew, and now we're on STS-5. I don't really know how to go into that. It was a year of training. It was, of course, a lot of fun. It was the first Space Shuttle [mission to carry] a payload, [i.e.,] two communications satellites. We worked with the satellite developers and we got to know how the satellites were put together. We understood thoroughly what they needed for successful deployment.

The concept of the satellite in itself is simple. They are meant to be deployed spinning, and the way you do it is just put [the satellite] on a table that will spin, like you put a record onto a record player. You put it down, and then you cause it to spin. In the case of a record, you then put the needle on it—this dates me. We don't have records anymore. Never mind.

In the case of the communications satellite, it's mounted on the table [prior to launch, then] you go to orbit. ... [Once there], you cause the table to spin and you point the Shuttle in exactly the right direction, and then at precisely the right part of the orbit, you just release hold-down arms that are holding the satellite to the table top. When you release the arms, springs [on which the satellite sits] expand and just give it a very gentle push out, spinning very beautifully. That was the first priority of the mission, to deploy successfully the first hardware [put into] orbit by the Space Shuttle.

The second objective [of STS-5] was to verify that the spacesuits designed for the Space Shuttle operated properly. Bill Lenoir and I were to do [this initial] spacewalk. ... [Although we] had other bits and pieces of experiments to do, [on] the day before the spacewalk was to take place, we commented to ourselves that we really had just two important things [left] to do. One was the spacewalk and then the second was the reentry and a safe landing. I made the observation, "Vance, out of these two, if we have to make a choice, let's choose the safe landing." And we all laughed about that.

It turned out we did have to make a choice. ... [Just as] the spacewalk was to begin my spacesuit failed. It was an electrical failure in the spacesuit. When one is in a spacesuit, Jennifer, and you power it up [you hear a very high-pitched hum] there someplace in your ear, just a high-frequency hum. When I powered mine on, the hum started, but it didn't sound like it was healthy. It sounded indeed more like an [angry] mosquito. It just went [demonstrates].

Changed its pitch. I'd never heard it before. Then [I] proceeded to [make] various electrical checks [of the suit systems, and none passed the check].

So we tried all sorts of things, powering it on and off, and it was just not going to work, a very bitter disappointment to me, without any question. It was equally bitter to Bill, and the question now was, could he even do just a little part of a spacewalk—[a short solo, if you will.] ... [But Mission Control said, “No buddy system, no spacewalk.” Bill] was really upset, obviously. Nothing to be done.

The flight report we later wrote, at least the first draft, had said, “Our assignment was to meet this test objective, to demonstrate that the spacesuits worked properly,” and I put in, “they failed the test.” I think I elaborated on it later. But, of course, we came home and the difficulty was determined and it had a serious electrical problem, [but easily repaired for future walks].

So the bad news was the spacesuit failed; the good news was we were not outside the ship when it failed. It would have been considerably more traumatic had it failed outside. It would not have been [fatal to me], but it would have gotten [my] attention, for sure, including, [I] would have to scramble to get back in, button [my]self up and get out of [the suit] before other parts of it started to fail.

Let's see. Various things that happened. ... I was to be the ship's photographer, and I had always had an interest in photography. I mentioned that earlier with regard to the IMAX cameras. I knew a lot about cameras. Not that I was an expert photographer; I just knew a lot about them. We were given, to my total delight, flight cameras to use on the ground, so you could take rolls of film and then the NASA photo labs [laboratories] would develop [the film and] or give you little proof [prints through which] you could hone your [photo] skills, which I wanted to do. ... [The idea was, with practice], people can learn to take better pictures. And

quite frankly, the pictures that had come back in the first few flights, [where] photography was not the objective, were average [at best]. And the TV that had come back, using kind of not very good television recorders, was pretty bad.

In the course of the training, I got a videotape, a training tape, made [at] ABC Television, by Lynn Sherr and Jules Bergman, and Lynn's voice is on [the tape] explaining what's good and what's bad [in TV coverage]. She would give examples of good TV shots and then she'd give examples of really bad, and the really bad, most of them came from STS-3 and STS-4. ... I was viewing this [tape] in a TV monitor when I looked around and Ken [Thomas K.] Mattingly was standing behind me. Ken had flown STS-4. I felt really bad, but he said, "You know, she's exactly correct. That is terrible." [Laughs] He says, "We can learn from this," and we did. So I took very seriously [the assignment of] coming back [from orbit] with nice images from the journey.

I asked to keep my training camera with me until the very last minute, and they asked me—these are people in Houston—"When is the very last minute going to be?"

I said, "When I strap into the spaceship."

"You've got to be kidding."

I said, "No, I'll give [the training camera] to the suit techs [at the launch pad] and they can bring it back."

I took photos going from the crew quarters and going out in the van and then going up in the gantry, up the elevators, and then loading aboard. ... And, Jennifer, when we got back, I was thrilled. A couple of those photos were in *Time* magazine. The NASA labs had developed [the film] and said, "These are great photos," and they had put them out [to the news media]. ...



I also had use of a Hasselblad camera one very beautiful spring day, the 19<sup>th</sup> of May, 1980. I remember this because it was my daughter's birthday. She was [eight] years old. Her mother gave her a wonderful English tea party, where the girls would come [in party dresses] and then they would make very large hats to wear. ... [Then], they would have a big tea [party wearing the hats]. ... I had the use of a Hasselblad camera, so I took all kinds of photographs at this tea party.

The next day, I took [the exposed film] to the NASA labs and they gave me little proof sheets, and I really had some quite beautiful photos of a birthday party, with [eight]-year-old girls having just the best time of their lives. We'd also hired a small limo [limousine] to pick [the guests] up and bring them to the party and then later, drop them home, with appropriate [party favors and] mementos, including the hat. ...

The photos were terrific and I told NASA, "Well, now make some prints."

And was told, "Oh, well, see, these are just training. Our labs cannot make big prints, just proof prints."

I said, "Oh. Well, can I have the film?"

"Sure. Here's the film."

I took the film to a commercial laboratory and was horrified when I was told that, first of all, these were negatives [from the negative]. You have to make a positive, and then from the positive you can make a print. The positive of each would be six dollars; the prints would be eleven. ... [I was trapped!] I had to have [these photos but they] cost me hundreds of dollars, because I didn't think [in advance]. [Laughs] So that was a training lesson I should have been smarter about. But I still remember it. Gorgeous photos, [though, albeit very expensive].

The NASA trains people on all sorts of things by giving them workbooks. With the cameras, they give you a workbook with the camera. With the Nikon I was given, which was a flight Nikon, I couldn't understand how to do the delayed shutter release. You press the button, ten seconds goes by, [and the shutter releases—a useful feature] for taking pictures of you and your friends, when you all want to be in the picture. [This is] probably more than you or history wants to know [about cameras]. ... I read all through the workbook, the whole thing, which was as boring as sawdust. I couldn't find [the description of this feature].

I went down to a photo store and I asked to see an owner's manual for that same model, and I was given an owner's manual. I looked through it, and it showed me exactly where on the camera body [delayed shutter release] was. I had the camera with me. I looked at it, and there on the camera body was a blank, a plug. There wasn't a button there.

I went back to the photo people and I said, "This is a defective camera. It's been plugged. I want a real Nikon." Well, it had been modified, and the modification had cost tens of thousands of dollars in order to make it more astronaut-proof; such that astronauts [didn't], by mistake, put [the camera] on delayed timing and thus mess up a picture.

I wanted to know then what other modifications. A couple of modifications had been done, none of which was necessary, all of which [were] costly, and I just was very upset with my colleagues. I said, "Cameras are amongst the best tested of complicated tools that we have humans have. They've been tested in wars. They've been tested in violent storms. They've been tested at the bottoms of the oceans. They've been tested everywhere. Why are you making them better?" Well, it was an argument I did not win.

The STS-5 was to be the first time four Americans were together in space. We'd had up to [three] before [—in Apollo and in Skylab—] but that was the max [maximum]. I wanted a

photograph of four Americans. Jennifer, this also was a time that was following still on the heels of this very sad circumstance that involved taking of personal items to the Moon and then later selling the items. There was a hearing in Congress that had to involve the Apollo 15 crew, to my bitter disappointment, and was resolved in some way. But part of the resolution was [a set of] very strict rules about what individuals could have or not have of a personal nature [aboard the spaceship, rules] probably followed to this day. And I won't say that they're bad rules, they just are what they are. Sad, nonetheless. ...

Perhaps in spite of [the rules] and because I've been a little bit of a troublemaker, but not serious trouble, I went to a camera store and was able to find a very old-fashioned shutter release mechanism. It's a long stem [made using a spring like the shutter release on] an old-fashioned camera, where you go like this [demonstrates]. ... So it's just a little mechanical toy that you can thread into the top of the shutter release, and the Nikon camera had still the place you could thread it in.

I took [this device] aboard the spaceship without anybody really knowing it, and it came [secretly] off the spaceship [on my person]. This was [against NASA regulations], and I will readily admit to it. But in the flight photos that came back, there were numbers of photos of us, the four-crew men. [In one, we array ourselves] like the four faces on a face card, with one head going like this, one like this, one like this, and one like this [gestures]. It's a fun photo, [good enough to appear in *Time* magazine the next week]. But this was with a camera that had no delayed shutter release! Not one [NASA] person said a word to me about it, but you knew that the people in the photo shops wondered how in the world those photographs were taken.

A very nice man ran NASA Photo for many years—I know his name; I'm not going to give it, because I don't want to incriminate him. When he retired, I gave him [that secret shutter

release] device—a flown object. I'm not certain he's still living, but if he is, I can guarantee it's one of his favorite things. Because I knew he knew how I'd [made that photo]. He just had to know how I'd done it.

In that flight there was also photography taken [using only] available-light. Gorgeous photographs of astronauts in [natural] light, which really pleased me. Again, NASA Photo [had] said, "Well, no, Hasselblads are for taking pictures out the window." And I'd used several frames to take photos of people inside, and they were quite good photos.

... I flew to space on the middeck. I would assert I'm probably the first "passenger" to go to space. I had no duties at all on the outbound journey nor on the inbound journey.

On the inbound journey, it was clear to me that we were not flying for very long, we shouldn't be too deconditioned. If I were not to strap into the middeck, I wouldn't be a threat to my fellow shipmates, because if I fell to the floor, or for that matter, even passed out, I wouldn't endanger them in any way. So I decided, and my fellow crew members said it would be fine, I just would come home standing up in the aft part of the flight deck. I had my cameras there, and I took some wonderful shots through the window and several of those were in the book, *Entering Space*. There's a wonderful one of Bob Overmyer's face being silhouetted by the orange glow outside of reentry, and there's another one of Vance Brand. Then there are several photos taken out through the top, the ceiling windows of the plasma coming back together behind the Orbiter, and the engineers were very interested in that. They'd never seen it before. [All of these were "first time" photos.]

I did one other thing that I'm just very pleased about. The first time we did an OMS [Orbital Maneuvering System] burn—it's to change your orbit ever so slightly, after we were safely in space and the payload bay doors were open—you do the countdown and [fire the

engine]. Since the burn was being done by Vance and Bob Overmyer, Bill and I had only to just look out the back and see at T-minus-zero the OMS engines ignite, and to my astonishment, it looked like the back of the Orbiter blew off. It just went [demonstrates], this enormous flash of light—[totally unexpected]. You hear kind of a “whump” of the engine starting, [and see] a flash of light. It just is there and then it’s gone, even though the engine continues to burn.

I later learned there’s a reason for that. The engines are started rich, more fuel than oxidizer, in order to make sure a clean burn starts, and then [the mixture is] made lean again, such that everything gets burned and there’s no light at all. You would think there would be light from a rocket; there’s none, at least looking out the back.

Every OMS burn from that time—I mean, we did maybe four or five during that mission—with every one, I would have a camera and at T-equals-zero I would take a photograph. To my astonishment, one of those photographs has the flash on it. [The] “OMS burn” [photo is] in the *Entering Space* book, [and] in several NASA publications. [It turns out] the flash lasts for only a fifth of a second, [a fact] we can tell that from video, TV cameras, camcorders. About a fifth of a second. The exposure of a camera is a sixtieth of a second, so you have to put a sixtieth of a second right during that fifth of a second, which is virtually impossible to do. But I got very lucky and was quite pleased by that result.

ROSS-NAZZAL: Can we take a break for just a second? I need to change the tape.

ALLEN: Yes.

[Tape change]

ROSS-NAZZAL: You were talking about the photos on STS-5. I'm curious, do you have a favorite photo that you took on that mission?

ALLEN: I don't think so. I mean, there's several that I like very much, possibly of just various individuals. I don't know. Well, of course, the photos of the Earth are beautiful, but everybody's gotten gorgeous photos of the Earth, depending upon where you are. STS-5 was in [a low inclination] orbit, so we weren't over the really spectacular parts of planet Earth, so I can't claim any one photo that is remarkable of the Earth per se. So again, it's mostly just of things around the spaceship.

I very much like the ones of the glow during the reentry. There are a couple of amusing ones taken by my shipmates of me with orange juice, but I mean, those amuse me. They've been used in various science classes, by the way. I have several that I use in science classes to talk to young people about the zero gravity, and it's a good illustration for that. ...

I do have a photo from the STS 51-A that is the only photo that I've taken but I'm also in, and it did not use a delayed timer. By then we had the delayed timers back on the cameras. ... I [took] a photograph of Dale Gardner during the spacewalk, and I'm reflected in his helmet, taking the photo. That's pretty neat.

Let's see. Other things about STS-5 per se. Oh, there's so many things to remember, Jennifer. One is, we flew aboard *Columbia*. It was fresh off its flight from STS-4. It still was equipped with ejection seats, and I remember very well the flight techniques meeting where the subject of ejection seats came up, and the four crew members were in this meeting, and Vance Brand had already stated going in that the ejection seats would be pinned. Both Bill and I had

said, “Vance, it does not disturb us. If it’s down to nobody gets out, or two get out—,” [but] he was adamant about it; they were going to be pinned. He said, “That’s not a choice,” and he stated it categorically in a flight techniques meeting, and NASA officials did not argue with him.

Do you know what I mean by pinning them? Such that they cannot be used as ejection seats, regardless, that even though they are indeed ejection seats, with explosives, etc., etc., he could not have effected an ejection for Overmyer and Brand.

He later said to me, “Joe, this is not a selfless decision on [my] part.” “Indeed,” he said, “it’s selfish, because I could not live the rest of my life knowing that [I survived and you didn’t]. I couldn’t do it. I don’t think Bob could either.” He said, “I have some historical evidence as to that’s being a true statement. I don’t just surmise it.” He had been a test pilot in England for a while, and some of the English bomber airplanes enabled the pilots to get out, but not the gunners. So there was a small body of data that involved psychological studies done on individuals [who] had escaped, but by escaping, had left their shipmates to a certain death. They had been definitely tormented, in terms of what the data showed, for the rest of their lives. So it was not a good solution. Vance was aware of that [data], and he didn’t want to be another bit of statistic in that [database—a decision I thought was gracious]. He said it was selfish; I didn’t think it was selfish at all. But that was just maybe a difference of terminology there.

All four crew members were, of course, part of the press conferences prior thereto, and the news was still very interested in this. First operational flight, first time four people would be there. “Commander and pilot, we know what you’re going to do. Lenoir, what are you going to be doing?”

“Oh, I’m the flight engineer,” and he would describe it.

“Joe Allen, what will you be?”

And I said, “Well, I’ll be actually, in a sense, a passenger. I’ll be in the middeck, but I’ve requested of my shipmates that they not send any radio transmissions or ask any questions on the intercom that end in the word *that*, like, ‘What was that?’” [Laughs] “They will be very specific in what they say.”

And they said, “Well, what are your duties going to be?”

And I said, “Actually, I think I’m just in charge of religious activities,” which was a little bit flippant on my part. If I had it to do again, I wouldn’t have said that. NASA public officials were a little distressed I had said it. But it turned out that there were several letters that NASA received from followers of Madeline Murray O’Hare stating that the government should not speak [on] religious [matters]. You know, completely mistook what I’d said, and actually thought I was going to be in charge of religious activities. I thought, “Oh, Joe, you’re stupid for having done that,” but it was too late.

Let’s see. As crews did just prior thereto and have done since, we went to the Cape several days before the launch, hung out in the crew quarters, as crews always do, and then loaded aboard the crew vehicle to go out to the launch pad.

In the couple of days prior thereto, there had been some security threat. I have no idea what it was, but we were told there’d been some security threat and, as a result, there were members of SWAT [Special Weapons and Tactics] teams that were there. ... We didn’t think much about it. But, to my surprise, when we came down and got into the van [to take us] from the crew quarters [to the launch pad], sitting in the van was a man dressed all in a black uniform, with a helmet, carrying an automatic machine gun. You know, [he] just said, “Hello. Don’t mind me.” ...



George Abbey loaded with us in those years and John [Young]—did John come with us? I can't remember. But George was there, and I think maybe John was there as well. He was the head of the Astronaut Office by then. I turned to George and I said, "George, your employee tactics are rather heavy-handed. *We are* going to go through this launch. Don't you worry about it." [Laughs] He was somewhat taken aback that I was accusing him of having posted the guard to make sure we go through this launch. Even George thought it was pretty funny.

Let's see. The launch day—and you will have to help me, dear friend. I think it may have been the 11<sup>th</sup> of November. Was it?

ROSS-NAZZAL: Yes.

ALLEN: We were to launch on or around seven in the morning. Do you have that?

ROSS-NAZZAL: I don't have that, actually.

ALLEN: I think, Jennifer, I'm correct in stating that we were the first Space Shuttle launch that went right on time. We didn't have one hiccup, not one delay, no nothing, and we went—bang—on time.

We were told the night before that a Russian spaceship had actually changed the timing of its orbit somewhat and would come right over the Cape at exactly that time. [Because we did] launch on time, I suspect there are some photographs that could be found in the archives of the Soviets, of us coming off the ground. I have no idea, but clearly they intended to at least watch us do it with their own eyes, which was pretty interesting. What they, the Russians, did not

know, nor we, on that [very same] day, the Premier of Russia died, and I think it was [Leonid] Brezhnev.

ROSS-NAZZAL: I think you're right.

ALLEN: And when we got back, the front pages [of] all the newspapers are [about his death, not about our space launch]. Not that I much cared. There was maybe a little blurb, a little photo of us in the lower corner of some newspapers, but we were pretty much second-page news, with the exception of my hometown [paper, the *Journal Review of*] *Crawfordsville, Indiana*, [where] I was [on] the front page [story].

This happened in 1982. When I was selected in August of 1967, this same hometown newspaper had carried on the front page the next day an account of the calf-judging contest at the county fair, and only on the back page was a small article about a local native, a young man from Crawfordsville, selected to be an NASA astronaut. My mother knew the newspaper editor very well, and she called him, quite upset. She said to him, "Harold, you know my son Joe was selected as an astronaut. I think that's very important news, and there's practically nothing."

And he said to her, "Harriet, you know perfectly well we're a small town, we're a very small newspaper. If you want a story about your son Joe in the paper, you're going to have to write it yourself." [Laughs] ... But even our town had progressed some, because they wrote the stories [about me] some years later and my mother didn't have to write [them] herself.

My overall recollection of the flight is it was so extraordinary, and so short and I was in kind of a mental saturation for the whole thing, that I could hardly believe the beauty of it and the grandeur of it. ... In the course of these oral histories, Jennifer, I suspect there's a division,

which may come out in your talking to a variety of people. There is a group of us, dwindling, [who] were adults before *Sputnik* flew, and we were in our late twenties, early thirties before John [H.] Glenn [Jr.] flew. [To those of us of that era], spaceflight is not a common thing and not ordinary. [Rather], it is awesome and awe-inspiring, and I'm very much in that group [of older space flyers].

Now, there is a much larger number of space flyers [who] grew up wanting to be astronauts and that now are astronauts, and I'm certain that they are awed by it, but I would guess they're not quite so overwhelmed by it or deem it as just totally surrealistic and [such an] out of the world experience. I still think it's surrealistic and an out of the world experience, and will go to the end of my days thinking that. I was so astonished by it that I felt, in the weeks following the flight, that I really didn't have my best senses about me such that I could have savored it and understood it, and for that reason, [I] was very keen on going again. I will say that when I did go again, I [indeed was] much more observant and in a position to appreciate [the space experience] a lot more than the first time. So I'm very thankful that I did [fly a second time].

Now, that might be a good place for us to stop.

ROSS-NAZZAL: I think this is a good stopping place.

ALLEN: We have another flight to go.

[End of interview]