

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

JOHN M. LOUNGE  
INTERVIEWED BY JENNIFER ROSS-NAZZAL  
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ROSS-NAZZAL: Today is February 7, 2008. This oral history with Mike Lounge is being conducted for the Johnson Space Center Oral History Project in Houston, Texas. Jennifer Ross-Nazzal is the interviewer.

I'd like to begin by asking you to tell us a little bit about your career with the Navy before you came to NASA.

LOUNGE: Okay. I'll be happy to. I graduated from the [U.S.] Naval Academy [Annapolis, Maryland] in 1969, went immediately to what they called an immediate master's program. If you got selected for and got a scholarship somewhere, the Navy let you go and spend a year or fifteen months getting a master's degree before you reported to your first duty station, and I got one of those degree programs at the University of Colorado [Boulder, Colorado]. I went over there as a Navy ensign, wore an ensign uniform, I think once, and spent fifteen months getting a master's degree in astrogeophysics, because then I wanted to be an astronaut and I hoped that somewhere in the future there would be opportunity. So, to put it in perspective, I think two days after I reported to the University of Colorado for that program to start is when Neil [A.] Armstrong stepped onto the Moon. So, a very exciting time. Every young ensign in the Navy wanted to follow in his footsteps, I'm sure.

So I did that. Then I went to flight training in Pensacola [Florida], went through F-4 training and flew as a radar intercept officer, is what we called them, but the systems guy in the F-4; it's a two-seat fighter. Flew about 2,000 hours in the F-4 on two different cruises, one on the East Coast, one on the West Coast, saw combat in Vietnam, about a hundred combat missions, most of them very boring. Were there at the end of that war when the prisoners were all released, and then we came back to California and almost immediately did a Mediterranean cruise, so I got to see the rest of that world.

After that, I went to the Naval Academy as an instructor, taught physics there for two years. At that time I was looking ahead to the credentials that I thought might be needed to compete as an astronaut candidate. There was an opportunity to be on the staff of a Navy spy satellite, essentially, project, and so I joined that staff and was on that staff for two years, and it was from that job that I interviewed the first time for the class of '78 Shuttle astronauts. I didn't get hired in that class, but I got close enough to get offered a job at the Johnson Space Center, working in Mission Operations. So I asked the Navy if they would send me down to Houston as a naval officer, because the Air Force, they must have had too many officers, because they had a hundred people down at the Center then, you know, on assignment from the Air Force. The Navy said, "No, Commander Lounge, we have an aircraft carrier in mind for you."

I said, "No, I think I'll just resign, then, and go to work for NASA." So that's what I did. I left the Navy and became a NASA civil servant in 1978.

ROSS-NAZZAL: How did the opportunity for that job come about? You got the phone call from—

LOUNGE: Well, after the interviews, I was curious about how I did, so I got a debrief on where I stood relative to the candidates who were selected, so I called George [W.S.] Abbey and I said, “I’d still like to work down here.”

And he said, “Okay, I’ll call you back.” Or he said, “I’ll have somebody call you.”

A couple days later, I got a call from either Skip [Axel M.] Larsen or Jim [James D.] Shannon. Skip ran the section in Shuttle Payload Operations. That was the early days of planning how a Shuttle would carry payloads. So Skip was the section head, and I was offered a job working for him. Jim Shannon was the branch chief—John Shannon’s dad—and John [W.] O’Neill, division chief, all working for Gene [Eugene F.] Kranz. In that time, both Mission Ops [Operations] and Flight Crew Ops were combined in one directorate headed by Mr. Abbey.

ROSS-NAZZAL: So you didn’t have the opportunity to interview with any other offices? You were given this one opportunity?

LOUNGE: You just went where George told you to go. [laughs]

ROSS-NAZZAL: Did you have any sort of indication that if you took this position that you might be selected for a future class?

LOUNGE: No. There was no commitment like that. It was obvious that there were thousands of people that wanted a couple of jobs, and you had to do something to differentiate yourself, so moving to Houston shows the commitment. Being more of a known quantity because you’re working in the organization, there’s a chance to either succeed or fail, right? So, no, there was

no promise like that. Actually, in my working for Skip Larsen, Jerry [L.] Ross and Bonnie [J.] Dunbar and I, the three of us, made that same move, and all three of us were selected. One other guy, I can't remember his name, was also a candidate then in '78, and he did not get selected. So a pretty high percentage of those of us who made that commitment. It paid off.

ROSS-NAZZAL: What can you tell me about working with the payloads? What stage was payload development at that point?

LOUNGE: We worked on the crew interface, so that hadn't been established. The contractors were proposing the control mechanisms for the payload and how the computer system would operate and check out the payloads. We got involved in reviewing that, making sure that it was the way that the crew wanted to see it. So my job in those days was, they were just doing very detailed planning for, I think, the first payloads on STS-5, Bill [William B.] Lenoir and Joe [Joseph P.] Allen, had [what] they called PAM, Payload Assist Module, satellites. The PAM-D system was a McDonnell Douglas product, and then the communications satellite went on top of that. So working with the engineers and figuring out how that would be operated by the crew, be checked out by the crew, and then what all the associated simulation requirements were, training requirements. That was the job at that time.

Before that, though, I got to work on—actually, I may be confusing that, because that may have been one of my first jobs as an astronaut candidate. I'm trying to think of the time frame. No, that would have been working as an engineer.

I also got to work on the STS-1 Flight Control Team as the Payload Officer, not a big job on STS-1, because there were essentially no payloads. But there was an observation airplane

that was going to fly underneath the Shuttle as it came back in, crossing the coast of California with cameras to do some imaging, and we were coordinating that. So it wasn't a big job.

In that same time frame, I also was assigned to the Skylab Flight Control Team. In those days, Skylab had been put in kind of on-orbit storage. The hope was that Space Shuttle would be finished in time to fly to the Skylab and attach some sort of—I don't know whether it was to attach a rocket motor to it or use the Space Shuttle to boost it up higher. I don't remember what. A lot of effort went into that in the early days, in the '78-'79 time frame, '78, maybe. They probably started it before then. Then it became clear that Shuttle was not going to launch in time, so Skylab came down in '79 and that ended up being about the time the first Orbiter [Space Shuttle *Columbia*] showed up at the Cape [Canaveral, Florida] about half done.

So I was on the control team that just essentially watched all the parameters of Skylab. There wasn't much we could do except watch it and see how the systems behaved. So I was there standing next to Chris [Christopher C.] Kraft when the thing splashed into, I guess, the Indian Ocean and then pieces of it onto Australia. But that was interesting.

ROSS-NAZZAL: An interesting time. Did you have any fears that Skylab was going to land anywhere where it might injure folks? I know that there was a lot of fear in the United States.

LOUNGE: I don't know if it was fear. There was a lot of uncertainty. We could pretty reliably predict what orbit it would enter on, and we could change in the attitude of Skylab and change how much drag it had, so they were pretty sure they could predict the Orbiter and maybe even the half orbit. So as we got closer, it looked pretty confident that it would be somewhere where it's mostly ocean, so we thought it would come in short of Australia, would have been ideal. As

it is, we hit some—I don't know if we ever caused any damage there, but there was some fairly big tank structures that ended up in Australia. I guess there wasn't a big concern, though. No.

ROSS-NAZZAL: Do you remember NASA getting fined for littering? Do you remember that event?

LOUNGE: No.

ROSS-NAZZAL: Just thought I would ask. We've had some recent requests about that, and there were a lot of people who want to know why didn't NASA pay the fine. They were just fined in jest.

I'm curious about your time on console. You had worked in the Navy for so long. Was this the first time that you had worked with women? Some of the people we've talked to from various classes had worked in the military for so long, that they hadn't had that opportunity.

LOUNGE: Good question. Professionally that's probably true. I never thought of it. But, yes, in fact, because in those days the Navy, women were in the Navy, but weren't on ships. So that's true, yes.

ROSS-NAZZAL: Were there a lot of women who were working on the Flight Control Teams at that point?

LOUNGE: Probably not as many as now, but a fair number. Bonnie, of course. Michelle [A.] Brekke was one of the first selected to be Flight Director in that time frame, or a little after that. ... Linda Ham. Short, blonde. She was in Propulsion, a very sharp gal, obviously in those days too. ... So, not as many as now. The engineering schools weren't putting out as many women then as they do now, but a fair number. It wasn't a big issue; it was just part of the business.

ROSS-NAZZAL: What was it like making that transition from the military to a civilian world?

LOUNGE: Again, not a big deal. NASA felt kind of like a military organization, very strong lines of command. At least that was our attitude, those of us who came from the military. We viewed John [W.] Young as assistant God, and George was God, you know. That was it. [laughs]

ROSS-NAZZAL: What was your schedule like when you were working in Payload Operations and then when you were working Flight Control?

LOUNGE: So we were just doing simulations. I was hired as an astronaut and joined the corps before we flew STS-1, so this was early simulation days, so it wasn't extremely stressful and difficult. Eight to five, seven-thirty to five-thirty kind of job. Not much travel in those days.

ROSS-NAZZAL: Did you guys have a Skylab Splatdown party?

LOUNGE: Oh, I'm sure there was, yes. In fact, my daughter still wears a Skylab Splatdown t-shirt. I think it's her favorite t-shirt. She's twenty-four, right? I think it's her pajamas. [laughs]

ROSS-NAZZAL: That's amazing it's still holding up.

LOUNGE: It is.

ROSS-NAZZAL: Probably has quite a few holes in it.

I also read that you were the lead engineer for Shuttle launched satellites. Anything you want to say about that?

LOUNGE: So that was the satellites that went on the McDonnell Douglas PAM booster. That was that job.

ROSS-NAZZAL: Why don't you tell me about applying for the 1980 class of astronauts. Had it differed at all from the '78 application process?

LOUNGE: No, essentially the same process, just kind of update the package and send it in. So that was done in the spring, I think, of '80 and interviews in the June time frame, and selection around July or August, as I recall. Interview process was very similar. Saw a lot of the same people that I'd seen before, or recognized the names.

So that was a very stressful time, actually. I spent a lot of time thinking, "Well, if I don't get selected, am going to stay here and make supporting from the ground my career?" I'm not sure I'd worked through all that.



ROSS-NAZZAL: So when you got that phone call from George Abbey, what was that like?

LOUNGE: That was good. Actually, I had some indications that I was pretty close, so it wasn't a total surprise, but it was a huge relief, and obviously the largest single career-shaping event of my life, that call.

ROSS-NAZZAL: Were you and Bonnie and Jerry sort of comparing, seeing if someone got a phone call?

LOUNGE: Our offices were within shouting distance, so you could hear the shouts. I think everyone was there that morning. I couldn't tell you who got the first call. But the party that night was at my house, of everyone that called in the Houston area, and there were probably, I don't know, seems like five or six, and then a lot of the '78 class showed up at the party that night, so that was fun.

ROSS-NAZZAL: That's great. So why don't you tell us about that first day as you're walking into the Astronaut Office and you've got this new class of—Dave [David C.] Leestma said you guys called yourselves “the Needless Nineteen.” What did the rest of the astronauts think? We hadn't flown the Space Shuttle yet.

LOUNGE: Too many, right? That was the general attitude, was, “We don't need these guys.” I don't know. It was intimidating. It was like being a freshman. I was going to say college, but maybe even high school again, you know, in there with all the legends. So it was intimidating, I

would say. But we got pretty busy right away, so you forgot about that. We were close to STS-1, so we were on board by, I don't know, the fall sometime, October maybe, September maybe, and went through getting checked out in T-38s. That was exciting. The basic training classes. Waiting for your first assignment. So we got our first assignments around Christmas, and I was assigned to be a Cape Crusader, or the Support Team at Kennedy [Space Center, Florida]. So we had typically half a dozen astronauts down there, about the same number of engineers of the VITT, the Vehicle Integration Test Team, that worked out of the Operations and Checkout Building, crew quarters building at Kennedy. So that was my first work assignment, an exciting one, worked for STS-1.

ROSS-NAZZAL: How closely were you working with the crew of STS-1 on this assignment?

LOUNGE: Well, we were sort of their support guys, so when they would come down for some of the training down there, we would make sure the cabin was set up. We did a lot of test support, so we would be in the Orbiter, on the pad or in the OPF [Orbiter Processing Facility] before it went out to the pad in the final checks, and then on the pad supporting all the pre-launch testing. STS-1, I was flying with Joe Henry Engle in a weather chase airplane, so I watched that launch from 10,000 feet overhead. Sort of missed the sound, but it was a kind of spectacular place to watch from. So that was exciting. So I was down there for the first three launches, STS-1, -2, and -3.

ROSS-NAZZAL: How much time would you typically spend before a mission launched down at the Cape?

LOUNGE: Oh, a week, probably. But it was really a full-time job at the Cape. We would typically fly down on a Monday night or Tuesday morning and fly back Friday.

ROSS-NAZZAL: Were you doing that much further in advance of a flight?

LOUNGE: Well, starting probably the first of January of '81. Is that right? Do I have the years right? Yes. When did we fly? We flew in April.

ROSS-NAZZAL: In April.

LOUNGE: Right. So I was there for that. I was there for STS-2 in November. I was at White Sands [Missile Range, White Sands, New Mexico] in Ground Recovery Team for STS-3, and Jack [R.] Lousma landing in the gypsum dust storm. Don [Donald E.] Williams and I were the exchange crew, so we went in and relived Jack and Gordo [C. Gordon Fullerton] after they landed, and rode *Columbia* on into where they parked it, did all those things. That was fun.

ROSS-NAZZAL: That sounds like fun.

Where did you guys stay when you were down at the Cape?

LOUNGE: Bob [Robert F.] Overmyer, who was sort of the team lead down there, had bought a condo, three-bedroom condo, and he would rent out rooms. That was one place. What were some of the other places? That was the one we stayed at mostly in my time frame.

ROSS-NAZZAL: Who were some of the other people besides Overmyer who were working on this project?

LOUNGE: Ellison [S.] Onizuka, Bo [Karol J.] Bobko was down there; Don Williams; “Ox” [James D.A. van Hoften] was down there; Kathy [Kathryn D.] Sullivan. I think that was my era.

ROSS-NAZZAL: How do you think your career with the Navy helped you in this first on-the-job training assignment?

LOUNGE: Being familiar and comfortable around complicated systems helps. I wasn’t intimidated by it. Well, that’s not exactly true. The first time we went down to the Cape on our class tour, my reaction when seeing the pad, at seeing the Orbiter and all that is, “My God, this stuff’s too big. It can’t possibly fly.” [laughs] I think that’s a common reaction. I knew how big it was, but it’s different when you actually see it and you’re walking underneath the Orbiter and all this stuff. But having gotten over that, it was kind of fun to be there with the hardware. Everyone enjoys hardware over simulations and paper.

ROSS-NAZZAL: Was there ever a point in the astronaut corps where you were talking about, “Is this thing ever going to fly?” You’d been in the office for a while, the ’78 class had been selected.

LOUNGE: No, not so much for us, because we came in and went to work in January, and it flew in April. Of course, the flight rate didn't pick up as fast as we would like, so there was some of that later. "Don't fall in love with your payload." That was the mantra, because in those days it was the policy that the crews flew in order. Seems kind of like a crazy policy now, in retrospect. So if something happened to the payload that was on the flight you were assigned three months before, you learned a new payload and a new mission, rather than slipping with that payload.

ROSS-NAZZAL: That's crazy.

What impact did the delays for STS-2 have on your position out at the Cape? There were several delays getting that mission off.

LOUNGE: Actually, I was pretty sick in that time frame. I had a case of mononucleosis and missed, oh, I don't know, six weeks of work in that time frame. That's mainly what I remember.

ROSS-NAZZAL: STS-3, you mentioned you were out at White Sands.

LOUNGE: I was.

ROSS-NAZZAL: Can you tell us about that landing? Were you there for the first few days when they were talking about landing out there?

LOUNGE: Yes, we were. It was pretty clear they were going to have to land at White Sands because of the rains in California, and either one day or two days before the landing, we were out

doing a practice convoy, so the convoy, it's I don't know, ten vehicles or something like that, and there's a dust storm you wouldn't believe. We were stuck out there with zero visibility, kind of leaning over at about a 45-degree angle from the wind, and I'm thinking, "And they're going to land an Orbiter here tomorrow?" [laughs] It was hard to believe. In fact, it cleared up the next day and it was a nice clear day, although I'm told that many years later, picking up pieces from East Texas of *Columbia*, they were finding gypsum from White Sands.

ROSS-NAZZAL: Really.

LOUNGE: Some of that stuff got in there and never got out. I don't know if that's true, but possible.

ROSS-NAZZAL: That's interesting. I know that, what was it, last year they were talking about landing the Orbiter in New Mexico. I thought that would be a sight to see.

LOUNGE: Yes.

ROSS-NAZZAL: I mean, it's beautiful out there with the white sand.

What was it like? Were there a lot of people out there to greet the crew?

LOUNGE: No, not really. It's kind of a hard place to get to and not designed for public viewing. I don't really know how many were really there, because I was inside the Orbiter most of the time. But, no, it was kind of a remote operation.

ROSS-NAZZAL: Your biosheet also says that you specialized in the Orbiter computer system.

LOUNGE: So my job after my stint as a Cape Crusader was, I was the astronaut representative to the Orbiter Software Control Board, or actually it was the Avionics Software Control Board. So I relieved David Leestma of that job; he had it, then I had it. I think Dale [A.] Gardner had it before him. So I guess Navy Mission Specialists were kind of on that track. But that was a fascinating job because I got to really understand how the Orbiter worked. It's a software-driven machine. So we were involved in all the discussions about should we do this change or that change, and what's the risk of doing the change versus the benefit. So that was a very rewarding job. I liked that a lot. Taught me a lot.

ROSS-NAZZAL: And did you work in SAIL [Shuttle Avionics Integration Laboratory] or FSL [Flight Systems Laboratory] at Downey [California]?

LOUNGE: SAIL more than FSL. In that time frame I think FSL was on its way out by then. We didn't have much to do with that.

ROSS-NAZZAL: And were there other astronauts assigned to this task while you were working assignment?

LOUNGE: No, that specific job of being the representative to the Control Board was a one-person job. We had, I don't know, three or four assigned to SAIL, but that was a little different job, really.

ROSS-NAZZAL: Did you have any other duties before your first flight?

LOUNGE: I don't think so. I think I went from that assignment to that flight crew assignment.

ROSS-NAZZAL: Why don't you tell me about how you found out you were selected for your first flight.

LOUNGE: I was on vacation. I had never taken a two-week vacation, so I pressed and pressed and got all the work done and flew—we had a little airplane then. Flew to Colorado, my home town, and then I came down with walking pneumonia when we arrived and finally checked myself into the hospital and was there for a week. I think that's when I got the call.

ROSS-NAZZAL: Not such great circumstances, huh?

LOUNGE: Yes, yes.

ROSS-NAZZAL: So you were obviously pretty happy, though, that had been selected.



LOUNGE: That was great. Didn't see that coming. To be on Joe Henry Engle's crew, which was great, Dick [Richard O.] Covey as the pilot, and a great crew besides that.

ROSS-NAZZAL: Can you talk a little bit about the crew relationship? You had worked with Joe Engle.

LOUNGE: Worked with Joe at the Cape. Ox a little bit at the Cape, Ox van Hoften. Bill [William F.] Fisher was in my class. Hadn't worked with him before, but knew him well. And me. So, very, I guess by some standards, a small crew and obviously stale, pale, and male. But we had a great time. The training was fun for that mission. It was great mission. Turned out to be greater than we had originally planned. I don't remember our original payload. Our original payload was a TDRS [Tracking and Data Relay Satellite], must have been, because I remember going to Seattle [Washington] for a technical meeting, and there was another crew that also had a very similar payload, and Rick [Frederick H.] Hauck was commander of that. We had a race to get to Seattle from Houston, and we beat them. That was a big deal. We thought about taking off the travel pod on the T-38 to see if we could go faster and do without our clothes, because winning was important. I think we finally decided we didn't need to do that, but we were prepared to drop our travel pods in El Paso [Texas] so we could make it one leg from El Paso to Seattle. Instead, we had to do El Paso to Las Vegas [Nevada] to Seattle. [laughs] That was great.

ROSS-NAZZAL: Now I understand from Dick Covey and from Ox van Hoften that you basically came up with this plan to go save an ailing satellite, you and Ox, when you were working in the Reserves. Can you tell me your recollection of that?

LOUNGE: Yes. Well, Ox and I were in the Air National Guard at Ellington [Field, Houston, Texas], and we were on alert, I think the same night. You would go out there and do alert duty, defending the soft underbelly of the United States, right, with these ancient F-4 airplanes. I don't know what we'd have done. But it paid pretty well.

So we were on alert together that night, and this is the same day that the—I don't know, or within days of the problem on—who was commanding that mission? It was the one [U.S. Senator] Jake Garn was on, [STS 51-D], so this would have been spring of '85. When it became clear that satellite was okay, it was just a matter of a switch that powered the computer had failed, and the technical guys thought they could design a way around that failed switch. The problem was, what do you do with that? So we, essentially on the back of an envelope, said, well, what's the mass properties of this thing? Could it be handled by some sort of handling device by hand? It's a reasonable task to do. Attached to the robot arm and then if we had to push it away, what kind of forces would we have to push on it to make it stable, and is that a reasonable thing to do? So we calculated a twenty- or thirty-pound push would be enough. Eventually they did computer simulations and said, well, it's 27.36 pounds. Okay. But, no, it was kind of the feasibility thing.

So we went back to Joe and said, "Yes, we could do this," and Joe really pushed it through Center management and up to [NASA] Headquarters [Washington, DC], "This is something we could really do." The key to the success of that mission and being able to do that

was NASA was so busy flying Shuttle missions that year that nobody was paying attention. If we'd had more attention, there'd have been a hundred people telling us why it wouldn't work and it's too much risk. But fortunately, we flew, what, ten missions that year, I think more missions than any other year. There was a twelve-month period we flew ten missions; we were one of those. That was the key. So that was great fun, just figuring all that out and training for it and then going to do it.

ROSS-NAZZAL: Were you surprised that you were able to—I don't want to say "hoodwink," but that you were able to achieve this plan that you and Ox had come up with on the back of an envelope?

LOUNGE: No, I was naïve then. I didn't know how hard the bureaucracy was. Today it would just astonish me that that would happen. But, no. Actually, we had a pretty narrow view of how NASA worked, I think, as crewmen back then. I didn't appreciate the big contractor team that was necessary to make all this work. I knew who built what, of course, but we really didn't have the—today the Internet and *Space News* and just the whole culture is one of much more data sharing, and you know what's going on, you know what the problems are. Back then, you didn't know what the problems were until they bubbled up to kind of the flight-readiness level, maybe a little bit before, but I think that's different today. And I wish we'd had a little more knowledge back then, or maybe not. Maybe we would have worried a lot more than we did.

ROSS-NAZZAL: How did doing things sort of on the fly impact the training for this mission?

LOUNGE: A lot of the things we couldn't train, especially that kind of mission. Actually, that made training more fun, because there was less rote learning. You had to train for skills and not for tasks, because you weren't sure how it would go.

ROSS-NAZZAL: Did your crew come up with any sort of tools to see that the mission would succeed?

LOUNGE: We built special handling tools and we were involved in the design of those, and they built them all on site in Building 9. So, a handling bar that was attached to the satellite. The satellite was the size of a Cadillac Escalade, probably.

ROSS-NAZZAL: That's pretty big.

LOUNGE: Weighed about—well, maybe even heavier, probably heavier. Weighed about, I don't know, ten thousand pounds, five tons, something like that. It's pretty big. So we designed a bar that would be attached. I guess that was the main mechanism. There was a grapple fixture that Ox had to connect so I could grab it with the arm. Then there was essentially a computer package that was bolted on—I don't know how we attached it—that was essentially the way we bypassed the failed circuitry inside. There was a radio receiver that was put down by the rocket motor to ignite the rocket motor after we were safely away. They did that by ground command. So those were some of the pieces that we had to deal with.

ROSS-NAZZAL: The launch of this mission was scrubbed a few times.

LOUNGE: Three. Two. Well, scrubbed twice. We flew the third time.

ROSS-NAZZAL: What did you guys do to pass the time?

LOUNGE: Went to the beach house, I think, swam. So that's frustrating when you climb in an Orbiter and you don't go. So you never want to ask the crews, "Is the weather okay?" That would be the wrong people to ask. Because they asked Engle on the day we did launch. So it's raining all day long—we're launching at, what, seven in the morning—all night long, and there's this little clearing that comes right over the pad just about the time we're supposed to launch. Going out there, we had to put slickers on to keep dry, and we thought, "Well, this is a waste of effort. Well, we'll just go through it." We got on board and suddenly, well, maybe it could happen. We think we see some stars up there. Then it starts drizzling a little bit, and the Launch Director calls Joe and says, "How does it look out there?" Joe says, "Well, it looks fine." So we launched. So what I think happened is that clearing in these clouds moved out over the Gulf and became Hurricane Elena, because during our mission, Hurricane Elena essentially filled up the entire Gulf of Mexico. So that's the launch weather story.

ROSS-NAZZAL: Why don't you tell us about that first launch and then your first day on orbit.

LOUNGE: So when I'm asked what launch is like—and I had three of them—what I describe is the first one was like slow motion. Everything took so long. There's just this huge "boom!" and you kicked off the pad in this huge cloud, and I'm sitting in the middle, but I had a pretty good

view because one of the things I did in training is we had a pocket checklist about this size [gestures], and I had them build me a Mylar mirror that I put on the back of the checklist, and what I told them I needed it for was there are a bunch of switches up here and I needed to be able to see those switches, make sure they were properly configured, and in some malfunctions, throw a switch. But what I really wanted it for was to look out the window, because there was this big overhead window over my left shoulder, but when you're strapped in the seat, there's no way you can look out. But if you hold this mirror right in your lap, this great view as the Orbiter lifts up and rolls, you're looking through that window right down at the pad, and this huge billow of smoke and flame, and the pad gets smaller and smaller. So that was pretty cool.

So the launch itself is very slow, I thought. It just took forever to get to Max Q and throttle down and throttle back up, and finally the solids come off and you see the flash, and sure enough, the engines get burning and the Gs come on again and you just wait for every call, "Negative return," "Single engine TAL [Transatlantic Landing]," you know, "Abort to orbit." So it seemed like it took twenty minutes to get to MECO, main engine cutoff, and then you're floating there. You kind of float up into your straps and your checklist floats up, and dust, a little bit of dust. Pretty busy right then, because you've got to make sure you get through the maneuvers to keep you in orbit. But then you get a minute and you want to sneak a peak, and by then your stomach has floated up to your throat. But it's pretty cool, and then you float up, look out the window, so you're upside down now, probably. It's just too overwhelming, the first view is. "I've got to get back to work. I'll deal with that later." And so you go back to work, and then finally you look out at this astonishing view of Africa by now coming by, and still busy, a lot of post-launch cleanup to do, get out of your launch entry suits, which was no big deal. That was before the big orange suits.

Just amazing. I remember really getting comfortable, sort of comfortable, about the time we came past Florida again, and looking out and you could see the contrail that we made going up an hour and a half before. It was still kind of there, just getting dispersed.

That was still a busy day on that flight. So I had a screw-up there that caused it to be busier than it should have been. So we'll talk about that. We were supposed to deploy a satellite several hours into the mission. We had three satellites to deploy: two smaller satellites, one for American Satellite Company that distributes *U.S. Today* newspaper, one for Australia, I think, and the third one was a big Navy communications satellite that was a twin to the one we were going to repair. So we were supposed to do one the first day, one the second day, one the third day, and then the fourth and fifth days were repair days, and there was a day in between.

So one of the things they had done before in the last couple of weeks before launch, they entered a task that said activate the camera and look at the payload bay and the sun shield to make sure everything was intact after launch, and we did that. I did that; that was my job. Then I commanded the sun shield open, and I had failed to stow the camera. If it had been Day Two instead of Day One, I'd have been more aware of it. On Day One you're just kind of overwhelmed and you're just down doing the steps, and it's not a good defense, but that was an example of why you don't change things at the last minute and why you don't do things you haven't simulated, because we'd never simulated that. That was some engineer or Program Manager said, "Wouldn't it be nice to add this camera task."

So now I had a camera out of position, opened the sun shield against the camera, and it bent the sun shield and it got hung up on the top of the Shuttle. So that was exciting. So then we had to activate the robot arm early and get it out and essentially use it to bang against the sunshade, like a baby buggy, very flimsy structure with aluminum tube frame and Mylar fabric,

so not a lot to it, but it had to get out of the way. So I maneuvered the arm. Oh, by the way, the arm isn't working either. The elbow joint had a problem that wouldn't let the automatic control system operate the arm, so I had to command the arm single-joint mode, which means instead of some coordinated motion, command the tip to move in a certain trajectory, you just had to say, all right, elbow, move like this; wrist, move like this, rotate like this. So, a little awkward and took a while, but I got the arm down there and banged on the solar array and got it down, and then we deployed that one. That was actually the one we were supposed to deploy on the second day, so we got that one out of the way. Then actually that was probably—was that “Fish's”? Fish was responsible for that, and I was responsible for the other one. Anyway, we deployed both of them on the same day, five or six hours after launch. So that was exciting, more exciting than it needed to be.

Was that the question you asked? I don't remember.

ROSS-NAZZAL: No, it's great. All these details are really helpful, and they were questions I planned to ask.

LOUNGE: Okay.

ROSS-NAZZAL: Did you experience any sort of space adaptation syndrome?

LOUNGE: Yes, probably typical. The first day you don't feel much like eating, and you're stuffy and fluids shift to your head, so you get the headache and the kind of stuffy nose, and want to move slowly and you don't like to see things upside down. It bothers you to see somebody



sitting on the ceiling eating, for instance. And that's kind of first-day experience. That flight, I actually didn't get sick, but could have if I'd thought about it.

The next day you feel great. It's like a switch. It's really an adaptation, I think, in your brain, that the brain has to just reconcile what it sees with what it thinks it should see. So as soon as you [snaps fingers] flip that switch somehow, it's okay and it's just fun. It's just easy, you float around, you push off with your little finger and you're on the other side. If somebody wants to sit on the ceiling, well, that's up to them, because that's fine. Every man for himself.

That was typical, I think, for my other two flights as well. Second flight, which we'll talk about probably later, we had a spaceship cooling problem going uphill, so it was a lot hotter, and we're in these launch and entry suits, these big orange pumpkin suits that have their own cooling problems, so that added to just a lot more discomfort on launch on my second flight, so that was worse. Actually, I did get sick. I was down using the WCS [Waste Collection System] twenty minutes before I deployed the TDRS satellite; that was my job. So I just went down, did it, and came back up and finished the checklist. It was just another task I had to do, but that was not a fun day. That's why it's interesting—and I hope these space entrepreneurs succeed, but the newest craze is selling tickets for a suborbital ride that lasts four minutes, and they pay \$200,000 for it. The first day is just not something I'd pay for. [laughs]

ROSS-NAZZAL: I guess they won't ask you to be their spokesman. [laughs]

LOUNGE: No, probably not.

ROSS-NAZZAL: That's funny.

LOUNGE: We were talking about launch. So I described this first launch as it seemed to take forever. My second launch was the first flight after the *Challenger* accident, with Rick Hauck and crew. That flight had taken so long to finally get ready and go through all the extra certification steps and everything, although we didn't have any launch delays. We only suited up once. I think we stayed on the pad for an extra thirty minutes or so for upper-level winds. But that launch happened very quickly. Just everything flew by. That seemed to take four minutes. I don't know why, it just did.

Then my last launch, on *Columbia*, was just like being in a simulator. That was a normal eight and a half minutes and things happened like they should. It was all differences in my attitude, I think.

ROSS-NAZZAL: I guess you get acclimated.

LOUNGE: Yes. STS-26, there had been a lot of scrutiny on that flight, you know. It was about as safe as flying a Shuttle could be. I think we were just so anxious to get gone, it seemed to go faster.

ROSS-NAZZAL: On your first flight, how did you handle issues like sleeping arrangements and when you would eat meals, things like that?

LOUNGE: The first flight, I don't remember having any strong meal discipline; you ate when you were hungry, fixed your own thing. Slept where you wanted to. In fact, if you go over to the

Visitors Center and go to the mockup of the Shuttle middeck, there's on the wall a picture, a poster, of one of the astronaut sleeping bags. It's strapped up to the wall, because that's where they were launched. You're supposed to unstrap them and get them out and get in them. I just got behind it, because I liked the feeling of that pushing me against the wall. So if you go over there you'll see this hand [gestures], that's all you see, and it's that hand. So that's where I slept on that flight.

ROSS-NAZZAL: I'll have to check it out.

LOUNGE: Yes. It's easy to take naps, because you just relax and you float around, but the trouble is you end up with your head next to the toilet or, worse, next to the teletype. That was before e-mail, so we had this very noisy teletype thing to get our flight plan changes, and that would wake you up if you were too close to that.

ROSS-NAZZAL: I understand you guys got to take Walkmans up and take music with you.

LOUNGE: We did.

ROSS-NAZZAL: Any special music that you took with you?

LOUNGE: Well, yes, I guess you know that I'm a big country music fan, and specifically Willie Nelson fan. I don't know who arranged this, can't remember, but we used to have wake-up music—oh, you asked the Walkman question. So I had a nice selection of country music, a lot

of Willie Nelson. But the cool thing about that was we used to have wake-up music that was picked out by the CapCom, the Capsule Communicator, in the Flight Control Team, and it was kind of tuned to the crew's interests, so on the second or third day of that mission, the wake-up music was Willie Nelson and the Geezinslaw Brothers singing about—and I can't remember the song; I've got it somewhere. But it was about our mission. They had written late one night. I don't know what the connection was that got them to do that, but it was done on kind of short notice and they had to get it over to Mission Control in a hurry, so we had somebody from Mission Control go to Hobby Airport and pick it up from the runner that they had bring it over. This won't mean anything to you, perhaps, but the runner was named Earl Campbell.

ROSS-NAZZAL: No.

LOUNGE: So Earl was All-American running back and star of the Oilers in that time frame.  
[laughs]

ROSS-NAZZAL: That's kind of cool.

LOUNGE: Yes, it was cool.

ROSS-NAZZAL : Who was your CapCom for the flight?

LOUNGE: [Charles] Lacy Veach. I think Leestma. I think David. Those are the two I remember.

ROSS-NAZZAL: And they're the ones in charge of picking the music?

LOUNGE: Yes. I don't know how they got that to happen, but as a result of that, later, about a year later, Covey and I flew over to—maybe it was a couple of years later, we flew over to Austin [Texas] and played golf with Willie on his golf course. That was a real treat.

ROSS-NAZZAL: All the astronauts always talk about the people that they got to meet when they were on the crews; the president and football players and things like that. I think Dick Covey went over to California to film *Home Improvement*.

LOUNGE: Yes, he did on one of his Hubble flights.

ROSS-NAZZAL: Just kind of interesting, those connections that you would make as a flight crew member.

Why don't you tell me about the EVA [Extravehicular Activity] and the role that you played in the recovery.

LOUNGE: So it was two days of EVA. The first day was rendezvousing with this satellite that had failed, stranded in low Earth orbit. So I'm the robot arm operator and the valet, so Bill Fisher and Jim van Hoften were the EVA crewmen. My job was to get them prepared, make sure that their suits were all functioning properly, get them in the airlock, and then as we approached the satellite, I went upstairs to the flight deck and got the robot arm activated, and

then as soon as Ox got outside—Jim van Hoften—he installed a foot platform at the end of the arm, I grabbed it. He got into that and then I maneuvered him up high above the Orbiter as we fly toward this satellite, and then his job was to reach out and grab it, as we had postulated six months earlier in the guard shack out at Ellington. So that was cool. That was surreal, really.

Everything didn't go real smooth on that approach. I don't know if you've talked to Engle, but you've talked to Covey, obviously.

ROSS-NAZZAL: Yes, talked to—

LOUNGE: And Ox.

ROSS-NAZZAL: Yes.

LOUNGE: Did you get Engle yet?

ROSS-NAZZAL: We did. Actually, now that I'm thinking about it, the only person we haven't talked to is Fish.

LOUNGE: So when the Orbiter's flying in space, it uses these big, really massive control jets. They're hard to describe. The Orbiter's too big to actually fly. They spit out a lot of this exhaust when they fire. Coming in, one of those exhaust plumes hit that satellite and got it tumbling, and so now we're flying up closer, and this thing's tumbling, and Joe's instinct is to try to match it, and Covey and I both yelled at him, "No, let Ox do it." And so we just flew up to it and let Ox—

and I say it's tumbling, but I don't mean real fast. It isn't stable. So Ox reached out and grabbed the—it's really the hard points that were used to attach it to the payload bay when it launched. Managed to grab those and get it slowly damped out and under control. But that was pretty exciting, seeing that thing floating around and wondering if we'd catch it.

One of the images I have etched in my brain is the sun is either probably just about to go down, and there's this satellite and there's Ox kind of looking at it, and Fish is on the work platform on the payload bay rail, looking at this thing as it sort of tumbles out there, and we're wondering, what next? Fortunately, or unfortunately, I don't know, that was the days before we had continuous communication with the ground, so half the orbit you could talk to them and half the orbit you were out of contact, and this was all out of contact from there out.

ROSS-NAZZAL: So they were surprised when you called back and said—

LOUNGE: I think by the time we got the thing captured during a loss of signal, so it was all stable, except we had burned a lot of gas. [laughs] More than we were supposed to.

ROSS-NAZZAL: The rest of the EVA went well?

LOUNGE: Yes. I mean, it was slower than probably we had simulated, because the robot arm was a single-joint operation, so we had to be very deliberate about moving the one joint at a time, but we worked out way through that, got it handed down to Fisher, who installed the handling bar and then he held it while Ox put on a grapple fixture. Dropped Ox off and went up and grabbed the satellite, and that was really the high tense part of the mission. Once I had it stable

on the end of the arm, then it was going to be okay. So we did about half the work that day and parked it overnight, went out the next day and finished the job.

ROSS-NAZZAL: What was the feeling in the crew cabin once the EVA had been completed, and you had finished all of the tasks you'd set out to do?

LOUNGE: Wow. I mean, we were pretty glad. Of course, it was time to get home then. There's five or six consecutive miracles that have to happen before you get home safely, so we were sort of focused on those.

ROSS-NAZZAL: What were some of those tasks that you focused on?

LOUNGE: Well, getting the cabin all stowed is a big deal, and then just executing all the steps to slow down, get out of orbit, get the OMS [Orbital Maneuvering System] engines burning about three minutes. You lose about 1 percent of your velocity. That's enough to start lowering down and scraping on the top of the atmosphere. Going through that entry was a spectacular thing.

ROSS-NAZZAL: You weren't sitting on the middeck. You were sitting upstairs?

LOUNGE: I was in the middle, upstairs, looking out the window. Ox was right by me, looking out the window. He probably told you that.

ROSS-NAZZAL: I think so, yes.



LOUNGE: He said, "Well, I'll go downstairs in time for landing." He didn't.

ROSS-NAZZAL: Did you take any photos of landing, or you just sort of took it all in as you were going down?

LOUNGE: I got some photos of the plasma wake, if you will. As we come ripping through the atmosphere at Mach 25, it just shatters the atoms and makes this bright orange plasma trail. You can actually see it from the ground. It's like an orange glow-in-the-dark kind of chalk drawn across the dark sky that you could see on a nice clear night. So that is just an awesome fireworks show. I got a couple shots of that out the window before we got down too low.

ROSS-NAZZAL: Once you finally were on Earth, and you opened up the crew cabin and stepped outside, what are your recollections?

LOUNGE: Well, before that, you know, it takes a while for them to get the access ladder up there and the technicians up there, and we're anxious to get out, so we've got all our stuff off. I'll never forget the technician's face when he cracked the hatch and the air equalizes, and then the look on his face, made me realize what a stinky place it must have been, because we didn't know. Our noses had plugged up nine days before. That was a priceless look. [laughs]

You're a little tentative on your feet at first, and you have to take the corners very carefully. Kind of like going up, it takes about a day to get adjusted. By twenty-four hours after landing, it feels like you never came home.

But that first coming into the atmosphere where the wings start holding up the vehicle, so you start feeling weight and your head starts to fall down on your chest, it takes an effort to keep your head up, and your checklist doesn't stay where it belongs, it kind of sinks down into your lap, and you think, "This feels awful, this gravity stuff. Am I going to feel this crappy for the rest of my life?" [laughs]

And you roll to a stop, and it's time, you've done the post-landing clean-up things and it's time to stand up, and the first time you try, you can't do it. It's not that you've lost strength; it's just you forgot how hard you have to try. So you really have to try to stand up and then you can.

ROSS-NAZZAL: Was your whole family there to meet you?

LOUNGE: Yes, for that one. My kids were pretty little then. Kenneth was four and Kathy was not two yet, barely. Almost two. No, one and a half. One and a half.

ROSS-NAZZAL: Were you ready to go right back up? Some of the folks we've talked to said they were ready to go the next day.

LOUNGE: Oh yes. I had a flight assignment before I landed. A month before we flew or something like that, we got assigned to the Ulysses Centaur flight, which would have flown in May of '86 on *Challenger*. So when we saw *Challenger* explode in January 28<sup>th</sup>—before that lifted off, I remember thinking, "Well, [Frances R.] Scobee, take care of that spaceship, because we need it in a couple of months." So we would have been on the next flight of *Challenger*.

ROSS-NAZZAL: Any concerns?

LOUNGE: Well, we weren't then, but, yes, I guess we should have been.

ROSS-NAZZAL: I think I read someplace that your wife was working at the Johnson Space Center.

LOUNGE: She was. She was a flight controller. Now ex.

ROSS-NAZZAL: Did she have any concerns about you flying on board the Space Shuttle?

LOUNGE: Probably. I don't know. But she was part of the team, so it was her mission as well as mine.

ROSS-NAZZAL: Tell us about your public relation tours after you came back from your first mission.

LOUNGE: Well, the most fun one was I went to my little hometown in eastern Colorado and they had Mike Lounge Day, and they had a parade. There were about a hundred floats in the parade. There were more people in the parade than there were in the town. I think they had to take turns watching the parade and being in the parade. That was pretty cool.

ROSS-NAZZAL: Did you get the key to the city and all that stuff?

LOUNGE: Oh yes. A street named after me. There are not a lot of streets, but—.

ROSS-NAZZAL: How big is the city?

LOUNGE: Oh, I don't know. Three thousand people, maybe.

ROSS-NAZZAL: Sounds fun.

LOUNGE: It was fun.

ROSS-NAZZAL: You had mentioned that you were assigned to another mission before you flew, which was [STS] 61-F, which was the Centaur mission.

LOUNGE: Right.

ROSS-NAZZAL: Was there any discussion amongst the crew that perhaps NASA was putting you at risk, since you were going to be flying a liquid rocket?

LOUNGE: Oh, we were very worried about it. We were involved in all the design reviews, the safety reviews, developing procedures for getting rid of that stage if we had a problem during launch. So that was a big concern, yes.

ROSS-NAZZAL: Did you ever approach John Young or George Abbey or Rick Hauck at that point?

LOUNGE: No, we assumed we could solve all these problems. We were still basically bulletproof. Until *Challenger*, we just thought we were bulletproof and the things would always work, some details to work out, but I guess that was my attitude, anyway. It was a challenging mission, it was a privilege to be assigned to it, important mission, I thought, so, we just had to work it out, was our attitude.

ROSS-NAZZAL: How closely were you working with the folks out at Lewis Research Center [Cleveland, Ohio] and the other contractors?

LOUNGE: Very close. Very close. In fact, they probably blamed us for getting that mission canceled, but we really weren't aggressive about that. We expressed some concerns about adequacy of the software or making sure we had the right procedures, but we thought it would work.

ROSS-NAZZAL: Were you surprised when [James C.] Fletcher finally decided to cancel the Shuttle's Centaur program?

LOUNGE: After the accident?

ROSS-NAZZAL: Yes.

LOUNGE: No. After the accident, it was a different environment, different willingness to take risks, different—because another accident would have killed the program forever. So, no, I wasn't surprised.

ROSS-NAZZAL: Did you have any involvement with the crew of STS-41 that eventually ended up flying the Ulysses spacecraft?

LOUNGE: No. No, by then I was off working station design, I think, Station Freedom.

ROSS-NAZZAL: Where were you when you heard about the *Challenger* accident?

LOUNGE: I don't remember if it was a training class. It was a flight procedures review, reviewing the Centaur abort procedures that we might have to exercise in May, when we flew that mission on *Challenger*. So we stopped the meeting to watch on the monitor in the room, watched the launch.

ROSS-NAZZAL: And what did you do immediately after you saw that the crew had been lost and the *Challenger* as well?

LOUNGE: So it was obvious when the thing blew apart. Nobody said a word. I think we all just filed out. My wife was due to fly in from a trip she'd had to California within an hour and a half

of that, so I decided to drive up to Intercontinental [Airport, Houston, Texas] and meet her. So that's what I did.

ROSS-NAZZAL: Did you have any responsibilities in the investigation or the recovery?

LOUNGE: Yes, I supported the technical team that looked at the tank and the engines, and tried to understand what had happened there, make sure there wasn't any engine-related problem. So we didn't know at first that it was the solid rocket booster joint, although that came out pretty quickly, so I didn't spend a lot of time on that task. A little bit.

ROSS-NAZZAL: What effect do you think the accident had on the astronaut corps?

LOUNGE: Well, it got rid of a bunch of people that were unwilling to wait around then, because it was obvious that this was a major change in the program, that we would never fly as much as we thought we would fly, and it would be several years, unknown how many years before we flew again, so I think it motivated people to leave. Ox is one, for instance, because he was not wanting to wait around. Did people leave because they now understood that this was a real flying business where accidents happen? I don't think so. Most of us came from operational backgrounds where that happened.

ROSS-NAZZAL: Did you ever consider leaving the Astronaut Office at that point?

LOUNGE: No. No, Rick Hauck said, "We're going to be all right. We'll be fine." He hinted that we might fly soon or we might be on the crew that flew the return. He went to Headquarters and was Public Affairs Associate Administrator for Fletcher then and was very tight with Fletcher, so we just hung around.

ROSS-NAZZAL: Before you flew on STS-26, you were working in Space Station.

LOUNGE: Yes, I got assigned to Space Station, the early conceptual design, Station Freedom at that time.

ROSS-NAZZAL: Was that the dual-keel design at that point?

LOUNGE: Well, it started with dual keel and had a racetrack arrangement of modules. It had all kinds of silly stuff. It had a hangar for fixing satellites. I don't know how we thought we'd ever lift all that up there or make it work when we got it there, but, yes, that was that time frame.

ROSS-NAZZAL: And were you primarily working crew interface as you were in the seventies with the payloads?

LOUNGE: Yes, yes, that's the assignment. Crew concerns. One of my big campaigns was windows in the staterooms. I said, if you're going to have staterooms, they have to have windows.



ROSS-NAZZAL: What are staterooms?

LOUNGE: Well, it's crew quarters, like on a ship. So I think in the end they didn't even have staterooms. They got tents in the hallway. In those days we insisted on staterooms with windows.

ROSS-NAZZAL: Who were some of the other folks you were working with?

LOUNGE: Story Musgrave. Ron [Ronald J.] Grabe was involved then. We set up an office to focus on it, so I think Mike [C. Michael] Foale worked with me for a while. Those are the ones I remember.

ROSS-NAZZAL: The Astronaut Office had changed a little bit since you had come in. I think John Young had left and Dan [Daniel C.] Brandenstein became chief.

LOUNGE: Right.

ROSS-NAZZAL: Flight Crew Operations, George Abbey wasn't there anymore, is that correct?

LOUNGE: He left after *Challenger*.

ROSS-NAZZAL: What impact did that have on the office as you stepped into more of a more management-type position?

LOUNGE: Things were probably a little more straightforward, you know, how decisions were made. So I worked for Don [Donald R.] Puddy as the Flight Operations Directorate Director. Your basic question was how did the environment change?

ROSS-NAZZAL: Yes.

LOUNGE: I think we were all more realistic then. Sort of the halcyon days of “We can do anything” and “The Shuttle will revolutionize the world,” that was changing. We realized that with the satellite business going back to expendable rockets, that the Shuttle had to have a mission, and so that’s why Station became very important, so we started really focusing on making Station a real thing so the Shuttle had something to do.

ROSS-NAZZAL: That makes sense. When did you find out officially that you were going to be on the Return to Flight crew?

LOUNGE: They timed that at the one-year anniversary of the accident. That’s when they announced it. I think we knew it a couple weeks before.

ROSS-NAZZAL: What did your family think of that decision?

LOUNGE: They were okay. It was fine. You either stay in the business or you get out of it, and if you stay in the business, it’s to fly.

ROSS-NAZZAL: A lot of people have told us, and I've read as well, that everyone wanted to be on this flight. Can you explain why that was the case?

LOUNGE: What I just said. If you're going to stay in the business, you stay in it to fly. So, yes, that was a big deal to be on that flight. My story is, well, they just picked the most qualified, best-looking crew they could find. The reality is, Rick Hauck already had the crew, essentially four of us, [6]1-F, were lined up sort of in line, and they added Pinky [George D. Nelson] to make the fifth, so that's the real story.

ROSS-NAZZAL: Tell me about the crew relationship. You guys were all veterans and you were going to be flying this flight.

LOUNGE: Yes. So that was a good, hardworking crew. We had a lot of responsibility, I think, and that was a lot more public. The first mission, as I said, we did it because no one noticed. We were just one of ten. Now suddenly we're one of one, so there was a lot more public pressure on doing things. I'll never forget Dan's prayer as we go to the pad for STS-26. He said, "We need to take time to say a brief prayer." Said, "God help you if you screw this up."  
[laughs]

ROSS-NAZZAL: Thanks, boss.

There was a lot of press interest, of course, in this Return to Flight.

LOUNGE: There was.

ROSS-NAZZAL: How did the crew handle that?

LOUNGE: You just focus on it. I mean, you don't see that. When you're flying, it's just the five of you and the CapCom. That's all there is in the world.

ROSS-NAZZAL: I understand that there was a *48 Hours* episode and you were also featured on the cover of the *New York Times Magazine*.

LOUNGE: Yes, that's true.

ROSS-NAZZAL: What did you think of all of this media attention?

LOUNGE: I didn't care for it, but part of the job, I guess. Not part of it that I sought out, enjoyed particularly.

ROSS-NAZZAL: Had training changed at all since your last flight?

LOUNGE: Probably a lot more training on contingency scenarios, the things that could go wrong during launch and what to do about them, although I've always been a little skeptical that that was really a "stay busy" kind of approach. Reality is, if things really start going wrong, there's not much you can do.

ROSS-NAZZAL: Was that sort of the consensus among the astronauts when the crew escape system was devised?

LOUNGE: Oh, yes. What a waste. That's political eyewash. And I really feel bad we didn't stand up and say that, because it's an extra I don't know how many thousand pounds of weight in the crew cabin that takes away from the payload-carrying capability of the Space Shuttle, and it just is no value added. It's value subtracted. What little you could do in the event something went wrong, you could do less of it when you're burdened by these suits that do you no good. I was totally against it and still am. They offer no value.

ROSS-NAZZAL: Interesting. Have you had a chance to read Mike Mullane's book [*Riding Rockets: The Outrageous Tales of a Space Shuttle Astronaut*]?

LOUNGE: Yes. Mike's great. Mike has a lot better memory than I do. He remembers things. I think he also has the writer's skill of where he can't remember, he makes it up. [laughs] In a creative way. My idea of the world in the office back then was never as Machiavellian as Mike's.

ROSS-NAZZAL: What did you think of his depiction of the Return to Flight crew and his depiction of Rick Hauck, the commander?

LOUNGE: I'm trying to remember what he said.

ROSS-NAZZAL: I haven't read it in a while, but I think he thought the crew was a little full of themselves, that they got, of course, dibs on all the simulators.

LOUNGE: Oh yes.

ROSS-NAZZAL: Seemed like the Return to Flight crew was taking up too much time [and received too much attention for their relatively easy mission].

LOUNGE: He was just jealous. He was just jealous. Although I like to claim that we did have a pretty good parking place. In fact, Building 4 South is smack on top of my old parking place. [laughs] So that was not bad, being prime crew for thirty-two months. Well, not thirty-two. Thirty-two minus twelve. Twenty months we were prime crew. So there were some perks to pay for all that crap about being in the press and dealing with the press and all that.

ROSS-NAZZAL: What was the mood like at the Center as you were preparing for this flight?

LOUNGE: Just anxious to get on with it. We'd dealt with all the issues. Truth is, we could have launched on the next warm day. So we had to fix that problem about three different ways. Flight rules say you can't launch when it's cold, and redesigned the joints so it can't have a problem when it's cold. I think they added a redundant seal, as I recall. So anyway, I counted three fixes. So we weren't worried about that one anymore. It's the one that we didn't know about that would get you. That's always true. Like debris falling down the leading edge. So I

remember thinking about the leading edge and carbon phenolic and handling it a little bit, just to understand what it was. We never thought of it as being this extremely fragile thing that you could knock a hole in, really. Well, I didn't lose any sleep about that.

ROSS-NAZZAL: Any concerns on that day going out to the launch pad, other than what Dan had offered?

LOUNGE: No, not really. It wasn't real high tension. It was, "Let's get out of here. We're tired of not flying."

ROSS-NAZZAL: You mentioned that that launch took about four minutes.

LOUNGE: Yes, just flew by. I don't know why. Compared to the first one, especially.

ROSS-NAZZAL: So, any thoughts of the *Challenger* crew as you were launching?

LOUNGE: Well, yes. When you go through maximum aerodynamic pressure, which is really where there's most stress on the vehicle—that's where *Challenger* blew up—when you fly through that area, you couldn't help but think about them. And we had a picture of the crew on the middeck and did a little memorial for them.

ROSS-NAZZAL: I understand that Dave [David C.] Hilmers came up with that idea.

LOUNGE: Yes, that was probably Dave.

ROSS-NAZZAL: What effect do you think that that had on the agency, paying homage to the crew of the *Challenger*?

LOUNGE: Oh, I think it was healing. I think it was a good step. We needed to do that.

ROSS-NAZZAL: Before you flew on the flight, President [Ronald] Reagan came out to JSC.

LOUNGE: Yes.

ROSS-NAZZAL: Can you tell me about that event? Any recollections?

LOUNGE: So we saw him then, actually, and then we saw him in the Rose Garden after the flight. But that was very flattering that he would come out there, and I got pictures of he and my family and he and the kids independently, that I hope I can find, actually because I'm not very good at keeping things. So that was an honor. What I remember about Reagan personally is he seemed not very animated until the cameras came on. That's what I remember. When the red light of the camera came on, he came on. He was 100 percent on. Then when it was off, he was sort of off.

ROSS-NAZZAL: The consummate actor.



LOUNGE: Yes.

ROSS-NAZZAL: And you took up a jacket for him, is that correct?

LOUNGE: We did. It wasn't me personally, but it was on the flight. In fact, we gave it to him in the Rose Garden. Yes, I'd forgotten that.

ROSS-NAZZAL: What did you guys during your free time on STS-26? You had a pretty light mission.

LOUNGE: Yeas, really. TDRS and a couple of middeck experiments. Did the usual playing with the M&Ms, playing with your food. That's always a biggie. Looking out the window is always a biggie. I didn't tell you about marching. Did anybody tell you about marching?

ROSS-NAZZAL: I think Dick Covey mentioned something.

LOUNGE: That was the funniest thing.

ROSS-NAZZAL: Tell me about it.

LOUNGE: Fish and I created this one on the middeck of the first flight, when we had kind of a down time. We had about a day or two after the EVAs, before we came home, to just kind of settle down. So we discovered that you could do close-order drill in weightlessness if you

maneuvered your arms and legs the right way. So we did close-order drill, right face, about face, marching in place, and Joe came down. He was the drill sergeant. That was just so funny.  
[laughs]

ROSS-NAZZAL: I also understand that's also featured in a movie. Dick Covey had mentioned *Loaded Weapon*, I think.

LOUNGE: *Naked Gun 33 1/3*.

ROSS-NAZZAL: All right. I'll fix that on his transcript.

LOUNGE: It is. It's *Naked Gun 33 1/3*, and it's about a half a second. You really have to be ready for, but it's there.

ROSS-NAZZAL: I'll check it out, because I couldn't find it.

LOUNGE: Yes, check that one.

ROSS-NAZZAL: Your crew also planned to carry out an American flag to sort of build on the patriotism of the flight.

LOUNGE: Yes, and it was right at the Olympics. Yes, we did, in fact, at touchdown.

ROSS-NAZZAL: Do you remember there being any sort of political outrage at carrying out the flag?

LOUNGE: I remember somebody saying, well, somebody might not like it, and we said, “We don’t care.” Did somebody not like it?

ROSS-NAZZAL: Rick had mentioned that it was the ’88 election, and someone had said that George [H.W.] Bush [and his campaign had staged the event].

LOUNGE: Oh. Well, you know, George Bush had nothing to do with it. That was our idea, so we just weren’t in tune to that kind of politics.

ROSS-NAZZAL: Were you surprised that Bush was there?

LOUNGE: So let me tell you an interesting story about Bush being there. I think we learned on orbit that he would be there. So my brother had been married to this girl that lived in California, and I had met her a couple of times, and her name was—I’m going to think of her name in a minute. That’s embarrassing.

ROSS-NAZZAL: You can always add it later.

LOUNGE: I'll think of it. Anyway, this is landing day. We hadn't landed yet, and the Secret Service is there and my wife's there with my kids, and somebody comes up to her and says, "Does Mike have a sister named—," whatever the name was.

And she said, "Well, no. Why?"

And she said, "Well, somebody just left this package and said it was Mike's sister."

So Kitty said, "No, I never heard of that."

So they went and they blew up the package, and it turned out to be some sort of crystal goblet that my ex-sister-in-law, who lived close by there, had driven up and had left it for me. So the Secret Service had blown up the package. [laughs] And I didn't know how to get in touch with her to thank her, to explain it to her. I didn't have any way to connect. My brother had lost connection with her. So to this day I don't know if she knows that story.

ROSS-NAZZAL: I'd hate to be around with the shrapnel.

LOUNGE: Yes.

ROSS-NAZZAL: So what are your recollections of the day beyond blowing up the package? Having lunch with George and Barb [Barbara Bush].

LOUNGE: Yes. Well, I guess we did. I guess we did. I went to George and Barb's home after my last flights, what I remember more about them, at the White House.

ROSS-NAZZAL: And after the flight, you guys went back to the White House, and then you also went to Congress.

LOUNGE: We did. They had a special resolution that day of our Return to Flight. I've got that somewhere, too. Yes, so that was a big deal. I think the Congress was much more friendly about the program back then.

ROSS-NAZZAL: Why do you think that was the case?

LOUNGE: I don't know. There were a lot higher expectations. It was a new program then, a new thing, not an old thing. Now it's an old thing. People want to get off of it.

ROSS-NAZZAL: After this, you guys took some PR [Public Relations] tours to the various contractors and NASA Centers.

LOUNGE: Yes, I think we hit all the relevant Centers and the big contractors.

ROSS-NAZZAL: How were you welcomed back at JSC?

LOUNGE: Big. It was a big welcome. Had a big party at the Gilruth, I remember. We wore our "Loud and Proud" shirts, which were the Hawaiian very garish kind of multicolored. We wore them on orbit and had one of our pictures taken with that, surfing. We were surfing in the

middeck. So that was fun, and it was good to go around and thank people that had hung in there and got us back to flying.

ROSS-NAZZAL: I'm looking at my watch and I'm wondering, do you want to stop here and pick up next time?

LOUNGE: We can press ahead. Let me make sure I haven't made a commitment I've forgotten about.

[tape pause]

ROSS-NAZZAL: So after this flight you were working as the Chief of Space Station Support Office.

LOUNGE: Yes, I went back to that job.

ROSS-NAZZAL: Had things changed much?

LOUNGE: There was more emphasis on it. As I said, somewhere around in there, the Center as a whole got serious about Station, and then there was a lot of battling—and there still is—about JSC's piece versus Marshall's piece [Marshall Space Flight Center, Huntsville, Alabama], versus Glenn's piece [Glenn Research Center, Cleveland, Ohio]. So a big part of the job was getting

involved in those inter-Center politics, which I'd never really been involved in before. So that was interesting times.

ROSS-NAZZAL: So you were working the various work packages?

LOUNGE: Going to reviews at the work packages, and it was clear that John [W.] Aaron was the Center Director and very possessive about Work Package Two. That was our Center's. Was it John Aaron? No. Aaron Cohen was the Center Director. John Aaron was the Work Package Two Manager. So there was always just this intense battle about whose work package had what and who was going to be the overall integrator of the whole thing. It ended up they had to bring it all to Houston eventually and put it under a prime contractor. That was actually after I left, they did that.

ROSS-NAZZAL: Why do you think there was such a heated battle over Space Station and which Centers would have what work?

LOUNGE: Oh, it's all politics and jobs and careers. You know the Center rivalry between Houston and Marshall goes back to Apollo. They never did really get along then. [Wernher] von Braun and Chris Kraft, the battle of the giants.

ROSS-NAZZAL: Were there any major changes made to the Space Station while you were working in this position?

LOUNGE: It kept getting smaller and smaller. We discarded the dual keel as being impractical. Baselined EVA. The big concern was how many spacewalks it took, and a big concern was there's no way to do that many spacewalks. I think in the end we've probably done more than we said was undoable, but at that time people were very reluctant about it. When I was flying, you didn't do a spacewalk unless it was really a very serious problem you were trying to fix, so I never got to do one. I got to train as the EVA crewman on two of those three flights, but I never got to do a real spacewalk. So that was a change. So, how long did I do that? I did it for about a year, and then I had to get back to training for my last flight.

ROSS-NAZZAL: Why don't you tell me about that last flight. A little different from your other missions.

LOUNGE: Very different. So this one was an astronomy mission. We had telescopes out in the payload bay and we used the Orbiter as the observatory, so twenty-four-hours-a-day operation, two shifts. I was the Orbiter operator on one of the shifts, with two astronomers, and Vance [D. Brand] and Guy [S.] Gardner—Vance the Commander, Guy the PLT, the pilot. That's interesting, isn't it, that we have an abbreviation that takes more syllables to say than the word it abbreviates. I always thought that was interesting. Those two had two astronomers with them on the other shift, and then, of course, so eight hours of the day it's just you, or it was just me and the two guys, and then you had the overlap and then tried to sleep while the other guys were working. It was a very different kind of mission, longer, more of a routine, I would say. We did, I don't know, several hundred Orbiter maneuvers. We'd do an Orbiter maneuver every forty-



five minutes during the operation of the telescopes. So my job was to run the Orbiter during that time.

ROSS-NAZZAL: So you actually got a chance to fly the Orbiter.

LOUNGE: To the extent we actually fly it. You tell the computer what to do and it does it. And keep all the other systems running. Gardner and I were the main plumbers. We had a major toilet problem, and we had to get involved in that. But that was a fun flight.

ROSS-NAZZAL: Who were the two astronomers you were working with on that flight?

LOUNGE: So, NASA crew Mission Specialists, we had Bob [Robert A.R.] Parker and Jeff [Jeffrey A.] Hoffman, so Jeff was with me, and then we had two Payload Specialists that had helped develop the telescopes. Sam [Samuel T.] Durrance was on my team and Ron [Ronald A.] Parise was on the other team. This was ASTRO-1. It was actually also supposed to be the next flight after *Challenger*. It would have flown in, I guess, February of '86 if it had been—so I like to say I flew both flights after *Challenger*.

ROSS-NAZZAL: Other than maneuvering the Orbiter, did you have any other duties?

LOUNGE: Yes, fixing the toilet.

ROSS-NAZZAL: How much time did that take?

LOUNGE: It was messy. It was plugged up, and we had to stow the waste from the waste tank into these plastic bags and seal them up. It was a mess. It was stinky. It was not a glamorous spaceflight. I don't know, we spent half a day worrying about that. What else did I do? There wasn't a lot to do. We had some medical experiments we did. That was mostly pre-flight and post-flight.

ROSS-NAZZAL: Did you do any SAREX [Shuttle Amateur Radio Experiment]?

LOUNGE: I didn't. I think that was on the flight. I think that was Ron Parise's thing, actually. He was a HAM operator.

ROSS-NAZZAL: Did you guys take what folks had learned on 41-D? They also had a problem with the waste collection system.

LOUNGE: No. So the normal way to empty these tanks was to dump it overboard in the vacuum of space, but to keep that nozzle from freezing up, there was a heater that had failed, so the nozzle was frozen shut, closed, so we couldn't dump the waste tank, was the issue.

ROSS-NAZZAL: Did you work at all with people at Marshall or were you primarily just working as the Flight Engineer and then [Shuttle operator]?

LOUNGE: So I backed up the guys that were dealing with the instruments, but never directly at Marshall. The simulations, we were involved with Marshall. But I didn't make a bunch of trips there, no.

ROSS-NAZZAL: Any Earth observations on board?

LOUNGE: Not that flight. We weren't pointed at the Earth very much, which was a little unusual, because the other flights, unless you had a reason to be at some other attitude, your payload bay down at the Earth all the time. This one, we were pointed at the stars, so we could be, depending on the target, any attitude. So that was a little different.

ROSS-NAZZAL: You guys landed at night.

LOUNGE: Landed at night at Edwards [Air Force Base, California]. That was interesting. So that entry was a little more colorful, I think, because it was in the dark. The landing itself was hard to see. So I hoped Vance was going to the right place.

ROSS-NAZZAL: Did you have in mind, when you were up for this last mission, that this would be your last flight, that you would be leaving NASA?

LOUNGE: No, not so much. I was thinking about my career, and I had a desire to have a career in industry and do something else, but I also wanted to help build the Space Station, and so I said, "Well, I can't wait forever to build the Space Station. If it looks like it's going to be too

much longer, I need to go ahead and try to get into industry.” As it turned out, I had an opportunity to join a small entrepreneurial company that was just getting started. I got a call from Chet [Chester M.] Lee, who was an old-time NASA guy, and he was the Vice President in SPACEHAB, and called me shortly after I got back from that flight. Actually, the first call was before I left. He left me a message saying, “Please call.” I returned the call after that flight and had some dialogue in that spring. Station was having trouble, and it looked like it was the right time, so I left the following June after that flight.

ROSS-NAZZAL: And since then you’ve gone on to work with a number of NASA contractors.

LOUNGE: Just SPACEHAB and Boeing, actually.

ROSS-NAZZAL: So what did you do for SPACEHAB, and what are you currently doing for Boeing?

LOUNGE: So at SPACEHAB I was the Operations Director for our initial missions. We flew a module research addition to the middeck in the payload bay. It was never a primary mission; it was always tied to other missions. So I got involved in that in the early days of planning the mission and building the systems, so I was making sure the systems were built correctly so the astronauts could operate them and meet all NASA’s requirements.

After a couple of years of that, I got involved in planning for the next series of missions which we did, which was to turn that research module into a cargo module to support NASA missions to the Russian Mir Station and later the International Space Station. I was involved in

those concepts and developing all the systems. So I sort of got into systems development and program management, and that's what I did in my last five years at SPACEHAB, I would say.

And then came to Boeing a little over five years ago, where I've done business development, which is really trying to predict where NASA will need help, what kind of things they'll need to carry out their missions, and position Boeing to be able to help them and, oh, by the way, get paid for it.

ROSS-NAZZAL: We have a couple of questions that we always like to ask people.

LOUNGE: Okay.

ROSS-NAZZAL: What do you think was your most challenging milestone while working for the space agency?

LOUNGE: Most challenging assignment? I'm trying to make sure I got the question right.

ROSS-NAZZAL: What do you think was your greatest challenge while working for the agency?

LOUNGE: Well, the obvious one for me would be to say the Return to Flight mission, but from what we actually did, there really wasn't much to that mission. We had to fly it successfully and, as Dan said, we couldn't screw it up. But in terms of difficulty or complexity, it was really simpler than my first mission or my last mission. The first mission is always personally the big milestone. After that, it's always, "What am I going to do to follow that one?" And my first

mission was just incredible, with, you know, the ability to contribute personally, as we've described. That was the most rewarding part of our job at NASA. If not the most important milestone, certainly the most rewarding, because we really had an influence on the mission design. So I don't know if that's an answer that fills the square, but it's some kind of answer.

ROSS-NAZZAL: Would you also say that that's your most significant accomplishment?

LOUNGE: In the years I worked for NASA? Yes, probably. Probably.

ROSS-NAZZAL: Do you think there's anything we haven't talked about that you wanted to talk about today or you think we should talk about, any lessons learned that you want to pass on, or any anecdotes you want to share?

LOUNGE: No, maybe I've captured just how different it was in those early years of Shuttle, and I guess it would be before *Challenger*, when we were going to fly once a month at least. That was going to be routine, and we were going to revolutionize space and discover these amazing things, and we still will, but we were just naïve, thinking it was going to happen the next year, and not the next decade or the next generation. So there was a lot of naiveté, and maybe it was just us or maybe it was just me, but that was the big change. I don't know if you've heard that from others. It's a little sad that that had to happen, but that's just maturing the industry, I guess.

ROSS-NAZZAL: I thank you for your time today, and I'm glad we were finally able to meet.

[End of interview]