

**NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT
ORAL HISTORY TRANSCRIPT**

RICHARD O. COVEY
INTERVIEWED BY JENNIFER ROSS-NAZZAL
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ROSS-NAZZAL: Today is November 1st, 2006. This oral history with Dick Covey is being conducted for the Johnson Space Center Oral History Project in Houston, Texas. Jennifer Ross-Nazzal is the interviewer, and she is assisted by Rebecca Wright.

Thanks again for joining us this morning. We appreciate it.

COVEY: Sure.

ROSS-NAZZAL: I'd like to begin by asking you to briefly describe your career with the Air Force before you came to NASA.

COVEY: Okay. Well, I grew up in an Air Force family. My father was a World War II and Korea fighter pilot and then did flight tests for some period of time, so as I grew up I grew up in an environment with military aviators, and it was a logical thing for me to want to go do. So I started my Air Force career by going to the Air Force Academy [Colorado Springs, Colorado], and from there getting a master's degree at Purdue [University, West Lafayette, Indiana] in aeronautics and astronautics. And there's reasons that I did all those things, and we might want to talk about that some.

ROSS-NAZZAL: Oh sure.

COVEY: In fact, it's probably a good way to start that is why did I even go into the Air Force and take the path that I did. It's particularly applicable to this, because when I was fourteen, Alan [B.] Shepard [Jr.] made his first flight. I was enamored with the idea that men were riding atop rockets, and I consumed everything I could find about the early astronauts. They all turned out to be military test pilots, so I connected with that, because my father worked with military test pilots and was a military pilot. So at that time I started thinking that, gee, that would be something I would like to do.

I was always good at math and science in school, and so as I looked at what it looked like those original astronauts had done to become test pilots, which was largely to have a lot of flying experience, and most of them had technical backgrounds, that became a path for me to follow. The way that appeared best for me to go was to this new school called the Air Force Academy in Colorado Springs, because that just looked like the right thing.

Now, I was fortunate to get accepted to the Academy, which was a first step, and I had a very good friend of my family, a gentleman named Jack Arnold [phonetic], who was a professor at the Academy. He came to visit my folks, and this was after I had gotten my appointment, before I had gone. He came, and he sat down, and he put these brochures out there, and he says, "You need to major in aeronautical engineering, and this is why."

I listened, and the why was because the Air Force Academy and Purdue University had a cooperative master's program where you could, as a cadet at the Academy, take additional courses that would allow you to take some graduate-level courses while still at the Academy, go to Purdue University, and Purdue would accept those graduate-level courses as part of their

master's, a non-thesis master's in aeronautics and astronautics. So he went through that with me and was very pointed in saying, "This is what you need to do."

At that time the Air Force Academy didn't have majors for everybody that went. The only way you could get a major was to take additional courses. Anyway, I didn't want to graduate without a major, so I said, "Well, that looks like a good one, astronautical engineering. What is that?" So that got me started, and if I would have showed up at the Air Force Academy without that prior knowledge, I might have stumbled on that program. There were a lot of people that did. But I was ready for it, and got into it.

It required taking extensive overloads for most of the time I was at the Academy in order to be able to qualify to be considered for that cooperative program at Purdue. Actually, fifteen of my classmates were selected for the follow-on and went to Purdue at the same time. That program was tailored for Air Force Academy graduates that took the courses as an undergraduate, the graduate-level courses as an undergraduate; went, spent seven months in residence at Purdue. We gave up our graduation vacation time. All my classmates got two months to go off and party and tour the world and do whatever, and then go to their flight training, while we all went immediately right after graduation to Purdue and started school again.

But in January—following graduation in June—in January we all had our master's degree in aeronautics and astronautics, and those of us that were going to flight training already had our flight training date, and we went immediately to flight training. So, for someone that wanted to be an astronaut, being able to go through the Air Force Academy, major in astronautical engineering, and get a master's degree from Purdue in aeronautics and astronautics within seven months and then go immediately to flight training, was an extraordinary opportunity. I often wonder if I had not done that, whether I would have ever become an astronaut.

So it was a neat program, and there's quite a few other astronauts that you guys probably have talked to that have done the same thing and have gone through the same program. One of the reasons Purdue has so many astronauts is there's all these Air Force Academy guys who went through that program over time, and it added to their numbers then. So that was how I got started on this path. That's how I started my career.

I went to flight training at Williams Air Force Base in Arizona. One of the things that I have always been fortunate at is that I test well, and that has gained me advantage in different situations. Don't know if I know things better than other people, but I know I test well. So going through flight training at Williams, the idea was to be as high in your class standing as you could, because then you got more of a choice of what type of aircraft you were going to fly coming out of flight training. Those of us that were—well, I'll say almost everybody really wanted to get into fighter aircraft, okay?

It was an interesting time, because there was a lot of people coming through flight training that were draftees—this was during the Vietnam War—that were draftees who, once they were drafted, were flight qualified, and so rather than go into the Army, they were able to come into the Air Force, get commissioned—go through Officer Training School—get commissioned, and then go to flight training. But once they got there, they had very little real motivation for staying in flight training. So we started with a hundred in our class, and by the time we graduated it was sixty. We had a pretty high washout rate, but those guys then were able to go off into an Air Force job somewhere for a couple of years as opposed to going over on the ground in Vietnam as an Army guy, so it was pretty smart on their part to play that game, whether they wanted to fly or not.

But since I tested well, I was always able to maintain a high standing in academics. In the flying stuff there were a wide variety of backgrounds in flying that came into our class. I had none, zero experience, other than riding in Air Force jets in the backseat and getting a little stick time. But I had not had any flight training. One of those guys that was in our class that got drafted was a flight instructor. He had almost 2,000 hours of flying time in light aircraft. Of course, he opted to go into the Air Force and go to flight training then after he had been [drafted]. So being able to fly, I was good, but I could never be as good as he was. So his abilities from flying made it a very—all of us had a high target to try to get to.

Well, it's weird circumstances, because he winds up being the top graduate in our class, as you might expect for someone that comes in with that type of experience. But he is also one of those guys that got drafted, and so he's not real interested in going to Vietnam. It turns out that, for whatever reasons, it looks like there was going to be, for these sixty people, there's going to be one fighter, one fighter. But it's clear that if you take that fighter, you're going to go to Southeast Asia. Well, he opted not to, because he wasn't interested in that, and he wanted to go be a flight instructor for the Air Force, which left the one fighter for me.

So again, you know, the things that happen just kind of—well, they just happen, and so I got the one fighter assignment from our pilot training class of sixty people, and only because the guy that was first in the class didn't want to go to Southeast Asia. I ran into him years later, and he was flying fighters, and he was telling me what a dumb decision he had made. [Laughter] But I thanked him profusely and told him that it made all the difference.

So my first aircraft that I flew out of flight training was the F-100; it's the North American F-100. It was an older fighter aircraft at that time, single-engine, single-seat, which, that was what we all thought we needed to be flying back then, kind of on your own in the

airplane with your wing man out there in his airplane, and single-engine just seemed to imply more danger, you know, more than two engines.

So I went then to Luke Air Force Base [Arizona]. I went through fighter training, basically, in the F-100. Was supposed to go to Phan Rang Air Base in South Vietnam, and about two months before we finished, they canceled our orders because they were bringing some of the F-100s back from Southeast Asia, and they reassigned me to fly an attack aircraft called the A-37B, which was a derivative of the Air Force's trainer, T-37, and I was going to do that at Bien Hoa Air Base in South Vietnam.

That required that when I finished my F-100 training then I went and trained in the A-37 for several months before I actually went to Southeast Asia, and I went there and spent a year and flew 324 combat missions in that time period. Most of what we flew were missions over Cambodia. At the time there was a prohibition against ground forces, U.S. ground forces, in Cambodia, but we were—although classified at the time, we were providing support to the Khmer royalist forces from the air, and most of it was coming from our squadron, flying out of Bien Hoa, because we were just a little, relatively short distance over to Cambodia. I could talk for a long time about my combat experiences, but that's not what this is probably most focused on. It's more to just say I spent a year there; I did that.

Then after that I went and flew the A-7 at England Air Force Base [Louisiana]. A-7D was the first fully integrated avionics airplane that the Air Force had, and the Navy, also, in their version. That, as much as anything, prepared me for flying more modern aircraft and the Space Shuttle, from the standpoint of an integrated avionics suite. Before, the airplanes had a radio and they had a Nav TACAN [Tactical Air Control and Navigation], and they had a weapons delivery system of some kind, but they weren't integrated. They were all kind of bits and pieces.

So I flew the A-7 for several years, and during the time I did that I had a deployment to Korat Air Base in Thailand in 1973 and wound up flying mostly over Cambodia again, right up to the end in August of 1973, when we ceased all U.S. air activity, planned air activity, over Southeast Asia.

So I came back after that, and while I was there, while I was in Southeast Asia on that second time, I went over the minimum number of hours, and you've got to remember, I was always watching this stuff. I knew exactly what I needed to do to get into the Air Force Test Pilot School. So the day that I went over a thousand hours of flying time, I already had my application ready, and I attached my flight records and sent it in.

I was discouraged from doing that by my Commander and my Operations Officer, and the reason was because they thought I was ruining my career if I went to Test Pilot School. Now, these were guys who had been flying fighters for years and years, didn't have technical degrees. To them being a Wing Commander of three squadrons, Air Force squadrons of fighters, was the ultimate job, and anybody that wasn't trying to get to that ultimate job was screwed up, basically. So they leaned on me very hard not to put my application in. I felt good about it because they felt I had a great future flying fighters and being a senior officer in the Air Force in the operations business, and I still was interested in the flying, the technical aspect of things.

So I did that. I was lucky, again lucky. I got selected the first time my application was looked at for Test Pilot School. So I actually got into Test Pilot School at a relatively young age in 1974. I was just six years out of the Air Force Academy, and again, it was one of those things where somebody was in the right place at the right time. Turns out that one of the instructors at the Test Pilot School had been my aero [aeronautical] instructor at the Air Force Academy. He had been pushing at Test Pilot School to look at younger people with advanced degrees and the

right flying experience to bring into Test Pilot School so they had younger people coming through rather than—the tendency had been they were having people later in their careers, and he thought that was not the right thing to do.

Well, I was the beneficiary of having the right application in front of the board when he made that case, and again, you know, right place, right time. Having done the right things, you get lucky, and good things happen.

So at Test Pilot School, again, because I test extremely well, I managed to finish first in my Test Pilot School class, and also the flying part, I did well there, too, so I caught up with everybody. But that enabled me then to get a choice of assignments. I took a test pilot assignment at Eglin Air Force Base in Florida. Turns out that's my home town, and my parents lived there, and it was something that just worked out again.

I was a test pilot for three years, primarily doing weapons flight tests and weapon systems flight tests, but toward the end I was flying the F-15 Eagle, preproduction airplanes in the early testing—the later stages of preproduction testing. There we were doing integrated avionics testing of the F-15, primarily looking at its electronic warfare systems, and I managed a detachment of folks there that were stationed at Eglin but associated with Edwards Air Force Base [California] and the Flight Test Center there.

In 1977—again, I had been watching everything that happens with the Space Shuttle now, and in anticipation that someday they were going to select more astronauts to go fly the Space Shuttle. In 1977 that process got kicked off. The Air Force decided, as the other services did, that they would have their own selection, preselection activity, so basically we filled out the NASA application and then what else the Air Force wanted and got our Commanders to sign it and sent that to the Air Force. They went through a selection process to nominate people to

NASA, and I was selected, along with a lot of other people. A lot of other people had done the same things I had done, actually, if you looked at it, so it was always interesting and that.

As you all know, then NASA took all those applications, along with the other services and with the civilian applications. Then in late '77, starting in the summertime, they started interviewing. I think they interviewed 200 people that time. Does that sound right? Yes, I think 200. I think it was like 80 pilots and 120 mission specialists.

This was funny. When they started—we knew they were doing it. In 1977 they were doing the approach and landing tests, so everybody's getting excited about the Shuttle now. The approach and landing tests are taking place, and everybody's watching the guys flying the *Enterprise* down to the lake bed out at Edwards. So we knew that NASA was getting ready, and I had a vacation planned. I had just taken my wife and kids and put them on an airplane. They were on their way to California, and I was supposed to join them within a day or two.

I got a call, and it was from Jay [F.] Honeycutt. Jay was calling to invite me to come to Houston. This must have been like on Friday, best I remember, and he was calling and inviting me to come to Houston on Sunday or something—it may have been a few days different than that; it was very short notice for an interview. That was the first day they were calling anybody. Finally had got their list down and alphabetically they started calling people to come.

I'm sitting there. I just sent my wife out. I'm supposed to go join her on this vacation out here. I remember thinking—I mean, this was the hardest question I was going to ask. I said, "Jay, so if I said I couldn't come next week, will you invite me back another time?" [Laughs]

I later talked to Jay, and he said that he—he said, "Well, just a second. Let me check."

So I go, "Oh, no," you know.

ROSS-NAZZAL: That's not the answer you wanted.

COVEY: He told me later, he says, "Yeah," he says, "I covered the phone. I says, 'Hey, I got one here that wants to know if he doesn't come next week, if we'll invite him back.'" Because they expect that everybody will say, "I'll be there tomorrow," you know. So he came back and says, "Yeah, we'll invite you back."

Well, so I go on my vacation, and I'm going, "Oh, my god. They haven't called me yet. When are they going to call me?" So it was a terrible vacation. It was a terrible vacation.

Toward the end of it they finally called; said, "Well, we're getting our stuff together. We want you to come week after next." And I got my invitation to come for an interview. So that was one of those things. Jay and I still talk about that.

But then the interview process was scripted as a week. Medical tests. I think they told us an hour-and-a-half interview or something with the Selection Board. Boy, that's when I realized how little I really knew about the Johnson Space Center and the folks involved with the selection process. I knew John [W.] Young. I knew he was involved, because he was Chief of the Astronaut Office, and he had come over and talked to a bunch of us over at Eglin about it, and I knew him. But I remember the Sunday night we all flew in and we're going to the first meeting. We're walking up, and here's John Young standing with this guy, flattop, whatever. And I'm over there, and I'm, "Oh, Captain Young, how are you doing?" and everything, and I'm ignoring this guy here.

John says, "This is George [W.S.] Abbey."

I go, "Oh, hi, George Abbey." Then we go in and we sit down, and the next thing I know, this guy, George [W. S.] Abbey, is up there talking to us. [Laughter] And I'm going,

“Oh, my god. Didn’t start out right here.” I should have known who the big guy was. It wasn’t John Young. It was George Abbey, and I did not know that. So it was an interesting start.

But an interesting week. One of the guys was my classmate from TPS [Test Pilot School], and he had been really working and working, and his goal was to max out on the treadmill test. Everybody worried about the treadmill and how far do you have to go and is it—well, of course, all they’re doing is just looking to see if you are healthy. But, we had convinced ourselves that it was not just a medical test, it was a something else test that the Selection Committee would have access to, which, of course, they didn’t. So he went, and he did it, and he ran till they ran out of paper or something, and he didn’t get selected. [Laughs] But it was interesting.

Got to know many of the people that eventually got selected. The Air Force guys, a lot of us, we knew each other from our background. Navy guys—we didn’t know as many of them. It was all pilots that came in my group, so we didn’t get exposed to any of the civilians or the scientists and women that were interviewed that were not in our group. Then, it was go off and wait for—I think I was here in August or something, and so it was go home and wait for five months to see what happened. And nothing; there was nothing. It was real quiet during that time period.

One thing I didn’t mention, and we probably could go back; it goes back to my Air Force Academy time. One of the things I did was—again, I was kind of focused on this stuff. Rather than do some things during my summer between my junior and senior year that were Air Force related, I looked at two programs that they had offered up. One was to go to Los Angeles [California] and basically be an intern with the Air Force on their Manned Orbiting Laboratory

[MOL] Program, which was where all the Air Force astronauts were. So this was in '67, and I had been accepted for that, and they canceled the MOL Program.

So I didn't have that assignment anymore, but the people that work in the assignments called and says, "Well, look," they said—because, you know, going to L.A. and stuff sounded pretty cool. They called me and said, "We do have an assignment in Houston at the Johnson Space Center as an intern, it's in astronaut training." Well, I think they had had that one before, but given a choice, like I said, of L.A. or Houston, I had said, "I think I'll go to L.A." And it was a shorter program, but they offered that to me, and so I accepted it and came down here as a JSC intern the summer of '67.

It was right after the fire, the Apollo fire. But I got to work with the astronauts in training in a very miniscule and insignificant role, but I got down here and I learned JSC and I got to work out here for a while, which also affected my thinking toward the future.

So selection came January 1978. Being in a flight test community, a whole bunch of people were there at Eglin that had been interviewed and were waiting, and I got a call from George Abbey. My office was remotely located from the rest of the test pilots, because we had a separate detachment, and so my secretary had taken a call; she knew who was calling and then I got it. Of course, there was, "Well, okay, don't tell anybody." [Laughter]

ROSS-NAZZAL: That's got to be the worst feeling.

COVEY: Of course, I'm going to have to tell somebody, like my wife. But anyway, so Meredith is out there, and she knows I'm taking this call. She's been a part of this whole process, and so I

jump up on my desk, and I'm jumping around. She comes running. She says, "So you got picked?"

And I says, "I can't tell you." [Laughter] We had to wait till later in the day. But all the other guys over at the other side of the road in the other building, of course, everybody, they were getting their calls from John Young or whoever else was calling to tell them, "Hey, you didn't get selected," and so they immediately started calling me.

It was, "Okay, I got my call from John Young. I didn't get selected. What did you get?"

You know, I go, "Ahhh—can't tell you." [Laughter]

"Okay, thanks. Congratulations."

It was neat. There were only two of us from Eglin that got selected in that group. Mike [Richard M.] Mullane was the other, but I was the only pilot out of the pilots at Eglin that got selected, and Mike was a weapon systems test engineer, and he got selected. So at least there were two of us from there. But that was pretty neat. We got asked over here to Houston, and that was wonderful, and we came. That's when I got to meet everybody else.

I remember riding in the elevator at—I forget what they call that hotel now. It was across the street over there. I think they tore it down or something. But riding in the elevator, and Judy [Judith A.] Resnik was there, and she lost her voice. So she was going through this whole week of orientation and stuff, and she couldn't talk. So we gave her a lot of grief about that, but I do remember that.

I also remember that we were real fired up. We were going to go out with some realtors, and we went out with this one realtor, and she was trying to figure out where we might want to live and what we were going to do. And we're saying, "Well, god, I don't know really."

And she says, “Well, tell me how much you make, because that will help me.” Now, she’s thinking, “These people are going to be astronauts. They’re making lots of money.”

I remember the Mullanes were with us, and we were in the car, and we say, “Well, we’re Majors in the Air Force. We make *x*,”—whatever it was—“a year.”

She slammed on the brakes, and she turned around, and she said, “Welders make more than that.” [Laughter]

I thought, “Well, they must be well paid, I guess.” It was kind of an eye-opener in that she didn’t think much about how much we got paid. And it didn’t get any different.

So anyway, so that was the selection, and then we had about four or five months before we actually moved here in June, I guess, of ’78. That’s sort of my Air Force career and getting selected, through there.

ROSS-NAZZAL: Let me ask you a couple of questions, go back. Where were you when Apollo 11 landed?

COVEY: I was in flight training at Williams Air Force Base, and I remember it. I was a water skier and had bought a little boat that I drug up into the mountains east of Phoenix [Arizona] to the lakes that they had up there. On that day a friend of mine and I had driven up to Apache Lake, a relatively remote lake, but I knew the times when everything was supposed to happen. So at the time of the landing we came in off the lake, and I went and turned on my car radio and listened to it on a car radio, okay? That’s actually where I heard, “Houston, the Eagle has landed.” And I’m sitting there laying on my horn. There’s nobody out there. We’re out there in the middle of nowhere, just two of us.

Then I said, “Okay, that’s it. We’ve got to pack up and get back down before they come out.” And we did. We got back down, and I was in our bachelor officers’ quarters at Williams Air Force Base, watching the really flickery black-and-white telecast when they came out and did their spacewalk there, or moonwalk. So that’s where I was. I remember it very specifically, as most people would.

ROSS-NAZZAL: What an exciting moment. Was there a lot of discussion amongst the fighter and test pilots about the possibility of being a Space Shuttle astronaut at some point?

COVEY: Yes. Not so much in the fighter guys. They were focused more on—95 percent, maybe more, focused on operational flying in the Air Force. A lot of them didn’t have technical backgrounds, so it was a smaller number that were interested in being test pilots and doing that. So in that group, no.

But in the test pilot group, yes. I would say half of my Test Pilot School class applied to be astronauts. I’m almost certain of it. It may be a smaller number than that, but probably close to that. That includes the flight test engineers and the pilots.

I think I was the only one besides Ellison [S.] Onizuka. Ellison, “El,” was in my Test Pilot School class of flight test engineering, so El and I were the only two from our class that wound up being selected. So, yes, I knew El. Of all the people in the class of ’78, I’m trying to think if I’d known anybody longer than I had known El. I don’t think so. Steve [Steven R.] Nagel. Steve Nagel, I did, because we flew A-7s together.

ROSS-NAZZAL: That’s a nice connection.

COVEY: Yes. Yes. I have to go look at the list sometime and see if there's anybody else that I knew before then.

ROSS-NAZZAL: One of the things I know that was involved in the interview process was writing an essay on "Why I want to be an astronaut." Do you recall what you wrote?

COVEY: No. It was about that much, though. [Gestures]

ROSS-NAZZAL: Okay. [Laughs]

COVEY: But I don't. Duane [L. Ross] didn't keep that stuff, did he? [Laughs]

ROSS-NAZZAL: Well, if he did, I haven't seen it. That might be kind of interesting to read some of those.

COVEY: Well, I remember reading some during the astronaut selection process, but until you mention it, I didn't even remember writing my own. I know I did. [Laughs]

ROSS-NAZZAL: Where did you eventually end up settling when you moved to Houston?

COVEY: We bought a home in Brook Forest here in the Clear Lake [Texas] area. It was under construction at the time. We looked around, and our kids were young. It was close to what

everybody was telling us was a very nice elementary school, and it kind of looked like a nice place to go. It was one of the newest communities at that time, and so we were able to do that.

I remember my wife had planned on working. She was a dental hygienist, so she was planning on resuming work when we got to Texas. In fact, she still gives me a lot of grief about the fact that in anticipation of maybe being selected to be an astronaut, I had her go and take the boards here in Texas as a dental hygienist, and it was either in '76 or '77, one or the other. Well, it would have been probably the latter part of '76. So she had gone and already gotten her license so that when we got over here she'd be able to start working. And she still says to me, "You were awfully smug."

I said, "No, I was just always being prepared." [Laughter]

So we had looked at some homes, and the one we bought was more expensive than we could afford, so she had gone from working two days a week up to about four days a week by the time we—and I remember her calling me. I was off in meetings or whatever, and she says, "Okay," she says, "I already got the job, and I'm going to work four days a week, and we can go do this."

"Okay." So we bought more house than we could afford, which was classic, right? But we did that.

ROSS-NAZZAL: Why don't you tell us about your first few days in the Astronaut Office, and also the reception of these older astronauts to the younger astronauts coming into the office.

COVEY: I really don't remember much about the first days there. I do remember that the remainder of the Apollo, Skylab, the MOL guys that were in there, was a pretty small group. I

never felt like they saw us coming in as “Oh, my god, we’ve got more people than we need,” okay? I’ve seen that since then, as the Astronaut Office has gone through huge swells and stuff, but I didn’t sense that from them. I got the sense that the twenty-something of them that were still in the office were looking forward to some additional help. We seemed to be welcomed very graciously, particularly by the MOL guys, the Bob Crippens [Robert L. Crippen] and Dick Trulys [Richard H. Truly] and folks. They really embraced our arrival, and I always felt like they felt like they needed more people to do the work for the office and getting ready to fly.

ROSS-NAZZAL: Who did you share an office with when you got to the Astronaut Office?

COVEY: “Ox” [James D.A.] van Hoften was my officemate for, well, probably the first five years, I want to say, up till the time he went off to train for his first flight. Then we wound up flying together, so we went back and had an office together. I don’t know if you all have done an oral history with him. You need to go track him down. He’s retired now out in California.

But he was just a terribly interesting person to me. One, he was bigger than the rest of the guys. Two, he had been a Navy fighter pilot and then had gone and gotten his Ph.D. after that and was a professor down at the University of Houston [Houston, Texas], doing research on putting artificial hearts in calves and stuff like that. I’m just saying, “Okay.” So there’s some really interesting people that aren’t test pilots that are part of this class. Of course, he was a mission specialist, but because of his flying background, he was checked out and flew the T-38s like the rest of us did back in those days when the mission specialists that had the right flying backgrounds all flew. But we roomed together for a long time.

ROSS-NAZZAL: Your class called themselves the “Thirty-Five New Guys.” Do you recall who coined that phrase?

COVEY: I don’t. Of course, you know, it came from the military side of things, so it was somebody on that side, because it came from FNG. Okay? “Friendly New Guys,” right? [Laughter] And so it became TFNG, and we accepted that. We thought that was a great one. [Laughter]

ROSS-NAZZAL: Well, your class was the first to include women, and a couple of the people that we’ve talked to from your class talked about how this was the first chance that they’d had to work with other professional women. Since you were from a military background, was this your first opportunity to work with other professional women as well?

COVEY: Actually, it was my second opportunity, and that was because in my Test Pilot School class, we had the first woman flight test engineer, Leslie [F.] Holley at the time, now Leslie [F.] Kenne, retired three-star general. She was awesome. She was a Maintenance Officer of an F-111 squadron, Auburn [University, Auburn, Alabama] graduate, aeronautical engineer. So, I don’t know, maybe the same thing, getting the young people, younger test pilots, they were getting a lot of young flight test engineers, and she came in as the first woman. So, we got to work with her—it was different—and fly with her.

So I still have pictures, and Leslie and I laugh about it whenever—she had long, blonde hair. It came down her back, and she always wore it up under her hat, but when she went to fly, she had to put it down inside her flight suit. I took her on her first F-4 flight. We went out, and I

took a camera, and I've got these great pictures—still have them—of Leslie out there on the flight line, which was very unusual to have a woman on the flight line, much less to have one that was going to crawl in and go fly in the Air Force's jets.

So I had had that experience working with Leslie, professionally in that environment. So I don't know how much that helped me or didn't help me in dealing with the women in the class. You know, the women in the class of '78 were all so proven professionals that they were easy to deal with; a novelty to go fly with and do things that we just hadn't done a lot with women before.

ROSS-NAZZAL: Why don't you tell us a little bit about the training that you participated in as an AsCan [Astronaut Candidate]?

COVEY: The things I remember about the AsCan training is that it was as much orientation as it was training. Seems like we were always on road trips and going to NASA Centers or to NASA contractors. I just seem to remember more about those events than I do a lot of the classroom stuff. Obviously, the classroom activities were focused on orienting us to the Space Shuttle and to JSC and to mission operations and all the aspects of human spaceflight that we would not have had any background in just coming in cold.

I also remember they used to bring in former astronauts that come in and talk to us about the good old days, and even some of them talking about how you've got to think about what you're going to do next, which was interesting. Yes. At that time most of us, when we came in from the services, it was a seven-year assignment. We expected two years of training, five years of flying—maybe ten missions in five years—and then we were going to be on our way. That's

where we were in 1978. [Laughs] Then we'd return to the service and that. Well, in reality, I didn't fly until seven years, so it was different, a different environment after we actually got into it.

ROSS-NAZZAL: Why don't you tell us about your mentorship program with Ed [Edward G.] Gibson. I saw that you had a three-month on-the-job training experience with him. How did that work?

COVEY: I had to think about that when I saw it on here. Ed was like the chief keeper of the scientist-astronauts or something. I didn't know if that was the mission specialists, scientist-astronauts or what. So my recollection was, "Gee, I'm not sure why I'm being assigned to go work with this scientist guy. We're pilots." [Laughs] Ed was wonderful. I can't remember what he had me do during that time period. I do not remember. Like I say, sitting across from the table with Ed and talking about it, whatever it was.

ROSS-NAZZAL: Your biosheet indicates you worked on Orbiter engineering development and testing before STS-1. What did that involve? That's kind of a broad focus. What did that involve?

COVEY: Mostly what it meant at that time is working either in the Flight Simulation Laboratory out in Downey [California] as a crew member pilot, or in the SAIL [Shuttle Avionics Integration Laboratory] even here in Houston. It seems like most of the time I spent early on in that was

working on the entry dynamics area, which was all being tested out at the Flight Simulation Laboratory—FSL, I think is what we called it—out at Downey.

So it involved a lot of trips out there. It involved a lot of sitting in simulation runs as the crew member, activating the right switches; looking as a test pilot at the responses of the vehicle as they would change the aero environment and the aerodynamic responses of the vehicle in the simulation, trying to envelope what they thought they were going to see on the first flight during entry. So it seems like, as I recollect, it was primarily focused around that. That translated then into doing similar types of activities as the crew member participating in testing in the Shuttle Avionics Integration Laboratory here at JSC.

It was interesting. I was out in my current position going around and visiting our USA [United Space Alliance] folks that run the SAIL out there, and they actually pulled out some of my log entries from back in the early eighties or whatever, and I thought that was funny that they were in there and did that.

So that was what that was primarily focused on.

ROSS-NAZZAL: How much time would you spend in SAIL or FSL if you were running a test?

COVEY: We generally covered a shift, and the shifts, as I recollect, we ran two shifts in SAIL, and I think we ran two shifts out at FSL, also. So it could be a morning deal or it could be the middle of the night. It seems to me the shifts may have been twelve-hour shifts. I don't recall. But I remember many nights out in California sitting there and finishing at four or five in the morning, and then going back to a crummy little hotel and trying to sleep during the day so I could go back and do it at night. Seems like we'd do that a week at a time or so, go out there.

ROSS-NAZZAL: Who else was involved in this type of work that you worked with?

COVEY: Bob [Robert L.] Stewart was. Ox van Hoften was. In the SAIL activity, Brewster [H.] Shaw [Jr.] was. There were others. I can't remember.

ROSS-NAZZAL: Oh, sure. It's been thirty years. Well, some of the other things that you worked on, you were working in CRT [Computer Response Time] verification. Can you tell us a little bit about that?

COVEY: Yes, a lot of that had to do with, you know, the displays were all being developed for the Shuttle, and so as a way of verifying the crew interface, which was through the CRTs, then we would run a subset of tests, basically where we would go in and go through all of the functions and entries and stuff on a display to see if they would be accepted and then if the right response would get into the software, okay? So it was a narrower part of the overall software testing that was focused on the crew interface.

And lots of times we did that in the simulators, because we wanted to make sure that what was happening in the simulators was the same thing that was happening in the Avionics Integration Lab; that there wasn't somehow between the two systems changes that happened or didn't get transferred over. Because the simulators ran on their own software loads, and so there was always the chance that you could have something that was different than what the real flight software would do.

ROSS-NAZZAL: You were at JSC for the—well, I don't know if you were at JSC at that time for the flight, specifically—but for STS-1 I've heard that everyone had an assignment. What was your assignment for that flight?

COVEY: Well, leading up to STS-1, I had been working with the backup flight software folks as the Crew Office representative to the—what did we call the—the Program Office. But they had responsibility for backup flight software as well as the primary flight software, but the primary flight software was being developed by IBM [International Business Machines]. Backup flight software was developed by Rockwell at Downey. It ran on one machine, and the primary software ran on redundant machines. That was the design.

So as things evolved leading up to STS-1, in some ways the backup had more capability, because it didn't have to use as much of its 128K memory to keep up with the redundant set; which was a tremendous burden on the primary flight software, is that so much of the computing capability was just to make sure these things stayed synched up. So that left a little bit for applications. The backup didn't have to do that, so it had more capability for applications. It was interesting, and that's why some things had shifted over to the backup. Ascent trajectory displays, really key pieces of software, were over in the backup system and intended to be used as a primary reference.

That's changed now. Over time the primary computers have more capability, and so now they have added all kinds of applications and real functionality in there that didn't exist to start with. But we're pretty skinny initially in the primary software set of backup.

So I worked with those folks, which meant looking at all of their FSSR requirement, the Flight Software System Requirements, FSSRs, the changes of FSSR, the way those were

boarded. Went through boards, being the crew representative to that. Looking at the verification testing that was being done, and validation testing being done on the backup flight software, and following how that was progressing. So because of that, then I was in the control room in the SPAN [Spacecraft Analysis Room], actually, for STS-1 as kind of the crew BFS guy.

ROSS-NAZZAL: BFS?

COVEY: Backup flight system. Backup flight software, BFS, yes. Yes. So that was my role there, so that's where I was for STS-1. It's just off to the side of the FCR [Flight Control Room] in the Mission Control Center, but back in a little room that was SPAN at that time. One of the interesting things, talking about the backup flight software, as we got smarter in preparing for STS-1, and of course, at that time John Young and Bob Crippen were the primary crew, and Joe [H.] Engle and Dick Truly were the backup.

The crew, as they saw more and more in simulation, the capabilities that the Shuttle had, were very interested in finding out a way to be able to abort downrange, as opposed to doing a return to launch site. So those were the initial look at what are called TALs now; initially they were—well, they changed the acronym. They kept the TAL, but it started out as something, you know, like Transatlantic Abort Landing, and maybe that's what it still is, I guess. I can't remember what it was. But the crew, and Joe Engle and Dick Truly, and Dick Truly is really the driver on this, and Joe Engle was the stick-and-rudder guy. Engle was the guy trying to figure out how do we make the software work.

They had figured out that at a certain point they could fly straight ahead with the Orbiter, and they could figure out how to get off the tank and fly a trajectory, but they didn't know where

they were going. There was real limitations on both the primary software and the backup as to the number of landing sites that could be coded in for any mission, and they were all coded to be [Kennedy Space Center] Florida, White Sands [Space Harbor, New Mexico], and Edwards, and there weren't any other landing sites in the table, landing tables.

Well, Dick and I sat down and talked about what we could do in using the backup flight software to enter some type of information that would provide them at least some type of guidance to a landing site, as opposed to just trying to fly and find it. What we came up with was—and I went out and worked with the Downey folks—was to come up with the code locations where the coordinates for one end of one of the runways was, and find a way to be able to do a real-time read/write to that location and enter coordinates for a site in Africa.

So I went out and worked with them. We figured out how to do that. Basically, the idea was Truly was going to carry these addresses, and then the right coded numbers for a lat/long [latitude/longitude] for a end of a runway, okay? The runway wasn't going to be lined up right necessarily, but it would at least be there, so the guidance would kind of get them to that. Then that would be, when they declared an abort, then they would go in—he'd go in and do a read/write to the backup and enter those, by hand, enter those numbers in there, and that would give them something to steer to.

That was how we did the some of the first TALs in the simulator was using that. The idea was that they would do that for real if we needed to. Well, as it turned out, by the time we ever got to the point where we thought we had to use the TAL, they would do a TAL, they had figured out a way to preload that data in there, initially in the backup. I still don't think they had the capability in the primary flight software to do it, but the backup did. The backup had

everything in one load. It didn't need to go through all these transitions and dump one load and reload entry and things like that. That's why it was simpler to do.

But that was fascinating to see it. So many things were happening with the entry planning and stuff. Yes, there was existing capabilities. The RTLS [Return to Launch Site] was the primary abort mode, and Abort Once Around was the next one—well, something in between. Basically, the crew pushed hard enough, saying, “We can fly this thing, so give us someplace to fly to.” Those guys really pushed it to the point where it became a capability.

Now it's, shoot, so ingrained into the software and everything, but it wasn't part of the original thought process.

ROSS-NAZZAL: That's great. That's a story I've never heard before. So tell us what was going on in the SPAN at the time that you were there for STS-1.

COVEY: Of course, there weren't any problems with the backup flight software. I believe that the problem that we had that scrubbed the original launch was the redundant set problem, that complicated pass stuff. I believe that was it. I'm trying to remember back.

It was pretty exciting. Everybody's gone through a lot of simulations. We had sat back there during the integrated simulations and then done some of that, so a lot of it was not new, but the whole anticipation of a real launch was definitely there. Lots of doughnuts being consumed.
[Laughter]

ROSS-NAZZAL: So what are your memories of liftoff then?

COVEY: I was holding my breath that it would hold together and actually work. I mean, you know, there's all the testing and everything, and still, you know, you put that together, and it was such a different structure for something to fly, with this big thing hanging off the side of a tank, solid rocket motors and everything. I just held my breath. Still do. [Laughs]

ROSS-NAZZAL: Where were you when they landed?

COVEY: I think I was back in the control center for landing, again in the SPAN, but I remember that, and I remember everybody pouring out, waving their flags or whatever.

ROSS-NAZZAL: Now, I understand you were a chase pilot for the next two missions. How did you get that assignment?

COVEY: You never know. Never knew for sure what was going to come down the road next with Mr. Abbey. After that they kind of juggled the assignments around a little bit. Jon [A.] McBride had led the chase team for STS-1. "Hoot" [Robert L.] Gibson had flown with him as one of the—I think there were four chase pilots. Maybe there were three, three or four. It may have been three. So Hoot had gotten bumped up to be the lead chase for STS-2, and I got named to his team. There was three of us; I'm trying to remember who the other one was on STS-2. I have to think about that. But then I got bumped up to be the lead chase for STS-3 is the way that worked.

That was a premier assignment. I mean, that's getting out there and doing that airplane stuff and flying around with the Orbiter; being airborne at launch in case they have to come back

and land, and joining up with the Orbiter at landing and coming around. That was pretty neat stuff, and everybody wanted to do that. So I felt very fortunate that I got the opportunity to do that.

It was fun. What we did was we just went all over the country flying and training. The way we trained is that we would use one T-38 as the target, and then the other two guys would practice joining up with them. We always worked with ground controllers. It was a ground-controlled rendezvous, intercept to rendezvous. We didn't have a radar or anything in the T-38, so very specific ground tracks, timing of where you were in turns so that when Orbiter got to the right place, you could go and get on it.

We worked with the guys at Vandenberg Air Force Base [California]. The range control there were the ones that actually controlled the intercepts over Edwards, and then it was the guys down in Florida that did it there. Then at White Sands, I think it was also the guys out at Vandenberg that controlled them at White Sands, Frontier Control. I'm pretty sure they did both of those, and they didn't do Florida. Florida was the guys in Florida.

So we had to be ready to chase to a landing in Florida, chase to a landing in California, in Edwards. We'd load up the airplanes. We had mission specialists who flew in the backseats. For STS-2 Jeff [Jeffrey A.] Hoffman was my backseater for STS-2, and then Ron [Ronald E.] McNair was my backseater for STS-3.

So, yes, I think, particularly for STS-1, as long as it went, everybody looked at Jon McBride and Hoot Gibson and the chase team guys, it was like, "How did they get this job?" And it lasts forever, you know, they get to go do that. So everybody always looked at the chase team as being a really good deal. It was. It was. We got priority on T-38s, and we were always

flying. Got extra flying time, and we'd fly all over the country, like I say, to those different locations to train on a regular basis.

So STS-2 then, my role was to be at the alternate landing site, or the abort site. So for STS-2 Jeff Hoffman and I were out at El Paso [Texas] and airborne or ready to get airborne should they Abort Once Around to White Sands on launch. Then for landing day we were at El Paso again in case they switched from Edwards to El Paso, or to White Sands, for landing. So although we trained for all the activities, the actual day of launch and landing, we weren't at the same site as the other guys were. They were all off doing that.

So then for STS-3 when I became the lead chase, STS-3, of course, was Jack [R.] Lousma and [Charles] Gordon Fullerton were the crew. Guy [S.] Gardner was one of the pilots and Bryan [D.] O'Connor was the other pilot, so three of us. Like I say, Ron McNair was my backseater, and I don't remember who the other guys' backseaters were. But it was fun. The chase team would, like I say, go off and so we got to do that for another six months or however long it was between flights. So by the time it was all done, I'd been a chase pilot for a year almost, I think, and that was pretty neat.

But STS-3 landed at White Sands, and although we had trained there, it wasn't preferable. It wasn't a preferable landing site or one to chase to. The reason I didn't like chasing there is because on a lake bed area around the runway, not too far off from it, they had telephone poles, okay? So, yes, the runway is marked, but the chase pilots, you like nothing out there in front of you, and I always worried about those telephone poles or whatever they were that were sitting out there, standing out there.

But launch, we were airborne for launch. That was wonderful. You're right over, basically, just south of the launch pad in a little holding pattern, so you get to see the launch from—it comes through your altitude and keeps on going. It's pretty neat.

Then we wound up at White Sands at the end of the mission, chasing that around. The other thing that was different, and it's the only landing that we've made in the Space Shuttle, is that because the winds were relatively high, they decided to have them do a straight-in approach, which makes it much more difficult for a rendezvous and join-up for chase. Instead of flying in overhead and heading in an alignment circle, coming over the field and making a big turn, like they've done on every landing other than STS-3, they brought them in and had them turn in to landing, and it was less than ninety degrees turn that they had.

So we had to try to find some way of intercepting them out here. When they're in a turn, it's easy, because they're turning and you can turn with them, and just the dynamics of flying rendezvous when the target is turning are a whole lot easier than when it's just going straight.

So it also meant that they were going relatively fast because of the winds, and because of the difficulties in the join-up and everything, we came in, and we had brought Bryan over from Edwards or wherever, because we knew the only place we were going to land is at White Sands. So we had all three of us there, and we were all airborne and ready to go and do it.

They modified the T-38 landing gear doors so that you could cycle them at a higher speed, and then you also could fly at a higher speed with the gear down than what the normal T-38 did. So ours were specially modified for that to allow us to lower the gear at higher speeds at high altitude, when you don't normally lower landing gear. We had to lower the landing gear in order to match the drag of the Orbiter, okay? So I just remember on STS-3 as we were trying to do the rendezvous, we're coming in, and we have to have the landing gear down before we join

up with the Orbiter, because we'll never be able to stay with it. We'd just go [imitates sound] right on by it. You know, it's so draggy.

We got the gear down, and we were just really having to go as fast as we could to join up, and we went over the gear limit, went over the—I think it was 320 knots or something, and we had to go fly. I knew we had gone higher than that, and as it turned out, after we'd gone and chased and were heading back to El Paso, I made some comment. I said, "Hey, I saw a lot of air speed on the gear." Guy Gardner came in, and he had seen 10 knots more than me, and then Bryan had seen 20 knots more than me. And we're all thinking, "Okay."

Well, it turns out that the guys in El Paso are listening to us, so when we got to the—they grounded our airplane. [Laughs] Fortunately, we had spares, and so we got to take the spares and go home. But I was not looked at nicely about having gone too fast.

Also, it was interesting, STS-3, one of the test objectives was to leave it in autoland as far down as they could, which is really poor planning and probably dumb. With the Orbiter, I've always said autoland is a farce, because you have no way of going around if something's wrong. The only thing you can do is for the pilot to jump in and take control. Well, if the pilot's going to have to jump in and take control, he might as well be flying it all the way down to start with. But they wanted to test this, and so they had talked Lousma and Fullerton into letting it stay in autopilot all the way down to below—I want to say 200 feet. So the first time that poor Jack gets on the stick is down here at 200 feet. Well, that's really stupid.

So he goes [imitates sound] down to the ground very fast, very quickly, but holds it off long enough. Still lands a little fast, and then as he's going down the runway, he gets to the point where he's supposed to do his derotation, and he starts, but he thinks it's going too fast, so he

pulls back on the stick. So he goes [imitates sound] and the nose comes back up. If you've ever seen the STS-3 landings.

Chase is supposed to be calling out altitudes, and I'm sitting there. First off, they come down to the ground so fast I go, "Fifty, twenty, ten, three, two, one," you know. Okay. Then he started derotating, and I started calling how high his nose gear was to the ground, and the next thing I know, it's going back up. I didn't know what to do. I said, "Okay." [Laughs] "I'm obviously not much help here." It was interesting.

But anyway, it was exciting to get to do that. It was being right directly involved in the recovery operations from that standpoint. We did manage to overspeed the landing gear. They were fine; the design factor is well above that. But it was an interesting experience.

ROSS-NAZZAL: Did you land then at White Sands after the Orbiter landed?

COVEY: No.

ROSS-NAZZAL: Or you went back to El Paso.

COVEY: Went back to El Paso, right. Right. We didn't want to land at White Sands. You don't want to land a T-38 at White Sands. You don't want to land anything at White Sands. [Laughs] The Orbiter wound up sitting out there for a month and got so much sand in it that I don't think they ever got it out.

ROSS-NAZZAL: Your next assignment, according to your biosheet, was you were a support crewman for STS-5.

COVEY: Yes.

ROSS-NAZZAL: Can you tell us about that and what that involved?

COVEY: There had been support crewmen for every spaceflight all the way back to whenever, as best I can tell, and a support crew goes beyond the backup crew. Backup crew members might be doing all the same training and preparation, but the support crew basically is to be there to be the eyes, ears, and arms and legs for the crew when they're in training and can't get other things done.

So, like working changes to their checklist. They've got to go off and do training. They can't go work with the Crew Procedures folks or whatever, so support crew go and work those changes with them. They may need representation at a board or something to make a point, to make their position known, so the support crew could go do that. Like I say, the nice thing about it is you get to work very closely with the crew before they go fly. So you learn a lot. You learn a lot about their training.

That was an interesting crew, because STS-5 was the first four-person crew, so Vance [D.] Brand and Bob [Robert F.] Overmyer were the pilots, and Joe [Joseph P.] Allen and Bill [William B.] Lenoir were the mission specialists, so they were going to be the first mission specialists to go fly. And you know Joe; working with Joe, that was the first time I ever really got to work with him. I'd known him for years there in the office, but didn't get to work with

him directly. That was wonderful, because some crew members are a little more insightful and intuitive and understand how to use their support crew better than others. Joe knew how to use us, and so it was fun to do that.

I don't remember a whole lot about the specifics of the things that I did, other than it was another one of those jobs where it was nice to have, going and working with those guys.

ROSS-NAZZAL: Let me ask you a quick question, and then we'll change the tape. When you came out in '67 you said you were working with some of the astronauts in training. Was he one of the astronauts you had worked with, since he was selected in '67?

COVEY: No. He had just came in. Of course, the Apollo 7 guys were the ones that were in primary training and the ones that, if I went over to the simulator to sit over there and take notes and abuse and stuff and write it down, they were the ones that were in training during that summer. There were others in the office that I got to know, primarily because they knew that—you know, there were some Air Force Academy guys around. Jim [James A.] McDivitt was the one I remember the most in doing that at that time.

ROSS-NAZZAL: Well, why don't we stop and take a break, and we'll change out the tape.

COVEY: Okay.

[Tape change.]

ROSS-NAZZAL: So we were going to talk about your CapCom [Capsule Communicator] duties first.

COVEY: Okay. Do you need to say anything so you know what tape this is or anything?

ROSS-NAZZAL: No, we've got that.

COVEY: Okay. Part of my support crewman duties for STS-5 was I also got to be a CapCom for STS-5, and specifically, which makes sense to some degree, I was on the planning shift, which was the off shift, and of course, then we didn't have any TDRSs [Tracking and Data Relay Satellites]. There was very little ground coverage during the planning shift's activities. The Flight Director for that, the first one I worked with, was [Gary E. Coen]. ... He was planning shift Flight Director. It may have been his first one.

Planning shift was always—I mean, it was so quiet. There weren't a whole lot of problems that were being worked, and we were basically getting the—spent all our time working with the Flight Activities Officer getting the messages ready to go up to the crew when we could wake them up, which, of course, at that time was a teleprinter. So everything had to be put into the right format to send up to the teleprinter, and then you didn't want to start until an hour before the crew wake-up time, because teleprinters are very noisy. It would sit there and start going clack, clack, clack, clack, clack, clack, clack, clack, you know, and it would just type this stuff out, and as I found out later, it's just this arc of paper coming out. There's this pile of yellow paper all over the place with the messages.

Then crew would take those and cut them up and paste them into their checklists or into the Flight Data File, wherever they needed to put it. So our job, basically, was to make sure that all the changes that they needed for the next day were done and ready to go, and then get them uplinked, verify they were on board and that was it.

So it was interesting. It was a fun way to get to—again, from the support crewman, I had been working with the Flight Activities Officer already relative to the Flight Data File and the other activities, so it was a natural thing to go do. Exciting to be in the control center and do that. CapCom was another one of those jobs that if you had a hierarchy of jobs people wanted, either being a CapCom or, for the early flights, the chase guys, was all part of that. They were good ones.

ROSS-NAZZAL: You mentioned waking the crew up. Did you get to select the music that was used on board?

COVEY: Yes, I think that we did. As part of the planning shift, we were the ones that selected the music. We always had an interesting debate over that. I can't remember about what it was; but that was also a support crewman role was to make sure that the planning team had the right music to wake the crew up with. So it was all kind of tied together there as the support crewman and CapCom on the planning shift.

ROSS-NAZZAL: Then you served as the CapCom for the follow-on mission, STS-6.

COVEY: Right. STS-6, I was the ascent CapCom for STS-6, back then very specialized, largely due to the high number of simulations in the training load, not so much with the actual flight load. But there were so many ascent simulations that they kind of dedicated ascent CapCom to those and had somebody else that was the entry CapCom. After that we kind of put them together, ascent and entry, later on. But early it was ascent-specific.

Flight Director for STS-6, ascent Flight Director, was Jay [H.] Greene; it was his first ascent plan so we worked together. Jay and I worked together as CapCom and Flight Director for STS-6. That has significance in that we worked together again for one other flight, which was the *Challenger* accident. It was our last time either of us was in the control center. But we started together, and we ended together.

So that was in preparation to become a pilot-astronaut or PLT or Commander, being involved in the control center during the ascent training and stuff was extremely valuable. Everybody wanted to be a ascent CapCom, everybody, and I was lucky to get to go do that for STS-6. Don't remember much else, other than a lot of training and being there during the ascent, which went pretty nominally.

Then I think I went to the planning shift again. [Laughter] Because I think that's what happened to the ascent guy then is I went to the planning shift. I remember working with Gary Coen, and it must have been STS-6 that I worked with Gary.

Back then you could smoke in the control center, so Jay smoked. He smoked a pipe, usually, so he always had his pipe there, but he also smoked cigarettes. Then Gary Coen was a cigarette-a-minute guy. So CapCom sits on the right side of the space between the two consoles, and the Flight Director sat over there, and his ashtray was right there. It was always just full of

cigarette butts. Whenever we'd get into any critical part of flight, man, it was—I just remember that. [Laughs]

It was interesting to see that change. I remember the first time at JSC when I saw a smoke monitor out in the hallway, when they finally started trying to figure out, "Gee, is there smoke here?" Yes, there's smoke here. And now nobody can even think that you would sit around in your office and smoke over at JSC, much less in a meeting room. Everybody was with their ashtray, sitting there smoking away, and the control center, smoking away. Changing times. [Laughs]

ROSS-NAZZAL: Yes, that's an interesting cultural study in itself, I would think. I wanted to ask you something before we talk about your first flight. You mentioned that a lot of people wanted to be the chase pilot and a lot of people wanted to be CapCom. Was there a lot of competition in your class for flights?

COVEY: Yes. Yes. You know, thirty-five people, fifteen pilots, twenty mission specialists, you know, you could sit there and you could say, "Gee, it's going to take a long time for all of us to get into the right seat as pilots." So, yes. John Young and George Abbey cooked up the crews. I look at a lot of them and, in retrospect, they did it with incredible insight. It wasn't always easy to accept the choices that they made, but they seem to have done that well. The guys who got the early assignments, of course, everybody was very envious of the fact that they did that. We were glad they were getting the opportunity, but we would have liked to have been there, too.

So the first people from our class started flying STS-7. Rick [Frederick H.] Hauck and Dan [Daniel C.] Brandenstein, [STS]-7 and [STS]-8, and I think Brewster Shaw, [STS]-9 kind of

started filling the pilot positions. The MSs [Mission Specialists], they went from thinking they were just going to fly two MSs on a mission to three, and so all of a sudden they started getting a lot more opportunities, which was good.

But as the Shuttle Program started stretching out and the flight opportunities started stretching out, it became obvious it could be a long time. Two of our pilot classmates actually flew as mission specialists first, Dave [S. David] Griggs and Steve Nagel. I think both flew as mission specialists, just because of that. I got the distinction of being the last person in our class to fly.

ROSS-NAZZAL: Were you really.

COVEY: Yes. [Laughs] You never know exactly what was going through the minds of the people that put the crews together, but in retrospect I got an extraordinary opportunity to go fly with Joe Engle and with my good friend, Ox van Hoften, who, you know, we'd sat in an office for a while. It was his second flight. I was getting to fly my first flight. But I got that distinction, and that was hard. It was hard.

When they finally made all the final assignments, and I was actually in Germany when George called me. Yes, I was in Germany; I was on vacation in 1983. George called and, I had in my mind that I was going to get an assignment, going to be pretty quick, right?

Well, when he told me which one it was, I kind of went through the math and everything, and it was way out there. It was 1985 sometime. So at the time I didn't realize I was going to be the very last one. [Laughs] But I knew I was going to be somewhere down there, and so that was hard. That was hard to take.

And then I was over in Germany, and I couldn't figure out a lot of stuff. I finally wound up getting back, finding out who all the crew members were and seeing how that—then it's a matter of, "Okay, I can accept that. I'm going to get my opportunity to fly, and I'm going to get to fly with an icon, and I will learn a lot from that," which I did. Which I did.

So we started out, I think we were first—we first were supposed to fly in early '85. The first mission that we had was going to be to fly a TDRS satellite up. There were two TDRSs that were supposed to go in that time period, and we had one, and Rick Hauck's crew of [STS] [5]1-A had the other one. It turned out neither of us flew a TDRS mission.

But that was the first one, so we started out training for a TDRS deploy, which actually is a pretty pedestrian type of Space Shuttle mission. Big, heavy payload, but you fly up, and you crank it up and [imitates sound] it's gone, and then you spend a couple of days, and you come home. It was a mission, but not one that we were all jumping up and down, saying, "Yeah, we've got the best mission out here."

Well, things change, you know. There was a lot of dynamics going on in the Space Shuttle Program at that time, and opportunities got created. For one thing, as things slipped out or whatever, then they changed. One of the missions, Dan Brandenstein's mission, I think, and I can't remember the number, was supposed to deploy the Long Duration Exposure Facility [LDEF], and so somewhere in there they shifted the timing of the TDRS flights, and our crew then became the LDEF retrieve crew. Then we said, "Okay. Hey, now, this is okay."

So we started training for rendezvous, proximity operations, and RMS [Remote Manipulator System] grapples and stuff. So Mike [John M.] Lounge, who was from the '80 group, was our RMS operator. Bill [William F.] Fisher from the '80 group and Ox van Hoften were our EVA [Extravehicular Activity] crew members. The only EVAs they were planning or

training for were contingency EVAs; there was nothing planned. Flying up to the LDEF and retrieving it was starting to look like a pretty nice mission because of the rendezvous and the flying aspects of it.

There were some interesting things there, too, because now as we started looking at being the crew that was going to have to retrieve the LDEF, we started realizing that it was poorly designed for retrieval. It had no lights. It was unpowered. It basically was just this amorphous shape, hexagonal or something, right? Octagonal ends, and so octagonal ends and then a tube between. So as we were doing our training for a rendezvous, Joe and I kept saying, "It would be nice to know when we're looking at this thing which end we're looking at and what orientation it is and stuff like that." It hadn't been launched yet, okay? But we know we're not going to get any lights or anything on it.

So we started thinking about what we might do, and we decided, well, why don't we do something like bicycle reflectors, because we can shine the floodlight at them. We'd see the colors of them in the daylight, but at night we could shine them at them, and they would reflect the colors if we shined a floodlight at them. So we came up with a design of bicycle reflector placements on the LDEF, and then found some people that said, "Yes, we can put it on there and know how to do it. We just have to get some flight-certified bicycle reflectors."

Well, by now the LDEF is down being processed for launch. It's getting close to launch, and so we're scrambling around doing that, and we find a guy that can make these bicycle reflectors and they can go test them and make sure they're all right and do whatever they have to do to call them flight-certified. But time is getting short.

They deliver them here. Bill Fisher and I take them and put them in a T-38 and fly them to the launch site and give them to the guys that are getting the LDEF ready, and they go and

they bolt them on days before we fly. So we were ready. We were ready to do all that. And it launched with the bicycle reflectors.

In the end I don't know how valuable they were, because we didn't go and retrieve the LDEF. [Laughs] But we left our mark on it. Okay, there's those bicycle reflectors, which came out of a crew idea that came from training when we said how are we going to know whether we're looking at the south end or the north end or the right side or the left side of this thing, and it was amorphous from that and a poor design. But we were able to go affect that and do that.

So then the manifest got dynamic again and started shifting around, and so the next thing we know we're off of the LDEF, and our mission is going to be to go and deploy three satellites. Two of them are on payload-assist modules [PAMs], an American Satellite Corporation [ASC] satellite, and the other one, I think, was a WESTAR. I might have to go look at that for you. [Laughs] That doesn't sound right.

ROSS-NAZZAL: I think one was an AUSSAT and the other was a SYNCOM.

COVEY: AUSSAT. It was AUSSAT. Yes, it was AUSSAT, not WESTAR. AUSSAT, that's right. AUSSAT was a Hughes-built spacecraft. ASC was a RCA-built spacecraft. Both of them were on PAMs, and then the SYNCOM was the third or fourth one of those that we were—the third one, I think—that was going to be deployed.

So we started training for that, pretty much at that time a pedestrian satellite deploy mission, except we had three, which was a bunch, and we started training for that. I don't remember when that final change was made, when we actually got assigned to that flight. But again, the dynamics of the Shuttle Program in that time period, things changed. Our lead Flight

Director was Jay Greene, which was wonderful. I was getting to work with Jay again for [STS] 51-I.

In April of '85 there was a Shuttle mission that was supposed to deploy the predecessor SYNCOM satellite to us. I'm trying to remember who the Commander of that mission was. It may have been [Karol J.] Bobko.

But they had a similar—same spacecraft, and when they deployed it, the SYNCOM was different than the others, in that it was designed to roll out of the payload bay, as opposed to popping out like the others did. So it rolled out. It was sort of hinged on one side and had springs that pushed it off on the other, and so it would roll out and track up above us. It had a solid rocket motor that was part of the spacecraft itself, and it rode in the payload bay completely unpowered.

When it was released, there was a lever that as the spacecraft rolled out, that lever would extend out. It was spring-loaded, and it would extend out, and it would connect the batteries to the bus of the spacecraft, and that's how it started getting powered.

Well, when this mission ... [STS 51-D deployed the satellite], the spacecraft never powered up. So that was obvious pretty soon, because they weren't getting any telemetry from it. They knew it wasn't. Instead of doing a separation maneuver and staying separated from it, they went a certain distance away. In case the solid rocket motor fired, you had to be a certain distance away, but they got far enough away where they could wait. Then the guys on the ground tried to figure out what was wrong with this spacecraft.

Well, they figured out that their best guess was that this lever had not made the contact that it needed to to allow the batteries to power the electrical buses, and so they said, "We want to go back and try to activate it." To do that they wanted to put a tool on the end of the remote

manipulator arm, which they fortunately had on the mission, and try to trip that lever by using the RMS while it was flying in formation with the spacecraft. To get that tool out there on it, they had to then do an EVA.

So they fabricated this tool, known as the flyswatter, and then they did an EVA, and Dave Griggs, I believe, was the EVA crew member, and he went out, and they attached it to the RMS, the end of the RMS, so that then [Margaret] Rhea Seddon, who was the RMS operator, if I remember right—it was a long time ago. They flew back the next day. They got up there. They put the flyswatter up on the side of the spacecraft and hit that lever as much as they could, and it still didn't work. So they left, defeated, with a dead spacecraft in orbit, and that provided opportunity for us.

While the mission was still flying, we knew the Hughes guys, because we were going to fly their next satellite, so we were very interested in what was going on and been following the mission. The Hughes guys over in the Payload Support Room, we'd go over and visit with them. After that, while they were trying to work out this re-rendezvous, getting the flyswatter on there, and doing all that, we had started talking about whether we could go get it and bring it back, because Rick Hauck and his crew had just done a rescue mission on a couple of Hughes spacecraft and brought them back. That was PALAPA and WESTAR, I think; that's where we got WESTAR.

But they brought them back, and we're sitting there saying, "Gee, we're taking one up. There must be some way to get the one that's up there into the same carriage as we went out in." We were trying to figure out how to do that. I remember Joe Engle and I went over to talk with the Hughes guys the day that they failed to activate it, and they were over there. They were the saddest folks we had seen in a while, and their faces were long.

We went in, and Joe sat down and he says, “Well, we think we can go get it for you.” Their eyes kind of opened up. Now, we were supposed to fly in early August, okay, so—May, June, July—we were like three months, a little over three months away, and we were talking about it.

Of course, Ox van Hoften is six-four. Joe Allen is five-four, if he’s that tall, okay? Right? And I remember one of the questions that we had was, “Well, okay, can we stop the rotation of this spacecraft?” Actually, a very simple physics problem.

Ox van Hoften went on the back of a piece of paper, and he says, “Oh, yeah.” He says, “It’s only going to take this much force to stop the rotation, so that’s not an issue.”

Then he said, “Well, you know, did anybody think that we could have a person stop the rotation and do that?”

Ox says, “Well, here. Here’s me,” and he draws this big guy, and he says, “Here’s the SYNCOM.” He draws a little guy, and he says, “Here’s Joe Allen, and there’s a PALAPA. So if he can grab that one, then I can grab this one.” [Laughter]

We said, “Okay, yes.” It was the big astronaut, little astronaut approach to things.

But anyway, physically we figured out very quickly that we could stop the rotation of this thing, and Ox had already had an EVA on his first spaceflight, so he was very comfortable in saying, “I can move this mass around, also.” So we were going down a path to try to figure out a way to go up and grab this spacecraft and put it back into the payload bay and bring it home for Hughes, much like they had done for the other guys, the PALAPA and WESTAR.

So we were going through all that, and we got Jay Greene spun up on it. Jay was right there. He was part and parcel of the whole even talking about it, okay, from the start. And Joe Engle, of course, he’s a throwback to the Apollo days when we make stuff happen, okay? As

opposed to the way we've gotten in the Space Shuttle Program these days, which is stuff happens to us. [Laughs] So he kept looking at it and figuring it out, and we kept talking to the Hughes guys. They finally started saying, "We need to talk to our insurers about this and see if it's something that they would want to—" because the insurers are the ones that benefit from—as much from anything.

Well, after—I can't remember. It wasn't too many days before they called us back and said, "Hey, rather than bring this thing back, what if we hot-wire it?" They said, "We think there's a way to bypass the switch and provide power to the buses from the batteries by going through test ports external to the spacecraft."

We're sitting there going, "Wow, okay."

That started an amazing three-month period, where we went from having two EVA crew members who were trained for contingency EVAs only—closing the payload bay doors, doing something, you know, but not for any planned EVAs—but had two guys that were doing that; having a crew, Joe and myself and Mike Lounge, that had done some preparation and initial training for rendezvous and RMS operations to now being on a mission that didn't have an RMS even on it; to having one now where we were going to actually do a rendezvous. We were going to actually do RMS operations. We were going to do EVA, and not only that but we were going to do an EVA where a guy on the end of the RMS was going to have to grab a 15,000-pound satellite, 15,000 pounds.

To think that we even thought back then that we could do that and go fly in three months is remarkable. But the Hughes guys and their insurers got their stuff together. Jay Greene and Glynn [S.] Lunney, who was the Shuttle Program Manager at the time, got in on it.

I remember the day that we got approval to proceed on. Glynn and Joe Engle and I were over at Jay Greene's house, and we had a bottle of Old Overholt, which is Jay Greene's favorite whiskey, and we drank that bottle celebrating just the fact that we had hoodwinked the whole system into letting us think we could go do this. It would not happen today. I just can't imagine it happening. So that was great.

We didn't have any tools to do the job that we needed to do, because basically Ox could get up there and maybe get ahold of this spacecraft, but we needed a way to get it on the end of the RMS and to get it stabilized so that we could do this other work on it and then redeploy it. So what happened was a very simple approach; came up with three tools that had to be developed in this short time period.

Now, the spacecraft was spinning, so we made a poor assumption that it would still be spinning when we got there. So they designed a tool that Ox could have with him on the end of the arm, and as this thing spun around, he would snap—there was trunnions that held it into the payload bay of the Orbiter on each side, but he could snap this one end of this tool on here and snap the other one on there, and then would have a handle that he could use to hold the spacecraft, the satellite. So that was one tool.

Then, assuming that that tool worked and he got ahold of it, then he would be able to maneuver it down to Bill Fisher, who would be on the longeron of the Orbiter with another tool that he would snap onto the opposite side, 180 degrees out, trunnions, snap it on, and it had a big old grapple fixture on it for the RMS. I think that's how it was supposed to go.

Then once that was on it and he had that on there, then Ox could—I think how this all went. I have to go back and look at it. But then we had another tool that which going to be used for redeployment. Once we had the grapple fixture on there, then we would be able to maneuver

the spacecraft around and Mike Lounge could grab it with the grapple fixture. Once we had it with the grapple fixture, then we could do the hot-wiring.

Basically, what they came up with, and it cost them about a million bucks to develop that I think was the cost. But it was a box that had a timer on it, and then it had a set of cables that would go around to a test port on one side of the spacecraft and another set that would go around the spacecraft over to another set.

So the EVA task was to hook those up, secure the box there, and then at the time of deployment was to turn that box on and let it count down time or go down to power up the buses. So given that was the EVA task to get the fix in place, and then with some tests to make sure that we had the connectivity we needed, okay? And that was great, when we saw what we did.

Then to back out of that was to put another bar on the satellite, remove the grapple fixture, and then after the grapple fixture was removed, then Ox would put on this other tool, which was a very light, small bar, and then the idea was he would use that to spin the spacecraft up. So he would get it over to payload bay, and then he would push it. Then as this bar came around, he would push it again, and then it would translate away, so Joe was going to have to fly with him and get him into position to push it every time.

So anyway, the choreography had to do with how we got those different tools on and off the satellite and got it there. Took a whole lot longer—there's more to this story. Let's see. I'll keep going. [Laughs] I see what time it is.

ROSS-NAZZAL: Well, we can finish this, and then we can start with liftoff next time, if you want, with launch.

COVEY: Okay. Okay. Yes, because this is really the story of the mission.

Rendezvous, I was lucky. Joe Engle, either I talked him into it or he agreed to let me do the rendezvous, and he would take over the controls when we got into the proximity operations, the final phases, and he would do the flying then. But for a first-time pilot to be able to actually perform the rendezvous maneuvers, and train to do that and fly that, was unusual, and Joe allowed me to do that.

But when we got there, as we probably should have expected, the spacecraft wasn't spinning anymore. Of course, they had gone and whacked it with this flyswatter and stuff, so that slowed it down and also got it tumbling a little bit. So by the time we got there, it was just kind of rotating in all three axes very slowly and just moving around.

So immediately we get there, and we can't do the capture like we had planned with this spinning spacecraft. In fact, it looks like it's going to be very difficult for us to get ahold of the spacecraft. Well, by the time of 51-I we only had one TDRS, so we still had half a rev [revolution] of TDRS coverage, and then we'd go loss of signal [LOS] and wouldn't have contact again for some period of time. When we got up there and it was tumbling, we were trying to relay back to the ground what was going on, and there was a bunch of stuff. We were trying to figure out stuff. They were trying to figure out stuff.

Finally we went LOS and Ox said, "Fly me up to it," and he went up and he just grabbed it. [Laughs] If the ground would have been watching, we wouldn't have done that, I'm sure, like that. But he grabs it and spins it, okay, just with his hands on the edge, where they say, "Watch out for the sharp edges." And he spins it a little bit so that the fixtures come around to him, and then he rotates it a little bit, and he gets that tool on, screws it down. We maneuver it down.

We come AOS [Acquisition of Signal]. We say, “Well, we got it, Houston.” [Laughter] They didn’t ask why. They didn’t ask how. We were okay. We did that.

Anyway, all of that took longer. We wound up having to stow the thing overnight and didn’t deploy it until the next day. It just took longer just to do things. And the redeployment went—everything from that point on, once we’d got control of it, went pretty much as planned, other than the time when we were taking it off the RMS, and Bill Fisher was holding it on the longeron while—I was trying to think how this worked—while Ox was putting on that bar that he was going to use to spin it.

Listening to the two of them—they couldn’t see each other, 15,000-pound satellite in between, and they’re fighting each other, you know, because it’s just that. But other than that, the redeployment went well. The little timer worked; powered up the buses. That spacecraft went on and was used for over a decade, which was good, because the one we deployed had infant mortality, hit it, and actually, I don’t think, lasted more than a month. So, they had a different type of problem that lost that spacecraft, but had one that we rescued at that time.

So maybe that’s a good point to stop now.

ROSS-NAZZAL: I think so, yes.

[End of interview]