

# NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT

## ORAL HISTORY 4 TRANSCRIPT

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INTERVIEWED BY JENNIFER ROSS-NAZZAL  
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ROSS-NAZZAL: Today is November 18<sup>th</sup>, 2004. This oral history with Joseph P. Allen is being conducted for the NASA Johnson Space Center Oral History Project in Washington, D.C. Jennifer Ross-Nazzal is the interviewer.

Thanks again for joining me for a fourth session. I think we should start today by talking about your second mission, STS 51-A.

ALLEN: And your timing is good. It's November 2004, and two weekends ago the crew of the mighty spaceship *Discovery* had a reunion here in Washington, D.C., and believe me when I say we relived that mission, as best we together could remember it. You should have recorded those conversations, but they were late at night and fairly rowdy, probably.

We were scheduled to launch on the seventh of November early in the morning, and we loaded into the spacecraft [several hours later]. We unloaded from the spacecraft, in spite of the fact that it was a beautiful, crystal-clear day in Florida and in spite of the fact that the equipment seemed to be working properly. The upper atmosphere was not cooperating, though we, of course, couldn't see that, and the weather controllers were getting reports of very high wind shear at upper levels. They consequently said we could not launch that day.

We were disappointed. History now shows we were also possibly very lucky, because both of the tragic accidents, that of the *Challenger* and that of *Columbia*, involved launching

through very high wind sheer conditions, and there's some thinking now that high wind sheers and Space Shuttles do not safely go together.

In any case, we were offloaded from the spaceship. I remember it for many reasons, one being I had a genuine feeling of anxiety that morning, and, perhaps because of naïveté, when I'd launched two years earlier aboard *Columbia*, I had not had that feeling of anxiety. We stood down for twenty-four hours. Loaded aboard the next morning, and that feeling of anxiety was no longer in my subconscious. So, again, I have no reason why that was the case, but I felt a lot more confident the second day, and indeed, we launched on that second day and arrived safely in orbit.

I'm going to back up with regard to the objectives of the mission 51-A. In January of that year, 1984, my former shipmate and good friend Vance [D.] Brand flew an earlier mission. The objectives of that mission were to deploy two communication satellites, PALAPA and WESTAR by name, both of them fitted with a new, improved kick stage, the rocket that sits behind the satellite that is used to take it to the proper geosynchronous orbit. They also deployed a satellite that, if memory serves me, was to inflate, for reasons that kind of escape me, and was to have been left in the low Earth orbit inflated so it was to physically have a large size. The fourth objective of the mission was to deploy still another satellite. The name of this satellite was Bruce McCandless [II], testing the Manned Maneuvering Unit.

The first satellite was deployed. The spaceship backed away and then watched as that satellite ignited its kick stage, and the impression to those in the spaceship was the rocket did indeed ignite. Then somehow they lost the sight of the rocket engine fire, but they weren't sure it was anything out of normal. The ground controllers, however, detected that the rocket had ignited, the satellite had moved in position, but then the rocket had extinguished itself. Thus it

was in only a slightly higher low Earth orbit. It was a long way from geosynchronous orbit; a terrible disappointment.

The second satellite was to be deployed the next day. The twenty-four hours between those two deployments were filled with debate as to what was this problem. Was it a satellite problem or was it a new, improved kick-stage problem? If it was the kick stage, perhaps it would be wiser to bring that satellite and kick stage home undeployed, and fix the problem. The other argument was, "Nah, it was just an anomaly. Go ahead and deploy it. Put it up to high geosynchronous orbit, and everything will be fine."

The decision was ultimately made, probably with a vote that resembles our recent presidential elections, a hair's breadth of difference between those for and those against. Sure enough, the second satellite behaved in exactly the same way. It did not get to geosynchronous orbit. I probably was watching this mission more intently because, again, my good friend Vance Brand was the commander, so I knew that Vance was distressed in the extreme, as his fellow shipmates now aboard this flight.

The third mission objective was then addressed, and that was to deploy the inflatable satellite. I don't exactly remember how that unfolded, but in essence, the satellite was put outside into an orbit a short distance away from the Orbiter. The inflation process began. To everyone's amazement, it inflated to the proper dimension but then continued to grow and popped. It was like a party balloon that had overinflated and then collapsed back on itself. So they were now zero for three in satellite deploys. I've never asked him, but I wondered what Bruce McCandless was thinking at that point, because he was going to be the fourth satellite.

Fortunately for Bruce and for the entire NASA team, that deployment worked like a charm, and the MMU [Manned Maneuvering Unit] behaved beautifully, and some of the best

known photographs of humans in space, Bruce McCandless specifically, as a satellite free in Earth orbit, maneuvering himself around with the maneuvering unit. Again, that photograph is one of the most famous and has appeared everywhere, including, I think, on a United States postage stamp.

The mission of Vance Brand concluded and, I think, landed at Cape Kennedy, the first mission to land back at the Cape [Canaveral, Florida]. I could be wrong about that, but I think it had that unique aspect to it as well. Perfect landing.

I was to fly aboard a mission in November of that same year, and the payload for STS 51-A was relatively firm on the manifest. However, the irony of a very successful MMU flight coupled with two stranded communication satellites, both in perfectly good working order, crept into the minds of a number of engineers at the Johnson Space Center, and very quickly evolved a plan to use the MMU and spacewalking crewmen to move out to the satellites one at a time, grapple them or grapple each, tug it back to the Space Shuttle, affix it in a clamping device of some kind, and bring [them] home.

This plan was encouraged from the outside by business entities now owning the satellites, and those entities were insurance companies, one of the companies being Lloyd's of London and another company being [International Technology Underwriters (INTEC)]. It was managed by a man named Jim [James W.] Barrett. The Lloyd's of London ownership was managed by a man named Stephen Merrett. Each of these individuals independently argued with NASA it would be a good idea to fetch the satellites, and following the precedent of the Law of the Sea, the salvors would then have possession of the salvaged treasure and could be returned to the rightful owners.

Well, NASA liked the idea. Keep in mind, NASA was still in its halcyon days, still riding on the coattails of the successful Apollo missions, successful Skylab, successful Apollo-

Soyuz [Test Project], successful first tests of the Orbiter, and a series of thirteen successful Orbital flights. This was the fourteenth flight. NASA continued to be bullish on itself. We, the crew, were thrilled with these discussions, because it would mean we would fly a very interesting flight profile and be given the opportunity to carry out the first salvage of valuable assets from the new ocean. Important assets had been dealt with in orbit in earlier flights, namely, the Solar Max [Maximum] satellite, which needed some repair, but that asset was addressed and repaired and left in orbit.

To capture the satellite was not an easy assignment, however. No one, in the building of the satellites, had ever envisioned that they would be visited later, much less handled by suited astronauts, because the satellites would be in their rightful place, namely, twenty-two thousand miles above the surface of the Earth in geosynchronous orbit. Space Shuttles could not go there. The only feature of the satellite that appeared to us might serve as a handle were microwave guides and antennae affixed to the top of the satellites, or possibly the opening at the bottom of the satellite through which rocket exhaust gases escaped to reposition the communication satellite in its geosynchronous orbit from time to time. So, in short, there was a small rocket bell extending from the back of each of the satellites.

With this in mind, the NASA engineers came up with a very clever plan. We decided the antennae would be too fragile to grapple, and so they decided we would stab the satellite from the back, using a device that I later called a tribute to Rube Goldberg and Sigmund Freud, the device we called the stinger. It, in essence, Jennifer, resembled a folded umbrella which one could put up inside the rocket and then open such that the tines of the umbrella would now stick against the side, and essentially the stinger would now be locked in the rocket engine of the

satellite. This didn't seem at first blush to be a good idea, but it was determined that the rocket engine had gone out, and it was not of itself ignitable again.

Because of troubles that the Solar Max mission had experienced with automatic tripping devices on grapple tools operated by the suited astronauts, we decided the stinger would not have any automatic devices. Everything would be manual, including the deployment of the umbrella feature would be done just with a button on the device, and the tightening down of a clamp that pulled a plate against the now open umbrella tines would be done just by a crank. Both the button and the crank could be reached by the suited astronaut—that would be myself or Dale [A.] Gardner—because the device was to be affixed across our chest. When completely suited in the space suit and in the MMU with the stinger device affixed to our chest, we looked for all the world like a space-age medieval knight entering a jousting contest. It was very bizarre-looking, quite ungainly on the ground, but in the zero gravity of space, should be quite workable.

The procedure was to be MMU crewmen would grapple the satellite and then patiently wait while the Orbiter was maneuvered close enough to the satellite-astronaut combination, such that the robot arm, the RMS [Remote Manipulator System], could grapple a grapple fixture mounted also on the side of the MMU. In personal terms, I would go out, capture the first errant satellite using the MMU feature known as the attitude hold; stop satellite and myself from rotating. Rick [Frederick H. Hauck] would maneuver *Discovery* close enough to me such that Anna [L. Fisher] with RMS could affix the grapple feature attached to the MMU. It seemed easy enough.

She would then maneuver me and satellite in such a position that Dale could affix a clamp to the delicate part of the satellite, the wave guides on the top of it, which the grapple fixture could then hold while the two of us, Dale and myself, affixed a much larger clamping

ring to the bottom of the satellite, the end from which the small rocket engine protruded. Seemed like a good plan.

We trained on maneuvering the MMU at simulators in Denver [Colorado] and at visual simulators there in Houston [Texas], and Dale and I both got very adept at flying the MMU. I was to make the first recovery attempt. If that worked, and based on experiences gained, Dale would make the second recovery attempt.

Our mission was also to deliver two other communication satellites to orbit, so again we had a fairly simple mission to fly; two satellites up and deployed, a few in-flight experiments to do, and then two errant satellites to recover, load aboard the Space Shuttle, and come home. I mention I got several somewhat rude notes from my fellow astronauts underscoring the fact that in delivering the two satellites to orbit and picking two up, that neither Dale nor I was to get these satellites confused. In other words, don't bring home satellites that we'd just taken there. It's very unkind from our fellow astronauts to point this out, but it was kind of funny.

The training for this mission unfolded in a blur, because there was a lot to get done, and in those years NASA moved with a certain amount of speed, in sobering contrast to the speed with which NASA now moves. Nonetheless, all the training was completed on time.

Jennifer, there are many, to my mind, amusing stories about this, some of them quite serious—not amusing, but serious—because this would be a tough mission. We also learned in a rather roundabout way that more than a few lives would be dramatically affected by our success or nonsuccess, lives of people whom we did not know on the ground, but were individuals who would lose considerable amount of their personal wealth if the satellites were not recovered. I won't go into the details as to how this works, but with Lloyd's of London, often the losers in a big insurance loss are individual people that have bet on the fact it's not going to be lost. With

American insurance companies, this is not the case; it's corporate monies that are lost, not monies of individuals. But in the case of Lloyd's, because of the way Lloyd's evolved as kind of one of the first insurers on a world marketplace, that's what's happened.

We saw a BBC [British Broadcasting Company] television broadcast, quite by accident, of the various serious people in England that would be bankrupt and destitute if this mission fail[ed], so we really felt considerable pressure to do the very best job we could to attempt to make certain it succeeded.

Another recollection I have of the flight is becoming for the first time in my life aware of the insurance industry, and I found it bizarre that the insurance industry was now touching on space adventures, in a way. I remember hearing an insurance person from England describe the mission we were about to set off on as very unusual to his way of thinking, because, he pointed out, he had spent a lifetime insuring things against fire or the chance they would explode, and he said, "With you chaps in the space business, you purposely set fire to a massive amount of explosives, and I find myself now betting on whether you can control the explosion or not." And I thought that was a rather graphic way to describe a rocket launch. The more one thinks about it, though, it's a very accurate way, and sadly, a year later, we saw an example of what happened when we chaps could not control the explosion, and we lost *Challenger* as a consequence, as a tragic consequence.

Since I'm talking about it, let me describe the recovery effort. We deployed the first two satellites without any problem in the first few days. We did some in-flight experiments, and then the day to do the spacewalks came upon us. I was very keen to have that day arrive, because, you will remember, I had been an unsuccessful spacewalker two years earlier. In a way, my dreams had been answered, because without the satellite recovery, the STS 51-A would not have

had a spacewalk, I'm sure. But here I was, through weird circumstance, being given a chance to do a spacewalk.

Per the procedures, Dale and I began to don the space suits, very ably helped by David [M.] Walker, who was the IVA crewman, the Intravehicular [Activity] crewman, with the assignment of being the caretaker of the EVA [Extravehicular Activity] crewmen. He would help us get suited, and he would then watch us closely through the aft windows of the Orbiter and help with the choreographing of the spacewalk as it unfolded. He would be the communicator to us, and he took that job very seriously, and he was superb at that job. Eight hours after the EVA started, we reentered, doffed the space suits with David's help, and then realized by looking at him that he had one of the worst headaches one could imagine. He put his heart and soul into it and was suffering as a consequence.

We were elated because we had succeeded in getting the satellite, but we were concerned about David, and as a consequence, urged him to consume more of the headache medicine that he perhaps he should. He asked me, "Joe, you're a doctor. How many should I take?"

I said, "Take all but two, and call me in the morning," and I think he did take more than two. He did not take all but two.

We were suited without consequence. There is a point when the IVA crewman pops the helmet on the head of each of the spacewalking crewmen, and he had already buttoned Dale up, and then he was coming to me. Just as he got ready to do it, I said, "David, stop. I am so hungry. I really need a cookie or something to eat."

He said, "Oh, Joe, how could you? We're slightly—."

I said, "David, I need a butter cookie." So he goes off into the food pantry, grabs things, throws it hither and yon and comes back with a butter cookie. I open my mouth. Keep in mind I

can't use my hands now. He puts the butter cookie into [my mouth], the whole thing, and then he hits my jaw shut [demonstrates].

He says, "Eat it, but don't choke, you little rodent." We can come back to that later.

I ate the butter cookie; felt better. David put the helmet onto me, popped it. We're now sealed, and there unfolded a pressurizing and then a depressurizing of the airlock, and the EVA started.

It was extraordinary, Jennifer, as you would imagine. EVAs have to be the most fun ever invented. In this case, with Dale's able help, I was plugged into the MMU, affixed to the gunnel of the *Discovery*. Once plugged in, I then removed my tether, pulled the pins that held the MMU, and it floated free in the payload bay. Ever so carefully, I then began to use the control mechanisms of the MMU, rotational motion on one hand and lateral motion—fore, aft, up, down, left right—on the other hand. I'd been very well trained to do this through the simulators and also in talking with Bruce McCandless and Bob [Robert L.] Stewart, the two earlier pilots of this. Everything they had taught me, and the simulation had taught me seemed to be happening as I activated these controls. The MMU moved exactly as I expected it to, and within a few moments I had confidence that I could maneuver wherever I wanted to go at whatever speed and achieve the first objective, which was to affix the satellite.

Now, I'm going to put a bookmark here, and I'm going to tell a story that's a true story that happened two days before the launch. As you know, crew members get very tightly booked as the launch gets closer and closer, and one finds oneself as a small cog in a big machine. You really do not, as an individual, have a life of your own. Training starts early in the morning and goes till late at night, and you work diligently through the schedule to make certain every square is filled and you're properly trained before a flight.

That said, to our surprise, when we arrived at the Cape maybe four or five days before the launch, we remarked on the fact that we had a meeting about two or three days before the launch with an Associate Administrator of NASA, an individual newly named to the job of the head Public Affairs Office at NASA by the White House. We didn't know why we were to have this meeting. It was to be for an hour. But we didn't question it.

The meeting took place in crew quarters at the Cape. We went into the meeting room in flight suits, we five crew members, and then in came the Associate Administrator. Very nice gentleman; introduced himself, and I think one of his aides or deputies was with him. Introduced himself all around. We sat down and Rick said, "Now, Mr.—;" it's unimportant—"what's the agenda for this meeting?"

Whereupon the albeit naïve individual—we didn't know it at the time—but said, "Well, no specific agenda. I just wanted to introduce myself and just say that if there's anything I can do for you, I'm here to help and wish you good luck." We as individual crew members were all surprised, because this really was occupying a good chunk of our morning, and time was very important to us right then. Not that it was discourteous of the individual, but it was unclear why this meeting was to take place.

However, an unfortunate incident had happened a day earlier, in that a story appeared in the Florida newspaper the *Today*, that an unnamed NASA spokesperson had quoted the crew as saying, "The likelihood of capturing both satellites was very high." We'd read the article and amongst ourselves, were curious, because none of us had said it, and how the crew could be quoted. Perhaps it was a support crew member, but we didn't think so, and were fretful that those words had gone in, because we thought the task was going to be quite difficult. We didn't

plan to do anything about it, because newspaper stories are newspaper stories, and it was now water under the bridge.

Something about the start of this meeting, though, got under Rick's skin as the commander, and he said, "Mr. so-and-so, there is something that you can do." He then cited this newspaper article of two days ago, and he said, "I do not know who said that. I assure you that none of us said that, nor do we believe it. And I will personally tell you that my assessment is, if we successfully capture one satellite, it will be remarkable, and if we get both satellites, it will be a fucking miracle." And he went on to say, "You can quote me on that."

Well, the man was shocked, properly so. We were as well. [Laughter] And then Rick said, "If you have no other business, I think this meeting is over." We're ten minutes into a one-hour meeting.

He excuses himself, somewhat distressed, with probably good reason, and leaves, and we go back, too, and we sort of said, "Boy, Rick, that was being very commanderlike. But good for you."

We're now back in orbit, Jennifer. I successfully grappled the first satellite, not without a bit of a wrinkle towards the end, because probably by accident, I found myself lined up approaching the satellite from the back exactly against the Sun, such that I was looking into the very, very bright Sun, and the satellite had no part of it easy to look at, because it was just a black silhouette in front of a terribly bright Sun. And I thought, "Oh, this is going to—." I couldn't see the center of it, and said, "This is going to be very difficult," and said as much in the communication with David Walker, the IVA.

I might say in those years we did not have a working TDRS [Tracking and Data Relay Satellite], and so one still was flying with a loss of signal, acquisition of signal. You're out of

listening with the ground for most of the orbit, a very convenient feature, because you can talk as normal people talk, not with the worry that someone was eavesdropping on what you said. I discussed this in English terms, whereupon Rick said, “Joe, not a problem. I’ll move the Orbiter over and shadow the satellite.” He did that. He moved the Orbiter slightly; a shadow was cast on the satellite such that I was no longer seeing the Sun. It was beautiful, clever as could be. I could then see the bull’s-eye, the center, the rocket engine, very easily, threaded it like I’d done it all my life, deployed the tines of the stinger, tightened down the clamp, and *voilà*, there it was. Anna grappled me with no problem at all; turned around, and Dale set about affixing the clamp to go to the top.

Time passed. Trouble had appeared. The tool designed to fit on the top of the satellite did not fit. The problem, we later learned, was the satellite was not built to the drawings of the satellite we had used on the ground. About the time we realized this was the case, *Discovery* came acquisition of signal, and we reported to the ground that the holding tool did not fit, and they said, “Roger that. We’ll get the back room working on it. What is your plan?”

And we said, “We’re going to go to Plan B.”

“Roger that. See you next AOS [Acquisition of Signal],” and the ground was now out of earshot again.

David Walker, bless his heart, was the keeper of all the Plan Bs that we as a crew, prior to the launch, had devised, and we’d written them down. What would we do in the event that “blank” failed? What would we do in the event that “blank” failed? We had a Plan B for what we would do in the event that this clamp failed, and it was, sad to say, written on David’s piece of paper just as “Improvise.” We really did not know what we were going to do.

But we talked about it, and on the fly, Jennifer, we decided that Dale could affix a foot restraint on a gunnel; this is a standard EVA tool that are there. I would come out of the MMU and into that foot restraint. Anna would maneuver the top of the satellite around to where I could grab it with my hands, and then I would be holding the satellite at one end, not the grapple fixture, and Dale by himself would put on the very large clamp on the bottom. That was the only thing we could think of to do, knowing full well it would be very difficult, because the very large clamp was a two-person operation. We had successfully maneuvered it with two people in the water tank several times earlier, but with the two of us, it was not easy.

The mission unfolded. I found myself holding the satellite; ground weight 2,000 pounds, on-orbit weight zero, so it was not nearly as hard as it looked. I held the satellite for about two hours. It took Dale about that long to single-handedly affix his big clamp. The fact he was able to do it still astonishes me, but he was. He's just persistent, the most persistent individual I've ever worked with, and one of the smartest, and he did the impossible. Ultimately the clamp was affixed.

I later was given far too much credit for supporting a 2,000-pound satellite for one orbit of the Earth, and a political cartoon appeared in Canadian newspapers the next day showing a chunky little space-suited crewman standing on the gunnel of an Orbiter holding this satellite, and the caption was, "Nobody kicks sand in this man's face anymore," referring back to an old Charles Atlas ad of many, many decades earlier. Dale was not recognized in the paper for the heroic work he had done, but his fellow crew members knew of it and still know of it.

ROSS-NAZZAL: Do you mind me asking, what was going through your mind as you were holding that satellite?

ALLEN: Hoping against hope that Dale would be able to affix the clamp, and attempting to maneuver it, the satellite, to better square with where the clamp was; where I thought it was, based on the feel that was coming through the satellite. Very difficult to describe, Jennifer, because a suited crewman has very little tactile sense. You can't see very well. The satellite was twice as big as I, and Dale was at the other end. But every so often I could feel where he was pushing and attempting to get the clamp to go on, and react against it such that it didn't move.

I also was aware of the fact that the Sun was moving across my body, because a space-suited crewman is naturally cooled or kept the proper temperature all over his or her body, except for the hands. The hands are not encased in the liquid-cooled garment, and your hands can sense which side is the dark side and which side is the Sun side, because when the Sun is on, for example, the back of your glove, you can feel the back of your hand get very, very warm. I couldn't really move my hands, so my hands were getting quite warm in places and very cold in other places. Not comfortable, but I didn't think it was life threatening. It definitely was not life threatening.

All this said, Dale ultimately was successful and clamped the clamp down, and then the two of us could maneuver it over the pallet to which the clamp would affix, and the affixing of the clamp to the pallet was considerably easier than putting the clamp onto the satellite. Once there, we knew we had it, and we clamped it down, as much as dusted our hands off [demonstrates], heaved enormous sighs of relief, and then went about storing all the equipment that we had pulled out of storage to use in this weird emergency, including putting the MMU back, putting all the foot restraints back, reorganizing the various tethers, and then we reentered

the airlock, repressurized the airlock to the point where David Walker could come in and get us out of our suits.

I think the record will show we came out of our suits about eight and a half hours after we had gone into them. It was an unusually long spacewalk, but we had one satellite locked aboard. We were both exhausted, but we were also concerned about Dave, who clearly was suffering mightily because of a headache, but we got serious pain medicine into him, and then we had the major dinner of the flight, which I think is a rehydrated steak or something quite extraordinary, and felt elated in the extreme.

The next day was a planning day. The NASA policy was, and I think still is, spacewalking crewmen and women do not do back-to-back spacewalks. There is a day's recovery time between them, and was also the case in this flight. It was a very full day, though, because we then attempted to devise plans, how do we do the next spacewalk. Do we do it per the plan, or based on what we now knew, do we use Plan B on the assumption that the same tool would fail to fit this, albeit different, satellite?

We discussed this a lot with mission control. Mission control is always extremely helpful in these things. To our surprise, mission control finally said they did not have a recommendation, that we knew more about it based on what we had seen and experienced, and that whichever procedure we elected to use was okay with them. Again, we were surprised at this. Serious responsibility again was with us. We decided that we would go immediately with Plan B, because if we started with that, there were clearly some steps we could skip over, not worry about at all, and on this day, Dale would recover the satellite, Anna would grab him, and then hand the satellite to me. I would already be on the gunnel. It would be a very dramatic shortcut to the path we'd had to follow by necessity two days earlier.

And that's what we did. Dale captured the second satellite every bit as easily as I had. I claim it's because I taught him how to do it; it's a totally false claim. The same procedure then unfolded. This time, Jennifer, perhaps not surprisingly, we accomplished it in about six hours. The second satellite was locked down. We were LOS, loss of signal, and Rick, Anna, and Dave all were very pleased for us and said, "Congratulations," and Rick, as the commander, said, "Joe and Dale, when we come AOS, I want you to report that both satellites are locked safely aboard."

We looked at each other and kind of shook our heads outside, and almost together, we said, "Rick, that's the commander's job. When we come AOS, you report that we have two satellites safely aboard, and you can also use the words 'fucking miracle.'" [Laughs]

We came AOS, and Rick, in his Chuck [Charles E.] Yeager-type relaxed drawl, said, "Houston, Roger. *Discovery* here. We have two satellites safely aboard." You could hear the mission control people cheering through the microphone of the CapCom [Capsule Communicator]. It was really quite fun.

That report being made, we were still ahead of our timeline, and I was still affixed to a foot restraint on the arm. Dale was on the tether. He went into the airlock and untaped from the edge of the airlock a sign that we had prepared in advance of the flight that said "For Sale," because the satellites would be returned and would then be in the ownership and the possession of insurance companies, which had every intention of selling them as brand-new satellites.

Dale came out, reached up, grabbed a stanchion affixed to the foot restraint on the arm, and Anna lifted Dale and myself up in the air somewhere—"in the air," there's a human term—up away from the gunnel, Dale holding on just with one hand, both his feet affixed in nothing at all and the "For Sale" sign in his other hand.

I took a photograph of him holding the “For Sale” sign with the Nikon camera I was carrying with me outside in a white jacket. It’s a terrific photo, and one of the only photos I’ve ever taken that shows me as well, because I’m reflected in Dale’s helmet, holding my camera, and the photo shows part of the Earth, the blackness of space, Dale Gardner, the “For Sale” sign, and my likeness reflected in his helmet; a favorite photo of mine to this day.

When we returned, the “For Sale” photographs—and Rick and Anna and David had taken many from the flight deck as well—were an important part of the press package that went out, and they showed up in a number of magazines. I might say that the Lloyd’s of London and the [International Technology Underwriters] were very, very pleased with these photographs. NASA was not as pleased, and we were given somewhat curt—*reprimands* is the wrong word—curt discussions from our [NASA] Headquarters bosses over what did we have in mind in doing that. I don’t think any harm came from it, but at the time I thought, “Maybe I should get into a different line of work. My career days may be limited here.”

One or two days later, we landed, and we landed at the Cape. So I landed once in California and once in Florida, both times on the sixteenth of [November]. Strange. I flew twice, and I landed twice on the sixteenth of [November], once on the East Coast and once on the West Coast.

We were greeted, as always, by the suited technicians that come out to save an Orbiter, and by now I had experienced one safe landing and the opening of the Space Shuttle to the wonderful smell of planet Earth, and the suited technicians coming in. In California when I’d landed, they pretty much were all, “Congratulations, welcome to planet Earth, and what a great job you all did.”

In Florida it was different for the following reason. During the course of the mission, after we'd successfully recovered both satellites and had just a few hours on our hands, extra hours, Dale Gardner and I had made a videotape of his pulling me, extricating me from inside a very tiny middeck locker. We reviewed the videotape on orbit in the black-and-white monitors we had there; found it was very amusing, because we had used an optical trick of sorts, and it looked as though I really had come out of a very tiny middeck locker.

Just for the fun of it, we beamed it down to the night controllers on the ground. These are the people that sit through the night shift, and because the mission was going very smoothly by then, we knew they had very little to do, so we thought that they would be amused by this. We were also certain that it can't be intercepted publicly, and it would just be shown around the mission control, and that would be the end of it.

What I didn't know is they had been so amused by it that they had shared it with other NASA Centers, including Florida, and people who had seen it in Florida were the very technicians that had prepared the spacecraft for launch. They were very well aware of the configuration of the middeck, and they knew full well that the dimension of a drawer would not accommodate an astronaut, however diminutive he or she may be, and they were quite mystified by that.

The same technicians that had packed the spacecraft for launch were also those that came out to greet us, and they came in and looked around; looked around at the configuration of the middeck lockers and said, pretty much, "How the hell did Joe Allen come out of—?" And then they said, "Oh, we now understand it."

Did I tell you this story before, Jennifer? Had you heard it before?

ROSS-NAZZAL: You've told me parts, but not on tape.

ALLEN: The trick, which we can now reveal for your history, is that the middeck lockers are just an array of lockers across the middeck, and they're maybe four lockers across and perhaps four lockers down, and so all told, you have sixteen lockers there. In our particular flight, because of the loading of hardware used to recapture the satellite, we had a weight problem and a center-of-gravity problem, and the Orbiter's nose was ever slightly too heavy. As a consequence, several of these lockers themselves had been stripped out, and so when you looked at this four-by-four matrix of lockers, there were several gaps that looked not unlike a human mouth with several teeth missing.

I had, in fact, crunched into a gap of two missing lockers, so I'd occupied basically a two-locker volume, and then we photographed my being pulled out of the drawer right along the face of the middeck locker, such that the drawer that Dale pulled out and said, "Joe, come out, come out," obscured the fact that I was in the gap offset from the locker that Dale was pulling out, and a television camera, because it does not have good three-dimensional accuracy, fooled the human eye looking at the picture, because I came out from the gap, not from the drawer.

But it was very cleverly done, I must say, and that particular video sequence is still shown in children's programs on Saturday morning cartoon videos, because it's kind of amusing just to watch the thing.

Well, the technicians then saw the gap and immediately knew what had happened, but I thought that was very unromantic "welcome back to planet Earth"-type remarks that they had made to us.

The debriefs at the Cape and the medical checks and so on were not unlike those that I'd experienced two years earlier in California. An aspect I'll recall—I'm a little uncertain that—it has no historical significance, but in the sense that people read these looking for human things, this is a human thing. Claudette [A.] Gage was the astronauts' nurse for many, many years, and she was as expert a medical individual as one would ever find and was a good friend to virtually every space flyer that flew, I think to every to space flyer who flew. She typically would draw the blood, would come to the Cape or to California and draw the blood of crew members coming off for the research purposes that are still important. She was there this time, but it had been determined by the then chief NASA doctor, who did not practice very much during the course of the year, that he would renew his proficiency by drawing blood on a couple of the crew members, I being one of them.

It had been a very difficult mission, and without question, I was more dehydrated because of the two spacewalks than had been the case, my case, two years earlier, and I felt that. I felt somewhat light-headed; not uncommon with returning space flyers, but I still felt somewhat different and not my usual able self. The chief NASA doctor began to attempt to draw blood and failed two times, whereupon Claudette spoke up and said, "Doctor so-and-so, let me just try that. Let me try." The doctor readily agreed; went off to other things.

I said, "Claudette, you've just saved my life."

And she said, "Joe, I know that. I know that. Now you just relax." And she skillfully drew the blood that was needed, and we were done. But she saved me, I'm sure, from passing out or being even worse. I've always been appreciative of her, and for that moment I'm really thankful. I think she figuratively did save my life.

There in the crew quarters we also were reunited with family members that were there, and Bonnie, my wife Bonnie, had understandably been very concerned during the mission, and she was also, though, quite happy, because she realized I had now done the spacewalk, and clearly we were quite happy. But at that point she said to me that I should now start to think about leaving the space-flying business, and I told her I would definitely think about it.

Jennifer, again, there are so many stories associated with this. A lot of them are like other space missions. I think the only thing truly unique about the STS 51-[A] mission was the recovery.

ROSS-NAZZAL: I understand you did receive an award, though.

ALLEN: We did, and I can speak to that. Let me talk about that. In the months that followed, just the few months that followed, this mission was really one of the last to get a certain amount of publicity. It still engendered some interest among the public. We were surprised and actually very flattered when Chris [Christopher C.] Kraft, as experienced a space pioneer as existed, told us in a meeting we had with him afterwards—and I think he no longer was at NASA; I think he had retired, but you can research this—he asked for a dinner with us, because he basically said he just wanted to congratulate us.

He said to his mind, this was one of the most remarkable of the space missions, and that all things considered, the fact that we'd had a short time to train, the fact that we'd been able to do procedure workarounds on the spot, really pleased him, and he said that it, in his mind, would remain as one of the great missions of the early space age. He also chided us for publicly saying it had not been that difficult. "Because," he said, "it was difficult. I know it and you know it,

and your making it look too easy is not helpful to the space program in the long run.” He said, “By your sounding as though it were easy, is not useful to NASA in the long run.” So he was giving us a very warm pat on the back and a bit of a scolding at the same time.

I neglected to mention, Jennifer, when we arrived at the Cape, we were met in crew quarters by two individuals from the United States Customs Department. We were surprised by this, and they said they had forms for us to fill out, because we were bringing into the United States approximately \$250 million worth of technical hardware, and there was a certain duty now due on this, because anything that’s imported into the United States over a certain value must be taxed, and the tax would be 10 percent of \$250 million. How did we plan to pay for that?

Fortunately, they also had an agreement between Customs and the NASA Office of General Counsel that waived this import duty, that the chief NASA lawyer—I think his name was [S.] Neil Hosenball—had foreseen this as a complication and had organized the waiver prior to the success of the mission. But we were to sign the Customs form, and for that they gave each of us a United States Customs hat, and we crew members had those hats when we had our reunion two weeks ago.

In the weeks that followed, we joked with the insurance people as to whether they were going to pay us a salvage fee, just a modest 1 percent of the value or something like that. And somewhat to our surprise, Stephen Merrett with Lloyd’s said they weren’t, but they were going to arrange a reception in London [England] for us, and that he had organized with NASA officials to permit us to attend this reception, and that they, Lloyd’s of London, were going to cover the expenses for it. We were thrilled and surprised, and I think in February of ’85 we, nine NASA individuals, that would be five crew members plus four spouses—David Walker was not married at the time—boarded a flight in Houston, Texas; flew to [Washington] Dulles

[International] Airport [Dulles, Virginia]; were taken off, taken to the luxury suite of a British Airways used by those bound to cross the Atlantic Ocean in the SST [Supersonic Transport]. We were wined and dined and then loaded aboard the SST and then flown aboard the Concorde to London. What a wonderful experience.

There unfolded five days of quite extraordinary entertainment and receptions, including a visit to [Prime Minister] Mrs. [Margaret H.] Thatcher in 10 Downing Street; a visit with Prince Charles in the palace, with Lady Di there upstairs with a probably two-year-old William running around. We're still regretful we didn't meet Princess Di. A visit to Oxford [University, Oxford, England], participate in High Table at Oxford at the college attended by Stephen Merrett when he was a student at Oxford. A grand reception in the City Hall of London, attended by the mayor of London with important persons of all kinds giving speeches. And numbers of other terrific experiences during the course of those five or so days.

One of the ceremonies was actually held on the floor of Lloyd's of London, where we were recognized and shown a bell there at Lloyd's of London called the Lutine bell, which, since the very early days of insurance on oceangoing vessels, was rung on each occasion an important treasure was salvaged from the depths of the ocean, and we were told that that bell had been rung on the floor of Lloyd's of London when Rick reported that two satellites were safely aboard the spaceship *Discovery*. We also were told that we would be given special awards—it's called the Lloyd's Medal—but that medal would be presented at a later date.

Stephen Merrett and his wife came from London two weeks ago and joined us in our reunion, and so we had great fun recalling what we had done when we were there with him.

Jennifer, a conversation that has definitely historical meaning to it was with Mrs. Thatcher. She met with us five crew members. She was at the time the Prime Minister and very

much in charge. We also were invited by her to go over to the floor of the Parliament during the questions-and-answers session, and she said, “Well, come over, dears. You’ll find it very interesting. It’s a veritable bear garden over there,” meaning the shouting. And bless her heart, to have to go over and withstand the questioning, as Prime Ministers must do. It’s a very interesting custom there in the English government and one that would serve us well in this government, but it’s not in the cards.

She was extremely keen to visit with Anna Fisher, and she’d been well briefed by staff, because she knew that Anna Fisher as an undergraduate had studied chemistry. Anna, of course, is a physician, but undergraduate, she’d been a chemist. She said, “Anna, my dear, I too am a chemist,” which, of course, we didn’t know. She said that she found it very useful and very useful in her responsible position right now. Chemistry, the study of chemistry taught one to think about problems and solve problems; that’s what she was doing.

She went on to say, “And you know I’m so keen on meeting you, and I adore your Ronnie.” She was talking about President [Ronald W.] Reagan. “I adore your Ronnie. He’s one of my favorite people, and we have just a terrific time together.” She went on to say, “You know, we two countries have only had one spat in our entire history, and you chaps were entirely correct.” [Laughter] It took us a bit to realize she was talking about the American Revolution. She wanted us to know there were no ill feelings left and that King George [III] probably was completely cuckoo, but she didn’t put in those words. It was pretty funny.

Moving on, Jennifer, we later were asked to come to the White House to be presented the Silver Medal from Lloyd’s, and in the presentation would be President Reagan, and it was the only time, actually, that I as an astronaut ever was invited to the White House. Astronauts before

have gone on a regular—and afterwards, but I was just in that particular segue where they really weren't doing that.

We were taken to the Oval Office by President Reagan and Vice President George [H. W.] Bush, and shown around, and Mr. Jim [James M.] Beggs, the NASA Administrator, had a presentation that he wanted to give to the President, and he did. He presented President Reagan with a set of spurs that had been carried to space. They were the president's own spurs, and he wanted them carried to space. They had been carried to space, and he, Jim, said, "Mr. President, these were carried to space aboard the very famous Space Shuttle flight number seven with Sally [K.] Ride."

Well, the President was very gracious, and the five of us kind of looked at each other. I particularly exchanged glances with Rick and smiled, because it was clear to us that the Administrator had forgotten that Rick was also aboard that same flight. He was the pilot. [Laughs] But never mind; Administrators can't remember everything.

We were then taken to the Roosevelt Room for the presentation, and in the Roosevelt Room were Stephen Merrett; his colleague and, I think, boss, probably, in a sense, a man named Peter Miller, who was the head of all of Lloyd's of London; and the British Ambassador, front and center there in the White House.

Mr. Miller began by thanking everyone for coming. He's a very impressive public speaker. He spoke without a note, and in this booming voice, he said, "Mr. President, Mr. Ambassador, crew members, I'm so pleased to be here. We are presenting this medal today to four men and a woman, and you may think this is the first time a woman has received a medal from Lloyd's of London. This is not correct. Dr. Fisher, you will be the second woman to

receive this award. Let me recount for you a newspaper story appearing in the *London Times*, April 18<sup>th</sup>, 1846.”

He then verbatim banged down through a story, and some of it was old English. It was amazing. It was not the way a story would read right now. It started, “On or about the first of April in the Year of Our Majesty,” and so on. “The good ship so-and-so set out from Plymouth Harbor, bound for the Indian Ocean and points—.” And then he goes on, “It was—,” etc., etc., and at the end, “The captain and his wife were able to save the ship, in spite of terrible hardship, and bring it very slowly back to port in England. For this heroic effort, the two of them were given the medal from Lloyd’s of London. And you will know, Mr. President, that Mrs. so-and-so was not an English woman; she was an American from Chicago.” Gave her name. She was married to Captain so-and-so, the captain of the ship.

Well, of course, no one in the room knew this, and we were quite surprised. I think, all told, there are just a handful of Americans that do have the medal, including two women. So we found that story very surprising and fun.

The ceremony was now over. Vice President George Bush said to us, “Crew members, come let me show you where the other half lives.” Then he took us over to his office in the West Wing of the White House, a beautiful office. A fire was burning in the fireplace; it was sometime in the winter. We sat down and visited for quite a long time, and I felt as though I got to know Vice President George Bush very well. This became very useful later on when we lost the *Challenger*, and we can pick back up on George Bush Senior, and the *Challenger* when we talk about that.

ROSS-NAZZAL: This might actually be a good place for us to stop.

[End of interview]