ORAL HISTORY TRANSCRIPT

JOHN C. STONESIFER
INTERVIEWED BY KEVIN M. RUSNAK
HOUSTON, TEXAS – 21 MARCH 2001

RUSNAK: Today is March 21, 2001. The interviewer is Kevin Rusnak, assisted by Carol Butler. Today we're talking with John Stonesifer, and we're at the offices of the Signal Corporation in Houston, Texas.

I'd like to thank you for taking out the time to speak with us today. I'm really looking forward to hearing everything that you have to say about recovery and your later jobs, too. If we could start, I'd be interested to hear about your background, maybe some of the experiences growing up and getting into college and through the military that might have led you on to your career path.

STONESIFER: All right. Well, I grew up in a little old Pennsylvania country town in Hanover, Pennsylvania, one of nine children in the family. So we had a very versatile family and lots of fun in growing up. Played lots of sports throughout school. Always very competitive because of the many brothers in the family.

After graduating from high school, I went to Gettysburg College there in Gettysburg, Pennsylvania, for three years, and the Korean War broke out, and many of us had to either be drafted or enlist. So I chose to enlist and I enlisted in the Navy and spent four years in the Navy in the Weather Service. So I was really a weatherman in the Navy. Spent a number of those years over in North Africa when the Navy had a weather station over there. Then came back to the States and was with the Fleet Weather Central in Miami, Florida, where we

plotted the hurricanes originating in the Atlantic. We also controlled the aircraft that went out and searched for the hurricanes and the Navy hurricane hunters. So that was an interesting activity.

Of course, being in Miami then, I thought, well, why don't I finish school at the University of Miami while I was in the Navy. So I finished up at the University of Miami in Florida and then looked around. Well, what shall I do now? I majored in mathematics and physics. So the folks from Langley [Aeronautical Laboratory, Hampton, Virginia] of the old NACA [National Advisory Committee for Aeronautics] were doing interviews at the University of Miami, so I signed up with them and went for an interview at Langley and decided to join the forces at Langley, and, as many of the old NASA people did, conducted research on aircraft in the wind tunnels.

I was in a group of engineers that studied aeroelasticity and flutter, and we performed tests in the wind tunnel on many of the high-performance aircraft of that day in the 1950s. Of course, then the Space Task Group was beginning to start up there at Langley to get man into space. I looked around, and I hesitated for a while because I heard that they may move from Langley to another area, either Washington [DC] or, of course, Houston wasn't in the picture at the time. So I looked around and interviewed with several of the people there and thought that recovery, since my background was Navy, I thought it might be a good thing to go into the recovery organization. I had heard a lot of those fellows were going out to sea and were getting an opportunity to travel. So I went and joined the recovery forces.

It was the beginning of the Mercury Program, and it was quite interesting at that time. It was all new. We hadn't done any of this before. So we were heavily engaged in working with the military, the Navy and the Air Force, in providing recovery support around the

world. A lot of people don't realize that the recovery support really extended around the world in those early days. We had aircraft in those early missions on alert around the world, and the early Mercury missions, a lot of people don't realize this, we had, oh, perhaps—I'd have to look back on some of my notes, but we had as many as ten ships spread across the Atlantic Ocean, and on the earlier orbital flights, in the [end of] mission area there was always an aircraft carrier, which was the primary recovery ship, and a destroyer up range and a destroyer down range with aircraft overhead. So it was a lot of support provided by the military.

On [John H.] Glenn's [Jr.] orbital flight, we had recovery support at the end of the first revolution, the second revolution, and the third revolution, and in each one of those was a carrier and a destroyer up range and a destroyer down range and aircraft flying overhead. So the support was very extensive. So with that kind of support, we had a lot of activity and coordination to do with the military. And it was not just the support; we had to go around the world, which was the interesting part of the job, and train these folks on what to expect, how they would be notified that recovery was occurring in their area, also what to do when they got to the spacecraft, how to recover the astronauts, what they might find. We taught Navy crewmen on board the ships what to do with the spacecraft, how to get it on board, and how to deactivate it, and what to do with the instruments, how to record all the information that was available in the spacecraft. There were highly toxic propellants on board, so we had to brief them on all the safety aspects.

Along with this, of course, we had to develop special equipment to do all of these kinds of things. Destroyers weren't equipped to pick things out of the ocean. So, working with the engineers in recovery, we developed the recovery equipment to put on board the

ships that enabled the destroyer to pick up the spacecraft. Also, then we'd have to train with the personnel on the carriers on how to pick up a spacecraft, because Navy ships are just not fully equipped or trained to pick objects out of the ocean. So prior to the missions, it was always a month or two of training time for the recovery ships.

Then with the Air Force we equipped some of the aircraft with special search devices. Again, we didn't have satellites in those days to locate the spacecraft. The spacecraft had a little light on it, whether it was Gemini or Mercury, even Apollo later on, a little blinking light and a beeping beacon, which the aircraft would have to home on, and none of the sophisticated satellites. So it was always search and rescue, with an emphasis on search because the early days we didn't always know where it was going to land. We knew it would land along the ground track somewhere, but up range, down range, we didn't know. Or on some of the early Apollo missions, we were prepared, in case Apollo skipped out and went on farther around. Now, as Apollo developed, that became less of a probability, but it was a possibility, at least in our studies in the early Apollo days.

I think one of the things that should be recorded in history is the tremendous support provided to NASA by the military. I mean, these ships and aircraft, they were committed to support NASA, and many times this took them away from their normal duties. I'll jump ahead a little bit. This became exceedingly important during the Apollo missions when the Vietnam War was being fought. I think back to the sacrifices that many of those people made, that supported us. Many of those ships that were called to support NASA were ships that were returning from their duty stations in Vietnam, and they were really coming back to the states or Hawaii for what they called R&R, their rest and recreation or refurbishment of the ship, resupplies. And here they were tasked to turn around and go out and support

NASA. So we really were taking their time, their R&R time away from them, to support NASA. There were always some complaints and some moaning, "Oh, here come these NASA weenies, these NASA civilians," but the support we got was just extraordinary and it was just so cooperative. That's part of what I remember and really admire about the military support that we got.

I'll go back to Mercury. On Mercury I was at the Control Center [for John Glenn's flight]. The Control Center at that time was at the Cape. My boss, Bob [Robert F.] Thompson, who we talked about earlier, he said, "John, why don't you go outside and watch this one lift off." So I ran out and that was the only one I was able to see lift off until one in Skylab. [For] all the others I was out at the other end and saw them come down. But I never had the chance [to see other liftoffs]. I'd love to see Shuttle go up some time, but I never had that opportunity either.

RUSNAK: Which flight was this?

STONESIFER: On John Glenn's first flight, the first orbital flight.

From then on, I think most of them I was out at sea. I think I totaled it up one time, counting the manned flights and the unmanned flights which we went out on. I think it was between twenty and twenty-five missions that I was out on the recovery ship. So ironically, when I was in the Navy, I was never aboard ship, and I go to NASA, in that one year I spent a third of the year at sea. [Laughter]

I think one of the interesting Mercury flights, as far as recovery goes, is [M. Scott] Carpenter's flight. As you may remember from your history, Carpenter overshot the landing

area. For a period of time there, we in recovery, we didn't know where he was. We had gotten an alert from the Control Center that there was a possible overshoot. Another part of history that isn't too well known: aboard the carrier were some new long-range helicopters which were not really designated as part of the recovery forces. We were using an older-model helicopter as our recovery helicopters. We always played a "what if" game on board ship. What if this happens? What if they overshoot? Undershoot? What if we can't get the helicopters airborne? What if we can't a boat in the water? Always a "what if," trying to think through every possibility.

So we got together with this commander of this helicopter squadron, and we said, "Well, what if?" How could these helicopters be brought into the operation if an emergency existed?

Sure enough, Carpenter landed 250 miles down range, and the helicopters that were designated Recovery 1, 2, and 3 were shorter range, slower. We quickly, once we knew where it was, shifted the gear. The frogmen, or the UDT [Underwater Demolition Team] men in the Navy—the Air Force used pararescue, that's what they call them—the Navy used the frogmen or the UDT people to drop to the spacecraft and put the collar on and assist the astronauts. Sure enough, we brought these helicopters into the operation, and they were able to take off much earlier and close the range much faster than what those other helicopters would have been able to do. So it's really an example of play the "what if" game and having a solution for it, and it was quite an operation.

Another interesting thing about the Carpenter flight is, we felt that it was down range based on the information that we had. Now, the Control Center said—I read some of the books and they said, "Well, he fired retros [retrofire rockets] five seconds late and was going

to overshoot." Well, in spite of what people say, we didn't have that information on board ship, that they were landing way down range. We had aircraft circling above the landing area and the line of sight of these aircraft, the line of sight from the aircraft to the spacecraft beacon, was about a hundred miles, based on their altitude, and here he was 250 miles down range. Through some atmospheric fluke, one of those aircraft picked up a faint signal beyond the range, beyond their line-of-sight range, picked up a faint signal from a down range area, and they turned their aircraft in that direction and homed in and were able to fly down range. That was the first indication that we had that [the spacecraft was] way down range, and that's when we brought these helicopters into the operation and headed them down there, the bigger, larger, faster helicopters to fly down range. So, again, it's an interesting aspect that is not recorded, and it's just one of those unusual events that occurred.

Then after that, the other missions, as far as I know or as far as I remember, were fairly routine. We backed off considerably on the number of ships and aircraft that we'd have on stations for launch after we went through the Mercury Program. We perhaps, and I don't remember precisely, but we'd usually have maybe a destroyer over in one of the what were designated the launch-abort areas. If something failed during launch and they landed over near the African coast, we would send a destroyer and have it on position down there. …We always sent a NASA person or tried to send a NASA person on each one of the ships. Of course, on the carrier we had a fairly large contingent. We had recovery engineers. We always had a press corps out there, sometimes very unruly, very demanding, and hard to get along with, made up of writers, photographers, TV [crews], there was the written press, the TV press, the camera press. Every element of a press team that would be put together, we had on board.

Then within NASA we had our own group of recovery engineers that would handle the spacecraft and do the training of the crew, the ship's company people, on what to do. Then we had the physicians, a team of physicians, always on board to take care of any emergency that could occur.

But one of the difficult jobs was assigning the NASA engineer to that destroyer that would go over near the coast of Africa, because they'd have to leave about thirty days prior to the mission. Then if you got a slip of a week or two, they'd just turn circles over there in the ocean, and they were gone sometimes two months, and two months on a destroyer is tough for some people.

But most of the missions then were fairly routine, as I recall, and we backed off on the support, as I said earlier. We usually asked the Navy to support with a carrier in the primary landing area and maybe a destroyer up range and a destroyer down range. Then we did have contingency areas, possible landing areas, and some of those were in the Pacific, and we usually asked the Navy to send and have on station a destroyer.

On Gemini VIII, Gemini VIII landed early. They had the problem in space. Who was it? [Neil A.] Armstrong and [David R.] Scott, I think. The spacecraft was beginning to roll and rotate, and they couldn't stop it. The command was given to land in the next landing area, which we designated as a contingency landing area, and that was out in the Western Pacific where we had a destroyer on station and we had aircraft on call, air rescue aircraft with their pararescue men on board from one of the air rescue stations in the Pacific.

The U.S. [Air Force] Air Rescue Services have air rescue bases, around the world… They had them, some in the islands, some out of Florida, the Azores, Greenland—not Greenland. We had deployments out of Newfoundland, and then we'd ask for aircraft to

deploy out of southern Africa and in Australia and in Guam, Okinawa, those places, and across [the Indian Ocean]. So we had air rescue capability around the world. Now, that may not be in their home bases, but we'd ask Air Rescue Service people to deploy aircraft and personnel to these bases around the world.

So the support was tremendous, and it was really a lot of effort that went into it. People don't realize how well we planned this worldwide recovery, and we always had concerns if the spacecraft in an emergency came down in an area where the U.S. forces were not permitted to come in. We had all kinds of arrangements with the State Department to put certain plans into action if those things occurred.

So we moved through Gemini and then into Apollo. Prior to really going out to sea in Apollo, we had recovery forces for all the missions at White Sands [Missile Range/Test Facility, New Mexico], because they fired at White Sands, somebody had to go out and find the spacecraft, dig it out of the sand or bring it back. Again, there's special equipment at White Sands. We had the sand dunes and we had terrain out there that was difficult to recover or difficult to traverse, especially to go out there with some kind of a crane or some kind of equipment that could lift the spacecraft onto [some type of] truck. Flatbed trucks couldn't go into the sand. So we came up with these terrain vehicles with the large balloon tires, the very big balloon tires, and we modified them so that they could accept the Apollo spacecraft and bring it back to the hangar. So it was interesting. We got our share of the land operation.

Then before the manned Apollo missions, we went from the White Sands operations to some of the unmanned Apollo missions. One that I was out on was a suborbital flight where they launched the Apollo spacecraft up and then drove it back into the atmosphere and

it landed down near Ascension Island in the South Atlantic. So that was a fun trip, way down into the South Atlantic.

People ask, "What was the highlight?" I said, well, there're so many of those. There are so many. But I'd have to put Apollo 11—well, Apollo 8, of course was first. That was quite a thrill. As you've heard other interviewees stress, and I think Chris [Christopher C.] Kraft [Jr.] says, that was one of the most important decisions that we made, to launch men around the Moon without the lunar module. That was a big decision, and that occurred over a Christmas. I can recall with the family we had an early Christmas that year because I was going to be away. That was down in the South Pacific, where that landed. It was a great trip.

We had a great Christmas tradition on board the ship, and I think it was on that mission where we crossed the equator. To cross the equator on a Navy ship is an experience that you don't wasn't to go through. It's torture. It's really torture. I mean, I won't even get into that. I mean, you get swatted across the rear end with belts, and you crawl on your hands and knees, and you crawl through garbage, and it's just a Navy tradition, and it is brutal. Brutal. But it was a wonderful mission.

Then I guess the next one would be Apollo 11, which was a highlight. The thing that I remember most about Apollo, well, there are many things that I remember, but the thing that I get goose bumps even thinking about it today, and again I have to go back a little bit. When we were out on board these ships, our communications were almost zero. We had sporadic or poor radio communications with our recovery people in the control centers. You would get very little information, first of all, because it was not a continuous broadcast. So you'd get up in the morning, and maybe you'd touch base with the Control Center, and

they'd say, "Well, everything is going fine, and we'll be back on the radio in six hours and send you any messages." You just didn't know what was going on.

The most unusual thing was on [Richard F.] Gordon [Jr.] and [Charles "Pete"] Conrad, one of Gordon and Conrad's mission, when Gordon went out and I think he straddled the angry alligator. While they passed over the ship, we heard that communication, and that's the only communication I think that I recall that we ever heard from the spacecraft while it flew overhead. We never got anything else, even though we were tuned into that frequency. But communications from the control center were almost—I mean, you just didn't have communications then.

But on Apollo 11, by then, of course, we had the satellite communications and we were able to get a pretty good rundown on what was happening on the mission. We knew that they had landed on the Moon, and we were tuned into the various broadcasts. I'll never forget that here for days we heard about this mission, we heard about the astronauts, and then all of sudden, here they are, right in front of you. You're bringing them aboard the ship. They'd been to the Moon, landed safely and returned safely.

Of course, the President came out on board the ship, President [Richard M.] Nixon and almost his entire cabinet. When I look at those pictures, I can't name all of them, but I know it was—and that added to our burden, really, with all of those, because there you are, the ship preparing for one of its most important events of the year, or even in history, and here you have the additional burden of all of these VIPs coming aboard, especially the President. And you have this quarantine on top of you, which I'm sure you've heard about that, the quarantine. But everybody worked well. We did a lot of coordination.

One of the interesting things that I remember about that mission was the thoroughness with which the Secret Service did their job on board the ship. Now, you know, we hear many complaints today, well, these people, the FBI [Federal Bureau of Investigation], CIA [Central Intelligence Agency], they don't do their jobs, but I was very impressed, because when they came on board, knowing the President would come on board, they wanted to know who had sidearms, who had arms,—you know, the Marines are on board—where they were, where they were locked up. They went into the personnel records of all of those people that had keys to, I guess, the atomic lockers. They just did such a thorough job. We mapped out the route that the President would take, and the various hatches were all secured entering that area. I was impressed with the thoroughness with which everyone did their job.

Superimposed on this was quarantine. I explained to the head Secret Service man, I said what was happening, why the quarantine. They knew a little bit about this, but this was all fairly new to them. I went through all of this. Well, we finished the walk-throughs and all the briefings and the details about 2 a.m. in the morning. The landing was around, I think, early light, first light. And I'll go into that story, first light. That was an important part of the mission. Well, the ship, only part of it was air-conditioned, and it was pretty hot in the South Pacific, and here you had all these VIPs. Of course, they were in most of the air-conditioned spaces. I had an air-conditioned room, and this poor head Secret Service man—I wish I'd know his name, I don't remember it—I said to him, "Where's your cabin?" and he said, "Oh, back here." I said, "Oh, you're going to suffer in there, and you have only two or three hours' sleep. Why don't you come into my room. My room is air-conditioned and there's two bunks in there."

So he comes and takes off his coat and lays his cannon down on the table. [Laughter] I looked at it. He said, "Now, John, tell me one more time. Let's go through this quarantine stuff," because here was the ground rule that we were operating under, and this, again, is not very well known, and it would be interesting to sit now and discuss it with some of the NASA managers, the Chris Krafts and some of the headquarters people. We had very rigorous, as rigorous as we could develop for an operation at sea, the quarantine rules. We had the biological [isolation] garments. We had special procedures for the helicopter people. We had special procedures for bringing the astronauts on board, getting them into the mobile quarantine facility, decontaminating the deck on which they walked, and getting them into the mobile quarantine facility.

Now, the question came up, what happens if that quarantine chain were broken anywhere from the recovery area, especially back on the ship? What happens? The rule we were operating under, if that quarantine were broken, that ship would remain at sea with all its passengers and all its occupants for twenty-one days, the quarantine period. So here you have the President and most of his cabinet on board that ship. I think to this day that would have been an interesting situation. I'm sure the communications back and forth, well, how serious was the break? Where did it occur? Which way was the wind blowing? And all of those kinds of things.

But, anyway, in order to prevent something like that happening, I was in communications with the helicopter that was over top dropping the frogmen, the UDT men, describing exactly what was happening, and they were familiar with the whole procedure. At any one time if quarantine appeared to be broken, either there or en route in the helicopter, we had to land that helicopter on board ship, and while on board ship, I would salute the

Secret Service man, he would whisk the President immediately up to the waiting helicopter, his waiting helicopter, on the flight deck, and off they'd go, to avoid this influence from the quarantine process. So, again, it's one of those parts of history that's not well documented, or the circumstances or the rules and regulations that we were operating under out there. So it was an interesting time.

RUSNAK: While we're on the subject of the quarantine, when did you first become involved in that and how?

STONESIFER: Well, it's an interesting story, and I don't know if you've interviewed with any of the doctors or anybody. The nation had established an Interagency Committee for Back Contamination, ICBC, whatever, and it was made up of the head of the Communicable Disease Center [CDC, now Centers for Disease Control] out of Atlanta [Georgia], I think a representative from the Department of Agriculture, the Department of Commerce. They were worried about contaminating the seas, the fisheries, and things. Department of Agriculture was concerned about the contamination or what you might bring back from the lunar surface that would destroy crops, or what harm would it have. The NASA medical organization at headquarters, several other organizations, but, anyway, the Interagency Committee for Back Contamination. They were concerned what would be the possibilities for bringing back some pathogen that would be harmful here on Earth. Each one of their elements were concerned about this. Of course, then we had to develop procedures that would satisfy them to an extent that we were doing everything possible to prevent this.

Now, that was a real challenge, because here you have an operation way out at sea. How are you going to do this? You can do these things in the laboratory. That's the lunar laboratory, which I'm sure you've probably read about, I mean, the precautions and the procedures and the hardware and the equipment that they developed to prevent any of these possible pathogens from escaping. Well, we had that problem tenfold out there in the open, and it was very, very difficult to develop procedures, because the relationship was good between NASA and the Interagency Committee, but developing our procedures to satisfy our doctors and then get it approved by the Interagency Committee, you had to—think about this. From the minute they landed in the water, from that water, we had to develop procedures that would guarantee that these pathogens wouldn't escape.

There are several weaknesses in the system. First of all, the spacecraft, having been linked to the lunar module, the lunar module was on the surface of the Moon. So we had to rule that out, and the thought processes there were that the heat of reentry would possibly destroy anything that was coming back on the exterior of the spacecraft, which seemed logical. Or if when it landed into the water, the dilution factor of the ocean was another backup to the heat of reentry. But the spacecraft vented in the air. So there wasn't anything we could do about that, except when the pararescue men got there and put the collar—you know what I'm talking about on this flotation collar that we put around all the spacecraft—and that was put on, a lot of people say, "Well, that was put on so it didn't sink."

Well, it was put on primarily to give the pararescue men a platform to work from to assist astronauts out of the spacecraft. So the pararescue men put the collar around the spacecraft, and they had tanks of betadyne, and they sprayed the entire top deck of the Apollo spacecraft to decontaminate it, because that's where the ventilators were. Then a weakness

in the system here, one of the pararescue men—I call them pararescue men, these were Navy people, UDT, frogmen—opened the hatch and threw in what we called "the bag of BIGs," the bag of biological isolation garment. So here again, you open the hatch. What else are you going to do? We went through these processes with this Interagency Committee and got their approval, and we challenged anybody, "If you can think of something else, have at it."

So they threw in the bag of BIGs, as we called them, and then the astronauts donned these biological isolation garments. You perhaps saw one. There's one in the museum, I think. They didn't like them, because they were hot and hard to breathe through the filter system.

Then they got into the raft, came out the door, got into the raft, closed the door quickly. Then the UDT people would spray the entire exterior of the spacecraft. They were picked up in the helicopter. The helicopter winch operator was also protected somewhat, and they had a curtain, as I recall, in the helicopter to separate the compartment where they would be retrieved with the pilot and co-pilot up front, because we couldn't put any protective gear on them because they had to fly the aircraft.

Then the helicopter landed on board the ship, and normally the astronauts would get out and walk to the mobile quarantine facility or, prior to quarantine, would walk to sick bay. Well, instead of that, we took the helicopter down as close to the mobile quarantine facility as we could get it, and the astronauts came out and walked in. By then they're in their garments, which are protecting the outside world, and they're walking in. Then, of course, the deck and the aircraft are decontaminated with a decontamination solution. Then they're in the quarantine facility for the trip back to Houston.

All right. Now we have the spacecraft out there. Now, remember, the spacecraft, their suits are in there. The suits have been on the surface of the Moon. The cameras, everything. So we bring the spacecraft on board. Now, it's closed up and decontaminated, supposedly. We bring that on board and we mate it to the mobile quarantine facility with a plastic tunnel, a plastic tunnel much like the walkways that come out from an aircraft terminal and mate with the aircraft. We had a simplified version of that made of plastic and hoop steel. We mate it to the spacecraft.

Now, the engineer who's in the mobile quarantine facility, who volunteered to operate the mobile quarantine facility and make the systems works, keep the systems working in the mobile quarantine facility, he would go into the spacecraft. The spacecraft hatch would be open. But, remember now, it's all enclosed in this tunnel. So you have a system that's closed as well as we could close it. The fans in the mobile quarantine facility are maintaining the pressure differential. Then that engineer shuts down all the controls and does all the instrument readings, everything that we would normally do to a spacecraft once it's on board. He would remove the rock boxes, the cameras, and all of those kinds of things, take them into the mobile quarantine facility.

Now, they were anxious to get all of that equipment back to Houston as quickly as possible. Now, how do you get it back? We had a lock system, a transverse lock, built into the side of the mobile quarantine facility, where we would put the rock box in and submerge it in—I think it was sodium hyperchloride, I think. And any of the other gear, cameras, pictures, photographs and that, we'd have to put in plastic bags, seal them, and immerse them in that transfer lock before they could come out and be placed on board aircraft to be flown back to Houston.

So if you think about it, we tried to establish a good chain of events to prevent lunar pathogens coming back, but you have to realize we're in an operational situation out at sea. It's tough to do it, but I think we were quite successful. At least nothing happened. We did that for Apollo 11, Apollo 12, and then, of course, 13, you know. With each mission the quarantine aspects were diminished somewhat, based on the fact that they didn't find anything in the Apollo 11 mission. But, again, you had all of this to do and worry about, and introduce the crew, the Navy people, to all of this, and then you had the VIPs coming out. It was a big job. It was a big job.

Then, let's see. Apollo 11, Apollo 12. I was out on Apollo 12 doing much of the same thing. Apollo 13, I had transferred into the Bioengineering Division, and that division was in charge of developing all of the experiment equipment for Skylab, which was coming up.

So that takes us into the Skylab missions, where I was landlocked for most of that. We had a very important role in that, and I did get to sea again a couple of times in preparation for the Skylab mission. Of course, Skylab, there were many, many medical experiments being done on Skylab. One of the most important things from a medical aspect when you bring back the astronauts is to get the data on the astronauts, the physical and the medical information as quickly as possible. They would like to have gotten data on the helicopters coming back, because the return to gravity starts taking effect immediately, and that's one of the parts that they were interested in. They certainly appreciated the rapidity with which you could bring the astronauts back aboard a ship.

Well, for Skylab, the division I was associated with, the Bioengineering Division, we had to develop the same kinds of equipment for the post-flight experiments that were done in

flight. You wanted to do the same kinds of experiments and have the astronauts go through the same kind of examinations that they were doing in space. So we developed—you may recall the Air Force M.A.S.H. [Mobile Army Surgical Hospitals] units, these medical hospitals. They were fold-up houses or huts that could collapse and fold in amongst themselves. We borrowed some of them from the Air Force. We didn't collapse them because we had all of our equipment inside, but we had three or four of those fully equipped with all the medical apparatus for the post-flight examinations on board ship. So that was a big task, to make sure all of the data systems worked properly and all the equipment worked properly. So, again, I went out on the ship several times to put those on board the ship and just tried them out, see where they'd fit and make sure that we could hook them up to ship systems for water and power, things like that.

But then after that, after Skylab, we started looking ahead at Shuttle and the Space Lab, because the early space labs, Spacelab was earmarked, as you know, a shirt-sleeved laboratory in space. One of the important things there was to perform the medical experiments in Spacelab. My division, again, was developing a lot of the medical equipment for the early medical Spacelab flights.

RUSNAK: Since you've moved into the things you've been doing after recovery, why did you make this transition from recovery into bioengineering and then going on from there? It seems like kind of a bit of digression there.

STONESIFER: Yes. Well, I guess along in Apollo, back in recovery I began working very, very closely with the doctors and some of the NASA people over in the medical directorate

to coordinate the quarantine evolution. We were the recovery engineers, but we had to satisfy the medical requirements for this quarantine. I began to work very closely with them and the medical people, Dick [Richard F.] Johnston—I don't think you've interviewed him. You've probably heard about Dick. He was put in charge of developing the medical experiments for Skylab, and I was working closely with him on this quarantine, working the procedures, the recovery procedures to satisfy the doctors. I got to know him, and he asked me to come over then and do the engineering aspects on the medical experiments for Skylab, and that's how I made the shift from recovery into the bioengineering world.

RUSNAK: Had anything other than your recovery experience in terms of how that works, had anything in your background really prepared you for the bio aspect of this?

STONESIFER: Well, it's not so much the bioengineer. I mean, I grew up through the recovery aspects. You're always faced with engineering-type tasks and engineering thought processes. By then I had moved into the management chain, the management field, and a lot of the work is very similar. If you're a manager, can you get the cooperation of your people and get the most from the people that are working for you? I think that was one of my traits and that enabled me to, what I believed, to be successful in any of those tasks. Even though I was not a graduate bioengineer, I was able to lead and bring people together and keep things in focus. One of the things in all of the elements of NASA is the dynamic tasks of working to schedules. If you can work to schedules and keep those schedules in mind and keep people working toward those schedules, that's the important part.

RUSNAK: As they're experiencing with the Space Station sometimes that's—

STONESIFER: Oh, I know. It's very difficult, and I admire the people, the whole evolution of Space Station. I have to say, in Skylab, the Marshall Space [Flight] Center [MSFC, Huntsville, Alabama] was working for JSC bioengineering people much as a contractor would, to NASA. So here you have a sister center who really is a contract role back to another center, and that was a difficult task. You'd think they all worked to the same rules, regulations, and specifications and things, and that always wasn't the same. I used to think about, here we tried to work with a sister center, and it was very difficult at times. Now in Space Station you multiply that, different countries, different centers, and the task was, I'm sure, very, very difficult, as we all know from reading about it.

RUSNAK: That's certainly an interesting perspective on that. I don't know how much we want to get into today since we're almost out of time, so I'd like to thank you for your participation. Hopefully we can set something up to talk a little bit more on the future.

STONESIFER: I'd be happy to do that. I've enjoyed it, and I hope I didn't ramble and jump around from one—because, you know, one thought triggers another thought, and you think, well, I'll reserve that one and come back to it. So, anyway.

[End of interview]