

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

February 23, 2021

Mr. Stephen Jurczyk  
Acting Administrator  
National Aeronautics and Space Administration  
Washington, DC 20546

Dear Mr. Jurczyk:

The Aerospace Safety Advisory Panel (ASAP) held its 2021 First Quarterly Meeting via teleconference February 16-18, 2021. We greatly appreciate the participation and support that were received from NASA 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 cursive script that reads "Patricia Sanders".

Patricia Sanders  
Chair

Enclosure

**AEROSPACE SAFETY ADVISORY PANEL**

Public Meeting  
February 18, 2021  
Conference Call

**2021 First Quarterly Meeting Report**

**Aerospace Safety Advisory Panel (ASAP)**

**Attendees:**

Dr. Patricia Sanders, Chair  
Lt Gen (Ret) Susan Helms  
Mr. Paul Sean Hill  
Dr. Sandra Magnus  
Dr. Amy Donahue  
Mr. William Bray  
Dr. George Nield  
Mr. David West  
Dr. Richard Williams

**Telecon Attendees:**

See Attachment 1

**ASAP Staff and Support Personnel**

**Attendees:**

Ms. Carol Hamilton, NASA ASAP Executive Director  
Ms. Lisa Hackley, NASA ASAP Administrative Officer  
Ms. Kerry Leeman, Technical Writer/Editor

**Opening Remarks**

Ms. Carol Hamilton, ASAP Executive Director, called the meeting to order at 11:30 a.m. EST and welcomed everyone to the ASAP's First Quarterly Meeting of 2021. She indicated that no comments or statements had been submitted prior to the meeting, but time would be allocated at the end for public comments.

Dr. Patricia Sanders, ASAP Chair, opened the meeting by noting that the Panel has been conducting fact-finding and insight discussions for their First Quarterly meeting of 2021. She introduced two new members of the Panel, Dr. Amy Donahue and Mr. William Bray, and indicated that they have already contributed in perceptive and meaningful ways.

This Quarterly has been complicated, Dr. Sanders stated, as many things are at this period in time, by the measures necessitated to safely operate in the COVID-19 environment. She noted that NASA continues to be a leader in addressing the impact of the pandemic and safely continues to perform its critical missions—albeit with both schedule and cost implications. Panel discussions were conducted virtually, of course, and some were distributed across a longer period of time. An added complication was the loss of power in the Houston area, which hindered some of the communications. Some discussions had to be deferred. Dr. Sanders noted

that Panel members would mention their thoughts on those discussion points later in the public meeting. Given that, the Panel still had a productive set of interchanges.

In the ASAP 2020 Annual Report, the Panel voiced their collective concern with the rapidly changing human space flight environment amid a growing commercial space industry, increasing global interest, and more complex missions. The Panel continues to believe that NASA's leadership will remain preeminent, but that the Agency's role is evolving with critical implications for how risk and safety will be managed. The report further provided advice to NASA with respect to the questions that NASA should ask itself to position the Agency and the nation strategically and thoughtfully for successful and safe human exploration of space. Dr. Sanders then introduced Dr. Sandra Magnus to continue discussion of that advice and the Panel's initial engagement with the Agency on this topic.

### **Evolution and Workforce**

In the ASAP 2020 Annual Report, the Panel described the evolutionary path NASA has traveled from the Apollo programs—where the design and operation of missions were performed fully in-house—to today's complex lunar campaign encompassing a broad mixture of acquisition strategies, partnerships, and operational paradigms. Dr. Magnus stated that the change in how NASA has done business happened organically, but the pace of that change has accelerated noticeably in the last two decades. Consequently, the Panel highlighted in the report the urgent need for NASA to begin to manage its ongoing evolution strategically to manage risk appropriately. As NASA continues to evolve, and it is clear to the Panel that this will be the case, the Agency must clearly define its central role, authorities, and responsibilities. The approach NASA chooses to take should inform not only the skill sets and workforce of the future, but also the acquisition strategy and operational posture that the Agency should establish. To help identify and define a strategy, the Panel posed the following questions in the ASAP 2020 Annual Report:

- What role does NASA intend to perform going forward and why?
- How will the Agency interact with both commercial and international partners?
- How will the Agency address shared risks across their partnerships?
- What management practices will be employed to manage risk?
- How will the expectations be communicated to their partners and to their workforce?
- How will effective Systems Engineering and Integration (SE&I) be accomplished?
- What should the NASA workforce of the future look like, and how will it be achieved?

The manner in which NASA addresses these questions, Dr. Magnus noted, has a direct impact on how safety, mission assurance, and risk is managed and mitigated. In particular, the Panel is interested in the ongoing evolution of NASA, including its missions, management roles, and acquisition strategies, and the effect that this evolution is likely having and will continue to have on NASA's workforce and infrastructure. In describing its workforce planning efforts, NASA has stated that the size and composition of the NASA workforce should be shaped by strategic guidance, rather than by independent hiring plans developed at the Center and organizational level. However, based on the information the Panel has received to date, it appears that key

decisions related to workforce needs are being made tactically by individual Centers, rather than in collaboration with Headquarters, or in response to top-down guidance.

The NASA Human Capital Office has also developed a number of principles intended to guide its workforce management efforts, such as, “NASA’s total workforce is agile and mission-driven, not supply-driven in all workforce segments.” Although that may be the ultimate goal, it does not appear to be an accurate assessment of the current situation, and the Panel is not aware of a coordinated strategy to achieve such a state of affairs.

Similarly, Dr. Magnus indicated, depending on how NASA answers these questions regarding its role and workforce, they have an opportunity to align their infrastructure to their long-term strategy. That is, by taking a top-down approach to align all Centers to Agency priorities, they should identify and close facilities that are not critical to Agency programs. This will contribute directly to reducing fixed costs and freeing resources for NASA’s programs, stated Dr. Magnus.

She articulated the Panel’s recommendation:

**Recommendation:** NASA should develop a top-level plan for the size and composition of its workforce and infrastructure that takes into account its aspirations for future missions, innovation and technology development, and potential partnerships with industry, academia, and the international community. The plan should be developed in collaboration with the Centers, and should clearly articulate roles and responsibilities for maintaining the necessary expertise and experience. The plan should also be communicated with key stakeholders and updated on a regular basis.

**Rationale:** The existence of a skilled and experienced workforce has always been critical for NASA to safely accomplish its mission. Because of rapid changes in technology and an increased reliance on commercial and international partners, it is more important than ever for NASA to think strategically about its future workforce and infrastructure needs. Such an effort will be challenging, and it will certainly take time to complete, but because it will likely have significant and immediate benefits, it should be initiated as soon as possible.

During the course of the year, Dr. Magnus indicated, the Panel will continue to promote the importance of a comprehensive and coherent strategic approach to the ongoing evolution of NASA’s role and its impact on risk management, safety, and mission assurance.

The Panel has consistently addressed the related topic of integration in recent quarterly meetings and in the ASAP 2020 Annual Report. Integration was once again a focal area of the ASAP 2021 First Quarterly Meeting. Dr. Sanders stated that in the traditional NASA structure, a program consisted of a number of development projects under a management construct that integrated those projects in a configuration to perform a well-defined, and usually repeatable mission. As currently synthesized, Dr. Sanders noted, Artemis is not being executed under a single traditional NASA program umbrella. The Artemis mission campaigns will involve multiple launches and multiple flight elements combined in multiple different configurations—operating across multiple gravitational bodies—all of which need to work together for safety and mission success. It is a comprehensive eco-system of a diverse set of systems, developed, acquired, and

operated in a myriad of ways, including commercial and international partners participating in a new paradigm. But the management construct and the integration challenge are substantially more complex, Dr. Sanders stated, and responsibilities are unclear because an overall program does not exist.

She then summarized the Panel's perspective of the Exploration Systems Development (ESD) and Advanced Exploration Systems (AES) organizations. The ESD organization is developing and testing, in Artemis I and II, a crew transportation system as a necessary component of the lunar campaign missions. The AES organization is coordinating the development of all the necessary additional components without the mantle of "a program." Dr. Sanders noted that a new management construct is being employed but, nevertheless, the fundamental program management principles—especially those of systems integration and risk management—must be recognized as critical to successful mission execution. NASA is challenged in the application of those management principles, the lexicon used to describe the management construct, and the communication across the workforce and among participating agents needed for shared understanding of responsibility and accountability. Dr. Sanders then asked Lt Gen Susan Helms to discuss the observations of the Panel on this critical integration topic and emerging formulation.

### **Integration**

In the ASAP 2020 Annual Report, the Panel mentioned three top-level concerns regarding SE&I for the Artemis campaign:

- For the overall campaign, how the leadership and organization for the overall Artemis mission set is arranged to adequately perform the necessary functions for SE&I.
- How adequate SE&I direction flows across the Artemis enterprise.
- How coherent integrated risk management decision processes work to manage risk across multi-program development.

During this quarterly meeting, the Panel was able to further explore insights into NASA's ongoing progress across all three of these concerns. Lt Gen Helms noted that regarding the first concern above, NASA is establishing top-level SE&I functions for the two major Artemis organizations: the ESD office, run by Tom Whitmeyer, and the AES office, run by Mark Kirasich. Both individuals have within their authority the ability to direct multiple programs that make up the components of the multi-mission Artemis campaign. As the head of ESD, Mr. Whitmeyer is performing program integration management authorities and responsibilities for the Space Launch System (SLS), Orion, and Exploration Ground Systems (EGS) programs. As the head of AES, Mr. Kirasich is performing program integration management authorities and responsibilities for the Human Landing System (HLS), Gateway, and lunar spacesuit programs. Clearly in the course of the Artemis campaign development, Lt Gen Helms stated, both managers must lead SE&I activities across the multiple programs within their respective authorities, and also across the two major efforts of ESD and AES. The Panel was encouraged to see progress on how these organizations plan to address the complexities of integrated risks.

The ESD office has a relatively mature SE&I function. However, at this time, the ESD integration functionality is focused on the integrated risks only between the SLS, Orion, and EGS programs.

The ESD programs together make up a complement that could be characterized as a crew transportation system to and from the Moon, stated Lt Gen Helms. How this overall transportation system integrates both technically and operationally with the AES lunar missions and infrastructure is an area of continuing interest for the ASAP.

Although considerably less mature than the ESD office, the AES office has made some very impressive strides toward setting up an SE&I functionality across the programs within the AES office. Lt Gen Helms recognized the positive contributions of Erika Alvarez, Acting SE&I Manager for Artemis AES.

In essence, both the ESD and AES offices are establishing traditional NASA integration risk management functions above the program level within their respective offices, under the respective authorities of the ESD and AES managers, Lt Gen Helms stated. Both managers are now discussing how their respective SE&I functions will come together to manage integrated risks across the entire Artemis enterprise. Lt Gen Helms likened the similarities between the ESD and AES organizations to previous NASA programs: the Space Shuttle Program, a crew transportation vehicle—and the International Space Station program, constituting on-orbit infrastructure and operations. The Space Shuttle and ISS programs came together to manage the overall risks associated with their melded missions and integrated technical baselines.

In the ASAP 2020 Annual Report, the Panel noted that another organization existed within the Human Explorations and Operations (HEO) Directorate that was designated as an SE&I functional manager above the ESD and AES offices. The Panel had many questions about the role of this office in the execution of risk management, given that it exists outside of apparent programmatic and operational authorities. Lt Gen Helms said that during the first quarterly meeting, the Panel was able to gain better insight into what this office is designed to accomplish. In essence, this office, headed by Marshall Smith and reporting directly to the HEO leadership, is organized to perform long-term strategic planning for human spaceflight, exploration architecture analysis, exploration mission analysis, policy development, and the definition of top-level requirements intended to flow down to the Artemis campaign. The Panel now has a much better understanding of the purpose of this functional office, and appreciates that this work is incredibly important to the development and maturation of NASA's strategic approach to exploration.

The Panel's second concern, as indicated in the ASAP 2020 Annual Report, relates to how adequate SE&I direction flows across the Artemis enterprise. In essence, within the ESD enterprise, appropriate guidance documents exist, such as systems engineering management plans (SEMPs), integration plans, and other SE&I products appropriate for the integration of the three end programs: SLS, Orion, and EGS. Across the AES program enterprise, the planning is there, Lt Gen Helms indicated, but the comparable integrated AES documents such as SEMPs, integration plans, test and evaluation plans, and so on, are in work but not yet produced. Without the appropriate SE&I guidance being in place for AES-level integration, it is difficult to then produce higher-level integration guidance that brings together the integration of the crew transportation system and the lunar land-based and orbit-based infrastructure.

Even though the guidance for the overall enterprise and the AES level is still a work in progress, programs within AES are advancing ahead of that guidance. This is a "watch item" for the Panel,

Lt Gen Helms stated. The Panel will have a continuing interest in the quality of SE&I direction across the enterprise to ensure that the guidance is transparent, comprehensive, strategic, appropriately oriented to drive integrated outcomes, and not unduly complex.

The Panel's third concern from the ASAP 2020 Annual Report is oriented on the risk management decision-making at all levels of the Artemis enterprise. The Panel was able to glean the initial concepts of a governance model designed for this purpose. The governance model appeared to be comprehensive, familiar to NASA personnel, and appropriate for the challenge of integrated risk management across established programs, indicated Lt Gen Helms. She added that the model is already in execution at lower technical levels within programs and across projects, with apparent success, particularly as it pertains to the ESD programs. The model is also fully understood by NASA personnel up to the program level (that is, SLS, EGS, Orion). However, the Panel would like to better understand how the governance over integrated risk management is executed above the level of a specific program. Given that many of the programs are in different phases of development, it is not yet well understood by the Panel how multiple AES programs, with staggered developments and different acquisition strategies, are risk-managed in an integrated sense within this governance model.

Dr. Sanders said that aside from the critical discussions the Panel has had with both the ESD and AES managers and their personnel with respect to integration and risk management, there are other topics of interest with both endeavors that will be reported on in this meeting. She introduced Mr. Paul Hill to summarize items with respect to ESD.

### **Exploration Systems Development**

During the Panel's discussions earlier in the week, Mr. Whitmeyer had reviewed the status of ESD's progress toward Artemis-I, -II, -III, and -IV, all of which are currently scheduled to fly from November of this year through 2025. Although the core stage hot fire was terminated early, all four engines fired, and the data reviewed so far indicates largely nominal performance until an engine controller initiated a controlled shutdown, stated Mr. Hill. NASA and Boeing are working toward another full duration hot fire after taking corrective actions for the hydraulic system parameters that led to the shutdown. After another hot fire, assuming it is successful, the core stage will be shipped to the Kennedy Space Center (KSC) where it will join the Artemis-I boosters that are being stacked and Orion that is being fueled in preparation for launch. Mr. Hill explained that Orion and SLS production and operations team training is well underway for Artemis-II. Orion and SLS manufacturing efforts are underway for Artemis-III and for the Exploration Upper Stage (EUS), critical design review is complete, and the first five engines have been built.

The Panel also heard updates on two specific ESD items. The first item regarded an Orion power and data unit whose controller card failed during power-up in November 2020. Lockheed Martin and NASA have evaluated system functionality and the impacts of a series of "next failures," and determined it is lower risk to fly as-is, giving up no functionality, than to disassemble the spacecraft to replace the failed component. Mr. Hill reflected that this was a great story and solid rationale. The Panel looks forward to the results of the program's assessment of potential Orion modifications that could facilitate better component-level avionics maintenance access on future spacecraft.

The Panel also heard a description of European Service Module propulsion system modifications that are in work to improve fault tolerance. Seven of these modifications are in place for Artemis-I and two more are on track for Artemis-II.

Mr. Hill expressed that these are exciting times for ESD programs: ESD is off and running on flight system and operations preparations for the first four Artemis missions, including Orion, SLS, the EUS, and extensive modifications at KSC to support and launch them.

Dr. Sanders stated that the Panel is pleased NASA has decided to proceed with a second attempt at a full duration burn of the core stage in order to obtain the vital data from that last critical test sequence of the Green Run. Following up on that topic, Dr. Sanders invited Dr. Magnus to provide an update on the Panel's engagement with AES.

### **Advanced Exploration Systems**

AES is focused on lunar exploration and sustained operations beyond Artemis-II. Consequently, NASA is engaged in building or acquiring systems that will enable human activities both in lunar orbit and on the surface. Dr. Magnus emphasized that how the Agency decides to manage the challenge of defining, acquiring, and operating multiple complex systems covering a diversity of missions across a broad time span is critical to understanding and determining the risk posture of the enterprise.

She went on to state that maintaining an appropriate balance between schedule, budget, and technical complexity allows the optimal control of risk, mission success, and crew safety. NASA has to carefully weigh the pros and cons of acquisition strategies, including the level of desired competition, against available resources and subsequent impact on mission assurance and safety at any point in the Artemis campaign. Clarity of budget, Dr. Magnus stated, regardless of acquisition strategy, is key to ensuring that critical system design, testing, and verification activities are made with long-term operational objectives in mind.

The Base Period for NASA's HLS was originally planned to conclude in February 2021, followed by the selection of up to two teams for lander development and a crewed demonstration mission. However, NASA recently announced a no-cost extension to the Base Period until April 30, 2021. This should allow NASA to gain better clarity on available resources, national policy, and schedule, and, according to Dr. Magnus, it indicates that the Agency is taking risk-management principles into account. As the Artemis campaign strategy evolves and matures, NASA should continue to view decisions through a risk management lens.

Dr. Sanders moved on to another area of interest for the Panel. She stated that as exciting and challenging as the lunar campaigns are for NASA, it is clearly not a time to divert attention from the Commercial Crew Program (CCP). Since the Panel's last quarterly meeting, the CCP has had some notable activity, which Panel members reviewed with NASA. The recent successes do not mean that attention can be diverted from what remains an endeavor with inherent risks. Dr. Sanders next introduced Mr. David West to summarize the Panel's understanding of the state of affairs with that program.

### **Commercial Crew Program**

This week, the Panel discussed notable progress being made by both CCP providers, SpaceX and Boeing, over the last quarter. Mr. West indicated that he would cover the SpaceX progress first, and then Boeing's.

On November 15, 2020, SpaceX launched the Crew-1 mission, carrying the first international crew of four on an American commercial spacecraft. This also marked the first time that a human orbital spaceflight launch was licensed by the Federal Aviation Administration. The Crew-1 spacecraft is still docked to the International Space Station (ISS) and is scheduled to return sometime in late April or early May of this year. On February 7, 2021 this spacecraft broke a nearly 50-year-old record by surpassing Skylab 4's mission duration of 84 days and becoming the longest single mission by an American-crewed orbital spacecraft.

The SpaceX Crew-1 Dragon spacecraft was docked to the ISS at the same time as the Cargo Dragon spacecraft used for Commercial Resupply Service (CRS), Mission 21. Mr. West said that because of the similarity between the Crew Dragon and Cargo Dragon capsules, several improvements and corrective actions made after the earlier Demo-2 mission were able to be demonstrated with the CRS-21 mission.

For the upcoming Crew-2 mission, SpaceX currently plans to re-use the Crew Dragon capsule from Demo-2 and the Falcon 9 booster from Crew-1. The Panel will be closely monitoring the work necessary by NASA and SpaceX for human-rating certification of re-used vehicles—both the crew capsule and the booster.

Boeing continues to make preparations for a re-flight of its uncrewed operational flight test, or OFT. For this re-flight, designated OFT-2, production has been completed of both the Atlas V Launch Vehicle booster and the Centaur upper stage. Integrated assembly and test of the mated command module and service module will be completed soon. It was recently reported that a power surge occurred during final checkouts. The Panel will be monitoring subsequent information that comes from evaluation of causes, effects, and all associated corrective actions associated with this power surge, as well as implications to system processes.

OFT-2 will prove the effectiveness of specific corrective actions taken after the initial orbital flight test, OFT-1, a little over a year ago, which experienced some in-flight anomalies. The NASA/Boeing Independent Review Team, after a thorough investigation into the cause of the anomalies, made several recommendations, and the Panel has been pleased to see the efforts that have been undertaken to implement the actions. However, the Panel is still waiting for NASA to take action on a safety culture audit that had recently been planned and was to have been conducted by now. NASA and Boeing continue to address issues as they process the vehicle and prepare for both the uncrewed OFT-2 and the future crewed flight test (CFT). The Panel believes it is imperative that the safety culture audit be performed to ensure that any lingering systemic issues related to risk management, quality, and safety are identified and corrected, before CFT takes place.

Dr. Sanders indicated that the Panel was unable to engage on ISS and Commercial Low-Earth Orbit (LEO) activities during the 2021 First Quarterly Meeting due to weather-related power outages and communications difficulties. These activities have some interrelated areas of safety interest to the Panel. Dr. Sanders stated that the Panel will engage with ISS and Commercial LEO

personnel as soon as those discussions can be rescheduled. She called upon Dr. George Nield to discuss the Panel's areas of particular interest with those activities and questions the ASAP intends to pursue.

### **International Space Station and Commercial Low-Earth Orbit**

Dr. Nield reiterated that because of the power outages that took place in Houston the week of the quarterly meeting, the Panel was not able to talk with NASA about the status of the ISS program and the Commercial LEO development program. He indicated that the Panel will be scheduling follow-up discussions on those topics as soon as possible. However, there are a number of questions and issues that the Panel would like to better understand. Dr. Nield indicated that he would highlight those questions and issues.

For example, for the ISS, the Panel believes it is very important that there be a U.S. astronaut onboard at all times. That objective could be difficult to meet in the event of an unplanned return of some of the crew, such as for a medical emergency, or if there is a delay in launching a replacement crew. One way to mitigate this challenge, Dr. Nield indicated, would be by always launching an American astronaut on every Soyuz flight, and always launching a Russian cosmonaut on every U.S. commercial crew flight. The Panel understands that NASA and Roscosmos are in the process of negotiating an agreement on this subject, but it has apparently not yet been approved. The Panel is also very interested in seeing more details on the probable cause, on-going risk, and risk mitigations in response to the scratch or crack that has been discovered in the service module, and that has resulted in small but continuing decreases in cabin pressure.

With respect to the Commercial LEO program, NASA has issued a policy that allows private citizens to visit the ISS. The Space Station is obviously a national asset and a working laboratory where complex operations are executed daily. NASA has begun discussions with industry, and has reached initial agreement with a private company that is planning to deliver four individuals to the ISS—a flight that is tentatively scheduled for a year from now. There is a precedent for having private citizens onboard the Space Station, as the Russian Space Agency has been hosting periodic visitors for over a decade. However, Dr. Nield emphasized, the complexity of operations on the ISS, combined with the number of proposed visitors, means that NASA must ensure that expectations of the visitors, the flight control teams, and the ISS international partners; the rules of conduct; and the chain of command are clearly established and agreed to before the flight. It will also be important that the visitors have successfully completed a NASA-approved training program. Furthermore, the Panel believes that the ongoing discussions and the final agreements should have the full involvement of the operational community, who have particular insight into any potential issues that should be discussed beforehand. Consequently, the Panel will be engaging in further discussions with the ISS program and the operational community to explore and understand how the Agency will be executing private astronaut missions in a safe manner.

Dr. Sanders asked that the lines be opened for a few minutes for public comments. No comments were received. She then concluded the meeting by summarizing the topics discussed. She stated that this is an exciting and challenging time for human space flight endeavors; it is a time of great promise and opportunity, as well as a need for continued vigilance. It is also a time for NASA to take advantage of this moment to examine its future—to thoughtfully and

strategically assess how to maximize its success in exploration, capitalizing on its rich history and wealth of talent and experience, while embracing a new and evolving environment and improving the Agency's approaches to managing development and operations. Dr. Sanders stated that the Panel looks forward to working with the Agency toward successful execution.

Ms. Hamilton adjourned the meeting at 12:15 p.m. EST.

**ATTACHMENT 1**

**Note: The names and affiliations are as given by the attendees, and/or as recorded by the telecon operator.**

**PARTICIPANTS**

Alan Deluna	ATDL Inc.
Andy Hoskins	Aerojet Rocketdyne
Ashlee Wilkins	House Science, Space, and Technology Committee
Cat Hofacker	Aero Space America
Cheryl Warner	NASA
Chris Davenport	The Washington Post
Damien Mills	Boeing
Dan Hartman	NASA
Danny Lentz	NASA
David Goldstein	Space X
David Milman	
Debra Percelle	Boeing
Dee Russell	Boeing
Devin Bryant	NASA
Diane Rausch	NASA HQ
Dillon MacInnis	Space X
Frank Groen	OSMA
Gene Mikulka	Talking Space
James Lochner	UFRA
Jeannette Plante	NASA HQ
Jeff Foust	Space News
Joey Roulette	The Verge
John Berkstra	
Josh Barrett	Boeing
Josh Finch	NASA
Julie Arnold	ULA
Karen Mahoney	NASA HQ
Kate Maliga	Aerojet Rocketdyne
Kenna Pell	NASA
Kevin Ford	JSC
Kyle Herring	NASA
Laura Forczyk	Astralytical
Lauren Woodbridge	NASA HEO
Laurie Glasson	Boeing
Lewis Groswald	Lockheed Martin
Linda Karanin	Aerojet Rocketdyne
Marcia Smith	Space Policy Online.com
Mark Carreau	Aviation Week & Space Technology

Martin Federick	Northrop Grumman
Mary Kerwin	NASA
MaryBeth Davis	Boeing
Meghan Bartels	Space.com
Michael Sarafin	NASA
Michael Sheetz	CNBC
Michael Smith	NASA
Michelle	NASA
Mike Curie	NASA Commercial Crew Program
Pam Whitney	House Science, Space, and Technology Committee
Rebecca Regan	Boeing
Theodore Kronmiller	Law Office
Zudayyah Taylor-Dunn	NASA