U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of the Administrator

May 28, 2024

INFORMATION MEMORANDUM TO THE SECRETARY

From: Michael G. Whitaker
Administrator
X73111

Prepared by: Kelvin B. Coleman
Associate Administrator for Office of Commercial Space Transportation
X77793

Subject: Commercial Space Transportation Advisory Committee Meeting Minutes - April 23, 2024

SUMMARY

The Commercial Space Transportation Advisory Committee (COMSTAC) meeting took place at the Federal Aviation Administration (FAA) Headquarters on April 23, 2024, 9:00 a.m. – 4:30 p.m. Eastern Time. Several COMSTAC members also attended virtually. The meeting began with remarks from FAA's Associate Administrator for Commercial Space Transportation, Kelvin Coleman. The bulk of the meeting was devoted to the briefing and discussion of observations, findings, and recommendations from six tasks that were assigned to COMSTAC by FAA. These tasks were related to space nuclear systems, solutions to part 450 regulations, human spaceflight occupant safety recommended practices, safety framework consensus standards, a commercial space transportation research alliance, and spaceport infrastructure funding. The meeting concluded with FAA's response to COMSTAC's recommendations from the November 2023 meeting, advisory circular and regulatory clarifications, and a briefing on the future of licensing.

In accordance with the Federal Advisory Committee Act (FACA) and its implementing regulations, agencies must keep minutes of each advisory committee meeting and must make the documents publicly available. The meeting minutes will be submitted to the FACA Database, and links to the database will be provided on FAA's website for ease of access.

BACKGROUND

COMSTAC is a discretionary Federal advisory committee initially established in 1984 and governed by FACA. Since its inception, the industry-led COMSTAC has provided information, advice, and recommendations to the U.S. Department of Transportation through FAA regarding

technology, business, and policy issues relevant to oversight of the U.S. commercial space transportation sector. The economic, technical, and institutional expertise provided by COMSTAC has been invaluable to the Department and FAA's work to ensure safety during U.S. commercial launch and reentry operations and support U.S. industry competitiveness. As the commercial space transportation industry continues to mature rapidly and the complexity of technology and operations increases, FAA depends on COMSTAC to help the Department and FAA address very important issues, including launch and reentry public safety standards.

NEXT STEPS

There is no follow-up action required.

The Secretary

REVIEWED: _____

DATE: _____

COMMENTS:

Preferred follow-up to comments / questions:

☐ Policy office hours
☐ Verbally in daily check-out
☐ In writing
☐ Standalone briefing meeting

Attachment:

- Meeting Minutes: COMSTAC April 23, 2024

Commercial Space Transportation Advisory Committee (COMSTAC) Meeting Minutes for Tuesday, April 23, 2024

Time and Location

The meeting was held on April 23, 2024, at 9:00 a.m. – 4:30 p.m. Eastern Time. It was held in-person at the Federal Aviation Administration (FAA) Headquarters, with virtual participants joining via Zoom for Government. The meeting was also streamed live on the FAA YouTube channel for the public.

Participants

FAA

Ms. Takisha Brown, Space R&D and Innovation Branch Manager, Commercial Space Transportation (AST)
Mr. Kelvin Coleman, Associate Administrator, AST
Mr. Daniel Murray, Executive Director, Office of Operational Safety, AST
Dr. Minh Nguyen, Executive Director, Office of Strategic Management, AST
Mr. Michael O'Donnell, Deputy Associate Administrator, AST
Mr. Randy Repcheck, Deputy Director, Office of Strategic Management, AST
Mr. Brian Verna, Designated Federal Officer (DFO)

Committee Members

Ms. Karina Drees, COMSTAC Chair, President, Commercial Spaceflight Federation
Mr. Mike French, COMSTAC Vice-Chair, Vice President of Space Systems, Aerospace Industries Association
Mr. Mat Dunn, Senior Director of Global Government Affairs, Space Exploration Technologies
Mr. John Elbon, Chief Operating Officer, United Launch Alliance
Dr. Moriba Jah, Associate Professor, Aerospace Engineering and Engineering Mechanics, University of Texas at Austin
Mr. Dale Ketcham, Vice President of Government and External Relations, Space Florida
Ms. Kate Kronmiller, Vice President of Government Relations, Jacobs
Major General Ted Mercer, USAF (Ret), CEO and Executive Director, Virginia Commercial Space Flight Authority
Ms. Megan Mitchell, Vice President of Government Relations, Blue Origin
Mr. Mike Moses, President of Space Missions and Safety, Virgin Galactic
Dr. George Nield, President, Commercial Space Technologies
Dr. Michelle Parker, Vice President and Chief Engineer for Space and Launch Engineering, Boeing
Ms. Melanie Preisser, Vice President of National Systems, York Space Systems
Ms. Caryn Schenewerk, Adjunct Professor, Georgetown University Law Center
Ms. Amanda Simpson, Founder and Chief Executive Officer, Third Segment LLC
Mr. Jay Skylus, Chief Executive Officer and Chief Engineer of the Aether Transport System, Aevum
Ms. Sita Sonty, Chief Executive Officer, Space Tango
Ms. Melanie Stricklan, Executive Director, Space Workforce 2030
Ms. Jolie Zoller, Head of Global Regulatory Affairs, Project Kuiper, Amazon
Ms. Ann Zulkosky, Vice President of Commercial Civil Space, Lockheed Martin

Welcome and Introductory Remarks

The Designate Federal Officer (DFO), Mr. Brian Verna, called the meeting to order at 9 a.m. Eastern Time and welcomed participants to the 78th COMSTAC meeting. After calling attention to the Federal Register Notice that announced the meeting, the DFO then introduced COMSTAC's Chair, Ms. Karina Drees. Ms. Drees noted that it was nice to be able to hold the COMSTAC meeting in person and expressed hope the committee would be able to meet one more time before its term expires in the fall. The Chair then turned to Mr. Mike French, COMSTAC's Vice-chair. Mr. French also noted the benefits of being able to discuss issues openly in person. The Chair then introduced Mr. Kelvin Coleman, the Associate Administrator for FAA's Office of Commercial Space Transportation (AST).

Mr. Coleman opened by welcoming committee members to the meeting, noting that COMSTAC, first created in 1984, was celebrating its 40th anniversary. He then briefed the committee on the rising demand for AST's products and services, noting that AST is increasing staff numbers and improving its processes to keep up with that demand. AST licensed 124 operations in 2023, a 48 percent increase over 2022. The launch cadence is continuing to increase pace. In March alone, AST licensed 17 operations, exceeding the previous record of 13 set in January of this year. AST is projected to license 150 total operations in 2024. Mr. Coleman also noted that AST is working with more than 60 companies in pre-application to ensure they have all of the tools available to them as they begin the license application process. With a history of more than 700 FAA-licensed operations, AST takes pride in the fact that none of these operations has resulted in a casualty among the public or significant property damage. However, AST will not allow that record of safety to lead to complacency.

Mr. Coleman announced that AST will soon be starting a Space Rulemaking Advisory Committee (SpARC) on part 450. This will be an effort to make improvements to the rule as opposed to restarting the full rulemaking process. AST is also reviewing public comments on its proposed rule to mitigate orbital debris and expects to issue the rule early next year. Mr. Coleman also briefly outlined AST's new policy for reentry vehicles. If launch operators have a reentry vehicle as a payload, the reentry vehicle must have a reentry license approval before being considered to have a favorable payload determination. This is to reduce the risk of a random uncontrolled reentry of reentry vehicles, which are designed to reenter the atmosphere substantially intact. The members were given a more in-depth briefing on this policy later in the meeting.

Mr. Coleman also called attention to AST's efforts to improve the licensing applications that are received from new operators, noting that the burden of proof on safety compliance lies with the applicants. Some of the applications that AST has received are not clear on how the regulatory requirements have been met and include documents that are not tailored to address those requirements. Additionally, some companies are starting the application process too late, scheduling launches that fall within AST's statutory review period. Companies are unable to make their safety case. This leads to a lot of back-and-forth between AST and the companies, resulting in amendments and unnecessary delays. Mr. Coleman encouraged companies to take advantage of opportunities that AST is providing to assist applicants with the licensing process, including office hours to clarify advisory circulars (ACs). Mr. Coleman then took questions from the committee members.

Ms. Megan Mitchell asked how AST plans to balance the workload of new licenses with the transition from legacy regulations to part 450. Mr. Coleman recognized that this is a challenge and emphasized that companies should begin the transition to part 450 sooner rather than later to avoid a bottleneck. Mr. Coleman added that bringing in additional staff would help with balancing the two efforts. Ms. Caryn Schenewerk asked Mr. Coleman to speak to using legacy regulations, part 415 and part 417, as a means of compliance for part 450. Mr. Coleman stated that if companies follow part 415 and part 417, he anticipates that they will be able to comply with part 450. Ms. Schenewerk followed up by asking if companies would see something like an application template. Mr. Coleman said that AST was not actively working on an application template but did not rule it out, noting that it could help speed up the application process. Mr. Coleman suggested that an application template is something that the committee could think about for future taskings. Ms. Mitchell then followed up on means of compliance and encouraged AST to allow alternatives to meet part 450 requirements. Mr. Coleman stated that as more experience with part 450 is gained, this will open up the aperture of what can be recognized as a means of compliance.

Ms. Karina Drees, the COMSTAC chair, then asked if there were questions from any of the committee members who were attending virtually. There were none. Mr. Coleman thanked the members for their work on the committee and invited them to join AST the following week for a demonstration of Astrolab's lunar rover. Mr. Brian Verna, the DFO, then announced that the meeting would turn to committee taskings.

Task #1 Discussion: Space Nuclear Systems (SNS) Advisory Circular and Space Policy Directive 6 (SPD-6)

COMSTAC was tasked to provide any observations, findings, or recommendations on AC 450.45-1, Space Nuclear Systems. The committee was also asked to provide recommendations on what the FAA can do to ensure that it contributes to Space Policy Directive 6 (SPD-6).

This task was briefed by Ms. Schenewerk, who led the regulatory working group (RWG). Ms. Schenewerk opened by recognizing RWG members and the broader members of the committee for their contributions to the task. She also noted that the RWG reached out to people from industry who will require a payload review for their space nuclear systems. Ms. Schenewerk presented the following findings:

Findings:

- As noted in SPD-6, "the Nuclear Regulatory Commission (NRC) has statutory authority under the AEA for licensing and regulatory safety and security oversight of commercial nuclear activities taking place within the United States." (Sec. 4(h)).
- SPD-6 also notes that the Secretary of Transportation, consistent with 51 U.S.C. 50904, has responsibility for payload reviews that "may be conducted as part of a license application review or may be requested by a payload owner or operator in advance of or apart from a license application." (Sec. 4(e)).
- In comments regarding the AC, a critical issue the industry identified for the FAA is the need for expedited decision-making processes. Industry consistently indicated the need for a framework in which the FAA commits to finalizing a Space Nuclear System (SNS)

payload review ahead of a launch or reentry licensing decision within a specific timeframe.
- The U.S. Department of Transportation (DOT) has taken actions to establish thresholds below which nuclear materials can be transported on various modes of transport, such as aircraft, buses, and trains, without the need for performance-tested packaging, approval from the NRC, or special authorization from DOT, particularly for devices containing radioactive material of activities less than 0.001 x A2.

Ms. Schenewerk then took questions from the attendees. Maj. Gen. Ted Mercer noted that carrying nuclear materials on a train is not the same as carrying a nuclear payload on a rocket, which is a controlled explosion, and cautioned on the use of such an analogy. Ms. Schenewerk recognized that this is a fair point, noting that it is necessary to have people involved who are real nuclear experts. However, it needs to be considered that all nuclear materials have similar hazards, no matter how they are transported. Ms. Amanda Simpson remarked that nuclear standards may not be the same as other modes of transportation, but some type of standard could be developed for launch activities. Ms. Schenewerk noted that currently, all nuclear payloads are treated the same – there is not a systematic approach because there is not yet enough practice. There is a need for clear categories for approval that can be followed. Maj. Gen. Mercer stated the need to understand the characteristics of material that is being transported and that ground scenarios are different than air scenarios. Mr. Jay Skylus noted that a better analogy could be nuclear submarines. Mr. Dale Ketcham noted that the public does not make a distinction for nuclear materials.

Ms. Schenewerk then presented the following observations from the RWG's work on Task #1:

Observations:
- The FAA published Advisory Circular (AC) § 450.45-1 on October 20, 2023, to provide guidance to applicants when space nuclear systems are present on a launch or reentry vehicle. The AC provides a means of compliance and guidance for applicants proposing to launch or reenter an SNS to meet the requirements for a safety review under § 450.45 as well as those seeking a payload determination for an SNS under 14 CFR § 450.43.
- The FAA would benefit from collaborating with NRC, given that an NRC-licensed SNS will be subject to FAA approval as payloads and for launch and reentry operations.
- The commercial space industry would benefit from clarification regarding which agency (if any) has licensing authority with respect to an SNS's ability to operate in space or on celestial bodies.

Maj. Gen. Mercer asked if the U.S. Department of Energy (DOE) was involved with developing the SNS AC. Mr. Verna and Ms. Schenewerk both affirmed that DOE was included in the interagency discussion. Ms. Schenewerk then provided RWG's recommendations for task #1, noting that the recommendations, as briefed, were broader statements of very detailed recommendations that are to be provided in a 28-page report submitted by COMSTAC.

Recommendations:
- The FAA should develop a strong collaborative relationship with the NRC.
- The FAA should explore with NRC, DOE, and the rest of the Interagency which agency (if any) has authority for licensing the operation of SNS once they are in space.

- The FAA should engage meaningfully with experts and companies developing space nuclear systems to make updates to AC 450.45-1.
- The FAA should adopt a framework for finalizing an SNS payload review ahead of a launch or reentry licensing decision within a specific timeframe.
- The FAA should allow for the launch of radioactive materials in small quantities without requiring overly burdensome safety analysis. This could yield valuable insights without increasing public risk.
- The FAA should address challenges with procuring insurance for launches of space nuclear systems.

Dr. Moriba Jah asked how FAA stays aware of the status of nuclear systems once in space and if it is possible to revoke licenses if systems have fundamentally changed. He also asked how the FAA can help with insurance. Ms. Schenewerk responded that the insurance challenge is addressed in part 440 SpARC on financial responsibility, but that report is not yet public. She also noted that SNS operators could potentially obtain a waiver for insurance if FAA deemed that it was too difficult to obtain. The government could also indemnify nuclear payloads, but Mr. Coleman noted that this would likely require a statutory change. As far as enforcement with regard to SNS, Ms. Schenewerk noted that FAA does not have jurisdiction over in-space activities, but enforcement would likely look the same as provisions that already exist in Title 51 if FAA was given authority for in-space activities. Mr. Coleman noted that applicants are responsible for notifying FAA of any deviation from the status that was on the application. The members then discussed what oversight would look like once a nuclear payload was in space, noting that there was more work to be done in this area.

The committee voted unanimously to approve all six recommendations from Task #1, with the option that FAA could follow up with a more refined SNS tasking.

Task #2: Part 450 Solutions

COMSTAC was tasked to provide FAA with suggested fixes to specific part 450 requirements. The FAA provided the RWG with a priority list.

Ms. Schenewerk briefed the attendees on the findings for Task #2, noting that more findings could be added but that the three provided were consistent among launch providers and applicants that were consulted.

Findings:

- The FAA's list of focus areas reflects many industry concerns regarding part 450 regulations needing improvement.
- Almost half of the AC for the part 450 regulations remain unpublished.
- Approval of Means of Compliance (MOC) has been extremely difficult under part 450.

Mr. Coleman asked what was making MOC approval so difficult for applicants. Members stated that AST should provide methodologies for MOC, and feedback should include what specific requirements have not been met. Mr. Skylus mentioned that there is a varying degree of experience between pre-application teams. Ms. Schenewerk noted that it would be helpful for applicants to see what a successful application looks like. She then briefed the attendees on the observations and recommendations for Task #2:

Observations:

- COMSTAC supports FAA's announced plans to initiate a Space Advisory Rulemaking Committee to gain industry inputs into challenges with part 450 and clear recommendations for changes.
- In reviewing the ACs that have been published, members have identified significant typos and aspects that fail to provide clarity. Those who have submitted comments on, and suggested revisions to, ACs have not seen any updates published.
- The FAA's approach to MOC has required applicants to expend significant resources developing new, bespoke models to be part 450 compliant, often in the absence of any published guidance by FAA on the requisite subjects.
- It is unclear what metrics play into MOC approval under 14 CFR § 450.35. Applicants report significant frustration with FAA's lack of transparency regarding the FAA's assessment and approval process for MOC.

Recommendations:

- The FAA should engage meaningfully and consistently with FAA applicants and interested parties to define clear goals for regulatory reform.
- The FAA should reinvigorate its efforts to publish Advisory Circulars (AC) that address aspects of the Part 450 regulations.
- The FAA should evaluate a change to its policy and regulations to address the significant challenges with its Means of Compliance review and methodologies for Flight Safety Analyses.
- The FAA should expeditiously move forward with the Part 450 SpARC.

The members discussed the observations and recommendations, noting the challenge posed by a lack of experience with the new regulations coupled with the demand for resources to license increased launch numbers. Ms. Mitchell remarked that there are regulatory overlaps between FAA and the Department of Defense (DOD), stating that it would be helpful to see consistency in how analysis from both is used. Mr. Mat Dunn noted that a challenge is the disconnect between federal ranges and AST as to what is safe – the government should say that what is deemed safe for a federal range should be good for part 450. He added that there is a lack of transparency regarding the methodologies of the Common Standards Working Group (CSWG) and that the CSWG should include industry representation.

The members voted unanimously to approve all four recommendations from Task #2.

Task #3: Human Space Flight Occupant Recommended Practices

COMSTAC was tasked to review the 2023 Recommended Practices for Space Flight Participant Occupant Safety and provide any observations, findings, or recommendations to this document.

This task was briefed by Mr. Mike Moses, who led the Safety Working Group (SWG). Mr. Moses expressed that the recommended practices document does not cover a lot of the human safety aspects and was unsure how the document was to be used, especially considering the ongoing work of the part 460 Human Spaceflight (HSF) Occupant Safety SpARC.

Observations:

- The FAA's Recommended Practices for HSF Occupant Safety V2 is an initial effort to clarify and guide human space flight occupant safety within the commercial space industry ahead of a future regulatory framework. Industry via COMSTAC or otherwise was not consulted ahead of its release.

Findings:
COMSTAC has serious concerns on the 1) purpose, 2) content, and 3) intent of use of this document.

- The purpose of the document is unclear as the title indicates recommended practices for SFP occupant safety; however, the scope of the document as written spans vehicle design, manufacturing, and other broader system safety topics. In addition, topics that directly affect SFP health and safety, such as medical reviews and radiation exposure, were omitted.
- The content of the document is prescriptive and not consistent. There is evidence of prescriptive requirements pulled from multiple existing sources that may not be applicable to all operators in industry. In addition, the content also introduces concerns about potential conflicts with Part 450 requirements.
- The intent of the document is unclear about whether this is truly intended to be guidelines or a framework for future regulation. The intent has important implications for operator use.

Recommendations:

- COMSTAC recommends a revision or retraction of the 2023 Recommended Practices for Space Flight Participant Occupant Safety.
- The AST should host a discussion on the scope of what human occupant safety entails before future guideline revisions are released. This could be held within the existing SpARC or another forum, but it is recommended that discussion occur after the initial Part 460 SpARC work is complete for guidance and deconfliction.
- Until a revision or a retraction is issued, AST should clarify intent of document to guide any use by new and existing entrants.

Mr. Moses noted the need for clarification from FAA on whether COMSTAC should provide feedback on the topic of human spaceflight safety separate from the 460 SpARC and why. Mr. Moses then introduced Task #4.

Task #4: Safety Frameworks Using Consensus Standards

COMSTAC was tasked to research possible frameworks that use industry consensus standards as a means of compliance for performance-based safety requirements and provide recommendations on how the commercial space industry might use similar frameworks.

Observations:

- COMSTAC notes that there is currently a SpARC effort on part 460 that may be looking at a range of topics to include potential future frameworks for human occupant safety.

Recommendations:

- In an effort to avoid duplicative work, COMSTAC recommends that this tasker be addressed in partnership with SpARC.

Following the brief on Task #3 and Task #4 from Mr. Moses, AST provided clarification on the difference between COMSTAC and the 460 SpARC. Mr. Verna noted that COMSTAC is more of a public venue than SpARC, as the 460 is a closed forum and not open to the public. Dr. Minh Nguyen, Executive Director of AST's Office of Strategic Management, added that a review of the HSF recommended practices was not assigned to the 460 SpARC. The members then discussed the fact that there is not necessarily a clear distinction between occupant safety and public safety. Mr. Moses provided an apt example—if a part falls off of a human-occupied spacecraft during launch and lands on the ground, that is a risk to the public but also likely a risk to those on board.

The members voted unanimously to approve all three recommendations from Task #3 and the single recommendation from Task #4.

Task #5: Commercial Space Transportation Research Alliance

COMSTAC was tasked to research options on AST standing up a Research Institute made up of government, industry, and academia to foster research and development. This would be a follow-up to the Commercial Space Transportation Center of Excellence and provide a recommended path to implementation that includes potential funding, structure, and governance.

This task was briefed by Dr. Jah, who led the R&D Working Group (R&D WG). He began with some background information on AST's Center for Excellence (COE). The COE was established in 2010 and included 10 member universities and 36 industry partners. The COE was funded at approximately $1 million annually for 10 years, with a requirement for a 1:1 match for all federal dollars spent. The COE research areas included aerospace access and operations, aerospace vehicles, human operations and spaceflight, and industry innovation. The COE was ended in 2022, with no replacement in place to allow academia to engage in commercial space transportation research. Mr. Jah noted that this has left a gap in research on the effects of spaceflight on humans. Although the National Aeronautics and Space Administration (NASA) has over 60 years of data on how spaceflight affects the health of its astronauts, NASA astronauts are typically young, in excellent health, and in outstanding physical condition. There is little data on non-astronauts. Future flyers on commercial spaceflights are likely to be older, with a variety of existing health conditions, and less fit than their NASA counterparts.

Dr. Jah also discussed the gaps in research related to Space Traffic Situational Awareness. Specifically noting three areas for improvement:

- The FAA needs improved screening of launches against anthropogenic space objects (ASO).
- The FAA needs more adaptive, timely, and realistic national airspace (NAS) deconfliction against launches – need to be more surgical.
- The FAA needs physically and statistically realistic models of atmospheric ASO reentries for NAS risk quantification and management and general public safety – how are things

reentering? How do we quantify the risk to people on the ground and in maritime vessels? No real understanding of what is reentering, models based on 'hope.'

Dr. Jah then briefed on the implementation options for a research alliance, focusing on the key questions of who would oversee and administer the program and how it would be funded. Implementation options included ad hoc research (the status quo), a government program, a public/private partnership, or a non-government program. Dr. Jah briefed on the advantages and disadvantages of each option. Dr. Jah then provided the observation and recommendation for Task #5

Observation:

- Given the rapid pace of activity, there is an urgent need (and opportunity) for government, industry, and academia to collaborate in performing commercial spaceflight and traffic research.

Recommendation:

- The Secretary of Transportation should competitively award a cooperative agreement to a university, nonprofit, or not-for-profit organization to establish a consortium that would operate a Spaceflight and Traffic Research Institute. The cooperative agreement should be awarded for a period of 10 years. An appropriate initial value of the award would be $30 million per year.

The members had a lengthy discussion on the merits of the research institute being established and why the Department of Transportation should be involved since FAA does not regulate space traffic. Some members thought it was a good idea and expressed that recommending the research institute would be an important signal for COMSTAC to send to Congress. Others pointed to the budget constraints that such an effort would face. Dr. Jah pointed out that human spaceflight and space traffic research are transdisciplinary, and some organization needs to take the lead in conducting much-needed research. In his view, it makes sense for the research institute to be stood up under FAA because the organization has a lot of interests here.

The members could not come to an agreement, and the COMSTAC Chair brought the discussion to an end to leave time for the remaining items on the agenda. COMSTAC would like FAA to revise this task to make it more general, such as "What should be the follow on to the COE?" instead of narrowly focusing on human safety and space traffic.

Task #6: Infrastructure Funding

COMSTAC was tasked with evaluating space transportation infrastructure funding options and assisting in the implementation of the most promising approach.

Dr. George Nield, who led the Innovation and Infrastructure Working Group (IIWG), briefed the members on Task #6. Dr. Nield began with some context on transportation infrastructure. He pointed to the fact that the federal government has traditionally provided substantial funding to develop, repair, or upgrade all forms of transportation infrastructure, including the interstate highway system, railroads, airports, and seaports. However, there is no comparable program to provide funding for space-related infrastructure, such as for spaceports. Dr. Nield then stated that

it is vitally important for federal programs to be established for the development, enhancement, and maintenance of spaceport infrastructure to enable space activities, given the importance of space operations to U.S. national security, technological leadership, and economic competitiveness.

Dr. Nield then provided a brief history of airport infrastructure funding, noting that government support for airport infrastructure began during WWII. Most recently, the 2018 FAA Reauthorization Act authorized $3.35 billion for airports. Dr. Nield then called attention to a December 2020 the Government Accountability Office (GAO) Report to Congress (GAO-21-154), in which the GAO encouraged the FAA to examine a range of potential options to support space transportation infrastructure, noting that FAA had focused on only two existing programs, rather than a range of options, because of limited time and resources. Dr. Nield then briefed attendees on the first recommendation of the IIWG and the working group's observations.

Recommendation #1:

- Update the Space Transportation Infrastructure Matching (STIM) Grants Program by changing the maximum Federal share from 50 percent to 90 percent (to be consistent with what is done for Airport Grants) and by deleting the requirement for a 10 percent private sector match.
    - Increase the program funding level to $100 million per year.
    - Prioritize grant awards based on the project benefit to the National Spaceport Network in terms of Safety, Capacity, Efficiency, and Resiliency.

Observations:

- The National Security Council is currently evaluating the nation’s critical infrastructure under Presidential Policy Directive 21.
- Some in industry believe that “Space” should not be considered as a “sector” when it comes to critical infrastructure designation since many space-based capabilities and their enabling infrastructure are already included within critical infrastructure sectors, such as the critical manufacturing, communications, defense industrial base, government infrastructure, and transportation systems sectors.
- However, spaceports are obviously essential for achieving assured access to space, and they are not currently included in the other groupings.
- A thorough cost-benefit analysis would be helpful in assessing whether it would be appropriate to designate spaceports as critical infrastructure, including the potential implications for federal funding and the need for implementing regulations (if any).

Dr. Nield then highlighted several key issues in the space sector:

- Spaceport Infrastructure Funding
- Commercial Space Transportation Research
- Commercial Human Spaceflight Training
- Point-to-Point Transportation through Space
- Planning for a Human Spaceflight Rescue Service

Dr. Nield suggested that lack of progress on these issues is a symptom of a bigger problem. He provided his opinion that as part of FAA, the AST has not always received the needed attention from senior leadership or required resources to successfully carry out its mission. He offered that AST’s need for resources and attention will only increase as space transportation activities

continue to grow in type and frequency. Noting the ways that space and aviation are different, ranging from vehicle types to the regulatory framework to the pace of industry activity, Dr. Nield provided the second recommendation of the IIWG.

Recommendation #2:

- Recognize Commercial Spaceflight as an independent operating administration by moving the Office of Commercial Space Transportation out from under FAA and having it report directly to the Secretary of Transportation.

In discussion of the recommendations, Mr. Mike French, the COMSTAC Vice-chair, mentioned that he had heard that moving AST out of FAA would make airspace integration more difficult. Dr. Nield responded that AST is not really currently involved with airspace integration. AST would still need to collaborate with FAA, just as it currently collaborates with NASA, DOD, and other government agencies. Mr. Coleman noted that there are constructs in place for AST to work with other organizations and that AST has a good working relationship with the Air Traffic Organization (ATO). He said that he had not seen data indicating that airspace integration would be harmed if AST were taken out of FAA. Referring back to the first recommendation of the IIWG, Ms. Drees noted that a previous COMSTAC had a similar task and found that there would be value in Congress funding spaceport infrastructure. There is similar language to the recommendation in a bill that is currently in the Senate.

The members voted unanimously to approve all recommendations from Task #6.

Response to Open COMSTAC Recommendations

The DFO provided a status update for COMSTAC recommendations from 2018 to the present: 72 percent are in progress, 23 percent are implemented, and 5 percent are not implemented.

The AST then briefed the members on FAA/AST responses to COMSAC recommendations from the November 2023 meeting. The response to the first three recommendations regarding science, technology, engineering, and math (STEM) workforce efforts was provided by Ms. Takisha Brown, AST's Space R&D and Innovation Branch Manager. The remaining responses were briefed by Mr. Randy Repcheck, Deputy Director for AST's Office of Strategic Management.

Recommendation #1: Establish a mechanism for industry inputs into the DOT-related tasks of the Interagency Roadmap to Support Space-Related STEM Education and Workforce. Establish workforce development officers to build STEM workforce pipelines, including regional postsecondary STEM internship programs.

> *FAA/AST response:* The FAA/AST will work through COMSTAC and direct industry outreach to get input into DOT-related tasks of the Interagency roadmap to Support Space Related STEM work. AST's Space Policy Division will establish more options to support tasks as they are established.
>
> FAA/AST leverages FAA's STEM Aviation and Space Education program, including the involvement of multiple outreach representatives from AST to provide strong local and

regional STEM outreach activities. The AST is currently hosting multiple interns through the Office of Personnel Management's Pathways program.

The FAA/AST has established an AST STEM team that specifically develops STEM space-related activities, and FAA/AST has established its first partnership with a local school that implements STEM Fridays into the curriculum. Additionally, FAA/AST is an active member of the White House Sub-Interagency Space Policy Committee on STEM and Workforce Initiatives.

Recommendation #2: Highlight space industry jobs available and identify academic and extracurricular points of engagement within FAA AST.

FAA/AST response: The FAA/AST participates in many STEM activities every year at middle and high schools and universities to raise awareness of the various career opportunities in the aerospace industry, reaching over 700 students annually.

The FAA/AST has established its first partnership with a local middle school, which incorporates monthly STEM Fridays into its curriculum. This is the first of additional direct school partnerships.

The FAA/AST joined the FAA White House HBCU Consortium and participates in the White House HBCU Interagency Week.

The FAA/AST partnered with the U.S. Department of Education, along with other governmental agencies, and participated in the first-ever National STEM Festival.

Recommendation #3: Extend the U.S. Department of Labor's Space-focused Apprenticeship Accelerator model to not only promote areas of research interest to FAA AST but also to support the space industry's workforce pipeline directly, emphasizing the employment of historically excluded communities in commercial space transportation.

FAA/AST response: Due to limited personnel resources, FAA/AST has not implemented this recommendation. AST will work with the STEM AVSED office to determine how we could implement this program.

Recommendation #4: The FAA should conduct a voluntary, non-attributable survey to assess the implementation of developed voluntary consensus standards.

FAA/AST response: The FAA/AST is working with ASTM F47, and as standards are published, we will evaluate this type of survey.

Recommendation #5: The FAA should assess the completeness of standards to serve as a means of compliance and provide guidance on how it will review and accept standards as a means of compliance.

FAA/AST response: The FAA/AST is currently updating its process to review a voluntary consensus standard and determine whether to accept it as a Means of Compliance.

The FAA/AST is updating the Means of Compliance table on our website and will include voluntary consensus standards as they become accepted as a means of compliance.

Recommendation #6: The FAA/AST should provide an update on efforts to streamline licensing, range safety approvals, and other processes.

FAA/AST response: The FAA/AST is building a part 450 SpARC charter to obtain industry recommendations on updating the rule.

The FAA/AST is drafting a policy on safety-related launch or reentry services provided by a Federal Entity.

The FAA/AST is developing an Interagency Agreement with NASA to address launches from NASA facilities.

The FAA/AST will provide COMSTAC updates later today on our efforts to streamline licensing.

Recommendation #7: The FAA/AST should brief results from the National Spaceport Interagency Working Group and solicit state and private spaceports' participation and feedback.

FAA/AST response: The NSIWG is working with the National Space Council and OMB to coordinate an inter-agency review of the recommendations in preparation for publication, and developing implementation plans in parallel. The Office of Spaceports will be able to brief the results when the interagency review is complete.

Recommendation #8: The FAA should clarify and, as needed, amend Part 450 to address challenges with requirements that are distinct to launch or reentry. The FAA should prioritize Part 450 clarification through guidance and policy balanced with reforms.

FAA/AST response: The FAA/AST is building a part 450 SpARC charter to obtain industry recommendations on updating the rule.

This will allow FAA/AST to gather detailed industry feedback on changes and updates that are needed to provide a better-streamlined licensing process while maintaining the focus on public safety.

As of 10 April, there are a total of 19 ACs published on the FAA/AST website, with 12 more being actively worked.

Recommendation #9: The FAA should develop and implement a change control process for technical standards. That process should account for the impact of changing technical standards during an ongoing licensing effort.

FAA/AST response: The FAA/AST is implementing a process to address cases where it has implemented a change to what was previously accepted or applied a new standard.

The FAA/AST will implement a change based on two core principles:

1. The information/change, if not implemented, would result in risk substantially higher than the 450.101 risk criteria, and
2. There must be something in place to readily implement the new information or change.

Recommendation #10: The FAA should prioritize Part 450 clarification and reforms to ensure that it is prepared to efficiently and effectively manage an increasing number of applicants and existing licenses transitioning from existing licenses to Part 450.

FAA/AST response: The FAA/AST is forming a Part 450 SpARC followed by a rulemaking.

Recommendation #11: The current definition of payload is not appropriately bounded for suborbital flights. Recommend the FAA adopt different payload classes to facilitate streamlined approval.

FAA/AST response: The current part 450 rule allows for different payload classes.

Recommendation #12: The FAA should revise Part 450 to address challenges with requirements that are distinct to launch or reentry.

FAA/AST response: The FAA/AST is forming a Part 450 SpARC followed by a rulemaking.

Recommendation #13: The FAA's approach to reviewing and accepting flight safety analysis (FSA) methodologies has been inconsistent in § 450.115(c)).

FAA/AST response: The FAA/AST has implemented an internal review process to better ensure consistency. AC 450.115-2 (FSA Methodology Rigor) is also in development.

Recommendation #14: The reference to "anomaly" in § 450.215(b)(2) is not appropriately defined.

FAA/AST response: The FAA/AST is forming a Part 450 SpARC followed by a rulemaking.

Recommendation #15: Provide for clear timeframes for FAA's initial application review and determination of the "complete enough" review. The recommendation is within 10 business days of submission.

FAA/AST response: On Dec. 18, 2023, FAA published AC 413.13-1, "Guide to Complete Enough and Complete Application for a Vehicle Operator License."

Recommendation #16: ACs should distinguish between launch vs. reentry license requirements, where differences exist, or at least include distinct sections discussing the difference in applicability of many of the regulations.

FAA/AST response: Conditional Expected Casualty *(*CEc) is the primary issue that has been identified by industry and is in work.

Recommendation #17: The FAA/AST should ensure that it can provide guidance to launch vehicle operators on efficiently and effectively implementing CEc.

FAA/AST response: The FAA/AST recently updated AC 450.101-1 High Consequence Event Protection.

Recommendation #18: The new 450 system safety framework should have clear success metrics: if a company meets X quantitative, agreed-upon goal(s), then it will have met the system safety requirement of Part 450.

FAA/AST response: The FAA/AST agrees. This will be a significant topic for the Part 450 SpARC.

Recommendation #19: Ensure that Advisory Circulars are accurate, accommodate variations in vehicle complexity, and prevent regulatory burdens with no public safety benefit.

FAA/AST response: During AC development, FAA/AST ensures accuracy and accommodates variations in vehicle complexity, which it will continue to do.

Recommendation #20: The FAA should provide more transparency into the software and analysis tools that have been accepted for use.

FAA/AST response: The FAA/AST continues to investigate a means to provide more transparency to the industry. Safety Element Approval is FAA/AST's primary tool for accepting safety components.

Recommendation #21: The FAA/AST should clarify the use of "benchmark" in 450.115 through an update to AC 450.115-1.

FAA/AST response: AC 450.115 is being updated to provide clarity.

Recommendation #22: Clarify AC 450.123-1 (Population Exposure Analysis) and ensure consistent understanding and application of the guidance by the FAA.

FAA/AST response: The FAA/AST has implemented an internal review process to better ensure consistency. FAA/AST will update AC 450.123-1 if necessary to provide clarity.

Recommendation #23: The FAA has interpreted section 450.108 to require a highly reliable flight safety system for the entire time it is active, not just during the period when it is required to protect the public. The FAA should clarify that the "highly reliable" requirement is related to public safety.

FAA/AST response: The FAA/AST believes this comment is based on a unique scenario.

Advisory Circular (AC) and Regulatory Clarification Updates

Mr. Repcheck also provided members with updates on ACs and recently implemented AST regulatory clarifications. AST currently has 19 ACs issued. One of these, *AC 413.13-1, Guidance on a Complete Enough Application,* has been issued since the previous COMSTAC meeting in November 2023. The AST has 12 upcoming ACs that are in work and expected to be released by the end of 2024. An additional 17 ACs are in some stage of development.

The FAA briefed the first regulatory clarification regarding hosted payloads. On March 14, 2024, FAA published in the Federal Register a clarifying statement that FAA will require applicants for a payload determination under parts 415, 431, 435, or 450 to provide a complete manifest of all payload contents and compositions, including those of all hosted payloads.
The FAA briefed a second regulatory clarification on the payload review process with respect to launching a reentry vehicle. On April 17, 2024, FAA published its clarification in the Federal Register on how FAA implements launch vehicle operator payload review requirements related to the launch of a reentry vehicle. The FAA requires reentry vehicle license applicants to have a favorable license determination prior to being a payload on an FAA-licensed launch vehicle.

Future of Licensing

Mr. Dan Murray, Executive Director of AST's Office of Operational Safety, briefed COMSTAC on the future of licensing at AST, highlighting key initiatives for 2024 and beyond. Key initiatives include a focus on hiring and retention in a very competitive job market, increasing industry guidance, sharing information through industry workshops – for domestic and international audiences, educating industry through office hours (most on Flight Safety Analysis, but other areas as well), looking at policies and procedures to speed up the licensing process, and automating the application process by the end of the fiscal year with the release of the License Electronic Application Portal (LEAP) tool.

Mr. Murray then took questions from the members. Dr. Jah asked who is thinking about the long-term sustainability of the space environment, noting that there are as yet unknown consequences of increases in both launch and the number of objects in orbit. Mr. Murray responded that AST does think about these things but is unsure if that is AST's responsibility. Mr. Coleman added that AST definitely does care about the long-term sustainability of the space environment, pointing to AST's soon-to-be-released orbital debris rule as an indication of this. Mr. Coleman also noted that AST's scope is public safety, and it is up to Congress to assign jurisdiction and responsibilities. Ms. Schenewerk asked about the transition to part 450. Mr. Murray responded that AST is currently discussing the transition approach with companies, recognizing that there is no 'one size fits all' path to part 450 from legacy licenses.

Closing

Ms. Drees opened up the meeting to the public comment portion of the agenda. Mr. Verna stated that he did not receive any requests to make a public comment. Ms. Drees encouraged members to get involved with ASTM's F47 work to develop voluntary consensus standards for the industry. The Chair stated she would send out a note to members on future taskings since there was no time to address those during the meeting. There will be a September meeting to wrap up this COMSTAC, which ends its term in October. Ms. Drees then closed out the meeting by thanking the FAA, notably Mr. Coleman and Mr. Verna, and COMSTAC members.

Mr. Verna adjourned the meeting at 4:30 p.m. Eastern Time.