March 20, 2017

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

Dear Dr. Sanders:

This is NASA’s follow-up response to the Aerospace Safety Advisory Panel (ASAP) Recommendation 2015-05-02, Human Space Flight Mishap Response Procedures. Enclosed are the results of NASA’s assessment of strategy options in the event of a major malfunction or mishap in the Commercial Crew Program requiring a Presidential Commission. As you know, this recommendation resulted from the ASAP public teleconference meeting held on December 14, 2015.

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

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

Sincerely,

Robert M. Lightfoot, Jr.
Administrator (Acting)

Enclosure:
2015-05-02 Human Space Flight Mishap Response Procedures (NASA 2017 Follow-up Response)
Finding:
The Commercial Crew Program is now developing a formal plan for how it will respond in the event of a major malfunction or mishap. In addition to optimizing what can be learned by proper investigation of malfunctions or mishaps, this plan must comply with specific language in the NASA Authorization Act of 2005 concerning Human Space Flight Independent Investigations. NASA has tentatively identified the entities that would investigate various types of mishaps during the five mission phases. Under the current Authorization language, a Presidential Commission would be required in all cases involving loss of the flight crew as well as in all cases involving loss of the vehicle, even if the flight crew is not injured. Use of a Presidential Commission in the latter cases would appear excessive.

Recommendation:
The Authorization language should be reviewed with today’s systems in mind. Also, more details appear appropriate for the NASA implementation document. These details would include the level of vehicle damage requiring investigation, the temporal issues of when mission phases begin and end, and NASA’s oversight role in mishap investigations conducted by its providers, as well as when the need for outside oversight is required. The mishap response procedures should be thought through, documented, and in place well before any actual flights.

Rationale:
The requirement for a Presidential Commission was logical for International Space Station (ISS) or Space Shuttle missions, because they were reusable national assets. It would, however, appear excessive in some cases for commercially provided vehicles or other vehicles not planned for reuse. One example would be the sinking of a non-reusable vehicle after the flight crew had been safely recovered and were on their way home.

NASA Response:
NASA concurs with the recommendation and has reviewed the application of the Authorization language with today’s systems in mind. NASA’s Human Exploration and Operations Mission Directorate (HEOMD) worked with other NASA offices, including the Office of Safety and Mission Assurance (OSMA), the Office of General Counsel, and the Johnson Space Center in its review. The review team also included representatives from the Federal Aviation Administration (FAA) and National Transportation Safety Board (NTSB), given the evolving roles and responsibilities of FAA and NTSB in human spaceflight.
During the review, the team identified several concerns with respect to the Presidential Commission requirement:

- Inconsistent Mishap Investigation Processes – The requirement only applies to Government missions. Consequently, the Commercial Crew providers will have two different investigation regimes, depending on the type of flight being conducted. This undercuts stability and certainty in a newly developing market.

- Unclear Application – Current legislative language suggests a Presidential Commission for the following events:
  - Loss of Virgin Galactic vehicle (not Loss of Crew) while under NASA contract to fly a middeck experiment.
  - Commercial Crew partner spacecraft sinks after a water landing and the crew has egressed safely.
  - Boeing spacecraft structure is compromised with an off nominal landing and the vehicle is deemed not reusable.
  - An ISS partner crew member has a heart attack and dies in his/her country’s ISS module.

- Timeliness – Slow mishap initiation timeframes (days to weeks) can severely impact mishap investigation activities. Having one of two providers grounded during an investigation and subsequent corrective actions will place operational challenges on the ISS, and the longer the grounding, the more difficult the challenges.

- Expertise – The Commission will be comprised of people that may have investigative experience and experience relative to human spaceflight, but are not required to have such experience. Also, a newly formed Presidential Commission may largely have to re-learn knowledge from previous commissions, as well as any corporate knowledge of other spaceflight missions. The learning curve required would likely further extend the timeframe of the investigation.

- Undercuts NASA Goals – The requirement for a large-scale, time-consuming Presidential Commission is inconsistent with NASA’s goal of routine human space transportation. Flights of humans to space are becoming more frequent, versus being “national events” more appropriate for a Presidential Commission.

The review team identified several alternatives to a mandatory Presidential Commission and defined the pros and cons of each approach. This information was presented to senior management from NASA HEOMD and OSMA, which determined that a more optimal approach would be to make the establishment of a Presidential Commission discretionary. NTSB would lead investigations into launch and entry mission phase mishaps for Commercial Crew missions as well as Orion missions. The NTSB will be requested to get to an organizational root cause and implement privileged witness statements. Mishap investigations will be funded by NASA. NTSB-led mishap
investigations would not preclude NASA from conducting parallel investigations, as defined in NASA regulations.

For mission phases outside of launch and entry, (i.e., on-orbit operations) the existing Mishap Interagency Investigation Board (MIIB) would be used. The MIIB would be the lead for ISS mishaps unless the President appoints a Commission. This approach ensures immediate investigation authority while maintaining Presidential Commission authorities outlined in current language.

This investigative process would take advantage of an existing investigatory body to execute mishap investigations. In addition, this approach provides certainty and consistency, employs experienced accident investigators equipped to initiate an investigation at any time, and provides thorough and timely investigations to determine causes and prevent recurrence. And, importantly, it would provide an independent investigative body that reports to Congress.

NASA and the review team are in the process of developing legislative language to implement this approach for consideration by NASA, FAA, NTSB, and ultimately Congress.

NASA will incorporate any required changes and address additional details recommended by the ASAP as we update NASA Procedural Requirements (NPR) 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping.
March 2, 2017

Reply to Attn of: Office of Safety and Mission Assurance

SUBJECT: MEMORANDUM FOR THE RECORD

I non-concur with the portion of this response to the NASA Aerospace Safety Advisory Panel (ASAP) that states the National Transportation Safety Board (NTSB) will investigate NASA Human Space Flight (HSF) mishaps, in particular those NASA missions involving NASA Orion Spacecraft.

This brief statement is simply to document my position, as Chief, Safety and Mission Assurance (SMA), that NASA should not transfer the primary responsibility for investigating NASA HSF mishaps, during NASA missions, to another agency.

During the February 14, 2017 meeting with the Acting Administrator, Robert Lightfoot and Associate Administrator for Human Exploration and Operations Mission Directorate (HEOMD), Bill Gerstenmaier, I explained my thoughts on this issue. Preliminary meetings between the Office of Safety and Mission Assurance (OSMA) and HEOMD personnel had resulted in an impasse, which led to this decisional meeting with the Acting Administrator.

After both parties explained our positions, some modifications were made to the HEOMD proposal concerning NASA funding the NTSB investigation, directing the NTSB to find “root cause,” and using privileged witness statements during the investigation. After these changes, Robert Lightfoot made the decision to support HEOMD’s position.

I do accept and will support the Acting Administrator’s decision on this issue, which is reflected in the Executive Signature Package (purple package). The Agency’s governance process was followed. However, as stated previously, I want to document my continued belief that NASA should retain primary responsibility for investigating its own HSF mishaps.

Terrence Wilcutt
Chief, Safety and Mission Assurance