

NASA AEROSPACE SAFETY ADVISORY PANEL

National Aeronautics and Space Administration

Washington, DC 20546

Lieutenant General Susan J. Helms, *Chair*

September 28, 2026

The Honorable Jared Isaacman
Acting Administrator
National Aeronautics and Space Administration
Washington, DC 20546

Dear Mr. Isaacman:

The Aerospace Safety Advisory Panel (ASAP) held its 2026 Third Quarterly Meeting in-person at NASA's Ames Research Center, August 24-27, 2026, with the public meeting on August 31, 2026. We greatly appreciate the participation and support that were received from NASA's leadership, the subject matter experts, and the support staff.

The Panel submits the enclosed Minutes resulting from the public meeting for your consideration.

Sincerely,

A handwritten signature in dark ink, appearing to read "Susan Helms", written in a cursive style.

Susan J. Helms, Lt Gen (Ret), USAF

Chair

Enclosure

AEROSPACE SAFETY ADVISORY PANEL

Public Meeting

August 31, 2026

Teleconference

2026 Third Quarterly Meeting Report

ASAP Panel Members

Lieutenant General Susan J. Helms, USAF (Ret), Chair

Dr. Amy Donahue

Dr. Richard Williams

Ms. Katharina McFarland

Mr. Paul Hill

Mr. Charlie Precourt

Mr. Kent Rominger

Dr. Mark N. Sirangelo

ASAP Staff and Support Personnel

Ms. Carol Hamilton, NASA ASAP Executive Director

Ms. Marcia Guignard, NASA ASAP Administrative Officer

Ms. Ashley Mae, Tom & Jerry, Inc, Technical Writer

[Appendix A – Teleconference Attendees](#)

Ms. Carol Hamilton, Executive Director of the Aerospace Safety Advisory Panel, opened the ASAP's Third Quarterly public meeting of 2026 at 1:00 Central Time (CT). She stated that callers would remain muted during the meeting and would have an opportunity to provide comments near the conclusion, but that questions would not be entertained. She further noted that the Federal Register notice had provided members of the public an opportunity to request a verbal presentation to the Panel or file a written statement on NASA safety, and that no such requests or written statements were received. Ms. Hamilton then turned the meeting over to Lieutenant General (LTG) Susan J. Helms, Chair of the ASAP.

LTG Helms summarized the Panel's August 24-26, 2026, visit to NASA's Ames Research Center. Ames Center Director Dr. Eugene Tu and his team provided updates on human spaceflight research and technologies, plans involving the Berkeley Space Center and Ames Research Park, modernization and infrastructure planning, Artemis II heat shield investigations and post-flight analysis, Artemis III Avcoat improvements, and electrical infrastructure modernization risks. The Panel also toured the Arc Jet facilities and multiple wind tunnels, which were of particular interest because of heat shield work supporting Artemis II and future Artemis missions.

LTG Helms reviewed NASA's workforce realignment initiative in the context of the Panel's 2021 recommendation that NASA develop a strategic vision for future space exploration, including management of risk in an environment involving commercial entities and international partners

and assessment of future workforce needs. She stated that the Administrator's directive to restore NASA's core competencies emphasizes mission-critical work and the workforce needed to perform it, strengthening the technical pipeline through human capital objectives, and improving technical autonomy by removing contractual restrictions. Intended outcomes include rebuilding internal talent, strengthening contractual provisions, and fostering technical resilience.

The workforce initiative has made substantial progress in approving positions, onboarding employees, and retaining contractor expertise. NASA is also addressing workforce funding, centers of excellence, procurement strategy, facility support, contractor oversight, and agency governance. Questions remain regarding how the workforce will be reskilled and redistributed as programs evolve. Although the speed and scope of the effort create challenges, the Panel did not identify immediate critical concerns. The Panel stated that continued attention is warranted regarding communication, attrition data, safety culture, contract risk, and risk management, and characterized the directive as a coherent and necessary vision for NASA's future workforce. ASAP will continue monitoring implementation and its effects on NASA's core competency in human spaceflight risk management.

Ms. Katharina McFarland discussed changes in NASA procurement and acquisition in relation to ASAP Recommendation 2025-05-01. She stated that the Ignition Initiative, mission directorate reorganization, emphasis on rebuilding core technical competencies, reconsideration of the balance between government and contractor capabilities, and use of commercial industry where it provides meaningful value indicate a shift toward a more focused and accountable institution. Greater mission-level accountability and clearer technical authority could reduce fragmentation in responsibility for outcomes and acquisition execution. The emerging Commercial Low-Earth Orbit Destinations (CLD) approach, including the draft request for proposals and continued industry engagement, also indicates a more deliberate consideration of which risks NASA assigns to industry, which it retains, and what evidence is required before relying on a commercially provided capability.

Ms. McFarland cautioned that it is too early to declare success. She emphasized the need for clear risk allocation, incentives aligned with desired outcomes, objective measures of progress, and sufficient evidence before critical decisions. She also stated that a stronger government role should not become government-directed development under another name and that commercial procurement should not assign contractors risks they cannot reasonably control. The objective should be appropriate risk ownership, aligned incentives, and accountability on both sides. LTG Helms noted that these observations align with the Administrator's guidance for acquisition and procurement and that effective implementation could be beneficial.

Mr. Charlie Precourt reported substantial progress within the Human Spaceflight Mission Directorate since the March Ignition Day. Priorities include accelerating Artemis, establishing a Moon Base, and selecting lunar terrain vehicles. The acquisition strategy focuses on increasing Artemis launch cadence and supporting creation of the lunar base. Actions include modifying SpaceX and Blue Origin Human Landing System contracts to incorporate the revised Artemis III mission and accelerate other options; conducting technical reviews for a new upper stage following cancellation of the Exploration Upper Stage; and insourcing a large workforce within Exploration Ground Systems to perform final assembly of Artemis missions, with transition expected by the end of September. NASA is also placing technical experts alongside Axiom Space personnel, providing NASA extravehicular activity facilities for spacesuit work, and adjusting requirements to reflect near-term mission needs. NASA increased day-to-day insight

through embedded personnel, and program leadership was meeting with Axiom six days per week, often in person. Artemis III and IV schedules remain aggressive. Leadership emphasized maintaining schedule while preserving safety, removing bureaucratic barriers, accelerating decisions, and resolving nonconformances more quickly without compromising safety requirements.

Mr. Precourt summarized the Orion heat shield char-loss investigation. The condition of the Artemis II heat shield after return was highly satisfying to teams that supported the investigation and safety assessment. Laser capability added to Ames Arc Jet facilities after the Orion Program identified the need before 2020 enabled more precise modeling of radiative reentry heating than convective Arc Jet heating alone. The investigation determined that char loss resulted from gases building to high pressure within the thermal protection system due to the combination of a skip-entry profile and insufficient permeability in the Avcoat blocks. This work supported use of the Artemis II heat shield as built with mission downrange capability limited to approximately 1,775 nautical miles. Approximately nine char-loss sites were observed after the mission, compared with more than 100 on Artemis I. NASA is reformulating Avcoat to increase permeability, with Arc Jet testing validating the change. The revised Artemis III mission is expected to use a low-Earth orbit reentry designed to emulate lunar conditions as much as possible and verify that the permeable material does not experience in-plane cracking or char loss. Artemis IV will still be needed to demonstrate performance under higher reentry conditions. The permeable Avcoat is expected to restore approximately 4,800 nautical miles of downrange capability.

Dr. Mark Sirangelo reported that Artemis III hardware work was progressing. The Artemis III core stage was in the Vehicle Assembly Building for final work before stacking, solid rocket booster assemblies were being stacked, the crew module and European Service Module had been joined and completed initial power-on activities, and RS-25 engines were being installed. For Artemis IV, NASA continued work with Blue Origin and SpaceX on landers. Booster segments were complete, aft skirts were in final production, core-stage engine components were at Kennedy Space Center, RS-25 engines were in storage, core-stage components were in manufacturing, and hydrogen-tank barrel assembly was on track. The Artemis IV European Service Module had arrived at Kennedy Space Center in December, and the crew module was in final assembly. Spacesuit work included mobility testing, exploration-atmosphere testing, Neutral Buoyancy Laboratory exercises, and rapid-turnaround testing. NASA leadership acknowledged that substantial work remained but reported continuing progress.

Dr. Sirangelo stated that Moon Base activities had been consolidated from four major programs into one and that most organizational work was complete. Phase 1 extends through 2028 and is intended to provide reliable lunar-surface access, collect ground-truth data, test infrastructure technologies, and establish initial command-and-control capabilities. NASA mapped technology gaps and determined that most needs involve adapting existing technologies for lunar missions. Examples include surviving the lunar night, preparing the surface, generating solar and nuclear power, understanding illumination conditions, and determining available power under those conditions. Following Ignition Day, NASA issued a broad request for information addressing identifiable technology gaps and received more than 400 responses related to power, surface pressurization, preparation, and mid-class landers.

Axiom spacesuit development involves rapid development testing and iterative improvement occurring concurrently. Integration remains complex because the suit, lunar terrain vehicle, and pressurized rover are being developed at the same time, although communication among the

programs has improved. An International Space Station (ISS) demonstration is planned as the first in-flight use of the Axiom suit. Representatives of the crew office have been assigned, allowing training and mission planning to proceed during system development. For reduced-gravity parabolic flight capability, the xEVA system is funding modification of a Boeing 737 obtained from the U.S. Air Force. NASA Armstrong is managing airworthiness, while Johnson Space Center Aircraft Operations Division is responsible for flight operations and EVA systems payload integration. One-sixth-gravity testing will validate lunar-walking mobility, recovery from falls, and other critical EVA tasks. Pilot training was underway, interior outfitting and systems work were expected to be completed in the fall, and the aircraft was planned to enter service in December 2026.

LTG Helms introduced the Panel's review of the newly integrated low-Earth orbit (LEO) program under Dana Weigel. Mr. Kent Rominger stated that the Panel remained impressed with management of the dynamic ISS program after more than 25 years on orbit. Since the previous quarterly meeting, SpaceX's 34th commercial resupply vehicle returned in June, the Soyuz Expedition 75 crew launched in July, and the Soyuz Expedition 74 crew returned in July. The JAXA H3 launch vehicle had completed two successful flights following its December 2025 failure to deliver a navigation satellite to the planned orbit and was cleared for an HTV cargo resupply mission to the ISS.

Four extravehicular activities had been completed since the previous quarterly meeting. Space Station Remote Manipulator System Joint 5 was removed and replaced during U.S. EVA 95 on June 30, and performance had been good. Preparation of the ISS Roll-Out Solar Array 3B power channel was completed during U.S. EVA 96 on August 6. On August 8, a U.S. EVA crew removed and secured a space-to-ground antenna; the same crew installed the spare antenna on August 25.

Mr. Rominger reported that SpaceX continued providing reliable and timely ISS crew and cargo services. Crew-12 launched aboard Dragon Freedom on February 13 and docked with the ISS 34 hours later. Crew-12 was expected to return following a short handover with Crew-13. Crew-13, which had been scheduled to launch no earlier than September 12, was delayed because of an oxidizer leak in Dragon's propulsion system. ASAP will continue to follow the leak. The Crew-13 complement was identified as NASA Commander Jessica Watkins, NASA Pilot Luke Delaney, Canadian Space Agency Mission Specialist Joshua Kutryk, and Roscosmos cosmonaut Sergey Teryatnikov.

Regarding Boeing Starliner, Mr. Rominger stated that NASA's reorganization of the Commercial Crew Program (CCP) within the LEO organization had produced a clear and focused path for Starliner-1 and crew-flight certification. Launch opportunities for the uncrewed Starliner-1 mission remained under review. NASA and Boeing continued addressing Crew Flight Test technical issues and final actions from the Program Investigation Team report. Two of three major Crew Flight Test propulsion issues had received interim closure for Starliner-1: the helium leak and crew-module thruster fail-off issues. Work remained on the service-module reaction control system thruster issue. NASA and Boeing also continued defining the certification and qualification plan, with investigations, testing, and complex test campaigns improving understanding of the anomalies and informing causal analysis and modeling.

The LEO Program had closed five Program Investigation Team actions since the June ASAP meeting and remained focused on Starliner-1 technical and cultural changes, although work

associated with a future crewed flight remained open. CCP operations and governance had changed under the LEO Program and mission management team. Provider mission management teams are now co-chaired with NASA. Mission support team training requirements were updated and used in simulations and tabletop scenarios with each commercial crew provider. Hazard-report and verification submission and approval processes were also improved. The Panel was pleased with the technical, governance, and cultural progress observed in the CCP.

Mr. Paul Hill addressed NASA's evolving CLD strategy. He identified several reasons to sustain the capability for humans to live and work in LEO, including life-sciences research supporting long-duration exploration, testing advanced systems in space, and developing the ability to maintain, repair, and upgrade operational space systems. The Panel viewed recent CLD strategy formulation and planning as positive, while continuing to assess related risks. With ISS operations currently planned to end in 2030, a gap in human LEO operations could erode expertise in flight operations, manufacturing, and the supply chain. Even if the ISS is extended to 2032 or later, the risk of a gap remains until a follow-on platform progresses from concept to orbit.

Mr. Hill also identified transportation as an unresolved requirement for any LEO destination, including ISS. With SpaceX planning to sunset Falcon 9 and Dragon and Boeing Starliner still facing design challenges, a LEO destination could lack a means to transport crew and materiel. Given the lead time required to develop and certify human-rated launch and entry vehicles, ASAP stated that it was not clear that current plans address the transportation risks associated with supporting a LEO destination in the not-too-distant future. ASAP will continue examining CLD and transportation plans, with emphasis on long-term risks to the expertise and supply chain required across NASA's exploration enterprise.

Dr. Richard Williams summarized briefings by David Francisco, NASA Technical Fellow for Health and Medical and Performance Standards, and David Bauman, Human Research Program (HRP) Manager. The first topic was venous thromboembolism. Altered venous blood-flow dynamics in microgravity can cause sluggish circulation in the jugular and cerebral venous systems and lead to thrombosis. Three crew members have been diagnosed and treated in flight for internal jugular and/or cerebral thrombosis. The Chief Health and Medical Officer convened a venous thromboembolism working group in April 2026 with experts in venous circulation and consultants from the Canadian and European space agencies. The group developed a proposed clinical practice guideline using weighted risk factors to identify high-risk crew members and trigger increased monitoring, prophylaxis with 2.5 milligrams of apixaban twice daily, or additional in-flight clinical assessment. The algorithm was expected to undergo Aerospace Medicine Board review at Johnson Space Center for clinical implementation.

The Panel also reviewed decompression sickness risk for EVA activities and the Health and Medical Technical Authority's updated NASA standard based on ground altitude-chamber studies. During ISS operations, the standard bounded the upper probability of Type I decompression sickness at 15 percent. The updated standard bounds the upper probability at 4 percent for remote exploration-class missions. Testing was being conducted at cabin atmospheres of 8.2 pounds per square inch absolute with 34 percent oxygen and 9.6 pounds per square inch absolute with 28.5 percent oxygen, with suit pressures of 4.3, 5.2, and 6.1 pounds per square inch absolute.

The third health topic was patent foramen ovale (PFO), an opening between the heart's atria that is present during embryonic life and does not close at birth. Approximately 27 percent of adults

have a PFO, and approximately 6 percent have a large PFO. The concern is that venous thromboembolism in the jugular or cerebral circulation, combined with nitrogen bubbles in venous blood at low pressure, could increase stroke risk in the presence of a PFO. An Office of the Chief Health and Medical Officer working group convened in July and August 2026 concluded that PFO alone is not a major risk factor for venous thromboembolism during spaceflight. No changes to astronaut selection criteria were recommended. The group concluded that a small PFO does not pose a significant risk, while a large PFO might be a concern. It did not recommend excluding crew members with large PFOs or closing large PFOs, instead emphasizing continued mitigation through prebreathe protocol design and data collection. NASA was considering options for screened Artemis crew members with a large PFO.

Dr. Williams also discussed NASA's Integrated Medical Model, developed by the HRP to use probabilistic risk assessment for medical risks in human space missions. The Office of the Chief Health and Medical Officer placed the model on a public website for use by external entities in reducing spaceflight-associated health risk; it previously had been used only within NASA and by partners. The HRP was accelerating Artemis risk-reduction work involving decompression sickness, landing simulations, planetary EVA capability, venous thromboembolism diagnostics and countermeasures, food and exercise systems, and workload-balance tools across commercially provided interface designs. Recent research products addressed lunar mission communication delays, lifetime bone-health management for long-duration crew members, and spaceflight and bed-rest evidence indicating no increased likelihood of more severe Spaceflight-Associated Neuro-ocular Syndrome among crew members who fly multiple long-duration missions.

During closing discussion, Panel members characterized NASA's recent progress in program formulation, strategy, contracts, organizational alignment, and leadership communication as substantial. Mr. Hill connected the progress to longstanding ASAP recommendations concerning coherent strategic vision and leadership governance, while noting that difficult technical and programmatic challenges remain. Mr. Precourt observed that NASA was addressing Program Investigation Team and ASAP findings concerning Starliner through reorganization and leadership communication and was treating the Crew Flight Test event with attention to the potential for a more severe outcome. LTG Helms stated that the Panel had advocated declaring the event a mishap or close call under NASA guidance and viewed the leadership response as the beginning of broader cultural and process change. She also noted that directives and town halls were being used to communicate objectives, strategy, planned changes, implementation, and workforce effects.

Ms. McFarland emphasized the Administrator's centralized communication and the alignment of multiple areas to a single mission thread in both thought and execution. Dr. Sirangelo highlighted the speed and mission alignment of the reorganization and expressed confidence in the leaders assigned to NASA's major areas. The Panel stated that it would continue observing the effectiveness of these changes.

Ms. Hamilton opened the meeting for public comment. No comments were received.

LTG Helms thanked participants and adjourned the ASAP Third Quarterly public meeting of 2026 at 1:47 p.m. CT.

Appendix A
Teleconference Attendees¹

Amir Deylami	<i>NASA Ames Research Center</i>
Ayle Herring	<i>NASA</i>
Ben Sorenson	<i>Starlab</i>
Beverly Perry	<i>NASA</i>
Bill Harwood	<i>CBS News</i>
Bradley Niese	<i>NASA</i>
Brian Harvey	<i>VAN Associates</i>
Christina Zaid	<i>NASA</i>
Diana Oglesby	<i>NASA</i>
Doug Morsches	<i>Starlab</i>
Dacia Bruns	<i>NASA</i>
Elizabeth Howell	<i>Payload Space</i>
Eric Berger	<i>ARS Technica</i>
Ernie Diaz	<i>Starlab Space</i>
Frances Heinlein	<i>Aerospace Corporation</i>
Hugh Jamison	<i>NASA</i>
Irene Klotz	<i>Aviation Week</i>
Irma Granell	<i>NASA HQ</i>
James Gannon	<i>NASA</i>
Jamie Krauk	<i>NASA</i>
Jeff Faust	<i>SpaceNews</i>
Joey	
John Tylko	<i>MIT</i>
Jose Ramos	<i>GAO</i>
Josh Finch	<i>NASA</i>
Josh Hein	<i>Vast</i>
Marcia Smith	<i>Spacepolicyonline.com</i>
Micah Maidenberg	<i>Wall Street Journal</i>
Mike Wall	<i>Space.com</i>
Miles Doran	<i>CBS News</i>
Paul Brinkmann	<i>AIAA</i>
Paul Frazier	<i>NASA</i>
Rachel Kraft	<i>NASA</i>
Richard Irving	<i>NASA</i>
Steven Ieronimo	<i>Starlab</i>
Tariq Malik	<i>Space.com</i>
Taylor Dacko	<i>NASA</i>

¹ The names and affiliations are as given by the attendees, and/or as recorded by the teleconference operator.