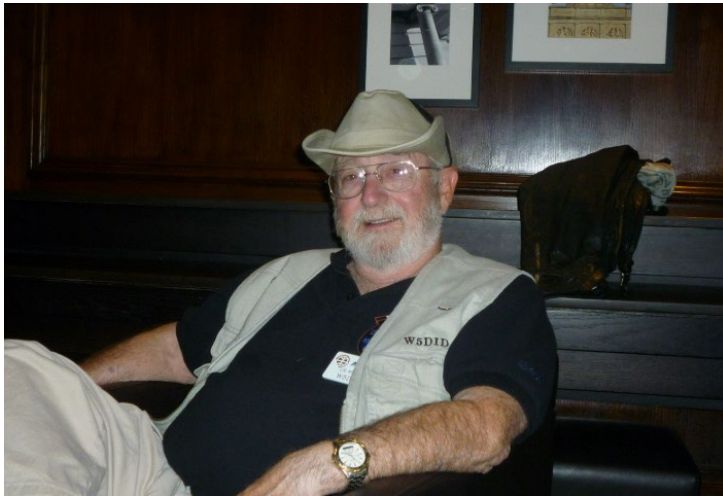


ARISS Founders and Legends Series

Lou McFadin (W5DID)



May 2026—This is the second in a series of ARISS 25th anniversary interviews with founding members and legends in the organization.

Our honoree for this article is ARISS Chief Engineer, Lou McFadin, who was key participant in the development of amateur radio for the Space Shuttle (SAREX) in the 1980s, and everything that followed. Lou remains an indispensable designer and developer of ARISS space-qualified amateur radio equipment.

Lou and his wife of many years, Patrice, live in Orlando, Florida (they were married in March of 1991). Between them, they have two daughters, a son, five grandchildren, and two great grandchildren.

Lou is one of those fortunate people who from a very young age know exactly what they want to do with their life. At 10 years old, he decided he wanted to be an engineer: “My goal was—and I guess it still is—was to be able to design and build anything I wanted with electronics. That’s a pretty big goal, but I think I came pretty close.”

ARISS: Tell us about yourself—where do you live now and where are you from?

I was born in Tulsa, Oklahoma, in 1940. My parents both worked at the Douglas Aircraft plant in Tulsa. I never got a good explanation of what they did, but knowing my dad, it had to be something technical. I know that he was in the Army and the Navy and that he went to a communications school in Chicago. When I was about four, my parents separated, and the following year my dad and I moved to Midland, Texas. I’ll never forget the train trip out there. We lived in Midland until I was 14, so that’s where I say I’m “from” when people ask.

ARISS: What do you remember most about Midland?

It was a desert town.... really desert. There was oil and there was cotton. And my dad had a place next to my grandmother’s. In that timeframe, I was into everything science. I remember in the summer I

would move my bed outside and just sleep out there under the stars all the time. The stars were beautiful.

That was one of the things I really liked about Midland. But, you know, the weather was not so great. It was hot as hell, but it was dry. And for me, it was adventuresome. I mean, (there were) all kinds of varmints out there in the yard. There were lots of ants. We had two major kinds of ants—black ants and red ants. Well three, if you count the little ones. In desert country, that's normal. And so I learned to take a glass jar, lay it down right next to the ant bed, and they would march in there. Regardless what you did, they'd walk in there. So I do that at each ant bed. Then I'd mix them up and let them fight. And there were the toads....they had horn toads in West Texas. We had a windmill out back and I would climb it as high as I could, and I'd make a parachute and let the horn toads parachute off. Nowadays, I'm shocked at that whole idea!

We didn't have running water or sewer or anything like that in our house. We had outhouses and the windmill provided the water. The wind was always blowing and it was always spinning, filling a wooden barrel with water. It would fill until it ran over. I would play with old vacuum tubes in the barrel. Some of them were neutral density—if you put them in the water, they would just float, or maybe if you pushed them a little bit, they'd go down all the way to the bottom and slowly come up. They were my spacecraft.



And I listened to radios. There were a lot of radio stations that had good entertainment. One of them had a program that came on Saturday morning at nine o'clock called *Tom Corbett, Space Cadet*, and that was my inspiration.

When I was about 10 years old, I decided I wanted to be an engineer, and that was my focus all the way through. I wanted to work on radios and electronic stuff, like my dad, who fixed radios. My goal was, and I guess still is, but, well, maybe not anymore, but I wanted to be able to design and build anything I wanted electronic. Now, that's a pretty big goal. I came pretty close, probably.

ARISS: How did you get your love for electronics?

From my father. He fixed cars and he was an inventor. He made electronic stuff...like he made a system for aircraft to identify that they were coming into the airport in the days before radio communications. He developed a system you could crank and it would send a sequence that said, "Hey, I'm coming in to land." We had electronics around the house, and he taught me how to work on them. [A drawing from the patent is shown to the right—NOTE: Searcy McFadin, Lou's father, also received a patent in 1931 for a "Radio Control System" to remotely control aircraft.]

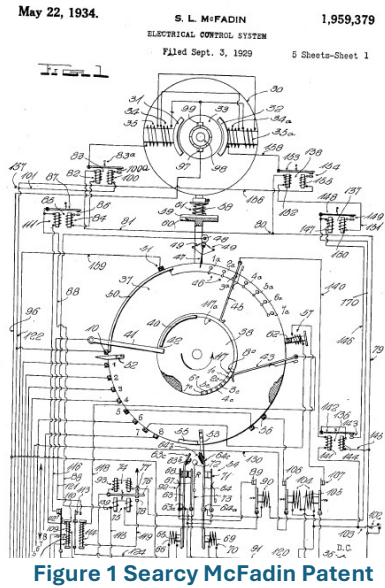


Figure 1 Searcy McFadin Patent

ARISS: And when did you first discover ham radio?

Well, I knew that it existed, but I started with radios. In high school we had an electricity class that I took. They had a four-by-eight-foot plywood board, stood up vertically and it had an old AC/DC radio and the teacher gave me the job of setting it up. At the time, the common radios that people bought in stores for listening to broadcasts and transmitting were run off 120 volts DC, or AC. On the backside of the board, the teacher had me put in switches so you could short things and open things to cause failures. The school also had a ham radio club, but I didn't have a license at the time. I got one right after I graduated. I had friends that were hams and they helped me get a license, but I didn't have the money to buy any radios or anything. When I went off to college at Oklahoma State, they had a ham station but I didn't have any time! Electrical engineering and graduating was my primary focus.



Figure 2 TV vacuum tubes

In high school, my first technical job was at a radio and TV repair shop. It was a nice little one-man operation. I asked the guy for a job and he said, "I'll take you but you have to do exactly what I tell you." So he showed me how to fix TVs and all that stuff. That was fun, except for the time I got shocked by a TV tube. He said, "Don't touch that spot right there", and I said, "That spot?" I just brushed against it and bam. I don't remember his name, but he was very helpful and kind to me and taught me how to test tubes and find failures on TVs.

After high school I went to the university there in Tulsa that emphasized petroleum engineering. I did my first year and a half there, and I took physics

because they didn't have electronics. At the end of that time, I moved over to Oklahoma State Stillwater to finish up my electrical engineering degree.

During that time I had job at a company called Midwestern Instruments in Tulsa. Midwestern was a company of about 100 people that built equipment for oil exploration, and they owned a company subsidiary called Magnecord that built high-end tape recorders for broadcast stations. I started working there after high school, because I needed the money. I had no parents to support me and my greatest terror was not having enough money to eat.

Midwestern had me laying out PC boards, and after a while, they put me in the calibration lab, myself and one other guy. Our job was to calibrate all the company's test equipment. I lived in the Tulsa Boys Home when I was working there. It was this place for boys who didn't have parents to support them, and they helped me go to college. At the boys home, I took an old AC/DC radio and added a microphone to it. That became our "radio station" at the home. The boys would get on the air and talk, and you could hear it for about 100 feet around. They'd get on there and pretend to be DJs on the radio. They had a great time with it.



Figure 3 Today's Tulsa Boys Home (not the same location where Lou attended)

ARISS: Tell us about your decision to enter the military

The Vietnam War started up right towards the end of my college time, and everybody knew if you didn't volunteer, you'd be drafted, even if you were in college. So I decided, well, I didn't want to get drafted, and I at least wanted to have some say what I did if I went in. Our college was what they called a Land Grant College, and they required male students to have at least two semesters of ROTC. It was sponsored by the Air Force at our school, but I didn't want to go in the Air Force. I don't know why, but I

remember I definitely did not want to go into the Air Force. So I joined the Navy Reserves, I guess because I always wanted to sail the ocean blue.



Figure 4 USS Lake Champlain

After college I went on active duty and was assigned to the [USS Lake Champlain](#) (CVS-39), an aircraft carrier that among many other roles, was used to recover Mercury and Gemini capsules from the ocean. That was just when things were starting out in manned spaceflight. At the time, I already knew what I wanted to do—work for NASA. But I also knew that you couldn't just change jobs when you were in the military, so I had to bide my time. On the ship, I was a Special Weapons officer. I couldn't tell people what those weapons were, just that they were "weapons". In addition to space capsule recovery, we were an anti-submarine ship.

ARISS: How did you get onboard with NASA?

When the Navy decommissioned the Lake Champlain in 1966, they reassigned me to the Lake Mead Base just north of Las Vegas. And when my tour of duty ended, I sent job applications to NASA and a bunch of other places. I got five or six offers to go to work, one of which was from NASA, and it was the lowest offer! That was in 1967.

We moved to Houston and I went to work in the Experiment Systems Division and the Lunar Orbit Experiments group at NASA. We were building all the experiments used in lunar orbit, and also ones for landing back on earth.

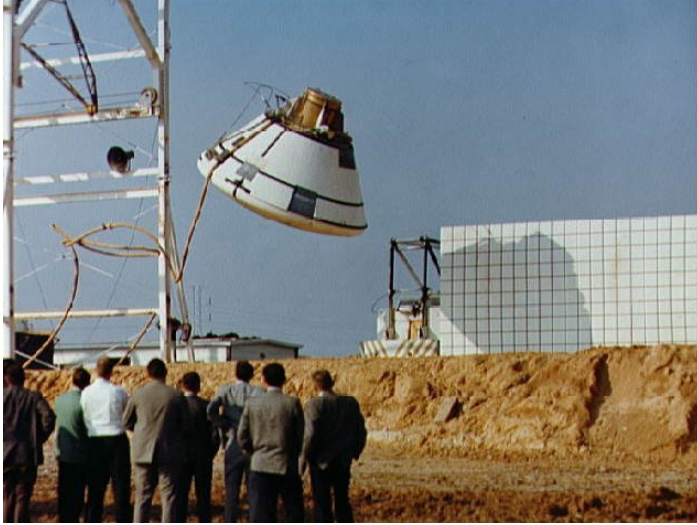


Figure 5 Apollo Land Landing Testing

Credit: NASA

I was part of the “land landing test team”, where we had a steel capsule that was the same shape as a returning Apollo capsule and we were testing the forces a capsule would experience for a surface or water landing. It had seats with anthropomorphic dummies, and all kinds of sensors to measure what happens when it lands. We built a horizontal frame that had a catapult and we would launch the capsule into piles of sand to simulate different horizontal and vertical landing velocities. For the water landings, we had a pond and they would shoot it off into the pond. And at the other end we had the sand.

It was challenging work. Lots of hours, and they didn't have nice green grass to work on. It was very muddy out there with the Houston rains, and they used shells to make the parking lots. While it looks pretty good, it sticks to your feet. Oh, man, it's horrible.



Figure 6 Apollo 17 launch in December 1972 Credit: NASA

Among many other projects, I worked on the Apollo Far Ultraviolet Spectrometer Experiment for Apollo 15 and 17. The purpose of the spectrometer was to measure whether or not there was any atmosphere around the moon, or as some said, to measure the nonexistence of atmosphere. There's actually some amount of hydrogen atoms floating around all over space (like one atom per cubic meter), which creates a hydrogen pressure if you're going fast enough. It's not enough to create measurable drag unless you going really, really fast.

I helped out on some of the other projects as well, and there were a lot of experiments that never flew, but there were usually preparations for flight.

I never attended any Apollo launches for work, but I did bring my family to watch the Apollo 15 and Apollo 17 launches. NOTE: According to Lou's biography, his NASA projects also included:

- Developing a two-wheeled lunar transport vehicle (an instrumented Honda 90 motorcycle) that was intended to serve as a contingency replacement for the Lunar Rover.
- Project designer and manager for the Plasma Probe Experiment developed to measure plasma current in the JSC Large vacuum chamber.
- Project manager for the Joint US-Russian Apollo-Soyuz Ultraviolet Absorption Experiment.
- Project manager for the SAS (Solid State Array Spectrometer), and Earth resources experiment.
- Project manager for the Shuttle Aft fuselage Gas Sampler. This device took samples of the explosive atmosphere around the Shuttle engines during launch.
- Project manager for the SCM (Systems Control Module), the controller for the data recorder that recorded the sensors that found the cause for the Shuttle Columbia breakup during reentry.

ARISS: So what was next after Apollo 17?

This is where it gets interesting with ham radio. So one of the guys in my group at the Manned Spacecraft Center (later renamed the Johnson Space Center) was a ham, and he knew [Roy Neal](#) (K6DUE). I belonged to the ham club at MSC, and they wanted to fly some kind of a ham radio on [Skylab](#) (May 1973 to February 1974). So we put together a proposal to help out the guy heading up the effort, Dick Fenner (W5AVI).

Anyhow, I did most of the work preparing that radio and getting ready, but they couldn't fly it because it was too late in the stream to make the Skylab schedule. Owen Garriot (W5LFL), the astronaut who wanted to fly the ham radio on Skylab, thought we could fly it on the last Apollo mission, Apollo 18. Owen was supposed to fly on that mission, but it was cancelled. We had to wait for the Space Shuttle to fly it (NOTE: Amateur radio would fly on the Shuttle as the Shuttle Amateur Radio Experiment—SAREX—starting with Owen Garriott's first Shuttle flight, STS-9 in 1983).



Figure 7 NASA C-130

When I was in the engineering group, we worked on whatever NASA needed, and there were other projects besides the Shuttle. We worked on aircraft borne Earth resources missions for quite a long time. We had several aircraft with instrumentation in them and I worked on those. I worked with recorders and instrumentation on one mission and I had to go take the flight training so that I could fly on the C-130 aircraft. I had to learn how to use the pressure mask, and they made me shave my beard... We had a big pod we flew beneath the aircraft. My specialty was instrumentation, or at least that's what they thought...Really it was

ham radio...

ARISS: And how did that lead to SAREX?

I mentioned Dick Fenner (W5AEI) earlier. Well he and I built all the ham radio equipment for the STS-9 flight. Everything we wanted to get on Skylab, we put on STS-9. Owen Garriot was the first to use it, and that was the first SAREX mission. It was a simple setup for that flight: a microphone and a headset

and the radio and antenna placed in one of the windows. From 1983 until 1995, I was the SAREX official principal investigator and overall, I did like 25 SAREX missions, maybe a few more. I was sorry to leave before the Shuttle program before the Shuttle program and SAREX was over.

ARISS: Why did you leave?

I retired from NASA in 1995 when AMSAT recruited me—well I also recruited them—to become the laboratory manager and integration manager for the [Phase 3D Laboratory \(P3D\)](#), the largest ham radio satellite ever built. It was more than six feet in diameter. And that's how I ended up in Orlando from Houston.

P3D was launched on an Ariane 5 in 2000 from French Guiana. Once on-orbit, the satellite was officially called AMSAT-OSCAR-40, or AO-40 or OSCAR 40.



Figure 8 Lou with his P3D badges

There were some problems initially after launch from which we recovered, but we ultimately lost it in 2004 due to battery problems. But it was an excellent amateur radio relay satellite with immense capability.

ARISS: Have you always been associated with ARISS, starting with SAREX?

Yes, from the beginning. One of the more interesting projects was building the hardware for SuitSat-1, which astronauts and cosmonauts on the International Space Station (ISS) land-launched in February 2006. SuitSat transmitted audio and slow-scan TV (SSTV) for two weeks and stayed in orbit seven months before reentering the atmosphere. It expanded the envelope for the possible uses of ham radio in space, and it was a forerunner for launching more cubesats from the ISS.

[NOTE: Lou McFadin and Frank Bauer (KA3HDO) led the team that built and tested the hardware in only three weeks.]



Figure 9 Lou and Frank Bauer with SuitSat-1 hardware

One of the follow-on cubesats was ARISSat-1, which I built in part in the workshop in my garage.

It was relatively small, about 2 ft x 2 ft x 1 ft. It was a free flyer tossed off the station. It didn't have anywhere near the capabilities of P3D, but it was the first satellite with a digital signal processor (DSP).

ARISS: Why is the DSP aspect important?

Because it's totally flexible. You can change bands. You can change how it modulates everything. It's a software-defined radio. You have an analog-to-digital converter that takes the audio signal and digitizes it. There's a bunch of ones and zeros that you can use software do to what you want with it, then there's a digital-to-analog converter on the other end for transmitting back out. You can change how the radio operates by uploading different software. That was the idea then, and that's how all the radio stuff works now.

ARISS: What was your role in that mission?

I built a lot of it right here in my garage. We did a lot of sheet metal work, including the solar panels, and we mounted all the solar panels. We built the electronics boxes and put the circuit boards in. It wasn't just me—we had a whole design team including a group from [Microchip USA](#) who donated their services.

ARISS: Are you still involved in building hardware?

I serve as the ARISS U.S. hardware manager (as well as chief engineer) and I voluntarily offer my time and expertise to the ARISS team on a continuing basis in addition to serving on the AMSAT Board of Directors for the past nine years. As a part of my duties as U.S. hardware manager for ARISS, I am responsible for the ham radio equipment in the U.S. segment of the ISS.

ARISS: How much time are you spending on ham radio these days?

Quite a bit. I'm active in local ham radio affairs in the Orlando area, and in my spare time, I enjoy traveling and visiting with my grandchildren in Houston, Texas and my new granddaughter in Orlando. I also run a little one-man company called S & L Engineering that builds antennas for satellites. I sell them to one company, and they sell them to other people. There's a lot of industrial satellites. People don't hear about them much, but they transmit data on 2.4 GHz. Last year we built about 50 antennas. This year (2026) I'm building 70.

ARISS: Tell us a fun fact about Lou McFadin

I'm a Star Trek fan. I think I have like 200 Star Trek Christmas ornaments. In fact, I haven't quite got my tree taken down yet, and it's March. I've been too busy.

ARISS: Who is your favorite Star Trek character?

Spock.

ARISS: Do you have any ambitions of going into space yourself?

Oh, I've always wanted to go, and I would still go. Not on suborbital flight, but all the way...

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