Scaled Composites, LLC
Koehn Dry Lake, CA
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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ATTACHMENT 3

Interviews Summaries

27 Pages

Interviewee: Mr. Pete Siebold
Pilot, SpaceShipTwo
Director of Flight Operations, Scaled Composites
Date/Time: January 16, 2015, 0900-1115
Location: NTSB HQ, Washington, DC
Present: Jason Fedok (NTSB), Roberto Montanez (Butler Parachutes), Tom Fowler (Butler Parachutes), Matthew Stinemetze (Scaled Composites)
Representative: Mr. Gary Halbert

Mr. Siebold stated that the day prior to the accident he and Mr. Alsbury had a discussion about which parachute system they would use for the following day's test flight. (Both Scaled Composites and Virgin Galactic pilots had complete sets of parachute systems available to them.) He explained that, at that point in the program, WhiteKnight2 operation had been transitioned to Virgin Galactic and the preflight operations of SpaceShip2 were run out of Virgin Galactic's building. They made the decision to use the Virgin Galactic parachute systems out of convenience. To his knowledge the parachutes were "in a consistent configuration with the latest generation chute" that had been received from Butler Parachutes. There was no specific protocol on which parachutes to use – it was at the crews' discretion.

Both he and Mr. Alsbury preflighted their parachutes at the same time on the day before the accident. Mr. Siebold stated he checked the overall condition of his system and recalled checking the flap pins on the back of the chute and ensuring that the safety wire had not been compromised. He looked at the packing information to see that it was not out of date and it was not. He unzipped the compartment with the oxygen bottle and verified that the bottle's gauge read full. He then rezipped the compartment. He did not check any of the hoses or their conditions. He performed a "standard" Cybernetic Parachute Release System (CYPRES) device preflight check by pushing the button and observed the device's blinking dots and display of the barometric pressure. It performed nominally. When asked if he checked the oxygen hoses on the harness he stated that he did not. The pilots took the parachute systems to the spaceship and they performed a communications check which tested the entire communications systems on both SpaceShip2 and WhiteKnight2. Afterward each pilot placed his parachute system in his seat where they were left overnight.

The next morning when Mr. Siebold returned to the spaceship he did not recall if he performed a second preflight check on the CYPRES device on his parachute nor did he recall whether he confirmed the system was the same one he had preflighted the day before. It was still in the seat and he assumed it had been left there during the night. He put on his parachute while standing behind his seat and described that he donned the chute while bent over and cinched the adjustment straps tightly. When he stood up straight the chute was uncomfortably tight, but was comfortable when seated. After he was seated he visually verified that the crew chief attached his static line to the seat. The crew performed their normal preflight checks to ensure the continuity of the oxygen system. The spaceship's oxygen bottle was turned on and flow was checked to ensure that it was constant and there were no "decays." The masks were checked for leaks and the oxygen flow indication verified that the entire system was intact. He did not recall any anomalies during the checks.

Mr. Siebold stated that he considered this a "high-risk" flight both personally and as the director of flight operations, although there was no formal differentiation between different test flights. When asked to elaborate on that classification he stated that Scaled Composites did not have a high, medium, and low flight risk classification; however, based on his 18-19 year experience at Scaled Composites he considered this a high-risk flight. They were "doing a significant envelope expansion that day. Flying an unproven rocket motor in an unexplored aerodynamic regime… classic test hazard assessments would categorize that as a high-risk flight." He stated another factor was that they were "using a propulsion system that history has shown can be unreliable, or much less reliable than a turbine or reciprocating engine." When asked if his categorization had anything to do with Scaled's readiness on the day of the accident he stated, "no." He also added that the primary purpose of test flights was to validate the engineering design, analysis and assumptions were correct and that there was always some amount of risk.

He estimated that he was seated and seatbelted in his seat for approximately one hour prior to takeoff. He was wearing a flight helmet and had taken the visor protector off prior to the flight. He had made a conscious decision not to fly with the visor down due to issues with fogging. He believed if it were necessary to bail out of the spaceship he would have time to put it down. At takeoff, procedures called for selecting "100% oxygen as desired." He did not recall if he did so for this flight, but stated that he normally did. During ascent while connected to WK2 the crew breathed "normal oxygen"[1] and can either leave the mask on or let it dangle from their helmet. He did not recall specifically whether he had his mask on during this time but specifically remembered taking several sips of water in which he would have had to remove his mask if he had it on.

At 30,000 feet they performed a cabin leak rate check to validate that the cabin pressure was holding. The bleed air supply was turned off to the cabin and the cabin isolation valve was closed to isolate the outflow valves. They took their masks off, turned the spaceship regulators off, and noted the cabin altitude rate of climb. He did not recall the values but stated that they were nominal – no leaks were identified. After completion the crew selected 100% oxygen, per procedures, and began their period of prebreathing 100% oxygen. This was done for a period of approximately 30 minutes prior to the release of SS2 from WK2 when the chances of an explosive decompression went from "improbable to possible."

During the climb it was not uncommon to encounter dry mouth and he used a special technique so as not to affect the prebreathe. He would take a deep inhalation breath, take off his mask, and take a quick sip of water. He would then put the mask to his face, and select "test mask" on the regulator which allowed a lot of oxygen to flow, essentially purging the mask of ambient air. He would then reseat the mask and continue breathing 100% oxygen. This was a technique he used but he had no scientific knowledge whether this was a desirable thing to do.

Because he considered this a "high-risk" flight he stated that he took extra precautions and took time to think through scenarios that might happen and how he would rapidly respond in an emergency and activate his parachute and oxygen cylinder. About 10-15 minutes prior to release there was a period of low workload when he was able to physically feel for the parachute

[1] According to Mr. Siebold, the cabin pressure was kept at a 5000 ft. equivalent altitude during climb.

D-ring rip cord, oxygen activation pud, and the dual-lever seatbelts to improve his "muscle memory" in the event of an emergency. This was not a written procedure, but something he personally did on some flights.

The last thing he recalled in SS2 was a very violent, large pitch-up with high Gs, and grunting noises. He heard a loud bang followed very quickly by signs of a rapid cabin depressurization. In the background he heard the sound of "paper fluttering in the wind," which he believed was the sound of pieces of the cabin coming apart. There was then a period when he had no recollection, which he attributed to "g-lock" due to the unexpected onset of high Gs for which he was not prepared.

The next thing he remembered he was outside of SS2 and he perceived that he was still at high altitude, above the haze layer. He heard a high frequency whistling noise and his helmet and mask were no longer straight on his face. He felt the mask was peeled up a little bit and both it and the helmet were twisted to the left. His believed the mask seal was compromised at that time. At some point he became aware that the visor had been ripped off. It felt as if something was continuously trying to rip his helmet off. He opened his eyes and saw a wide expanse of desert from a high altitude. He was falling in a stabilized position with his head slightly down and he had to look up to see the horizon. He was not tumbling.

He did not recall what actions he took first, but he remembered attempting to activate the oxygen system by pulling on it "many times." He could not be certain whether he attempted this activation at this time or during a later period of consciousness. He did not specifically recall being in his seat but remembered unfastening the dual-lever seatbelt without difficulty and assumed the free fall with his arms out and legs apart.[2] He recalled no pain. He then experienced another period of unconsciousness or lack of memory.

The next thing he remembered was a "sudden jolt" when the parachute opened and feeling as though he had been asleep. He did not pull the D-ring for the rip cord and believed the CYPRES device had activated the parachute. He described the parachute opening as "gentlemanly… it was not harsh." It was difficult to estimate the altitude but he estimated it was somewhere between 10,000 and 20,000 feet, noticeably lower than his previous period of consciousness. He looked up and checked on the canopy to ensure it was properly deployed. His eyesight was "degraded" and events began to "slow down" in his mind allowing him to absorb more information. He again recalled attempting to activate the oxygen but was unsure at what point in he made the attempts. It was either during one or both periods of consciousness. He tried "many, many, many times" and "just got the feeling" that it was not working and he never got oxygen flow. He also stated that he "didn't know what to expect or what it should feel like… it just didn't feel like it did anything." When asked if he used one or two hands he stated that he only used one hand – his left. He further stated that "you can't really do anything with your right hand with the oxygen. It's not a very convenient angle so I would assess it as a one hand operation." When asked if he could see what he was pulling on he stated that he could not recall.

[2] At the time of interview he realized that he was still in his seat and described the release of his seatbelts as "instinctual." In written comments provided after reviewing the draft interview summary Mr. Siebold stated that he "likely lost consciousness just after thinking about the D-ring and [his] next recollection was the jolt from the chute deployment."

The chase airplane began to circle him and he became aware that he had sustained injuries. His eyes hurt and it was very bright and difficult to see. He could not raise his right arm and assumed it was dislocated. He was concerned about the parachute landing fall and did not want to reinjure a previous left foot injury he had sustained years earlier. He wanted to reach the risers to position himself into the right attitude for a proper landing. He manipulated his right arm several times in an attempt to resolve the dislocation but he was not successful. He was running out of time and made the decision to put his hands at his sides with his feet and bent knees together. Between about 5,000 and 2,000 feet he noticed a very high ground speed and became concerned about landing and being dragged through the desert, but by the time of touchdown the surface winds were calm. He descended in a very slow spiral with no noticeable ground track.

Upon touchdown, he could not roll to one side because of a lack of directional control and fell forward into a creosote bush. He did not attempt to absorb any of the energy with his legs. The parachute drifted over the top of the bush and immediately collapsed. He sat up and began to become more aware of the severity of his injuries. His eyesight continued to degrade and was painful. He could not keep his eyes open and he never opened his right eye again until the emergency responders arrived. His right arm was bleeding and his flight suit was saturated with blood but it did not appear to be actively bleeding so he was "not overly concerned about it." He did not perceive any lower body injuries. As he was moving to take the parachute harness off he felt a "clunking noise" in his chest and was concerned about a spinal fracture. Therefore, he decided not to move until the emergency responders arrived. He took his helmet off and may have taken his glove off. His right hand was numb, as if he were out throwing snowballs without gloves while his left hand felt normal. He did not release the Capewells on the parachute harness, although he was prepared to do so if he began to get dragged.

The Extra chase plane circled him numerous times while he was both in the air and on the ground. He recalled waving to them to show them he was conscious. He recalled that it took "a really long time for the responders [helicopter] to get there," which surprised him. When they arrived the helicopter landed about 100 yards away. The first helicopter was from the National Test Pilot School. He recalled someone wearing a flight suit from the school and someone dressed in airport firefighting gear. They bundled up the parachute and were going to use it to stabilize him somehow. They examined him and eventually got a backboard and stabilized him on it. His boots were removed and later found on scene. He was taken to a second helicopter which had landed, which he presumed was the "Mercy Air" helicopter. One of the paramedics attempted to start an IV but was unable to until they got on the ground in Lancaster. Once in the emergency room he was cut out of his flight suit and his injuries were addressed.

He stated that had a four-part fracture of his right humerus that was not compound. The ball itself was broken as well as broken off the humerus and it was dislocated. He also had a nondisplaced fracture of his right clavicle. He had a small "gash" in his right elbow that was the source of the blood on his flight suit. He had a deep scrape/contusion on his right wrist and multiple scrapes on the back of his right shoulder. He had a lot of bruising on his right chest but did not know how that occurred. He did not recall any bruising on his left side. He had a lot of bruising on the tops of his quadriceps on both legs which were sore for many days. He did not

receive an official diagnosis for the "clunking" noise in his right chest but was told it may have been a muscle or cartilage tear between the ribs. Several days after the surgery his left little toe was sore. When it was x-rayed it was determined that it was fractured. He had an abrasion under his chin which he felt was consistent with the location of his chin strap. He had multiple contusions and scrapes on his face. He was initially diagnosed with only corneal scratches in his eyes but he removed a piece of fiberglass from his left eye during his hospital stay. His eyes did not improve as fast as he was told they would so he saw an ophthalmologist after being discharged. The ophthalmologist also removed some foreign matter from his left eyelid and a "silver sliver" from his right cornea. His eyes improved quickly almost immediately after the procedure.

Mr. Siebold was asked about his familiarity with the parachutes and how much hands-on training he had received on them. He stated that he had been employed by Scaled Composites for 18 or 19 years and had been using Butler Parachutes perhaps even before the SpaceShipOne project. In that time he had held both formal and informal training on the parachutes, including self-inspections. He recalled one time in which a parachute rigger came in and provided training on a deployed chute that was out of pack and needed to be repacked. He spoke about the various differences between the pieces of equipment that they had. He could not recall when that was done but believed it was before the current generation of Butler parachutes had been received. When asked what the differences were between the current generation and older models he explained that the original SS1 configuration (the HX-400) was a smaller unit that did not have a CYPRES device and the bailout bottle was external to the pack and stowed in a sleeve. That configuration was standard for "quite a long period of time." As the director of flight operations, he became aware of the CYPRES device and liked the idea of an automatic deployment backup. He worked with Butler and discussed options for integrating CYPRES devices into the parachute systems. The next series of parachute systems purchased contained CYPRES devices that were "manually armed." He described that the oxygen system had a loop-type lanyard affixed externally with Velcro. He believed the lanyard cable did not run through a conduit but was not certain. On the left side of the harness the CYPRES activation lanyard had a similar loop to the oxygen but it was red in color and was also affixed with a small patch of Velcro. The operator would arm the CYPRES device by pulling on the red loop. Mr. Siebold was not entirely happy with some "technical challenges" to the manually activated CYPRES device – specifically, possible problems with activating the device prior to cabin depressurization, where there was a possibility that the CYPRES could activate even before the pilot left the cabin. Therefore, he worked with Butler Parachutes to develop a static line option for CYPRES activation. There was a lot of internal engineering discussion about how to make a static line system feasible given the range of types of aircraft that they operate. Butler produced one "concept" unit with an external oxygen bottle that contained a static line and had an automatically activating CYPRES unit. They tried it and liked it and received more with that configuration. Butler made some additional modifications and the final configuration had the internal oxygen bottle. Scaled had one or two parachute systems with that configuration and all of Virgin's parachute systems were in that final configuration. At some point the oxygen lanyard switched to a "T-handle/elongated ball." He did not perceive any substantial differences between the units and stated that, until recently, neither he nor anyone else at Scaled had ever "actually actuated an oxygen system on a chute." He stated that pilots had pulled the D-ring but that "it was very difficult for us to recharge that [oxygen] bottle… I don't know that we thought it was necessary at the time." As

for his training, he did not recall becoming "intimately familiar with the new oxygen layout. I looked at it and thought – it's in the same place, you can grab hold of it just as easily. I never actually attempted to activate it."

He recalled that, at some point, two Scaled employees (Mr. Clint Nichols and Mr. Rick Aldrich) were off site and had to ship a parachute system back to California. The pressurized oxygen bottle was considered HAZMAT and they decided that the most expeditious way to ship the chute was to deplete the oxygen bottle. He described that as an "aha moment" because when Mr. Nichols attempted to activate the oxygen system he found that it was "very difficult to activate." They immediately contacted Butler to investigate whether that was normal or whether there was a problem with that particular parachute system. Mr. Siebold viewed the situation as "very urgent" as they had flight tests occurring in multiple vehicles and the oxygen activation forces were deemed "excessive" by his team. In parallel with contacting Butler Scaled began their own investigation to determine if there was a way to make even a modest improvement on those forces, so they could feel comfortable continuing to rely on them as a backup oxygen system. Scaled determined the root cause of the problem was a "geometry issue" where the activation cable entered the oxygen bottle with a rather sharp 90 degree bend. Scaled manufactured a small part that fit into the area that helped the cable "turn the corner" easier and made a small improvement in pull force values. They also continued to work with Butler to see if there was a better long-term solution. He believed that he "let them [Virgin] know" about the issue. It did not cross his mind when he selected the Virgin parachute for the flight and he did not follow-up with them to see what configuration they were in prior to the flight. At the time of the interview he still did not know what configuration Virgin's parachutes were in.

Prior to learning about the difficulty Mr. Nichols had experienced, Mr. Siebold considered the oxygen system to be a one-handed operation but the new findings made him "question whether that was possible." In discussions with Butler "it wasn't clear what the assumptions were and we recognized there was a disconnect there and maybe we didn't understand the system." Because Scaled had never activated the system before, "we had no understanding of what it should be or what was considered normal." When asked whether Scaled considered it a one-handed or two-handed operation after these new findings he stated, "I cannot comment on that because this information was relayed to me so I wasn't the one who actually pulled the handle… it was just described to me as "very difficult." When asked whether he personally considered it a one or two-handed operation on the morning of the accident he stated that, "I believe the feedback I got from Rick and Clint was that they were able to successfully activate it with one hand but it required a very substantial pull force. I believed it was possible to do. I knew and recognized that it was very difficult to do and that ideally you would use two hands." He stated that he was not certain if the reason he did not pull with his right hand was due to his right shoulder injury. When asked how confident he was that he was pulling on the green pud rather than something else on his harness he stated he was "pretty confident" and had "no reason to believe it was anything else," but could not be absolutely certain.

When asked about his prior experience with parachute jumps, he stated that he had performed one tandem jump in 1994 or 1995. He was also a paraglider pilot and very familiar with harnesses. When asked about his positioning and fit in the parachute harness while he was

under canopy he stated that despite snugging the harness up tightly he was "impressed with how loose it was… but at no time did I think it was abnormal. I had just never hung in the canopy before." He did not recall when he removed his oxygen mask after the event. His gloves were a new demo unit that had been given to him 6 months prior by a flight suit manufacturer. They had a metallic fingertip for use with touchscreen devices. They were similar to a standard military aviator's glove.

After the interview, Mr. Siebold was given the opportunity to examine his parachute harness from the day of the accident. He accepted and was asked to comment if it helped him remember any additional details that he wanted added to the factual record. He put the harness on and attached the clasps. He reiterated that he would not have been able to grasp the green pud with his injured right arm during his descent. He was asked if he could demonstrate the motion he used in his attempts to activate the oxygen system with his left hand. He described the motion as pulling the green pud "across" his body in "tugging motions." He removed the green pud from the Velcro pocket several times and during one of the attempts purposely hooked his thumb underneath the harness strap while grasping the green pud. He stated that could not completely rule out that this may have occurred during his activation attempts after the accident but added that "until you do it in a fight-or-flight type mode you just never know." He added that the preflight examination of the parachute was "not something we have a written checklist for." He also said that he did not believe that the attachment of the static line was documented in any of their written procedures, but that they had been trained to do so. This training generally consisted of a one-on-one discussion with a more experienced pilot in a particular aircraft type, although they had done some more formalized group training sessions as well. He could not recall that last time a formal training had been accomplished. One person was responsible for maintaining the parachutes which fell under his direction and budget as director of flight operations. Mr. Siebold was 5 foot 11 inches tall and weighed approximately 215 lbs. at the time of the accident. He was right-handed.

When asked if he had any additional comments for the factual record, he stated that he recognized that he was fortunate to have survived the accident and expressed appreciation for the group's efforts in investigating why he could not activate the oxygen system. He added that the rest of the system "performed perfectly and saved [his] life."

On February 18, 2015, Mr. Siebold was asked via email if he had ever received any training or briefings in hypoxia. He responded that his first hypoxia training was the FAA's Physiological Training Program in April 1998 which utilized the Edwards Air Force Base (AFB) altitude chamber. He took full pressure suit training with the U.S. Air Force at Beale AFB in May 2003. His most recent FAA Physiological Training Program was also at Beale AFB in the fall of 2006. He stated that all of the training involved the use of an altitude chamber.

Interviewee: Mr. Stuart Witt
Airport Manager, Mojave Air and Space Port
Date/Time: December 2, 2014, 1100-1215
Location: Mojave Air and Space Port
Present: Jason Fedok (NTSB), Roberto Montanez (Butler Parachutes), Tom Fowler (Butler Parachutes), Matthew Stinemetze (Scaled Composites), Eric Hansen (Scaled Composites), C.J. Sturckow (Virgin Galactic)
Representative: None

Mr. Stuart Witt was the airport manager of the Mojave Air and Space Port (MASP). He stated that the airport was not certificated under 14 *CFR* Part 139. It was a GA airport and space port. He was licensed by the FAA and USCG specifically as a space port and there were approximately 17 different rocket companies at the air and space port.

Prior to every test flight, he personally provided a prebriefing to all of the involved primary parties including the Kern County Sheriff's Office (KCSO), Kern County Fire Department (KCFD), California Highway Patrol (CHP), the air traffic control tower (ATCT), and the airport fire department. His prebriefings were a highly detailed PowerPoint presentation including information about the dangerous chemicals and pressurized vessels that may be encountered by emergency responders on that particular test flight. He required that the prebriefing be done approximately 4-5 days prior to the event to allow all of those scheduled to be on duty for the test flight to be present. He also ensured that the actual response personnel who will be on shift at the time of the test flight attend. If those personnel cannot attend in person, he would consider contacting the operator and postponing the test flight until all primaries could be properly briefed. Mr. Witt also performed a second prebriefing with the primary parties at approximately 0600 on the day of a test flight – which generally occur at first light. These parties generally included: KCSO, KCFD, CHP (as required - they were invited but did not attend the 31 Oct briefing). It also included the MASP CEO, operations staff, security, ATCT, and fire department.

The airport had multiple mutual aid agreements with the sheriff's office and local municipalities for both on airport and off airport events. KCFD had first response responsibility for an event off the airport while MASP had first response responsibility for an on-property incident. The first two powered SS2 test flights KCSO pre-positioned deputies on four-wheeled vehicles down range from the test flight. Since then KCSO had kept those deputies on stand-by, which they were on the day of the accident. CHP had pre-positioned officers at two points on the highway in order to stop traffic in areas where debris from an accident may fall when flights occur directly above Mojave, like the previous SS2 glide flight.

The airport was equipped with at least one specialized vehicle purchased by the airport (without FAA grant funding) that contains a platform to be used for quick entry/egress in the event of a gear collapse landing. The airport is also equipped with a "wand" that can be used to pierce the fuselage of an aircraft and inject extinguishing agent inside of it.

On the day of the SS2 accident Engine 14 (an on airport Kern County vehicle) was called off site prior to the launch. He stated that three helicopters were on standby – one from the

National Test Pilot School, a KCFD helicopter in Keene (a town west of Mojave on Highway 58), and a Mercy Air[3] helicopter at MHV. Both the Keene and Mercy Air helicopter were off on other calls at the time of the accident. The Keene helicopter usually prepositioned at the airport the day before a test flight due to the amount of fog received in Keene. He stated that the KCFD helicopter at Keene was on standby to be the first rescue helicopter on the day of the accident. Mercy Air 14 was the second standby helicopter (dispatched under the direction of KCFD Emergency Communications Center) and the backup was the National Test Pilot School's helicopter. That was "launched as an audible, basically because we could and had the resources."

When the off-airport accident happened he personally made contact with the Kern County Battalion Chief Jim Eckroth who was on site and already activating the emergency plan and dispatching units. Mr. Witt got in his vehicle and drove directly to NTPS and directed Dr. Al Peterson to launch the NTPS helicopter. He also asked Dr. Peterson to take an airport EMT/firefighter in Tiger 08. Dr. Peterson reported he needed 15 minutes for preflight and had the helicopter in the air within 14 minutes with Paramedic Campbell and Flight Surgeon Dr. Joseph "Chuck" Antonio. Mr. Witt directed his employees Kevin Wojtkiewicz and "Chris" to go to the crash site and to report back directly to him on status of crew. He stated they were trained not to touch anything at the scene of an accident.

The on-airport fire department vehicles did not leave the airport because there were still two airplanes (WK2 and the Extra 300) that needed to land. The survivor's location was found by Mr. Sturckow in the Extra 300 who circled the site and talked to the inbound helicopters and provided on-scene command. The helicopter from the test pilot school (Tiger 08) was the first to arrive and landed, allowing the paramedic to disembark. The Mercy Air helicopter arrived shortly thereafter and eventually transported the patient. Mr. Witt did not have the authority to launch the Mercy Air helicopter. It was activated through the Kern County Emergency Communications Center in Bakersfield – either via 911 call or direct radio request from the sheriff's office.

Mr. Witt explained that his office created a binder of pertinent information after every mishap including a timeline of events. He later provided a copy of the binder to the NTSB.

[3] Mercy Air was a full-service air medical transport system owned and operated by Air Methods Corporation. It operated 16 helicopters in California and Nevada. Mercy Air 14, a Bell 407, was stationed at MHV.

Interviewee: Sgt. Steve Williams
Kern County Sheriff's Office
Date/Time: February 20, 2015, 1500-1640
Location: Telephone Call
Present: Jason Fedok (NTSB)
Representative: None

Sgt. Williams was the sergeant in charge of the Mojave and Boron substations in the East division of the Kern County Sheriff's Office (KCSO). The area covered approximately 700 square miles. The East division also contained the Rosamond and Tehachapi substations. There were 17 patrol officers in the Mojave substation which was closest to the Mojave Air and Space Port. He had been employed by the Kern County Sheriff's Office for the past 16 years. Prior to his tenure with Kern County he was a sheriff's deputy with Los Angeles County for two years. He was also a private pilot.

Sgt. Williams had attended all of the previous powered flights of SS2 and many of the glide flights. He stated that he scaled his department's response based on the type of flight. Glide flights generally resulted in a smaller response from his office while powered flights required extra manpower. He recalled a lot of uncertainty for the first powered flight and a large amount of contingency planning. For that flight he preplaced many officers down range with off-road ATVs, dirt bikes, etc. and utilized the California Highway Patrol (CHP) to be able to shut down local highway in case there was an accident.[4] The program engineers had calculated possible debris areas in advance and provided estimates of how long it would take debris to hit the ground from different altitudes. CHP officers were placed in locations where they could close the roads and ensure that any traffic would have passed possible impact areas prior to debris reaching the ground. Although KCSO was the ultimate law enforcement agency in the area, they had a good working relationship with the surrounding municipalities and CHP and utilizing these agencies augmented their manpower and response capabilities.

By this flight the response was "toned back." He had 9 officers set aside specifically for this flight - 6 deputies with him at the airport for the launch and 3 others were "in town." Two of those with him were in on overtime and he "flexed" the shifts of 3 others so they could be in early. He developed an operations plan prior to each launch and briefed his personnel prior to arrival at the airport. If they were bringing in deputies from other locations he would provide them with information on the local area including where the hospital and fire stations were. KCSO's biggest responsibilities were security at the airport and scene security and road closures in the event of an accident. They were aware that the altitude of any mishap would greatly increase the size of the debris field and had planned accordingly.

On the day of the accident he was at the airport with 6 other KCSO deputies. He ensured that he and his deputies arrived at 0600 for the airport's safety briefing. He recalled representatives from the Kern County Fire Department and airport security, among others. Scaled/Virgin also provided a safety briefing the day prior that he attended. They were doing something a little different and had scheduled a post-flight "static charge" test. He stated that it

[4] He stated there was a specially trained group of officers who utilized this equipment that was stored on trailers at the Ridgecrest substation.

was "hit or miss" whether they were invited to preflight briefings by Scaled/Virgin. He thought that usually the airport was invited and then the information was sometimes passed along to his department. The briefing on the morning of the accident covered a lot of safety information and repeated a lot of the day before. He felt they covered everything and was prepared for the flight.

He watched the flight and launch while listening to a radio that was monitoring the mission frequency. He recalled seeing the rocket motor ignite and SS2 pitch up. The plume then disappeared behind some clouds. He heard someone say, "knock it off, knock it off, knock it off" and knew something was wrong. He listened to the radio and the chase plane's reports until he heard that the spaceship was "on the deck." He immediately used his radio to advise his dispatch and stated that occurred well before any 911 calls could have been received. The chase plane provided a general location and he had no personnel closer to where the debris fell, so he and the other deputies responded to that location. When they got in the vicinity they saw the chase plane and eventually came upon the cockpit wreckage which was next to a road. He located the deceased pilot who was still in his seat. He was able to identify the victim because Scaled had provided a flight manifest and he saw the name on the back of his flight helmet.[5] He called the coroner's office and notified them of the fatality. The coroner was also part of the sheriff's office. They arrived on scene within 2-3 hours.

His primary objective was to identify the location of the pilots and he confirmed that there was one fatality in the wreckage. They had heard radio calls that there was one parachute sighted. Officers from the Ridgecrest substation had responded with the off-road vehicles and identified the driver of a FedEx truck that had just driven past the wreckage sight a few seconds prior to its impact. He had stayed in the area and called 911. A road crew was also identified who had seen debris fall and saw a parachute. They directed Ridgecrest deputies in the general direction of the parachute and the deputies eventually arrived on scene and identified the pilot as a survivor. Shortly thereafter, the Mercy helicopter arrived and transported him to the hospital.

After both pilots were located KCSO's primary mission changed to scene security. They realized how large the scene was and, within an hour, had two KCSO helicopters searching the debris field and identifying the location of wreckage. The large pieces were spotted relatively quickly but no one could find the tail booms for some time. As they plotted the locations of the wreckage they began closing streets and, eventually, dirt paths to prevent the public from gaining access to the accident site. Once the news media began reporting about the accident, members of the public began trying to access the site. One problem was that the area where the debris fell was designated as an off-roading area and there were many trails. He felt they had a "good lock down" on the area within about 3 hours and, within, 8 hours no one was gaining access to the area. Eventually he had 15-20 deputies on scene 24/7 until the wreckage was recovered. CHP was utilized for some road closures and officers from California City and Ridgecrest (another nearby city) were also involved.

The Kern County Sheriff's Office Air Support Unit had a total of 5 helicopters and 3 fixed wing aircraft - two Hughes MD500 helicopters, two Bell OH-58 helicopters, one Bell UH-1 helicopter, one Cessna T-210, one Cessna T-206, and one twin-engine Turbo Commander

[5] At some point he received a phone call from the Mojave Air and Space Port manager who asked him to confirm the identity of the fatally injured crewmember. By that time, the surviving pilot had already identified himself to responders.

690A. One the day of the accident two helicopters were utilized – a Hughes MD500 and the Bell UH-1 Huey. The Huey was equipped as a rescue helicopter and had a hoist. It carried a flight medic and an EMT. The Kern County Fire Department also had a rescue helicopter and these two shared rescue responsibilities. Rescues were performed on Friday, Saturday, Sunday, and Monday by the sheriff's office and Tuesday, Wednesday, and Thursday by the fire department. On the day of the accident the fire department was on standby, even though it was a Friday flight. The KCSO helicopters knew about the flight but he believed that the fire chief selected their helicopter for standby because it was closer to the area – 10 minutes versus 20-25 minutes for the KCSO helicopters. Those decisions likely would have involved Lt. Tom Little at KCSO in Bakersfield. During the first four powered flights he recalled that the fire department helicopter twice staged at the airport and twice was on standby at another location. The Mercy helicopter (Mercy 14) was stationed at Mojave Air and Space Port and was also on notice for the launch. He stated that the personnel usually came out of their hangar and watched the flights. They launched after the accident but he did not know how they were dispatched. He thought the fire department helicopter responded as well. He believed that Mercy also had another helicopter in Barstow. Hall ambulance had a helicopter (Medevac 1) in Bakersfield that also covers Mojave if Mercy 14 was busy.

Interviewee: Mr. Ben Diachun
Vice President of Engineering, Scaled Composites
Date/Time: February 19, 2015, 1000-1025
Location: Telephone Conference Call
Present: Jason Fedok (NTSB), Eric Hansen (Scaled Composites)
Representative: Mr. Gary Halbert

Mr. Diachun stated that (b) (4) for their emergency response plan. It was designed to cover any emergency at the company and it was developed after a major ground test accident in 2007. It had small changes and improvements since that time. These changes generally stem from lessons learned from emergency simulations that were conducted about once per year. The last simulation was in May 2014. It was a test flight emergency involving an anomaly upon release of SS2 from WK2. There was significant structural damage to both vehicles and involved the crew bailing out of both vehicles and the loss of both vehicles. All of the actions and communications took place in-house as if it was an actual emergency but there was no vehicle flight involved. Company employees were given notification several days in advance that there would be a simulation and were told when it would take place so they would not cause any undue concern. No external organizations were involved with their simulations other than the fact that they may test phone numbers to ensure that they are still active. Scaled also regularly met with the key external stakeholders for their operations. The company conducted debriefs after the simulation which led to the improvements to the document. Mr. Diachun was aware that Scaled provided briefings to the airport and emergency responders prior to actual test flight but he was not involved with those briefings.

On the day of the accident Mr. Diachun was the senior manager in the control room. He was observing the flight and standing by in the event that an emergency happened. He initiated Scaled's (b) (4) and internal emergency response by picking up the phone and calling the front desk. Per their procedures, the front desk staff sent out a wide scale email to all of the Scaled emergency team by simply pushing one button that is designed for that purpose. He believed most of the individuals on that distribution list were already on site at the time of the accident. He stayed in the control room and performed two major roles. He relayed information (primarily VHF radio calls from the Extra 300) from the control room to the emergency command center that was established in Scaled President Kevin Mickey's office. He also went through the emergency response plan/checklist in the control room. That included supporting the test conductor and the mission control team, contacting the vehicle ground crews, contacting the external emergency services by calling 911, contacting the FAA and NTSB. He did not recall the exact order of his communications but stated that he assisted Mr. Mark Stucky working through the TA emergency checklist. He remembered that Mr. Stucky made the phone call to 911.

Interviewee: Mr. Kevin Mickey
President, Scaled Composites
Date/Time: February 20, 2015, 1330-1415
Location: Telephone Conference Call
Present: Jason Fedok (NTSB)
Representative: Mr. Gary Halbert

Mr. Mickey started his employment at Scaled Composites in 1987 and worked until 1992 when he went to work for Lockheed. He returned in 1996 in a senior leadership position. He had worked at various levels of the company as an airplane mechanic, chief financial officer, and president, which he was named in early 2012. In 2007 Scaled realized that they did not have a good, documented emergency response plan. That led to the development of the "(b) (4) plan, which was designed to cover a multitude of possible events – from an employee falling off a ladder to a welding tank explosion or larger. The document provided guidance for whoever was assuming the command leader role on how to handle the emergency at not only a tactical level but also an organizational level. It provided checklists for each individual member of the emergency team on their roles and responsibilities.

He stated that the (b) (4) was practiced throughout its existence to ensure that they were "still sharp with the checklists." He stated that there was "a balancing act always between making sure that we don't catch somebody excited thinking there's a real incident going on and trying to make it real enough that people feel the pressure to respond… and exercise themselves." There was always a debrief after each event and changes were made if they felt they were warranted. He stated that "anyone can bring up anything" in the debrief and changes were discussed as a group. Mr. Charlie Clark was the Environmental Health and Safety director and originator of many of the changes but only one person, Ms. Vivian Marufo, could actually make changes to the (b) (4) document. He desired and attempted to be involved in every simulation and debrief but, at times, his scheduling did not permit that and a delegate would stand in for him.

On the morning of the accident he arrived at the airport a little before 0600. He spent some time meeting and socializing with the others who had gathered at the base of the tower. He recalled there was a delay but could not remember the exact reason for it. He did not observe or participate in a safety briefing. He thanked many of the emergency responders for being there but did not recall any specific comments about their equipment or readiness. He saw police cars and fire equipment there but did not recall seeing any helicopters. He stated that "they are a nicety. It's not a go/no-go item for us, but they support us when they can." He added that there was emergency response helicopter based at MHV that was present that day but he was not certain what the protocol was for them getting dispatched.

He believed he had a handheld radio tuned to the special test frequency being used by the control room to talk to the spacecraft. After SS2 launched he heard "knock it off" over the radio. He knew that something was not nominal and immediately went back to his office. It took him 2 or 3 minutes to get there and by that time people had already started to collect in his office. He got out his (b) (4) three ring binder and began to work through the checklist. He established a communications line with the control room vis his desk phone. Eventually 8-12 people were in

his office and began to perform their responsibilities as well. The family members of the crew were provided with chaperones and brought in to a conference room near that location as well. Then it became a "waiting game" as facts came in from off-site. He was not willing to share information on the status of the flight crew until he was absolutely certain. It was difficult to get that information. Finally, Stu Witt came to his office and they went out to the ramp and called someone from the Kern County Sheriff's Office or Fire Department. Mr. Mickey was handed the phone and spoke with the individual who confirmed who had been fatally injured and who was headed to the hospital.

He stated that the National Test Pilot School helicopter was the first on-scene and that Scaled did not have a communications plan with them "because we did not know that they would be participating." He did not know how they were dispatched to the accident. When asked if it was part of Scaled's emergency response to notify the emergency response organizations that were already on site for the flight test he replied "only if there's any doubt that they have not been touched." He stated that the (b) (4) called for managing the incident, getting 911 called, and then moving on to other tasking. He commented, "I think in the case of that morning, knowing the involvement of emergency response, we know that that's not a 911 call we need to make." There were no direct communications to emergency response agencies from his office after the time he heard the "knock it off" call.

Scaled conducted a debrief on the use of the (b) (4) plan on the day of the accident. Mr. Mickey was traveling but called in and listened to as much of the debrief as he could. The "common theme" was that communications can never be fast enough. When asked if there was sufficient communication in his office to do everything that was necessary he stated that there was. There were several dedicated telephone lines besides his desk phone as well as UHF radios, aircraft radios, and cell phones. He could hear directly what the chase pilot was saying. The only communication that was lacking was the NTPS helicopter. He stated that they would have been able to communicate with the Kern County Fire Department helicopter through the sheriff's office or fire department if it had been dispatched. They had direct communication with other Kern County responders but were not communicating directly with them, just listening in a passive mode. He could also hear direct reports from the chase plane, but he did not communicate because there were very specifics protocols about who could communicate with the airplanes. They were not lacking in equipment, they just wanted the information faster. He thought the overall process went well and that they were well prepared.

Interviewee: Mr. Charlie Clark
Environmental Health and Safety Manager, Scaled Composites
Date/Time: February 25, 2015, 1130-1215
Location: Telephone Call
Present: Jason Fedok (NTSB)
Representative: Mr. Bob Craft

Mr. Clark stated that he had been in his current position at Scaled Composites since January 10, 2011. Prior to that time he was a contractor at Scaled for 3 months assisting with materials and processes. To his knowledge the (b) (4) plan dated back to 2007 after Scaled had a major accident - although it has been "revamped" since. It was a document that prepared Scaled for any emergency situation involving either personnel or property. It included emergency contact information, maps, information on MSDS sheets, legal information, and OSHA information – among other things - so that it would all be conveniently located in the event of any emergency. The "heart" of the document was a series of checklists outlining the responsibilities of Scaled employees, by title. These lists allowed employees to quickly see what needed to be done and when. It was a "living document" and he was the facilitator of all changes in order to keep it current. It was the responsibility of others to provide him the changes as needed. The document existed electronically on the Scaled intranet and all of the senior members of management had hard copies as well.

After every (b) (4) event, Scaled always performed a debriefing to see if anything needed to be modified or updated. Simulations were also conducted; although there was no set schedule for them. They were conducted "occasionally." A debrief would also take place after the simulations. Additionally, he frequently met with the airport management, airport fire department, and local fire station 14. Prior to a "significant test" he might bring the firefighters on site and show them the test setup and explain what was going to happen. Possible tactics for an unexpected event would also be discussed.

The SS2 Mishap Investigation Plan was part of the (b) (4) It was written "because of the FARs – 431 and 437" and the natural place for it to exist was in the (b) (4) When asked about prebriefings prior to SS2 launches, Mr. Clark stated that he was involved with the briefings from a ground operations standpoint. Ground operations usually began at midnight for a 0700 launch. There was a prebriefing with the airport and fire department regarding those operations. That prebriefing was usually a PowerPoint presentation conducted by a Scaled engineer named Bob Withrow 2-3 days prior to an event. It covered where the vehicle would be sitting and the location of "Nigel" (the mobile unit that was utilized for the nitrous oxide and helium). Circles would be drawn on diagrams showing the safety zones.

Mr. Clark oversaw and published a manifest for that operation that included the times certain events (helium loading, nitrous oxide loading, etc.) were to occur as well as the names and contact information for the primary personnel involved. Once the spacecraft went out onto the ramp or runway, there was a flight operations manifest in place. He was not involved with the flight operations side but stated that there was similar planning and documentation.[6] When asked if Scaled requested or had any input into the size of the emergency response preparation on

[6] The briefing on the morning of a launch was a flight operations briefing that he did not attend.

a specific day he stated that it was a "collaboration." For example, Scaled would suggest possible staging locations for the firefighters or the need to have a helicopter on site rather than staged in Keene, CA. Additionally he stated that "Mercy Air is right here on Mojave Airport property… and we have talked to them too. In fact we even notify them. We generally wait until the last minute for an activity like a SpaceShip2 flight - because that's an unannounced thing and we don't tell the public about that - but we, at the last minute, do let Mercy Air know we're doing this, this morning." He also stated that Scaled employees had been in direct contact with Mercy Air personnel in order to understand what their capabilities were, but added that they were not invited to the pre-mission briefings. When asked if he knew how they were dispatched to the accident he stated that he knew because he had asked them "point blank." He stated that Mercy Air told him they would not dispatch if Scaled called directly. The phone call to Mercy Air would have to come from 911 dispatch or the sheriff's department.

When asked about the SS2 Mishap Investigation Plan, he stated that he was sure it was performed following the accident but it was not his responsibility. It would normally be the responsibility of the Director of Flight Operations, but he was the pilot of this particular flight. In the (b) (4) it stated that the director of flight operations' backup was "as communicated case-by-case" He was not certain who performed those responsibilities. He stated that, although he assisted, the SS2 Mishap Investigation Plan was primarily written by Mr. Bob Withrow and Mr. Pete Siebold. Mr. Clark assisted because he had attended a workshop put on by the FAA and NTSB at the Mojave Airport.

The Flight Test Center was on the second floor of the north side of hanger 78. That was where Ben Diachun was at the time of the accident with many other employees. The command center for the (b) (4) was in Kevin Mickey's office on the first floor on the west side of hanger 78. That was where the senior management responded after the (b) (4) was called. On the day of the accident he was outside watching the flight. Without any independent information it became readily apparent that something was not right and he went back to his office. It was not long before he got the (b) (4) email and went to Mr. Mickey's office. He observed everyone with their hard copies of the (b) (4) plan. He was satisfied with the plan's functionality.

His only primary responsibility was to notify CAL-OSHA because they had a serious injury and a fatality. It took a while to get all of OSHA's required information. He stayed in Mr. Mickey's office for about two hours. After receiving Jason Kelley's (VP of Operations) approval, he faxed the form to the CAL-OSHA district office in Bakersfield at 1645. He followed up with a phone call to ensure they had received it.

Mr. Clark recalled that Scaled conducted a debrief of their response to the accident approximately three weeks prior to his interview. His "overall take" from the debrief was that they were very well prepared for the accident. Any changes to the (b) (4) need to go through him. He then presents the information to Kevin Mickey for his approval. Once received, only one person can actually edit the electronic document – Ms. Vivian Marrufo. She would then send out a notice to those with hard copies that certain pages needed to be changed. There were several minor "typos and transposition" changes made after the SS2 accident debrief.

Interviewee: Mr. David Walls
Lead Pilot, Mercy Air 14, Mojave, CA
Date/Time: February 26, 2015, 1515-1530
Location: Telephone Call
Present: Jason Fedok (NTSB)
Representative: None

Mr. Walls explained that Mercy Air 14 could only be requested for a mission by the Kern County Emergency Communications Center (ECC). After receiving a "tone out" or flight request from ECC the pilot would formally request dispatch from the Air Methods dispatch center in Nebraska. He explained that Mercy Air was simply a tenant at MHV and there was no other established relationship. Occasionally they would get visits from other agencies asking "what can you do for us?" The Mercy Air response was that they would need to call 911 – they could not be dispatched directly by request.

Mr. Walls stated that, to his knowledge, Mercy Air staff were "never" included on briefings prior to test flights or any other activity on the airport. He was uncertain why they were not included but suspected it was due to some sort of privacy concerns. He stated that the only way they know when Scaled Composites was having an operations was "when we see their employees walking out of their hangar." They did not receive any sort of formal or informal notification.

On the morning of the accident the helicopter was out of service for a time due to scheduled maintenance. He stated "if they let us know we could have scheduled [the maintenance] around [the launch]." There were four pilots at the Mojave base, with one pilot on duty at any given time.

Interviewee: Ms. Kathy Branson
Flight Nurse, Mercy Air 14, Mojave, CA
Date/Time: February 26, 2015, 1530-1600
Location: Telephone Call
Present: Jason Fedok (NTSB)
Representative: None

Ms. Branson was the flight nurse on duty at the time of the SS2 accident. She stated she had worked in her position at MHV for 2 years. Prior to her time at MHV she had previously worked in EMS as an EMT I, EMT II, paramedic, and a registered emergency room nurse. She was not involved in any preflight briefings prior to the WK2 launch and stated that the only reason Mercy Air staff knew there was going to be a Scaled launch that day was because they saw WK2 and SS2 at the end of the runway when they returned from a call at around 0600. The Mercy Air hangar was located directly next to the hangar for the National Test Pilot School.

The helicopter was out-of-service at the time of the accident but was actually in the air flying over airport property in a test flight after undergoing some maintenance. She and Mr. Brent Eichelberger were on the ramp and noticed activity at the NTPS hanger. They were quickly pulling the helicopter out of the hanger and preflighting it. Then they threw equipment and saw a firefighter board the helicopter before it took off. They knew something was wrong. Mercy Air 14 landed a few minutes later and she immediately approached the pilot (Ed Keefe) and asked if they could go back into service. He responded that they could and she called the ECC to notify them. At the time she did not specifically inquire about what was happening regarding the WK2/SS2 flight. Less than a minute later they were put on standby for an Alert 3 by ECC. Being put on standby activated their radios and they could listen to the reports coming in. She called ECC back and asked if they wanted Medic 14 to launch because it was an "auto-launch area." She was told "no" and they were left on standby.

At 1100 they heard a request over the radio for Mercy Air 14 to respond to the site and ECC launched them at that time. Ed Keefe was the pilot, Brent Eichelberger was the flight medic and she was the flight nurse. They were initially given a "key map" of the area to respond to and later were given coordinates once they were in the air. Once they got on the ground she exited the helicopter with Mr. Eichelberger. There were no paramedics present, only a firefighter/EMT I. The EMT told them to get him in as quickly as possible and transport him. She complied but felt rushed and stated that she normally performed a better assessment while on scene.

They attempted to start an IV while transporting him to Antelope Valley Hospital in Lancaster, CA. Because his right arm was injured they attempted to get an IV inserted into his left arm. Because of the helicopter's configuration his left arm was up against the left sidewall and they struggled to get a line inserted. They succeeded just as the helicopter was touching down and were able to provide some pain medication. When asked the difference in duties between the flight nurse and flight medic, she stated that they were a team and made joint decisions – neither outranked the other. The major difference was the "scope of practice" and that flight nurses could dispense a greater variety of medications.

Ms. Branson wrote a statement after the accident at the request of Mr. Aaron Keller, who was the regional clinical manager for Mercy Air in Modesto. That statement is included as attachment 8.

Interviewee: Mr. Rich Fauble
Fire Chief, East Kern Airport District
Date/Time: April 10, 2015, 1610-1645
Location: Telephone Call
Present: Jason Fedok (NTSB)
Representative: None

Chief Fauble stated that, in addition to himself, he had a "full crew" of 9 firefighters on duty at the time of the accident. Two firefighters were assigned to Rescue 1 which was positioned at the intersection of taxiways J and A. Two firefighters were assigned to Unit 17 at the same location. Three firefighters were assigned to Crash 1 which was positioned on taxiway H. Two firefighters were assigned to Crash 2 which was positioned at the foot of the ATC tower. Also at that location was a mutual aid Kern County vehicle (Engine 14) from Station 14 in Mojave. It was commanded by Battalion Chief Cody. Chief Fauble stated that there were a total of 13 firefighters at MHV, but only two of those were full time firefighters. The rest were part-time positions who split time with other fire departments in the area (U.S. Navy, NASA, Los Angeles County, and California City). All were retired military firefighters.

After the accident the airport manager went to the National Test Pilot School to launch an air rescue helicopter. The firefighting units stayed at the airport for the returning aircraft. They had heard the report of a parachute and Chief Fauble selected Firefighter Campbell to travel on the helicopter. He was one of four military experienced air flight rescue EMTs at the airport. Firefighter Campbell was an advanced EMT with 20+ years of experience. Prior to flights, the airport manager or air operations officer normally requested the KCFD helicopter be on premises at the airport. For some reason the helicopter was not available on the day of the accident. Mercy Air also had a helicopter at the airport at hangar 60. They were under contract to the county but could not launch without a county request. He believed that Battalion Chief Cody requested the KCFD helicopter respond after the accident and thought that Firefighter Campbell may have requested the Mercy Air helicopter from the KCFD helicopter personnel after he had assessed the survivor's injuries. He did not have radio communication with Firefighter Campbell at the scene due to line-of-sight limitations with their radios. Firefighter Campbell did take the airport's only county radio with him in the helicopter, in addition to a trauma kit and oxygen. Mercy Air eventually launched and transported the survivor to Antelope Valley Hospital.

Chief Fauble said he usually needed at least 24-48 hours of notice to properly staff a test flight launch. The type of operation determined how many personnel were called in. He had a full crew on the day of the accident because it was a powered flight and he had a "bad feeling in [his] gut." There was a memorandum of understanding (MOU) between the East Kern Airport District and Kern County Fire Department, in which KCFD would respond to an off airport accident within a 3-10 mile radius of the airport. That allowed the airport fire vehicles to remain on site for aircraft taking off and landing.

He usually was notified of a flight test operation well in advance during the airport's staff meetings and briefings. He was aware that the airport manager conducted safety briefings several days before a test flight but stated that those were "mostly for the county guys," and, although he was available if required, he did not always attend the briefings. He also did not

normally attend the early morning briefings on the day of a flight because he had many other duties including helping with crowd control.

Chief Fauble stated that if a new fuel or new vessel was being developed he was informed about it very early on by company engineers. He was kept very well informed about any changes to the vehicles. The entire department received recurrent training annually which provided the firefighters the opportunity to see the vehicles and talk with company personnel. He always included KCFD and the HAZMAT personnel from Edwards AFB at these sessions. Overall he felt they were very well prepared and trusted his firefighters completely.

Chief Fauble had been the full time fire chief at MHV for about 4.5 years at the time of the accident. Prior to that, he had been a firefighter at the airport since the spring of 1998. He started his firefighting career as a volunteer in 1974. Throughout his career he had been a firefighter for the U.S. Navy, U.S. Forest Service, and as a firefighter at Camp Pendleton. Additionally he was a full time firefighter for BAE Systems for 4 years and has taught firefighting at both the high school and college levels for more than 10 years. His direct supervisor at MHV was Mr. Kevin Wojtkiewicz, the airport's air operations office and airport district chief operating officer.

Interviewee: Mr. Patrick Campbell
Firefighter/EMT, East Kern Airport District
Date/Time: April 13, 2015, 1500-1600
Location: Telephone Call
Present: Jason Fedok (NTSB)
Representative: None

Firefighter Campbell arrived at MHV before dawn and attended a hazards briefing from Chief Fauble and Chief Hughes. The briefing covered the spaceship that was going to be launched and their rescue plan for anything that happened on or near the airport. He was assigned as the primary rescueman on Rescue 1. They stood by for several hours, first at the base of the tower and then at their assigned position on taxiway J. They were monitoring the flight on their radios. He recalled there was a delay of some kind and then a normal drop. They were expecting the spacecraft to return but that did not happen and it became apparent that something was wrong. About this time he noticed Mercy Air 14 take off and fly to the airport's compass rose and then return to their hangar. They drove back to the tower and he recalled volunteering his services to Mr. Stuart Witt and Chief Fauble in case a rescueman was needed. He stayed there for a few minutes while they "improvised and adapted." He was directed by them to drive to the National Test Pilot School and board a helicopter there.

He proceeded there in Rescue 1 where he met the crew who was pulling the UH-1N helicopter out for preflight. He said the crew did an excellent job preflighting the helicopter. He met a flight surgeon and photographer who would be accompanying him on the flight. He had never met them before. They performed a safety briefing both outside and again inside the helicopter after the preflight had been completed. The crew instructed them on looking for other aircraft, as they knew other helicopters were likely responding to the same location. He assumed Mercy Air was probably enroute as well. He estimated it took roughly 5-10 minutes to get the helicopter prepared for flight after he arrived. It took approximately 15-20 minutes to arrive on scene after departure from MHV. He took his trauma bag as well as the AED and oxygen. He briefed the flight surgeon and the photographer on his rescue plan and that he would utilize them as his assistants.

The helicopter was in communication with the E300 chase plane that showed them the location of the pilot. He could see the parachute on the ground from the air. They orbited the area and landed a good distance away from the pilot to protect him from their rotor wash. He exited from the right side of the helicopter and took the gear he had brought on board with him. He approached the pilot who was seated next to a bush. His parachute lying on the ground to the west. He immediately noticed that his eyes were closed and that he had a contusion over his right eye. He asked if he had any additional injuries and the pilot stated he had a sore right shoulder, possibly fractured right arm, an injured right wrist and possibly broken right ribs. Firefighter Campbell noticed what appeared to be first and second degree burns on his right wrist. He noticed the pilot's first name on his name tag and asked if he knew the whereabouts of the copilot. The pilot's response was garbled but stated that he did not think the copilot made it out of the vehicle.

He continued asking him questions to ascertain his level of consciousness and the pilot responded but did not open his eyes. He retrieved a sterile water solution from his bag and attempted to clean the dirt and debris out of his eyes while supporting his head and neck. The pilot eventually opened his left eye but never opened his right eye. He tasked two Kern County sheriff deputies (who had just arrived on scene) with retrieving the parachute and used it to provide in-line stabilization and protect him from the rotor wash and sun exposure.

KCFD helicopter 408 landed about 5 minutes after his helicopter. The personnel who departed that helicopter took over assisting him from the flight surgeon and photographer, who he then tasked with becoming his scribes. He took full c-spine precautions. The pilot had no shortness of breath, a good airway, and good motor function. He removed his boot and noted he had good capillary refill of his extremities. He requested the KCFD captain have Mercy Air 14 respond because he wanted an advanced life support helicopter to transport the patient.[7] The captain asked if the pilot could be transported by ground ambulance because one was in the area, but he replied that he wanted Mercy Air 14 to transport him. The captain, who he believed was from Station 11 in Keene, CA, made the request through the KCFD communications system.

He knew the vehicle did not have an ejection seat and asked the pilot how he got out of the vehicle. He was confused by the pilot's right-sided injuries because he knew the exit hatch was to his left in the vehicle. The pilot responded that the vehicle "came apart around him." He asked if he came out of the vehicle in his seat and the pilot responded, "yes." He was "very concerned" about the pilot's exposure to high altitude and decompression injuries. He immediately placed him on high flow oxygen and he responded well, but remained in pain. He was packaged for transport using a backboard and scoop litter from the KCFD helicopter.

Mercy Air 14 landed and he left the pilot to brief that crew. They all agreed that he should be immediately loaded and transported and that was what happened. He stated that he had worked with Mercy Air 14 "a lot" and had flown in the helicopter. He then gathered his gear and attempted to leave the site as he had found it. The sheriff deputies agreed to leave the parachute, boots, and harness where they were. The NTPS helicopter had already departed the scene to look for additional SS2 wreckage. An additional helicopter had also landed at the site. It was a Blackhawk helicopter from the China Lake Naval Weapons Center. The crew approached him after the pilot had been packaged for transport and he told them their assistance was not needed at the site.

He was a HAZMAT specialist and took care to decontaminate his equipment and the people who had assisted him with the sterile water he had. He was particularly concerned with contamination from carbon fiber. He was transported back to MHV on KCFD helicopter 408 and continued the decontamination process upon his return. When asked about his communications during the event he stated that he did not use the MHV radio he had taken from MHV due to line of site communications issues. He relayed all communications through the KCFD captain who arrived on scene in KCFD helicopter 408. When asked about the KCFD's helicopter presence at MHV during other flight, he confirmed that it had stood by at MHV for other launches and did not know why it was not there on the day of the accident. He stated that

[7] He initially thought Mercy Air 14 was already responding given its flight activity around the time of the accident, but when he saw they were no on scene, made the request through the KCFD captain..

following the incident, MHV conducted multiple air rescue training sessions utilizing the NTPS UH-1N Huey aircraft and established an air rescue operating instruction document in coordination with NTPS.

Firefighter Campbell had 34 years of firefighting experience. He also had HAZMAT experience with 11 departments including U.S Army, U.S. Navy, and U.S. Air Force and air rescue experience with 3 of these fire departments. He had served as an air rescue coordinator in Kuwait between 2004-2006 and had 15 years as a KCFD reserve firefighter. He had been a part-time firefighter/EMT at MHV since 1995. He held a current CA basic EMT certification with AED training.

Interviewee: Mr. Pat Williams
Supervising Chief Pilot, Kern County Fire Department
Date/Time: April 14, 2015, 1250-1320
Location: Telephone Call
Present: Jason Fedok (NTSB)
Representative: None

Mr. Williams was on duty at the time of the accident at the KCFD's Keene, CA helibase and responded to the SS2 accident in the department's UH-1 "Super Huey" rescue helicopter (call sign 408). The department has two helicopters at the Keene helibase and employed 3 full time pilots and 3 seasonal pilots. He stated that the notification for PF04 was different than previous powered flights. Generally they were given a "heads up" of a powered flight from KCFD Command Chief Cody between 2-4 days prior to the flight. Chief Cody was the primary KCFD with Scaled Composites. Mr. Williams stated that the helicopter had been prepositioned at MHV for the majority of previous flights and, perhaps, for all of the previous powered flights. In this case, Mr. Williams did not get a call from Chief Cody until the night before the accident. He asked him if Mr. Williams knew about the launch, and he replied that he did not. Chief Cody asked him to remain on standby at their base in Keene in case they were needed. When asked whether he could have prepositioned the helicopter at MHV on the day of the flight given the short notice, Mr. Williams replied "absolutely, we could have done that." Flight time from the Keene helibase to MHV was approximately 20 minutes.

Mr. Williams had a full crew at Keene at approximately 0600 on the morning of the flight. In addition to himself, the pilot, he had a rescueman/hoist operator, an EMT/paramedic, and a safety officer. They received a briefing from Chief Cody that provided the basic timeline of the day's planned activities. WKS/SS2 was scheduled for a 0700 departure from MHV. The helicopter was successfully preflighted and they were on standby monitoring the KCFD radio frequency. At 0704 Chief Cody called and notified them of a delay. At 0840 Chief Cody notified him that takeoff was scheduled for 0845-0900. Chief Cody had to leave the site and left Battalion Chief Steve Pendergrass as the on-scene KCFD commander.

At 1008 Mr. Williams received a text message on his cell phone that indicated that SS2 had launched but "cut it out, problems with something, they're coming down." The message confused Mr. Williams and was followed by another text message one minute later. That text message stated "Get ready." Nine minutes later, at 1018, a third text message was received that stated "launch, Kern 5." This was not a standard operating procedure, but indicated to Mr. Williams that he was to launch the helicopter and switch to Kern County's discrete frequency 5. It took about 5 minutes to get the helicopter into the air. He did not recall when he received coordinates for the accident site but thought it was when they were in the air. He recalled receiving cross street directions prior to that which helped because they were familiar with the area.

When he arrived in the area they noticed a large piece of wreckage and landed nearby. A Helicopter from the NTPS had also departed MHV and was already on scene. He heard that they had found a survivor and took off and flew approximately one mile to their location. The medical personnel disembarked and helped package the survivor for transport. Captain Rich

Anderson was one of those individuals and radioed for Mercy Air 14 to launch to the site. Mr. Williams explained that he and the county's emergency communications center had mistakenly believed that Mercy Air 14 was out-of-service. In discussions with the crew after the accident, he found that they were not out-of-service, but just doing a maintenance flight. A UH-60 helicopter from China Lake landed behind them and wanted to hoist and transport the patient, but he was already set to go in Mercy Air 14. After Mercy Air 14 took off, he transported an EMT from MHV back to the airport before returning to their base.

Overall he characterized the event as "fragmented" and stated "it wasn't good dispatch." Afterward he produced a timeline "to produce a training point on how ***not*** to dispatch an incident." Mr. Williams provided a copy of that timeline which was integrated into attachment 7.