

# NASA JOHNSON SPACE CENTER FACILITIES ORAL HISTORY PROJECT

ROBERT E. MITCHELL  
INTERVIEWED BY JENNIFER ROSS-NAZZAL  
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ROSS-NAZZAL: Today is August 10th, 2009. This interview with Bob Mitchell is being conducted at the White Sands Test Facility for the JSC Facilities Oral History Project. The interviewer is Jennifer Ross-Nazzal, assisted by Rebecca Wright. Thanks again for joining us this morning. We appreciate it. We're interested in learning a little bit more about the White Sands Space Harbor, but I thought it might be fun just for you to talk briefly about your career at NASA.

MITCHELL: My career started after eight years of being with the White Sands Missile Range [WSMR, New Mexico]. I came over as the environmental coordinator for White Sands Test Facility [WSTF, Las Cruces, New Mexico], which also meant that I did an interface with White Sands Missile Range, from the perspective of White Sands Space Harbor [WSSH] being on the Missile Range as well as White Sands Test Facility. Moved quickly from being the environmental coordinator to the lead manager for NASA of the maintenance and operations group. Title we technically use is line manager, and I did that for a couple years.

My background is a civil engineering degree. I received it from New Mexico State University [Las Cruces] in 1976. Went to work for several consulting firms. Uncle Sam had me as a civil servant in White Sands Missile Range for eight years, and then I came over to NASA. After the maintenance and operations, then in 1992 I was assigned as the backup for White Sands Space Harbor as the NASA manager of this facility. Then about '94, Mr. Al [Alex S.]

Paczynski took a medical leave for a year, year and a half. So I took over the lead of the Space Harbor. May have been '93, but time flies when you have fun. And it has been fun. Out of all my jobs that I've ever had, it's been one of the most exciting to visit with all the different kinds of folks in the Shuttle Program.

I never thought I'd be an aerospace kind of guy, just a facilities kind of guy. But when you do the Space Harbor, you have no choice but to get into the aerospace and a little more understanding of what that is. I interface with White Sands Missile Range, Holloman Air Force Base [New Mexico], Fort Bliss [U.S. Army Post, Texas], William Beaumont Hospital [Army Medical Center, El Paso, Texas]. I've even, in the process, had to coordinate with New Mexico State Police. It just really takes you to a broad range of folks that have to be conferred and met with in order to understand what would happen if we had a [Space Shuttle] landing at White Sands Space Harbor.

ROSS-NAZZAL: That's a lot of coalitions.

MITCHELL: Yes, and it also drove me into understanding how radios work. The communications at White Sands Space Harbor is a challenging field. You could be standing closer than we are during this interview and talk on a radio, and you would not hear what I was saying to you because of the lakebed phenomena. It took us quite a long time to figure out that that was an issue, surprisingly enough. It's not uncommon. They talked about it at the Salt Lake lakebeds in Utah. It's amazing that you're all on the same channel, but you can't pick me up and I can't pick you up. The person standing next to you might pick me up on their radio. So I had to learn radios as well as Space Harbor management and all the rest of it. My job is really more

equivalent to an airport manager, from the perspective of managing the facility activities associated with maintaining the runways, the navigational aids, the interface with different organizations. It's quite an interesting job, and I plan to retire as soon as it's over.

ROSS-NAZZAL: So you're going to retire in 2010?

MITCHELL: Well, yes, unless we stretch [the Shuttle Program] out to 2015. February 25th, 2009 was my anniversary date.

ROSS-NAZZAL: Give us some history, if you would, about Northrup Strip. What was it before it became the Shuttle landing site? How did NASA change all of that to make it suitable for Shuttle landing?

MITCHELL: Northrup Strip was originally a small dirt runway that Northrop Corporation used for landing aircraft out on the Missile Range during testing that they did. There's other publications that can give you more information. They finished using it, and then Mr. Paczynski and George [W.S.] Abbey and some others started looking at the Northrup Strip area to determine what they would need to do in order for the Shuttle Training Aircraft [STA] to use the facility.

One thing they did is they came in, and they widened it, compacted it, lengthened it. So they had what was called Runway 17/35, it's the north-south runway. They used that for years and years. Then we had the *Challenger* [STS 51-L] accident. During that time period they expanded it, added an east-west runway which simulated Edwards [Air Force Base, California],

and a transatlantic runway. We call it the TAL [Transatlantic Abort Landing] runway. So what we have at WSSH are three runways, two that are 15,000 feet long by 300 feet wide, marked to simulate Edwards runways and Kennedy [Space Center, Florida] runways. Then we have a third runway which is 150 feet wide by 12,000 feet long that simulates the Transatlantic Abort runway. The Shuttle Training Aircraft will fly against each one of those according to the scenario of that particular training exercise.

In addition to the runway description I just gave you, on each end of the runway is a 10,000-foot extension. Inside that extension are PAPI lights. PAPI stands for Precision Approach Path Indicators. They basically set up a light path at a certain angle [so an] astronaut can visually see that light. As long as the red and white lights are doing what they're supposed to, then he knows he's on the right angle. If they're not, then he has to try and adjust the best he can, keeping in mind that he has no propulsion capability, so he's a glider—a rock coming out of the sky.

Then we also maintain another 300 feet on either side of the runway. Up until 1997 we maintained 35,000-foot-long by 900-foot-wide runways: north, south, east and west. The TAL runway would be 32,000 feet long with 450 [feet] wide. Mid 1990s, the program came in and asked us how much [surface area] we had to have, and justify how much we had to have. Through that process, we reduced the requirement down to 50 feet on either side of the runways and 1,000 feet on either end. However, because of the weather conditions at WSSH, we still have to maintain the 900 by 35,000 in order to control wind erosion and sand dunes that can occur on the runways. You can do a grading and compaction on the runways one day, and the next day you come back, and if they had wind or rain you could have anything from a six-inch gouge out of the runway to a 12-inch sand dune, depending on the conditions.

It takes us six months to do the maintenance of all three runways. So it's an ongoing process through the year, because as soon as we finish the maintenance, the grading, the compacting, we have to immediately start over again. We do all of the work ourselves. The WSTF support contractor right now is a company called Easi [Enterprise Advisory Services, Inc.]. They're out of Houston; they're a small business contractor that supports Johnson Space Center. They have 24 individuals that maintain [WSSH]. Those 24 individuals are broken down between heavy equipment operators, mechanics, air traffic advisers, navigational aids technicians, and a couple of facility maintenance techs [technicians]. It's an ongoing 12 months out of the year activity.

We run all the navigational aids with six nav [navigational] aids techs. We have four traffic advisers, and they operate the control tower and observe the radar system, monitoring for safety. We run in two shifts, when necessary for the traffic advisers and nav aids, because when the STAs do their training, it can be anywhere from morning testing, afternoon testing to evening testing. Flights may be a better way to call it. We have to man up accordingly, so those [navigational aids techs and traffic advisors] could be on a second shift. The second shift would be until about 10:00 at night.

We go through and coordinate the airspace with White Sands Missile Range. Right now the gentleman that is our sponsor, our project engineer, at White Sands Missile Range is a gentleman named Ray Saenz. He has been doing that for probably eight to ten years. We've had some other folks do it prior to him, but he's been at White Sands Missile Range the longest. He and I used to work on projects—not the same projects, but we knew each other back in my first eight years [of civil service] working over at the Missile Range. So having my experience was

really of benefit, because I knew who to talk to, how to talk to them, and what they needed to do for me in order to support [the] Shuttle Program.

ROSS-NAZZAL: Are there any other planes that land on these runways other than the STA?

MITCHELL: Mr. Abbey used to come out to White Sands Test Facility two to three times a year to do a visit, and he would always fly over to WSSH and land, and we'd throw a luncheon party for him. That's an unofficial specialty that the guys at WSSH can do—throw a party. There have been some other planes land. There has been a lot of C-130s. They're the small cargo planes. A lot of military exercises that would occur, some which we do not speak about and some that are not a problem. Then there's been a C-117 that's done a landing over there in some of that exercising.

We had an emergency landing back in the early 1990s of a KC-135 Air Force fueling plane. The plane had taken off from Altus, Oklahoma. When it took off, it lost its entire left landing gear so all it had was a stub. Later that afternoon, after flying and using up its fuel, it did an emergency landing at WSSH. The pilot only put a one-to-two-inch gouge in the runway for 700 feet, when he basically stopped and rolled off of the runway. Nobody was hurt. It was also a time when we had an opportunity to reverse the gypsum bias that was established back in STS-3. When *Columbia* landed at WSSH, it was a scheduled landing. At that time I worked for the Army, and I was down on main post watching it on my little nine-inch color portable TV with rabbit ears hanging out the building. That was my first real exposure to the program as far as landing capabilities.

I had been on the outskirts when they expanded the [the landing capabilities], reviewing the grading plan that was proposed to the Army. The grading of the runways—the requirement is no more than one inch deviation in 1,000 feet. To give you perspective, your regular highway grade is a quarter inch in 100 feet. So you can do the math and realize that that's very smooth. For 35,000 feet, basically six, seven miles, you're flat. Quite an engineering requirement. Those runways are gypsum with oil markings, sideline, centerline, etc. They are not concrete. When you get gypsum compacted to the hardest capability that you can, it has the consistency of concrete or granite rock, with a one-to-two-inch cushion on the top.

We could take an emergency landing anytime, even if the runway was moist. Technically considered red, because what would happen is the vehicle would come in and squish down one to two inches and then be on hard surface again. Make a mess if it was wet. Back to the gypsum bias—when *Columbia* landed in March of '82, it was on the runway right out in the middle of the lakebed, and it was one of the worst sandstorms that has been recorded in history. Got gypsum inside the vehicle. When they did their maintenance on *Columbia* prior to [STS-] 107 [the *Columbia* accident], there was still gypsum in some of the joints. However, with that KC-135, that plane landed in February, was towed over to our new deservice pad, which is in the southwest corner of the facility, and was there from February until November, right through the sandstorm season. When the Air Force came back in October to do a certification on the vehicle, they found that no gypsum had infiltrated any part of the plane. So that helped us start dispelling the gypsum bias.

The other part that helped was when LeRoy [E.] Cain came out. We were looking at the capabilities of WSSH in 2001, -2, and -3 and checking to see if we were going to expand WSSH to be equivalent to Edwards Air Force Base. Prior to [STS]-107 we were moving down that

path. LeRoy came out, and I took him in my van out on the runway, and I started going down the runway. I kick it up to about 75, 80 miles an hour, and I noticed that LeRoy kept looking around. I asked him, "LeRoy, what are you looking for?" He said, "Well, I'm trying to see how much dust is being kicked up." I said, "You won't find any. We maintain the facility such that for Shuttle support, the runway is kept moist, and there is no real dust problem."

"The dust problem was when they towed the vehicle off the runway and left it sitting for a week, and then the day of and the day after we had some of the worst sandstorms. That's when the damage really occurred. Covers on the engines and sealing of doors was not accomplished as per my understanding." I worked for the Army at the time, but according to the story of the folks that were out there trying to support, nothing was done to cover up the engines or seal the vehicle. So it infiltrated, and even on the maintenance they did prior to [STS]-107 they found some gypsum in some of the joints. We don't have that problem now with the new deservice pad.

ROSS-NAZZAL: You mentioned you keep the runway moist. How do you do that?

MITCHELL: We use water trucks. Just regular highway construction water trucks, compactors, graders, heavy equipment scrapers, to move dirt in massive quantities if we have to. It's just like doing highway dirt work, except for the requirement is one inch in 1,000 feet, and then the compaction is really hard. When we do compaction, you cannot use standard highway compaction [testing] equipment because the equipment breaks, and it doesn't get the full strength of the gypsum, it is so hard. So what we've developed is a piece of equipment called a loadcart. When we run it up and down the runway, three foot on center, it has two aircraft wheels in the

center, and it's loaded up with iron bars to the approximate 205,000 weight translated into what the weight on the wheels would be. If those wheels sink into the gypsum more than an inch and a half, then it's not compacted hard enough. We continually compact, and eventually you'll get it to where the wheels don't even show more than just a trace of indentation.

It's quite interesting. Being a civil engineer, highway design and construction kind of guy, it was really fascinating to go out and be assigned to that kind of work, because it's nothing like I've ever seen in any other kind of construction or highway design. They sure don't teach us in college about what it takes to do gypsum.

ROSS-NAZZAL: You mentioned there's the gypsum and then the oil markings.

MITCHELL: Right. The oil is basically the same oil that they use when doing an asphalt road. They'll go in, and they'll do their base, and then they'll put in their base course, and then they'll put that layer of oil before they put the asphalt. Well, this is the same basic oil. It's EPA [Environmental Protection Agency]-approved, so it's environmentally sound. We just mark out where we want it sprayed, and we spray it on the ground. Every so often it builds up, so we have to go in and totally scrape it off, remark and replace it. Sometimes it blows away with the sandstorms so we have temporary repairs that we do with oil sprayers. When we do the full redo of the runway—that's about every 18 months, 24 at most—we hire a company to come in and do that activity. [For repair] we have our own little sprayers that we can go in and do it with.

ROSS-NAZZAL: Can you tell us about the operations complex? I was reading a little bit about it. It's old Apollo equipment, is that correct? Or has it been updated since then?

MITCHELL: When I took over, the communication system inside that we used was the old Apollo communications equipment. Since then we have definitely upgraded. I would say somewhere in the late 1990s, anywhere from '97 to '99, we put in a new system called an OIS, Operational Intercommunication System. You have communication that comes in by what we call long lines, landlines. Comes across T1 lines from Goddard [Space Flight Center, Greenbelt, Maryland], through T1 lines coming across from White Sands Test Facility to the White Sands Missile Range, and then across their telephone system up to WSSH. Then it changes that from a signal on a piece of wire or fiber into a radio wave. We upgraded and put that system in the late 1990s and we've been using that ever since. It does such circuits as command, purge, cooling, Landing Field Prime 1. There's 17 to 19 different circuits that come across.

ROSS-NAZZAL: Earlier you were telling us about radio and some of the problems you encountered. Can you talk to us about that gypsum radio effect?

MITCHELL: I do not understand it; I just know it exists. I know that when we do exercises with Holloman Air Force Base, and we try to do one or two of those a year—when I first took over, it was baffling, to say the least, as to why somebody could not communicate, and you were only feet or just a few yards from each other. Now the new [digital] technology is helping alleviate some of that. We're now installing at White Sands Test Facility a new Motorola radio system in conjunction with Fort Bliss and White Sands Missile Range and Holloman Air Force Base. Instead of being what they call an analog system, it's a digital system. It tends to do better, but there's still occasionally a time where even with this new digital system you may not get a

transmission. Somebody went up and did some research one time, and it's a phenomenon that's been recorded, but that's all I can tell you about it.

The other thing that you asked about, the Apollo-age equipment—let me tell you just a little bit about the equipment and the facilities at WSSH. We run the facility on a very small budget overall compared to other installations like the activities at Dryden [Flight Research Center, California] and at Kennedy. Predominantly, the credit for that goes to the guys at WSSH. There is a Defense Reclamation Management Office, [I believe that is correct]. DRMO is the acronym. They have a main office at Holloman Air Force Base, which is just 35 miles east of White Sands Space Harbor. The guys will go over there and look to see what other people are turning in. Or they'll get phone calls from WSMR folks and say, "Hey, we're going to turn this truck in or this piece of equipment."

So the guys will find out what this equipment is, and they will obtain it. Once, early 2001, I asked the gentleman that tracked all that to go in and do a summary for me. I was totally shocked. The cost to White Sands Space Harbor was somewhere in the neighborhood of \$300,000 to \$500,000 for a ten-year period, but the value of the equipment that we obtained was over \$30 million.

We used to have what was called an [LOSP, Landing Operation Support Panel]. It was chaired by folks out of JSC. Right now Don [Donald L.] McCormack is the chair of it. We went to a meeting in Florida one time; we were asked to present what the status of our facility was.

I did a status of WSSH and all this equipment we had obtained. That particular time, we had obtained a 38-foot RV [Recreational Vehicle] that we turned into what we called the Astrovan. Basically that van is used to transport the astronauts—if we had a landing—from the runway, to the dispensary in the ops [operations] area or to Holloman, wherever they needed to

go, if they were in good health. After I did all that presentation, one of the gentlemen from Kennedy politely tagged us as *Sanford and Son*. If you're familiar with the movie, *Sanford and Son* is about a father and son who run a junkyard. Mr. Frank Offutt is the contractor manager of WSSH. He's been around the area for 30-plus years. He was at another facility just ten miles from WSSH prior to taking over WSSH. Because he's older than I am, I was real quick to identify that I was the son and he was Sanford. It is a way that we've been able to keep the cost down and maintain the facility in readiness at all times.

Another example: in trying to determine how to set up security guard positions, you need some kind of a structure for the guards to have other than just their vehicle. So we found out that FEMA [Federal Emergency Management Agency] had 28-foot camper trailers that they were excessing. They were in the Houston area. I happened to know from personal experience these particular models normally cost in about the \$26,000 apiece range, because I'd gotten one for my son when he was in college. We went and got six of those, and it only cost us \$12,000. All it cost us was the shipping from Houston up to here.

That's the kind of mode that we have operated in, in order to keep the cost down for the program. Quite an interesting process. We basically have operated from \$3.5 million to \$4.5 million from 1992 to today. We're a year-round operation. Compared to a lot of the other facilities, we're 25% of their budgets.

The primary purpose of WSSH is astronaut training. The numbers vary depending on the time period. Anywhere from 70 to 90% of the astronaut training has been done at WSSH. Depends on how you crunch the numbers as to which way you get close. When I look at the number of days that we were having STAs fly at WSSH back in the late '90s and up to 2003, the

*Columbia* [accident] time period, we were flying 90% of them a year. [About] 200, 210 days a year out of the working week.

That's what our main job is, to provide that training facility, since we have three runways that simulate not only the CONUS, the Continental United States landing facilities, but we also have the Transatlantic capability. A typical day in it for an astronaut is he would get in his STA in Houston at Ellington Field [Houston, Texas], fly up to El Paso Hangar at El Paso International Airport [Texas], get out of his T-38, go in, check his weather, his flight plan, get into the STA, fly to WSSH, do an hour to an hour and a half of approaches, go back to El Paso, refuel, fly back to WSSH, fly another hour to an hour and a half, fly back to El Paso, get in their T-38, go home. That would be a typical training day for an astronaut.

Sometimes, if their flights were early in the morning or they were late at night, they might spend the night in El Paso. Not so much in the last [couple of] years, but back in the middle of my time period that was not uncommon. We are the third choice for a landing of a Shuttle mission. We almost had a landing here in I believe it was December of 2006.

ROSS-NAZZAL: Yes, I wanted to come out for it.

MITCHELL: Well, that's why your name is familiar then. I'm the one that approves who can come out and do all that kind of stuff to a certain level, as far as who gets on the Missile Range.

It was an exercise that opened a lot of people's eyes as to what we could do, what we needed to improve. We had some additional equipment that was brought out after that experience. There's plans in place that if [it] looks like we are going to be the landing site of choice, or even the alternate, Kennedy would send some special equipment out. I don't even

want to begin to try and describe to you all of the equipment. I know that there's a purge unit for attaching to the vehicle to help with the keeping it cooled and proper temperatures. I'm a facilities kind of guy, not a technical Shuttle kind of guy so I'm not the guy to go into further technical detail about that. It was an exercise and experience where we ended up having over 200 additional folks come in to help us if we had the landing.

Sometimes, as you can imagine, having that many people in a triple-wide modular trailer, it was a rather exciting—and I'm trying to find nice words to describe how you can have 200 people in a very small place getting in your way. Everybody under the Sun wanted to be out there to watch it land, and they found all kinds of legitimate reasons to be in the control center that we have. It's called the WSSH Operations Control Center, the WOCC. Might hear it called "the Wok" by some folks. The Control Center has stations set up for the ground operations manager, who is a KSC NASA employee. Comes out for every mission. A WSSH airfield support coordinator, which is my duty, who basically makes sure everything's operational and doing what the GOM, the ground operations manager, needs to have done. If we have special requests then they flow through that position. So he has one console, I have another. Then there's three other consoles for other engineers and positions inside our console room.

There's a sixth position that's just outside that room. If we did have a landing, where they would potentially set up for what they call PC GOAL/GOLD. The purpose is monitoring the condition of the vehicle. Then they communicate with people on the ground at the deservice pad and people back in Houston and Florida as to what the condition of the vehicle would be. If we had a landing, what we call the A Team would come out from Dryden, Kennedy, and Johnson. There'd be anywhere from 75 to 100 folks. That's why my '06 experience was a

shocker when I had 200, because I wasn't expecting 200. They would be the technical folks to come out and do the initial safe-ing of the vehicle.

The Landing Operations Office is out of Kennedy. Right now the gentleman that I interface with predominantly is a gentleman named Dean [O.] Schaaf. He sets up the schedule for who the GOM is going to be that comes out. With the retirement of the program getting close, folks are leaving the program, so finding GOMs to come out is getting difficult. Mr. Schaaf for years has always said that I needed to be his GOM during a mission, and I always tell him that it would take no less than two to four weeks of Shuttle training. So he'd have to take me to Florida for two to four weeks, and of course it would have to be in the springtime when it's nice weather. It's just one of those little points that you develop with your coworkers of harassing and teasing each other. He would always call me and he'd say, "Well, is the WSSH GOM available." I'd say, "No, he doesn't exist yet." There was little things like that, which is what I was referring to when we started about the neat people that I've been exposed to and had the opportunity to work with in this program. A lot of very smart, intelligent folks that ranged from [the degreed professional] down to the technical worker bee on the ground that is just the good old boy kind of thing. Lots of nice folks.

If we had a landing at WSSH, you also have Holloman Air Force Base, White Sands Missile Range, and Fort Bliss. When I say Fort Bliss, there's two contingencies of Fort Bliss that would come into play. One is the security guards and the other is William Beaumont Army Medical [Center]. Holloman Air Force Base is responsible for the first landing activity and then up to the first 24 hours. Then after 24 hours, the Missile Range will take over security and everything except fire support, and Holloman maintains the fire coverage.

If we had a landing, [and] the astronauts are hurt or deemed that they need medical attention more than we can just give them at our simple little dispensary, they would be put into an Army helicopter or an Air Force ambulance and taken to William Beaumont over government property. The purpose in making sure that we do that is such that they were always under government control, because let's say that the vehicle came in on an emergency landing and it crashed outside of the government property. Then the State of New Mexico Coroner's Office really comes into play. He and the state police have jurisdiction. If it's on Holloman or Fort Bliss or White Sands Missile Range, then they still have some jurisdiction, but they don't come in and force their jurisdiction, so it stays as a US government activity. We try to maintain that kind of a posture, and therefore you have Army helicopters and Air Force ambulances that would travel over federal property down to William Beaumont.

If an astronaut is just needing hydration or a little time to get their legs underneath them, we would take them to a dispensary that we've established at WSSH. Nice recliners, some small beds, things like that, the doctors could check them out and make sure they were still doing well. Then from the dispensary they would be loaded into the Astrovan and taken to planes to go back to Houston from WSSH or Holloman Air Force Base. Or they might even be taken over, depending on the timing, and spend the night at Holloman. The scenario is all dependent on the circumstances of the landing and what's around it.

The Air Force convoy is anywhere from 35 to 45 vehicles, consisting of ambulances, fire trucks, flatbeds with light-alls for night operations, fuel trucks for fueling vehicles and helicopters, security vehicles, etc. It ranges anywhere from 65 to 85 individuals, they can be civilian or military. Up until just recently most of it has been military, except for the fire department, and that's where some of your civilians would come into play.

That [convoy's] a pretty significant effort. We try to exercise twice a year, no less than once a year. If we only do it once a year, we usually do it in the October timeframe. White Sands Missile Range joins in on that activity, typically with the security folks.

ROSS-NAZZAL: Do you practice that with an STA landing?

MITCHELL: No. Actually what we practice with can be one of two vehicles. It could be a blue Air Force bus with Air Force personnel dressed in orange NASA suits. Or it could be a bus plus what we call the BUF. I don't know what that stands for, but it is the front end of a B-52 that they've put on a trailer, which allows the Air Force fire department to actually put their ladders up against the vehicle, crawl up, crawl in. Small opening on the side simulating the hatch on the side of the Shuttle, etc. It depends on how the Air Force wants to play the scenario. We support the Air Force in that activity.

ROSS-NAZZAL: For every mission that goes up, are you automatically planning as soon as that mission goes up that you might potentially see a landing? [If so], when do you know that the Space Shuttle might land here? When do you start planning for all those activities?

MITCHELL: A schedule for a mission for WSSH is 30 days prior to a mission we go off and start checking out nav aids, all the equipment, all the buildings, all the facilities. We coordinate. There's calls that are made to the Army and to the Air Force making sure they're ready. Then two to three days prior to the mission, you have six individuals that come out from Kennedy Space Center, one government, five USA [United Space Alliance]. The government, as I

mentioned earlier, is the ground operations manager. The rest are in the convoy. We basically establish ourselves to receive a vehicle any time during the mission. Those six individuals from KSC stay here the whole time.

We have opportunities of landing coverage. There's [three] types. On the day of launch we have a potential of abort once around, or AOA. That, under the scenario of the angle of the launch, can depend on whether we're prime, alternate, or tertiary. When it was a mission like the Hubble [Space Telescope], we could be down as third place because of the angle. If it's a high angle mission like some of the DoD [Department of Defense] missions were, we are the only AOA site that the vehicle could reach because of cross-range restrictions, etc. Again, not my topic of expertise. Those are the statements that have been made to me by others. If it's in the middle for [International] Space Station, an AOA can either be achieved at Kennedy or White Sands. There are some occasions now, since [STS]-107, where they've said that Edwards could be AOA. I don't remember what mission it was, but there was one time that they got called AOA. Usually it's KSC or White Sands. So that's the first opportunity for a landing.

Then during the mission there's two scenarios. One is called primary landing site (PLS) of the day. That's the site that is designated by the LSO (Landing Support Officer) down in JSC, through whatever process that is. Or LRD [Landing and Recovery Director] maybe does it, I'm not sure. We find out through the LSO and the GOM as to who's prime PLS. During the mission, a site is declared PLS for the day, and that would be—you have an emergency, you have time to prepare for the landing, so this is the site that would be most optimal for the day.

Then you have other opportunities, which we call mission coverage. At all times there's a site that is declared to receive a vehicle. Let's say we had a mission going and something went wrong, and they needed in the next orbit to come down. There's always a facility, Edwards,

White Sands, or Kennedy, designated where that could happen. So we have those particular opportunities as well.

The PLS—we definitely bring individuals to WSSH to turn on nav aids, make sure equipment is ready. The Air Force goes on standby. In the daily mission coverage, we bring WSSH guys out, the Air Force does not come up, they're notified of when it is, but usually you're called off four hours prior to that opportunity. Because it's an hour's drive out to WSSH, the guys are already headed that way usually when they get that phone call, so we just work for a four-, five-hour shift. Depending on the circumstances, we may even just say, "Okay, you're on a slipped shift and you're going to work eight hours, and it starts for this mission coverage." And goes so on, so forth.

There's all kinds of scenarios that could occur in that process. The answer to your question is that we basically are ready any time that a Space Shuttle is in the air. On end of mission is the last opportunity for coverage. There, we are considered the third choice. Kennedy first, Edwards second, and White Sands third. That's because we do not have the equipment necessary to lift the vehicle on top of the 747 [Shuttle Carrier Aircraft]. That requires an 800-ton crane. During the 2000 to 2003—looking into building up WSSH, there were only six of them in the free world. A company out of Louisiana at that time was under contract to provide the 800-ton crane. [It] takes an 800-ton crane, a 250-ton crane, and a couple of 100-ton cranes to lift the vehicle up onto the Shuttle.

Basically what happens, you get the 800-ton crane shipped in here. It takes—my experience with shipping that kind of equipment—possibly three weeks. It comes in on 21 semitrucks. It has to be brought in, put together, then it is load-tested. It takes the 250-ton crane to put it together. Then they lift the 250-ton crane as their weight for load testing. So it's quite

an interesting process. I've never seen it done. It has been done once that I can recall, and I believe that was when the *Enterprise* [Space Shuttle OV-101] was taken to the Smithsonian [Institution, National Air and Space Museum, Washington, D.C.] I don't think it's ever been done since then. You had what they call the golden arches at Palmdale, and then the Mate-Demate Device at Dryden. Then you have a mating device at Kennedy that is used.

When STS-3 landed here, we had a stiff-leg derrick that was built into the deservice pad out in the middle of the lakebed. That was the only time that stiff-leg derrick was used, because after that particular mission it was declared—I don't remember what the technical word is. The weight capacity of the stiff-leg derrick was less than what the Shuttles were going to be after STS-3. So it was no longer certifiable to do the lifting. The last I heard, that particular stiff-leg derrick was down someplace in Louisiana, Florida, somewhere down in that part of the country. I don't even know if it's still around anywhere. There are a lot of pictures that are in the archives of either the WSTF photo guys' library and the JSC archives. That's places you can get a lot of pictures of STS-3 landing.

ROSS-NAZZAL: Other than providing STA training and a landing site for the Space Shuttle, is there any other way that the Space Harbor is used to support the Shuttle Program?

MITCHELL: Supporting the Shuttle Program, I don't think there is anything else. There's no other way that I know of that we've used WSSH to support the Shuttle Program. The Army has used WSSH for, like I said, military exercises. Also, White Sands Missile Range has old airplanes that have been excessed that can be flown with a real person or by remote control. They're targets for the missiles. If the plane is in the remote control process, they call it a drone,

and that drone, if it has any kind of instability, damage from the missile or whatever else, it will not land back at Holloman. They're based out of Holloman Air Force Base, but it will not go back to Holloman Air Force Base. It will land at WSSH. They fly approaches against WSSH quite frequently, and that's the Army.

The area for WSSH has also been used by the Japanese program called Chu-SAM [Surface-to-Air Missile]. It's the Japanese Patriot program. There are some other missile types that they've been using. They've been in the area for at least five to six years that I can think of. They fly in the general vicinity of WSSH. That's not using WSSH proper, but they are within the area as well.

WSSH used to be also a bombing range years ago. Out in some of the outer areas of the ten-mile-by-ten-mile WSSH facility, you can see these grid patterns of old tires that were set up for the bombing practices. [WSSH's] had a lot of use in its years.

ROSS-NAZZAL: Besides Easi, who are some of the other contractors who've supported the Space Harbor?

MITCHELL: Easi has a subcontractor that is responsible for the air traffic advisers. Lockheed, out of Ames [Research Center, Moffett Field, California] is where their home office is. There's one more big company that has been the support contractor for White Sands Test Facility, [and that's Lockheed]. White Sands Space Harbor is part of WSTF, so it's under the same contract. Probably no more than six different contractors since I've had it in the facility.

ROSS-NAZZAL: You mentioned some changes that happened to the runway. Were there any changes brought about by the *Columbia* accident? Any modifications?

MITCHELL: No, actually, because not too long after *Columbia* accident the President [George W. Bush] changed the direction of the space program. As I mentioned, prior to *Columbia* we were looking at trying to establish WSSH similar capacity as Dryden, which meant that we would have built a Mate-Demate Device and brought a lot more equipment into WSSH.

There was no real significant improvement. Inside of my budget and capability, Mr. Offutt and I did some things like put foundations for wind walls that would have to be constructed if we had a landing. We've tried to get the wind wall built, but the program didn't want to spend the money at the time. Temporary buildings were brought in, but nothing of real significance. It was just like, "Oh, we have \$30,000 this year's budget that wasn't used. This would be an improvement that would be here if we ever did have a landing." So we did things like that, but nothing real significant after [STS]-107.

When the President did his announcement, that pretty much cut the legs out from underneath our massive improvement. I have in my time period heard some of the astronauts mention that they would like to land at WSSH because it's so easy to see from in their entry. If you look at the picture on the wall behind me [demonstrates], you see a black line, you see a mountain range on the left side and a mountain range on the right side, and towards the bottom part of the picture you see this big white dot. White Sands Space Harbor is directly in the middle of that big white dot. This is an infrared picture, so it's not as real-looking, but the black line is a lava flow. [It points] between the two mountains and the lava flow, it basically points directly to

WSSH location. So coming in from space, you can see all of this very clearly. They like that. There's a lot of area; it's a ten-mile-by-ten-mile flat area.

I described for you how much we maintain for the facility. Like I said, they do most of their training at WSSH. The only time they don't train at WSSH is the week before a mission, [when] they'll go out to Kennedy Space Center and do practicing. Then every so often, and I'm not sure what the percentage or how often, they go out to Edwards and do training just so they're familiar with those particular landing sites as well, but most of it is done here at WSSH.

ROSS-NAZZAL: Do you handle training pretty much on a daily basis then? Like today would we see them flying the STA?

MITCHELL: If they were flying. We could probably have gone out, if the Missile Range didn't have what they call an evacuation. We have to deal with the Missile Range operations as well, and that can involve being evacuated from WSSH for a long period of time. Missile firing—for safety reasons they do not want personnel at WSSH. So we fall back to a facility we built at Holloman Air Force Base, since it's only 35 miles away. [WSSH employees] would hang out there until the all clear sign is given and the roadblocks are lifted and they're allowed to go back to WSSH, depending on the day. The guys at WSSH would try to take that time—let's say they had vehicles that needed servicing, they'd try to service those vehicles during that down period.

I have to say that in all my 30-plus years of experience with the government and other private entities, the folks at WSSH have been the most professional that I have ever worked with. Not only professional, but they've taken a personal interest and ownership of making sure WSSH was the best WSSH could be. We have facilities that have been provided to us that a lot

of companies would throw in the trash, take to the dump, the metal refinery. We take it and the guys rebuild it such that it's like brand-new. The white room staircase is an old staircase and trucks that were sent to us from Kennedy, rusted. The guys stripped off the rust, they rebuilt them. That's also part of how we got the *Sanford and Son* name. Some people would say, "Oh, that's not very nice." But you know what? I take it as a personal plus [like I shared], because we've saved the government millions of dollars by being resourceful and using things that other organizations have declared excess or unusable. And the guys go in and make them usable. So it's really quite an experience.

ROSS-NAZZAL: Any anecdotes from WSSH that you're like to share? Any stories or anything that stand out in your mind?

MITCHELL: The only stories that really stand out in my mind are the times that George Abbey would come out. I would be on this side of the mountain here at WSTF, and I would sit in the conference room while George was getting briefed. It would be almost hilarious for me to sit in this office and watch people run in and out trying to get ready. So tense, so uptight, "Oh, I'm going to have to brief George Abbey." Then we'd get George over at WSSH. Sitting in the conference room over here, George Abbey, straight face. Getting him over to WSSH, he'd put his feet up on the table, he'd smile, he'd crack jokes. Just totally different. The folks over here just did not believe that that's the way he was. "George was that relaxed?" "Well, yes." And he would be. I never found Mr. Abbey to be anything but professional, trying to make sure facilities under his direction were prepared.

Keep in mind he and others were the originators of WSSH, so it was like his little baby. But sitting, cracking jokes with you—it was not the George Abbey you saw down at Houston at JSC either. So I tell people down there. He'd bring anywhere from seven to 14, however many he could fit into the STA executive jet, and we'd throw a picnic for him and sit around. He'd be out there for an hour and a half, two hours, just visiting. I'd give him a tour of the facility.

There is one thing about George Abbey that I will never forget. Bonnie [J.] Dunbar was with him on this particular visit. I always drive a seven-passenger van, and Mr. Abbey always sat in the passenger seat, and Bonnie would sit in the middle [seat], right between us. We'd be talking along, I'd be sharing improvements or status. You would think Mr. Abbey was asleep, because he'd lean forward like the seatbelt was all that was keeping him from falling over. Bonnie and I would keep talking. Then all of a sudden, Mr. Abbey would raise up and be right smack in the middle of the conversation. I don't mean asking you, "What'd you say?" I mean he would finish the sentence that you started. It was like, "I'm never going to underestimate George Abbey." I commented to Bonnie about that when we were off, and she said he does that a lot. It was just an experience that I will never forget.

Again, Mr. Abbey was somebody I had a lot of respect for. A gentleman that I knew you did not try to play games with. He knew his business. He, from all I could tell, treated us very fairly. We asked for some stuff, we got it; we asked for some stuff, we didn't get it. We weren't the golden child that got everything we wanted. But then again, you got to keep in mind our budget was 25, 30% of everybody else's. Yet we had more stuff available for the program to use than everybody.

It comes into an evaluation of unions. We have a union here, but the job descriptions are such for our workers at WSSH that they do a broad section of everything. Even a traffic adviser

could be asked to pick up a shovel or a nav aids tech could be asked to pick up a shovel. A heavy equipment operator could be asked to help a nav aids guy. Where at Kennedy and Edwards, when I looked into it, before STS-107, you had a lot of issues of no, this union guy can't do this job because this union guy was required to do that. Some cases, what we do with one guy took five guys to do for them. Between filling up the fuel tank for the generator to turning the generator on to maintaining the generator, all that kind of stuff.

Again, WSSH has been a blessing in my life for 18, 19 years. I attribute most of that to the professionalism and the dedication of the guys at WSSH. Because being on the west side of the mountains, I did not always get over there every day. Yet I didn't have to worry about the other side, because Mr. Offutt in several instances would be more picky about how to operate WSSH than I would be. More picky about how much dollars he'd be spending. I'm like, "Well, I got the dollars, why don't we—" "No, no, we don't need them, so therefore we're not going to do it, Mitchell." I'd go, "Okay, Frank."

Don't get me wrong. The respect is very definitely there. If I said, "No, we're going to do this," Frank would say, "Okay, here's my suggestion on how we do it." Frank Offutt is ten, 12 years older than I am. Under the *Sanford and Son* mentality, he'll call, and I'll pick up the phone and I'll say, "Hi, Dad" or "Okay, Dad, what do you think?" Because his wisdom is way up there. It's a respect that I will never forget.

ROSS-NAZZAL: One last question for you, and then I'll ask Rebecca if she has anything. Do you have any documents, correspondence, memos, letters, anything that you think that might add to the historical record if this is put on the National Register? Any histories maybe people have written?

MITCHELL: There are. I do have copies of documents.

ROSS-NAZZAL: Would you be willing to share those with us?

MITCHELL: Oh, I don't have a problem sharing them. The group that came out looking for historical preservation was led by Mr. Mario Busacca out of KSC. I provided them with a lot of the preliminary documents in developing WSSH. Environmental assessments, some of those kinds of things.

ROSS-NAZZAL: Could we get copies as well?

MITCHELL: Yes, yes. We can send you copies.

ROSS-NAZZAL: Rebecca, do you have anything for Mr. Mitchell? You have answered all my questions. I didn't ask too many, because you just went through and answered everything I had.

MITCHELL: Well, I enjoy taking tours. Every so often I would take co-op students, secretaries, people that would not get the opportunity to go to WSSH—I'd take them over there on a special tour. It takes an hour to drive over, an hour to drive back, and two hours to do WSSH, and then another hour to go over to Holloman and show them the facilities over there, eat lunch and then [return].

ROSS-NAZZAL: It's a full day.

MITCHELL: So they get a full day, 7:00 to 7:30 until 1:30 to 2:30. And I'm constantly just running through everything that we have going on. Having been the environmental coordinator responsible for all environmental work at WSMR, White Sands Missile Range, I was able to get a lot of historic information. We'd throw all that in there.

There are some videos and pictures, some storyboards that were put together for WSSH for special events, that I don't know if they would be beneficial for you or not. I don't even know how we can get you visual without taking a picture of them. That'll take a little while to get that accomplished. A couple of them were just recently done, and our photo guys up in the photo lab may be able to get you electronic copies of them, I don't know.

ROSS-NAZZAL: Yes, if you can give us their names.

MITCHELL: Moira [J.] Romansky, David [W.] Huskey. David is the photo guy. Moira is the pubs [publications] leader.

ROSS-NAZZAL: Great. Well, thank you so much for taking your time this morning. We certainly appreciate it.

MITCHELL: You're welcome. It was a pleasure, I enjoyed it.

[End of interview]