

NASA AEROSPACE SAFETY ADVISORY PANEL  
National Aeronautics and Space Administration  
Washington, DC 20546  
Dr. Patricia Sanders, Chair

August 31, 2020

Mr. James Bridenstine  
Administrator  
National Aeronautics and Space Administration  
Washington, DC 20546

Dear Mr. Bridenstine:

In accordance with your request, members of the Aerospace Safety Advisory Panel, led by Rear Admiral Christopher Murray USN (Ret), performed an assessment of the safety aspects related to NASA's operation and sustainability of its diverse and unique aircraft fleet. The report documenting the results of that assessment is attached.

Overall, we concluded that aviation safety is well managed by NASA. We do, however, provide some advice on areas where safety-related processes and the NASA organizational structure for aircraft safety could be improved. We also provide a recommendation for the safe long-term sustainment of the aircraft fleet.

We would be pleased to discuss our insights from this assessment with you in detail at your convenience.

Respectfully,



Dr. Patricia Sanders  
Chair, Aerospace Safety Advisory Panel

Enclosure

cc:  
OIIR/Ms. Hamilton

# **NASA Aircraft Fleet Safety and Sustainment Assessment Report**

## **Introduction**

This assessment was undertaken at the request of the Administrator to inform future decisions on the operation and sustainability of NASA's aircraft fleet (Terms of Reference attached). The Aviation Safety Advisory Panel (ASAP) primary team consisted of Dr. Don McErlean, Mr. David West, Dr. Richard Williams, and Rear Admiral Chris Murray, USN (Ret), but the final product was coordinated with the entire Panel. The assessment was conducted from May 14, 2020 to July 14, 2020 with multiple personnel interviewed (list attached), as well as Panel discussions.

## **ASAP observations and assessment**

Overall, aviation safety is well managed at NASA. There are very positive trends in mishap rates, injuries, and reporting. NASA's Safety Management System and associated procedures are well delineated in NASA Procedural Requirement (NPR) 7900, Aircraft Operations Management, to include remediation measures for aircrew who are not meeting standards. The Intercenter Aircraft Operations Panel (IAOP), which is led by the Aircraft Management Division (AMD), is well received and performs the following functions: conducts audits of operational aviation entities on a three-year basis, has the capability to conduct audits and build remediation plans in response to incidents that have occurred, and provides a forum for the aviation community to share lessons learned and best practices. NASA is manned, trained, and equipped to operate their own aircraft. Commercial Air Services (CAS) have been used to some extent, but the NASA Centers are not optimally manned to support such efforts. Increasing CAS efforts in the future needs to be balanced by the risk incurred with not being manned accordingly to provide oversight. Aviation Safety training exists at NASA, but completion of that training is not a requirement for personnel who work in aviation entities.

## **NASA organizational processes to be considered for improvement**

- The reporting of significant events up the chain of command has proven to be problematic. Significant events, whether they are related to aviation safety or not, are not being reported to the Administrator in a timely manner. There needs to be a process in place which bounds the reporting of what is significant, vice allowing personnel at all levels of the organization to make the decision on what is reported to the Administrator. Simply put, leadership at the highest levels needs to be prepared by their organization with the information they need to answer questions from the executive and legislative branches of government, along with the media.
- The ability to grant the "Concept of Privilege" to witnesses in mishap investigations would be of great utility to NASA. This is a "time honored" practice in the Department of Defense where key witnesses are granted the concept of privilege by the senior member of the accident board so they will be truthful and help the accident board get to the root cause of the mishap, without fear of legal repercussions. A separate process exists for legal culpability,

but it is not associated with the mishap investigation. NASA has presented this proposal to Congress, but its deliberation is being held up while Congress deals with the pandemic.

- NASA has a wide range of reactive metrics that the AMD uses to characterize aviation safety performance. With the help of the NASA Safety Center and their data analysis capability, more proactive and predictive metrics could be introduced to prevent mishaps, fatalities, incidents, and injuries.

### **NASA organizational structure for aircraft safety is not optimized**

- The AMD, the headquarters entity responsible for Aviation Safety, is located under the Mission Support Directorate and is not represented as it should be in the NASA organizational structure. Due to this situation, funding for Aviation Safety, along with funding for Aviation, is not considered to be part of “core” work, and funding must be fought for on a yearly basis; this includes critical safety of flight systems like the NASA Aircraft Management Information System (NAMIS). If Aviation activities support the core work that NASA does, they need to be funded in that manner. The AMD does not have a “direct line” to either the Administrator or the Associate Administrator, which is a widely accepted High Risk Safety best practice. The Office of Safety and Mission Assurance (OSMA) is receptive to having Aviation Safety in their organization and would support the Aircraft Management Director having direct communication authority to the Administrator or the Associate Administrator. This initiative could also tie the AMD (Aviation Safety) with the Technical Authority for Safety (OSMA).
- The NASA Safety Center (NSC) could have a greater role in creating safety training for the aviation community; helping to create more proactive and predictive safety metrics.
- Regionalization of the NASA Centers should support teaming, mentorship, and the best use of assets; a Regional Lead/Follow concept should make the smaller centers more whole and allow the bigger centers to positively influence the region through leadership/mentorship.

### **Long-term planning for aircraft recapitalization lacks structure and rigor**

- Aging aircraft is a concern on every flight line at NASA. The Center Directors or Science Mission Directors have been charged with leading efforts to update their aircraft when required, and a perfect example of this is Kennedy Space Center’s recent recapitalization effort for their helicopters. Dynamic Center Directors have healthy organizations because they proactively work the requirement through the organization and receive approval for procurement of a suitable follow-on aircraft. This also holds true for unique aircraft (e.g., Super Guppy and SOFIA) and the astronaut training aircraft, the T-38. The Astronaut Office presented a compelling argument for the requirement to train astronauts in a dynamic flight environment to be used as a training tool for decision-making in space, which is currently supported by T-38s. Since the U.S. Air Force still operates the T-38, the aircraft is being maintained satisfactorily. However, there will be a time when the Air Force divests itself of the T-38, and proper maintenance and logistic support will become unachievable. The Astronaut Office needs to start working on a plan now to replace it. A process currently exists for fortifying and validating aircraft requirements, the Aircraft Advisory Panel, but it deals mainly with decision-making related to acquiring and retiring aircraft within a short-

term timeframe. This panel does not look across the entire NASA portfolio with priorities based on the long-term vision of the organization. A validated requirements process does not exist where a centralized entity validates aviation requirements with the Administrator's strategic vision and meets the needs of the aviation stakeholders.

- Personnel required to support and administer CAS are not funded or specifically trained to support the effort. The work-around is to engage personnel who support generic aircraft be 'dual-hatted' and have to time-share their efforts when CAS is utilized.

### **ASAP's recommendations**

- **Move the AMD to the Safety and Mission Assurance Directorate and allow Aircraft Management to have a direct line to the Associate Administrator or the Administrator, when required.**
- **Aviation operations and safety need to be considered as core and funded accordingly.**
- **A formalized process to reporting significant events to the Administrator needs to be adopted.**
- **A group, chaired by the Associate Administrator, needs to be created that balances the organization's aircraft requirements against the Administrator's strategic plan. This group will also have responsibility for approving aircraft recapitalization plans.**
- **The AMD, NSC, and Aviation Office should collaborate on a yearly basis to review/expand the current reactive Aviation Safety metrics to include proactive and predictive ones.**
- **If NASA decides to expand the level of CAS operations, a manpower study needs to be conducted to determine the correct manpower levels that need to be in place to adequately support the initiative.**
- **Aviation Safety training should be required for all personnel who work in aviation entities.**
- **"Best practices" should be compiled and shared among the NASA Centers and Science Mission Directorates.**