Commercial Space Transportation Advisory Committee (COMSTAC)

March 23, 2021 Meeting

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Kelvin B. Coleman
FAA Deputy Associate Administrator for Commercial Space Transportation

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Mr. Steve Jurczyk
Acting NASA Administrator

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U.S. State Department Office of Science and Advanced Technology

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Steve Dickson
FAA Administrator
Welcome Remarks

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Brigadier General Wayne R. Monteith, USAF (Ret).

FAA Associate Administrator for Commercial Space Transportation Welcome Remarks

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FAA/AST Updates:
Part 450 Advisory Circulars
Office of Spaceports

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Part 450 Advisory Circulars & Effective Date

Randy Repcheck – Effective Date

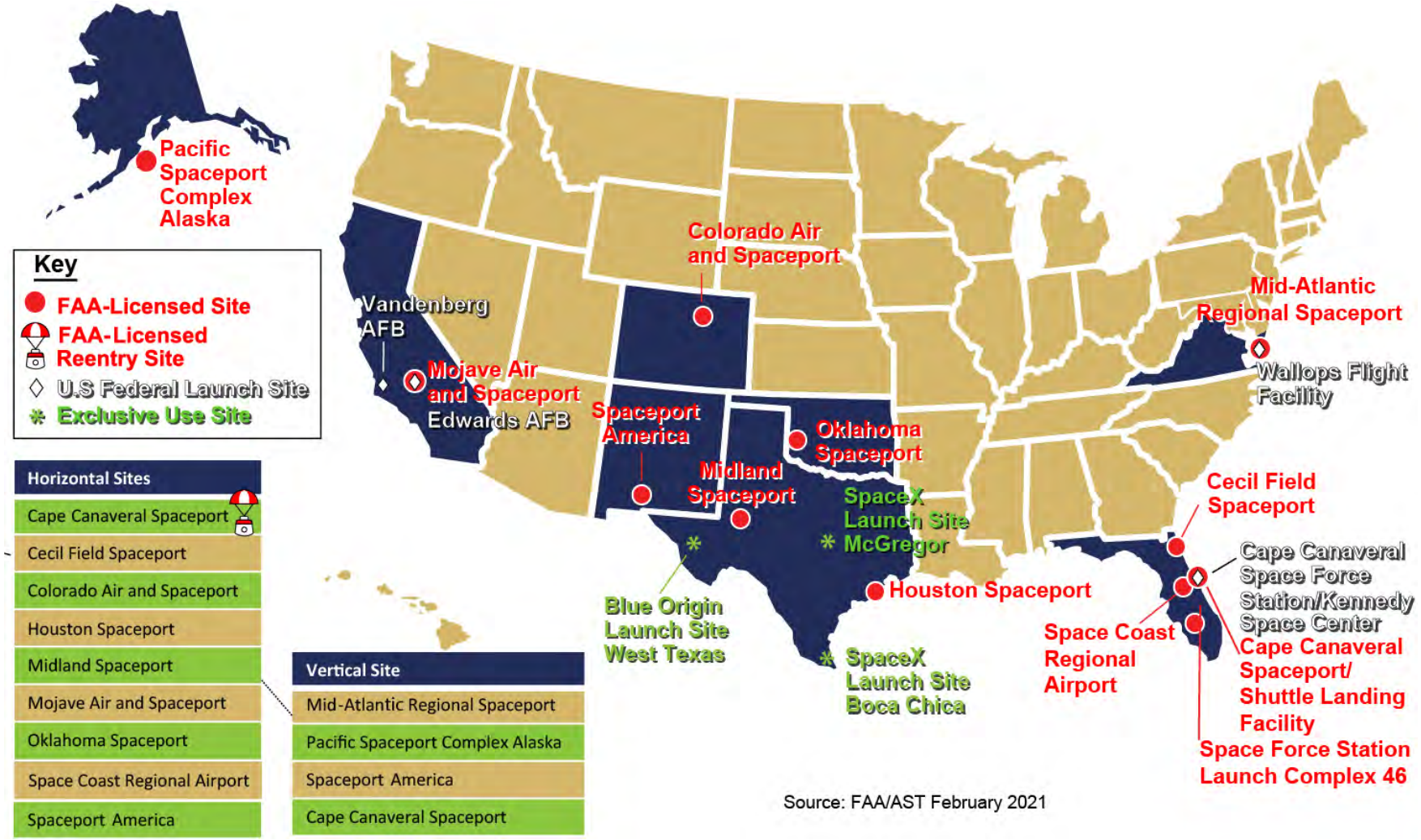
Steph Earle – Advisory Circulars Update

- 29 AC's associated with Part 450
- 6 complete by end of March 2021
- All complete by end of CY 2021

For more information on Part 450:

https://www.faa.gov/space/streamlined_licensing_process/

Office of Spaceports



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COMSTAC Chair
Charity Weeden
Welcome Remarks

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COMSTAC Vice-Chair
Karina Drees
Welcome Remarks

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Regulatory Working Group Tasker Response and Discussion

email questions in advance to COMSTAC@faa.gov

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Task 1: Prioritize future rulemaking

From June COMSTAC meeting:

Task #1: Prioritize future rulemaking.
COMSTAC will provide feedback to FAA on a prioritized list of future rulemaking activities for the commercial space transportation industry.

RWG Task 1 Recommendation

Task 1 - Recommendation:
The Regulatory Working Group recommends that AST continue to prioritize support for industry's transition to and compliance with the revised Part 450 before significantly engaging in the next streamlining effort. Prioritization of Part 450 includes preserving resources for development of advisory circulars and any other needed refinements. The Regulatory Working Group recommends the following order of priorities for regulatory streamlining:

Part 440.

Part 420/433.

Regulatory Working Group Task #2

Task #2: Define a "Complete" Application

Propose language to revise Part 413.13 (Complete application) that defines a complete application. COMSTAC should take into account all the generic components of a typical license and permit application (e.g. flight safety, ground safety, system safety, policy and payload reviews, environmental compliance etc.) and propose benchmarks in each of these areas that an applicant must meet that allow compliance with Part 413.11 (Acceptance of an application). The deliverable should be in the form of a narrative report of sufficient detail that AST could potentially use the language in a future rulemaking.

For more information see the related white paper on the COMSTAC website: https://www.faa.gov/space/additional_information/comstac/presentations/

RWG Task 2 Recommendation 1

Task 2 - Recommendation 1: Pre-Application Consultation Process

- The FAA should create specific deadlines for evaluation in the Pre-Application Consultation Phase, including a formal initiation of the Pre-Application Consultation process with the FAA acknowledging, in writing, that the Pre-Application Consultation has begun and a clear timeframe for when the FAA expects the applicant to move to the evaluation phase.
- Once the Pre-Application Consultation has concluded, the FAA should acknowledge in writing that the applicant's initial application is under "Complete Enough Review." It is recommended that the FAA complete its initial review of a "complete enough" application within two weeks of issuing that determination and provide written feedback within 30 days to the applicant.

RWG Task 2 Recommendation 1

Task 2 - Recommendation 1: Continued

- After the review, the FAA should provide the applicant with a determination that the application is "complete enough" or, as required by 413.11(b), provide in writing to the applicant a list of specific items of concern, missing content, or clarifications of checklist items that precludes the agency from issuing a complete enough evaluation.
- The applicant should be provided with a reasonable deadline for responding to the concerns outlined in the letter and respond expediently. Once the issues identified in the review have been addressed in writing by the applicant, the FAA should provide the applicant with a specific acknowledgement, in writing, that the application is "Complete Enough" and the application has been accepted for evaluation under 413.11(a).

RWG Task 2 Recommendation 2

Task 2 - Recommendation 2:
The FAA should provide in an Advisory Circular (AC) the specific requirements the applicant must meet to be considered "complete enough" to move out of Pre-Application Consultation to the evaluation phase. FAA should work with industry to develop the appropriate content in this AC.

- COMSTAC recommends that the FAA define requirements in each of the following areas, at a minimum:
- Safety Critical System Descriptions, Draft Airspace Agreements (if applicable), Nominal Operating Procedures, and Emergency Procedures (if applicable), Safety Management System, Flight Safety Analysis, System Safety Analysis, Hazardous Materials List, Verification Program Plan (if applicable), Emergency Response Plan, Mishap Investigation Plan, Applicable Part 460 content, Contingency Abort Profiles, Environmental Assessments.

RWG Task 2 Recommendation 2

Task 2 - Recommendation 2: Continued

- The ability of the FAA to request additional information from the applicant during the evaluation of the application should be limited to only information that was not covered by the list included in the AC. The FAA should not use the evaluation period to request additional information from those areas already provided as part of the "complete enough" determination unless there were material facts discovered through the application process that call into question the completeness of the information provided in the pre-application phase.

For more information see the related white paper on the COMSTAC website: https://www.faa.gov/space/additional_information/comstac/presentations/

RWG Task 2 Recommendation 3

Task 2 – Recommendation 3: Acceptance of a Complete Application

- The ”Complete Enough” Determination Letter should include a notification that the statutory 180 day or 120 day review requirement has started as of the day the application was submitted (not from the day the application was deemed “complete enough”) and a timeline for evaluation of each of the following application areas, including:

Flight Safety	Ground Safety
System Safety	Payload Review
Environmental Compliance	Policy Review

For more information see the related white paper on the COMSTAC website: https://www.faa.gov/space/additional_information/comstac/presentations/

RWG Task 2 Recommendation 4

Task 2 – Recommendation 4: Review Period

- Throughout the entire evaluation phase, the FAA should provide a substantive update to the applicant on the status of the pending application periodically and upon request.
- In the event that the FAA believes an application review period must be tolled as outlined in regulations, the FAA should provide to the applicant, on the day of the beginning of the toll, a letter that outlines the specific deficiencies of the application that precipitated the toll, how the applicant can cure the deficiencies, and a timeline for response, evaluation of the new information, and the end of the toll.

For more information see the related white paper on the COMSTAC website: https://www.faa.gov/space/additional_information/comstac/presentations/

RWG Task 2 Recommendation 5

Task 2 – Recommendation 5: Accuracy and Requirements Updates for Existing Licensees

- COMSTAC recommends that the FAA eliminate Pre-Application Consultation for licensees with active licenses that are in the process of being updated for accuracy upon certification by the licensee that there have been no technical modifications to the launch vehicle.

RWG Task 2 Recommendation 5

Task 2 – Recommendation 5: Accuracy and Requirements Updates for Existing Licensees Continued

- To the maximum extent practicable, when evaluating an application from an applicant with an active applicable launch operator's license, the FAA should utilize existing environmental impact and assessment data, existing flight, ground, and system safety data, and existing information from previous policy and payload reviews for applications from applicants with actives licenses or permits.

For more information see the related white paper on the COMSTAC website: https://www.faa.gov/space/additional_information/comstac/presentations/

Regulatory Working Group Task #3

Task #3: International Dual Licensing

Propose process improvements, policy decisions, and/or regulatory language for the FAA/AST to reduce potential duplication and burden on industry from dual-licensing with other countries during US launches and reentries outside the United States while maintaining safety. The deliverable will include ways to reduce AST costs (such as travel and staff time) of on-site inspection. The deliverable should be in the form of a narrative report.

RWG Task 3 Recommendation

Task 3 - Recommendation: COMSTAC Recommends FAA AST Adopt the Following Processes or Practices to Benefit the Dual Licensing Process:

- Earlier in-depth gov to gov activity by FAA/AST and Department of State ("pre pre-application").
- Partial / mutual recognition agreements.
- MOU process.
- Regulatory templates.
- Cross-waiver education support.
- MOU/Agreements allowed.

For more information see the related white paper on the COMSTAC website: https://www.faa.gov/space/additional_information/comstac/presentations/

RWG Task 3 Additional Information

COMSTAC endorses the following processes or practices as beneficial to the dual licensing process:

- FAA/AST's risk-based assessments of required on-site inspections at non-US launch sites.
- Including industry in government to government meeting where practicable.
- FAA/AST operating in a leader/follower model with other USG entities.

RWG Task 3 Additional Information

Further study is needed to determine whether the following will benefit the dual licensing process.

- FAA Aviation lessons learned.
- Multi-site environmental assessments.
- A statutory change to the definition of “US Citizen.”
- Statutory or Executive Order change on the applicability of U.S. environmental regulations in non-U.S. jurisdictions.

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Lunch Break

We will start again at 12:45 eastern.

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Commercial Space Transportation Advisory Committee (COMSTAC)

March 23, 2021 Meeting

A. Bradley Mims
FAA Deputy Administrator
Welcome Remarks

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March 23, 2021 Meeting
Innovation and Infrastructure Working Group
Tasker Response and Discussion

email questions in advance to COMSTAC@faa.gov

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I & I Working Group Task #2

Task #2: National Spaceport Authority

Provide input on how a National Spaceport Authority covering the Eastern and Western ranges should be organized to both protect public safety and benefit the commercial space transportation industry.

Note: IIWG Task #1 is complete and a recommendation forwarded to the FAA in September 2020.

IIWG Task 2 Recommendation

Regarding the formation of a National Spaceport Authority, COMSTAC recommends:

1. AST should convene an Interagency Planning Group and direct the effort.
2. A National Spaceport Authority planning effort must incorporate industry, states, and other critical stakeholders into the deliberations to establish efficiencies and ensure the best interests of the nation's broader space enterprise.
3. A National Spaceport Authority should have a governance structure which enables access to the immense private capital markets as well as federal grant funding for critical infrastructure.

IIWG Task 2 Recommendation

Regarding the formation of a National Spaceport Authority:

Observation:

Regardless of what governance model is selected, it is important to acknowledge that significant federal investment will be required for a transition period for a National Spaceport Authority as it moves towards greater independence as a self-sustaining entity.

For more information see the related white paper on the COMSTAC website: https://www.faa.gov/space/additional_information/comstac/presentations/

IIWG Task 3 regarding R&D

Task R&D-1: Industry Input on AST's R&D Priorities:

- Examine and evaluate AST's R&D priorities and work plan. For each R&D topic area provide feedback and suggested improvements. Propose additional R&D topics that would be useful to industry and in keeping with AST's public safety mission.
    - The deliverable should be in the form of a narrative report.

- Determine how well the current R&D program aligns with industry priorities in terms of maximizing safety and minimizing risk, especially to the uninvolved public.

IIWG Task 3 regarding R&D

Task R&D-1: Continued

Specific questions FAA seeks to answer include:

- What FAA/AST R&D products, if any, will industry adopt to improve safety?
- What FAA/AST R&D products would industry like the U.S. government to adopt (perhaps in statue or regulation) in order to both improve safety and encourage industry development?
- Are there any safety technologies industry is not pursuing because they are too expensive/have no clear return on investment?

IIWG Task 3 Background

- Congress appropriates funds to AST for research, engineering and development
- Current funding is directed toward projects in four broad research topic areas:
  - Space Traffic Management and Spaceport Operations
  - Space Transportation Vehicles,
  - Human Spaceflight
  - Industry Innovation
- AST also conducts near-term safety R&D through contract acquisitions with specific milestones and deliverables
- Longer-term safety R&D is conducted through the Center of Excellence for Commercial Space Transportation funding research with member universities and other organizations

IIWG Task 3 Background

- COE CST is scheduled to cease operation in August 2022
- Recommendations on the future construct of AST's R&D consortium covered via a separate I&I WG topic

IIWG Task 3 Discussion

- To gather industry input on this topic I&I WG created and distributed a survey to the commercial space community via several trade organizations
- Survey questions were categorized along the four AST research topic areas as well as the COE CST
- I&I WG provided AST with insight regarding four questions:
  - What AST R&D products, if any, will industry adopt to improve safety?
  - What AST R&D products would industry like the U.S. government to adopt in order to both improve safety and encourage industry development?
  - Are there any safety technologies industry is not pursuing because they are too expensive/have no clear return on investment?
  - Is there a general awareness of AST R&D efforts?

IIWG Task 3 Overall Observations

- Most respondents indicated a low-to-medium level of familiarity with existing AST R&D and COE efforts
- Awareness in many cases through individual employee participation in events rather than whole-of-organization awareness
- R&D needs to be connected to future operations and linked to safety, technologies, and practices of commercial spaceflight technology
- R&D efforts should aim for a step function increase in capability
- R&D projects should narrow in focus to include only areas necessary to accelerate the progress of the commercial space transportation industry vice basic research across a broader range of areas

IIWG Task 3: R&D Themes and Priorities

- Regulation and Policy Research
  - Collaborative sets of requirements among regulatory agencies
  - Review of insurance regulations to reduce complexity
  - Regulatory reform to support increased flexibility
  - Transparency in safety practices, license conditions, and lessons learned/ incident and anomaly reporting
  - Orbital debris mitigation
- Space Transportation Vehicle Research
  - Vehicle safety analyses, systems, and technologies
  - Industry-developed best practices documented within AST
  - Industry-developed methodologies of existing safety models employed at fully commercial launch sites and spaceports
  - Green propellants for space transportation vehicles

Continued: R&D Themes and Priorities for Industry

- Advancement of Space Launch Integration of the National Airspace System (NAS) Research
  - Efficient airspace management technologies
  - Scheduling deconfliction algorithms
  - Real-time hazard area calculation tools
  - Defined safety criteria for launch operations
  - Airspace Access Priorities Advisory & Rulemaking Committee 2019 Report representative of many NAS and spaceport recommendations
- Aerospace Physiology and Medicine
  - Commercial health metrics database for future standards development
  - Commercial acceptance criteria for spaceflight participants
  - Suborbital research including participants with unique physiology
  - Research into adverse outcomes among crew and participants
  - Work within NASA related to habitability and human factors

Continued: R&D Themes and Priorities for Industry

- Space Situational Awareness Research
  - Identification, tracking and cataloguing of objects following deployment of large numbers of satellites
  - Collision and casualty risk for mega-constellations
  - Collision risk data accuracy and persistence
  - General debris mitigation and remediation

IIWG Task 3 Recommendations

1. AST R&D activities should be directly linked to commercial spaceflight and focused on future operational implementation from which industry and the public can benefit. Follow-through activities should aim to recognize distinct and measureable advancements in commercial spaceflight capabilities, technologies, and operations.

2. AST should continue the solicitation of industry input regarding R&D investments and efforts to stay ahead of developing requirements. This may require a narrowing of topics in order to focus funds on efforts that provide the maximum output and greatest innovation. A mechanism for on-going industry input and feedback should be created.

IIWG Task 3 Recommendations

3. AST should select R&D topics addressing the speed with which assessments of launch vehicles and their integration into the NAS can be accelerated. In particular, AST should invest in “tools or processes to evaluate, certify, and incorporate industry-developed elements and methodologies” for launch vehicles. AST R&D should also focus on the development of technologies to enable more efficient management of spaceport, launch site, and airspace activities.

4. AST should stay informed of, and support where appropriate, cross-cutting research efforts such as space situational awareness (SSA) with other U.S. government departments and agencies.

IIWG Task 4 also regarding R&D

Task 4 - R&D-2: Industry input on AST R&D CONSORTIUM

- Examine and evaluate FAA/AST's R&D plan to establish a research consortium, providing feedback and suggested improvements.
- FAA/AST seeks industry input to identify strengths and weaknesses of the current research consortium idea, and to identify additional potential alternatives and options.
- The deliverable should be in the form of a narrative report.

IIWG Task 4 also regarding R&D

Task 4 - R&D-2: Continued

Background: FAA/AST conducts near-term safety research through contract acquisitions with specific milestones and deliverables.

Longer-term research is conducted by through the Center of Excellence for Commercial Space Transportation (COE CST), funding research grants with member universities and other organizations

The COE CST is scheduled to cease operation in August 2022, and a follow-on research structure is required to focus and coordinate longer-term commercial space safety research.

AST has identified a candidate research consortium structure to fulfill this need.

IIWG Task 4 Recommendation

COMSTAC supports the FAA's direction in reforming its R&D efforts.

COMSTAC recommends that the FAA continue to develop the Commercial Space Innovation Institute (CSII) program and provide additional briefings and documents to industry. Industry, and COMSTAC members in particular, should avail themselves of these opportunities.

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March 23, 2021 Meeting

Safety Working Group Comments on Past Work

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Commercial Space Transportation Advisory Committee (COMSTAC)

March 23, 2021 Public Meeting

New Taskers

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Safety Working Group Task #1

Task #1: Update Existing Human Spaceflight Guidance Materials

There are a number of documents on the AST website providing guidance to applicants on carrying spaceflight participants (see next slide for a list). Most are out of date. Review the documents and recommend updates/revisions to bring them up to date, in anticipation of the human space flight learning period ending in 2023, or sooner. Final recommendation on revisions due at next COMSTAC meeting in Fall 2021.

Website:
https://www.faa.gov/space/legislation_regulation_guidance/

Safety Working Group Task #1

Task #1, Continued: List of Human Space Flight Related Documents on the "Guidance" Section of the AST Website:

- Human Space Flight Checklist (Jan. 2008)
- Guidance on Informing Crew and Space Flight Participants of Risk (April 2017)
- Guidance for Medical Screening of Commercial Aerospace Passengers (March 2003)
- Draft Guidelines for Commercial Suborbital Reusable Launch Vehicle Operations with Space Flight Participants (Feb 2005)

Regulatory WG Task #1

Task #1: Write Draft Regulation Revising Part 440

Recommend changes on how 440 needs to be improved and how. Specifically: Thresholds used to determine MPL, and the cost of a casualty.

Additionally:

- What alternatives to insurance would industry recommend for operators? Do the financial instruments need to be 'liquid assets' for example.
- Make a recommendation on how DOT should use maximum probable loss information to comply with the informed consent statutory requirement (U.S.C. §50905(a)(5)(A)).

Final recommendations and draft regulatory language due at next COMSTAC meeting in Fall 2021.

Regulatory WG Task #2

<u>Task #1: Propose What Industries, Organizations, and/or Individuals Ought to be Represented on Potential Future Aerospace Rulemaking Committees in the Following Areas:</u>

- Human space flight regulatory reform.
- Launch and reentry financial responsibility (insurance) reform.
- Spaceport reform.

Limit the size of each committee to a manageable amount of people. Final recommendation due at next COMSTAC meeting in Fall 2021.

IIWG Task #1

Task #1: Propose in Detail a Spaceport Grant Funding Mechanism

Review past and current infrastructure grant funding mechanisms and propose improvements and best practices that will work for the spaceport industry. Final recommendation and proposal due at next COMSTAC meeting in Fall 2021.

IIWG Task #2

Task #2: Examine how a fully electronic license application submission system might work for FAA/AST.

Recommend best practices and industry preferences. Final recommendation due by next COMSTAC meeting in Fall 2021.

IIWG Task #3

Task #3: Conduct of Aeronautical Studies.

Provide recommendations/feedback on implementing the Aeronautical Studies requirements of Sec. 539 (h) of the FAA Reauthorization Act of 2018 (FAARA). These studies determine if construction or alteration of a structure may result in an obstruction of the navigable airspace or an interference with air or space navigation facilities and equipment. The aeronautical study examines the extent of any adverse impact on the safe and efficient use of the airspace, facilities, or equipment, as well as the impact on launch and reentry for launch and reentry vehicles arriving or departing from a launch site or reentry site licensed by the Secretary of Transportation. Final recommendation due by next COMSTAC meeting in Fall 2021.

Potential Future Tasker Topic Areas

- High speed aerospace transportation – Paul Damphousse, Calspan Holdings
- To what level of safety should the FAA use when looking at regulating human spaceflight participants?
- Suggesting/drafting additional Part 450 Advisory Circulars.
- STEM promotion.

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March 23, 2021 Public Meeting

Public Comments

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Closing Remarks from COMSTAC Chair and Vice-Chair

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March 23, 2021 Meeting

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