Oral History Interview of
John Aaron

Interviewed by: David Marshall
December 20, 2017
Meadowlakes, Texas

Part of the:
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Transcript Overview:

This interview features John Aaron as he provides a more in depth look at the space missions that he has worked with during his career at NASA. In this interview, Aaron describes photos that he has of the NASA control room, and provides context to those space missions captured in the photos.

Length of Interview: 02:00:53

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David Marshall (DM):
Hold on. I'm going to get this started here. The date is December 20, 2017. This is David Marshall interviewing John Aaron at his home in Meadowlakes, Texas, and you're going to talk about some of these photographs that you found and scanned.

John Aaron (JA):
What I did is that my photographs were totally unorganized, so I bit the bullet, got out the big scanner and scanned them on a disc. The ones that you mentioned plus anything else I had remotely what I thought you might be interested in.

DM:
Okay. Yeah, yeah.

JA:
The—what I find is I've got very few pictures of me at NASA.

DM:
Yeah.

JA:
I asked Jerry Bostick. I said, "I remember that nobody ever took pictures in the mission control center, except the official photographer." And he mostly took pictures of the flight director and the astronauts. I said, "Is that true of you, Jerry?" He said, "No. There's very few pictures of me in the control center." I said, "Well, help me remember. Was there a policy that we were not allowed to take our camera to the mission control?"

DM:
Maybe.

JA:
And he said, "Well I don't think there was ever a policy, as I remember it, but you're right, nobody ever took pictures."

DM:
You ever seen that one?

JA:
Oh yeah.

DM:
That's you right there. You have it?

JA:
Yes, I sure do. I've got a high resolution copy of it.

DM:
Oh good. So we can crop that.

JA:
Because that's one of the pictures.

DM:
There's another one in here of you at mission control. I think it's at your forward. Right there.

JA:
Yeah. I've got that one.

DM:
Good. Okay.

JA:
That's the only pictures of me that were taken.

DM:
You know, from the archives, where I work, we contacted NASA and said, "Do you have any John Aaron pictures?" And we had some others, some astronauts we were asking about as well. No, flight directors. They didn't have any of you at NASA. So I'm glad we're going to get some of these into the archives.

JA:
You know, at NASA, Johnson Space Center, according to Jerry, has shut down their photo—they used to have a pretty good photo office.

DM:
What have they done with them?

JA:
They did photo production work as well as archiving.

DM:
Yeah.

JA:
And they just laid the whole section off.

DM:
Well what happened to the materials?

JA:
Well some of it wound up—and I don't know whether it was because of the astronauts. Some of it wound up on the NASA.gov website.

DM:
Okay.

JA:
But not much of it. Mostly astronauts and space ships and so forth. Now, Jerry told me, he said, "Well they said—they told Rick Houston, the guy that wrote that book, that they had a lot of miscellaneous photographs in boxes and although they didn't have any formal index or any way to look them up, but that he was welcome to come down and look through it."

DM:
Really?

JA:
So who knows what they got?

DM:
Do you know anyone there? A contact person? Because we'll contact them and say, "Let us preserve that stuff for you."

JA:
I'd have to make a phone call to see if there's anybody there from when I was there that I can contact. I can run down how to—

DM:
If you want that stuff preserved, we'll do it at Texas Tech if they want to go that route. I mean, it's in peril if it's sitting there in boxes and no one's overseeing it.

JA:
Of course. Oh yeah.

DM:
And if they just let anyone come in and look through, you know?

JA:
Oh, that's disaster.

DM:
Yeah. So if you want to make a call and contact me if you hear something, well I'll be happy to work that in.

JA:
Okay. I'll pursue that next few days.

DM:
Yeah. Okay. But those two photos are on your—

JA:
Yeah.

DM:
Oh good.

JA:
There's very few pictures of me.

DM:
Isn't that something? I know everything was busy, but you know, historical events were unfolding. [Laughter]

JA:
They—I'll just run through them real quick.

DM:
Sure.

JA:
Now, this picture.

DM:
Oh, you know what? They're titled too. You've titled them, right? Looks like you have a title up here.

JA:
Well I titled a couple of them. What I can do is either go through these.

DM:
Uh-huh.

JA:
The easiest thing for me to do is just take the scan number and then write just a word document that talks about it.

DM:
Either that or we can do it on audio if you'll just read the title up there.

JA:
Now, this. You're going to see two Apollo 11 landing team pictures. Now, there is an original of this that I have seen, but I can't find it because someone took the trouble and numbered all these people and then put the names down at the bottom.

DM:
There you are.

JA:
And there, I'm number eleven. And this is the—this would be the team for Apollo 11 landing.

DM:
Wow.

JA:
This is Gemini 5. This is the picture.

DM:
Right.

JA:
That's Gene Kranz. That's—

DM:
Kraft.

JA:
Kraft. And this is—if it's not the last one, he was actually the official flight director or maybe—he may have been there for Gemini 6. You know, he moved up to the mission director console.

DM:
Right, right.

JA:
That's McDivitt, one of the astronauts. That's Glover. This Glover was in EECOM. Right here, and he was my section head at the time. This happened not long after—before I got to NASA.

DM:
Yeah. Gemini 5. What four was your—

JA:
See, it says, "94606," 94—no, that's not the right number. I started to say they—NASA usually indexed their pictures by year.

DM:
Um-hm. Kay.

JA:
Sixty-nine dash. Now, the—this is Gemini 5. This is a situation where Kraft and—was the flight director for the launch phase for the first few orbits. Glover was the EECOM for that phase and I was just going piggy back with him. So what happened here is—the EECOM console is down here. We're all huddled around the flight director console here.

DM:
So this is the whole mission control right here for Gemini?

JA:
This is the mission control room. The issue that we were chasing was a fuel cell problem. On Gemini 5 was the first flight of the fuel cells. We couldn't get them to work on the ground very well so they were delayed. We flew the first few flights with batteries. We finally flew the fuel cells on Gemini 5 and they take hydrogen oxygen. Well the oxygen tank—the cryogen oxygen tank started losing [coughs]—was pressurized to nine hundred PSI [**Pounds Per Square Inch**] before wash with heaters and it had heaters in it to keep it pressurized, to keep it super critical.

DM:
Okay.

JA:
That heater failed and we only had one tank and just started a slow decay. And Glover was on the console and he kept thinking it was going to stabilize, hoping it would stabilize, and maybe try to will it to stabilize and he kind of just sat there and I watched it all go down. Meanwhile, the spacecraft was moving off of the prime landing area ranges. Have you heard this story before?

DM:
A little bit of it, but you're filling in.

JA:
Meanwhile, the spacecraft orbit was processioned such that the—we were moving off the good landing areas so it kept going down to—from nine-hundred all the way down to two-hundred. Glover was talking to Kraft about it and so forth and I was sitting there watching all that, and we finally got to the point where it got just little above two-hundred and we thought, uh-oh. If it hits two-hundred, the fuel cells are going to shut down because the regulators that regulated it from nine-hundred down to the fuel cell pressure was only certified to work accurately if the inlet pressure is above two-hundred. Wake went right on through to two-hundred, and it kept working.

DM:
Wow. Really?

JA:
Well meanwhile, we had moved off the range of good landing sights so this was a huddle around the flight director console just before we left an opportunity to have a good landing area and the question was, "Can we make it through the night or do we come home right now and end the mission?" The—so Glover mentioned to Kraft, "Well John Aaron has done some analysis about how far you can fly with just using the batteries." And sure enough, I had my little cheat sheet with me, and Glover was my supervisor. Wasn't that for Maryweather [?] [0:11:03] so he told Kraft, he said, "Let us talk to you. John Aaron has got some work here." So that's me.

DM:
Yeah. He's talking to you right there, isn't he?

JA:
Yeah. He's, "I need to know where the console," talking to Kraft and I was explaining to him if we could power the spacecraft down a little more, there's enough battery power that we can

make it back. We can make it through the night and get back to a prime landing area to end the mission there because they would much rather land in that kind of an area than a contingency landing area.

DM:
Right. And this is probably the conversation that's going on right here in the photograph.

JA:
That is. That is me and Kraft having this conversation about, "How far can we go? What do we need to do? Are you sure? How confident are you?" So sure enough, Kraft okayed the story and so the shift kind of ended because it was time to hand over. Well I wound up pulling a double shift because they handed it over to me. Well so Kraft got up a little after that. They told the crew—the flight astronauts that we're going to go for it and he turned it over to Kranz and Glover turned it over to me. That was the huddle and that was not unusual that when you were approaching a decision point about what to do, you would often just huddle right around the flight director's console. There's another picture in here of the same thing happening on Skylab [0:12:53]. I'll send that one to you?

DM:
Oh, really? Oh, so it didn't just end with Gemini. It was the same in Apollo and Skylab. You did a little huddle?

JA:
Yeah.

DM:
Oh okay.

JA:
Sometimes a big huddle. You could see that over time, the huddles got bigger. So he handed over to Kranz. I started powering down the spacecraft as far as I could power it down and whereas, instead of it pulling about forty amps, I got it down to eight amps. That means it was just barely circling.

DM:
[Laughter] That was good practice for Apollo 13, wasn't it?

JA:
Yeah. Good practice for Apollo 13. And so Kranz sat down and I think he and Kraft had had a conversation on the side and maybe Kranz and some of the contractors may have had a

conversation on the side. So he sat down and everybody left and so it was just back to the normal team. The first thing he told me, he said, "Okay, EECOM. Let's—after we get a little further into the night, I want you to start powering this thing up. Let's see what this thing will do." Have you read that part of the story?

DM:
Yeah, I have. With the fuel cell.

JA:
And I thought, what is he doing? So, I mean, I'm just—now, I think got—so I started systematically picking little, small loads that I could turn on, because what happened was there was a phenomena in super critical tax storages that if you're above the super critical point, you're above what they call the dome of what the two phase line is. And the two phase line is interesting in that it's literally a dome. If you draw a profile of quantity, which is just another way of saying density, versus pressure, then at very low pressures, the two phase boundary looks like that. So what happened was—I want to draw this like that—what happened was we were very close to a 100 percent of full suit. Right where the pressure crossed the dome was 72.8 PSI. The pressure fell. I mean, it just started coming down here as a function of a time. It fell until it hit that boundary condition, 72.8. Now, what causes it to stop—and I learned a lot about super critical liquids as a result of this flight. What caused it to stop is that as you're pulling oxygen out of the tank, you're pulling energy out of the tank. You're pulling pressure energy out of the tank and so it's pretty linear down to here. Energy versus pressure drop is like Boyle's law until you get to here. To break through that boundary, you have to take more energy out to break through it. Now, if you break through it, it'll go to zero. So it was a case of we hit here. We were powered down so low that you couldn't take it. That the fuel cells wouldn't draw enough oxygen to cause it to break that boundary. It's kind of like—it's the same phenomena that although we're not talking about super critical, is that when you—when the atmosphere cools down to the dew point, usually that's how the weatherman predicts how cold it's going to get because it will stop at the dew point until you condense enough moisture to cause it to go on through. Same phenomenon.

DM:
Yeah, that's interesting.

JA:
It's a boundary. It's—I watched the weather guys here. They always get it wrong. And so when I talk about what the temperature is going to be, the low it's going to be tonight, they notoriously miss it. But if there's quite a bit of humidity air, if you just look at the—unless there's a major storm coming through, if you just look at where the dew point is, that's going to be the low.

DM:
Well I'll be.

JA:
It comes down to dew point, condenses all the moisture out in the air, lays it on the ground and trees.

DM:
Sounds like you need to call them and tell them. Give them a tip or two.

JA:
But if there's no—if the humidity is very, very low. There's nothing to stop it. That's the same thing here. So what happened is we hit here and the pressure—the regulators miraculously kept working and we found out later from the contractor that accepted these regulators from the vendor, because he had a whole bunch of them. He said, "Well I handpicked those based on which ones would have that characteristic. That they would keep operating below the specification level."

DM:
Wow.

JA:
[Inaudible]. Well so now, look what happens. If I power up a little bit, it'll tend to pull energy out of the tank. Meanwhile, the quantity decreases. So we started fly. We started pulling more energy out of the tank and the pressure started doing that. It climbed the dome. By the next morning, we had the spacecraft fully powered up. It had climbed the dome that night just by itself.

DM:
That's how it happened. Well I've read that it climbed up there. I just didn't realize the dynamics of it. You did learn a lot.

JA:
Oh. I learned a lot.

DM:
Well now, fuel cells were—it was the first mission that they used fuel cells, right? Did many people in the country know anything about fuel cells at that time?

JA:
No. No. They read their efficacy. It turned out the fuel cells, actually, on that flight worked well, but we didn't anticipate having the oxygen tank failure. So it—so that is this huddle.

DM:
Okay. Well they really caught a great moment then.

JA:
Yeah, because Kranz, he wanted me to power this thing up and see what he wanted to do because I think Kranz—I was just trying to get back to the landing site—Kranz was trying to save the mission. I think he thought, oh look. We got enough battery power. If we don't figure how to make this thing run, Kraft is going to come in here in the morning and cancel this mission. Well Kraft walked back in the next morning and we were all humming.

DM:
Surprise, surprise.

JA:
Now, the thing that caught me off guard and it was typical because that was in 1965. I had got there in '64.

DM:
Yeah. That's right. *Gemini 4* was your first one? Is that right?

JA:
First one I did was *3* and it was at Florida.

DM:
3, okay. Right, right.

JA:
The mission control in Florida.

DM:
So you were new.

JA:
So I was relatively new. The thing I didn't think about and didn't even cross my mind is nothing was ever said about that huddle. We just kept flying the missions. You don't tend to look back. You just keep flying. It wasn't—no accolades were ever exchanged. There were no rewards

handed out, but it turned out that that was a pivotal—Kranz later said something about that being a pivotal—he said it in a way that I concluded was a pivotal point in Kraft and Kranz and my relationship.

DM:
Golly.

JA:
Because he mentioned the fact that what I did on *Gemini 5* and I had to stop and think about what it was.

DM:
And you were twenty-two years old?

JA:
Twenty-two years old.

DM:
Well you know, you did get into mission control as a prime crew pretty early so maybe this was one of the deals.

JA:
Yeah. So that is what that's about. There's Hodge. John Hodge, he's a flight director. There's Kraft and there's Kranz. That was three flight directors. That was Capcom McDavid and this was a backup astronaut. I'm trying—I forget the person's name right off, but that's it.

DM:
Well I'm glad to know about that photograph because of the momentous—

JA:
Yeah. If you look at that photograph, see, it's a three megabyte photograph.

DM:
Good. Okay.

JA:
Okay?

DM:
Yeah.

JA:
Now, this one.

DM:
This is the third one.

JA:
This is a modern day photograph that we walked in—a bunch of us were drawn into control center one day and I sat in front of the EECOM console and they took a picture.

DM:
Yeah, okay.

JA:
Thought you might—any of these. I just threw a bunch of stuff in here that I thought was relevant. Here is the photograph of—let's see what the number of that one is.

DM:
It's number ten, it looks like. Scan 010.

JA:
Yeah, but that's just the scan. I need the—

DM:
Yeah, okay.

JA:
This is another one of the Gemini teams. You can tell just from the ground tracker, that's Gemini. And there I am. I don't know why it is everybody else had just shirt and tie on. I had a coat. But that's—

DM:
It was the case in that other one as well.

JA:
That's me. That's Gene Cernan.

DM:
Yeah. Cernan. There's Kranz.

JA:
And I'll make you a template up of what this is about.

DM:
Good. Okay. Thanks a lot. This is eleven. Number eleven.

JA:
Now, this—there—this is another photograph of just the white team that did the landing.

DM:
Right.

JA:
I don't know whether you've seen this or not, but that's me right there.

DM:
I haven't, yeah.

JA:
Kranz. That's Charlie Duke.

DM:
Yeah, sure is. He was Capcom.

JA:
There's Bostick right there.

DM:
Yeah. Huh.

JA:
There's Ed Fendell. Jay Greene. Steve Bales, the guy that talked about the arms all the way down.

DM:
Yeah, yeah. You're the only one without a jacket now, John. [Laughs]

JA:
Kind of laid back, wasn't I?

DM:
You and Charlie.

JA:
I'm sure that was taken a couple days after we landed. Now, here's an interesting picture.

DM:
Oh yeah. Is this your high school?

JA:
This captures my high school on one sheet. This is my entire graduating class.

DM:
Oh. Okay. Yeah. Eleven people.

JA:
Isn't that something?

DM:
Yeah.

JA:
Five.

DM:
Mine was sixty-five. I thought that was few.

JA:
See, there was—I think there was ninety in my class. There's me. One, two, three, four. Four boys and five girls.

DM:
Yeah, yeah. 1960.

JA:
That's my graduating class.

DM:
Oh, good. So you still have your annual.

JA:
Now, there is a just stock shot of—see, that says S-90 up there?

DM:
Um-hm.

JA:
That means it was taken in 1990.

DM:
Oh, I see.

JA:
You see that header.

DM:
This is scan 14. I'm going to say this for the—so I can match them up.

JA:
I'll make you an index.

DM:
Okay.

JA:
This is scan 15. Now, here's an interesting photograph.

DM:
Yeah.

JA:
There's an interesting story. Recognize—that's Ann Richards.

DM:
Yeah, it is.

JA:
That is the senator from Maryland, Barbara Mikulski, and she was key on the space committee on the senate's side in those days. Ann Richards came down. This is actually—we're standing in a mockup of the space station Freedom's logistics module. And I was showing her—I was giving

her a tour that day and a briefing to these two. So that's me right there. The interesting story that came about was that I described how the logistics for the space station Freedom was going to follow the Sierra Club model and that is rather than dock the trash into orbits and let it burn up and come down, whatever we took up, we brought it back.

DM:
Really? Okay.

JA:
She said, "Brought it back to where?" And I said, "Well it lands in Florida." And then she said, "You're not bringing it back to Texas, are you?" [Laughter] That is a true story.

DM:
Florida's okay, but don't bring it to Texas.

JA:
Ann Richards, as you know, had a certain wit about her.

DM:
Right, right.

JA:
"You're not bringing that stuff back to Texas."

DM:
I love it.

JA:
I said, "Oh no, Miss _____ . We're going to bury it in Florida." [0:27:45] [DM laughs] That is a true story. You can write that one up. Ann Richards. This is me at Hawaii.

DM:
Oh yeah. Yeah.

JA:
That is the Remote Site Systems console. The Capcom console was here and there was a medical console over. So these were all analog meters. The spacecraft would come over and the analog meters would just read out like analog meters. The only communications we had then back to Houston was either voice or we could send teletape.

DM:
Uh-huh, really?

JA:
And there's a little keyboard right there. I could tell the computer to send a summary message. It would take a snapshot of all the parameters and send it back via teletype. Mostly, it's sixty words a minute. Sometimes, it would go to a hundred words a minute.

DM:
Really? But you had a Capcom here. Was it always an astronaut in these remote sites?

JA:
Yeah. They got some _____ [0:28:51] Now, this was in November of '64. I got there in June. This was a simulation. The flight controllers conducted a worldwide simulation. They deployed everybody and then did a simulation called Network Simulation 1. And so this was in November.

DM:
So it wasn't a Gemini flight. It was just a simulation.

JA:
It wasn't a flight. And so I went through the remote sight one time and the next thing I knew, I landed in mission control. I never got back out again. So all the good stories they tell you about going to Australia and all that.

DM:
Well but that's because you were proving yourself for mission control, it sounds like.

JA:
I don't know. I don't know how that happened.

DM:
Huh. Well it's a good photograph.

JA:
This is Kranz, myself, and Kraft at a—I think it's at my retirement party. Here's another photograph of Kraft. It's kind of interesting. He had me by the arm. He must've been talking to me when I shot it and so I like this picture. He's looking at me, talking to me, when I guess I just turned around and—

DM:
You know, that's a good one alongside that one when you're young talking across the console.

JA:
Yeah, that's true. Now, this is when I was in Washington D.C. NASA Headquarters. I did a tour up there as the assistant to the NASA administrator. [Phone rings] [Pause in Recording] So I'm sitting there talking about how we're working on going to Mars when someone snapped that picture.

DM:
Right. You really have been scattered throughout the career. That's nice. You have space station Freedom. You have the Mars initiative. You have Gemini. You have Apollo. High school.

JA:
Well and I had the flight software. I was the software manager for a while and then a program manager.

DM:
Yeah, yeah. I'm just talking about how the photographs are really scattered through the career. That's nice.

JA:
And then I did a tour at headquarters. Some people tell me when they look at my career, they say, "You had a hard time keeping a job."

DM:
[Laughter] Now, here was your dream career right here. Being a rancher.

JA:
See, yeah. Boy, that desolate country. I don't know that you can run many cows out there. This is at the Black Gap Wildlife Management Reserve near Big Bend. Just right outside of Big Bend. We had—I had applied for ___ [0:32:00] out there. This is Gary Cohen, another flight director, and I, and another guy, Bart Bason [0:32:08]. Went out there and hunted mule deer and that was our hunting wagon.

DM:
I see.

JA:
We only had—Trill [?] [0:32:15] and I only had one car then and I took the only car and went to Big Bend in it. That was our hunting wagon.

DM:
Did it make it all right?

JA:
Yeah. That was in my element right there.

DM:
Yeah, yeah.

JA:
December of 1976.

DM:
Sixty-six.

JA:
I mean, '66.

DM:
Yeah.

JA:
There is six of my sisters.

DM:
Oh, okay. Yeah, you were the fifth of—

JA:
See, Grace. My sister, Grace, we had lost her by then. But there's the oldest one and then that's the one that's just younger than me.

DM:
Okay.

JA:
So it goes this one, and Grace, then that one, and then Holly Quill, who lives up the street, and

then Johnny, and then Ann Shirley, and then Wyatt [?] [0:33:13]. And I've got one in here of the whole—of all seven of them.

DM:
You were the fifth or sixth child?

JA:
Well I was next to the youngest so it would make the sixth.

DM:
Sixth. She was the seventh.

JA:
That's me accepting—George Addy [?] [0:33:33]. He's that block right there. That's at my retirement party.

DM:
Oh, that's the retirement party. Okay.

JA:
I think I told you the story of Kraft going to my retirement party and asking that question.

DM:
Yes, yes. Tell me again though because I can't remember.

JA:
Well he normally didn't go to retirement parties, but so I was elated and surprised when he showed up to my retirement party. Rather than getting on the agenda to make a speaking part, to say something—because, I think I told you, those are—the setting there is mostly—some get up and talk about accolades and some of them get up and roast you. They turn out to mostly be a roast.

DM:
Right.

JA:
And so he just came out and sat in the audience. Came in and sat in the audience, and so what happened, the master of ceremonies. I'll just point him out in a minute. David Hammel was the master of ceremonies and so he was running who was going to come up and talk and so forth, but at the end, he allowed walk-ons and he made an announcement. He said, "Well that's all the list

of people that was on the agenda to talk today." But he says, "Is there anybody else that wants to say something?" And a couple of people came up and said something and then he said, "Anybody else?" Kraft raises his hand and he says, "Well I don't have anything to say, but I do want to ask John Aaron a question." And of course, Dave Hammel—you know. Kraft had so much respect and that kind of presence, all he could say was, "Well go ahead." He says, "I want to know from John Aaron how he do that on Apollo 12, after we had gotten struck by lightning, how did he know that it was okay to go to the moon that day?" Does that ring a bell?

DM:
Yeah. It does. I think you wrote about it in a forward or somewhere.

JA:
I wrote about it in the forward of his book.. In the body of the book. Well you got to think about that. A year or two. It was 2000. It was—that happened in 1970. No, late '69.

DM:
November '69.

JA:
Well that's—what? Thirty-one years. So he stopped me just for a little bit. I wasn't expecting it and so the audience all kind of turned around and looked at Kraft. First of all, a lot of them realized for the first time he was there and most of the people who were in the audience had no idea why he was asking that question. So my reaction was well maybe I better bring the audience up to speed on this. On Apollo 12 and so forth and I told the audience the story about him coming down here and saying, "Young man, that was a good job, but I just came down here to tell you that if you can figure out a way to check out this spacecraft while we're in earth orbit and everything checks out okay, we'll go." But he says, "I really want to tell you that if you don't feel comfortable, don't feel like we have to go to the moon today." Wow.

DM:
That's a lot of responsibility.

JA:
That dropped that—and so I told that story and of course, the audience kind of reacted with kind of a wow, you know, something like that. It got real quiet. Kraft spoke up and said, "John, I'm still waiting on my answer." Vintage per scrap..

DM:
Oh, gosh. That's a good story.

JA:
There is my parents. My father's name was John William Aaron, as well. That was my mother, Agnes Melissa. And this is me and my baby sister. So that would've been about 1948, maybe. '47, I don't know. How old is that? That girl is there, about five years?

DM:
Or younger.

JA:
Or younger. So I may have been six. Five, probably.

DM:
I'd say five or six.

JA:
Six and four. Overall.

DM:
Yeah. Uh-huh. And you were born in what? '43, right?

JA:
Now, my mother is holding a baby. I assume that's the youngest member, person, Jerry Paul, and he died at the age of three.

DM:
Oh really? Oh.

JA:
That was the second boy of the family.

DM:
Oh, that was your little brother.

JA:
Hm?

DM:
That was your little brother?

JA:
Yeah.

DM:
Oh. Wow.

JA:
That was a major loss. Now, here is a picture I think I've spent some time explaining to you. We were coming—this is me. We were coming back from the barn and he's got two buckets. My father has two buckets of milk in his hand. We'd been to the barn to milk the cows and here's the calf.

DM:
Um-hm. And it looks like--

JA:
I show this to school kids. Primarily, when I get a chance to show it to middle school kids because the theme of my presentation is: this is America. If you get a good education, that's your ticket out of here because—and I looked—I said, "Now, this is me. You saw me earlier in a video." And I said, "I got from there."

DM:
Right.

JA:
And I said, "You know, this is America. You can do it." I said, "It wasn't exactly prosperous, our surroundings that I grew up in."

DM:
No, no.

JA:
"Look at that old barn." You see a lot of old [?] [0:40:16] barns today in that situation, but this was 1943.

DM:
Yes, yes. Now, y'all were still using a wagon then. Weren't you? Did you have a tractor by then? I know it was a while.

JA:
Well I think they had an old car. They often didn't run and they didn't have enough gasoline to run it because the war broke out.

DM:
Right, right. Rationing. Those look like some big elm trees there.

JA:
Big old dead Chinese elm trees.

DM:
Chinese elm, yeah.

JA:
And they'll grow in that country, but don't last long. They die.

DM:
No. Yeah, that's right.

JA:
There's when I lived south of Wellington and that's me and that's my baby sister, Wyona [?] [0:41:15]. But you can look at that old house. Needed a little paint, didn't it?

DM:
Yeah. Humble beginnings.

JA:
I spent most of my time in the early days around Quail.

DM:
Right.

JA:
If you know where Quail is.

DM:
I know where Quail is.

JA:
And so in 1948, we moved it five miles south of Lovington.

DM:
South. Quail is a little west of Wellington. Right?

JA:
Yes, it's west. Yes. toward Memphis.

DM:
Were you near a community five miles south or it was just out there in the country?

JA:
When I was at Quail?

DM:
No. When you were here, five miles south.

JA:
That was out in the country. That was on a farm five miles south of Wellington. Just about a mile north of Buck Creek. It was a little thing to come through Buck Creek. Our place joined the guy. The Carol Wyatts [?] [0:42:12] he became famous back in the—I guess, the sixties. He's the one that the aliens picked up and took him on a ride and he made all the—he made the *Wellington Leader*. I mean, the—I think he even made the Amarillo.

DM:
Globe news. I'll be.

JA:
Yeah. But anyway, his place, his family's place, joined us on the south.

DM:
You know, maybe that—somewhere, there was that call to be in the space program for you. [Laughter]

JA:
Maybe they captured me and I just don't remember.

DM:
Maybe so.

JA:
That is the story.

DM:
Oh yeah.

JA:
That's me. That's my graduating picture from high school in 1960. That's another picture that was taken of me at NASA in the 1990's timeframe. Now, here's an interesting picture and it took me a long time to find this. I've been looking for this. This is a slide that I—in fact, I've started—I've got to get back on my—I started using this to do something with all those slides.

DM:
I'm glad you did. You just put the slide in here? Or you just set it in?

JA:
There's a little—

DM:
Template?

JA:
There's a mask up there, but it only does four at a time.

DM:
Right, right. Yeah, yeah. Well I'm so glad you're rescuing your prints like that because this will fade. You know, these slides fade pretty easily.

JA:
Yeah, this one is in good shape even though it's in—this was taken in '67. If you look on the—in the summer of '67, Cheryl and I were back in Vincent on vacation.

DM:
Looks like a vacation all right.

JA:
Looks like a vacation and so we were staying at Cheryl's father's place and he—they were plowing a wheat land and he asked me, kind of, "Why do you want to do that?" I said, "Well I want to go help you plow." Cheryl looked at me and said, "What do you mean you're going to go plow?" Because it was hot outside. You know how hot it gets. I said, "I want to go plow today. I want to go plow a wheat land today because I want to." If I ever have a thought that I was going to return to—quit my job at NASA and come back here and farm, I'm going to think

about this picture. This is—this was the summer of '67. That's the story behind that. That's me. Look at that old car. Look at that dent right there.

DM:
Yeah, it's been around a bit.

JA:
Oh, that says '46.

DM:
six, maybe.

JA:
Yeah.

DM:
Forty-six.

JA:
The license plate is '46.

DM:
Yeah, so see, you were three or four years old.

JA:
I was four years old and that would've been at Quail.

DM:
Okay.

JA:
That would've been at Quail, but I was in love with that old car.

DM:
Oh, that's a good picture. Yeah, that really explains the circumstances right there.

JA:
This is my mom and dad's wedding picture.

DM:
Okay. Really? Nice that you have that.

JA:
My mother was a pretty lady.

DM:
Yeah.

JA:
She came from Bee County, Texas, down by that part of the country.

DM:
Oh, really?

JA:
Her ancestors migrated through Galveston.

DM:
Oh yeah. Major port of entry.

JA:
Rather than Ellis island. This is my great grandmother.

DM:
Golly. I'm glad you have that.

JA:
And she had quite of an Indian—we have quite a bit of Indian heritage and then there she is again with her husband. And I've got to talk to my sister. I don't quite understand why it would've been Green Berry Wagon [0:46:44] and maybe that was her brother. I don't know.

DM:
You have the dates on those pictures?

JA:
No. It was—I don't know. Now, this is my Grandmother Eversole and my Grandmother Aaron. Now, you can tell—you can see the Indian there.

DM:
Yeah. You can.

JA:
And that's my oldest sister, Ruth. I gave you that write up about how we all wound up going to college and at first, we started with Ruth at the West Texas Canyon.

DM:
Right, right. Yeah, I've got that.

JA:
So that's Ruth.

DM:
Uh-huh.

JA:
My grandmother had an interesting name. Safronia Jane [?] [0:47:36]

DM:
Really? Safronia?

JA:
I never heard of it.

DM:
Never have heard it either.

JA:
This was my grandfather who I never I met. That was Amos Eversole. Husband of the picture, of the one we just saw.

DM:
I'm trying to figure on what's going on back there with the calf.

JA:
Oh yeah, it's a calf. I was trying to figure out. Is it a white?

DM:
He's got his head turned.

JA:
Hereford calf.

DM:
There's just a little damage. Maybe some water damage on the photo or something. Golly. I'm glad you have these family pictures.

JA:
Now, this is a pretty recent picture, comparatively speaking. This is December of '57. That's about the time—very close to the time we moved from south of Wellington over to Vincent and that's my Grandmother Aaron.

DM:
Well you were probably—were you in junior high when y'all moved?

JA:
No. I was in the ninth grade.

DM:
Ninth grade. So really, starting high school, I guess.
JA:
Just starting high school. We moved between semesters. Moved around Christmas time. So this would've been very close to that time. I think that picture was taken in Vincent. I think that's the house.

DM:
It looks like winter. There's no leaves on the trees.

JA:
It's dated December up here.

DM:
Oh, it is. Okay. Yeah.

JA:
I got picture somewhere. Anyway, that's when I moved to Bugger Holler [?] [0:49:19]. I think I—I don't know—did I tell you about Bugger Holler?

DM:
I don't think so. I don't remember it.

JA:
Well that's another story. That was a half section of land down on Elm Creek, which is a little saltwater creek that comes across from Texas, flowing east, and it's like five miles north of Vincent and about five miles west. East.

DM:
Oh yeah. You know, that does sound familiar now.

JA:
I told you, probably, how he got his name, Bumper Face Davis [?] [0:50:03].

DM:
I just can't remember.

JA:
Well they named him Bumper Haller. He got to be called Bugger Holler because it was a land that weaved right into the bend of Elm Creek. Nice and flat. [0:50:23] There was a family there back—back there, named Davis, and he had a daughter that married a guy and the son-in-law was living with the daughter. I mean, the son-in-law was living with them, And so Davis kind of had a reputation of being a mean guy. And so the daughter figured out that the father, her father, was really mad at her husband and said—because she ran down to where the gate—the gate to the—from the road was almost a quarter of a mile from the house and she ran down there. When her husband was going to open the gate, stopped to open the gate. He was up on a big load. He was sitting upon a big load of loose hay. You know, how some, you just take a wagon and scoop up loose hay on it.

DM:
Right, right.

JA:
She said, called his name, said, "Don't go down there to the house because daddy's going to kill you. Daddy says he going to kill you." And he says, "Oh. That old man's always threatening me here and there. He ain't going to do that." Well just as he turned into the yard, the old man walked over and blew him off the top of that haystack with a shotgun. Killed him.

DM:
Golly. Wow.

JA:
So he had a tremendous reputation. Well anyway, apparently, he was a scroungey looking old

codger and he had a big beard and he dipped snuff and the kids that rode the school bus, when they would go down to pick up school kids, started calling him "Bugger Face." So he got the name 'Bugger Face' Davis because he would have the spit in his—so then he got to be—they sent him away to prison. He only served, what I'm told, just a couple of years.

DM:
Really? For killing his son-in-law?

JA:
Killed his son-in-law.

DM:
Golly.

JA:
But that's how it became Bugger Hollow.

DM:
Rough country.

JA:
So I lived nine miles from Vincent.

DM:
Yeah.

JA:
Almost to Reed. In fact, our mail address was Reed.

DM:
Okay.

JA:
This is—

DM:
World War I uniform.

JA:
A World War I uniform. This is my—this is my grandfather.

DM:
Okay.

JA:
That's my father. He was serving. Getting ready to go to Europe in World War I. Look at that old car.

DM:
Yeah.

JA:
He was a Methodist minister. See, the Aaron side of the family came from a long list of Methodist ministers. They were ministers and educators. They would—the story goes every time they would move somewhere, they would do two things, you know, neatly. Build a school and a little church. They—he and—he and Safronia Jane [0:53:35] stopped from—they were migrating from Red River County, Texas, to Greer County. The old Greer County, Texas, up there around Altos. They stopped at Fort Sill, and taught at the Indian School.

DM:
I remember you mentioning that. That there was a Quanah Parker there.

JA:
There was a Quanah Parker there.

DM:
Who's the little person there?

JA:
You know, I don't know.

DM:
This would be 1917 or '18 photograph with him in that uniform.

JA:
My daddy was born—my father was born in 1894. I don't know. I'd have to look up when his youngest sister was born. He had a young sister that I'll show you in a minute.

DM:
Photo's got to be 1917 or '18 for him to have that uniform on.

JA:
Yeah. So that could be my father's little sister.

DM:
Could be. Okay.

JA:
Good question. There's my father milking that old cow. Look at that old wat. That thing is about to fall down. That old cow looks—that may have been the Dust Bowl. Look, that old cow wasn't in real good shape.

DM:
Now, that cow was pretty gone. She was pretty gone.

JA:
She was drawn down, wasn't she?

DM:
Yeah. And it looked like he's milking her right out in the open. Not in a chute or anything.

JA:
Well there was—he's on an old corral that's about to fall down.

DM:
Yeah, but she's just sitting there taking it. A lot of cows have to be in a chute.

JA:
Oh, you mean a chute. Yeah.

DM:
Yeah.

JA:
I thought you said street. Yeah.

DM:
Must've been kind of a tame cow. Probably had some feed in front of her.

JA:
I don't know whether he was—I guess that's a bucket right there. He's not really in a position to sit there very long and milk.

DM:
No, he's not, come to think of it. But he's holding something underneath and using a hand like he's milking.

JA:
Yeah, he's milking here, but I was wondering what is up in his hand.

DM:
Maybe he just needed a little milk.

JA:
I don't know.

DM:
Maybe he's doctoring her.

JA:
Is that a—that's not a calf under that cow he's trying to teach how to suck, is it?

DM:
I don't know. I can't tell what that is. I can't tell.

JA:
There he is in World War I uniform. What impressed me is how his uniform looks so nice and pressed. Little wrinkled. There's my daddy's three other brothers.

DM:
Uh-huh. That's him right there.

JA:
There was the oldest one, yeah.

DM:
Yeah. He's the third one there. Good family photos.

JA:
Here is the—there's the whole family. That's my father's whole family. There's the youngest sister right there. That may have been who was in that picture.

DM:
Oh yeah, uh-huh.

JA:
There's me.

DM:
Okay.

JA:
One, two, three, four, five, six. So this is—Wyona [0:57:53] had not been born then.

DM:
Yeah, but one of these sisters died. Is that right?

JA:
Yeah. So the youngest sister is not in the picture yet because that's my older sister right there.

DM:
Right. Good picture of you there.

JA:
Yeah, that—yeah.

DM:
[Laughs] Got your overalls on.

JA:
I was fascinated by something, wasn't I?

DM:
Got your overalls on, too.

JA:
There's Ruth. I was telling you about Ruth.

DM:
Uh-huh.

JA:
That would've been Grace, the next one. Now, here's the picture of us coming back from the cotton patch. My sister labeled this picture, "Boel Pullers."

DM:
Are you in there?

JA:
You can tell it was late in the year. We've all got—this is me, right there, that poor old English Ford tractor. So that would've been '46, '47.

DM:
Yeah, you're pretty small there. What kind of orchard is that?

JA:
But—hm?

DM:
What kind of orchard is that?

JA:
What kind of what?

DM:
Orchard. Looks like—

JA:
Oh, oh. I don't know what that—

DM:
Now, that looks—that's an evergreen in the back, but these up here.

JA:
That looks like some kind of an orchard. Yeah.

DM:
Now, that back there is evergreen.

JA:
That's a cedar.

DM:
Yeah, yeah.

JA:
There's an old barrel laying there. Looks like something. They made a table out of an old sideboard.

DM:
Yeah. Yeah. Looks like a little picnic table now.

JA:
Was an old wagon. There's the--

DM:
Oh, there it is. Yeah.

JA:
Then here's the crew again. That's me, Shoddy, that'd be Ann, Shirley, Ruth, and Quill, and not sure who that is. That's not daddy. I think that's one of mother's brothers. That—you recognize that old car? Is that a?

DM:
Hudson.

JA:
Is that a Hudson?

DM:
Um-hm. Yeah, well I can read it there, a little bit.

JA:
Okay.

DM:
I'll be.

JA:
There's me again.

DM:
Uh-huh. With your overalls on.

JA:
There is the whole family.

DM:
Okay. Yeah. That's the younger one right by you. Is that right? The younger sister?

JA:
No, the youngest one is actually right there.

DM:
Oh, right there. Okay, yeah.

JA:
That's the youngest one. That's the next. That's the next. And then that's the next—no, no, that's the next. That's the next. And then Grace and Ruth and me. That's a classic picture.

DM:
Yeah, that's really good.

JA:
That's me in the first grade. That's Cheryl and I and our family. That's my son and daughter. We were in Houston by then, obviously.

DM:
Uh-huh.

JA:
Now, this—that is—I don't know whether you've seen that picture.

DM:
I haven't seen that. No.

JA:
After Apollo 12, there was a newspaper person came to NASA and wanted to interview me

about the lightning thing.

DM:
Oh, really?

JA:
So we walked over to the control center and you could tell the room was dark and shot that picture.

DM:
Well I wonder if there's a *Houston Chronicle* article about it.

JA:
Is that right?

DM:
No, I wonder.

JA:
Oh.

DM:
I'll look and see.

JA:
There probably was.

DM:
How long after Apollo 12?

JA:
It would've been less than a week.

DM:
Oh yeah. I'll look it up and see if I can find an article. If I do, I'll shoot it to you.

JA:
Okay. So that's the other control center picture that I have, but it's—that's not the EECOM console. That's a retro fire officer console, I think.

DM:
Okay, okay. He just sets you at the closest chair apparently.

JA:
Yes, and we took a picture. That's a good high resolution picture.

DM:
Uh-huh.

JA:
That's another stock picture of me once I—when I was the program manager.

DM:
Program manager. Yeah, yeah.

JA:
That was in '85.

DM:
Okay.

JA:
Okay. Here's another huddle. That's me. That's the flight director, Don Puddy. Everybody is standing around and I'm discussing options with Don Puddy.

DM:
What mission? What mission do you think that is?

JA:
Skylab 1.

DM:
Oh, Skylab 1. Okay.

JA:
I don't know whether I talked to you much about Skylab 1. Skylab 1 was like Apollo 13, except it went on for six weeks.

DM:
Oh, this is where it un-shucked.

JA:
Yeah. It un-shucked.

DM:
Yeah.

JA:
Well he had—this was right after we put it in orbit and we were discussing options. There was—I was—during the launch phase, I watched the instrumentation system go squirrely on him. We lost a bunch of measurements and so forth and then once it got into orbit, there was an automatic sequence. It started deploying. You can see the thing up there with a helicopter wing looking thing.

DM:
Yeah.

JA:
Well that—there was two big wings on the workshop. You know, we took the third stage of the *Saturn 5* and made a workshop out of it so most of the power was in those two wings. That one was stuck and the other one was gone and so they started the sequence, and I realized right away something was wrong. And Don Puddy kept trying to tell me, "John, you know, maybe its instrumentation." Just [inaudible] [1:05:21], maybe it's expectation. And I said—in fact, Kranz, when he came in to watch the launch phase, it was unmanned. When he came in, he didn't go up to the flight director console and plug in. He came down to my console and plugged in. So I was working the problem and looking at Kranz and I was trying to tell Kranz, you know, that that silver wing wasn't that it wouldn't come out. It was gone. So finally, I just unplugged and walked up to the flight director console while it was out of station contact and had a conversation with Don Puddy about what we're going to do next because the way the sequence was. We vented the workshop, which would've cooled it down and so there was a set of big heaters that were going to come on to heat, to warm it back up. I could tell it wasn't going to cool down. In fact, the temperature—

DM:
Was rising.

JA:
Was rising. So we came to the conclusion, we got to do something. So that's when I was trying

to settle the idea of point the spacecraft forty-five degrees pitch up.

DM:
Oh yeah. Right, right.

JA:
Well there was two problems with that. The guys in Huntsville, who were on the line and watching all of this, they wanted those heaters to come on and I said, "No, no, no, no. We got to keep those heaters from going off. Coming on, because it's already heating up. In fact, we're going to have to do something." So they were behind the power curve on analyzing this problem. And the guidance guy said, "John, we can't pitch that thing up because we've got—we don't have an inertial guidance on this thing. It tracks the sun and it's only got one degree field of view. If you pitch this thing up, we'll lose reference. We won't know where we are. So that was what all was being discussed.

DM:
I'll be. Okay. Yeah.

JA:
It was kind of interesting. The—I was trying—the first battle I had was with the guys from Huntsville about those heaters and so we were arguing over the phone about—I told them I was going to not let those heaters come on. "No, no, no, no. You got to do it. You got to do it. You got to do it." And so we've come up over Australia and I looked up and we got telemetry and I looked up and those heaters were on. I just started sending the commands to turn them off. Finally, I just told the Huntsville guys, I said, "Guys, this debate is over. I just sent the commands to turn them off." The room went totally quiet. The next thing I know, minutes later, and it, fortunately, was summed out and delayed. The Huntsville guys didn't call my boss. They called NASA headquarters and said, "That EECOM down there is out of control." Well fortunately, by the time it all filtered back down to chain of command, it was obvious even to anybody what the hell was going on. So I escaped the—I escaped the wrath of the agency.

DM:
Wow. Golly. Well I'm glad you were willing to take the bull by the horns like that.

JA:
So we had to burst—how that thing flew. We literally flew it by the seat of our pants based off solar panel voltage.

DM:
Golly.

JA:
I think I told you the story about what Steve Bales did once. We had to keep sending commands to tilt it or pitch it because the gyros—we didn't know the gyros were all [crosstalk, inaudible] [1:09:15].

DM:
Right, right, right.

JA:
So it came over the hill and we saw that. We looked at the voltages and all that and said, "We're not in the right position. That thing has walked off again on us." So I called the flight director and I said, "Flight, we need to roll this thing about twelve degrees left and we need to pitch it back up another three degrees." And so the guidance officer got frustrated with the flight director about—because it was happening too often, we were going to have to reposition this thing. And finally, the flight director just called, just told them, said, "Steve, go ahead and build a command load. Dial it in and send it up." Well Steve went back to his console and called the guys down in the basement and said, "Okay. Build my command load to do that." And while that was being built, I'll never forget, he leaned over. The trench was lower than the EECOM was. He leaned over the console at me like then said, "EECOM, tell me. Do you know what the hell you're doing?" [Laughter] I said, "Yes, Steve. Just go ahead and build a load." So we flew it for days like that and then they got worried when we got ready to rendezvous whether or not, we had to tilt it down to a local vertical, local horizontal, to rendezvous with it.

DM:
Oh, yeah.

JA:
And so then they started a pool. They started bets on about whether or not we can find the sun. It was a one degree column that you had to get the—

DM:
Yeah, yeah.

JA:
So the morning that it came down at the same time that we waited, of course, as long we could because we wanted to heat the vehicle up. Morning light came in and Dick Brown and I sat down and made our best guess of how much pole pitch and how much roll it was going to take to find the sun. And so we announced that and said, "Okay. Build the loads, flight director." And of course, there were just giggles in the room. They've sent that load up and by some miracle, the sun was in the center line, one degree.

DM:
Golly.

JA:
Absolute miracle.

DM:
Well that took care of that. [Laughter]

JA:
Oh, I tell you.

DM:
Pretty good. It's another good photo then because it's a momentous time. It's an important moment.

JA:
Yeah. Now, this is—

DM:
I see Kranz over there in his vest.

JA:
There's Kranz and there's me.

DM:
Yeah. Well this is pretty early.

JA:
That—I believe that is. Let me see.

DM:
What kind of console?

JA:
That looks like Neil Armstrong, but I don't think it's him.

DM:
That looks like—yeah, that's Armstrong and Aldrin. That looks like Buzz Aldrin.

JA:
Oh.

DM:
To me. Sure looks like Armstrong and Aldrin to me.

JA:
It does look like Buzz.

DM:
Now, what kind of consoles are those? Are those Apollo or Gemini?

JA:
This was Gemini. See, there's still meters.

DM:
Yeah, I see it now. Uh-huh. Yeah, it's got to be early because you look really young there. Well another great photo.

JA:
If I could run down the original to that, I could get the number off of it and probably could find out.

DM:
He was never teamed up with all them.

JA:
Oh. MCC 1965.

DM:
Sixty-five, yeah. Pretty early. This was not—when was Aldrin—when was Armstrong's flight with Scott?

JA:
It was *Gemini 8*.

DM:
8, yeah.

JA:
So that would've been—that would've probably been '66, probably.

DM:
Okay. It's earlier than that then.

JA:
But see, these guys—the CAPCOMs, the astronauts floated through the teams because we used them as CAPCOMs.

DM:
Well maybe that's what they're doing there then, huh? One of them serving as CAPCOM.

JA:
I don't—that's interesting. Now, that's it.

DM:
Oh, that's a great collection.

JA:
Now, there—probably—that exhausts the pictures that I think that I have, but I've got boxes and boxes of pictures unsorted and slides unsorted of families. Those would be mostly family things.

DM:
Right, right. Well I think you've got a good selection of family photos in there and a good selection of mission control photos through the different programs so that's nice. I think that'll be real good. I'd like to put some of these in as—during the talk.

JA:
Okay. Well I'm going to give you this disc.

DM:
Okay.

JA:
This is a disc.

DM:
Okay.

JA:
Now, all the black and whites are scanned with the 16-bit grey scale.

DM:
Okay.

JA:
1200 hundred BPI [**Bits Per Inch**].

DM:
Oh, good. Good. That's what I was going to set mine on if I scanned them today so that's--

JA:
And the color is 24-bit color 1200.

DM:
Good. Okay.

JA:
Now, what that means is that—and that's doesn't necessarily mean that the thing I was working on had that resolution, but that was how much I scanned them.

DM:
Uh-huh. You have a piece of paper I can fold this into to where I'm not—I don't think I brought any sleeves with me.

JA:
Yeah, I got it. Yeah, I got a sheet.

DM:
I'm going to pause this here. [Pause in recording] All right. So I was curious. I wanted to fill in a couple of blanks about Apollo 12 and you've already talked about Apollo 12. I have good information on that, but I was wondering, when you first saw that problem during the simulation and everything shut down and they were running on battery power. This was fourteen months before Apollo 12. How long did it take you to run down the problem? The way I understand it, you came back into the office the next day and you started going through the circuitry to find this issue. How long did it take?

JA:
Well first of all, with respect to what was going on in Florida, they were simulating us a mission,

but they were actually using the real hardware. It was a real spaceship. It was the real spaceship. So and one of the reasons we always wanted to watch those tests was that you learned things about spacecraft that you wouldn't otherwise know.

DM:
Which was certainly the case in this one.

JA:
Certainly the case here. The next morning, because we gathered the information that night and went home. The next morning I was in the office at eight o'clock or a little before and I chased down the expert on that piece of equipment, Dick Brown.

DM:
Right.

JA:
It was—we spent from probably the eight o'clock or eight-thirty or whenever we got started, it was early in the afternoon when we had it all wrapped up and understood.

DM:
Maybe five hours?

JA:
Yeah, five hours analyzing all that circuitry and getting an explanation that would fit the scenario that we witnessed.

DM:
Right, right. And this happened the night before? What? Around midnight or so?

JA:
It would've been—I would say—nine or ten o'clock Houston time.

DM:
Okay. Yeah.

JA:
I think I told you that we wore the astronauts out. They had sent us spacecraft all day and then we got what they called a sim crew, which were test controllers, were actually sitting in the spacecraft. And the way they did the test, much not like how you fly it because the crew goes ahead and takes actions and so forth. The test conductor reads each individual step sequentially.

Panel 21, switch number 3, blah, blah, blah, on. You know, it takes forever because they want to do it very systematically. So that's what happened. It happened and then they said, "Wow. That's unexpected." So then they started trying to backtrack through the test documentations. The procedure documentations. How did we get here? Of course, I got concerned. I don't care what you got—how you got here. Let's get this thing safe.

DM:
Right, right. Well I knew you had talked about tracing that down and I knew it was quite a bit of work to trace it down, but I just didn't know how long that took. If it was an hour or if it was a day or—so about five hours you say. Why wasn't it added to the trouble shooting procedures? You know, this idea of this could happen. Did it just never occur to y'all that this might actually happen?

JA:
I have thought about that a lot and that was irresponsible on my part that we didn't document that and particularly, and train the other EECOMS on what it would look like.

DM:
I'm just glad you remembered it.

JA:
Well it was lucky I was on the console when it happened.

DM:
Well it all turned out alright.

JA:
Yeah. Some things in that program were just meant to be.

DM:
Yeah, it's amazing. Everything seems like it was just so close. So close. Gemini 8. Spinning out of—you know, so close. And yeah, it's amazing. It makes me shake my head when I read these things. On the SCE to aux switch, where is it in the command module? It was Conrad, Gordon, Bean. It had to be over on Bean's side, I guess.

JA:
On Bean's side. I believe he said it was over his left shoulder. I mean, his right shoulder.

DM:
His right shoulder, okay. Okay. Is there—

JA:
I can chase that down for you.

DM:
I was going to ask if there's any way I could see the layout of the command module.

JA:
Oh yeah. I got it.

DM:
Oh, really? Okay.

JA:
I'll take it while I chase it down.

DM:
Oh, thank you. I don't know where on earth I'd start to find that. Yeah, if I could find that switch, that would—I just want to get this as accurate as possible. [Claps] You know, so okay. So it was in Bean's area. Bean is the one that flipped the switch.

JA:
And Bean recognized the name of the switch.

DM:
Yeah. [Laughter] Although it was obscure.

JA:
It was obscure.

DM:
Did the other guy's know? Did—Conrad didn't know. Did Gordon know? Okay, it was just Bean. So close. Such a close call.

JA:
Well the story goes that I heard that Bean told the other crew, he says, "I know where it is. I know where it is."

DM:
Okay. Wow. Now, when this whole thing happened with the lightning strike and you determined that it was SCE to AUX that needed to be switched. You called over to Jerry Griffin. Or did

Griffin call over to you asking? Did he call you and ask, "Hey EECOM?"

JA:
It happened, coincidently, to be the same. He said—he just said—I think on the loop, he just said, "EECOM?" And I just answered him, I said, "Flight. Tell them to try SCE to AUX."

DM:
Uh-huh. Okay.

JA:
So he—we came—

DM:
Yeah, perfect. Yeah, you don't have that recording, do you?

JA:
Yeah.

DM:
You have the audio?

JA:
Yeah. I tell you what happened is I didn't know anybody had the recording of that and when we wrote the book here, they wrote that book. Somebody got in contact with the right person in Houston and they found it.

DM:
Really?

JA:
Now, I've got it somewhere on my computer and I'll email it to you.

DM:
It would be okay for me to use it?

JA:
Oh, yeah. Absolutely.

DM:
Okay. I'd like to listen to it.

JA:
And now, the backroom person is Jim Kelly, because as soon as I said, "I think it's SCE to AUX," I called the backroom just to see what my electrical expert would say and I think I said something like, "Jim, it looks like SCE to AUX to me." I don't remember exactly what he said and I didn't even wait for him to answer. Probably, I didn't wait for him because Griffin may have called me simultaneously on the flight director loop.

DM:
Okay. Can you hear you saying this in the background?

JA:
Yeah.

DM:
Okay. Well yeah, if you don't mind sending that to me. I'd appreciate that.

JA:
Yeah. I'm pretty sure I've got it.

DM:
Okay. I'd love to hear it. Now, here's the timeline as I have it down. The first lightning strike occurred at thirty-six seconds. Does that sound familiar?

JA:
Sounds about right.

DM:
The second lightning strike occurred at fifty-two seconds, but that's not the one, I don't think, that knocked off the power.

JA:
It must not have been because you know, I had forgotten there was two strikes.

DM:
Yeah. Conrad or someone said he thought the second strike's what knocked off the navigation, but I don't know about that. I think it sounds like the first lightning strike was the critical strike. Not sure.

JA:
I don't know. It would've been the first one that I reacted to.

DM:
Right. Okay. Maybe the reason there's talk of a second lightning strike is people on the ground in Florida reported two strikes. Maybe that's where it came from, but the damage was already done by the second. The third thing I have here is that your response was at a minute twenty-five. In other words, you responded with SCE to AUX forty-nine seconds after the lightning strike. Does that sound right?

JA:
That sounds about right. That sounds like a long time.

DM:
It's less than a minute though.

JA:
But it's less than a minute. Now, it didn't seem that long in real time.

DM:
Yeah. But you know what, the lightning strike happened and then it took just a bit before the astronauts called down. You know, that might've taken several seconds or maybe even ten seconds. I don't know, but then, so that's—you know.

JA:
Well course, when the lightning hit, the telemetry went really haywire for a second or two. So it took a while just for it to settle down on what it was going to say.

DM:
Right.

JA:
And then, when it settled into the pattern was when I started looking at it.

DM:
Right, right. So you know, forty-nine seconds doesn't sound unreasonable.

JA:
No, it's not very long, but it's—

DM:
Was it close to abort? If you called in at a minute twenty-five to launch?

JA:
Yeah. We had the escape tower, I believe, on the spacecraft until about two minutes. Maybe two and a half minutes. So it would've been a tower abort.

DM:
That was close. If not for that rapid response, it probably would've been an abort then. Do you think?

JA:
I don't know.

DM:
Okay.

JA:
I just—I—that's a question we're never going to be able to answer because--

DM:
Who's able to call an abort? Who calls in an abort? Can any EECOM do it?

JA:
There's a couple of the consoles and the flight director console have a switch that they can light the abort light in the spacecraft and then the crew physically twists the t-handle to abort, but EECOM, if he wants to abort, has to call the flight director.

DM:
Right, right.

JA:
Yeah. I couldn't do it. Unilaterally with a switch.

DM:
Sure, sure.

JA:
That's outside. Range safety has the capability to, independent of the flight director, blow up the spacecraft.

DM:
I think Bostick had that.

JA:
He would've probably told you about it because he was the—Bostick was the interface to range safety, but he couldn't overrule them.

DM:
Right. Was there a way of aborting without the crew? Because what if you lose communication with the crew and it needs to abort and you know it, but the crew doesn't. Wow, okay. Anyway, it's another close call.

JA:
Well it was—you know, there was a very select way to abort. I mean, they didn't just hand that to anybody.

DM:
Right, right. Now, how long was the disruption of the hydrogen and oxygen feed to the fuel cells? Did that go off completely? It never was disrupted?

JA:
No, it wasn't a fuel cell output shutdown. It was the connection—electrical connection to the bus.

DM:
Got you. It was the bus dropped. Okay. It was A and B bus going off.

JA:
Yeah.

DM:
Okay. Got it. Do you recall anything—

JA:
I mean, thank goodness it didn't close the fuel feeds to the fuel cells because that's irreversible.

DM:
Oh, okay. Oh, I didn't realize that. You can't get that back.

JA:
Can't get that back.

DM:
Now, Bean did reset the fuel cells. What does that mean? Just the power to them?

JA:
The terminology is that there's electrical centers in the line that protects you from reverse current. That is if the fuel cell shorts out, it doesn't take the other fuel cells down because all fuel cells are connected to the bus. So the reverse currents are trapped on all three of them.

DM:
Okay. So that's what he had to reset.

JA:
So when you put the fuel cells on, it's on slash reset. So you reset that current center and cause the bus—cause the fuel cell output to be reconnected to—it's like a circuit breaker.

DM:
Right. That's what Bean was doing when it says—

JA:
Reset.

DM:
--Resetting the fuel cells. It was actually resetting the breaker. Okay. I got you. All right.

JA:
And then there—then the voltage came up and then all the lights went off back to normal.

DM:
Yeah.

JA:
It was a classic brown out. The voltages didn't go to zero. It just went about half of what it's supposed to. Probably around instead of being twenty-eight volts, it probably got around fourteen, thirteen.

DM:
Okay. How long did it take for—go ahead.

JA:
I don't know how long it took us to get the word up to reset the fuel cell. That's what I remember

being a long time.

DM:
Well now, here's what Bean says about it. I've read his interview transcripts. He says, "They called up and said, 'Reset the fuel cells.'" And he said that worried him. So he thought, I'm going to do this slowly and one at a time because I'm afraid something's going to blow. So click. He did it slow. He did it slow. He did the whole procedure slow and it all worked and he said, "Would've been better if I had just listened to them." [Laughter]

JA:
In his position, I would've done the same thing because that had never happened before in flight.

DM:
He was afraid there was a short or something.

JA:
We had never hit that switch. We had never used that switch in flight.

DM:
Anyway, I thought it was funny, though, that he admitted, "Yeah, they were right."

JA:
Well he had a right to be.

DM:
How long was it before Kraft came around and patted you on the—the way I understand it, he patted you on the shoulder and said, "Great job, young man." Was that a true story?

JA:
Oh, absolutely.

DM:
Chris Kraft. Was this right after?

JA:
I remember. You can imagine sitting there watching that thing go through the launch and then the kind of anxiety that got built up, right? I remember exactly what happened as soon as they announced that they were in a safe orbit. All I did, I just stood up like this and then I—

DM:
Oh. And he was there.

JA:
There he was.

DM:
Right when he opened—

JA:
And then so I remember—I remember thinking, oh my gosh. I mean, that's the scariest launch phase I've ever been through and now, before I even get a chance to catch my breath, they lay that one on me.

DM:
Yeah. Can you remember exactly what he said?

JA:
He said—he said, "Good job, young man. But I just came down here to tell you that we don't have to go to the moon today. Don't feel like we have to go to the moon today." And then he paused and then he said, "But if you can come up with some kind of sequence to check the spacecraft out and assure yourself it's okay, we can go. But don't feel like you have to go."

DM:
So if you had told him right then, "I don't feel comfortable with this," would he have aborted that mission?

JA:
Well probably not at that instant.

DM:
Right, right.

JA:
Because see, we were in a three hour coach. Normally, you spent two orbits in earth orbit. We were already in earth orbit, so we were at a stable.

DM:
Right. So you have time.

JA:
So that would've started the discussion about—we'd have had some time to huddle. There would've been a lot of people in that huddle because the whole world was connected in and wired to mission control.

DM:
Well that's got to be a highlight.

JA:
But as I remember, we quickly built that sequence and jotted it down. Pieced together pieces of the crew procedures because you couldn't do a switch-by-switch, you had to grab whole sequences.

DM:
Right.

JA:
Parts and pieces of whole sequences. And as I remember, we grabbed those and said, "Okay, here's the way we're going to do it. We're going to—even though we can't light the big engine on the command module, on the Command Service Module. We're going to go through a mock major maneuver with that engine and that will use all the hardware. You know, including sending up a set of targets. That'll use all of them. Turn on the gimbles to the engine and checking those out and so forth. Turn—you know, putting the batteries back on the bus. That would check out all we need to at least be able to go around the moon and come home." When we pieced that together, I don't remember a single critique that we got from industry or the back rooms. There was never any discussion about that wave, and I don't know whether that's good enough or not. It was—there was never that discussion.

DM:
They just trusted that mission control was doing the right thing. Is that it?

JA:
Yeah. Isn't that something? Yeah. See, Kraft, I'm sure, was concerned that we would wear on the other side of the debate that we would not—if we couldn't prove it was no-go, then we'd feel pressure to say go. He wanted—the reason he came down there to lay his hand on my shoulder was to flip the debate the other way to say, "Don't go if you're not confident, don't go. Not if you don't know, go." Do you understand what I'm saying?

DM:
Right, yeah.

JA:
Because that's a lot of pressure.

DM:
Oh yeah. Sure. What a great—I mean, I hear nothing but good about his management abilities. But what a great example of that.

JA:
Yeah. He didn't waver in many accolades on very many people.

DM:
Yeah, yeah. That was a big time.

JA:
So he wanted to bias the analysis to where we're not going until you're confident and he wanted to make that okay if we decided that. Why else would he have done that? What an interesting choice of words.

DM:
Yeah. Anyway—

JA:
Well and then, fast forward thirty-something years to my retirement party. I hadn't thought about it. We just went to the moon that day and then we started working on the next mission.

DM:
But you know, he sure remembered it. He sure remembered it or—

JA:
Well I've thought about that and here's my answer. Here's my speculation as to where he came to my retirement party and why he answered that question. At that time, he was writing his own book.

DM:
Oh.

JA:
And I, like him, if I was writing a book, I would've probably [Inaudible 1:38:11]. Did a flashback and say, "Boy, that was kind of gutsy. How did we know it was okay?" He's never told me that. He's never said anything about that, but—

DM:
But it was definitely on his mind.

JA:
See, we tended to fly missions and we were flying them so fast, forgot about them. It's like I told you the story about the guys from public television coming down and I told them, "You don't have a story here. Nobody's mentioned that flight for thirty years." And they told me, "No, we think there's a story here." Did I tell you that story?

DM:
Yeah.

JA:
That's the way we were flying things so fast.

DM:
Yeah. But despite all of this, despite this blur of activity, this flurry of activity, Chris Kraft remembered that moment enough to come back later and ask you about it. It was critical. It was critical in his mind or he wouldn't have remembered it like that or made a deal of it.

JA:
Well see, what happened is not only as I and my peers were very young in those days, Chris Kraft was very young.

DM:
Yeah.

JA:
I mean, he was thirty-something years younger.

DM:
Amazing.

JA:
And you know, one of the things I found out about being young, you don't tend to second guess yourself and look back. You get over—

DM:
I can't remember who said this. It might've been Jerry Bostick. It might've been you that said, "When Apollo 8—" When Apollo 8, you were talking about that and golly, all of a sudden,

you're talking about going to the moon? Someone said—I have the quote—someone said, "You know, we were too young to realize we probably couldn't do it."

JA:
Yeah.

DM:
Great quote. All right. Let me see what else I have here. If there's anything else. Oh, is it true that some space fan sent you their license plate with "SCE2AUX?"

JA:
Yeah, it's in my attic somewhere.

DM:
Are you serious? I just wanted to verify that that was—that that was a true story.

JA:
I need to find that thing again.

DM:
If you do, take a picture of it and shoot it to me if you don't mind. It's just such a—

JA:
I think I told you that story. This guy, he called me up and just wanted to talk. I think I told you, a lot of people just call and want to talk. He was telling me all about himself and where he was and all that and he says, "In fact, you know, you'd never guess what my personalized license plates are on my car." I said, "No." And he said, "Well SCE2AUX." Fast forward about two years after that, or at least a year, he called up and he said, "Remember when I talked to you about SCE on my license plates?" He said, "I just sent it to you." So I've got it in my attic somewhere. I hope.

DM:
Isn't that something?

JA:
That's an interesting story.

DM:
It really is because people out there were recognizing the significance. You would kind of think, well that would mostly be a mission control thing. People in mission control. Yeah, they would

see this and they would realize, but there are people out there watching this and realizing.

JA:
Well it's a famous phrase. It's kind of like, "Failure's not an option." It's kind of a—

DM:
It has become, yeah. I've googled searched it and it pops up for sure.

JA:
Yeah, somebody—let me see if I can figure out how to get it up here. Where would that be?

DM:
I'm going to borrow your pencil here a second.

JA:
[Long pause] [computer mouse clicking] Well I don't know. It's in this. I'm so disorganized.

DM:
You know, there are YouTube's titled "SCE to AUX." If you go on YouTube, there are little clips. Like there's a clip from the documentary, "Failure is not an Option." The History Channel documentary. There was an "SCE to AUX." If you put in SCE to AUX, it pops up lots of things.

JA:
This one, somebody sent me a little poster and I guess there's this phrase that's kind of going on right now that says, "Stay Calm and Do Something." You know, stay calm. Stay calm. It's getting to be a watchword, you know. This one just says, "Stay Calm and Try SCE to AUX."

DM:
Love it.

JA:
And I ran across it. But where is it? I don't know.

DM:
That sounds familiar. Maybe I've seen that too. Do you have time for a few questions about Apollo 13?

JA:
Sure.

DM:
There's—I know they were—they did a good job of making the movie, but there are a couple of things there. In the movie, they have you—I mean, you're very recognizable in the movie, *Apollo 13*.

JA:
With the little black rim plastic glasses.

DM:
Black rim glasses. Yeah. But they have you come in and say, "We have to power down," after the spacecraft is already around the moon. I was under the impression that happened before *Apollo 13* even got to the moon.

JA:
Oh yeah.

DM:
I wonder why they did it that way. Because when would it have happened? How far would *Apollo 13* have been toward the moon when you came in and said, "We need to power down now?"

JA:
Distance-wise, it was probably four-fifths of the way there. Jerry Bostick could tell you exactly. Time-wise, it was almost a day. See, because we had time to work the problem. They had worked the problem and we finally got it to power down and transfer it to the limb, and then they had time. We all went back in the backroom and I told you that story about Kranz. You can't do that. So that took a couple of hours because they had to put together a maneuver to get back on a free return.

DM:
Right. That all happened before that maneuver, right?

JA:
So oh yeah. It would have happened way before that maneuver. It happened only about an hour and a half after it hit. I've got a timeline here somewhere. I ran across it.

DM:
I wonder why they got that sequence wrong in the movie.

JA:
See, the—I'll give this to you.

DM:
Oh. You have another copy?

JA:
Well I do, on the machine here.

DM:
Okay.

JA:
See, here's where the problem happened. This is where they entered the room. Fifty-three hours into the flight.

DM:
Oh, that's excellent.

JA:
It gets real detailed here until you get over—I think I'll annotate this one. We were three and a half days from home at the time that, "Houston, we got a problem." An hour and forty-eight minutes later, they entered the ____ [1:47:01]. The SIM systems were powered down at two hours and forty-five minutes after that, which would've been fifty-five. At fifty-eight. And then they did the—here's the mid-course correction to free return.

DM:
To free return. Okay.

JA:
Sixty-one hours. See, so it happened at fifty-five. Six hours later, they did the—five and a half hours later, they did the mid-course.

DM:
Right.

JA:
And then at PC plus two, which is two hours from behind the moon, would've been at twenty-eight hours after that. So it was a day.

DM:
Yeah, okay.

JA:
You said that was in the movie or the documentary?

DM:
That was in the movie. It has—you come into the—you come in and say the power down after the thing has already gone around the moon. I watched it again.

JA:
Well the only thing—the only kind of power down they were arguing then was about the lunar module. You know, there was a big issue. The lunar module guys didn't know how far they could go and they were trying to choke the power, and the flight director and the guidance guys wanted the big power build up out of a platform. And they finally cut a deal. Gwen Money [?] cut a deal with Merlin ___ [1:48:37]. He said, "Merlin [?], if you'll let me keep that platform up and that guidance system up until we do this big speed up for home at PC plus two, I'll let you power this thing down as far as you want."

DM:
Okay. So well maybe it was about the lin [?] [1:48:57] power down then. I'll just have to re-watch that part and see, but that was a little bit confusing to me. But this will be very helpful. When all of this was—

JA:
You want the audio?

DM:
Oh, I would love to have it.

JA:
The audio.

DM:
The index to the photos.

JA:
For Apollo 12 launch.

DM:
Yeah, yeah. Now, what about—did you pretty much live up there during Apollo 13? Or did you go home?

JA:
No, I came home. I went home. I couldn't sleep up there.

DM:
You came home? Yeah, some people were sleeping in cots and whatnot.

JA:
I had an interesting characteristic. I could be under incredible stress and I could just go home and go to sleep.

DM:
Oh, good.

JA:
Now, that's—

DM:
That's good because you got real rest. So you got to eat at home, sleep at home. Good, okay. I was curious about that.

JA:
Now, of course, I spent a lot of time. I mean, we worked real hard on the sequence initially. Nonstop. And then once we started taking shape and it kind of got farmed out for other people to review.

DM:
Right, right. That was your chance to run home.

JA:
Yeah.

DM:
Okay. When they were powering back up, were you worried about the dampness in the command module shorting something out? No worries? Okay.

JA:
No. The design policy—philosophy by then, they had learned their lesson on *Mercury 9* when Gordon Cooper poured back a union—a bag of urine. Have you read that story?

DM:
I don't remember that.

JA:
Well back—the way they built the Mercury spacecraft, they didn't ever intend to invent it to vacuum a space. They just built it out of standard electrical circuitry design. You know, the wire's points were exposed and the circuitry was all exposed so if you happened to hit a vacuum, it may not survive and it also didn't like moisture. After—and so what happened is—I think it was Gordon Cooper. He mishandled a urine bag. They would store all the urine. Somehow, he ripped it. It ripped or something and it all just went right into his control system boxes. Of course, they just quit.

DM:
Oh no.

JA:
So after that, the Gemini spacecraft and the Apollo spacecraft was built to seal all that stuff.

DM:
Oh okay. No concerns about that then.

JA:
No, very few concerns about that. Now, shuttle came along and they went back to a military airplane, kind of, standards.

DM:
Oh really?

JA:
Because that's heavy. You start to see when everything—it makes things heavy.

DM:
Right, right. Now, how about when you—

JA:
I think if I was concerned about anything, it was the heat shield and the parachutes.

DM:
Yeah. Right, right. When you came in with the thirty-nine pages of procedures. I understand it was thirty-nine pages and over four hundred entries. How long was that before splashdown? Oh, maybe it's on here.

JA:
Well I don't know whether it would say the entry procedure was read up to the crew or not.

DM:
And when you walked in with that, that was the only existing copy. Is that right? When you first walked in, that was the only existing copy?

JA:
Um-hm.

DM:
That's kind of scary.

JA:
That is because in those days, it was—you couldn't make copies. You didn't have the technology.

DM:
But you did end up—when you had it all in place, you did run some copies?

JA:
Yeah. Well there were certain places you could go where there was a high speed Xerox.

DM:
Okay.

JA:
Maybe two or three at the whole center. [long pause] Uh, [pause] it doesn't say.

DM:
Okay. How about—

JA:
For that—the only way I can tell you when that was is that I remember we got those copies drawn and I stayed and that was a good thing to do because by making those copies and

distributing them to the consoles, the operators in the control center knew how it was going to happen, as well as the crew.

DM:
Right. Everybody was checking.

JA:
Everybody was checking. Everybody got educated all at once. That's very important.

DM:
Right, right.

JA:
I remember that I went home and got some sleep.

DM:
After you handed that out?

JA:
After I handed that out and wrote it out. I came back in the next morning and we started powering it up.

DM:
You think it was as much as twenty-four hours?

JA:
No. It would've been more like eight.

DM:
Between the time you delivered it and the time they started to send the procedures up?

JA:
It would've been about eight hours after they read it up. Maybe six. I went home and got some sleep and came back.

DM:
Okay. So let me get this right. You handed over the copies and another eight hours or so—six or eight hours—they started reading it up?

JA:
No, no. After—we walked in, they said, "Go make some copies." It took about an hour to do that. And then they came back and they started reading it up. Took about an hour to read up.

DM:
Right. Okay. They started right away reading it up?

JA:
Right away. Reading it up. Oh, the crew was hot to get it.

DM:
Right, right.

JA:
Particularly, Jim Lovell. I think I told you and you've run across the fact that he said, "Houston, I've got a chance. I'm looking out the window here. That earth seems to be getting just bigger and bigger all the sudden. Where's my checklist? How you coming on that checklist?" So it took about an hour and a half to read up. They ran out of paper and they ran out of places to write it down. They had to say, "Stand by. We got to find some scratch paper to write this down on."

DM:
Thirty-nine pages worth. Yeah, thirty-nine pages. Then how long—just guessing—how long by the time they powered up before splashdown?

JA:
Oh, that's on—

DM:
Oh. That is in there?

JA:
It's on that.

DM:
It's okay. Well I can find that later.

JA:
Yeah. That is about five and a half hours.

DM:
Five and a half.

JA:
Now, don't get me wrong about the thirty-nine pages. The thirty-nine pages was the complete sequence. It wasn't necessarily thirty-nine pages long because it would say, "Go to crew checklist page so and so and do this step until that step."

DM:
I see. I see.

JA:
But it still took an hour and a half to ring it up. The amazing thing is I didn't keep a copy of that thing. You can't find a copy of it.

DM:
Oh, really? You don't think there's one in existence?

JA:
Well there's a guy in Horseshoe Bay that says it's in existence, but I don't have a copy of it.

DM:
What—you know, one of the big deals was recharging the command module batteries.

JA:
Yeah, and that sequence—that time is in here as well.

DM:
Okay, okay.

JA:
Those times.

DM:
You were pretty big on getting these batteries recharged, as I recall, the command module batteries. Before reentry, you wanted them fully charged. What might've happened if they weren't at full charge?

JA:
Well I think we could've still had enough power. Didn't have any reserves. I'd have to go back

and think about that because the checklist started consuming more and more power after we got the word—we okayed more and more things to go in the checklist after we got the word we were going to charge the batteries. Battery A charge initiated. Battery A charge terminated. Battery B charge terminated. So those were the two batteries.

DM:
I was just wondering if you were worried that the shoots would not deploy if the batteries were down a little bit.

JA:
No, the pyrotechnics was powered by separate batteries.

DM:
Oh, I see. Okay.

JA:
They were not the kind of batteries you could run on. They were the kind of batteries that didn't have much capacity, but they would deliver—they were designed to deliver short intervals of very high power draw.

DM:
I see.

JA:
You know, like if—because when you fire a pyrotechnic, you're shorting them. You're shorting a battery.

DM:
Right, right.

JA:
The detonator is just a piece of fuse wire that you short it. It's like a flash bulb.

DM:
Yeah. That's why the separate batteries. Okay.

JA:
Yeah. They are designed with that.

DM:
So you didn't have to worry about that power supply.

JA:
And it wasn't usable anyway because they were no capacity of anything to speak of.

DM:
Right, right. Okay.

JA:
Yeah. Otherwise, if you tried to fire them off the bus, you'd likely cause a glitch on the____ [?] [1:59:50] because it is like a flash bulb. It just shorts the bus until the fuse vaporizes.

DM:
Yeah. I have one more question for you. Did you work—I understand that instead of Mattingly in the simulator, it was more often John Young. Is that right?

JA:
I believe it was John Young and another crewman. I forget who it was.

DM:
John Young. That's what Jerry was saying. He said it was John Young, mostly, in the simulator. Did you work with him or was he off doing his—

JA:
Mattingly was the go between.

DM:
Oh. I see.

JA:
See, I never actually went over to the simulator.

DM:
Yeah. So it was Young in the simulator, you doing your thing and Mattingly back and forth.

JA:
Telling us how it was going.

DM:
Well oh. Okay. That makes—

JA:
And he would come back and say, "This sequence is a little too tight. We got a little more time."

DM:
Yeah. Okay. Well okay. That explains it. Well very good. I'm out of questions. Do you want to add anything else?

JA:
No, that's it. I'll chase some of this stuff down for you.

DM:
Okay.

End of Recording