

National Aeronautics and
Space Administration
Office of the Administrator
Washington, DC 20546-0001



March 29, 2019

Dr. Patricia Sanders
Chair
NASA Aerospace Safety Advisory Panel
Washington, DC 20546

Dear Dr. Sanders:

Enclosed is NASA's response to the Aerospace Safety Advisory Panel (ASAP) Recommendation 2018-04-01, Required Actions for Crewed Flight Test Risk Reduction, and Recommendation 2018-04-02, Action to Ensure U.S. Access to the International Space Station Given Commercial Crew Program Schedule Risk. These recommendations resulted from the ASAP 2018 Fourth Quarterly Meeting held at NASA Johnson Space Center on October 11, 2018.

Please do not hesitate to contact me if you or the Panel would like further background on these responses.

I look forward to receiving continued advice from the ASAP that results from your important Quarterly and Insight fact-finding meetings.

Sincerely,

A handwritten signature in black ink that reads "Jim Bridenstine".

James F. Bridenstine
Administrator

2 Enclosures:

2018-04-01: Required Actions for Crewed Flight Test Risk Reduction

2018-04-02: Action to Ensure U.S. Access to the International Space Station Given
Commercial Crew Program Schedule Risk

NASA Aerospace Safety Advisory Panel Recommendation

2018-04-01: Required Actions for Crewed Flight Test Risk Reduction

Finding:

There are serious challenges to the current launch schedules for both SpaceX and Boeing. For SpaceX, one challenge is the lack of final resolution of the composite overwrapped pressure vessel (COPV) failures, which are generally considered to have been involved in a launch pad accident and which affect the total safety of the “load-and-go” launch concept. In addition to this issue, recent parachute performance, both during the Commercial Crew Program (CCP) qualification-testing regimen and during the resupply contract, indicates potential problems with parachute designs. A potential redesign, which may be required, would drive a requirement for additional qualification and certification testing. The Boeing program also holds key risk items, some of which have emerged during the qualification test program; specifically: parachutes, launch abort engine hot fire testing, and pyrotechnic separation bolt initiator device qualification failures. The burn-down curve of certification products remains fairly steep for verification and validation (V&V), and much work is ahead. Schedule pressures and the desire to launch pose a potential for the uncrewed test flights to occur without all the critical content to fulfill the role of risk reduction for crewed flight.

Recommendation:

NASA should confirm and then clearly communicate the required content and configuration for the upcoming CCP test flights – Demo-1 and Orbital Flight Test (OFT) – specifically, those items that must be successfully demonstrated prior to the first crewed flights.

Rationale:

Despite a desire to launch the uncrewed test flights (Demo-1 and OFT) as soon as feasible, it is important to keep in mind that the primary purpose of those flights is to fly the vehicles in a configuration as close as possible to the first crewed flights in order to reduce risk. If content important to that purpose is not flown in a test that essentially duplicates the conditions of the first crewed flights, uncertainty is increased and safety could be compromised.

NASA Response:

NASA concurs with the ASAP Recommendation. NASA has been working over the last few years to define and communicate the requirements that buy down the risk to the uncrewed flight test while making progress toward crewed flight tests to the International Space Station with both commercial providers. These requirements take into consideration the specific providers’ flight test objectives, configurations, and operational concepts and have been established in program and contract documentation and reviewed and approved by the CCP boards and panels, which includes participation from the technical authorities and the Flight Operations Directorate. NASA senior leadership met and reviewed the providers’ progress toward meeting the requirements associated with the uncrewed test flights. NASA has agreed and plans to brief

ASAP at the next meeting. NASA will also continue to work with the commercial providers to obtain valuable data from the uncrewed test flights in order to minimize risk to crew for the upcoming crewed test flights: Demo-2 and Crew Flight Test (CFT).

As outlined in the CCP certification plans, the results from the series of reviews for each test flight will culminate in a Certificate of Flight Readiness (CoFR), asserting that the commercial provider has completed all work associated with meeting the applicable requirements, standards (including alternate standards), and hazard reports. NASA's CoFR is the approval of the commercial provider's evidence that:

- The physical as-built Crew Transportation System (CTS) was produced, assembled, integrated, and tested within the approved production and operational constraints.
- The specific requirements applicable to the flight test are enveloped within the CTS capabilities.
- The CTS personnel are trained and certified to support the test flight.
- All aspects of the CTS are ready for the test flight.

The CoFR process is expected to evolve from the initial uncrewed and crewed test flights to the Post Certification Missions (PCM). Upon completion of the uncrewed test flights, lessons learned will be captured to provide improvements into the CTS design and operation, as well as the overall CoFR process, for the crewed test flights and Post Certification Missions.

NASA Aerospace Safety Advisory Panel Recommendation
2018-04-02: Action to Ensure U.S. Access to the International Space Station Given
Commercial Crew Program Schedule Risk

Finding:

As outlined in the Finding for Recommendation 2018-04-01, serious technical difficulties and challenges pose considerable risk to both providers' schedules for crew transportation to the International Space Station (ISS) in CY 2019. Currently, there are no Soyuz seats available for U.S. crew after 2019.

Recommendation:

Due to the potential for delays in the schedule for the first Commercial Crew Program (CCP) flights with crew, senior NASA leadership should work with the Administration and the Congress to guarantee continuing access to ISS for U.S. crew members until such time that U.S. capability to deliver crew to ISS is established.

Rationale:

Without commercial crew flights in 2019, the U.S. will have no other means of access to the ISS unless other options are identified and approved, or existing constraints are waived. Although they may not be needed, having backup plans in place for such contingencies could be extremely important if the CCP flights are significantly delayed.

NASA Response:

NASA concurs. NASA is actively developing, assessing, and implementing options to protect for presence of crew on the ISS to support the United States On-orbit Segment (USOS). NASA continues to monitor launch schedules and is developing options to provide schedule margin by protecting USOS presence if CCP's current launch dates are delayed beyond the return of U.S. crews on Soyuz. NASA continues to work with Roscosmos on Soyuz mission extensions to maximize the onboard stays for the missions with USOS crew. Current plans have USOS presence on ISS through January 2020. In parallel, NASA is working with the U.S. Commercial Crew providers on options that allow for mission extension of the crewed flight tests to support USOS crews on ISS for longer periods of time. NASA continues to remain focused on working together with the providers to meet schedules for U.S. crewed missions to the ISS. In parallel, NASA will continue to look for backup options to maximize USOS presence in case of contingencies.