

ORAL HISTORY TRANSCRIPT

THOMAS U. MCEL MURRY
INTERVIEWED BY KEVIN M. RUSNAK
HOUSTON, TEXAS – 23 AUGUST 2000

[Note: *This transcript corresponds directly to the audio interview and should be used only as a reference. It has been annotated only to clarify names, places, and acronyms.*]

RUSNAK: Today is August 23, 2000. This oral history with Tom McElmurry is being conducted in the offices of the Signal Corporation in Houston, Texas, for the Johnson Space Center Oral History Project. The interviewer is Kevin Rusnak, assisted by Rob Coyle and Sandra Johnson.

I'd like to thank you for taking time out to visit with us today.

MCEL MURRY: It's a pleasure.

RUSNAK: Good. If we could start with some of your personal background, where you grew up, the kind of interests you had, and, going into college, what types of things you were doing.

MCEL MURRY: Okay. I tend to be wordy, and I apologize for that at the beginning, but bear with me.

I grew up in a town called Batesville, Arkansas, in north central Arkansas, probably the best town that a kid could ever grow up in. Marvelous place to hunt, fish, play, and do all kinds of things. From the time I was ten years old, I never wanted to do anything but fly. I was fascinated with airplanes and took what money I could earn mowing lawns to buy flying

magazines. I had a problem. I was deaf in my right ear, and I realized fully that you didn't get into military flying with a deaf right ear.

So, as a consequence, I didn't really make an effort to go to college, first of all, as I grew up. We didn't have a bank account that could afford for me to go to college. So there was no point in trying to get the two years that were required to be taken into the Air Force as a cadet. So I didn't go to college for the two years.

Then there was a thing back then called Citizens Military Training Camp [CMTC], and you never heard of that because it doesn't exist anymore. But when you were seventeen years old, you could apply for CMTC. It was a four-year program. Three weeks each summer you went to Camp Robinson in Arkansas. First year you were a basic, the next year you were a red, the third year you were a blue, and the last year you finished with a reserve commission as an infantry second lieutenant. So when I was seventeen, I applied for CMTC.

When I reported in to Camp Robinson, they stripped us off naked in a long barracks, and they had a doctor at about twenty feet apart that examined different parts of your body and whatever you had. The last one was the ear doctor, and when I walked up to his station, he looked at me and said, "Son, you're deaf in your right ear, aren't you?"

I said, "Yes, sir."

He said, "That's okay," and wrote down 15/15 for both ears, and I was allowed to go to CMTC camp.

When I went home that summer, there was an opening in the Arkansas National Guard in my home town in Company L. There in those days—today you have to draft people—the members of the company voted—and I'm talking about privates all the way through the company commander, who was a captain—voted as to whether you were allowed

to come into the company or not, and they always had more young men wanting to go into that company than they had slots for. They used the physical I had at CMTC and took me into the National Guard. A year later in 1940, December 1940, they called us to active duty for World War II.

Amazingly, the Army Air Corps then came through with an order that said if you are between eighteen and twenty-three years old and you have never been to college, that's okay, you can apply for pilot training. I was platoon sergeant in a company in Alaska, Seward, Alaska then. Of course, the first sergeant, knowing how I felt about flying, he came and said, "Hey, Mac, I think you might have a chance here." So I applied and I was accepted.

So I went to Anchorage to take the physical and I thought, you have no clue how you're going to pass this, but go. When I got to Anchorage, they had a long barracks again and one doctor did the whole thing. When it came time for the ear exam, he said, "I want you to go down to the end of the room, I'm going to whisper some numbers. You hold your ear and read them back to me." So that was easy. This is the deaf one. Over here I just held it about like that [demonstrates], and passed the exam.

So in March of '42, I arrived at Santa Maria, California, for primary flight training. Flew two tours in World War II, one in light attack bombers and one in fighter bombers, and came back and, recognizing that the only difference between me graduating from flying school as a staff sergeant—we were sergeant pilots—and a second lieutenant was the fact that my fellow classmates who were cadets—we were aviation students, they were cadets—was that they had two years of college or a college degree. So it didn't take much smarts to realize the first thing you'd better do is go to college.

So the day the war was over with Japan, I was allowed to leave, which was in August, and I arrived at Tuscaloosa, Alabama, entered the University of Alabama and picked up a degree in mechanical engineering. Took me two and three-quarter years. I worked my tail off. While I was there, a team of Air Force officers—by then the Army Air Corps had given up their flying outfit—came through and said, “If you would like a regular commission, fill out this paper.” So I did.

Then I got a job with Standard Oil of Indiana when I graduated and came to Texas, and, lo and behold, they had an opening in the Texas Air National Guard and P-51s at Ellington [Air Force Base, Houston, Texas]. So I immediately signed up there.

Then a wire came through that said, “You’re offered a regular Air Force commission if you want it.” I sent back and said, “I won’t tell you what kind of subterfuge I engaged in here to pass an ear exam, but I did, and I’m not proud of it, but I wanted to be in very much.”

They assigned me to the 27th Fighter Group in Kearney, Nebraska. The first thing they did when I arrived was say, “You have to take a flight physical,” and I said, “But I just did.” They said, “That doesn’t matter. You have to take it.” They had a corporal giving me the audio thing, and I tried every way to shift the head phones and test the same ear twice and was unsuccessful.

There was a Colonel Hunter, who was the flight surgeon for the group, and he called me in and said, “I don’t understand this, Lieutenant. Less than three months ago, you passed a flight physical with good ears, and suddenly you’re deaf in your right ear.”

I said, “Sir, let me tell you a story.” I told him everything I just told you.

And all his comment was, “I’ll be damned.” [Laughter] He said, “Since you shot straight with me, I’ll do what I can for you.” He got me a waiver. It had to go all the way to

USAF Headquarters in the Pentagon. In my record it says, “Although we do not condone this sort of subterfuge, in view of Lieutenant McElmurry’s war record, we will give him a waiver.” So I was out of the closet then. They had me.

I’ll skip all the flying I did in the Air Force, but, as I think I said earlier—if I didn’t, I was with the Navy at China Lake?, doing altitude missile tests, this wire came through, and I grabbed an F-100 and I went up to Andrews Air Force Base [Washington, DC]. The next morning we met General [Thomas D.] White, who was then the Chief of Staff of the Air Force, and we couldn’t imagine what this was all about, had no clue. He said, “I’m going to tell you about something with this new outfit called NASA.” Then he told us what they were looking for.

So they took us to a red brick building—I have no idea where it was—in Washington the next day, and we went through interviews, the shrinks gave us some psycho tests, and a number of things. I think we stayed there two days. [Alan B.] Shepard [Jr.] and all the first seven crew were there. So that’s first time I’d seen them.

One thing I do remember about the interviews is that they had a question-and-answer period and said, “Do you have any questions about this?”

I said, “I have one.” Of course, there were other questions. I said, “I have one. What do we do about flying when we’re with you guys?”

The answer was, “We think we can get you excused from flying.” Of course, the room was filled with test pilots, and we all just roared laughing at that.

Anyhow, the day come to leave, and they called us individually. I had a buddy named Buck [Robert S.] Buchanan who was from the same base I was there, and he said, “What are you going to do?”

I said, "Well, I think I'll give it a try. But if they say one more thing about my ear, I'm going to tell them to shove it."

And I went into the exit interview. Warren [J.] North, a guy who spent a lot of time over here, was my interviewer. He said, "Well, we like your record very much." Buck and I had been sponsored in the Air Force for a master's degree at the University of Michigan for a guided missile course, so we were probably the only guys in the room who had a master's degree in engineering. They weren't just interested in your flying. In fact, I don't think they were very interested in your flying. They were going to put you in this can and run you around the world. So he said, "We like your record very well, but we're concerned about your ear."

I said, "Forget it."

He said, "Well, that doesn't mean you're disqualified."

I said, "It does for me. I'm outta here."

In retrospect, if all they ever did was fly around in capsules, I would not regret my decision, because you didn't fly anything, you just rode along. But I'd had any inkling that they were going to do something like this fantastic thing they did with the Moon thing, man, I would have competed like a tiger hungry for food. But in hindsight, you live with what you did.

So I went back to China Lake [Naval Weapons Center, California] and picked up where I had. It was the best flight test job a test pilot could want. I had a company F-104 from Lockheed and two F-100s from the home base back in Holloman [Air Force Base, New Mexico], eleven ground crewmen, and they were all my airplanes to fly and do the missile

tests. I mean, it couldn't get any better than that, which was the major reason that I was very unsure about what I wanted to do with NASA. Anyhow, all that's behind me.

Skip the middle in the Air Force that I was in the Pentagon for a four-year tour and got a call from Deke [Donald K.] Slayton, who was the Flight Crew Ops chief down at JSC. I'd known Deke a long time; we were good friends. "Would you consider going to NASA Headquarters as a detailee from the Air Force? We need you over there. We're trying to form an operations office that's supposed to head up the missions that we do in Headquarters." Of course, the Centers liked that about how they'd like a bubonic plague case.

So I said, "No, Deke, I don't want to do that."

Well, it just so happens—I happen to believe that my entire life God decides what I'm going to do. He decides where I'm going to go. He decides when I'm going to live and when I'm going to die. He decides everything.

Just coincidentally, an order came out in the Air Force at that time that said, "If you've been a pilot for twenty-three years and you're forty-three years old, you're grounded. We'll pay you flight pay until you retire, but you won't fly anymore." I was exactly all those things. So I was flying T-39s, Saber jets, at the Pentagon, and that meant when my birthday came that year, I was through flying.

Again, coincidentally Deke called me back. He said, "Would you consider coming over there as a civil servant, retiring and coming over there?"

So I talked it over with my family, and my wife was not in favor of it at all. She said, "You're going to be sorry if you do that. You love the Air Force and you're going to wish you hadn't done that."

But, anyhow, I wound up retiring and moving over to Headquarters. The Headquarters' plan—I'm making this too long probably.

RUSNAK: No, no.

MCELMURRY: No? Okay. The Headquarters' plan was to build an operations outfit at Headquarters that would be the overseer of the missions. They had a fellow named [Everett E.] Christiansen from Lockheed who had been brought in to head it up. I'd known Christiansen at Holloman Air Force Base when he was a captain, so I knew him well. They brought in a Navy admiral, Rod [Roderick O.] Middleton, and an Air Force general, Rip [Carroll H.] Bolender, and a Navy captain, Chet [Chester M.] Lee, and me. Rip Bolender and Rod Middleton were going to be the mission bosses. Chet Lee was going to be the operations guy for things like flight mission control and all that phase of the operation. I was going to be the flight crew guy in the team at Headquarters.

Well, the battle ensued, and it never had a prayer to begin with. Dr. [George E.] Mueller was the boss up at Headquarters, was the one who wanted this. Dr. [Robert R.] Gilruth and [Wernher] von Braun and [H. Kurt] Debus didn't care for this at all. To shorten the story, the Centers won, which was what you would expect them to do, and they brought in a Headquarters guy named Bill [William E.] Schneider to sort of be the, this—well, I shouldn't say but I will say—a figurehead chief. All the rest of us were to maintain our function, but we had been neutered. [Laughter] It was a powerless organization, and it didn't take but about one minute of thought to realize you were a nothing in a Headquarters job.

So I called Deke and said, “Deke, this is what we’re up against. Have you got anything at all I can do down there? Because I can’t go back to the Air Force. I retired.”

He said, “Sure, I can fix it.”

So he brought me down to the Center. He was busy with Apollo, so he said, “You do the crew training stuff for Skylab.” So that was a fun thing to do. It was really something that I enjoyed.

Then when that was over, Deke was on the Russian mission, and he said, “Why don’t you go out to Edwards and get the team organized on Approach and Landing Tests [ALT]. Then I’ll take over when I come back from the Russian mission.” That’s what he did. I spent about a year before he got there. Total, we were almost two years out there. Part of that time, Tom [Thomas P.] Stafford was the—was that the guy? Yes, was the Center director at Edwards. My quarters were the TDY [temporary duty] general quarters and the BOQ [bachelor officers quarters], and I lived high on the hog out there for a good while. Not because of that, but that was a very interesting program.

We had a Kennedy [Space Center, Florida] team that came out and was the NASA’s ground team that was second to none. In fact, everybody who was there, who did that program, were just absolutely super. The Kennedy team, the Rockwell-Boeing team, the Dryden [Research Center, Edwards, California] team, the Air Force crowd that came over from the Air Force, the harmony was topnotch and the people were just, everyone gung-ho. It was one of the most fun things I’ve done second to flying out there.

I came back from that and did a staff job in the Program office, the operations. I was deputy to the guy who had it, and then he left. Then I, for a short period of time, was the head of that office. It was just purely a staff job, and a good boss. Bob [Robert F.]

Thompson, in my judgment, is one of the finest managers I have seen or worked for. He's very bright, solid as a boss. I don't like staff jobs, but I sure liked him as a boss. He was a first-class guy.

Then I retired and went to Texas A&M [University, College Park, Texas] and taught thirteen years in the aerospace engineering department and then retired, and here I am, teaching flying out at LaPorte [Texas]. So God's been very kind, and I've had a very, very good life.

RUSNAK: And you're still getting to do what you love.

MCELMURRY: I can't beat it. It's the best little flying out around here. Debbie Rihn owns the outfit. She's just coming home from France, where she competed on the National Acrobatic Team, internationally she competed. She's been doing that for eight years. She runs the best fixed-base operation, rental places I've ever seen. She's a real pro and at the same time, she doesn't have to prove anything to you, that she's as good as a man is. She knows she's better, so she doesn't have to prove that to you. She's really good. It's a joy to fly out there.

RUSNAK: If you don't mind, I'd like to go back and maybe fill in some details.

MCELMURRY: No, that'll be fine.

RUSNAK: Okay. Great. I notice when you were out at Edwards back before you came to NASA Headquarters, you and some other people started the Aerospace Research Pilot School there.

MCELMURRY: Oh, I forgot about that. That's right.

RUSNAK: If you could tell us about that for a little bit.

MCELMURRY: I'd completely forgot that. That was in the period that I skipped between China Lake and going to the Pentagon. I was stationed at Holloman Air Force Base, but when I graduated from test pilot school, this month in '56, I went straight into the Navy at China Lake. They called me from Holloman and said, "You're assigned here, but we want you to go out there and do this altitude testing with them."

So I did that, and, oh, that was just absolutely superb. Short of flying combat—I flew two tours in World War II, one in Korea, and except for that, that was the most fun flying that I ever did.

When I finished that at Holloman, I took the Sidewinder [air-to-air missile] from China Lake and moved to Holloman and set up the test program there with the Sidewinder. We did that for about a year and a half more at Holloman, doing high-altitude testing. Do you want trivial things?

RUSNAK: Sure.

MCELMURRY: Okay. While we were at China Lake, we discovered the Sidewinder missile would eat up the targets we could launch at 60,000 feet with no problem. But the only thing we had was a five-inch HIVAR [phonetic] rocket with flares on the back we would carry on one wing of the F-104 and then we had the Sidewinder missile on the other. You'd take off at China Lake, leave the airplane in afterburner, and make a big 100-mile-radius circle and wind up at 60,000 feet at mach 2 right over the test site, and then fire the five-inch HIVAR and then acquire it with the gun sight and then fire the missile, and the missile would eat it up. It would just wham right into it.

We said, okay, that does something launched from the airplane you're in, but what about something else that's not on the airplane, when you're not launching the target from the airplane you're in? The only thing we had were balloons, so we would put up balloons that would go up as high as we wanted them, in this case, 60,000 feet. We tried and we tried and we tried, and it just wouldn't do it. The missile wouldn't do it. With F-100s you had to zoom and go up at an angle because you couldn't get up there, but with a -104, we could run in straight. It would just not do it. It would come in under the balloon and at the last minute it would try to make the bend and it couldn't do it.

Well, that left an uncertainty in the minds of those who were interested in the missile. Okay, so it can't hit a balloon, but can it hit something between a balloon and a target rocket? So when I moved down to Holloman with the project, we tried to build one at our little office. It wasn't authorized. We just built a triangular delta-wing target and put two two-inch rockets on the back. We intended to test it, and did test it at 60,000 feet. But we tested it on the ground, a funny incident, by putting two telephone poles up and putting a wire across and then hanging our little launcher rail with this delta target on the back from that.

Then we would go over to the side and, with a wire ignitor that we could hit with a button, launch it. We would preset the little tabs with the horizontal board, had vertical delta and a horizontal delta. We would fire it.

The first one we did, we were intending to watch go out like this. It fired and took off and did a perfect loop, went right up like this, and when it got to the top, we realized that thing's going to make a loop, and we all started to run. [Laughter] Then we realized, shoot, there's no hope. We couldn't possibly run out of the way of that thing, so we just stopped. It plowed into the ground about 100 yards short of where we launched it. So we fixed that.

Then a guy named—gee, I should remember. It escapes me. It'll come in a minute. A first lieutenant in the project designed a launcher for it where he took two photocells, or one photocell and two lights, and had a compass that he drilled up five degrees each side of north. We mounted this on the launcher so it was going to be balloon-carried up to 60,000 feet. If it was out of the north direction, then the little motor would drive it, the photocells would work and it would drive the thing back to north, and it would stay in that little 10-degree box.

So the first flight I went up in a 104 and they had it all in place with a balloon and the flares lit. They said, "Okay, everything's good" and counted down. I was all set for when it took off the balloon. I was going to lay it to it. When they launched it, it came straight at me. The thing was 180 degrees out. I didn't even have time to dodge. It just went right on by. [Laughter] But we finally got that working.

That still wasn't suitable, because we were firing straight ahead at something that was prepositioned. We needed to shoot an angle off, have an airplane launch the target and us come in at an angle off and with a pursuit curve, fire it, and see if it would shoot it.

So my project officer, Colonel Woods at Wright-Pat [Wright-Patterson Air Force Base, Dayton, Ohio] called me and said, “Tom, we’ve got some money, a little bit, and I’ve located a guy in Santa Barbara [California] working for Curtis-Wright, who they say can design anything.” He was the German name, Vogt, who in World War II had designed a German reconnaissance airplane that had a half a wing over here, a half a horizontal tail over here and a fuselage—weirdest-looking thing you ever saw—and it flew and did okay. He was now working for Curtis-Wright at Santa Barbara. So got a T-33 and went out there.

He was a little guy, like 4'8" tall. We told him what we wanted. We said, “We need something that’ll fly for two minutes at 60,000 feet. It needs to be able to climb. It needs to be able to hold level. Of course, it will descend if we set it to, and we will be shooting angle-off shots at it.” And he listened to all that. “And it has to be launchable from an F-100.”

He thought and he said, “Yes. Come back in three weeks. I think I can have you something.” So that was it.

We went home, came back three weeks later, and had taken an anti-tank rocket and put little fins on the back with little elevators that dithered. It just dithered in place. The purpose of that was to avoid the break-out friction that you would get if they were still before you started giving them command, before you launched. Then he had a canard that you put on the front that was presettable. You could set it at any angle you wanted, and that would make it either climb, descend, or hold level.

We said, “We need that in about three months.” A contractor like Boeing or Rockwell would laugh you out of the office. They’d say, “You’ve got to be out of your mind.”

In three months, he had us thirty usable targets. Every one of them worked, and every one of them did what he said it would do. And he charged us 1,500 bucks a piece. I mean, you couldn't even think of anybody doing that now.

But, anyhow, they worked and the missile worked, out to about 30 degrees at 60,000 feet. It would acquire that and meet it up. No problem. Couldn't hit a balloon, but it could hit that thing.

So after that was over, I had applied for a Ph.D. program at University of Michigan. I had been accepted, and the Air Force was going to send me. The day that the moving van came to get our furniture, Dick [Richard C.] Lathrop, the Commandant of the Air Force Test Pilot School, stopped at Holloman and called me and said, "Can you meet me down at operations?"

I said, "Sure."

So I went down to ops and he said, "Mac, I want you to come out and be the ops boss at the test pilot school."

I said, "Well, I don't know about that. I'm supposed to leave to go to University of Michigan."

He said, "Well, up to you, but do you want to fly or do you want to go to school?"

So I went back and told Kate, "We're not going to University of Michigan."
[Laughter]

So I had to fly to Systems Command Headquarters and talk to the personnel boss at Systems Command Headquarters in Washington, and I talked him out of my orders to the University of Michigan and I got orders to go to Edwards.

While I was there with Dick—I was the ops officer for about a year—he came in said, “Tom, I want you to”—Jonesy [Jones P.] Siegler, a guy down in—the only Army class we ever had was coming through. He said, “I want to put Jonesy in as the ops boss for this Army class, where there’s going to be helicopter stuff, and I want you to be the special assistant for a space course.” In those days we were still in the running to do manned space. In fact, the Air Force had the Dyna-Soar and they already were at the mock-up stage. He said, “I want you to organize and run the first class, and we’re going to establish a school for space pilot operation.”

An interesting thing, Bill [William G.] Schweikhard was a civilian, the only civilian instructor we had, an outstanding instructor and a real bright guy and a good guy. He said, “You can have Bill Schweikhard to help you, and but you don’t get any money.”

I said, “Okay. Can we have a T-33?”

He said, “You can fly a T-33 anywhere you want to, anytime. It’s up to you. But we don’t have any money.”

I said, “That’s okay. We can do that.”

So Bill and I—Bill wasn’t a pilot—got in this T-33, and over a period of a while we went all over the place, even to NASA. But NASA in those days was in being. They hadn’t told the Air Force, “You can’t be in space yet.” But NASA was out and running.

So we went to NASA, and they were very helpful. They gave us some time on the Johnsville [Pennsylvania] centrifuge, and actually we participated in an Ames [Research Center, Moffett Field, California] program.

Frank Borman had just graduated from test pilot school, and I asked Frank if he would be willing to stay as an instructor. We were all going to be students, because we

didn't have anybody else, so we were going to be the instructors. We were going to divide up the spectrum of things to be taught, and each guy was responsible for producing a curriculum for that chunk of the thing.

Dick Lathrop, the boss, the school commandant, said, "Okay, Tom, who would you like from down at flight test as a student and to participate?"

I knew of [James A.] McDivitt's record, and I said, "I'd like to have McDivitt." Well, McDivitt was about as eager to get there as a pole cat is to—well, I won't give you—he did not wish to come. But he's a good guy, very solid citizen, and he did. He, just, "Okay, whatever." We had been in the same fighter group in Korea. He was in a different squadron, but we'd been there at the same time. Anyhow, he came.

Then Buck Buchanan, who was the guy who went to NASA when they first called, was getting his Ph.D. at Michigan University at that time. We had previously been graduate students at the University of Michigan together, back when I got the other degree. Anyhow, he was being assigned to Maxwell Air Force Base [Montgomery, Alabama], and he called me and said, "Tom, we've got to do something, because if we don't, I'm going to be at Maxwell Air Force Base."

So I got a B-57 and flew to Selfridge, Michigan, picked him up, and we went to Systems Command Headquarters again and got with a different personnel boss—the other one had shipped out—and convinced him we just had to have Buck at the school. So he got his orders changed.

Then for the other guy we took Bill Schweikhard, and he was going to be fifth student. So we had a five-student class, and we worked our tails off. In some cases, we were able to find guys at Edwards who could teach things. I remember an orbital mechanics guy

was someone down in flight test, not a pilot, but in flight test, and he was a very good instructor in orbital mechanics. But we divided them up like that, and what we didn't know, we learned as we went.

RUSNAK: What were some of the other types of things you were studying?

MCELMURRY: Some of it pertained to the flight program. We didn't have anything that would be like a Shuttle, but we had a thing that would be worse than the Shuttle. I mean, it would demand, would give you a tougher landing profile than the Shuttle does, and that was the F-104. So we built the flight training program with what we could do with the F-104, and you could do a great deal. The F-104 simulates the X-15 landing with 80 percent power, takeoff flaps down, and landing gear down, and speed brake—no, maybe the speed brakes are in. I think the speed brakes are in. And it will simulate the profile of an X-15. We did that, but they also put down landing flaps, gear down, speed brakes up, and whatever power it took to hold it, which was well above 80 percent, and were able to produce a profile that was worse than the Shuttle. We did those landing exercises.

We didn't have anything that would simulate a vertical launch, could even come close, but we could do an exercise that would require the student to plan the use of the energy that he had at the start of a so-called launch and manage that energy to achieve the maximum altitude with the airplane. That, in a sort of a distant way, could be like determining the performance of a booster and when you separate and all that kind of stuff. So we did that.

We run in at, I think, 38,000 feet at mach 2, coming east to west so that we'd wind up close to the lake bed. Then each student had to have done the calculations to determine what

angle to put it to—it was his decision—and we had to shut the engine down when you hit 70,000 feet, because the engine had a feature that the intake temperature of the compressor when it got, I think it was 121 degrees Centigrade—could be a different number—but you hit that, you had to get out of that flight regime or you could tear the thing up.

So when we would go up to 70,000 feet, as our temperature thing came up at 70, we would bring the throttle around the horn and shut the engine down, and it would coast over the top and then come down the other side. At 35,000 you would do a restart, and if it didn't start, we had a pass such that you could make a left turn and land on the lake bed dead-stick. Nobody ever had to do that. We always got a restart. But that was a pretty good exercise where students were managing energy in a distant way like you would for a space operation.

Then we reviewed, in the school part, all the math we'd had back in college that we'd forgotten, that we had to use in calculations for orbital mechanics and that kind of stuff. But we also tapped everything we could find in this T-33 soirée out through the country. We got the whole collection of the von Braun films they had back then, when he was lecturing and stuff like that was going on. Northrop down in Dallas gave us some time on their moveable base simulator. Rockwell gave us time on their fixed base simulator. As I said, we had Johnsville for the centrifuge. Boeing gave us a show-and-tell on the Dyna-Soar. They had a mockup and teams up in Seattle doing that. We were given a free shot at a space seminar at the University of Michigan. Little things around that we had a pretty doggone good first course.

I stayed a while after the first course as a deputy commandant. Then I decided, for the good of the boys—and this is all dumb stuff—but for the good of the boys, that if I took them at the Air Force Academy, we'd then have a stable time period before they got out of

school. And had—I can't remember his name, I'll remember in a little while—a colonel at the Air Force Academy that had asked me to come there and teach one time. We'd been to Holloman together, so I called him, and he said, "Sure, we'd love to have you."

So I said, "Okay, gang, I'll hang it up and go do that."

After I left, they had three more classes, to make a total of four. Then President Eisenhower said, "Air Force, you will not be doing manned space." So the school folded. They went back to teaching test pilots, and that was it.

RUSNAK: Frank Borman tells a story about the two of you sitting over his kitchen table, designing a modified version of the F-104.

MCELMURRY: Bill Schweikhard initiated that. He came in one day. I was sitting there at my little desk, and he said, "Tom, did you know they have six J-2 rocket engines down in salvage that they're getting ready to salvage?"

I said, "Well, go down and get them, and bring them up here to the hangar." And so he did. Again, no money, so we called Lockheed and said, "Would you put us together a quickie feasibility study on putting that J-2 engine in an F-104?" And they did. When I was telling you about the training profiles and all that, Frank and I were doing a "What do we do with this when we get it?" kind of thing. That would have been a real whiz that got destroyed fairly fast. They didn't let us test it. The guy who did the flight test was a guy named Brown, and he got 124,000 feet out of it, but then Yeager had a problem with one, and then a Navy student there had a problem with one, and a third one, I said, "Well, we might as

well put that on a pedestal out in front of the school, because we're not being very successful." But Frank probably told you about his mishap with the 104, didn't he?

RUSNAK: I don't think he did, actually.

MCELMURRY: Well, I can't imagine him not telling you that. I was telling you in a clean airplane how we ran it at 38,000 feet. Well, one happy day, Frank was out making his run-in, and he was doing mach 2 east of the field, and a fire warning light came on. He shut the engine down, with the intent of putting in on the lake bed. Then he realized, "I'm too far. I can't get to the lake bed." So he started the engine again, and the fire warning light came on again. He flew it until he saw that he could make the lake bed, and he shut it down and dead-sticked it into the lake bed. Well, it had a hole that big burned through the fuselage, and he's lucky that it didn't—well, he would have had to eject if it had done that, but he did a great job. In fact, I may be wrong, but that may have been one of the airplanes they pulled out of our fleet to take down to Lockheed to put the engines in it, patched the thing and fix the engine and put the rocket on.

RUSNAK: I think he may have put that story in his book, but I don't think he shared it with us.

MCELMURRY: I'll be danged. Well, McDivitt had a happening during that school period. We had been having trouble with one of the 104s that the stick would pulse and the airplane would go blip. We'd write that up, and they'd get to the ground, and, as so often happens,

the ground crews would check and check, couldn't find anything wrong. They'd put "Nothing found on the ground." Then we'd fly it, and it'd go "blip, blip." Finally we just quit writing it up because nothing was happening.

Well, one day McDivitt was in the traffic pattern landing, and it didn't just go "blip, blip," it went "bang, bang, bang, bang, bang," just like that. [Laughter] He's a real excellent pilot, but even he couldn't get it on the runway. He did manage to hit it in the rough ground off to the side and go tearing through the sagebrush and shedding pieces, and fortunately came out okay. Then they took the wing and took all the lines out and found dirt and junk in the lateral control hydraulic lines. Those were the only two airplanes that got damaged in our course.

Dave [David R.] Scott and Mike Adams, one of my flight commanders in Korea, were doing one of these land flap, super-steep, high-flare things, and Dave, I think, misjudged a tiny bit. They hit the desert, and, as soon as they hit the desert, Mike ejected. We had the Baker [phonetic] seats that you could do zero altitude ejection, and made it. David rode it out and just tore it all up, but it didn't hurt him. Those three, I believe, are the only airplanes we lost in those four courses that we had.

RUSNAK: Did any of the students-turned-astronauts give any sort of input of how effective they thought their experiences there were?

MCELMURRY: I haven't heard any from any of them. I remember McDivitt's wife just didn't think the school was a good idea at all. "What are you doing all this for? We're not ever going to be in the space program." You just smiled and let it go. I doubt that it would

have been—well, any experience like that equips you to do something new and challenging from the standpoint you've never done it before. Of course, the space operation is all something they had never done before. So probably in a very broad sense, it was useful to them. It would have been more useful to them in a Dyna-Soar Program and in the Shuttle Program, because it was really an airplane that would perform in higher regime that we'd been before. The capsule was something, you admire them for doing so successfully and so well, but it wasn't flying an airplane.

RUSNAK: You had mentioned Chuck Yeager before, and he was one of these people who seemed to ascribe to the "Spam-in-the-can" theory for the astronauts. So was that kind of a general sentiment around the people at Edwards who weren't getting into the program?

MCELMURRY: I'm not too sure. I think most of the guys that I knew would compete in it. We had a guy named Dick Corbett [phonetic] at Holloman, and I can't remember all the other names who competed and didn't make it, who were later, came in later. But I think there was a strong interest by people in the Air Force, the Navy, and the Marine Corps to do that. I think my case was a little non-typical. In retrospect, if I'd known it was going to the Moon, I would have competed like a champ. I might not have made it with a deaf ear, but it would have been worth doing it.

RUSNAK: We've mentioned several times that you participated in high-altitude research, and so I want to ask you about the pressure suits that you would have used and what your experience with those were, if you had any.

MCELMURRY: [Laughter] I had an interesting set of—in high altitude tests at China Lake. We had the old original pressure suits and they were terrible. When they inflated, you just went rigid and it was hard to do things in those old things. Four times I lost the engine when I fired a missile at 60,000 feet at China Lake. The missile, when it came off, would hook over in front of your intake and blow the engine out. My greatest concern was getting below whatever the altitude was, 40,000 feet or something, before the pressure suit inflated. When it would flame out, I'd just roll it over and dive straight down to try to get to forty before the suit inflated. They restarted every time I had to do it.

But my biggest concern with the pressure suit was the lack of mobility when that thing inflated. I think it was about as much hazard as being stiff in the cockpit as there was with the pressure drop, because you could beat it. The cabin in the 104 would not get below the trigger pressure by the time you got to 35,000 feet if you were quick.

RUSNAK: So I guess they never had you testing any experimental suits or anything like that?

MCELMURRY: I never did, and we didn't at the school. We all used the—well, there we didn't have pressure suits. Oh, that's not so. Wait a minute. I think I remember—yes, we had pressure suits when we did that at the school. Did Frank tell you we had pressure suits?

RUSNAK: Not specifically, no.

MCELMURRY: Because I remember Teague, Sergeant Teague, the guy who became the astronaut personal equipment guy, here—

RUSNAK: Clyde Teague.

MCELMURRY: Clyde Teague, he was our suit guy. Yes, I remember. We did wear pressure suits when we did that 70,000-foot thing, because I remember him doing the suits, I think. I'm sure I do, because you wouldn't want to go up high without a pressure suit on, although I have. You're just risking that it won't happen. What else?

RUSNAK: When you first got this offer from Deke Slayton to come to NASA to do something, what was your impression of the space program at the time? How closely did you follow it and what did you think of sort of the relative—

MCELMURRY: Yes, sure, I followed it. I have always—and this is not just for public appearance—I always felt that the space thing is one of the finer things that the country ever did. I'll deny it—well, I can't deny it, you'll have it on film. But I think that General [Dwight D.] Eisenhower made a very, very wise decision. The Air Force is the greatest part of my life. The twenty-one years I did in the military was the joy of my life. But I think as an organization to do the space program, I don't think it would have ever done as well as NASA did it. I'm confident that the people they brought in and the way that they functioned could not be matched in any military organization.

By that, I'm not doubting the military. The feature of NASA that I had the greatest respect for was senior management listening to the people who had the expertise and who they perceived to be knowledgeable guys, even if they were the lowest man in the outfit. In the military it's "I'm a colonel and you're a major, so I'm right," and that would never have gotten us on the Moon, never gotten us on the Moon. It's the only way the military can operate. I don't want to bad-mouth them. That's the only way they can work.

But in a civilian organization who has the focus on the technical worth of what we're saying, what we're doing, NASA were the champs, no question about that, and we would never had done what we did without an organization like that and the people that manned that organization.

RUSNAK: So then what about the relative success of the U.S. versus that of the Soviet Union at the time? Did that have any effect on you?

MCELMURRY: Well, I think that shows the difference between a totalitarian outfit that can dictate what we're going to do and one that you have to convince the hierarchy and the public and the whole world that what you're trying to do is worth doing and worth supporting. If the Russians decided they were going to do that, there was no time lost or debating of whether we're going to do it or anything like that. It was just, "This is what the chief says. This is what we're going to do." From that standpoint, the emphasis it got, for whatever their motivation was and the application of what it took to get there and being able to say, "Do it now," they beat us time-wise. They beat us time-wise. They didn't beat us technically. The quality of the machinery they had, I think we're miles ahead of them there.

But we were a little later than they were because they were a totalitarian outfit that could make it happen. NASA—and I came in late—had to prove that what they had was worthy in the eyes of those that could allow it to happen. Otherwise, the NASA crowd was perfectly capable of doing that earlier or whatever it took.

RUSNAK: Once you got to Headquarters, what were some of your actual responsibilities?

MCELMURRY: It was just a cotton-picking staff job that nobody would have done except the Headquarters outfit. I hope Bob Thompson forgives me for saying this, but he came up there and stayed less than a week. They had recruited him, and it didn't take him very long to look that over and say, "This is not something I want any part of," and go right straight back to the Center. We were—"tolerated" is too strong a word, but we were allowed to be party to, but we were not really required for anything. It doesn't take you long to sense that, and you want to leave as quick as you can.

RUSNAK: Who were some of the people up there at Headquarters you think, besides the ones you had mentioned earlier, that you had some exposure to and you thought were maybe making some significant contributions at the time?

MCELMURRY: I think Dr. Mueller was an extremely effective head of the manned space crowd. I'm not downing him. He just wanted something that wasn't going to happen because the Centers were stronger than he was. If they bowed their back, he was not in a

position to unbow them, but he was an extremely effective manager otherwise, and was a very bright guy. Had the most fantastic memory I've ever seen, which is a real asset.

General [Samuel C.] Phillips was a real valuable individual that they acquired from the Air Force, to come over on detail duty. Couldn't have done better. I think they were as significant a part of the success for the program as were Gilruth, Debus, von Braun, and those people. But like any headquarters, everybody else is a staff outfit, and they beat the bushes and collect the data and present it to the chief and, for whatever it's worth, what they think, but if you're an operations guy who likes operations, Headquarters is not the place you want to be. I think General Bolender, he saw the light and he went to JSC and did a super job working in the LM [lunar module] world. Admiral Middleton hung around up there, and I think he went to—what Bill Schneider was to JSC, Admiral Middleton was to Kennedy, from whatever that was worth from Headquarters. Christiansen went back to Lockheed. They brought in a retired major general, Richardson, to be the head of the neutered outfit.
[Laughter]

RUSNAK: Since you had mentioned chiefs, what level of interaction did you have with the Administrator, James Webb, if any?

MCELMURRY: I had none. No, my senior management stopped at Mueller. So I don't think I ever was sitting in a meeting where Webb was.

RUSNAK: Around the same time that you were leaving Headquarters and going to JSC is when they had the Apollo 1 fire. Do you remember where you were when this went on?

MCELMURRY: Yes, I was out at Rockwell, and, I forget, they were running some kind of test and I was out there for that reason, just a staff guy from Headquarters overseeing what was happening to show-and-tell back at the home base. I remember a whole bunch of the astronauts were out there. McDivitt was there. White was at Kennedy. He was in the fire. Let's see. I can't remember the names, but quite a few of the astronauts were right there at that test, and they packed up and jumped in their T-38s and got out of there like birds going home, down to see what was going on at Kennedy.

Yes, that was a big shock, because all the astronauts were very close to those guys, especially the Air Force guys. They had been at test pilot school at the same time and they had been in NASA together all that time. So they obviously were extremely close, and that was a shock.

RUSNAK: Did you have any role in what was going on afterwards?

MCELMURRY: No. I was at Headquarters then. I was biding my time up at Headquarters.

RUSNAK: As you had mentioned, your buddy Slayton brought you down to JSC.

MCELMURRY: Absolutely.

RUSNAK: What were the first things he had you doing then?

MCELMURRY: Well, fortunately, for me and, I hope, for him, he really was wrapped up in the Apollo crowd. I sort of was his alter ego for Skylab and spent a lot of time in all the places that were associated with Skylab at Huntsville and all over the place. I was not just a staff function there; that was a job. And I enjoyed that job.

RUSNAK: When you made the move, Apollo Applications Program was very early in its development.

MCELMURRY: Oh, we were right at the very beginning. In fact, the major thing that I did at the first, if not in the whole role, what little I did in my role, was the flight planning world. The mission planning world was almost consumed with Apollo. Within the flight crew directorate, we started from a handful of two or three contractor guys and built a Contractor Flight Planning Group and build a Trainer Development and Support Contractor Group, sort of a parallel to the operations world for Apollo, because all the NASA people—not all, but the major part of the NASA people, were dedicated to Apollo, and that persisted well into the actual operation of Skylab.

RUSNAK: How difficult did you find it to muster these types of resources to your program?

MCELMURRY: That was just money. You had to convince the bosses who managed the money that we need—now, we had a skeleton, flight crew operations for Skylab, of very good people, but they were just a handful, like maybe thirty people, a very small group, and the leaders in that little skeleton outfit just needed help from folks to do work. The pool of

NASA people to do work was small because they were dedicated to Apollo. So we brought in Martin guys and McDonnell-Douglas guys, and they were the staff, if you will, or not just the staff, the members of the NASA functional leaders for the Skylab Program. Where you would have used NASA people for Apollo, we had the leaders in place, but we used contractor people to do the functions that NASA people would ordinarily do, to a major degree, not totally, but to a very major degree.

RUSNAK: Were then the relationships between the contractors and NASA very civil, or how would you describe those?

MCELMURRY: Oh, yes. I mean, the contractors recognized that they had to function like members of the organization for the NASA leaders, and the NASA leaders had to recognize "Those are my troops." So they worked quite well together, very well together. They had some good people in the contractor units. I can't recall their names offhand, but I can see their faces, that understood the relationship and were very effective in helping make it work.

RUSNAK: What were some of the significant challenges associated with your position here on Skylab that you remember facing, either technical or with personnel or however?

MCELMURRY: There weren't a whole lot. Most of them were having to do with supporting the opinions that we—"we" being the whole flight crew contingent of NASA and, to some degree, well, we had a relationship with FOD [Flight Operations Directorate], now those two have to be brothers—were just working out differences in opinions. Both the people at

Marshall and the contractor and FOD and us, we were all entities that occasionally had different ideas of what we thought was necessary. Making that all work, I made technical judgments that I had, but that was just an input into the whole system.

The whole NASA system, as I said back when the Air Force would not be the choice for doing what NASA did, the voice of everybody was heard. The ones who ultimately had to be convinced to go a particular way were the chiefs. But with rare exceptions, the chiefs at NASA listened to everybody, right down to the last guy. As an individual and as sort of leading a group of people, making our voice heard and our opinion stabilized to make our voice heard before we made it, was primarily what you did. You're not like the Air Force. You don't command. You persuade and you make sure what you have to offer is heard. The ones that are at the very tops or near the very tops are the ones who finally decide. That's not very clear, probably, but I can see what we did.

It was different. It was very hard for me to finally adjust, and I did some dumb things. I had grown up with chain of command, like, "Hey, he says this, I say this, I say this to you." And NASA didn't work that way. Underneath they do. I mean, Gilruth, no question he was the boss, and he was a good boss. He just didn't act like a general, like, "You do what I say because I'm the general." It came across differently than that.

RUSNAK: As someone who was dealing with flight crew operations, how did you find the astronaut support of Skylab? Were they eager to work there?

MCELMURRY: Oh, yes. Almost without exception, probably not without a few exceptions, there were very few exceptions, I'd had the Air Force astronauts as students at the test pilot

school or the aerospace research pilot course. So I knew them very well and they knew me very well. So there was no problem there, and you got acquainted with the Navy guys very quick.

I remember when I first met Al [Alan L.] Bean. I was on a flight line on a Sunday for some reason out at China Lake, and I was out looking at the airplane for some reason. This Navy officer comes up and said, "Do you know anyplace I can get some food to eat on Sunday?"

I said, "Sure. What do you like?"

He said, "What do you have?"

I said, "I know a Mexican food joint that's sort of a McDonald's kind of place for Mexican food."

He said, "That's great." So he jumped in the car, and I drove him out to Ridgecrest and fed him Mexican food, and he thanked me for it, and I came back and never saw him again until he came in as an astronaut down here at NASA. So we got to be well acquainted at NASA.

But all the Air Force types, with maybe just one or two exceptions, I'd had as students or something at the test pilot school.

RUSNAK: Skylab was also going to be a little different in that it was incorporating some of the scientist astronauts from the beginning. What interaction did you have with those folks who weren't coming in as test pilots?

MCELMURRY: Well, see, they were our men for Skylab. They were the astronauts for Skylab. So I got to know them very well, and every one of them is a champ. They were really good guys. [F. Story] Musgrave was probably as good a pilot—in those days they all went to pilot training in the Air Force. He was an excellent pilot and a time hog of the first order. I mean, he was in the cockpit every time he could get away from anything. Also a very good handball player. I used to play handball and, in fact, Joe—what's Joe's name?

RUSNAK: Engle?

MCELMURRY: No, Joe [H.] Engle was at the test pilot school. Oh, shoot, one of the scientist astronauts.

RUSNAK: Kerwin?

MCELMURRY: No, it's not Kerwin. This guy looked like a thirteen-year-old kid when I first saw him. I'll think of it. When you get to be seventy-eight years old, you have a ten-minute time lag in your memory. But I'll think of it after a while. He was a good handball player, and we used to fight it out regular over at the gym.

So I knew them real well. Every one of them was a really capable individual.

We've got to have a break. Can we have a break?

RUSNAK: Sure. [Tape recorder turned off.] If we could talk some about the crews and the training in preparation for their flights.

MCELMURRY: Okay. My observation, more than training, I would call it preparation for the flight. My take on how the crews prepared at NASA, I think is an exact parallel of what you do when you build a new airplane, when you design, build, and flight-test a new airplane and put it into operation. The training is more being a participant in the entire operation from the time the airplane is conceived, and that's a little early for some of the flight test crews, but not too long from that point they get into the picture. I think NASA does that in spades.

It happens as a natural part of the process at the Air Force, but I think it's more intentionally established that way in NASA. That is to have them be party to the group that designs the airplane, that fabricates the airplane, that does component testing, and partial systems testing as the airplane is assembled, and then does the actual flight of the airplane when it's first flight-tested, then is party to the analysis of the results of the flight test that has been accomplished, and is party to the exercise where they modify the airplane to get it closer to being what you want as a full-time airplane in an operation. I think that is the NASA training program for astronauts, and it happens to be untitled as a training exercise program of what the Air Force does when they build a new fighter.

There is a training group in Skylab and Apollo and all those that's named a training group, but part of what they do and probably the major function they do is the management of the crews doing what I just described. The team that keeps score and schedules and manages and gets modified, the things that the crews participate in to get ready to do it. I don't think there's any better way of handling a new thing and getting folks equipped to do that new thing than that method. I think NASA does that in spades, and it's done in the Air Force to conceive, design and build and test a new airplane. Eventually it gets to be like—

the parallel there would be turning this airplane over to an operational unit in the field. There they train by doing the exercise in the field, and that's where we are with the Space Station, sort of.

The Space Station now, in my observation, is a combination of the things that the crew does to get the hardware ready and then actually go do what you're going to do with that hardware. I think that the Space Station thing is in that mode right now. Some of it's up there, it's functioning, but I think a much larger percentage is still in the mode of getting designed, tested, fabricated, and then the crews doing it. That's just the way the training program, I think, at NASA was.

RUSNAK: This is a method that I guess NASA had been developing since Mercury.

MCELMURRY: I think that's the mode they've had through the whole program. The thing that is amazing to me, and I think it harks back to the way NASA management functions, was that they did that, and we only killed three people in the Apollo Program and none, well, not till [*Challenger* Commander Francis R. "Dick"] Scobee and his crew, but even counting that, that is an unprecedented record. We killed eight test pilots getting the F-104 in an operational squadron. There has never been a fighter built and put in operation, to my knowledge, that didn't kill at least one test pilot. To take seven trips to the Moon and do all that they did, NASA did, is just amazing. That is the most phenomenal performance I've ever seen in anything. I said too much for the training program.

RUSNAK: For some of the actual training part itself, the training part of the preparation, you had a lot more of that going on at Marshall than, I guess, that they had with the Apollo program.

MCELMURRY: Oh, yes. In fact, it was funny, a funny incident. I'm sure you had somebody tell you, or you already knew, that clandestinely von Braun built the world's biggest water tank. Before that became operational and public knowledge, they had a little swimming pool-level water tank that they were using for Skylab.

Of course, there's always been rivalry between JSC and Huntsville, Marshall, as to where the training would be done and all this sort of thing. So one of the schemes that we actually were doing was to question the safety of this swimming pool water tank at Marshall and that might be something we should refrain from doing.

So I flew in a T-38 with [L. Gordon] Gordo Cooper. He was going to—I was just there to observe—evaluate whether this would be something the crew could safely do. I think the political hope was that there would be something that could be said that would question the safety of the tank and knock that out of the picture. When we arrived there and went out to where the water tank was, von Braun in his bathing suit was in the tank to demonstrate the use of the water tank. [Laughter] And who's going to tell von Braun that it isn't safe to get in there? I thought that was pretty sharp. Of course, then it was okay. Now we don't think it's the best, but we could do that.

So there was a great deal of that, and, boy, he was a champ in one-upsmanship on that huge water tank he built. By default that became *the* Skylab EVA training device.

RUSNAK: Were there other areas where this rivalry affected the areas that you had responsibility for?

MCELMURRY: I don't recall. I vaguely recall discussions from time to time about locating astronauts up there, but I don't remember enough of the details to even comment on it. But I think there's always been some, probably not anymore, but back then a desire to establish an astronaut group, at least quarters and things like that, for them up at Marshall, but it never did materialize, to our knowledge. I suppose you could develop an argument for some of that if you tried.

For example, the bends got into the picture when they would go up to go work in the water tank and then fly back in T-38s. That got to be an issue. You shouldn't be hopping in a T-38 after you've just spent some time thirty feet down in the tank for the last four hours, and fly back. So they had some rules about that. But those were minor issues, I think, and never caused any trouble.

RUSNAK: When they finally launched the Skylab unmanned vehicle, they had some problems with it.

MCELMURRY: Yes. Lee [Leland F.] Belew was the boss up there and, in my opinion, one of the finest managers I've encountered, and he took some licks for that, some bad words and maybe some things that I don't know about that were not in his favor. Shoot, with something like that, who's to know that you're going to hit a resonant condition with things just slamming in and out of against the hull and tear it off. But they had that problem. The plus

side to that is it allowed the astronauts to demonstrate all the fine things you could do if you just had a man along on the mission that you couldn't have done if you didn't.

RUSNAK: Did you help in the preparation for the recovery?

MCELMURRY: No, I mostly observed the preparations for that. I was not directly involved in that. They had a team at Marshall going, and they had a team at JSC going. From a time standpoint, the JSC team arrived at a solution earlier than the Marshall team did. The thing that interested me was the fact that—and this is a personal opinion—that for political reasons they went ahead and did the pole thing that Marshall had just to not lose face and that you really didn't need that. But that's a judgment call by others. I didn't have any vote at all in any of that.

RUSNAK: As you suggested, that really reflected the flexibility of having people up there.

MCELMURRY: You bet. Of course, they had a perfect guy to do that, [Charles C. "Pete"] Conrad. He's a determined, "It's going to happen. I'm going to do it" guy. So they sure were fortunate to have the right guy when they did that. Of course, the other two guys were good troops, too. But he was a good commander, a good leader.

RUSNAK: During the Skylab flights, the flight operations people have mentioned that they had a definite learning curve in terms of how to manage long-duration spaceflight.

MCELMURRY: Yes, that's true, very true, and I can recall the reason that we had the ceiling of the crew quarters the distance that it was from the floor of the crew quarters, because we weren't too sure how a man could get about if he didn't have something to hold onto, so it was built so that an average-height guy could walk around or move about with his feet on the floor and his hand on the ceiling. The distance between those two was determined to be what it was for that reason.

To his credit, I'll tell you about a comment that [R. Walter] Cunningham made. He wasn't on the Skylab, but he had been on the Apollo mission in Earth orbit. He pooh-poohed that from the go. He said, "That's crazy." He says, "You're not going to have any trouble moving about in there." He said, "You could put that ceiling anywhere you want to, and you're going to be able to move about." But there was not that certainty among the totality of NASA that that was true, and that was after we had had a whole bunch of capsule flights. Of course, it turned out to be no problem at all.

RUSNAK: I guess one of the things that they ran into during the missions is things like scheduling and how long things took to do in space versus on the ground. I guess that created some tension. So I was wondering where you fell into this whole picture.

MCELMURRY: The Flight Crew Operations fell into that thing. I believe Bob—gee, I mentioned his name this morning. Who received the thing recently from NASA? John [W.] Young and—since breakfast this morning, I can't recall his name now. But anyhow, I'll think of it in a minute. He and a crew did a whole simulation in a closed can for quite a while—you've probably talked to him about that—to see what the difficulties would be in

living in an environment like that for a period of time. He was the Center director at Kennedy for a while, and he and John Young flew the first Shuttle.

RUSNAK: [Robert L.] Crippen.

MCELMURRY: Crippen, Bob Crippen. He and a team that he headed did that simulation in 1-G gravity for a while and learned a lot of things, but it turned out not to be any problem at all. But I really was an observer more in that than I was to having any part of that.

RUSNAK: When the Apollo flights were winding down and Skylab was actually going to be the mission that NASA had going, did Slayton then have more to do with that, or was he doing other things?

MCELMURRY: Oh, yes, that was true of everything. The time period in which I did most things I did and relied on to do, to get them done, was when Deke was very busy with something else. That was true of Skylab, and as soon as we moved into Skylab, Deke took over. I still worked, but I did not perform the role that I had up until then. Same thing in the Approach and Landing Tests. After he finished the Russian mission, why, Deke came on out and took over, and I became sort of his runner after that, when he came out and took over.

RUSNAK: At what point in time did you move Skylab into the Approach and Landing Tests, or was there something in the middle that you had worked on?

MCELMURRY: No, when we finished, when they finished Skylab, I think I went to—I'm trying to think of when I worked for Kenny [Kenneth S.] Kleinknecht. I actually worked for Kenny Kleinknecht for a while. Outstanding boss, good guy. But whoever I was working for a very short period of time in there gave me the choice, when we finished Skylab, of going out to Ellington and being Joe [Joseph S.] Algranti's deputy, the gentleman who ran the T-38 and all the other flying operations out at Ellington, or filling that role in Approach and Landing Tests.

I was sure tempted both ways, because I was flying T-38s. One of the benefits of coming to JSC was to get to fly the T-38, and that was a big benefit, probably the biggest benefit I could think of, but, anyhow, it was a super deal. I opted to do the Approach and Landing Tests.

Then I went right straight from there out to Edwards because we were just getting ready to start forming a team out there and getting the facilities all squared away. Deke then, when he finished the Russian mission, came out and he became the boss and I became the runner. Still plenty to do, but different role. And when I say "a boss," in a boss' role you were sort of the guy who made sure everything was getting done on time.

Don Lee was the head of the Kennedy team, and Bill—gosh, I can't remember his name now—was the head of the Dryden team, Rockwell had a boss, and Boeing had a boss, and I was holding the fort for Deke in the role of tying all those together, which was what Deke did. That was a busy two years and a lot of fun. Deke's a good leader. He has no trouble making difficult decisions and getting the thing moving.

RUSNAK: Speaking of him, I was curious about when he ended up on the ASTP [Apollo-Soyuz Test Project] flight and how he found out or ended up there and recovered from his heart condition, I guess, that had led to that. So if you tell us some of what you remember about that time period.

MCELMURRY: You mean when Deke was doing all his thing during that time?

RUSNAK: I guess specifically with when him finally being able to get a flight.

MCELMURRY: I was on the fringes of that, observing. I had no functional part at all in that, but just observing. Of course, I think Deke got a bad deal all the way through. As a guy who has a deaf ear and had to finagle his way through the whole system, I can appreciate that. I think they did him a dirty deal by ever taking him off flight status. But I suppose they have to play it super careful from a political standpoint, and I think it was more "protecting your rear" kind of thing on the part of the folks who had a vote in that at NASA than it was a fundamental reason for not having him on the flight.

I don't particularly have a great deal of relationship to the folks who protect their rear all the time, and I think that's what they did for Deke. That may be unfair to say that, but from my viewpoint, it was. I was just overjoyed that he eventually was able to surmount that, with the help of people who cared, and get to fly that mission. Deke would have done a super job on any part of the Apollo or Skylab or any program that had him in. I'm confident of that. But, as I say, God determines your course, and who knows His reasons? Take what you get and go with it.

RUSNAK: It was obviously his assignment to that flight which put you in the Approach and Landing Tests business, I guess. Can you tell us something about the specific types of activities you were doing on that job?

MCELMURRY: Of course, in the period when we were shaping things and putting them together, was doing—and I hate the word “staff” but in a way that was staff work. Well, I guess I was having a tiny vote in some of the things, things like getting more of a following role, making sure that it happened from the bosses’ standpoint back at JSC. Getting the Shuttle from Palmdale [California] to Edwards, that was more of a watch and report and make feedbacks in role. In terms of what Rockwell did, that’s mostly what I did. I didn’t have a voice, really a voice in deciding what they were going to do, but making that that all happened from the standpoint of the bosses I had to satisfy, and what facilities we used for, like you had none when you got there that had been identified as something you were going to use. It turned out that the Kennedy ground team wound using a rehabbed hangar up at north base, and there were questions about how is that going to be from a communications standpoint and a distance rather than close proximity to the actual ground operations down at Dryden. That turned out to be the right choice. We already had the hangar up there and housed the entire Kennedy team there.

Let’s see. Some of the problems. As I mentioned, getting the Shuttle across the desert, that was interesting to watch. The Environmental Protection Agency had a concern because we had to come up through the desert and there was, I remember, a cactus along the proposed route that was causing concern. One night the cactus disappeared, and it wasn’t a

problem anymore. [Laughter] So they had telephone lines and poles to move into town, and those all came out pretty much with the cities doing all they could to help. That turned out well. That was by no means sure.

Of course, Deke was there when the flights happened. The decisions relative to what was going to happen, that was Deke's. I was sort of a runner to get done whatever he wanted done to support what he was going to do. But I recall when we did the tail cone off flights in the 747 [shuttle carrier aircraft], when you took the tail cone off, the 747 shook terribly. It was so bad that Fitz [Fitzhugh Fulton, Jr.] couldn't read the instruments. There was some misgiving about being able to get that flight off, and we wound up deciding to do it, to make the decisions as we went.

The plan was that at each step, each step up in air speed, Fitz would make the judgment as to whether we proceeded to the next air speed. Whereas we were releasing at something, 20,000-something feet, with the tail cone on, we were down to 17,000 with the tail cone off. In fact—and this is my observation—Dryden would not have done that. They are the masters at flight-testing airplanes and new vehicles. They are one of the finest outfits that I found, but I think they would not have done that if we had never had an input there, since we didn't have an input. He's the best big-airplane test pilot, I think, we've had, and he got it up to an altitude that would allow us to get it off at 17,000, which was enough to get it on the ground in a straight-in approach.

Decisions like that were very significant in how much you were able to do in the program. They were the things like coming across the desert and others similar to that, but that was a big step in the flight testing we did. Other than that, it was just like anything you do every day there's a problem, and every day there are more and every day you do it.

RUSNAK: What did you think the idea of the Shuttle carrier aircraft, of putting the Shuttle on top of a 747 and flying it around?

MCELMURRY: Well, it's amazing what we thought about doing before they did that. You know, they were going to engines on it. That was insane. John [W.] Kiker—have you interviewed him?

RUSNAK: Yes, we have.

MCELMURRY: He was a strong voice in getting that to happen. I think they made the wisest choice they could have. It wasn't without precedent, though. If you go back and review what the Germans did and what the British did, there have been lots and lots of piggy-back airplanes, many, many, not just one or two. So there was ample historical evidence that that would work. So I think they made exactly the right choice.

They had some crazy ones. They were so ingrained, had become so ingrained in how you do a taxi test with an airplane before you make your first flight, that there was a move afoot to tow that Shuttle at taxi speeds and then release it and bring it to a stop. There was a proposal that was created to put JATO [jet-assisted take-off] bottles on it and boost it up to taxi speed and then stop it. If you had a problem while you were boosting, you were dead in the water.

I was flattered one time. Bob Thompson called me in and said, "What would you do?"

I said, "I'd do nothing. I wouldn't try to taxi with the airplane at all. Just take it out and land it the first time you do it. Don't even try to do that. Your odds of coming out well doing nothing, in my opinion, is considerably great that you'll succeed than if you try to tow that thing or JATO it with a bottle or anything like that." And he must have heard that from somebody else, because we didn't do it.

RUSNAK: Sounds like it was good advice, then.

MCELMURRY: Well, I'm sure he got a lot of other advice, too. But anybody who looked at that would, I think, reasonably would say, "No way. You don't want to do that." It turned out well.

Some things happen in the program. I'm sure you probably heard it from others. Fred-o [Fred Haise] had a problem with a porpoise. We did one of the tail-cone-off landings on the runway, and he felt badly about it, but in actuality, it's the best that could have happened because they discovered a deficiency in the flight control system as a result, that was fixed before they had to make the first orbital reentry in flight.

I remember we were standing opposite sides of the runway and we had Prince William, or whoever was Prince from England at that time, and this started to happen, and I think there was about as much concern of getting him out of the way as there was about the Shuttle out there.

The Approach and Landing Tests and the Skylab, I couldn't have gotten assigned to better programs. They were a lot of fun.

RUSNAK: The Approach and Landing Tests fell into kind of, I guess, a down period for NASA in terms of space flights, between the end of ASTP and the start of the Shuttle, where they have six years where they're not flying anything. Do you recall the mood or the attitude around NASA at that point and time? Or were you just kind of too busy with the stuff you were doing?

MCELMURRY: Well, I think obviously the majority of the leaders supported it or it wouldn't have happened. But I know I thought about it more like an airplane test. When they started hooking up the control center at JSC and linking it to the operation at Edwards and actually, to the degree they were able, simulating the landing part of the mission, I thought, man, you could save a lot of money and not mess around with that stuff and just treat it like a X-15 launch. But I came more to appreciate the value of checking out all the players in a simulated operation before it was over.

Of course, they knew that was the right thing to do, because that's the way they'd been doing them all along. But that made it even more worthwhile doing, and I know some of the managers were extremely nervous that we would ding it, and not so much that they were afraid, although on the first flight the plan was to be sure we clear the tail, then pick up speed and make sure that they could flare the airplane when we reached the landing position, and if they couldn't, the crew was supposed to bail out and let the Shuttle go in.

It turned out that wasn't the problem at all, but there were various degrees of nervousness. The biggest one, I think, was we will give the Shuttle a black eye before we really get a chance to show what it'll do in orbit. And that's legitimate. But we were so sure that it would work that we didn't share that.

RUSNAK: Fortunately, you didn't give the Shuttle a black eye and the program overall was successful.

MCELMURRY: And I think it turned out beautifully, and I think that was the way to do it. They learned something with the Gordo incident and gave the crews and the FOD crowd an opportunity to check their system as they had it planned. It was a lot of fun to watch it happen, anyhow.

RUSNAK: After that you said you went to work for Bob Thompson in the Shuttle Program.

MCELMURRY: That was a staff job, and it was okay, but I don't think I startled the world with any contribution. The high point of it was to work for Bob Thompson, because he was a great boss to work for.

Actually, I would have retired sooner, because I didn't see anything I really wanted to do, but I had a problem with retirement. I had to be sixty-two before I could retire as an Air Force guy and as a NASA guy, independent of each other, and that needed me to stick around about a couple of more years. That's sort of dirty for the taxpayers, but personally I had to do that. So it was fun working for Bob Thompson, and I'm glad I did, but after that, there was no reason that I wanted to stick around with NASA. There was nothing going to happen that I cared about after that, because I wasn't going to get to be in any kind of an operations role at all.

RUSNAK: What did you think of the launch of the first Shuttle and sending that up with Crippen and Young the first time?

MCELMURRY: I think that came off like a champ. I was out there when it happened, but more as a coordinator, just “Do you have an errand you want me to run? I’ll run it” kind of thing. If I disappeared, the operation wouldn’t notice much. [Laughter]

RUSNAK: After you did finally leave NASA, you said you went and did some teaching.

MCELMURRY: At [Texas] A&M, and that was one of the most rewarding things I have done. The young people were absolutely superb, and there’s no question in my mind you were doing something for them that was worthwhile. I still hear from them, to tell me they got married, they had a kid, what they’re doing in their job. The way I teach flying is, if you’re an Aggie, I teach you free. If you just pay for the airplane, then I’ll teach you for nothing. Everybody else gets charged. [Laughter] So, some of the finest kids I’ve—I taught at the Air Force Academy for a little while. They’re very similar from the course standpoint.

It’s a super career. I would do that again if I had the choice, a chance to do that. Faculty at A&M, couldn’t ask for better companions in the business, and that is a great school. If you have a kid, that’s where you want to send them, or the Air Force Academy. I have a granddaughter in the Air Force Academy now, so I stick up for that school, too.

RUSNAK: Did you still follow the space program after you had left?

MCELMURRY: Oh, yes. In fact, I was very fortunate to have many contacts in crew operations, and we regularly had test pilots from Dryden and astronauts from Houston and operations guys from Houston, apart from astronauts, always come up and speak to the kids, and they were always well received.

RUSNAK: Have you had any other sorts of activities going on since then besides the flying that you've talked about?

MCELMURRY: Only in helping them get jobs. They e-mail me. I'm becoming much, much less useful to that because my work period, calendar-wise, has progressed to the point where I don't know anybody, like every few people over at JSC that I actually know now. They've all changed. I know George real well, George [W. S.] Abbey, and John Young. Not many more.

I've taught some of astronauts to fly. I soloed Sally Ride, and I taught Kathy Sullivan and Baker.

JOHNSON: Ellen?

MCELMURRY: Ellen, Ellen Baker. Now I'll have to think. But I've taught several of them to fly, and I still teach acrobatics over at LaPorte, so I fly with the astronauts over there. In fact, the French astronauts, they like to fly the Pitts, so I go do that. So I stay in contact from that standpoint. But other than that, I don't ever much go over to NASA anymore, not that I'm disinterested, but I don't have anybody I know.

RUSNAK: While we're talking about people, Bob Gilruth just passed away not too long ago. I wonder if you had any remarks about him and what you thought of him back when you were working here.

MCELMURRY: I think he was exactly the right choice to pick to head up the group. He was a gentleman every time I ever talked to him, and they couldn't have done better. I think Kraft is probably one of the most key individuals in the operations world that made the program an overall success. They picked exactly the right guy there. I'd pick Deke. I'm sorry Deke had his misfortune, very sorry that he did, because we were very good friends, but I think NASA benefitted from having him, definitely benefitted from him being the head of the crew operations. He was exactly the right guy for that.

There were several others. Bob Thompson, as I said, was an excellent manager, really good manager. A lot of them, a lot of them. They had an excellent team. George Low was the right guy. There are others in my ten-minute memory, lost them.

RUSNAK: I wanted to give Rob and Sandra a chance to ask any questions if they had some.

MCELMURRY: Okay.

COYLE: I'm fine.

MCELMURRY: Couldn't stand to hear any more of that. [Laughter]

RUSNAK: Are there any concluding remarks you want to make, anything else we didn't talk about that you'd like to mention?

MCELMURRY: None that I can think of at the moment. I'll have to admit—this is a confession—I'm not sure I would have made the choice to come from the Air Force here to NASA. I had a guarantee. I'd just made permanent flight colonel when I left, so I was assured of ten more years in the Air Force, nine more years, but the idea of spending three more years in the Pentagon and not flying airplanes was overwhelming. But I loved the Air Force and there are times that I wonder, well, should you have stayed? But Satchel Paige—you know who he is—made a very wise comment when he said, “Never look back. Something might be gaining on you.” So the best thing to do is never look back and consider what you might have done; just be happy that you were fortunate to do what you did. I guess that's it.

RUSNAK: I'd like to thank you for joining us today.

MCELMURRY: Well, it's a pleasure.

[End of interview]