

NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT

ORAL HISTORY TRANSCRIPT

MIKE FOX

INTERVIEWED BY SANDRA JOHNSON
HOUSTON, TEXAS—28 OCTOBER 2004

The questions in this transcript were asked during an oral history session with Mike Fox. Mr. Fox has amended the answers and reorganized the text for clarification purposes. As a result, this transcript does not exactly match the audio recording.

JOHNSON: Today is October 28, 2004. This oral history interview is being conducted with Mike Fox, in Houston, Texas, for the NASA Johnson Space Center Oral History Project. The interviewer is Sandra Johnson, and she is assisted by Rebecca Wright and Jennifer Ross-Nazzal. I want to thank you again for joining us today.

FOX: Glad to be here.

JOHNSON: To begin with, I want to ask you if you could briefly describe your career with the Navy, when that began, and how your experiences there may have led you to join NASA.

FOX: I originally enlisted in the Navy in 1952 and became a hospital corpsman. In my early career, I was assigned to the Marines as a Navy Corpsman. I served in Korea during the Korean War, and completed my tour of duty on a couple of ships, the USS *Helena* and the USS *Fletcher*. After I was discharged from the Navy, I enrolled in Wayne University, Detroit Michigan; now called Wayne State. I spent a year at Wayne University, but wasn't really a serious student. I dropped out of Wayne and re-enlisted in the Navy. I got married the same day that I went back in the Navy and talked my wife into being a sailor's wife.

I was assigned to Chase Field, Naval Air Training Command in Beeville, Texas. This was part of the flight training program in Pensacola Naval Air Station, Pensacola, Florida. It was there that I got interested in aviation. In Pensacola I went through Aviation Medicine Technician school, which lasted six months, and then was assigned to the Naval Air Station in Barber's Point, Hawaii; tough, tough duty. But I was with a squadron, which meant that I had to deploy quite frequently; so every six months I would deploy for a short period of time and return to Barber's Point. I was reassigned after my tour of duty in Hawaii to Pensacola, Florida. In Pensacola, I headed up the school for aviation medicine technologists and physiology training techs, and helped write the original curriculum. I taught there for three years.

One day I got a telephone call to report to the Administrative office. You never like to report to the Administrative Office. Usually that means you are going to get chewed out, or you're getting your orders. When I reported, the chief administrative officer said, "Mike, you got your orders."

I said, "What do you mean I have my orders?"

He said, "You're going to the Manned Spacecraft Center in Houston, Texas."

I said, "Run that by me one more time."

He said, "You're going to the Manned Spacecraft Center in Houston, Texas."

I said, "Okay." "Is there any other information?"

He said, "There's a fellow that they'd like you to contact, Commander [Robert G.] DeVine."

I called Bob DeVine. He was a Navy commander who worked for Dr. [A. Duane] Catterson and Dr. [Charles A.] Berry. There was no Medical Directorate then, and they all fell under the Crew Systems Division, headed by Dick [Richard S.] Johnston. He told me that the

Navy was asked to send five people to the Manned Spacecraft Center, later named Johnson Space Center, to be test subjects and provide medical support for all the activities that go on there. I asked, "How was I selected?"

He said, "I don't know how you were selected. All I know is that we have your orders." And he said, "By the way," "are you interested in any housing?"

I said, "Certainly."

He said, "I'm leaving. How would you like to buy my house?"

That sounded pretty good to me and I said, "Where is it, Commander?"

He said, "It's in Baytown, Texas."

I said, "Is there any way that NASA could send me to see the Manned Spacecraft Center? Certainly I can't turn down the orders, but I'd like to scope it out and see what it's like."

He said, "Sure," and within two days I had plane tickets that were sent to my command, which was the Naval Medical Institute in Pensacola. I came down to Hobby Airport; at that time there was no Bush Intercontinental Airport, and Commander Devine picked me up and introduced me to the different folks at the Manned Spacecraft Center in his area, the medical area, Dr. Catterson and Dr. Berry, Dr. D. Owen, Nick Coons, and some of the other folks that were there at that time. Then he took me over to the places where I would be working. One was the centrifuge area. The centrifuge was halfway completed. One of the things they said was, "You have ridden the centrifuge in Pensacola. You have a lot of experience. You're the kind of guy we're looking for and you're a diver." It was like a carrot, you know, telling me how wonderful I was.

All I was really interested in was seeing his house. I had two children and a wife. We were living in Navy housing at Pensacola. He took me to Baytown, and he had a lovely house. I

asked him how much he wanted for it, and I couldn't believe the price; it was only \$10,500. It was a beautiful house, and the mortgage payment was only \$103 a month. I wanted to say, "When can you move out, Bob?" My orders were to report in May, 1965. I went back home and was pretty excited at that time, of course, and told my wife. She said, "If that's what you want to do, honey." I said, "I really don't have any choice." You know, if the Navy sends you, you don't say, "I don't want to go." So I told her that I had a house lined up to buy.

She said, "Did you already commit to it? I haven't seen it."

I said, "Honey, you're going to like the house. Don't worry about it." It was in a nice section called Plumwood II in Baytown, and I guess the houses were only about four or five years old. So for the next month and a half, waiting to leave my command, I was getting more excited, because I, of course, followed the space program, and I was going to be working for astronauts and with astronauts. Finally, the time came to go. We left for Baytown the first week in May. We didn't have any furniture yet because the movers weren't scheduled for another day or two. I said, "We'll just sleep on the floor."

When I checked into NASA, the very first thing they did was usher me into Al [Alan B.] Shepard's [Jr.] office. He was wearing civilian clothes and I was in my Navy uniform. No one had told me to wear civilian clothes. He introduced himself, "I'm Al Shepard." He said, "What do you go by?"

I said, "Mike Fox." I was a chief petty officer at that time. He asked several more questions and I always ended up with, "Yes, sir."

"Look, Mike," he said, "we've got to get something straight. Here, we do not use 'Yes, sir' and 'No, sir.' We don't use military titles. I'll call you Mike and you call me Al."

I said, "Yes, sir."

He said, “You don’t catch on very fast, do you?”

I said, “Look, I’ve been in the Navy almost 14 years. I’m not used to addressing 06s by their first name.” He got a chuckle out of that. He told me I’d be working in Crew Thermal Systems and an organization called the Systems Test Branch, which was in Building 29. It was right next to Building 7 and 7A, where all the altitude chambers were. It was also where the centrifuge was being built.

I met Dick Johnston who was the head of the Crew Thermal Systems Division, and got assigned to that Systems Test Branch, which was headed up by Art [Arthur H.] Hinnens and Howard [N.] Hunter. They called me in and told me that they wanted me to write some medical procedures for the centrifuge because I had experience riding centrifuges. They wanted me to train the people who were going to ride the centrifuges so they would know what they were going to get into. Also there would be a lot of testing done on the Gemini and the Apollo suits, and they needed a lot of test subjects. They asked me to head up the test subject pool.

That kind of took me back. I didn’t know a soul and I was just checking in. Now they were telling me I would be writing medical procedures. Before I left Pensacola, I took the medical procedures we were using there and just revised them—I wasn’t going to reinvent the wheel—and I was really able to write some good procedures. Everyone said, “Wow, what a wonderful job.” Of course, I didn’t tell them that I’d brought everything from Pensacola with me. Let them think the best. I’d just gotten there.

One day Dr. John [J.] Gordon, a physician and a Navy commander, called me in and said, “Mike, we got the centrifuge half done, but we haven’t got any medical equipment. How do you want to set up the medical organization here?” I thought, “Good grief, what’s going on here?” They’re bombarding me and I haven’t even been here very long. They wanted the centrifuge

fully equipped to handle any emergencies that might happen. I ordered X-ray machines, the defibrillator that was available at that time, all the emergency equipment that we might need, splints, different pain medications, etc. A laborious but fairly easy job. We got all of that in a very short period of time. In those days, it seemed if NASA wanted something and they ordered it, everyone got it there in a hurry. In a very short period of time we had all of the equipment in place.

I wanted to find out how I had ended up at NASA. I didn't find out about the selection process until I left the Manned Space Center to go back to the Navy. It turned out that I knew one of the fellows that was working in the centrifuge area. He was a retired chief named Gene [Eugene K.] Wendler and they were telling him, "We're going to need a lot of subjects, but they need to be people that know what they're doing. They're going to be evaluating a lot of equipment that's going to be flight hardware. We're going to use some of it in Apollo and some in Gemini. So what do you think?"

Gene said, "I told them, 'Look, the Navy has what they call these aviation medicine technicians and these physiological training techs. That's what these people do. They know that system.'" So that word was passed on to Dr. Berry, who was in the Medical Section, and he went to the Bureau of Medicine and Surgery, and the Bureau of Medicine and Surgery made the selection process and sent five of us down. It was the typical Navy way; they had a senior person, a next senior person, next senior person, all the way down to somebody who's going to do all the scut work.

Since the centrifuge wasn't quite ready yet, I was assigned to help out in the clinic. We went over to Building 8, and at that time the medical contractor was in the process of being selected. It was the Kelsey-Seybold Clinic folks, but they weren't officially on board. They sent

a skeleton crew there, and we ended up helping with the scheduling. We also did the EKGs [electrocardiograms]. They had a lab tech, but we did all the eye tests, everything leading up to the hearing test before the exam. None of us really liked that. In about a month, a nurse came in, Mona [Ramona M.] White. We were glad to see Mona. Then Evelyn [D.] West came to be the Chief Nurse.

The clinic was being run at that time by Dr. [Phillip P.] Pease, a retired Colonel in the Air Force. There were two sides: a flight medicine side and the occupational medicine side. The purpose of the occupational medicine side was to keep a healthy, productive workforce. The flight medicine side was to take care of all of the flight personnel, not just the astronauts, but the pilots out at Ellington Air Force Base, [Houston, Texas] and the air crewmen.

Dr. Catterson also had his offices in this clinic. He was the number two guy behind Dr. Berry. All of us corpsmen got together and I said, "Let's give it our best shot. Let's not gripe. That isn't what we came here for, but we're going to do it. We don't want to look like malcontents." So we worked really hard with those folks and we got to know all the docs. There was [Dr.] Jack [John H.] Droescher and there was [Dr. G.] Fred Kelly. They were all good guys. [Dr.] Bill [William R.] Carpentier and [Dr.] Clarence [A.] Jernigan were the other two, and Clarence stayed here [MSC] for quite a while.

They were going to be the crew medical officers for the assigned crew. They went out on the launches, and the recoveries on the ships. They were all ex-flight surgeons. They all had military experience; three of them were Navy and two of them were Air Force. But most of the military folks that we ran into were predominantly Air Force, especially the medical side of the house. I attribute that mostly to Dr. Berry because he'd been an Air Force Flight Surgeon.

About five years ago, we had an Engineering Review Board out at the NBL [Sonny Carter Training Facility - Neutral Buoyancy Laboratory, JSC]. That's where they come in and look at a facility that could have potential loss of life if you're not careful. We were asked about all of the different types of systems that we had in place. When they got to our section, one of the folks stood up and said, "Why do you have your slide up there, Air Force Class III physicals must be physically qualified and entered in a computer before they can be trained? And why do you call them Air Force Class III?"

"I'll tell you. It's very simple. If we'd have had a person who wasn't a retired Air Force Colonel in charge of the clinic at that time and he'd have been a Navy person, it would have been a Navy Class 1 physical." I said, "That's the only difference."

He said, "Are you sure?"

I said, "I'm absolutely sure, because I wanted to use the Navy standards, because that's what we were used to, but Colonel Pease said, 'No, you're going to use Air Force Class III.'" And they were almost the same, but I just found that kind of interesting. Everyone always wants to know why you call it Air Force Class III. It really confuses people, because there's something called an FAA [Federal Aviation Administration] Class III exam for pilots, private pilots, and it's a very minor exam. If you can see, hear, talk and chew gum, you can fly an airplane as a private pilot, really. But an Air Force Class III requires chemistries and complete urinalysis and treadmill tests, EKGs, audiometric tests and detailed eye exams. You don't receive any of that when you get the FAA Class III. Some of the people who would come to us who had to really have an Air Force Class III would give me a little card and say, "See, I got an FAA Class III. Why do I have to take this physical?"

I would say, “Sorry about that, that’s the rules.” But just as an aside, it’s pretty interesting why everybody said, “Why is it,” when I tell them that, they just say, “Oh, it’s got to be something besides that.” I don’t blame Colonel Pease. He was in charge and he was setting up standards, and why would he use a Navy standard when he was totally familiar with the AF Class III Standards.

Finally, the offices were completed in Building 29. It took about four months and we stayed in the clinic helping out. The main person in the clinic at that time was the guy who ran the pharmacy. He was a Navy guy named Hal [Halley M.] Bishop, who later became Administrative Assistant to the Medical Director. Then they hired a preventive medicine tech, because somebody had to inspect the galley [provide preventative medicine inspections]. Interestingly enough, he was a Navy guy [William Thompkins]. The reason he was a Navy guy was because Commander DeVine was Navy. He was looking for people with experience. I bonded with those guys right away. They were two ex-Navy chiefs and one was running the pharmacy and one was doing the preventive medicine work.

Then they hired an occupational health officer, an industrial hygienist named Charles [P.] Bergtholdt, who was a real nice guy. At that time we had moved over to the clinic in Building 8. The Chief Nurse was Dee O’Hara, and there were, I think, five docs, so that’s six. Then there was Colonel Pease. There were only about twelve people for that whole clinic at that time.

It was really a small organization. We were just growing. We still had people that were living out in different areas. Not everyone was at the Manned Spacecraft Center at that time; a lot of the facilities weren’t completed.

We then moved into Building 29 where the centrifuge was located and were introduced to the altitude chambers. They said, “Look, we’re going to be doing a lot of work in the altitude

chambers and we're going to be doing a lot of work on the LCVG," which is the liquid cooling ventilation garment. They wanted to get a lot of test subjects in suits on treadmills to measure the BTUs [British Thermal Units]. How tired are they getting? Can we keep them cool? Can we keep them warm? Because these suits have these little tubes that have water, there's a way of controlling the temperature inside the suit.

I had to make sure that the test subjects that I picked for these studies were in fairly good condition. I told anyone who wanted to be a test subject that we would use the astronauts' running track, and when the weather got real hot, we would run inside the rotunda of Building 29, where the centrifuge was. Sixteen times around was a mile and I expected everyone to run at least a mile a day. There was a viewing section, and at that time NASA was letting people come around and view the centrifuge activities in Building 29. All the folks that were in the viewing area would see us running. They thought we were astronauts. They would wave at us and we would wave back. It was a big joke with everybody there, and some of the guys would really ham it up. They'd run real fast, leaving the guys behind.

Getting on a treadmill in a space suit is really bulky and it's much harder to maneuver in than the Space Shuttle suit because it doesn't have a hard HUT [Hard Upper Torso]. You stepped into it and zipped up the back. As you inflated it, it moved you up and backwards. There was a restraining strap and as the suit inflated, you had to keep pulling it down. Then you had to get on this treadmill and hold on. The last thing I wanted was for someone who wasn't in shape to get on the treadmill and collapse.

To recruit subjects, I went over to Crew Systems and talked to Harry Mills, the supervisor and another ex-Navy chief. I said, "Harry, I'm in the process of setting up a subject pool. How do I reach volunteer test subjects?" Of course, we didn't have computers in those

days, so he said, "Let me put out a little flyer asking for test subject volunteers." The next thing I know, they've got one of these little mimeograph machines, old time, and they've got it posted on their bulletin board, and soon I'm being deluged with volunteers. Everyone wanted to be a test subject. A test subject at NASA? Wow!

I started interviewing the volunteers and I never said no to anyone as a subject, but I kept their names on a list. I had almost 102 people, but out of that 102, the core was only about 35, that I could really feel comfortable assigning to chamber work or later to ride the centrifuge. But I didn't want to discourage people and say, "You just don't meet the criteria." I told them, "Can you get away during a noon hour?" Or, "You're going to have to run after hours." Some of the guys, I could just see the look on their face right off the bat, "This isn't what I thought it was going to be."

We were waiting for the centrifuge to be up and running and we were having all kinds of problems getting the centrifuge going. They really started cranking up Crew Systems. The principal subject that they had here at the Manned Spacecraft Center at that time was a fellow by the name of Jackie [D.] Mays. Jackie was doing most of the chamber tests. He was a parachute rigger in the Navy, so he was pretty versed in working around pressure suits. I got together with him, and he knew a lot of these people. I'd say, "Jack, what do you think of this guy?" because he'd been there.

He'd say, "Hey, that's a good guy."

I'd say, "What do you think of that guy?"

He wouldn't really say anything bad. He'd just say, "Well, you know—" I'd read between the lines.

They had some tests that they needed to do over in Building 7. One of the tests I didn't particularly care for, but I volunteered for it anyway. This was when the Gemini was going up. The guys were going up in their Gemini suits. This was the same situation when they were going up in Apollo. There wasn't a launch-entry suit like they have now. But the point is, especially for Gemini, if you're in that semi-reclining position the whole time, that's pretty tough, six, seven days and you're just lying like that. One of the reasons they did that is because they had the LCVG on, so they still had some control of the temperature. The temperature could drop in the spacecraft to about 58 degrees.

The test was to see if thermal underwear like Sears & Roebuck sells would work under the space suits. As a volunteer test subject, I would be put in a cold box and the temperature would be lowered to 58 degrees. I would stay there for ten or twelve hours. The scientists would put thermistors over my body and insert a rectal probe.

I said, "Okay, I'll do that."

Then he said, "The next step is we're going to go into the boilerplate." That was the Gemini spacecraft that was sitting in Building 7 in the twenty-foot chamber. "And we're going to have you get in the same underwear and we're going to hook you up the same way."

I said, "Okay. I can do that." I had another running mate who was going to do that with me, but later backed out. He had a family problem and it was too late to change. I didn't mind the cold box so much, but when I got into the spacecraft, in the boilerplate, and I was lying down, I just had the underwear on and they were bringing the temperature down. They had all the thermistors so they could get the surface body temperature, and then the rectal probe for body core temperature. After about eight hours, I'm lying on this thing and I said, "This is not going to fly." So I removed it.

The medical officer—I had to laugh about it—the medical officer said, “Hey, Mike,” he said, “we lost your rectal probe.”

I said, “No, we didn’t lose it; I just took it out.”

He said, “Can you put it back in?”

I said, “You’ve got to be kidding. You’re going to get all the information you want off the skin body temperature, and if I get cold, I’ll tell you.”

He said, “We’re looking for core temperature.”

I said, “Well, you’re not getting it from me. You want to continue on with the test or don’t you?” And I won’t tell you what it felt like. I don’t want to get into that, but it was very uncomfortable.

So I spent one day and one night in that configuration and really, I was very comfortable. In fact, I even kind of zipped down the zipper a little bit. So they could wear that kind of underwear and not worry about being confined in a suit all the time, which was very restrictive.

The next test that I can remember that was unusual was where they were trying to determine the use of the urine-collection device and how feces would be captured during defecation. I couldn’t get anybody to do that one. So the way I looked at it, I said to myself, “You set the example, so, okay, I’ll go ahead and do that.” The urine-collection device is not much of a problem, although I always say, “Where is this camera?” because everybody had video, black and white, in their offices in those days, and directors’ offices, because we even had one in our branch, and I said, “When I’m using this device, what are we doing? Is this being flashed out to everybody?”

They said, “No, it’s not.” I don’t know if that was entirely true or not. It was easy using the urine collection. It just meant filling a bag and hitting a switch that took the urine and

dumped it off the spacecraft without a problem. But defecation was extremely difficult in a semi-reclining position. There is a little bag that has a seal. I pulled off the wrapper which had a sticky substance and an indent in it. If you're up in space and you have to defecate, you use the indent part of the bag to push the feces down into the bag, because it's just going to sit there; it's weightless, too. But you've got to stick it on your bottom and it's awkward in a semi-reclining position. I knew that, so what I did before that test—I guess it wasn't too fair—I started watching my diet. I didn't want to get in a position that I had to use that, and I didn't have to.

We were evaluating the food at that time, too. There were little fruitcake bites and some beef-jerky bites. There were some tubes that you used to squirt stuff into your mouth; awful stuff, in my opinion. I loved the fruit bites, but that was it. I lived on the Tang. I don't know if you recall, but it was kind of like an artificial orange juice, so you had a little water spout that you could use that was trigger-motivated, and I would just empty Tang in there and that's what I was living on; a good way to lose weight for a few days.

When that test was over, I said, "Hopefully, we got all the information we need on that test, because I don't particularly want to do that one again." Then I heard, and I don't know how true, some guys said, "We saw you up there," and all these little crude remarks that were spoken and I wasn't too happy to hear about.

There were so many other little tests, but the one that I specifically remember is the one where somebody in space in the suit might be injured and need an antibiotic. If we had to give him a pain medication—basically we were carrying Demerol in those days—how would we get the needle through the suit? Today we have a Test Readiness Review Board to figure out a problem, but in those days we just got everyone together who was involved to talk about it.

We'd all sit around a table and we'd start talking about, "Okay, this is what we want to do. This is what the test subject has to do. How do you feel about that? Do you want to do that?" You didn't have to sign any papers; you just said you'd do that. We went down to the Baylor College of Medicine in Houston and they had a Tri-lock patch attached to the leg of the space suit, and a spring-loaded syringe. What you had to do was jam the needle through the Tri-Lock patch fabric of the space suit and into your thigh. That was the way to administer an antibiotic or pain medication to yourself.

I said, "I want to measure the distance between that fabric, the air, and my thigh, so when I administer the medication, I don't hit my bone with that needle."

He said, "Oh, we can do that, Mike."

I said, "Okay." I think Al [Alan M.] Rochford was the suit tech and I think maybe Joe [W.] Schmidt was with him; I'm not sure. The hardest thing when you're inflated is to look down to see where you are aiming the needle. Of course, they had the X-ray on so I just told them when I was ready to go so I wouldn't sit there and be over exposed to the radiation. I plunged that hypodermic needle down; not only did I go through the fabric, I went through the air, and I went right down through tissue and muscle into my bone, and that was painful. I came out of the suit and I said, "You can do it guys, but, boy, oh boy, I tell you what. Nobody did what I asked you to do."

He said, "We don't know what happened."

I was very upset about that. Boy, you talk about a Charlie-horse for days. And that isn't what bothered me. I was worried about maybe coming down with an infection, because here I am, taking basically contaminated material and putting it all the way through my thigh, into my bone.

They said, "Do you want to do it again?"

I said, "No, that's it. One time."

He said, "You came down awful hard."

I said, "Wait a minute. Are you going to tell somebody up there he's going to do it real gently?" You have to apply the injection with enough force. I hit it the very first time, but the momentum carried it pretty deep. I'm not one to complain, but that test really irritated me.

There were a lot of different chamber tests like that. I was in good condition in those days. Now, at almost seventy-two, I'm kind of slacking off on working out. So I didn't mind getting on the treadmills. I used to like to see how long I could go and I'd always ask Herm [Herman S.] Sharma, who was the exercise physiologist, "Who lasted the longest on this treadmill?" You know, one of those kind of macho things. I always wanted to go a little longer than somebody else. After awhile, they didn't want to use me, because sometimes when you're in too good a condition, then you're not going to get the feedback that you're after, because not everybody is in the same condition. As I was building up the pool of subjects, I was able to recruit more people to ride the chambers.

We had one episode that happened that was pretty dangerous. That's not accurate; it could have been fatal. We had a Colonel [Rufus R.] Hessberg, who was an Air Force Flight Surgeon, and he liked to watch the chamber runs all the time. He said, "Mike, I'd like to be an observer and act as a rescue tech."

I said, "Colonel, we really don't need any rescue techs. I've got plenty of those, because Brown & Root supplies those people for us." They had a lot of ex-military people, especially Air Force, who had worked in altitude chambers.

He said, "Well, you know, I think I want to go."

He's a full Colonel. I said, "You can go."

Before anyone went into the altitude chamber, they had to pre-breathe for four hours. It was important to have an N2 washout to get the nitrogen out of your system so you wouldn't be susceptible to decompression illness, or bends. On the second floor of Building 7 there was a recliner chair and a nice setup with a radio and television set. You could sit and watch TV while you were pre-breathing for the four hours. The Colonel sat in the room and did the pre-breathing for four hours. I was downstairs with the medical officer. We had a small area downstairs designated for handling emergencies.

When the four hours are up, a portable bottle is hooked to the person who has been pre-breathing and they hold their breath so they don't break their pre-breath. The portable system is attached to take the person down to the altitude chamber. I went up to the Colonel and said, "All right, Colonel, you ready?" "Hold your breath." He held his breath and we put the new mask on him, with the portable rig. He took two steps and collapsed. He was totally unconscious. I yanked his mask off and the medical officer standing by put it back on. I yanked it off again and I said, "Leave the mask off." I said, "There's something wrong. It's not a heart attack."

Part of our training is to instinctively know when something's wrong. What happened is that somebody had filled the portable O2 cylinder with nitrogen. That's hard to do, because to stop that from happening, we had different threads on each end. You couldn't take a pigtail and go from a big oxygen bottle to a small oxygen bottle, unless it was an oxygen bottle. Somebody had rigged it one way or another, so that when he took those two breaths, he had nothing left in his lungs and down he went. Had we left that mask on him, he would have died. He'd probably have been gone in a short period of time, within minutes. We cancelled that test, of course, and there was a big investigation. We never did find out how that happened. I'm pretty sure the IG

[Inspector General]—I wasn't privy to it—was involved. Of course, I just testified about what happened. When I came back to NASA 10 years later, I asked Jim [James C.] LeBlanc, who was working there at that time, "Jim, did they ever find out how that happened?"

He said, "No."

I was just curious, because I kept on thinking what if it had been one of my test subjects or what if it had been me? Would somebody there have been smart enough to take the mask off. It would just be one of the Brown & Root technicians, and would he know what to do? But because it was Colonel Hessberg and a doctor, the medical officer wanted to be there. Everything fell into place, maybe, to not have a fatality. But that was one of the worst things that happened.

The other thing that happened was when we were taking Jim LeBlanc, one of the young engineers, to hard vacuum. Now, when I say "hard vacuum," I mean we're in space, for all practical purposes. We had pumped that chamber down and he was wearing the Gemini suit with the umbilicals. He was at a hard vacuum, for some reason the inlet pressure on his suit, the umbilical popped off; it just came off—I don't know how—and he collapsed inside. In fact, there's a video of it that we still have. It just shows him going backwards. I was at the medical officer's console. Hank [Henry A.] Rotter, who is still here, was one of our test subjects. I let him act as an observer. He was in a chamber at 18,000 feet.

We kept the crewmen sitting at a hard vacuum and then we had the rescue person at 18,000 feet. When we crashed the chamber down, he had to get in there as fast as possible. He ran in and was afraid of what he was going to find. I was afraid of what we were going to find when we all ran out there. And Jim came out and said, "What happened?" He didn't even realize what had happened. All the air came out of his lungs. It was pretty scary, and we did a

complete physical on him and found no residual medical problem from this event. We discovered that the locking mechanism for the umbilical had malfunctioned. We didn't know why. We always double checked it before sending someone to altitude. I don't know if they did any design feature to change that. I have no idea, because when you think of someone that's out there doing an EVA [Extravehicular Activity], and all of a sudden the umbilical pops out, you've got a significant problem.

Those are the only two emergencies that I saw, other than on the centrifuge once with me. I wouldn't call it an emergency, but I would call it an event. I was riding a high-G profile run and I wasn't having any problems with it, and they were talking to me and telling me what we were going to do, and then suddenly, the centrifuge stopped on a dime, and we were up to at least 12-Gs [gravity]. I was woozy and I had a terrible case of Coriolis effect. In fact, I've got a picture, I think, of me getting out. When you're going in a circle, we have what we call semicircular canals in our inner ear that maintain our balance. When the centrifuge stopped suddenly, the fluid went in the opposite direction, and the sensory hairs that are normally going this way, moved in the opposite direction.

When I got off the centrifuge, I could barely walk. If you've ever seen these events, picnics where people run around with their head down like this and then they say, "Pick your head up and start to run," you lose your equilibrium. I just couldn't maintain my equilibrium and I said, "You guys have to help me get back to the bed." We had one little bed there and I laid in bed for several minutes. It was kind of a late run, about seven o'clock at night, and I felt pretty good. I said, "Okay, I think I can drive home," and I thought I could. So I had a little Volkswagen Beetle, and I kept my head real straight. I didn't want to move it too much. I got down to my vehicle and I got in my car okay, and I started driving down [Texas State Highway]

146, which was a two-lane road. Evidently I was weaving all over the place. Next thing I knew, there was a siren and a police officer pulled me over.

In those days we wore a dog tag. It had a statement that said, "If you find this person acting peculiar or you find him unconscious, call this telephone number," and it would be out at JSC at the clinic, so somebody would know it's a test subject who went down. Often when people got out of the chamber, they could get delayed reactions from the bends, so everyone wore the tags.

The officer ordered me out of the car. I got out of the car and, of course, I kind of stumbled because of this Coriolis effect. He said, "I want you to put your hands on top of the vehicle." And I thought I was headed this way, but I fell down. The guy thought I was drunk. He said, "Have you been drinking?"

I said, "No, I haven't been drinking."

And he said, "You're acting like you're drunk." I tried to tell him that I was out at NASA and I was a test subject. I was trying to show him my dog tags that said call this number. He said, "We're leaving your car right there and we're taking you down to the hoosegow [jail]." This was in LaPorte [Texas]. So they took me down to the jail. In the meantime, I'm getting pretty aggravated, too, about this thing.

The desk sergeant said, "What's going on?" I was standing in front of him, and I was really having trouble maintaining my balance. He said, "I guess you've been drinking too much, so we're going to cool you off. We're going to put you in the drunk tank."

I said, "Look, I haven't been drinking. Here's this dog tag. Would you just please look at it and let me go?"

And the guy said, “No, we’re not going to do that.” When they think you’re a drunk, they don’t listen to you.

One of the jailers came back there. “We’re not writing anything up on you,” because they know you’re NASA, you have your sticker on your car. He said, “We’re just looking out for you.” I talked to this jailer. They check on everybody to make sure somebody hasn’t vomited or they get in trouble. I told him the problem I was having and handed him the dog tag. He read that thing, and he said, “Maybe I ought to do something about this,” I guess. The next thing I know, they’re taking me out, and they’re apologizing to me, and they said, “Are you okay to drive home?”

I said, “Yes, I think I am.” That was stupid, too. I got back in my Volkswagen, and I had forgotten all about calling my wife. Now it’s about three o’clock in the morning. I had told her, “We’re running the centrifuge late. We’re ending about seven o’clock. I won’t get home till maybe eight-thirty, nine o’clock.” I don’t know if she was thinking, “Okay, he’s out on a drunken binge or something.” When I pulled up, she was still waiting up for me. She was really worried, and I told her what happened, and I was beginning to wonder if even my wife believed me. For the next four days I didn’t show up for work. One of the guys called and I said, “I’m not coming to work today.” I said, “I don’t feel good.” I didn’t tell them why. It took four days before that fluid and those sensory hairs came back to normal.

I never could determine why that centrifuge stopped so dramatically like that. It wouldn’t have been bad if I was pulling 1-G, 2-G, 3-G. You’re just kind of going around like that; it’s no big deal. But when you’re going around at that speed, and that’s pretty quick, that thing just stops on a dime. It was an eye-opener for me. That was about the only event. The rest

of the stuff at the centrifuge was a piece of cake. Luckily, I'm not very susceptible to motion sickness.

When we started the centrifuge operations, Dr. Gordon, who was a Navy Commander, got promoted to captain and got his orders to go to the USS *Forrestal*. We really hated to see him leave. We had just converted into the Medical Directorate. We were taken out of the Crew Systems and we all came under Dr. Berry. He was in charge of Life Sciences. We went from Systems Test Branch and into Medical Directorate under Dr. [Williard R.] Hawkins, who was now our branch chief. So they assigned another doctor to support the centrifuge, Dr. Chuck [Charles K.] LaPinta.

Chuck had never worked around centrifuges before, and two of us, of the Navy crew, had centrifuge experience. I told Chuck how we monitor centrifuge operations. We could talk to the person riding the centrifuge pretty well up to about 7 or 8 Gs, but after that, we didn't speak to them unless it was an emergency. The way we determined how a subject was doing on the centrifuge—and this has been time immemorial; everyone does it—were peripheral lights. You have a switch in your hand, and when you are the medical monitor and you want to check someone's condition, you flash lights at the subject. As lights are flashed, the subject turns them off. As the person pulls G forces, and depending on whether it's head to toe, or chest to back, or back to chest, the person can take many more Gs in a semi-reclining position, because the G load is distributed throughout the body. When someone is taking Gs from head to toe, they cannot sustain the same amount than Gs from chest to back.

I explained all this to him and I said, "I'll be riding that centrifuge, so just flash the lights at me and I'll just flash them off." I said, "Are we clear on that, doctor?"

He said, "Yeah, I'm clear on that." So I made the first centrifuge ride; they had performed numerous prior tests unmanned. There was a gimble controlling the gondola so we could actually put this in the same configuration as a liftoff. In those days, we were pulling many more Gs than we are now. I think it may have been a max of two and a half, maybe three Gs. But we were in a semi-reclining position, so the G forces weren't that much. They wanted to evaluate the lights and they wanted the heads-up displays, because they had three-dimensional mock-up panels where you'd have to reach out and throw switches. Part of the reason to ride the centrifuge is to evaluate whether you have good arm movement if you're taking higher G forces. So that first run was kind of a shakedown.

We began with 4-Gs, no big deal. The lights flashed and I turned them off. I said, "I'm doing just fine," up to about 8-Gs and now it's starting to get a little more difficult. Then we peaked at 12-Gs for a second and he said, "How you doing?" And I didn't answer. When I was taking 12-, 13-, 14-Gs, I didn't talk to anybody, because it felt like a 500-pound lady was sitting on my chest and it was kind of tough. My jaws were down to here and my eyes were watering and I could barely speak. If I were taking it for a long time, I could only speak in short spurts. He kept talking to me. Finally, the centrifuge ride was over. He came out and he was upset with me. He said, "You were not responding."

I said, "I was responding to lights, doctor. You need to learn how to be the medical officer monitoring a centrifuge ride. You do not talk to somebody when he's pulling 10- or 12-, 14-Gs. In fact, what you ought to do is take a G-ride sometime and you'll see what we're talking about," because you can't waste your time talking to somebody." It's difficult, you know. Dr. LaPinta understood that. He was a brand-new medical officer. He didn't know me from Adam.

We've remained friends. After I retired from the Navy, I returned to JSC and Dr. LaPinta ended up being my NASA boss, and he said, "I remember our conversation."

I said, "I certainly remember it, too, Chuck."

We did not get a lot of people who would ride the centrifuge a second time. With the exception of one person in our group who did not want to ride the centrifuge, the rest of us Navy guys rode the centrifuge all the time. Principally, we were evaluating the Apollo couch. When the astronauts were in a semi-reclining position and their helmet was resting in the couch mold, it was important to determine if the person was taking high G.

The person would be looking at what they called the eight-ball on the console. It was up to the crewmen in those days to get the spacecraft over water and follow the trajectory of the spacecraft. The spacecraft was designed to land in water, not on land. If you were peaked out at what they call a high-altitude abort, let's say, at 16-G profile for a fraction of a second, your 10 pound arm would weigh 160 pounds. Could you manipulate the hand controller and follow the meat ball altitude indicator? Those were some of the things that they wanted us to do. I found that if I was in the semi-reclining position and my helmet wasn't secured inside the couch, my head would move back and forth from the vibration and I couldn't see the instruments [the eight ball.]

We had to go to Weber Aircraft, the manufacturer of the couch, in California. One of the engineers, the project officer, Earl Hensley [Jr.], went with me to California. Weber Aircraft made some changes and I evaluated the couches. They brought the new designed couches back for further evaluation and I rode the centrifuge. Now we were where we wanted to be. It's pretty important, when you're lying in that suit in a semi-reclining position and you have to have fairly good visibility.

Very few of the astronauts rode the centrifuge. In fact, while I was there, I can't remember any of the astronauts riding the centrifuge. Normally, they would ask me how it was. "Mike, I know you rode that program. Any problems?"

I'd say, "No problems."

Five of us went to Johnsville [Naval Air Development Center, Pennsylvania], where they had a large centrifuge. Several of us rode their centrifuges, more or less an indoctrination for us. I kind of rolled my eyes. I had been doing this at Pensacola for years. I brought a picture. It shows the five of us in front of the Johnsville centrifuge Building.

In those days, believe it or not, everybody was more or less expected to wear a shirt and a tie. We even got a \$500 clothing allowance from NASA, because NASA was really paying our salaries, and they expected us to dress appropriately. I went out and bought a couple of suits. We all got dressed up, and when we went to Johnsville we were all wearing suits and ties, and all the people there thought we were NASA brass. [Laughs] I had to chuckle over that. But it was interesting and it was kind of fun. We flew down on the Gulf Stream. The NASA plane took us down and brought us back. We weren't used to that. You don't basically get that kind of treatment when you're in the service.

I'm trying to think of some of the other things that we did. I know I was in and out of a lot of Gemini and Apollo suits and on a lot of treadmills in different liquid-cooled garments, LCVGs, as we would call them. But the next thing that came down the pike was weightless environmental training, because they knew Ed White II was going to do a spacewalk. We built a pool called the WIF, the Water Immersion Facility. NASA has a way of changing names pretty regularly, but we all knew the acronyms. The pool was only 16 feet deep. There was an Air Force Captain named Joe [R.] Zaleski, and a fellow named John Smith, and [M.] Scott

Carpenter, who was no longer an active astronaut, but who had a hand in putting in the pool, and me. We more or less were the group that got this thing up and running. My job at that time was to write the medical procedures if we had an emergency.

It wasn't safe to operate a water pool, especially with people in pressure suits who might have an air embolism, if there was no way to treat them. There was a Navy captain named [Dr.] Ed [Edward L.] Beckman, who was at Bethesda [National Navy Medical Center, Maryland], and he brought a hyperbaric chamber down and had it installed right next to the WIF. The WIF was only 16 feet tall and 25 feet in circumference, so there wasn't a lot of working room in there. We had a platform sitting right on top of the pool and we had a control room with a video capability in the pool, which was really nice. Then we had the hyperbaric chamber installed up there and we had a chute attached to the chamber, so if somebody came out of the water spitting blood, we would just push them head first into the chamber using the chute and then we'd follow them in.

Back then we took the chamber down ourselves. It was really an old-time chamber. We don't do that today. It had these little hand wheels inside the chamber to take the chamber down. We'd practice emergency drills. We'd come up and slide in there and take the chamber down.

Dr. Beckman brought one of his Navy chiefs to help install this chamber. I had said we're not going to do anything suit-wise until we get the chamber set up, as long as I have anything to do about it. Supposedly I was a so-called expert. I wasn't an expert, but people in those days gave you titles. I wrote the medical procedures, and we had to come up with how we were going to train the astronauts to get in this little 16-foot circular pool.

That decision was made at a higher level. "Let's go to the Navy." Dr. [Donald E.] Stullken was an ex-Navy water survival training expert. He wasn't on active duty, but he ran the survival program at Pensacola, Florida, and I knew him fairly well. We sent the astronauts to the

Navy Underwater Swimming School in Key West. Dr. Stullken prepared a modified scuba course. The minor course did not turn out to be a minor course. The astronauts were expected to swim 600 yards in open water with no fins and compass accuracy. I had not seen the modified course curriculum and brought this to the attention of Pete [Charles C.] Conrad. Pete brought his concerns to the Officer in Charge and the course was modified. The folks were trained in scuba for a confined space. To make a long story short, I was told I would provide the scuba training in Houston.

I said, "Okay." It wasn't a big deal. Ellington Air Force Base was fairly active at that time, and they had an Officers' Club that was next to a swimming pool. We went over and asked, "Could we utilize your swimming pool?" We told them what hours it would be so it wouldn't interfere with the folks using the pool.

They said, "Yes, you can use it from eight to eleven every day." As soon as you said you were from NASA, they'd roll over, "Sure. We'll help you any way we can." Then one of the other guys said, "You know, they just built that Clear Lake Recreation Center. When winter comes and it gets cold out, why can't we use their pool?"

I said, "That's a pretty good idea. Let's go over there." We went over there and asked them, "Could we use your pool?"

"Oh yeah. You're going to have astronauts swimming in our pool? Absolutely."

We trained several astronauts in very small groups. I didn't want to have more than two or three, because when you're by yourself and have people in the water, you have to be able to see them. Then we had to start training some of the Brown & Root contractor personnel. We needed more divers, because we were working long hours in the WIF. We didn't worry about decompression sickness because the pool was only 16 feet deep. Sometimes we'd be in the

water four or five hours. We would come up and get another tank on. I'd look at my hands sometimes and they'd be all shriveled up.

One funny thing that happened concerned one of the people from Brown & Root. He was a fairly young guy who evidently dyed his hair. We didn't know that. He got into the pool and the next day he came in and he had green hair. He had a hard time living that down.

We were basically working in confined spaces that the astronauts had to get into with an umbilical attached and then try to exit to make their spacewalk. That's what we were training for. We weren't doing too much of, let's say, neutral buoyancy in those days, not like we're training now. However, we were evaluating Apollo suit malfunction and egress from the Lunar Excursion Module to the Command Service Module, moving lunar packages through the airlock and emergency egress procedures from a carrier to the Command Service Module. It wasn't like when Bruce McCandless [II] and Kathy [Kathryn D.] Sullivan went out the first time. That must have been hairy. They were out there depending on something to propel them. That, to me, took a lot of guts.

The one thing that we had a problem with was how we were going to find people that were comfortable in the water in an emergency. Joe Zaleski and I came up with an emergency training procedure. They don't use it any longer, because now the Apollo suit has a total bubble without a visor, but in those days the Gemini suit had a bailing bar with a visor that could be lifted up and down, and it locked into place to keep the suit pressurized. "We're going to put them at the bottom of the pool with a weight over their legs, and then we're going to have them breathe into this Gemini helmet, where they create an air pocket. Then on the count of three, we'll lift up the bailing bar attached to the visor and the next thing you know, water will rush into their face. How would they handle that?"

Some people just didn't like it because we wanted them to count to one, two, three before they took the regulator to buddy breathe. Now, in those days they didn't have an octopus [regulator]. Octopus in diving is having two regulators splitting off the air cylinder. Well, in there you had to buddy-breathe. When you gave your buddy the mouthpiece, he'd breathe and then he would hand it back to you so you could breathe. Of course, you're only at 16 feet; no big deal, and he's sitting there at the bottom of the pool. That's the procedure that we used to qualify people. We didn't care if you were an astronaut or not. If you didn't pass that, we didn't feel that you could handle anything that might happen in this pool. It was never a problem for the astronauts. Some of the new divers, even though they'd gone through a PADI [Professional Association of Diving Instructors] course or NAUI [National Association of Underwater Instructors] course, whatever it was in those days, they weren't used to that. But we wanted to make sure that our rescue techs down in the water wouldn't panic if they lost their mouthpiece and they had to come up.

The only thing I didn't like about working there was all the hours that we spent in the pool. I have my old diving log in my office. Some people say, "You mean to say you spent four or five hours in the water?"

"Yeah," I said, "that's what we did." We didn't have a lot of people there. No big deal. In fact, the tank had a couple of viewing windows so you could actually look inside and see, and if somebody looked in, I'd always wave back at them.

I left NASA in 1968 and returned 10 years later. They had built the Apollo simulator right next to the WIF. We all had gotten orders to go to Vietnam at that time. In fact, a lot of folks at NASA got their military transfer orders because of Vietnam. Things had really heated up and the military was looking for corpsmen and doctors. The Marines did not have their own

corpsmen; they were supported by Navy corpsmen. All of us got our orders. All of my folks went to Vietnam in different ways. I went to a medical company. One of the guys went to the First Marine Air Wing. One guy went to the USS Goldsboro, and the other guy was sent to a smaller ship. At the time, we were trying to get an extension here, because they had built a suit for me to do a lot of testing work. In those days an Apollo suit was expensive. Back in the '60s, it was a lot of money. That didn't fly, but I was hoping it would, not so much that I was worried about going, but I was really enjoying myself. You get to do a lot of neat things to support the program.

A couple of the other things that we did involved the LLTV, the Lunar Landing Training Vehicle program that we had at Ellington Field. Dr. LaPinta and I were the medical support people at Ellington Field. That was really kind of hairy, watching those vehicles fly, and they had a few near accidents. Neil [A.] Armstrong, Joe [Joseph S.] Algranti, and then Stu Present had successful ejections in three separate vehicles that crashed. We were worried about how well the lunar landing vehicle was working.

There was an old LST [Tank landing ship] called Retriever. We would have the boilerplate [spacecraft used for testing] for the Gemini spacecraft in the water and then we'd have a helicopter. We'd jump in the water, put the flotation devices on and then we would provide medical support. We had a lot of UDT [Underwater Demolition Team] people, because when they did the rescue missions out there in the Pacific, it was the UDT divers, the Navy that supported us. Those were the folks who, if there were any emergencies, were going to take care of them out there. They certainly weren't going to use us, who were doing this stuff right out here in the Gulf [of Mexico]. That was kind of interesting, but it's also kind of boring. We went

out on that ship the night before, and the thing was diesel-driven. It smelled like heck. I didn't get seasick on a Navy vessel, but, boy, on that thing, that diesel fuel just ate me up.

JOHNSON: Could just explain maybe a little bit more about that LST, the landing craft?

FOX: It's a Navy landing support ship that supported rescue training of the spacecraft. We had the medical folks aboard in case there was an accident, and we just went out there and we stood by. So when we put the spacecraft in the water from the LST, the helicopters would come over and we'd jump in the water and attach the float station to the spacecraft. Some people loved that duty. You ate well, but the quarters were lousy, and the darn thing was a flat-bottomed ship.

When we went out there, there was a little rocking action and the smell of diesel fuel. Luckily, one of the guys that worked with me lived out at Ellington Field. He lived in a trailer; they had a big trailer court for the military people. So there was a lot of stuff going on in the LLTV out there. There were five of us and I was rotating people through. I said to Bob [Robert G] Stevenson, "Bob, I tell you what. Why don't you cover all the LLTVs, because you live right out there."

He said, "God, I was hoping you'd say that," because it was two minutes from his trailer.

I said, "What do you think about the Retriever?"

He said, "I love going out on that Retriever." So he covered, I would say, 95 percent of the Retriever and most of the LLTV. I think I covered LLTV twice and I went out on the Retriever maybe two or three times, and I was very happy not to cover either one, just sitting there, hoping nothing happened. Kind of boring.

Bob and I still remain friends. He got commissioned, interestingly enough, and became a PA, physician assistant, and was really a sharp guy. Then he got promoted to Warrant Officer 4, and he ran the PA program for the entire Navy. Interestingly enough, about five years ago, he called me and he said, "You know, Mike, when I retired from the Navy, I hoped I'd never see another patient." He was always good in woodworking and he started up a woodworking shop and got in line with all these military bases. He would make the plaques. He said he was just happy as could be. He just got burnt out as a physician assistant.

When the PA program started, I was at El Toro [Marine Corps Air Station, California]. I'd come back from Vietnam and they wanted to see how receptive military folks would be if they weren't being treated by a doctor. When you're out at sea on a ship, it was just me. Everybody counts on the corpsman, because you've been through independent duty school. But when you come ashore, now you're dealing with dependents' wives and their children. When they started up this program, they picked four sites. You wore a long doctor's coat, but you didn't put any rank on it. Then you had a nurse practitioner. When the patients came in to the dependents' clinic, she would say, "Okay, you're going to be seen by a PA," because the PAs were taking care of minor medical problems, [i.e., colds, headaches, etc.]. Then if the nurse practitioner thought it was something very serious, they were sent to physicians. So we didn't wear any type of marking device.

Evidently the word got out, because every once in a while somebody would come in and the very first thing they would say is, "Are you a doctor?"

And I'd say, "No."

They'd say, "I want to see a doctor."

And I'd say, "Fine." But it was well received, because it speeded up the process so you could screen the people. You didn't need to have a doctor's degree to take care of a cold. And the nice thing about it is we had so many medications that the doctors approved of our giving out. They weren't over the counter, but they were approved. You couldn't do that in the civilian world, but you can do that at a military base.

So Bob [Stevenson] headed up that program and worked at it about 20 years, and he had seen so many patients and taught so long, he said he didn't ever want to see another patient. It's kind of amusing to me, because I never thought his mindset was to take care of patients. Dr. LaPinta was a big hands-on, very popular guy, and he said, "If you guys get sick, come on over to Building 29 and we'll take care of you." We had an emergency room so we would take their blood pressure, take their temperature, and then call Chuck in.

I departed the Manned Spacecraft Center in 1968. I was detailed to Vietnam, and Vietnam was quite different. When I was ordered to Korea as a young corpsman, I went over by ship and when I got off the ship, I got on a bus that took me to a railroad station. We went in at Pusan, South Korea, which was quite far away from where the action was going on. From there I went by railroad to the regiment where I was going to be detailed out. Everybody was full of bravado on the ship. But as the train got closer and closer, and you started to hear artillery fire, you'd be surprised how quiet it got on the train. It's one thing to run your mouth; it's another thing when, holy cow, something's going on out there. And you were spoon-fed everywhere you were going to go in Korea. You got out at Regiment and they called you by your alphabet. That's how you got assigned. I was assigned to an Item Company, [3rd Battalion, 1st Marine Division]. So if Item Company needed a corpsman and your name was Fox and it was near the head of the alphabet, that's how you were assigned. I was kind of hoping I'd get Fox Company,

but I ended up getting Item Company. That was quite an experience for a guy just barely 18 years old thrust into that situation.

Vietnam was so much different. They took you to Okinawa [Japan] and that's where you were staged. They gave you Gamma Globulin shots. We went out and did weapons firing for familiarization and medical surveillance about VD [Venereal Disease] and some of the other problems that you might be facing. We were there for a week and then we were on an airplane. We landed in Da Nang City, South Vietnam, and we were on our own to get to our organization, which blew my mind.

I got off the airplane and I said, "Okay, I'm in the 3rd Marine Division. I have to get way up north." Now, Da Nang is considered up north, but Da Nang was south of where we were. We were right up about as close as you could get to North Vietnam, where I was going. And I said, "How do I get there?"

A guy said, "You go over to that building there and you sign up and you just tell them that you're trying to get to Khe Son." And that's what you did. You went in and—they called it the frag office, and what you said is, "Look, I'm Master Chief Fox and I need to get to Khe Son."

He said, "Okay, doc, just sit over there. We'll call your name off and when we have a time, we'll tell you what time it is and then we'll tell you to get on the airplane and off you go." They didn't have any dungarees at Okinawa, so I was still in my khakis. So here I was in Vietnam and I had a pair of plain old shoes, no boots, and they said, "Yeah, they'll give you your stuff when you get there."

I was sent to kind of a hot zone. The plane lands, a ramp is dropped, the plane slows down, and you run off the ramp as fast as you can and get behind the bunkers, because Charlie [slang for Vietnamese Communist or Viet Cong [VC]] is trying to blow you up as you come in.

And that was my indoctrination. I had thought they were going to be taking me step by step to my assignment. Not so in Vietnam; totally different. Then we were pretty far up north for a while, then we moved back to Dong Ha, which was fairly close, and then back to a place called Phu Bai, and then finally to Quang Tri.

I ran the hospital side of the medical battalion. We were the biggest medical battalion in Vietnam. We had a lot of surgeons and big ORs [operating rooms]. We'd be the first drop-off point for bringing the people in from the field with casualties and then getting them out to the hospital ships or out of the country.

I left there after 13 months, which was probably the second longest separation I'd had from my family. That's one of the bad things about the Navy, the numerous family separations. When I came back, the political environment was disturbing. I landed at El Toro and my wife picked me up. When we came out of the gate, everybody was out there calling us baby killers and throwing stuff at our cars. I said, "Wow," because I wasn't aware of that climate when I was in Vietnam. My wife was livid. When I see what's going on now, that really bothers the heck out of me.

I went back to the Marines because I had three years of sea duty to complete. I ended up at El Toro. Then they needed a clinic opened up at Camp Pendleton [Marine Corps Base, California]. The next thing that happened was, "Fox, you're going to go out there and get that clinic going." I went out there and there was just nothing in place.

We put the dispensary in. I had to commute, because when I first got there, there were no quarters. My wife was living in Oceanside [California]. So I commuted for about two months. That's a 70-mile drive from Oceanside to El Toro, and I was doing it every day. So then I got my orders for housing, I got to move into a place called LTA [lighter than air, Naval Air

Station]; it's in Santa Ana. So I moved up there, had very nice quarters, and then I got this assignment to go down to Camp Pendleton for six months.

I got a call from my detailer, and he said, "Mike, we got orders for you."

I said, "Okay, where am I going?"

He said, "You're going to Hawaii, and you're going to be at CINCPACFLT [Commander-in-Chief, U.S. Pacific Fleet]. You're going to be on the staff there, and you'll be working with the Environmental Preventive Medicine Unit."

I said, "Sounds good to me." I kind of liked the idea of doing that, and so we got our orders, and we went back to Hawaii. That's where I started when I was with the aviation group with the VP Squadron [Patrol Squadron]. My wife was excited about it. My boss was a four-star Admiral, so everything in the Pacific Fleet belonged to him. He wore two hats. He's CINCPAC, which is everybody, and then he's CINCPACFLT, which means all the Marines and all the Navy belong under his command. I became a Medical Inspector. Everybody hates Medical Inspectors, because you're going out there in the hospitals on the ships, and you're doing the inspections, and when you say, "I'm here to help," you know how that is.

"You're here to help me, my eye." I've felt the same way.

Commander Daniels was leaving, and he said, "You know, Mike, I support everything out here in the Pacific Fleet for NASA. We need to turn that over to somebody. You worked for NASA, didn't you?"

I said, "Yes, you looked at my service record." Because I didn't see a need to tell anybody that I had worked at NASA.

He said, "From now on, you're going to provide all the medical support." So every time there was a launch, we'd get different doctors from different areas. We'd get pulmonologists,

and we'd get chest surgeons, and we'd get orthopedic folks, and we'd have all these people sitting on the carriers, so if we had a hard landing in the water, we would have everything available. We always had a ship there that contained a small hospital. We could take care of anything. So that was my job.

The one real incident that I remember is when we had the Apollo-Soyuz mission, and we had that leak of contaminated air. I got this call from the ship, and they said, "This is what we need, and we need it when we get in there." They wanted a suite of rooms up at Tripler Army Hospital [Army Medical Center, Hawaii]; they wanted transportation; they wanted a pneumologist; they wanted a neurologist; they wanted them to be on 24-hour standby; and they wanted quarters for Dr. LaPinta. I can't think of the other doc who was with Dr. LaPinta. "Can you take care of that?"

It's really funny, when Commander [Harold] Daniels was there, and he would talk to the Chiefs of Staff from the different commands, they all knew him. When I called up, I would just say, "This is CINCPACFLT calling," assuming that they'd know what that meant. They didn't know me from Adam, and I'm requesting all this medical support, and they said, "Who are you?"

And I said, "This is Master Chief Fox."

They think, "Enlisted? I'm not going to pay much attention to him."

So I was talking to this one Chief of Staff there for the Army, because that was their hospital, and I said, "This is what we need."

And he said, "Well, is there someone else that can give us a call about this?"

I said, "Let me rephrase this." I was getting a little upset. "I am the same as a four-star admiral, and when I use the term CINCPACFLT, I don't use that term loosely." Because that's

what you're told when you go there. "You be careful how you represent yourself. If you're going out there on a medical team, and you say CINCPACFLT, whatever you want them to do, they do." Boy, did that guy get the message in a hurry.

It was really nice to renew acquaintance with Dr. Chuck LaPinta, because Chuck and I had worked together on the centrifuge, and we were really pretty good friends. So we got them all up there at Tripler, and then Chuck would come over and have supper with us. But the rest of the time, whatever Commander Daniels set up just worked. When we knew that there was a launch, we knew what ships were going to be out there, which was taken care of by what we call the line side, and all we wanted to do is the medical side.

NASA came with a bunch of doctors. In fact, Craig [L.] Fischer, who's here, Craig was a young pathologist. He was a young captain, and he was out on the ship, too. In fact, I knew a lot of the folks, because I hadn't been gone that long. But I wish I could say I'd done a lot more when I was out there, but other than that one mission, that's the only thing that stands out, because Commander Daniels did a great job of setting that thing up. It was a different era. People were patriotic; they were just so energized with the space program. If they knew that they could help you and support you in any way, people just fell all over themselves. I don't think it's that way anymore. Everything is a contract. It's for profit. In those days, it was, "We're here just to get this program going." That's how I saw it.

When I got my orders to Hawaii, I asked my detailer, "How did I end up at NASA?" I've always wanted to know how I ended up there. Were there a bunch of guys I competed against, and they picked me out?" In those days you had IBM [International Business Machines Corporation] card data sheets, and they had all your qualifications on them. He really burst my bubble. I always thought, "Boy, I was picked out of the whole Navy to come here." I was the

only guy that was an aviation medicine tech and a chamber tech and a diver, and I hadn't even been diving in years, and that's how I got selected. I didn't tell that to too many people at the time, but I really thought that there was quite a selection process.

And the other guys were basically the same way. Did they have a lot of experience in aviation medicine? No. But knowing the way the Navy is, when they hand-picked people, like for embassy duty, they would go through a whole list of qualified candidates. So here I had been patting myself on the back all these years, thinking, boy, I was the man, and a little card picked me out. And that's what my detailer told me. He had no reason to lie, and I'm sure that's what it was.

I could have stayed in Hawaii. They asked me to stay, but my son was in his first year in high school, and we decided, gosh, this is not the place to educate your children. The school systems were not that good. So I got offered New Orleans, Louisiana, to be the Master Chief of the Command there, and I said, "Okay, that's fine. Let's go. But before I go, I want to know if the schools are integrated." If they weren't integrated, I didn't want to go.

Six months after I got to New Orleans, they made a decision to close the naval hospital. Now, that hospital was the most modern Navy hospital we had at that time. They built it for \$23 million, and the reason they built it is they were going to move a whole fleet of destroyers down to New Orleans. They were going to move CNESTRA, Chief of Naval Reserve Training Command, to New Orleans with the Chief of Naval Personnel. They were going to get an influx of ten thousand people there with dependents. So they built this hospital, bowling alley, theaters, and commissaries. Everything was brand new when I got there. I said, "Wow, this is neat."

Our hospital was automated. We had one engineer who sat in the control room and he could look at all the environmental control systems for the whole hospital. We had TVs sitting

in the hospital rooms for the patients like you see now, in 1978. We had everything, absolutely everything.

E. F. Hebert was the head of the Armed Forces Committee, and the Navy hospital was the only Navy hospital named after an individual; it was named after E. F. Hebert. What had happened is the seniority system got challenged in Congress, and no longer did you always have to be the senior person in charge of the committee; it's just who they caucused and nominated, which they do now. Hebert lost his job as the head of the Armed Forces Committee, which is an extremely influential position. No ships would be coming, no BUPERS [Bureau of Naval Personnel], and no Air Fleet. Here we are, we have this big, empty hospital, bowling alley and quarters, and they're shutting us down.

So Dan Rather of *60 Minutes* [CBS News show] did a special on us. Around that time there was trouble in Oak Knoll [Hospital, Oakland], in California, by San Francisco. One of the hospitals there was a pretty old and dilapidated hospital. So one of the anesthesiologists was saying they lost a patient because this place was old and antiquated and didn't have the up-to-date equipment it needed to have. Somehow or another this seemed to be a good thing for *60 Minutes*. And this same anesthesiologist said, "Over there in New Orleans they have a brand-new \$23 million hospital."

So in comes Dan Rather. His staff does a background check on the person to be interviewed, and when they come in, they try and charm you. They sat down, and they knew my wife's name, knew I was from Detroit, and knew I went to Wayne, knew when I came in the Navy. They knew everything about me, and what they were trying to do is get all kinds of answers out of me. Dan asked "What is the morale here?"

And I said, "Not what it should be, but you've got to consider that the Navy's going to get everybody there assigned as close to their home as they can," because guys and gals and docs had bought houses. Now they've got to sell these homes and leave. And so we told them that the reason this place was built is because of the ships and because of the air wing coming down here, the reserves, and Bureau of Naval Personnel with all the people and dependents. They had a camera crew, and you know what the camera crew did? They didn't go on the second floor; they went on the fourth and fifth floors where we had all the beds stacked up, and they were all out of service, and they videotaped all that. Then when they interviewed Dr. Gregg, Captain Gregg, he told them the same thing. He said, "Now, this hospital was built before we got here."

When Dan Rather aired that show, he never said any of that. He just said, "This shows you how the Navy operates." I mean, really a slam job, and he talked about this hospital, Oak Knoll. He said, "And here we have this hospital," and then they flashed the empty wards with the beds piled up. He didn't use any of the background information because I was in the room with Captain Gregg when he told them all the things, why we did it, and he even said, "You can see that's why we even have a golf course, and we have a commissary. You can see those are all new buildings." He knew all that.

So anytime you see a program on *60 Minutes* and you believe everything they tell you, you are very naïve. I was naïve up to that part, too. You don't have any editorial privileges. And the Navy told us we had to cooperate with this. "When they come down there, you give them your full cooperation." Then they slant it any way they want. So, to the point when *60 Minutes* came out, every Monday the Surgeon General would always call down, so it would be me and the Chief Nurse, the Chief of Professional Services, and the CO [Commanding Officer]. At that time, the Surgeon General [Admiral Arenzen] came on and he said, "You people are an

embarrassment.” He said, “Why did you let those people get up there on the fifth and sixth floor to get that camera view? Didn’t you, Captain Gregg, in a very stern voice, tell them why this hospital is closing down?”

Captain Gregg said, “Yes, I did.” He was getting ready to retire, and I knew he was getting upset. He said, “I understand Dan Rather is coming up there to interview you pretty soon, Admiral.” He said, “We’ll see how you fare.” I mean, usually that is not the way you speak to an admiral, but he was retiring.

A month later they aired *60 Minutes*, and it was the follow-up of our story, and the admiral told them the same thing, that this thing was planned well in advance. We probably had \$100 million sunk in for quarters and commissaries. When the show aired, it said “The Follow-up,” and Dan Rather said, “We spoke to the Surgeon General, and he has no real good explanation of why this occurred.”

Monday morning after that aired, the Admiral came on the conference call with all of us at the hospital, and the very first thing he said was, “Is everybody in the room there?” He said, “I apologize.”

I thought, “What a rotten thing to do.” So everybody will think about the armed forces, “They build all this stuff, and they don’t know what the heck they’re doing,” and nobody knows any differently. Then they bring in Oakland, and they’re getting ready to close Oakland down because we had moved so many ships out of there, and it was an old hospital. It had wooden ramps; this was a real old hospital, maybe years old. But it was nice fodder for them to show a brand-new one closing down, and here they could have taken this money. The inference is you could have put this money here in this old, dilapidated hospital. That was sad.

I decided that I was going to get out of the service. I had 27 years in by that time, and I decided it was time to leave. I just didn't feel like I wanted to settle down in New Orleans, and I knew I didn't want to go back to Michigan. My wife felt the same way; we didn't like cold weather. We grew up that way, and we didn't want to return to that climate. I received a telephone call from Chuck LaPinta. Chuck called me and he said, "Mike, how would you like to come back to NASA and do what you were doing before, but not test subject work?"

I said, "You've got to be kidding me, Chuck. Is it a civil service or a contractor job?"

He said, "It's a contractor."

I said, "I don't know if I want to work for a contractor. I know how those contracts are. They can drop you anytime."

He said, "No. It's Kelsey-Seybold, and you worked with them for a while. Hey, they're a medical contractor; they do a great job. They're going to be here forever."

I said, "Okay. Can you get Kelsey-Seybold to send me a ticket, and I'll come down there for an interview?"

He said, "Sure," and a couple of days later, just like the first time, two tickets came, and I was interviewed at the clinic. Kelsey-Seybold had become the prime contractor. When I was here in 1965—I think it wasn't till '66 that they actually went through the RFP [request for proposal] business, but they were there in '65 as a skeleton crew. I came back, and some of the people that I knew were still there. Mona White was still there, which was kind of nice to see, and a gal named Brenda ran the X-Ray Department. Dee O'Hara was there. She was the astronauts' nurse; very popular, very nice lady. So I knew a lot of these people. Bill [William L.] Tomkins was now in SA [Space and Life Sciences], and Hal Bishop, both these guys; one

was a pharmacy tech, and one was a preventive medicine tech. They had moved themselves up to GS-13 administration positions, and they were sitting at the directorate level.

When I returned to Johnson Space Center, Dr. Joe [Joseph P.] Kerwin was head of SA, and I knew Joe really well, because he was a Navy lieutenant commander when he got assigned here, and I just kind of shot the breeze with him. He was an interesting guy. He has a dual designator; he was a Navy pilot and a flight surgeon. You don't see that too often. In fact, we had several at JSC. Norm [Norman E.] Thagard was that way. I'm not sure if Sonny [Manley L.] Carter [Jr.] was, but Dr. [David M.] Brown was a dual designator. There are not a lot of them.

Joe was in charge of the Medical Directorate at that time. There were only five of us at that time in what they called the Manned Test Support Section. To be politically correct now, we have to call it the Human Test Support Section. Sore point with me. If you look at the dictionary in "manned," it has nothing to do with gender. But that's what we are now, the Human Test Support Group. So at that time I was the low man on the totem pole. They had four Air Force guys. It's interesting; I should have mentioned something I think is worthwhile. When I first arrived at MSC, my management wanted a physiological training program, they said, "You guys come from Pensacola. You run a physiological training program there.

But I just thought I'd throw that in, because that was kind of interesting, because everyone thought, "Boy, these Navy guys, they know everything." Actually, we owe it all to Gene Wendler, because Gene, the ex-Navy chief who was working there in Building 29, he's the one that raised the specter of, "Why don't you go out and get the people who are available."

We came back and Dr. Kerwin was in charge, and we worked specifically for Dr. Chuck LaPinta. We ran the physiological training program, and we provided all the medical support

that was done at JSC, so any manned tests, whether it be an astronaut or a test subject, it would be Dr. LaPinta or one of us five people who would be there, and we manned the hyperbaric chamber during suited operations. Also, we'd fly in a zero-G airplane, so if Chuck didn't fly, I would fly as medical support. I had flown with all the test conductors they've had in the last 26 years. Don [Donald] Griggs was there when I first got there. Then Larry Majors relieved him, and after Larry Majors came Bob Williams, and after Bob Williams was John Yaniec.

I have flown a lot of parabolas. I had a lot of fun. I brought in some pictures of those. I had fun flying. I don't particularly like taking care of the people who are throwing up. I have a very bad vomit reflex, sensitivity, and so when somebody throws up in front of me and I smell it, even here on the ground, I gag. So many of these people are throwing up, you know. We give them a little bag, and they're supposed to go in the bag, and then they're supposed to cinch it off, because if you don't cinch it off, guess what happens? It just comes out. So you have to give them tender, loving care.

Dr. Chuck LaPinta gave me a few tips, too. He had these little portable fans that you can buy in Walgreen's that have three little blades on them, and they do very well if you can get some cool air on them, because the plane does get kind of warm. Normally, we'll set them in the back and just look at them and see if they're okay, because we don't turn the plane around and return to Ellington Field. If somebody gets sick and says, "I have to go home," well, that's just too bad.

An interesting story about this concerns Jim [James P.] Bagian, who is an astronaut, and his brother who came to visit. Jim was an M.D., and he was working here in Life Sciences when I first got here. He was supposed to be selected, and he was a finalist. They told him to stick around. For some reason, there were no selection processes the next year, so he left and went

back to Philadelphia [Pennsylvania] and was doing a residency in anesthesiology. He came back and was selected as an astronaut. His brother came down to visit—his name was Bobby—a real cocky guy. He was also a medical doctor. So Jim was telling him some of the things he did while flying on zero-G airplanes. He said, “Ah, no big deal. Anybody can fly in that and not get sick.”

Jim said, “Let’s just take you out there one time.” So he called, I think it was Don Griggs at the time, and said, “Look, I’m going to get a physical for my brother, and we’re going to fly in the KC-135.” You’re not normally supposed to do that, but we did. So we all went out there, and we’re all flying, Dr. Chuck LaPinta, myself, Dr. Jim Bagian, and his brother Bobby. So we got up there, and we’re doing the very first parabola. We told him, “What we want to do is get you in a spin, and then we’re going to stop you, and then we’re going to talk to you, and we want you to turn your head to both sides as you talk to us. You got that, Bobby?”

He said, “No problem.”

We got up there, did that first parabola, and he was spinning around like that for about 20 seconds, and after about the 25th second, he stopped and Jim said, “Bobby,” and he turned his head, and Chuck called “Bobby,” and he turned his head in the opposite direction.

The next thing you know, he’s vomiting. He went to the back of the airplane and remained there for the rest of the flight. He was so sick that we had to take him off with a forklift. In those days, you went up to the aircraft through the crew entry hatches. It was a little ladder leading up to the plane. Now we actually have a loading ramp just like you would on commercial aircraft. But he couldn’t make it and he couldn’t drive his car home. We had to leave his car there and then come back for it.

I remember Jim saying, “Well, it’s just a cup of tea, isn’t it, Bobby?” [Laughter]

I said, “Boy, that’s some good sibling rivalry there.” That poor guy was so sick.

I flew a lot on the airplane. Dr. Chuck LaPinta liked to fly all the time. It was very seldom that he didn’t go up and say, “Mike, can you go up?” You get to play Superman if you know how to do it and there’s not a lot of people on the plane. You push off on the back of the plane and just float all the way to the length of the aircraft. It’s really a wonderful feeling.

The other thing that happened is I had been affiliated with the American Heart Association since 1969, and had been an instructor. So Kennedy Space Center [KSC] at the Cape [Canaveral, Florida] came up with a requirement, if you’re going to go down to KSC, you had to have first-aid training and you had to have CPR [Cardiopulmonary Resuscitation] training, and it had to be within a year of your mission. So I had told Chuck about the requirement. “Mike,” he said, “can you do that?”

I didn’t know what I was getting into. I said, “Yeah, we can do that.” So I originally was just doing all the healthcare professionals, everybody that was in the clinic and all the flight surgeons.

So we used to have to carry all of our stuff over to Building 4 North. They didn’t want to come over to Building 41. Finally, Tom [Thomas S.] McClure, one of the schedulers, said, “If I can find you a little place to put your equipment, will you do that?” Because we had to lug these big mannequins over.

I said, “Yeah.” So we did that for about a year and a half, and Dr. LaPinta and I alternated giving the first-aid lecture and then I would do CPR training and the healthcare provider course. Then Chuck ended up saying, “Well, I’ll tell you what. I’ll just take care of the first-aid part and you can take care of the rest.” Well, the missions were starting to go hot and heavy, and the next thing I knew, between the healthcare professionals and everybody in the

Kelsey Clinic, I was getting overloaded and my contractor boss was saying, “Hey, you’re not supporting what you came here for.”

I said, “Why don’t you talk to Chuck LaPinta about that.” Although he was a NASA guy, he was right in our office. He graded us. So I ended up performing that task. Herb retired and then another fellow, Larry [Lawrence] Busch, took over and then he left. For about the last 10 years, I’ve been the Manager of the Human Test Support Group. I made a mistake. I knew when they came out with these automated external defibrillators [AED] that I wanted one. They’re pretty expensive. This was about eight years ago. So I went to the NASA side of the house, Dr. [Roger] Billica, and he had no problem ordering one. Chuck [Charles J.] Beckman and I decided that we would take the training. We went down to Orlando [Florida] and they ran their first AED syllabus training course; we came back, and we put in a monthly report. We wrote down that we had just become trainers and AEDs were coming out, and we now had one here at the NBL. I didn’t think anything about it. Put it in a monthly report.

Well, Dr. [Dave] Williams, who was in charge of SA Directorate at the time, came out with this new program to initiate CPR for everybody at the Center, and we trained about 4,000 under that program. Then President [William Jefferson] Clinton came out with an edict, and he said that he wanted all Federal facilities to have an AED in their buildings within 18 months. I had read that, because I’m on the distribution list from the American Heart Association. I saw all that and I didn’t think anything about it. The next thing I knew, Dr. Williams contacted Dr. [Charles] Ross and Sean Keptra and said, “We need to get this AED program going. You need to head it up.” The next thing I know, I get called into my project manager’s office, and Sean was sitting there, and I knew something was up. I said, “What’s going on?”

He said, "They want to start this AED program up, and we've seen in your reports that you're an AED instructor. You're now going to head up that program."

I said, "Do I have a choice?"

Dr. Ross said, "Well, I don't think so, as long as you work here."

So we started the program in December, 1999; we initially had eight AEDs. We were trying to cover the whole Center with eight AEDs. Sean Keptra came up with a great idea and asked me what I thought. We have some people here called fire protection folks. They drive around in vehicles 24 hours a day and whenever there's an incident, they're the first ones on the scene. He said, "These guys might volunteer to be AED people if you approach them." He said, "A lot of them were EMTs [Emergency Medical Technicians] and a lot of them were ex-firemen and they're working here."

I said, "Sure."

So we went out and spoke to them. "Yes, I'll be glad to do it." So out of the eight AEDs, we took two of the AEDs and put them in their vehicles. Now we have coverage 24 hours a day, because they're on duty 24 hours a day.

I said, "Well, for sure we've got to put one down in the Gilruth Center." We'd already had five events at Gilruth. So we put one there, so that was three of them. Then we decided, we've got to do the politically correct thing. We put one in Building 1. That took care of that. I didn't like the AED that we had, so I traded it in to Physio-Control and put one down at the NBL, because I felt that the potential for use might be stronger there. Next we said we've got to get some on the airplanes, so I put two on the airplanes at Ellington; so when they're flying Gulf Stream they would have an AED available. We kept one for training and also if somebody had problems with their AED, we would swap it out.

We only had 11 trained operators at that time. We had the fire protection people, me, and a fellow named Chuck Beckman. Without Chuck, this program would be lingering, because I'm not very good mechanically. This guy, he built all the brackets and mounted them all over the place. I asked him to set up an AED supply system. This guy could do anything. A Navy guy. I recruited him. I knew him; I had him as a student back in 1963. Just a super guy. In fact, he's now my deputy. I said, "Chuck, I'm going to turn you into an instructor, too."

He said, "Well, I don't mind that." So he became an instructor.

Then Dave Williams really put the heat on somebody. He said, "We have \$100,000 to buy AEDs. We need you to survey the rest of JSC and see where we can put them." So Chuck and I surveyed all of the sites. We now have 71 AEDs. Not all of them are here. We have them in Russia. We have them in El Paso [Texas]; there's an air detachment there from Flight Ops. And we have them in [NASA] White Sands [Test Facility, Las Cruces, New Mexico].

We run the whole program here. We do all the training. We do all the maintenance. We do all the supplies, and I've trained everybody in my group. I've got 16 people. Some didn't want to be instructors and after they did it for a while, and they saw the motivated people that came in for training, now they just say, "When are we teaching some more AED?" We started off with 11, and we've got 957 people trained as AED operators, which is almost one for every 10 people.

Yesterday, during the Total Health Safety Day, I was invited to do the presentation and we got all the people up there, 31 of them, who, through the years, had come across. I had got them American Heart Award certificates, but [Deputy Director] Bob [Robert D.] Cabana said that he wanted to set up a lifesaver award recognition program, which is great. So now we can

recognize people who have acted in an emergency, not just here at NASA, but also if they've done something in town.

Usually I'll get something through an e-mail. They'll send me, "I did CPR," or, "I did this," or, "I did that." So we even got one of the guys in Russia who reported there was a guy who was choking, a Russian, and he jumped up and did the Heimlich maneuver, probably saved his life. So that was pretty rewarding to have that suggestion go forward to award Lifesaver Certificates and American Heart certificates. I'd approached Dr. Chuck Ross many times and said, "Chuck—," and he'd tried to elevate this thing and say, "We need to do something for recognition," so it makes people more interested in the program. Chuck had elevated that, but it never got to somebody who was receptive. So when Bob Cabana got it, he said, "We're going to do that." And they designed a nice little award certificate. They're going to have a plaque with everybody's names.

Probably some of the best satisfaction I've had here at NASA is knowing that the group we trained were instrumental in saving five lives. That's kind of neat. We've used it eight times. One guy got electrocuted, a contractor, and the other two people had massive heart attacks and there was nothing we could do for them. But it's a great program. I didn't personally save anybody's life, but I think I and my group of people trained these people. One guy's son, not too long ago, had an insect bite and went into anaphylactic shock at his house, and he did CPR on his child and saved his life. One of the other fellows was confronted with a drowning. A child had drowned in a pool, and they yelled for him and he went there and pulled the child out of the pool, performed CPR and saved that little boy's life. So when you hear those things, you really get a warm fuzzy feeling.

There are a few more stories, if you want to hear them. Probably the one that is kind of funny, when I look back on it now, had to do with the STS-3. I went out on the first 11 missions. Part of my job was to work with Dr. Fischer, Dr. LaPinta and Dr. [James S.] Logan. We did the post-flight physicals on the astronauts. I would go through spatial disorientation questions and I would do some heart-rate studies. So on STS-3, there was a sandstorm, and in those days, they were supposed to land in California, on the lakebed. But the lakebed was inundated with water, and Kennedy wasn't set up yet for landings. So they were going to divert STS-3 to White Sands. We went to White Sands. That darned sandstorm came up and the next thing you know, George [W.S.] Abbey said, "Get the docs and the techs out here. We're flying them to the Cape. We're going to bring it into the Cape."

So [Dr.] Craig Fischer and I jumped into a rental vehicle and tried to find aircraft operations in a sandstorm. It took us about an hour to go about two miles. Unbelievable. Just terrible. We got out and went inside the terminal. George turned around and he said, "Okay, guys, we're not going to KSC. The sandstorm is clearing. We're going to land here at White Sands." Just then the sandstorm kind of relaxed, and Craig Fischer and I came out of the terminal. We looked at our car and it was just about stripped of all the paint from that sandstorm. So back we go. It didn't take us very long to get back. STS-3 landed.

Now, my job was to assist [Dr. James M.] Jim Vanderploeg. He was one of the mission docs. The other Flight Surgeon was Dr. Chuck LaPinta. During the sandstorm, before they got us out of there, we were treating army personnel caught in the sandstorm. They only had a couple of nurses, so Chuck and I were taking care of all these people. They had these terrible corneal abrasions. They'd get sand in their eyes and then they'd rub them. So we were doing that when they told us to mount up.

When we came back to the medical trailer, the phone kept ringing in the trailer where I was at. Each time it rang early in the morning, the person on the line said, "Is this a secure line?" He said, "The President will be on. He wants to talk to Jack [R.] Lousma." I said, "Yes, you have a good line here." That phone call came about three or four times. Then the Shuttle landed and the crew were transported to the medical trailer and all the workers were right in front of this trailer where the physicals were going to be performed. James [M.] Beggs, who was the NASA Administrator at that time, was there and George Abbey, and John [W.] Young. I was standing on the steps on this little platform to the exam trailer, listening to Beggs. He was wearing his cowboy hat and boots. The phone rang. I picked it up and it's [President] Ronald [W.] Reagan. He said, "Jack?" I said, "No, sir, if you'll wait a minute, he'll be right there."

I went and tapped Abbey on the shoulder, I said, "Mr. Abbey, the President's on the phone."

He said something to Beggs. They stopped the ceremony. He said, "We'll be right back." They [Jack Lousma, C. Gordon Fullerton, George Abbey, John Young, and Jim Beggs] went inside, and Jack picked up the phone. No answer. There's nobody on the other line. I got a look from John Young. If looks could kill, I'd be dead.

George said, "Mike, you sure?"

I said, "Yes, sir. That was Ronald Reagan." And Jim Beggs just walked out kind of disgusted. They all went back out and the ceremony began again. The phone rang. I picked it up again. It was Ronald Reagan. When I called for my admiral, I'd always get somebody on the line and say, "The admiral's coming," and you held on. I poked them and I said, "You're not going to believe this, guys, but the President's on the phone."

They stopped the ceremony again. They went inside. Jack picked up the phone and he said, "Yes, Mr. President." There's nobody there. Oh, shoot.

So Mr. Beggs said, "Well, we're not going to go out there anymore. The ceremony's over." So I screwed up the ceremony, right? George and John are standing right there and I'm getting ready to go in the back to do a physical on Gordon Fullerton, when the phone rang. Dr. Jim Vanderploeg answered it. He picked it up and he said, "Yes, sir, Mr. President," and he handed the phone to Jack Lousma, and Jack Lousma said, "Yes, Mr. President." Nobody's on the line.

I turned around to John and George. I said, "I told you so. I told you so," because they were looking at me like, "The goddamn guy doesn't even know how to answer a telephone."

I tell you, you talk about an embarrassing moment at the time.

JOHNSON: Did he ever talk to the President after that?

FOX: Oh yes. While I was doing the physical on Gordon Fullerton and they finally got through, we never did find out the problem, but I was so happy. Dr. Jim Vanderploeg and I have related that story several times, because everyone thinks we're making it up. I don't use names like Abbey and John Young, making up stories like that.

Another funny story happened when we were doing physicals in the trailer at NASA's Dryden Flight Research Center in Edwards, California. On STS-1. I had Bob [Robert L.] Crippen, Craig Fischer, Herm Sharma and Dr. [Joseph] Degioanni and we were doing the physical exam on John Young. They landed and were brought to the trailer. We were really worried about weight loss and fluid dehydration in those days, so we had stripped the crewmen

before they launched during preflight physical exams and got their actual weight, and then when they came in for their post flight physical, we stripped them; everything came off. My job was to read off all the disorientation questions, and we have it on the tape recorder, with the examining doc, and then I performed the stand test, where we get heart rates and do hard recording. But the very first thing, I said, “Bob, you need to completely strip down and get on the scale.”

He said, “Okay,” and he got on the scale and he stood there butt naked and he looks at me, and I’ll never forget it, he said, “You know, Mike, there’s probably a billion people waiting to talk to John and me.” He said, “how much more humbling can this be, standing here naked in front of you?” [Laughter] And Crip is such a nice guy. It just cracked me up. It was funny.

JOHNSON: Looking back over your career, and obviously it was very interesting and very varied, what would you think would be the most challenging time for you?

FOX: The most challenging time. Well, I really think the first time I was here and I was worried about having a reliable group of test subjects, knowing that the inputs that they’re going to give were going to shape the suits the astronauts would be wearing, feeling that those folks were kind of counting on people who do this type of testing, and I wanted to make sure that whatever we did and the input that we gave—I just felt that that was important.

Other than that, I think, really, was this AED program and trying to get it off its feet and trying to get the people interested in it. I received a lot of help from Chuck Beckman, who, without him, it just wouldn’t have flourished the way it is now. That was a big challenge, because we have personally trained all these people, with the exception of a few people at Ellington Field. Our little group has trained every one of those people at JSC. The most

satisfying thing is everyone who has taken our course, and a lot of them have had CPR before, said they had never taken a course as good as we give, and that's from everybody that comes through.

Even our refresher training, we do four hours for refresher training. We don't do any mini courses. I don't care if they're doctors, I don't care if they're anesthesiologists or cardiologists, we're going to go through it step by step. And I monitor all my instructors all the time. When those students walk away, we know that we've prepared them. Now, whether they can do the job when the time comes, nobody knows. Because I remember when I was a young hospital corpsman, and I went out on my first ambulance call, and it was an automobile accident. I kept thinking, "I hope this driver knows more than I do," because I was scared to death. "What am I going to do?" And I had training; I had six months' training before I went out. Now, these people are getting four and a half hours of training and they've got somebody's life in their hands. I think that was a big challenge. There were some other challenges, but for personal satisfaction, I think that's it.

JOHNSON: Back in 1952 when you joined the Navy, did you have any idea that you wanted to go into the medical field? How did that come about?

FOX: I wanted to be an air traffic controller, because that sounded really neat. When you go through training, you are interviewed by a classifier who looks at your scores. You take a GCT [General Competency Test] for general intelligence, you take a mathematical part, and then you take a mechanical comprehension. So my GCT was really high, my math was fair and my mechanical was way down there. Everyone laughs at me at work, too. I say I can barely wash a

car, let alone drive it. When I told the classifier traffic controller, he said, “You know, everybody wants to be a traffic controller. We’ve got all those we need. How’d you like to be a hospital corpsman?”

I said, “Well, what does a hospital corpsman do?”

He said, “Well, you work in a hospital around all these nurses. It’s a nice, clean environment.”

I said, “It doesn’t sound too bad to me.” [Laughter] I hate to say it. So I volunteered. Little did I know that the Marines didn’t have their own corpsmen and I was going to end up in two wars. When the Navy wants you, unless you’re dumb enough to volunteer and not a lot of guys do that, you just get picked and you wear a Marine Corps uniform and off you go. Then you spend your time with your Marine outfit. But I didn’t mind it. I liked working with the Marines. They really take care of you. You go out on patrol and they put you in positions where you’re not going to get hurt or you’re going to be the last one to. They really take care of you. So I never minded.

I belonged to the 1st Marine Division and the 3rd Marine Division units, and I alternate going to their reunions and I see some of these guys I knew from 1953, 1954. I had a difficult time recognizing them. I guess I haven’t aged that much, because they always say, “Hey, it’s Doc Fox.” And I see these guys with potbellies, no hair, maybe 70 pounds more, and if they didn’t have their name tags on, I wouldn’t know who it is. It’s just kind of amazing.

One little story. When I went to Beeville, we were going to a drive-in movie. That was the big thing in Beeville, back in 1956. Coming back, the speed limit was 40, and I was doing at least 70, and I had a convertible then. I was doing about 70 miles an hour and a siren goes off. I said, “Oh, jeez.”

My wife said, "I told you so." You women have a way of doing that.

They pulled me over and the officer came out; I didn't even look up at him. I reached in my pocket and I handed him my driver's license; I said, "Oh, man, I'm really going to get a ticket here."

The guy said, "You're not Doc Fox, are you?" I looked up at him and I recognized the guy. His name was David Martinez. He was in my company in Korea. And he said to me, "Jeez, Doc, how about slowing down. I don't want to see anything happen to you."

In those days, if you got a ticket, they'd transfer the ticket to the base. Then, depending on the offense, they may take your sticker away and you couldn't even drive on the base. So all those things were going through my mind, and I thought, well, wasn't bad to have served with the Marines; it saved me a ticket.

JOHNSON: One of the things that I've read about, which was, I think, kind of interesting, is that you produced a number of videos for flight crews.

FOX: Yes, I have.

JOHNSON: Do you want to talk about that for a second?

FOX: Okay. The first video I made was how to do CPR in a weightless condition. That was produced along with some crew people at that time, which is now WYLE, and what we wanted to do was come up with some suspension systems that would secure the patient and the rescuer.

They have lockers, and on the lockers they have openings on all four sides. So we made these restraint straps that we could put the patient down on the lockers, and then we could restrain them here [demonstrates] and restrain them here so they wouldn't float up. Then we had to do something for the rescuer, so we got a belt and made it with Velcro so it would fit everybody. Then we had them lean down, when they were upright. So we wanted them down like this [demonstrates] and then they had this restraint strap. Then they would cinch upwards real tight so they could go down and up like this [demonstrates] so they wouldn't float off. But we told them, "Don't cinch them up when you're down like this [demonstrates], because when you go down, you can't get back up.

I had a hard time getting somebody to go with me to make that video, so I captured my son, who is an engineer here at JSC, and I said, "Jeff, how about you coming out." Well, he likes to fly on the KC-135, so we went out there and we made that video, and we show it to every crew that launches, because if they're on a Shuttle, they could do CPR anyplace when they're weightless, upside down, it doesn't make any difference, but they have to restrain people. I made another one on the Heimlich maneuver. How do you do the Heimlich maneuver in space? It doesn't make any difference if you're free floating; it's real easy. I took Dr. [Philip] Stepaniak with me. Phil and I practiced on each other. In fact, I told him, "Do this gently, Phil." And Phil is a big man. He's an ex-weightlifter. I've got a video; in fact, there's a picture in one of these maneuvers and I felt like he was putting his fist through my spine on the other side. I puked and I was really having a hard time.

"Oh man," I said, "give me a few minutes here," because you have to do these in between the parabolas.

I said, "Phil, it's your turn now, because you're so much bigger and I want to show how much easier it is to do on somebody as big as you," because he's about 210. And I made sure that I popped him good. He went in the back of the airplane and he sat down and never got back up. He was so sick. But we made those videos for the astronauts so they can see how these procedures are performed.

If you have a decompression on an aircraft, there are some things that you have to do. You have to descend the aircraft to a lower level in rapid order. You've got to keep your regulator on 100 percent oxygen. You've got to recognize some of the symptoms. You've got to know what to do and who to call. So I wrote a script for two of our guys, and we made a five-minute video that we show to everybody who flies out there in the T-38s, and all our staff who stand the duty at Ellington Flight Operations, because part of the video says, "You call back here at NASA. We'll tell you where there's a hyperbaric chamber; and put them in touch with the Duty Flight Surgeon.

Then we collaborated with the JSC Public Affairs Office. We made an AED video that we pass out to all these different organizations that they can show at their safety standdown meetings. The video shows how the AED program works at JSC, and what the signs are and what people carry on their badges.

I made a video that we show to all physiological training people, and this is a 10-minute video of how a student should take care of himself when he's flying on the KC-135 airplane; what body position he should be in; how to use the oxygen equipment; emergency procedures; what is the little white bag and how do you use it; where should you keep it; what medications should you take. We show that to everyone who goes through physiological training. So those are the videos I've made.

JOHNSON: Just out of curiosity, since you said that you rode the centrifuge or you were involved with that in Pensacola, and then coming here and doing it here, how many times do you think you've been on a centrifuge?

FOX: Maybe a hundred times. One of the reasons I rode the centrifuge a lot down in Pensacola is in those days, when you went into the altitude chamber, you had to accumulate so many points in order to get what we called hazardous duty pay. So if you rode an altitude chamber, you had to ride it five times a month in order to get a hundred points. If you rode on the centrifuge, and all you had to do was take 1-G, but you got 33 1/3 points. So if you made three runs, and normally, when you made a run, you did about five runs in one day. You did a round, stopped, got ready, stopped. In one day I had a hundred points. So I decided, well, this isn't bad. And it was fun; I liked the centrifuge. So I volunteered. They called me all the time to come down there, and I'd ride the centrifuge. To be honest, that's how I got into centrifuge work.

I always took my turn going in the chamber anyway. And you could accumulate points; you could accumulate up to three months. So you couldn't ride the centrifuge all day long and say, "Okay, now you got to pay me for the next six months." They weren't that dumb either. But that's how I got involved in centrifuge work.

JOHNSON: If you don't mind, I'm going to see if Rebecca and Jennifer have any questions.

WRIGHT: I just have one. When you were doing these other tests, what is the longest duration that you were under a testing facility?

FOX: I think the longest one was three days in an altitude chamber at a hard vacuum, which was kind of nice, though, because they would pipe in music, and I could call my wife from there. It really wasn't bad. I didn't mind that, because you had all the subtleties. The only thing was the food. The food sucked. It came in tubes. They've come so far now, but there wasn't anything in a tube that I ever liked. Fruitcake bites and Tang and beef jerky.

Jackie [D.] Mays is another guy that you should interview. He did a lot of this test subject work before I ever got here. He was the principal test subject and probably the most knowledgeable guy of all. Dr. LaPinta has got more knowledge of what's going on here in NASA than anybody I can think of. He has a photographic mind. That doctor remembers everything. He was on the ships for the recoveries. He was the crew medical officer on a lot of the earlier missions that I went on, out here with the Shuttle. Then he was on a Retriever. He jumped out of the helicopters. I think he rode the centrifuge one time.

JOHNSON: Is there anything else you'd like to add or any other memories that you'd like to share?

FOX: When I first was asked for an interview, I wrote everything down quickly. I tried to go question by question, but I didn't quite make that. Let me just see. Glove tests; make it cold, make it warm. Those were uncomfortable. I didn't particularly care for those, but you don't pick and choose. Well, you could have. If I were running the pool, I could pick and choose what I wanted. I shouldn't say that. With all the medical kits, we had all these places where if we thought the Shuttle might go down, we used a lot of the astronaut doctors and we set up

emergency kits that they carried with them all over the world. In fact, we even had these small little defibrillators at that time; real simple to do, because all you have to do is look at what they carry in an ambulance. It's no big deal.

JOHNSON: If you had to pick a favorite memory, what you feel most proud about, would it be the AED training also?

FOX: Most satisfaction. That's a good question. I think it's always the hardest question to answer. I don't know. The one thing that I really loved was the camaraderie we had in the early days. After every mission, we'd go out and party and if you had a job to do, there was no complaining. Maybe a little bit sometimes from the civil servants, because if they can't get a test after hours to draw overtime, or if it was going to be a weekend test, they didn't ever want to do it, and that used to irritate me. But you asked these folks to do something, it got done. I didn't have to go around and say, "Hey, did that get done?" How many times do you work someplace for a long time and you can trust everybody that you're with? I trusted everyone. We do hyperbaric chamber proficiency dives and I trust those guys and gals with my life.

JOHNSON: Are you still doing those kinds of things? Are you participating?

FOX: I can go in the altitude chamber, but I don't go in the hyperbaric chamber, because I've been bent a few times, so they don't want me diving. For 20 years, I was the only inside tender that did out treatment dives with all the patients. So I just got bent a couple times while treating patients, so after that, they decided I could go in the altitude chamber, because I can pre-breathe,

but pre-breathing doesn't do you any good going down, because that's the worst thing you can do is set yourself up for O2 toxicity.

I like the doctors that I work with. One's a retired colonel, Army, and one's retired Navy, a Navy captain, but he was a Colonel in the Air Force. He switched sides. Finally he got it right. I always throw those little digs in. We always are after each other at work. I always call them bus drivers, and they say, "Well, at least we're not swabbies." That old stuff. That'll go on time immemorial. That will never stop. I imagine you ask that of other people, that's got to be a hard question for them to answer.

JOHNSON: I think sometimes it is the most difficult.

FOX: Probably if I drive out of here and I'll say, "Why didn't I think of that?" But I can't think of one thing that really stands out.

JOHNSON: If there's not anything else that you want to add, then I want to thank you for joining us today and agreeing to participate.

FOX: Well, I hope it's interesting for somebody. I don't want anyone to look at five minutes and say, "Shut that off."

JOHNSON: No, I think it was very interesting.

FOX: Okay.

JOHNSON: Thank you.

[End of interview]