ORAL HISTORY 2 TRANSCRIPT

JACK KINZLER
INTERVIEWED BY PAUL ROLLINS
SEABROOK, TEXAS – 16 JANUARY 1998

[This oral history with Jack Kinzler was conducted in Seabrook, Texas on January 16, 1998. This oral history was conducted by Paul Rollins and Jennifer Buchli for the Johnson Space Center Oral History Project.]

KINZLER: I have quite a few exhibit pictures that cover the range of the early space programs on through to the Shuttle days, so I was asked to come and give a little bit of information regarding these events. So we'll start right here. And I'm Jack Kinzler.

This is the picture of the seven Mercury astronauts, and it has all the signatures I received from the crew. It's indicative—here's the model of the rocket booster, and then there's a little Mercury model there. By the way, our shops made models in the early days at the beginning of programs for display purposes in order to make it clear how things were going to work, so you'll note the astronauts do that quite often in their shows.

The next picture here depicts the Gemini crews, and they picked nine astronauts for the Gemini Program, and I was able to get the signatures from the crew members, and then a nice note here says, "To Jack, with much appreciation for your personal and technical support. The Second Generation," being the Gemini astronauts.

Over here there's a picture of the Exceptional Service Medal which I received, and it has to do with a contribution to the Apollo Program and so on, and we won't dwell on that a whole lot, but I'm very proud of that. That's a secondary level award, and later on I have a Distinguished Service Medal, which is the highest award that NASA gives. So this is secondary.

This is a picture of the moon flag, and Buzz [Edwin E.] Aldrin [Jr.] is saluting it there, standing by it, while Neil [A.] Armstrong made the picture, and you can also note the

footprints of the astronauts on the lunar soil. So I just put that up because it's something I had a lot to do with, as you'll hear later.

ROLLINS: You designed the flagstaff. Was it your idea, or you instructed—

KINZLER: It was my idea.

ROLLINS: Would they have not had a flag up there if you didn't—

KINZLER: No, they would not have had a flag there had I not come forward. There was a committee formed to determine how to celebrate the first moon landing, and in regard to that committee, it was held in Dr. [Robert R.] Gilruth's office, and I, being the head of the Technical Service Department, was well known to Bob Gilruth as the person who could come up with designs of things that they want to do that are kind of unique.

So he asked me to attend the planning meeting. There was the head of the NASA agency and a couple of astronauts, about five people in this planning meeting. Anyway, they said, "Jack, what do you think we should do?"

I said, "Well, the first thing I'm caught up in is the idea we should have a plaque. We ought to have something with words on it indicating the crew's names and when they landed and where they came from." So my first suggestion was we ought to build something that we could put that information on. So I got an action item out of the committee saying, "It's up to you. You go do it." That was all I had, "Go do it."

So I went over to the shops, and I personally had a few samples which I could show you, but the samples were suggestions of a plaque that would say—well, first of all, I had an American flag etched on the top of it and painted in with epoxy colors, and I said there's a place for a message and there's a place for astronauts' signatures and the date. So I showed

that, just a dummy, a proposed plaque, and so I got the go-ahead signal to go back and produce the actual item.

So I returned to the shops, and we went ahead and we designed a stainless steel plaque that would fit nicely on the center leg of the descent ladder. Whenever they would come down from the moon and step off, that plaque would be mounted right there in the immediate vicinity, and it would be there forever more because it was mounted on the descent stage, which stays on the moon. So I came up with that plaque idea, which was approved, and to make a long story short, I wound up flying down to Cape Kennedy and installing the plaque myself just prior to the moon launch.

Now, the flag which we're looking at has the same sort of story. In the case of the flag, the lunar module, which is down here—if you'll hand me that, I'll show you. Just the whole works there. This is the way the lunar module was designed to be flown. You see a painted flag on the side of the lunar module. Well, I knew about that, and I thought that's a terrible way to celebrate a major event that the crew would be achieving. So I suggested we have a free-standing flag. Once again, I was given an action item in this same meeting to go ahead and design a deployment system. What we have in that is a series of pipes and tubes and hinges, and we have a nylon flag that's three-by-five feet in size, and that combination was all something that I came up with. I drew some sketches and then I showed those to the directors, and they approved that.

So then the next job was to have it built, and finally I had to demonstrate to the astronauts how to deploy it on the moon. So I flew down to the Cape and I showed Neil Armstrong and Buzz Aldrin the deployment routine. The last thing I did, as I said about the plaque, I also went up and installed the flag kit, and it was installed on the right-hand underside of this ladder, right here. The crew could come down out of the spacecraft and walk out on the moon, and then by removing two pins, they could lift this flag assembly out. Now, later on I'll be showing you the whole thing in a series of pictures, so we won't dwell on

this too long. But anyway, that made it possible for them to deploy the flag later and also to leave behind a plaque. There's a miniature plaque on this model, by the way. It's kind of tiny, but that's the position. And if you will, would you mind going over there and picking up the plaque for me?

This is an exact prototype of the plaque. Whenever we make something that's a flight item, we call them, we have to always make a back-up model, second, in case we damage it, lose it in transit, or whatever. So this is the plaque that we had in reserve over at the Space Center at the time I flew down to the Cape and took the real one with me. But as you can see, it has a message. It says, "Here men from the planet Earth first set foot upon the moon in July 1969, AD," and then this statement, "We came in peace for all mankind." Now, I didn't create these messages, but I created the idea of having the plaque and having a message and so on. Now, it also has the astronauts' signatures, Neil Armstrong, Mike [Michael] Collins, and Ed Aldrin—"Buzz" Aldrin—and finally, it has the President's—his own signature on here. Initially, when we first took the plaque up and showed it as a concept in this meeting I was telling you about, we didn't have the President's signature on it, simply because we were thinking, well, NASA's doing this, and we're just going to talk about the crew, and it didn't occur to us that it should have the President's signature.

So when I got the action item to go forward with it, we had a photographic copy made, and we sent it to NASA Headquarters. They, in turn, took the copy, after much thinking about it, that we should involve the President, probably. They went to the White House with it and showed it to [President] Richard [M.] Nixon, and he was very impressed with the concept, but he said, "I believe it would be better if you put the President's name on the bottom of it, since he's head of the United States." So we did get his okay for that. I told you a lengthier story, but I think I'll save that one.

Anyway, the last part here, though, is interesting. I had initially an American flag up in this region as I showed the first model to Dr. Gilruth, and he turned to me and he said,

"You know, Jack," he said, "what you really could do, you could put an image of the Eastern Hemisphere and the Western Hemisphere on top." He said, "If any creatures from outer space should land on the moon at a later time and look over back toward Earth, they would see this kind of an outline and they would know where this craft came from."

So I said, "Boy, that's a great idea," and went back to the shops. The final version, of course, contained the Eastern and Western Hemispheres.

So that's a real quick review on the flag and plaque, but we'll do a little bit more later as we progress past these other things.

Now, this is the Gemini liftoff. The most noteworthy thing I can tell you about my involvement and our shop, the Tech Service Division, with Gemini, we did a lot of the support work with technicians helping the astronauts learn how to do various things. This picture shows the liftoff. It says, "To Jack, What a ride. Thanks for the great support." Anytime they say "support," it doesn't mean me alone, it means the department that I headed up and the real talented technicians I had.

ROLLINS: How many men would that—ladies and men, I guess.

KINZLER: Yes. I had about 180 employees in the Johnson Space Center, and many of them went through a training program which I came through in my earliest days, and that's a technician training program where you take four or five years and study all the different aspects of technology before you are approved as a journeyman, I guess. So I had this large group working with me.

This is a picture of Copernicus, and that's a spot that you see when you go up and look at the moon from Earth. The interesting part, that was taken by a fly-by of the moon, and it shows this great—it's a little hard to recognize it, but there's a big valley down in here, and a high mountainous thing on the far side, and the opposite over here. So it's like a crater of

great depth. I think it's hundreds and hundreds of feet, maybe five, six hundred or better feet, in depth. But that's a very famous picture simply because it depicts what you see when you're looking for the man in the moon. If you get a powerful telescope, that's what you would see.

ROLLINS: That's what you're seeing when you see the man in the moon?

KINZLER: Yes. When you look at the man in the moon, that's the imagery that creates that impression.

Okay. To follow on, in this time frame we decided— … [Aleksey A. Leonov] had made a flight for Russia where he went outside of the spacecraft, and he dangled on—they call it EVA, extravehicular activity. He dangled on a life line that contained oxygen and electric wiring and so on, but he didn't have any means of propulsion of any kind. With the Russians having made the first EVA before us, one of our engineers conceived of the idea of building a very quick propulsion system. So our shops built this hand-maneuvering unit that consists of compressed nitrogen in bottles here, and then there are tubes that come out on either side, and they have nozzles on the end which aren't real visible, but he has a hand controller that allows him to turn his hand down, up, right, or left. As he does so, jets of p_____ nitrogen gas come out, and they actually rotate and move him around.

So we were the first to have a man able to hang on an EVA and fly around with full control of where he was. And that's a big thing. I mean, that's a major thing. That was all done through our shops having built this. We built this in the civil service shops; it didn't get out to the contract level. And this one says, "To Jack Kinzler, This would not have been possible without your help and support." Once again, signed by Ed [Edward H.] White as a thank-you for that.

The next plaque here is Apollo 12. If you'll notice, we looked at the Apollo 11, a very important plaque. You'll notice 12 is kind of bare, just plain. That was done deliberately

because we didn't want to make the Apollo 11 plaque seemingly less important. But this is Apollo 12, and in my case, it's very important, because Pete [Charles C.] Conrad [Jr.] was my next-door neighbor, and he was on that crew as the commander, and I suggested to him that he was going to have a plaque mounted on his ladder by the crews and it would have information on it about their names and all that, would he like to have light-weight copies? This is a thin aluminum light-weight copy of the plaque for 12. He said, "Yes, Jack, I would like to do that, but I want you to make four of those." So you're looking right now at the fourth plaque, which has been to the moon and back, and it was given to me personally by astronaut Charles Conrad. So I'm quite proud of that.

ROLLINS: And where are the other three?

KINZLER: The other three are in the hands of the three crew members. Each one had one. They have what they call a pilot's personal preference kit, PPK, and they're allowed like two pounds or three pounds of total weight, anything, rings, jewelry, pictures, whatever they think they'd like to bring home as remembrances goes in that PPK. Well, in this instance, four of those little thin plates, not the wood and all, just the nice plate, they were packaged and put into the PPK kit, and I have one of them myself. So that's a main event for me.

Let's move along. These are to scale. This is Mercury, Gemini, Apollo, and Shuttle. It doesn't have Skylab in it right here, but those are things I got as I retired. This one depicts everything: Mercury, Gemini, Apollo, Skylab, Apollo-Soyuz, and Shuttle. This is all the way around. Chris [Christopher C.] Kraft [Jr.] is the director of the Center who was there at the time I retired.

ROLLINS: Has that big fish been in space, too?

KINZLER: Good question about the fish. My mother lived in Florida for part of the year, and her sister was the mother of a wealthy man from Chicago, and he owned a large boat that was docked right there near their home, and he would take my mother out with deep-sea fishing trips and so on. So, sure enough, Mom went out there, she caught that—it's a white marlin—she caught it and worked it for about two hours, bringing it in slowly, and then eventually the captain's assistant gaffed it and pulled it aboard.

Well, my uncle said to me, "You know, Jack, your mom's got to have this fish. That's pretty important." So he arranged to send it to a taxidermist and get it mounted so it could be put up, and I've had it all these years. I'm so proud of that, though. My mom was about seventy years old at the time she caught it.

ROLLINS: When she caught it?

KINZLER: Yes, around in her seventies.

ROLLINS: I'll bet that was a big thrill for her.

KINZLER: Oh, it was. Yes, it was very, very neat.

Okay, we'll look at the next one here. This is another shot of the flag, but this time we have the lunar module in place. The crew had started putting out some of the experiments, so you get a broader view, but you can see the blackness of space. [Brief interruption]

In regard to this picture, I was mentioning it covers all the things of interest to the public in general. It has the blackness of space. It has the U.S. flag now deployed, and you can see the lunar module at rest nearby. Then you also see that the astronaut has been deploying some of the experiments which stay aboard the moon after they lift off and leave.

Those are magnetometers and all sorts of devices that send by telemetry, radio signals, the results of what they are seeing as they conduct their experiments.

This one is signed, "To Jack Kinzler, With thanks for adding the color to this picture." Now, that was a novel thing for him to say, the color being the red, white, and blue of the flag. That was special. And it's signed by Neil Armstrong and Buzz Aldrin.

I guess I didn't get the following picture signed. I don't see it there.

Okay. Moving on, this is the Distinguished Service Medal. This has to do with the Skylab Program. When they launched Skylab, they had a mishap. Skylab was launched without a crew. It was to go up by itself and then have a crew fly up and join it after it was in orbit. So as Skylab was ascending in space, it went through a very violent part of the atmosphere called Maximum Q [a period of maximum pressure on the spacecraft], and at that time it tore some of the insulating materials off of the outside of the Skylab cabin area. So as a result, the spacecraft went into orbit nicely, but it started heating up, and it was going to be uninhabitable if we didn't do something quick, within five or six days or a week or so, to save the cabin from overheating.

Meantime, there was films and foodstuffs and lots of thing aboard that would be destroyed in short order, the reasoning being the cabin went up to over 120 Fahrenheit because it was overheating due to a missing section of thermal insulation. So at the time that happened, NASA put out the call to all the space centers and to all the contractors and asked them if they could conceive of some way we could save the capsule by putting a repair part on it. Quite a few of the ideas that were used by the others suggested the crew would go up and dock with the spacecraft and then they would proceed to deploy coverings on the outside of the spacecraft using techniques like putting up a mast on a sailing boat and then later stringing a sail out on the mast. Very complex operations, all by EVA.

Knowing what they were trying to do, I thought about something much more simple. I checked and I found that there's an aperture, an eight-inch-square opening directly on the

side of the Skylab which normally holds a camera, and the camera, of course, can be taken down and put up. So I asked them to bring me a mock-up or a model of this camera box, and it turned out it was a four-foot-long box about eight inches square, and it had quite a bit of space in it, I thought. So I designed a parasail based on a lot of unusual techniques, mainly using telescoping tubes and material like parachute silk that was very lightweight, and the combination of using some metallized fabric twenty-four-feet square along with some telescopic tubes to deploy it was my idea to package all that in this small box. We made up a separate box. Instead of a camera, it just contained an open space.

And with that concept, I demonstrated how that could be done out of the hangars in our shops, and we went through six days from concept to completion. We designed, built, tested, and proved out the parasail concept, and it was chosen as first priority over all the others because they were more complex. Later I have some books that we can look at, and you'll see why it's such a good thing.

ROLLINS: Did they take that with them inside the Spacelab and employ it through that aperture [unclear]?

KINZLER: Yes. I didn't say that, but what they did was they flew up on the second mission, as they were supposed to do, and they went aboard the spacecraft that was in trouble, the orbiting one, and they walked over to the camera port. It didn't have a camera on it, it just had the port block shut. So they picked up this box which they had brought with them, they mounted it up against the wall and tightened up a couple pinching screws and so on, and from that point on, everything was automated.

ROLLINS: Once they got in the Skylab, they were in atmosphere?

KINZLER: No.

ROLLINS: They still had their spacesuits?

KINZLER: They still had on their spacesuits because it was 120 degrees and hotter. So I left that out. Yes, they were in there under bad condition, but they could do that for a while in spacesuits.

So what they did mounted the box, and then they had a kit of tubes about this long. Everything had to fit in this box, which was four feet long. They had a kit of tubes with screw threads on each end, and they could screw a part, like a simulated pole—like if you were doing a flag pole and putting them together, you would have more and more lengths of it to achieve length. So they'd screw one on, and they'd move it out, they'd open the door of the hatch, the camera hatch. They'd open that door, and then they would advance the length of one of these metal tubes. They'd take another one out of the kit, screw it on, and advance another length. Progressively, they had about six or seven of these—yes, seven times four feet long—they got out twenty-eight feet by advancing the parasail.

While the parasail was advancing—I'm talking about the fabric, now, which is in turn—I didn't describe it. The fabric had a telescoping tubular section attached to all four corners of it, and they were all folded up very neatly and nicely, and they were fixed in such a manner that, as it emerged, it would pull the fabric out as the telescoping tubes extended, these small tubes which were on the corners.

By the time they got out to twenty-eight feet, they had now reached far enough out that they had all the fabric out and all the maximum length of these four tubes ready to come out. We had fasteners on the inside end of these tubes so they wouldn't just jump out on their own, and we said, "Now we're ready to deploy." So that next step, the astronaut unscrewed

holders and they moved the parasail out another half inch or so. It swung out like so, and it formed a nice rectangle, but it was twenty-eight feet out away from the spacecraft.

So then we had deployment, and all they had to do then was back in and unscrew a four-foot tube, back in, unscrew another. When they got in close to the spacecraft where the damaged area was, they were able to rotate it, and they rotated it around and got it directly over the damaged area. Now, this was an aluminized piece of material that's like a great big drape. Then they used that piece of material in its proper position to shade the sun's rays from the spacecraft. And it worked perfectly. The cabin temperature went from 120-plus all the way down to 70 degrees, and they had a live-in atmosphere. They could take off their spacesuits and go about their business.

So that's the story in a very brief fashion of the Skylab parasail. I was able to receive NASA's highest award for that because my concept was selected, and I spent all my time for six days and nights will all the employees—we had 100 employees working on this thing—and we did everything. We made all the parts, we demonstrated how it's to be done, and we completely pulled that thing off without any outside help, except at NASA we have some contractors that pack parachutes and things of that kind, and they did some of the packaging of the fabrics and so on. They did help us a great deal. But it was primarily a civil service operation.

ROLLINS: As we've interviewed people, more than one of our interviewees has spoken about the parasail. That was one of NASA's better days, wasn't it. That whole program was saved by doing that.

KINZLER: Yes, it saved the mission millions and millions of dollars, in fact.

One other thing. Let's see, we were talking about what that did do. I thought I had a good thought right there, but I have to let it go.

ROLLINS: Does it show in that picture? Is that in this Skylab?

KINZLER: Yes. I hadn't got over to point to it. This is the Skylab with the parasail deployed, and it's this yellowish thing. This is one of the solar panels. They lost one solar panel also during that mission, and they had to live with less power and so on. But what you're looking at right here is the parasail, and it's laying right close now to the back of the spacecraft, the outside, and it's shading the area that was completely exposed.

This is all the signatures from all the crews, and this one—what does it say? "Our favorite shade-tree mechanic." I really love that. You're familiar with that term? I think everybody is. Yes, because I kind of whipped this thing up, "I know what we can do," and it turned out. And that's signed, "Thanks for taking the heat off." That's signed by all three crew members, everybody, Neil, [unclear], Jack [R.] Lousma and Conrad and Joe [Joseph P.] Kerwin and Paul [J.] Weitz and Bill [William R.] Pogue. Who else do we have up there? Gerry [Gerald P.] Carr, yes, that's right. Gerry Carr is one of my close friends because he attended our church throughout all this time.

Well, that's all we'll do here, and then we'll go—

ROLLINS: Want to take a little break here? [Tape recorder turned off.]

KINZLER: Among my memorabilia I have a series of pictures of the development of the Apollo flag. This cover picture is the end result of what we accomplished, but I want to go through the details in picture form as we go.

We'll skip this. This is an awards ceremony where I received the Distinguished Service Medal.

This is a procedure of flag-folding. Whenever you do anything, even as simple as folding a flag for a special occasion, you have to have a written procedure. That's just NASA requirement. I wrote that, of course. This one is a procedure for mounting the flag assembly on the lunar ladder. That's another one that I wrote.

Now we're looking directly at the components of the flag kit. The flag is partly folded up, and the staff is compressed because it has some telescoping tubes in it. Everything is about in a four-foot length. Then out here below there's a metal shroud right here that actually has fittings that we're pointing to right there which attach to the lunar ladder. With this metal shroud that has insulation in it—it's a stainless steel U-shaped piece of metal—we were able to sustain the short time frame when the flames from the moon landing are occurring and they're flaring back from the moon's surface. You have to imagine 3,000-degree flames coming up. But it only lasts for probably fifteen or twenty seconds' time, so you don't burn things up if you have an adequate protection. But this was a thermal protection we built.

This is a strip of reflectivity material as thermal insulation, and this design has Velcro on it, and there's a handle here. The astronauts can take a hold of the handle and rip and open this package out, which you'll see in just a moment. But this is the basic components of the flag kit.

Now, this picture is right in my office at the Johnson Space Center, and these are the flag components all folded up close together. You can see some rods lying here on the side. These little tabs are temporary clamps, you might call them.

ROLLINS: Are they tie wraps?

KINZLER: They're plastic tie-wraps, yes. They're holding everything as an aid to us while we want to keep it tight and fitted. They come off later. But it's interesting to see this, because

there's a sequence involved. The people in this are all high-level people, head of the Engineering Department over at the SC [Space Center], or head of the safety sort of thing, and myself and my deputy. This is a better view. That's myself. This is my deputy, David [L.] McCraw. He and I jointly did a lot of designing of things of this sort, so I have to give him some real credit at this time. What we're doing is we're very carefully, step by step, placing the flag into a container.

Next picture, we're kind of buttoning it up.

ROLLINS: Is this for Apollo 11?

KINZLER: Yes, this is the Apollo 11 flag you're taking a picture of. I should have said that. We did it in a constrained space, in my office, because we were trying to keep everything pretty much under wraps until we actually deployed and got to the moon. Same with the plaque. We kept the plaque very quiet and that sort of thing, because, you know, it was more important to not leak. So actually we did all this in my office with only people that had to be there in. This is one of my parachute-packing employees. This is the engineer I mentioned. Quality assurance is what I was talking about. The QA [Quality Assurance] head person was there. I look kind of serious in that picture. [Laughter]

ROLLINS: Serious business.

KINZLER: Now, this picture shows it in the metal shroud. We're closing it down, and these are the end pieces that mounted against the ladder. That's Jack Jones there. I can't remember this engineer's name. Billy Drummond [phonetic] over here and Dave McCraw.

This is called a pip pin. It's a little squeeze pin that has a ball inside, and you put it through a hole, and it won't come back out of the hole unless you squeeze the pin and release

it. It's very common. We use two pip pins. I wanted to simplify the design so all they had to do was squeeze two pins and take it off, not wrenches and so on. So here's the pip pin that I'm holding, and it goes through this fitting. This is a shipping bracket that holds the assemblies together until we get to the point—here it is, here—till we're ready to actually put it up on the ladder. In other words, I carried it up on the elevator with this bracket on it.

There you see the finished product. Now I'm going to show you something very interesting. We wanted to be sure what we had designed would fit on the ladder at the Cape on the vehicle. So we happened to have a mock-up out at JSC Center. So Dave McCraw and I went out there with our product that we had come up with, and we fitted it onto the right-hand ladder edge, just like it would be. Here's the sequence. He's got it on the ladder. He takes a pip pin, pulls it out, and another one on the top. You can see the sequence. Here's the plaque. Okay? This is really handy, to have this.

Now, inside of that shroud that he set down is that package. You remember seeing some reflective material? The astronaut would take and rip that Velcro and pull this clear. Now he's got everything off. Here's the flag still rolled up. Then he gets to this point, where he's putting this—the pole has an extension in it so it can be longer, the upper part of the pole.

Now, there's another thing I hadn't described to you so far. We wanted the flag to be able to suspend itself nicely, and we knew there's no atmosphere on the moon to speak of, so what we did was sewed a hem in the top of the flag, and we made an aluminum flexible tube that slipped through the hem, and you could take hold of it and you could pull it by hand until you extended—remember, it's a five-foot-long flag in a three-foot box. [Laughter] So we extended the top out, and there's a latching effect. Once you get it out there it stays, or you can pull it back and you can leave it wherever you wish. But the intention was originally to pull it all the way out so it's fully deployed.

Now you see what happened later. See how nice it deploys when you pull it all the way out? Well, as it turned out, when they landed on the moon and they went out and started to deploy it, they saw the rippling effect that it had if you left that extender there slightly short. So they decided to take the picture that way, and I'm so glad they did, because it makes it look more realistic, like it's fluttering in the wind. Like this. It looks like it's fluttering. Well, that's simply because they left it short. So we've covered the plaque.

Now, here's a cover that was made to go on it, and we carried it to the Cape with the cover on it. They weren't going to tell the press about the event until they actually achieved it. So the last-minute word leaked out that there's some kind of a message thing going up, and the press was all over everybody saying, "We've got to know more about this." So I got the instructions to take the cover off, let the press snap some pictures, and so we went down and flew to the Cape without it being covered.

These are the clips that fit the round rungs on the ladder, the cross rungs. See how they are? There's holes here. All you had to do was take an Allen wrench and tighten up, open them and close them and tighten them onto the lander.

Here it is covered. We covered all corners. We started out with it hidden. The plaque in particular, they were real proud of that.

Now, this is a continuation. We'll just pick this up. I've forgot what all's in here. There were six moon landings, there were seven supposed flights, but Apollo 13 didn't get to land. So what we're looking at here, this is the Apollo 11, and you can see the terrain. This is Apollo 12. This was deployed by Pete Conrad, and he had difficulty getting the—I didn't tell you that. In addition to the hem, we also had a latching mechanism at the pivot point. In other words, we had to be able to pivot out. He didn't connect the latch for one reason or another. So he just stood and held it at this position, and it still served its purpose.

That's 12. Then 13 was the one that didn't go. Here's 14, and that was flown by Al [Alan B.] Shepard [Jr.] and Ed [Edgar D.] Mitchell and Stuart [A.] Roosa. Then here's 15.

Notice the different territories. It's real impressive, I think, that I have this series that shows you how different it was. That's 15. Then here's 16. And finally, John [W.] Young flew on this one.

ROLLINS: That's that famous photograph when he's saluting it, brought him up off the lunar surface.

KINZLER: Right. And it looks kind of dusty, too, like they've been moving it around and about, you know. And 17, [Harrision H.] Schmitt. By this time the lunar rover was on the program. Earlier in the program we didn't have that. All they had were lunar hand-tool carriers. We built all those in our shop, and I may have a picture of them somewhere around here. But anyway, the rover was late in being delivered to NASA, so they went several missions without. I think it took maybe—this is 17, but I think it might have been around 15 that they finally did that. It really helped, because they could go distances better.

That gets us through the flag, and I'd like to show you similar things on the parasail, if that's okay.

ROLLINS: Yes.

KINZLER: I don't know if I told you, Paul, I had to get a complete knee replacement about two years ago. All the bearing material in my knee went out, disappeared, this right knee. Now I'm scheduled to get the left knee done, and I hobble around a little bit in the meantime. The cartilage is gone. It's just bone on bone. As you walk along, you're pivoting on bone. There's no cartilage here at all in this one.

This one is really fun. This is parasail now. You talk about conception and reality. How did that ever come about? Well, this story is really here in black and white. This is the

hangar at my shop, the Tech Service Division, in Building Ten, big high bay. I wanted to demonstrate my concept, so I had my parachute-packing friend there in the division get us a twenty-foot-square piece of parachute silk, and then I sent downtown to Houston and ordered up some fiberglass fishing rods that were telescoping, and I designed a little base holder for the assembly and put some metal cans together, just something to hold the stuff.

I'm on the floor there with—you see strings here? Those are threads. Those four threads are attached to the outside end of the telescope fishing rod pieces that we arranged. The inside into the telescope fishing rods are on springs that are designed to throw and make the pieces go out. So envision this as a demonstration of a concept. Here's what we did. First of all, I put the strings up and over a hook on the crane so I'd get some elevation, and I pulled slowly and pulled these components outward, out of this can. Each one of them had a telescoping tube, a fishing rod, that was attached firmly at the bottom and free to extend itself.

KINZLER: So we're going through the steps, and I had quite an audience for this, people from the headquarters and all the major people. They may show up later. But this was a key demonstration that committed us to doing what we did.

Anyway, I pull a little harder, and I pull until at this point I've got all the extensions that are available on the fishing rods, and they're still fastened to a base plate. So all I had to do then was start letting off, and as I let off, the springs that were mounted to the four corner telescoping tubes, they forced it to lay out like so, and it came out of here, and it laid it right out on the floor like that. And you talk about impressive. They said, "That's it!" [Laughter] But that's how I do things. I thought, well, I've got to prove this idea. So there we went ahead and did that.

A little later we're getting into the real thing. This is a kind of aluminized mylar that we used later. This is some of the crew people. Here's a detail. These are the telescoping

metal, aluminum tubes, now, not fishing rods. These are all attached with coil springs to a base, and they're like pre-loaded. When you pull them upward, outward, they go from a 90-degree bend.

These are some of my technicians here. What they're doing is they're gradually bringing out this great big—I think it's twenty-by-twenty-four-feet size aluminum sheet. They want to bring it out and package it. At the same time, they have to have all the rods assembled and so on. So they're in the process of doing that.

ROLLINS: Did you work in shifts?

KINZLER: We worked around the clock, nonstop, for six days, and I didn't even come home. I slept in the office, and my daughter brought food and so on. But we did this on a real pressure basis. But this clearly depicts how it went about. You can see we're gradually doing things, getting it together. That looks similar to what I had before. This time it's the real thing.

Now, here's the dignitaries. You have to look close, but there's a whole slew. This is probably midnight or 2 or 3 a.m. It didn't matter what time it was. We were at different stages during those days, and near the last there were people out there all night long.

ROLLINS: What building are you in here?

KINZLER: This is Building Ten, the big high bay, Building Ten. I'm easy to see, with my red pants. There's Don [Donald D.] Arabian. He's one you might interview some day. Don Arabian is one of the major engineers at the Center that had a lot to do with things. He had his own concept, by the way. He was going to package a bunch of telescoping tubes that would snap with springs in them, and in a drop-test mode you would drop them and let them

fall free, and while they're falling free, they would spring out on their own. It was like a hand-held package of tubes and fabric. He put his in a box and dropped it at the big SESL [Space Environment Simulation Laboratory], the space chamber, you know, sixty or eighty feet high. He dropped his down, and they just went plop and fell out.

ROLLINS: It didn't open up?

KINZLER: Nothing. And Don said, "That's it." He came over to me, and he says, "I'm going to work with you, Jack." [Laughter] That's an aside, but it was another one of the options.

Okay, we'll continue. You can see where we're working from a dangling crane from a crane here so we could work on it. This is my branch chief, Roger Messier [phonetic]. Boy, you talk about having an audience; everybody was wanting to see what we were doing. I don't have to go too slow here. Pretty soon we'll get to a point where it's pretty obvious.

There's a plastic bag around it now, just kind of holding it until we can get further in, you know, an aid to help get it in. They're trying to enter everything down into the vertical box. This is the box I've been talking about. That's a duplicate externally, length and width and so on, of the camera unit that was available at the Cape. I shouldn't say length. The cross-sectional end of it, because the camera only needed to be that much, like this is. But this box had to fit exactly into that pressure opening, because, otherwise, you'd dump air into this cabin. So you're looking at it there.

Now, here's the squeeze. See how they're really getting ready to work and coax that bundle into a small box. There's Dr. Kraft, my deputy David McCraw, and Roger. But what we've done is show the box that's going into it and it's ready to go. This is the one that went to the moon. You have to keep that in mind. This is actually it.

Now, this is one of the astronauts. He's getting ready to go up on the platform. I remember for sure this was the middle of the night.

ROLLINS: Now, this is training for him, then?

KINZLER: Yes, and also he's an authority representing the astronauts to see whether he's in agreement to do what we were suggesting he do. They do that with all the things. I could pull his name up, but it just escapes me.

Here's that tube. In this case, it's all together. They've screwed it all together. You remember I mentioned sections of tube? Well, it's standing up there ready to go. It comes out, as you can see with the arrow, it goes out that way. So this astronaut, his job was to deploy it, make sure it would deploy. Now, you'll notice we were working vertically. Can you understand why? Everything with a gravity direction, you have gravity pulling downward. If you tried to deploy it horizontally, it would get all tangled up. In space there is no gravity, so we try to simulate as best we can. We do things vertically going down.

ROLLINS: You let gravity be your friend.

KINZLER: Let gravity be a friend, exactly.

Now, I talked about lots of visitors. This is—everybody's around. Anyway, he is deploying it by pushing these rods one by one that are connected. We ran into a glitch. We had covered the fabric material with a secondary cover, thinking we needed additional thermal insulation, and that we were told to go ahead and try to do that; if it doesn't work, we'll decide what else to do. So we're down to the night before I go to the Cape, and they had this package with the extra thick, double-layered capton [phonetic] covering on the parasail segment. So we actually tried to push it out of the box. It was too difficult. And we had to call and send over and get the other one with a single layer, bring it back and repack that son of a gun in the last hour. I'm talking about really close running.

Anyway, this is further deployment coming down, and you can see—now, it's falling a little awkwardly here. It would do nicely with no gravity to affect it. But that demonstration caught us short. We had additional canopies, I guess is the best name for them, and we just went back to the one that was less dense, the single-layer canopy. I mentioned before that when they extended the parasail out to the twenty-eight feet, they still had control of it on the inboard end and that they didn't want to release until they were sure all the telescoping tools totally emerged to their latching position. There are latches to make them catch as they go out. So this inboard block here had screw nuts on it, and the crew, when they got done, on the end of this box here there was four connectors to the four ends of the telescope tubes. This is a mock-up of it here. But anyway, they were unable to unscrew at the last, and then when they pushed it out, they knew everything was taut and all the tubes had extended, because if they didn't all extend properly, it would be awkward, it wouldn't be properly shaped.

ROLLINS: And they really only had one shot.

KINZLER: One shot. It all has to work. Yes.

Okay. Then, because we had to prove that it worked, we finished, we got it out on the floor, we had to hurry up and put it all back together again. So now it's going back together, and the folding and everything has to be just so. You don't want anything to snag. I mentioned the contract employees. A bunch of them worked at Crew Systems, where they did a lot of spacesuit support work and all, and they had some expertise in parachute work and so did I in our division. So we used both Crew Systems contract people and our civil service to pack and make—they actually had a sewing shop, and they made up these units for starters, and then they came over and helped us pack. So that's quite a few of the people

outside. These are my employees here, and we're closing out, last step. I'm still there, kind of sleepy-looking, probably.

This is the sewing shop where the support—now, the important thing about this was everybody at the Space Center was available to do work constantly, around the clock if necessary. So we didn't have to have any special dispensation. We already had it. Just do it.

That's the white clean room where we finally put it together. There it is in orbit. Isn't that beautiful, you know, the sky?

ROLLINS: Was that picture taken—do you know whether it was on the way in or the way out of that particular mission? It probably doesn't say.

KINZLER: It may. It's a print. Sometimes they'll have words on the back. Yes. "Skylab Two on board the—taken from Skylab Two command service module during the final fly-around." Yes. Remember, when they leave they fly around and check it out with the second—clouds over the water in the background, parasail which shades the orbital [unclear] where the micrometeorite shield is missing. The one remaining OWS [Orbital Workshop] solar array ring had been fully deployed successfully. The OWS solar panel on the opposite side is completely missing." Yes. This is missing. So I would say they went around before they returned in their spacecraft. These are all astronauts except me. I don't have their names written down. These are some of my co-workers. This is a knob that goes in the push rods.

I went on national TV after the launch. By the way, I was stationed in the Mission Control Center as Skylab parasail expert, and I stood by during the deployment of it. One thing we were concerned about, as you go around in orbit, you go in in daylight and darkness, and the temperature swings 200 degrees Fahrenheit, plus and minus. So they started the deployment, and they were moving on into the night cycle, and we talked a bit about it, we might have freezing and crumpling, stiffening, take place in this fabric material if it were cold

right in the middle of trying to make it move. So we put a hold on and told them, "Stop the pulling until we tell you to go again," and then when they knew they'd come around onto the sunny side, continue with deployment. So that was an on-the-spot decision right there. But I was there as the expert. [Brief interruption]

They never had to [unclear] because they ever had this danger occur, but it opened in one thousandth of a second. It cut an opening big enough for a guy to dive out of, and they were hanging on davits, just like you swing on a boat with a davit, and they would swing open and just stop and hang in the clear. So what it did was, actually, it cut in an instant, in a thousandth, it cut through this structure of a spacecraft shell and made a—

ROLLINS: Like a greenleaf punch.

KINZLER: Yes, just exactly like a greenleaf punch, male, female die, and that worked quite well. We demonstrated how that all worked, and I got a—

ROLLINS: There had to be a hole there.

KINZLER: Yes, we had to drill a half inch—let's see—

ROLLINS: And then they'd fill that hole up—

KINZLER: And they plug the hole after launch. Yes. That's all it had, is just one single hole so that the shaft of the piston cylinder could go inside. Right. And they mounted those. We changed from three hatches to nine. We had them expeditiously set all around in different elevations. So they installed those everywhere, and they went through all the follow-on

missions feeling much more secure about these guys that might get trapped in there. That was one of my patents. It's kind of neat.

This is one of the typical rods, and that's the knob there.

ROLLINS: And this is you in the Control Center as parasail expert.

KINZLER: Yes, we skipped that. This is Chris Kraft, Sig [Sigurd A.] Sjoberg, and Kenny—oh, boy. Anyway, he was one of the main guys; I can't think of his last name. And myself. We're in there, and I'm talking about the deployment sequence in Mission Control the night of the event.

ROLLINS: How did you feel? Were you pretty tired at this point?

KINZLER: Oh, yes.

ROLLINS: Not much sleep, right?

KINZLER: I think I show it. My hair is all fluffy and raggedy-looking.

ROLLINS: You look like the typical scientist, the mad scientist.

KINZLER: I know! [Laughter] Unfortunately, I don't fit that classification, but you're right, I just look like one of those wacky guys. Anyway, these are the tubes that we used. Oh, here they are, all in a nice little bag. They just have a male thread on one end and a female thread on the other, and they just go together.

Okay. This is a famous picture. In a press conference after the successful deployment, I held up a picture, and then they put this in the newspaper. Now, an interesting aside, for the next year—

ROLLINS: What is this a picture of?

KINZLER: That's the parasail.

ROLLINS: Similar to one of the ones that you show—

KINZLER: Yes. And here's an artist's sketch of the parasail in place here. But when this happened, it went around the entire world, and I wound up getting 200 requests for autographs and my signature, mostly on these first day cards, stamp-collector type—

ROLLINS: First day of issue.

KINZLER: —they put a first-day-of-issue stamp together and then said, "Mr. Kinzler, will you please sign this?" Anyway, I've got an album that thick full of those. But it went around the world, and it's so interesting, the type of comments I received with that much of a cross-section.

Here's something. Dr. [James C.] Fletcher, head of the agency: "It gives me great pleasure to inform you that you have been selected to receive NASA's Distinguished Service Medal for your outstanding contributions to NASA. This medal will be presented at the NASA Skylab Awards Ceremony on October 26, '73. Please accept my warmest congratulations." That was the letter.

And then another thing happened afterward. The entire nation's civil service employees, sometimes they have a Civil Servant of the Year Award program where any center, not just NASA, Post Office, the [U.S. Army] Corps of Engineers, they all submit names of people who they think have done something extra significant, and actually, when they read my report, which was turned in by JSC, which I was thrilled about, I came out being the second choice out of—they had about seven people. I'm talking about dignitaries, like the guy that invented the heart machine, stuff like that. Anyway— [Brief interruption]

Business Association, FBA. "The Civil Servant of the Year Award is established on service to government and community service contributions. The field is highly regarded, and the selection of Kinzler is the first time that a JSC employee has received it. The parasail system reduced," blah, blah, blah, which you know. "They earned a reputation as a last-minute service organization with special items such as camera [unclear] modifications, spacesuits, other things fabricated and supplied in an extremely short time." Well, you can hear about that. They're going into my duties at NASA. I was chairman of a lot of Source Evaluation boards and things. Enough said about that. I only look at this when folks like you come around. It's kind of, "Well, look at that."

Apollo 12 crew. This is the big space chamber indoors. When we deployed, we hung a great big drape to catch it because we didn't want it to come down on all this structural stuff. Remember we were up there with that box and they're putting it down. It came down and landed in this canopy like a—it kind of looks like a—just a recovery device.

ROLLINS: Big cargo net.

KINZLER: Yes. Let's see. What is this one? It's just typical. Okay. I don't think I have anything else. I don't think so.

This is a book on Skylab. I didn't tell you about this. One of the deployable things that you would put out by going out extravehicular, they had it with them as a back-up in case mine didn't work, and about six months to a year later, people over in Huntsville, Alabama, that came up with that, they said, "Can't we go ahead and do an EVA and put it out and see how it works?" Because they wanted to be sure for the future. So they put it out and left it on top of mine, which didn't hurt anything. It was just a follow-on. But that was what would have possibly gone out by hand had they not had my setup.

This is the box right inside on the camera port, and then the steps, one, two, three, start here and started out, started further out, and then after you got all the way out, it has an opportunity to deploy, and once it's deployed, you can back it in. But this is the damaged spot. And this tells all about that. We won't go into that. So, except for the main event—I'm sure you want to see that. Yes. We'll go outside. And you owe me a copy.

ROLLINS: Yes. I'll bring that by Monday.

KINZLER: Okay.

[End of Interview]