

**AST** Commercial Space  
Transportation  
Go for launch.

# Commercial Space Transportation Advisory Committee (COMSTAC)

**September 14, 2020  
Public Meeting**

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Elaine L. Chao  
Secretary of Transportation

Welcome Remarks

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## Sec. Elaine L. Chao video



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**Steve Dickson  
FAA Administrator**

**Welcome Remarks**

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## Steve Dickson video



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Brigadier General  
Wayne R. Monteith, USAF (Ret).  
FAA Associate Administrator for  
Commercial Space Transportation

Welcome Remarks



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Maj. Gen. DeAnna M. Burt  
Director of Operations and  
Communications, Headquarters  
United States Space Force

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**FAA/AST Updates:**

**Part 450 Update  
– Lirio Liu**

**Launch and Reentry Collision  
Avoidance (COLA) Briefing  
– Steph Earle**

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# Part 450 Update

## Lirio Liu

Executive Director, Office of Operational Safety  
FAA Office of Commercial Space Transportation

### Status of Rule

After rule is published, FAA/AST will engage with industry through:

- Briefings
- Education opportunities

Announcements on these engagements and more information on those opportunities will be posted on our website.

# Launch and Reentry Collision Avoidance (COLA) Briefing

**Steph Earle**

Supervisory Management and Program Analyst, Policy and Innovation Division

FAA Office of Commercial Space Transportation

- Status of DOT Orbital Debris Rule
- Overview of Launch and Reentry Collision Avoidance (COLA) in Part 450



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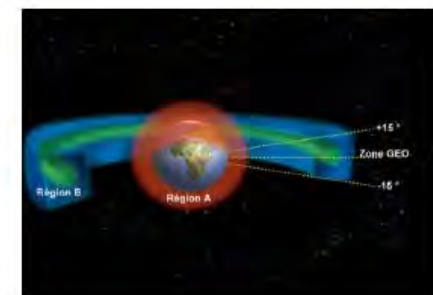
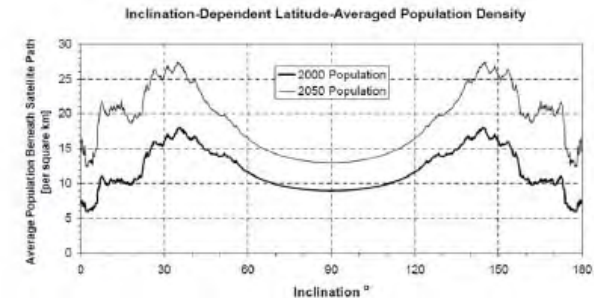
# DOT Orbital Debris Rule

FAA has jurisdiction over rocket bodies (including upper stages) through the end of launch

Goal: Updated regulations would better align with the US Government Standard Practices

Challenge: Cost vs benefits must be analyzed

- Difficult to quantify – similar to environmental concerns
- Rules that impose a cost to the industry are hard to pass through the review process



# DOT Orbital Debris Rule

Orbital Debris Mitigation Methods for Launch Vehicle Upper Stages (Orbital Debris) Popular Title: Orbital Debris Mitigation Methods

Stage: NPRM Previous Stage: None

Abstract: Orbital debris poses a growing threat to space operations. Debris mitigation guidelines, standards, and policies must be revised periodically, enforced domestically, and adopted internationally to mitigate the operational impacts of orbital debris. To help accomplish this, FAA, in consultation with appropriate Federal partners would update its existing orbital debris mitigation regulations to more-closely align with the U.S. Government Orbital Debris Mitigation Standard Practices, and would update current launch collision avoidance regulations to match U.S. Air Force Space Command (AFSPC) practice.

Rulemaking Project Initiated: 03/12/2013

New Projected Date for NPRM: 10/01/2020, likely TBD

Source: February 2020 Report on DOT Significant Rulemakings



# Launch and Reentry COLA in Part 450

§ 415.39 Safety at end of launch  
§ 415.133 Safety at end of launch  
§ 417.3 Definitions and acronyms. Remove Conjunction on launch  
§ 417.107 Flight safety. 417.107 (e)  
§ 417.113 -- Launch safety rules  
§ 417.121 Safety critical preflight operations. 417.121 (c)  
§ 417.129 Safety at end of launch  
417.231 Collision avoidance analysis  
A417.31 Collision avoidance  
C417.11 Collision avoidance  
§ 431.43 Reusable launch vehicle mission operational requirements and restrictions 431.43(c)  
§ 437.65 Collision avoidance analysis

**§ 450.169 Launch and Reentry Collision Avoidance Analysis Requirements.**

**§ 450.171 Safety at End of Launch.**

**Appendix A to Part 450—Collision Analysis Worksheet**



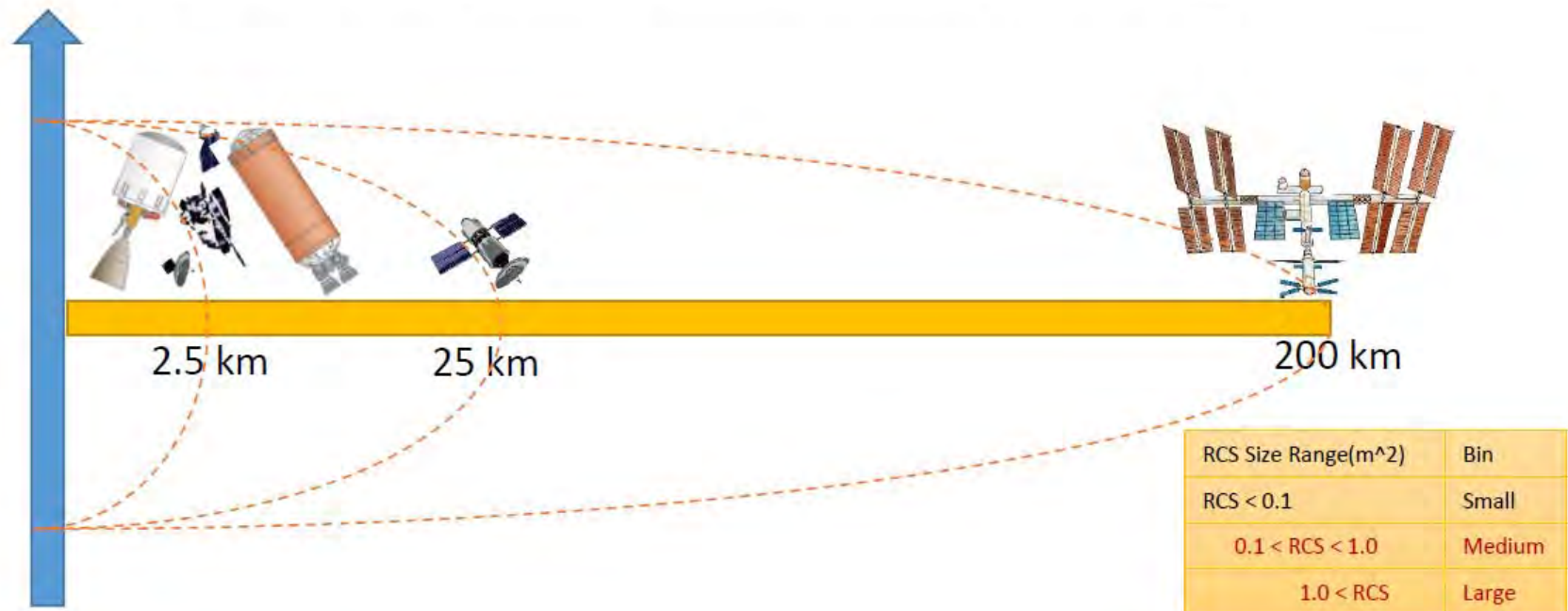
# Launch and Reentry COLA Standoff Distance Requirements

15346

Federal Register / Vol. 84, No. 72 / Monday, April 15, 2019 / Proposed Rules

FIGURE 2—LAUNCH COLLISION AVOIDANCE JUSTIFICATIONS AND TIERS

	Separation distance	Protect public health and safety	Safety of property	U.S. national security or foreign policy interests	International obligations	Avoid debris generation
Inhabitable Objects	200 km	Yes	Yes	Yes	Yes	Yes.
Active Satellites	25 km	Yes	Yes	Yes	Yes	Yes.
Trackable Debris >10 cm <sup>2</sup> (LEO).	2.5 km			Yes, if it creates significant debris.	Yes, if it creates significant debris.	Yes.
Un-trackable Debris <10 cm <sup>2</sup> (LEO).	Not applicable					Protect with shielding & design.



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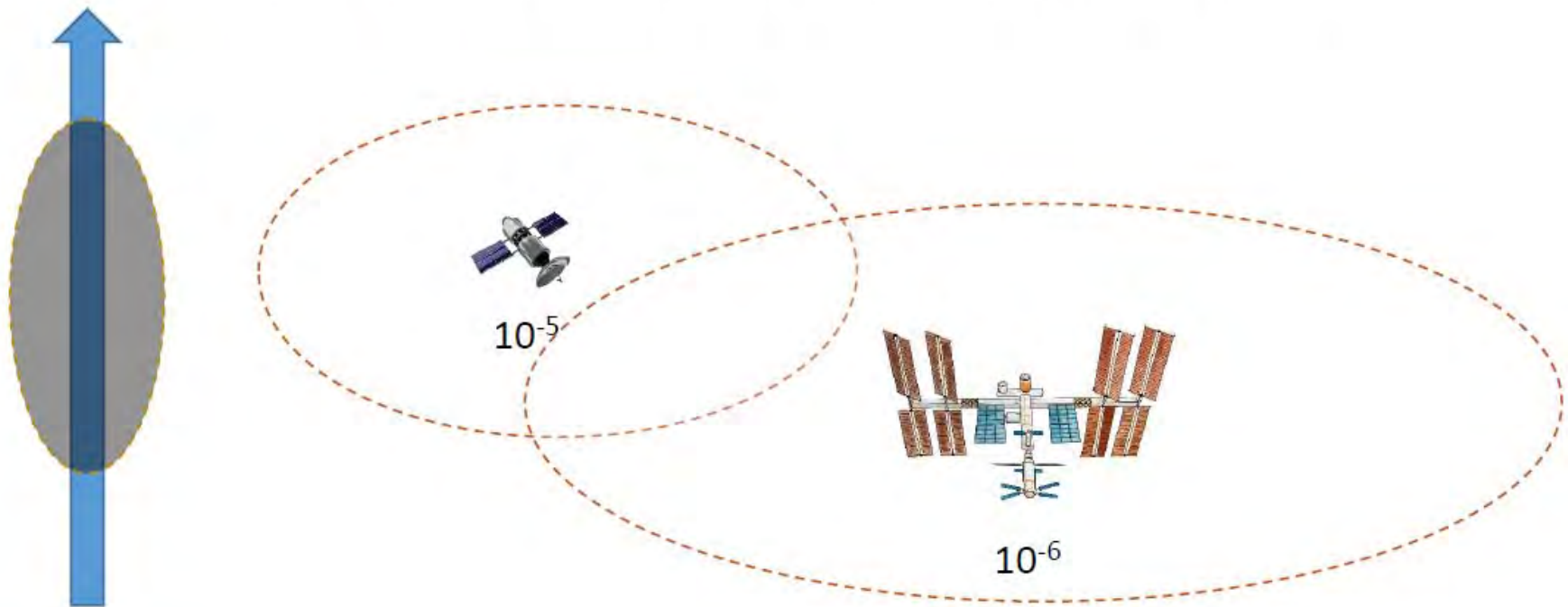
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# Launch and Reentry COLA Analysis Probability of Collision Requirements

When an operator can provide sufficient covariance the probability of its collision with an inhabitable object can be accurately calculated and launch window closures can be limited to only those times where actual high risk exists.



# Orbital Safety – ODM/STM/SSA

## STM CFE responsibilities

**Conjunction Assessment** (predict close approach)  
**Collision Avoidance** (maneuver planning spt)  
**Launch Deconfliction** (deconflict windows, launch and early orbit spt – tracking)  
**Deorbit/Reentry** (CA spt for maneuvers, reentry predictions)  
**Disposal/End-of-Life** (advise on disposal orbits, CA spt to maneuvers)  
**Anomaly Resolution** (tracking, health/status, EMI spt, )  
**Space-track.org** (unclass database for space users)

## Orbital Debris Mitigation responsibilities

**Limit Source Debris** (Limit debris released during normal operations)  
**Limit New Debris** (Minimize debris generated by accidental explosions)  
**Pre-launch Planning** (Select safe flight profile )  
**Disposal – debris removal** (EOM disposal procedures for spacecraft and upper stages)  
**Special Operations Unique Considerations** (Large constellations, Small Satellites)



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# Launch and Reentry COLA – the Future

## LCOLA Issues

- Covariance discussion
- Standoff distance
- Cluster launch discussion
- Debris updates
- LCOLA Gap

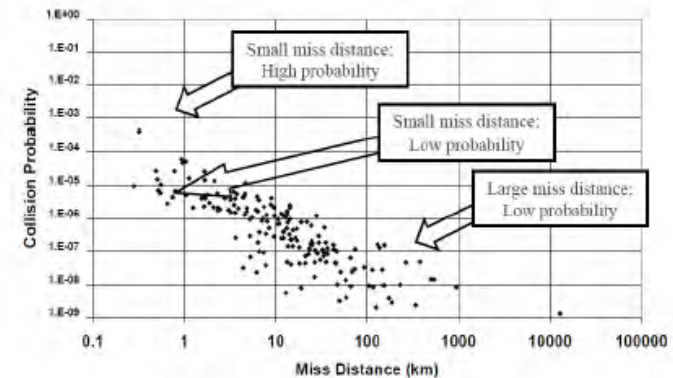
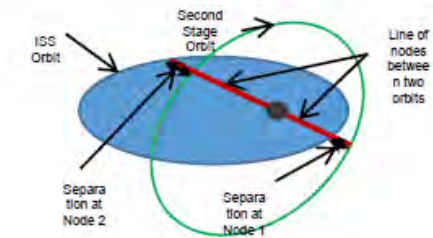
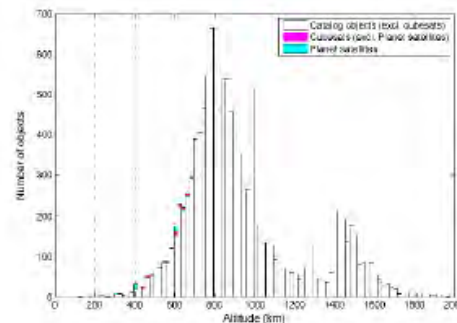
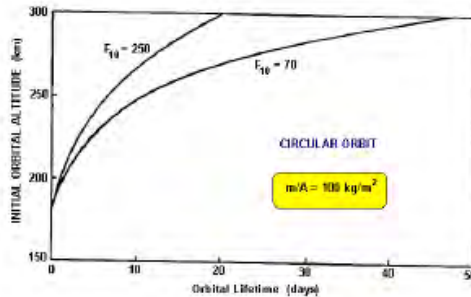


Figure 15.11 Collision probability versus miss distance for sample constellation in LEO



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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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# Commercial Space Transportation Advisory Committee (COMSTAC)

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Safety Working Group  
Tasker Response and Discussion

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# Safety Working Group Tasking

The COMSTAC Safety Working Group (SWG) was tasked with formulating human spaceflight best practices to guide industry in anticipation of updates to human spaceflight regulations upon expiration of the commercial industry moratorium under the 2015 Commercial Space Launch Competitiveness Act (CSLCA).

This regulatory moratorium is currently extended through 2023.



# Safety Working Group Tasking

Specifically, the SWG was tasked to:

- Determine the extent to which voluntary consensus standards are being used by industry
- Identify any existing industry-developed voluntary consensus standards appropriate to serve as means of compliance or regulation
- Make recommendations on how to implement a voluntary safety reporting system for the commercial space transportation industry



# Observation/Finding/Recommendation 1

- **Observation:** The current commercial human spaceflight safety framework, while providing value to the public and crew; does not have the specificity nor the mandate necessary to address non-crew participant safety.
- **Finding:** The COMSTAC has determined that while the industry is still learning, it has developed a valuable knowledge base on which to build voluntary standards that may inform potential future regulations whenever the current moratorium terminates.
- **Recommendation:** FAA form a Commercial Spaceflight Safety Space Rulemaking Committee (SRC) to focus industry efforts on voluntary standards development, help the space community apply relevant lessons learned, and inform future regulations on commercial spaceflight in general as well as human spaceflight.



# Observation/Finding/Recommendation 2

- **Observation:** The SWG reviewed existing commercial space standards published by multiple organizations to determine applicability to the human spaceflight safety framework.
- **Finding:** While industry has contributed significant time and effort to this standards development process, overall development of commercial consensus standards has been a slow process, a phenomenon which is not uncommon in other industries.
- **Recommendation:** FAA retain a systems engineering and technical assistance organization (e.g., MITRE, Aerospace Corporation) as soon as possible to conduct the CSLCA-required independent review on readiness for an evolved commercial human spaceflight safety framework.



# Observation/Finding/Recommendation 3

- **Observation:** Industry has already gained much relevant human spaceflight experience and learned lessons through many years of engineering development, review, ground tests and test flights, a few with their own crew as well as with government astronauts. Accidents and serious incidents, while regrettable and inevitable in any transportation sector, have occurred and offer valuable data points.
- **Finding:** A standardized reporting structure is called for.
- **Recommendation:** FAA develop a reportable incident database with the goal to provide public access for certain safety-critical data, based initially on the required informed consent process.



# Observation/Finding/Recommendation 4

- **Observation:** Lessons learned from almost a century of aviation safety regulation have contributed to the development of one of the world's safest transportation systems and many of these lessons are also applicable to the emerging commercial human spaceflight industry.
- **Finding:** Companies should implement internal safety reporting systems with the intent to eventually integrate with a future industry-wide voluntary space safety reporting system modeled after the Aviation Safety Action Program (ASAP) used in commercial aviation. Significant differences between the aviation and the current space transportation sector are noted and include lack of operational experience and a much wider diversity of vehicle designs.
- **Recommendations:**
  - That FAA plan for implementation of an industry-wide voluntary space safety reporting system based on the ASAP program, and provide guidance to industry on development of internal reporting systems that will interface with the industry-wide system.
  - That FAA AST supports industry development of a voluntary safety reporting system.



# Observation/Finding/Recommendation 5

- **Observation:** Several standard setting organizations have done work on standards for spaceflight safety. These include the International Standards Organization, International Association for the Advancement of Space Safety (IAASS) and ASTM International.
- **Finding:** While all of these organizations have contributed valuable material for consideration by industry and rule makers, ASTM F47 was found to have the largest engagement of US industry, government and academia. US companies have more to gain from collaborating on a domestic safety framework that satisfies FAA licensing requirements than from engaging with international entities that have yet to develop similar capabilities. FAA has had significant involvement as observers in the development process.
- **Recommendation:** FAA and COMSTAC continue to support the ASTM International Committee on Commercial Spaceflight as the technical standards organization responsible for development of US commercial industry consensus standards.

# Areas of consensus for standard setting in human commercial spaceflight

Informed by:

- **Industry feedback** from firms conducting human spaceflight soon:
  - Blue Origin
  - Boeing
  - SpaceX
  - ULA
  - Virgin Galactic
- **Existing standards** documents from sources including ASTM and ISO
- **Existing regulations** in 14 CFR §460 that currently apply to crew



# Cabin Safety

- Focus on “loss of crew/occupants” vs. “loss of mission”
- Pressure, temperature and humidity maintenance
  - Emergency depressurization mitigation
  - Atmospheric management
  - Redundant O2 supply option
- Occupant restraint systems
- Smoke and fire management
  - Detection
  - Suppression



# Emergency Procedures

- Efficient and simple egress
- Escape systems (when needed)
- Search and rescue and medevac preparations
- Mishap investigation



# Ground Ops and Material Handling

- Ground safety
- Limiting hazardous operations risk to occupants and adjacent operations





# Software

- Software development
- Software validation and testing standards



# Testing, Information and Training

- Informed consent standards
- Critical Personnel trained for safety of occupants
- Flight testing
- Qualification testing of components including FTS



# Data Standards

- Lessons learned / incident database
  - Non-proprietary info.
  - Anonymized (difficulties with this in a small, diverse group acknowledged)
- Risk analysis standards
- Occupant risk assessment standards
- Collision avoidance standards
- Orbital debris catalog
- Definitions





# Additional recommendations

- Standards need to stay at the performance-based level, and move prescriptive content to an accompanying guidance document
- Leveraging governmental insight (NASA, FAA, etc.)
- Continued support of ASTM F47 with FAA representation



# Areas lacking consensus requiring further exploration

- Autonomy
- Testing to qualification / failure



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**Lunch Break**

**We will start again at  
12:00 eastern.**

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Regulatory Working Group  
Tasker Response and Discussion

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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.



# Future Rulemaking Task: Process

## Task Plan (as implemented)

- ✓ Identify strategic changes to rulemaking process
- ✓ Initial survey via associations
- ✓ Create detailed survey (esp. re impacts)
- ✓ AIA, CDSE, CSF emailed survey to their members & a few others (no broad public call)
- ✓ Collect/anonymize responses
- ✓ Share and assess responses
- ✓ Create initial prioritized list





# Future Rulemaking Task: Building on a Good Start

**RWG acknowledges the tremendous effort put forth by AST staff over 3-1/2 years:** starting with informal industry discussions, signing up to an unprecedented schedule in SPD-2, creating a first-ever space-related ARC (plus two others) while initiating an accelerated NPRM process, receiving “strong feedback”, and then rushing to complete a final rule... most of that accomplished within the last 30 months... *while industry grew in cadence, breadth, & diversity.*

**This task builds on the foundations laid by SLRLR rule-making, and gleans its lessons to continue upwards!**



# Future Rulemaking Task: Final Recommendation - 1

**Top priority: Perfect/Augment SLRLR initiative using a new DOT-chartered 'AeroSpace' Rulemaking Committee**

- **Strategic learnings from SLRLR (and preceding efforts):**

RWG in agreement that AST rulemaking needs to become more interactive and transparent. AST should use rulemaking committees earlier and **longer** to engage industry expertise, attain consensus approaches, and **continue to engage with involved stakeholders throughout the rulemaking process.**

Example: DOC/NOAA reacted to industry concern with OCRSRA's initial NPRM to reform remote sensing regulation by stepping back, involving OSC, **engaging with ACCRES**, and producing dramatically different rule that was consistent with SPD-2.



## Future Rulemaking Task : Final Recommendation - 2

### Top priority: Perfect/Augment SLRLR initiative using a new DOT-chartered 'AeroSpace' Rulemaking Committee

- DOT should utilize new (2018 FAA Reauth) statutory authority to **immediately** create Aerospace Rulemaking Committee limited to space industry to help AST implement and build on SLRLR rulemaking by:
  - Reviewing final rule and prioritizing any truly urgent problems that might “break the licensing process”
  - Assist in developing/reviewing several advisory circulars to accompany and simplify compliance with Part 450
  - Draft consensus improvements to Part 450 that help realize fullest possible streamlining per SPD-2 (within similar scope)
- Ideally AsRC set up before/with publication of final Part 450 rule.



# Future Rulemaking Task: DRAFT Recommendations - 1

Three medium priorities within 14 CFR 400 et seq.:

- **Revise launch/reentry site rules (Parts 420, 433)** to conform to final version of 450 and pursue other streamlining improvements. (=> Infrastructure & Innovation Task Force)
- **Part 440 (liability)** includes confusing provisions, e.g. conflict between spaceports' liability management plans and regulatory requirement to waive all claims against parties, including damage outside of licensed activities. Spaceflight Participant liability needs to be addressed, as do MPL calculations for commercial services performed for government customers.



# Future Rulemaking Task: DRAFT Recommendations - 2

## Three medium priorities within 14 CFR 400 et seq. (cont'd):

- No clear regulations on airspace telemetry requirements (only internal FAA policy) for providing real-time vehicle data into the FAA ATC system, instead of levied as condition of securing airspace LOA. Burden may be higher for commercial than gov't missions.

***Note: All of these would benefit from further definition before extensive discussion and final recommendation.***



# Future Rulemaking Task : DRAFT Recommendations - 3

## Last major reform topic: Environmental Reviews (per NEPA)

**Background:** in early 2020 the White House Council on Environmental Quality published a final rule updating the process by which agencies assess environmental impacts of “major decisions,” including what constitutes a major decision.

Some licensees/applicants have communicated concerns over lack of equivalence between review process for comparable vehicles at differing locations. SPD-2 aimed to enable standard launch/reentry vehicles with standard payloads flying standard missions at multiple pre-approved site;; this necessitates consistency in approach to, and standards for, the environmental review process. consistent EA processes/standards.

**Note: this is likely a challenging task, but it needs to be started soon.  
There may be a role for AST contractors with industry expertise to help.**



# 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.

# Industry Request

Industry requests more clarity on:

- what is required to move from Pre-Application Consultation to Evaluation;
- what constitutes “complete enough;”
- what constitutes an acceptable application;
- how the applicant should provide data and information to the FAA; and
- how the FAA can streamline the process to conserve resources for the agency and for the applicants.



# 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.

# Methodology

- Reviewed FAA AST international MOUs and white papers
- Interviews with FAA AST international and licensing staff, launch industry representatives, and former gov official
- Discussion and input from COMSTAC Regulatory Working Group



# Recommendations – Current Practices

- **Endorse FAA/AST's risk-based assessments** of required on-site inspections at non-US launch sites
- **Endorse earlier in-depth gov to gov activity** by FAA/AST and Department of State (“pre pre-application”) where warranted. Considering both necessary trade agreements and then next layer of regulatory discussion
  - UK may be in this position now and could serve as a pilot
- **Endorse FAA/AST leader/follower model for cross-USG activity** – In some cases, for example, launches from areas of the ocean, where additional USG licenses are required, FAA AST acts as the leader for coordinating approvals from the other USG entities



# Recommendations – New Actions

- **MOU process** – In cases where the non-US jurisdiction does not have comprehensive regulations in place, recommend FAA AST enter into an MOU allowing the FAA AST process to govern initial launch activities while the non-US jurisdictions establishes its framework.
- **Partial or Mutual Recognition Agreements** – Starting as soon as non-US activity is “likely enough” (previous recommendation), AST and State should work to establish partial or mutual recognition agreements with non-US launch jurisdictions outlining the specific aspects of the non-US regulatory framework AST will consider adequate to meet AST licensing requirements.
- **Encourage MOU and Recognition Agreements** – For non-US jurisdictions without regulatory frameworks or developing their regulatory framework, recommend FAA AST advocate that the non-US framework allow the use of MOUs and mutual or partial agreements.
- **Cross Waiver Education Support** – Recommend FAA AST and State help educate non-US governments on FAA AST required cross waivers, which are often in conflict with non-US entities typical agreements.
- **Regulatory Templates** – Recommend FAA AST develop detailed templates of its regulatory structures to enhance technical assistance to non-US government without an existing regulatory framework.





# Recommendations – Further Study

- **FAA Aviation Lessons Learned** - Recommend FAA/AST seek lessons learned from FAA / DOT from its international activities and coordination on the aviation side.
- **Multi-Site Environmental Assessments** – Recommend FAA AST explore the ability to grant operators Environmental Assessments that encompass multiple sites at a time, including both commercial spaceports, international airports, and military bases
- **Significant Statutory Changes**
  - Further study on impact of statutory change on **definition of “US Citizen”**
  - Further study on impact of statutory or Executive Order change on applicability of **US environmental regulations** in non-US jurisdictions
- **Next Steps:** further public input, finalization of white paper



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Innovation & Infrastructure (I&I)  
Working Group  
Tasker Response and Discussion

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# I & I Working Group Task #1

**Task #1: FAA Office of Spaceports.** Recommend changes, if any, to the existing Space Transportation Infrastructure Matching (STIM) grants program. Define how this program, or a similar spaceport infrastructure funding mechanism, might work: eligibility criteria for grantees, qualified uses of funds, funding, and preferred funding sources.

**Recommendation:** The Innovation and Infrastructure Working Group (IIWG) recommends the U.S. government create a federal program for funding improvements at spaceports.



# Background

Throughout US history, Congress has supported nearly every form of transportation through federal funding for infrastructure improvements.

In order to match anticipated future demand for launch volume and variety (and safeguard US leadership in launch capabilities), spaceport infrastructure is the next mode of transportation that requires assistance from designated federal funding.

Over the last decade, discussion of multiple different funding mechanisms for spaceport improvements has taken place. Some options include:

- Creating a spaceport-specific program, similar to the Airport Improvement Program (AIP)
- Renewing focus on the Space Transportation Infrastructure Matching (STIM) grants program
- Creating a new matching grants spaceport infrastructure improvement program administered through FAA AST's Office of Spaceports
- Encouraging federal agencies (DOD and DOT, for example) to share the cost of improvements for spaceports that serve a variety of government and commercial customers



# Discussion

- STIM was a good first effort at making federal funding available to non-federal spaceports but has not been successful in the long run. However, IIWG still believes a matching grants program that encourages state and local investments is the best way to move forward.
- This could be achieved through updating/reinvigorating the STIM program or through creation of a new grants program that would be run through the Office of Spaceports at FAA/AST, which is the US government institutional knowledge base and authority on spaceports.
- Such a program would be subject to the annual Congressional appropriations process. This will be necessary until there is enough launch activity across the different spaceports to generate money sufficient to warrant an Airport Improvement Program (AIP)-like program for spaceports that is both “self-funding” and able to provide adequate resourcing for meaningful projects.
- Some items that might be considered as grant “criteria” include: the level of existing launch activity at the spaceport, the availability of local funding support to meet the matching requirement, and assurance that grants will be awarded for capital improvements, not operational expenses.



# 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.

**Response:** This concept holds much promise and we endorse the working group concept as a vehicle to drive this idea through to its full development. However additional understanding is required to fully grasp how it would be implemented and if it would achieve its very aspirational yet essential goals in the future. More time to incorporate additional perspectives and stakeholder deliberations is encouraged.



# Questions Raised By Industry

**Interagency Feedback Group** – How to properly incorporate non-USG stakeholders, primarily industry, and also states, who will be major players in this enterprise?

**Merging of KSC into CCAFS** is a major simplifying development for the commercial sector and relieves NASA & DOD of non-core mission responsibilities. How are the equities of National Park Service and Fish & Wildlife Service at the Cape to be properly addressed?

**Bonding and Financing.** With USG assuming liability as a financial backstop, how would the benefits of a commercial business model available to private sector truly develop?

**Other issues:** Eminent domain authority? Menacing ambiguity in the application of USDOT Section 4(f)? Potential revisiting of other governance models to achieve desired USG as ‘tenant & customer’, as opposed to traditional ‘landlord and operator’? Implications of potential future expansion to other Federal ranges?

# Observations

**Don't kill the golden goose.** National Security imperatives must always have priority. However, to not drive the growing commercial sector to move elsewhere (it's happened before), and thus defeating the purpose of the entire effort, clarity of definitions and expectations for ops by commercial marketplace is demanded. This will be hard.

**Competition with non-ER/WR facilities.** Spaceports not a part of this concept will perceive the USG evolving into competition with them. COMSTAC recommendations will seek to provide transparency and reason to best mitigate misunderstandings as USG customers make decisions. And to provide appropriate recourse to those decisions.

Initial Charter for new Authority leaves open which agency is best positioned to oversee it, and proactively incorporates a mandate to facilitate advanced manufacturing capability and to cultivate the necessary STEM activities to sustain the workforce in the region.

FYI - Industry trade association CSF has been crafting a White Paper to address a national spaceport authority. ETA TBD.



# Regulatory and I&I Working Group Task

The Innovation and Infrastructure (I&I) Working Group initiated this task. Between now and the next public COMSTAC meeting, the Regulatory Working Group will continue to refine the recommendations before bringing them to the full COMSTAC.

**Task: Spaceport Regulatory Reform.** Research current methods and best practices, consult with a variety of industry stakeholders, and then propose regulatory language revising how FAA/AST authorizes launch and reentry sites.

# Recommendation 1 and Discussion

**Recommendation:** Implement a “gated threshold” approach that creates a preliminary or contingent “spacepark” authorization for aspirant spaceports pursuing local economic growth prior to their identification of launch operators.

**Discussion:** Licensing a spaceport without a launch operator is problematic for both AST and the applicant. Organizing a tiered consideration of aspiring spaceports with clearly defined on-ramps once a launch operator is identified will help streamline the AST application process while also reducing costs and confusion to local communities. This approach would provide applicants increased support during each step of the process, set realistic expectations, provide guidance on resources and approvals needed to obtain a spaceport license, and reduce the AST license application backlog. In addition, this economic spacepark “gated threshold” may invoke an interagency view to this future critical infrastructure. For example, the spacepark authorization process may be supported by the DoC/Economic Development Agency (EDA).

**Background Note:** Requiring a spaceport have a named launch operator, rather than a concept vehicle, may require a change to the law (CSLA). Also, there may need to be a distinction between launch/reentry commercial market and all other space economic activity at the spacepark. That is, can there be an exclusive (single) operator, or must operators be treated like all the other spacepark participants and remain open to competition at that site?



# Recommendation 2 and Discussion

**Recommendation:** Create a flexible, strategic roadmap for US spaceports both individually and as part of a US and internationally network against which to prioritize and evaluate regulations for individual spaceport applications and future grants.

**Discussion:** DoT/FAA-AST is legally required in [US Code part 51](#) to both protect public safety (both of the NAS and uninvolved third party individuals on the ground or at sea) and to promote and facilitate the commercial space transportation industry. To embrace this responsibility, AST should create a flexible, strategic roadmap for US spaceports against which to evaluate success or shortcomings of regulations for individual spaceport applications. The newly established Office of Spaceports in AST is a logical office in which to develop and sustain such a roadmap that helps the overall US launch industry to become resilient and competitive and to recommend USG infrastructure investments.



# Recommendation 3 and Discussion

**Recommendation:** Translate Part 420 from prescriptive to performance based. As a part of a performance based approach, consider moving the ground safety burden of proof onto the spaceport operator, not the launch or reentry operator (similar to airports)

**Discussion:** Per strong and consistent industry input, move away from prescriptive and change to performance based regulations that insure public safety.





# Recommendation 4 and Discussion

**Recommendation:** Generalize the environmental and hazard portions of spaceport licenses like is done for aircraft and airports, such that they can acknowledge and incorporate state & local regulations.

**Discussion:** As a part, of moving to a “performance based” approach, AST should acknowledge that state & local regulations on hazardous materials and operations can be leveraged to meet the Part 420 goals for a particular site. Part 420 confusing with respect to other regulations (e.g., DoD 6605 guidelines for hazardous materials (QD [quantitative distance])), and AST does not enough resources or expertise to evaluate. In the long run, consider empowering spaceports with the authority to meet the requirements under their own authority and to be able to issue permits or fines. Currently, spaceports only have authority over: control of public access, scheduling events, defining the envelope of activity, explosive storage, public facilities, and keeping records. All else is covered by the space operators (users of spaceports)



# Recommendation 5 and Discussion

**Recommendation:** Work with DoC and the interagency to modify statute that allows “maximum probable loss” liability coverage of state/local assets in addition to private and federal assets.

**Discussion:** Filling the “donut hole” on liability coverage for state/local assets will positively affect state and local spaceport economic investment decisions, but requires legislative changes. “Maximum probable loss” calculation does not significantly increase if state/local government assets are covered as well as private & federal, only who gets the money. Fixing this “hole” has been attempted in the past but never succeeded.



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AST Priorities for COMSTAC  
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# Finalized Recommendations

At the next public meeting:

COMSTAC will present finalized recommendations (i.e. will vote on whether to forward the recommendation to the FAA) on all of the draft recommendations presented here today.

- Please forward any written feedback you may have on anything presented today to the COMSTAC DFO James A. Hatt. He will send it on to COMSTAC for their consideration.

Additionally, the Innovation and Infrastructure Working Group will present a final recommendation for COMSTAC's consideration on each of the following taskers (see next two slides):

# Innovation & Infrastructure Working Group

## **NEW COMSTAC TASKER: 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.

FAA/AST seeks industry input to 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. 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 statute 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?

# Innovation & Infrastructure Working Group

## NEW COMSTAC TASKER: TASK 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. The deliverable should be in the form of a narrative report.

### Background:

FAA/AST conducts near-term safety research through contract acquisitions with specific milestones and deliverables. Longer-term safety research is conducted by FAA/AST through the Center of Excellence for Commercial Space Transportation (COE CST), funding research grants with member universities and other organizations (e.g., affiliate members, associate members, and collaborators). Currently, the COE CST is scheduled to cease operation in August 2022, and a follow-on research acquisition 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.

FAA/AST seeks industry input to identify strengths and weaknesses of the current research consortium idea, and to identify additional potential alternatives and options.

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Closing Remarks from  
COMSTAC Chair and Vice-Chair

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