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Below are updates regarding the anomaly that occurred in preparation for the AMOS-6 mission:

January 2, 2017, 9:00am EST

Over the past four months, officials at the Federal Aviation Administration (FAA), the U.S. Air Force (USAF), the National Aeronautics and Space Administration (NASA), the National Transportation Safety Board (NTSB), along with several industry experts, have collaborated with SpaceX on a rigorous investigation to determine the cause of the anomaly that occurred September 1 at Space Launch Complex 40 (SLC-40) at Cape Canaveral Air Force Station in Florida. This investigation team was established according to SpaceX's accident investigation plan as approved by the FAA. As the primary federal licensing body, the FAA provided oversight and coordination for the investigation.

Investigators scoured more than 3,000 channels of video and telemetry data covering a very brief timeline of events – there were just 93 milliseconds from the first sign of anomalous data to the loss of the second stage, followed by loss of the vehicle. Because the failure occurred on the ground, investigators were also able to review umbilical data, ground-based video, and physical debris. To validate investigation analysis and findings, SpaceX conducted a wide range of tests at its facilities in Hawthorne, California and McGregor, Texas.

The accident investigation team worked systematically through an extensive fault tree analysis and concluded that one of the three composite overwrapped pressure vessels (COPVs) inside the second stage liquid oxygen (LOX) tank failed. Specifically, the investigation team concluded the failure was likely due to the accumulation of oxygen between the COPV liner and overwrap in a void or a buckle in the liner, leading to ignition and the subsequent failure of the COPV.

Each stage of Falcon 9 uses COPVs to store cold helium which is used to maintain tank pressure, and each COPV consists of an aluminum inner liner with a carbon overwrap. The recovered COPVs showed buckles in their liners. Although buckles were not shown to burst a COPV on their own, investigators concluded that super chilled LOX can pool in these buckles under the overwrap. When pressurized, oxygen pooled in this buckle can become trapped; in turn, breaking fibers or friction can ignite the oxygen in the overwrap, causing the COPV to fail. In addition, investigators determined that the loading temperature of the helium was cold enough to create solid oxygen (SOX), which exacerbates the possibility of oxygen becoming trapped as well as the likelihood of friction ignition.

The investigation team identified several credible causes for the COPV failure, all of which involve accumulation of super chilled LOX or SOX in buckles under the overwrap. The corrective actions address all credible causes and focus on changes which avoid the conditions that led to these credible causes. In the short term, this entails changing the COPV configuration to allow warmer temperature helium to be loaded, as well as returning helium loading operations to a prior flight

proven configuration based on operations used in over 700 successful COPV loads. In the long term, SpaceX will implement design changes to the COPVs to prevent buckles altogether, which will allow for faster loading operations.

SpaceX is targeting return to flight from Vandenberg's Space Launch Complex 4E (SLC-4E) with the Iridium NEXT launch on January 8. SpaceX greatly appreciates the support of our customers and partners throughout this process, and we look forward to fulfilling our manifest in 2017 and beyond.

December 7, 10:30am EDT

We are finalizing the investigation into our September 1 anomaly and are working to complete the final steps necessary to safely and reliably return to flight, now in early January with the launch of Iridium-1. This allows for additional time to close-out vehicle preparations and complete extended testing to help ensure the highest possible level of mission assurance prior to launch.

October 28, 4:00pm EDT

The Accident Investigation Team continues to make progress in examining the anomaly on September 1 that led to the loss of a Falcon 9 and its payload at Launch Complex 40 (LC-40), Cape Canaveral Air Force Station, Florida.

Since the incident, investigators from SpaceX, the FAA, NASA, the US Air Force and industry experts have been working methodically through an extensive fault tree to investigate all plausible causes. As part of this, we have conducted tests at our facility in McGregor, Texas, attempting to replicate as closely as possible the conditions that may have led to the mishap.

The investigation team has made significant progress on the fault tree. Previously, we announced the investigation was focusing on a breach in the cryogenic helium system of the second stage liquid oxygen tank. The root cause of the breach has not yet been confirmed, but attention has continued to narrow to one of the three composite overwrapped pressure vessels (COPVs) inside the LOX tank. Through extensive testing in Texas, SpaceX has shown that it can re-create a COPV failure entirely through helium loading conditions. These conditions are mainly affected by the temperature and pressure of the helium being loaded.

SpaceX's efforts are now focused on two areas – finding the exact root cause, and developing improved helium loading conditions that allow SpaceX to reliably load Falcon 9. With the advanced state of the investigation, we also plan to resume stage testing in Texas in the coming days, while continuing to focus on completion of the investigation. This is an important milestone on the path to returning to flight.

Pending the results of the investigation, we continue to work towards returning to flight before the end of the year. Our launch sites at Kennedy Space Center, Florida, and Vandenberg Air Force Base, California, remain on track to be operational in this timeframe.

September 23, 1:00pm EDT

Three weeks ago, SpaceX experienced an anomaly at our Launch Complex 40 (LC-40) at Cape Canaveral Air Force Station. This resulted in the loss of one of our Falcon 9 rockets and its payload.

The Accident Investigation Team (AIT), composed of SpaceX, the FAA, NASA, the U.S. Air Force, and industry experts, are currently scouring through approximately 3,000 channels of engineering data along with video, audio and imagery. The timeline of the event is extremely short – from first signs of an anomaly to loss of data is about 93 milliseconds or less than 1/10th of a second. The majority of debris from the incident has been recovered, photographed, labeled and catalogued, and is now in a hangar for inspection and use during the investigation.

At this stage of the investigation, preliminary review of the data and debris suggests that a large breach in the cryogenic helium system of the second stage liquid oxygen tank took place. [Updated 09/24: At this time, the cause of the potential breach remains unknown.] All plausible causes are being tracked in an extensive fault tree and carefully investigated. Through the fault tree and data review process, we have exonerated any connection with last year's CRS-7 mishap.

The teams have continued inspections of LC-40 and the surrounding facilities. While substantial areas of the pad systems were affected, the Falcon Support Building adjacent to the pad was unaffected, and per standard procedure was unoccupied at the time of the anomaly. The new liquid oxygen farm – e.g. the tanks and plumbing that hold our super-chilled liquid oxygen – was unaffected and remains in good working order. The RP-1 (kerosene) fuel farm was also largely unaffected. The pad's control systems are also in relatively good condition.

SpaceX's other facilities, from the Payload Processing Facility at the Cape, to the pad and hangar at LC-39A, are located several miles from LC-40 and were unaffected as well. Work continues at Pad 39A in preparation for bringing it online in November. The teams have been in contact with our Cape Canaveral and Kennedy Space Center partners and neighbors and have found no evidence of debris leaving the immediate area of LC-40.

At SpaceX headquarters in Hawthorne, CA, our manufacturing and production is continuing in a methodical manner, with teams continuing to build engines, tanks, and other systems as they are exonerated from the investigation. We will work to resume our manifest as quickly as responsible once the cause of the anomaly has been identified by the Accident Investigation Team. Pending the results of the investigation, we anticipate returning to flight as early as the November timeframe.

Other efforts, including the Commercial Crew Program with NASA, are continuing to progress. Getting back to flight safely and reliably is our top priority, and the data gathered from the present investigation will result in an even safer and more reliable vehicle for our customers and partners.

September 2, 6:45pm EDT

SpaceX has begun the careful and deliberate process of understanding the causes and fixes for yesterday's incident. We will continue to provide regular updates on our progress and findings, to the fullest extent we can share publicly.

We deeply regret the loss of AMOS-6, and safely and reliably returning to flight to meet the demands of our customers is our chief priority. SpaceX's business is robust, with approximately 70 missions on our manifest worth over \$10 billion. In the aftermath of yesterday's events, we are grateful for the continued support and unwavering confidence that our commercial customers as well as NASA and the United States Air Force have placed in us.

Overview of the incident:

- Yesterday, at SpaceX's Launch Complex 40 at Cape Canaveral Air Force Station, an anomaly took place about eight minutes in advance of a scheduled test firing of a Falcon 9 rocket.
- The anomaly on the pad resulted in the loss of the vehicle.
- This was part of a standard pre-launch static fire to demonstrate the health of the vehicle prior to an eventual launch.
- At the time of the loss, the launch vehicle was vertical and in the process of being fueled for the test. At this time, the data indicates the anomaly originated around the upper stage liquid oxygen tank. Per standard operating procedure, all personnel were clear of the pad. There were no injuries.

To identify the root cause of the anomaly, SpaceX began its investigation immediately after the loss, consistent with accident investigation plans prepared for such a contingency. These plans include the preservation of all possible evidence and the assembly of an Accident Investigation Team, with oversight by the Federal Aviation Administration and participation by NASA, the United States Air Force and other industry experts. We are currently in the early process of reviewing approximately 3000 channels of telemetry and video data covering a time period of just 35-55 milliseconds.

As for the Launch Pad itself, our teams are now investigating the status of SLC-40. The pad clearly incurred damage, but the scope has yet to be fully determined. We will share more data as it becomes available. SpaceX currently operates 3 launch pads – 2 in Florida and 1 in California at Vandenberg Air Force Base. SpaceX's other launch sites were not affected by yesterday's events. Space Launch Complex 4E at Vandenberg Air Force Base is in the final stages of an operational upgrade and Launch Complex 39A at Kennedy Space Center remains on schedule to be operational in November. Both pads are capable of supporting Falcon 9 and Falcon Heavy launches. We are confident the two launch pads can support our return to flight and fulfill our upcoming manifest needs.

Again, our number one priority is to safely and reliably return to flight for our customers, as well as to take all the necessary steps to ensure the highest possible levels of safety for future crewed missions with the Falcon 9. We will carefully and thoroughly investigate and address this issue.

September 2, 9:00am EDT

Statement from SpaceX President and COO, Gwynne Shotwell:

"We deeply regret the loss of Amos-6. Our number one priority is to safely and reliably return to flight for our customers, and we will carefully investigate and address this issue. We are grateful for the continued support that our customers have expressed to us."

September 1, 1:28pm EDT

At approximately 9:07 am ET, during a standard pre-launch static fire test for the AMOS-6 mission, there was an anomaly at SpaceX's Cape Canaveral Space Launch Complex 40 resulting in loss of the vehicle.

The anomaly originated around the upper stage oxygen tank and occurred during propellant loading of the vehicle. Per standard operating procedure, all personnel were clear of the pad and there were no injuries.

We are continuing to review the data to identify the root cause. Additional updates will be provided as they become available.

September 1, 10:22am EDT

SpaceX can confirm that in preparation for today's static fire, there was an anomaly on the pad resulting in the loss of the vehicle and its payload. Per standard procedure, the pad was clear and there were no injuries.

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