Current and Emerging Regulatory Aspects: SmallSats & Propulsion Systems

Propulsion Systems 101 Interactive Workshop
July 8, 2020

Ian Christensen

ichristensen@swfound.org

Director of Private Sector Programs

Secure World Foundation

Secure World Foundation – Who We Are

- Secure World Foundation ***is a private operating foundation*** that promotes cooperative solutions for space sustainability

The Foundation acts as a research body, convener and facilitator to examine key space policy topics often through partnership.

Small Satellites and Small Launch

Small Satellites & Cube Satellites

Opportunities

- Lower costs of access to space technology
- Lower technical and scientific barriers
- Broaden and diversify actors and users
- Enable new applications and services
- Commonly operate at low altitudes with short-lifespans (although this may be changing)

Challenges

- Diverse, heterogeneous set of actors
- Pace of innovation challenges regulatory fit and efficiency
- Often lack propulsion and have limited maneuverability and may pose challenges for tracking
- Reliability may be limited

Source: SpaceNews and Spaceflight Industries

Small-class Launch Services

- Emerging market for launch services focused on small satellites
- Challenges in developing best practices for payload deployment and identification
- Launch operators as de-facto gatekeeper for payload regulatory compliance
- Rapid & regular launch cadence will challenge efficacy of licensing regime

Key U.S. Regulatory Authorities

Federal Communications Commission

- Spectrum licensing for Earth stations and space stations (satellites/constellations)
- Space debris mitigation requirements / oversight
- Licensing for **satellite owner/ operators**

Federal Aviation Administration Office of Commercial Space Transportation (AST)

- Commercial space launch licensing and payload review process
- Licensing for **launch operators**

Department of Commerce

- NOAA – Commercial Remote Sensing Licensing
- Licensing for **satellite owner/ operators**
- Office of Space Commerce – future role in commercial space licensing & space traffic management?

United States Space Force

- 18th Space Control Squadron (SPCS) - space situational awareness (SSA) sharing program & conjunction assessments
- Range safety requirements and range operations

Regulatory Reform: Space Policy Directive-2

PRESIDENTIAL MEMORANDA

Space Policy Directive-2, Streamlining Regulations on Commercial Use of Space

INFRASTRUCTURE & TECHNOLOGY | Issued on: May 24, 2018

(Image: © White House Photo by Shealah Craighead)

- **Building on Earlier Work:** Regulatory reform efforts, focusing on SSA/STM began in the Obama administration
- **Review and Streamlining:** Initiated a review and streamlining process across all executive branch agencies with role in oversight and regulation of commercial and non-governmental space activities in the U.S.
- **Reorganization:** Directed efforts to increase the role of the Department of Commerce in oversight and promotion of space activities
- **Rulemaking:** Initiated a number of rule making activities related to launch, remote sensing and export control
- **Coordination:** The FCC is not directly subject to SPD-2, so executive branch agencies are directed to coordinate with the Chairman of the FCC

Recent U.S. Rulemaking Proceedings

FCC

"Streamlining Licensing Procedures for Small Satellites"

"Mitigation of Orbital Debris in the New Space Age"

NOAA

"Licensing of Private Remote Sensing Space Systems"

Commerce

RFI on Space Situational Awareness (SSA) and Space Traffic Management (STM) Services

FAA

"Streamlined Launch and Reentry Licensing Requirements"

Key Provisions: NOAA Remote Sensing Licensing Proceeding

Final Rule: "Licensing of Private Remote Sensing Space Systems"
Federal Register No: *2020-10703* Docket No.: 200407–0101

- **Current Status:** NPRM and review process completed. Final rule adopted as of June 2020 - effective date is July 20, 2020.
- **Key Aims:**
  - Aims to speed up and increase efficiency in the timelines for processing and issuing NOAA remote sensing licenses
  - Establishes low and high risk categories with different licensing requirements
  - Clarifies and imposes additional cyber security requirements, including specific requirements for systems with propulsion

Key Provisions: FAA Streamlined Launch and Reentry Licensing Requirements

NPRM: "Streamlined Launch and Reentry Licensing Requirements"
Federal Register No: *2019-05972* Docket No.: FAA–2019–0229

- **Current Status:** Comment period closed, and under review in FAA/AST, expected finalization in September 2020
- **Key Aims:**
  - To "consolidate and revise multiple regulatory parts and apply a single set of licensing and safety regulations across several types of operations and vehicles"
  - Original "proposed consolidation would retain most of the current payload review requirements"
- **Issues and Concerns (of original NPRM):**
  - not adequately performance-based as intended
  - adds burdens and costs
  - lacks the flexibility to allow for innovation

Source: https://spacepolicyonline.com/news/csfs-stallmer-slams-faas-proposed-commercial-space-regulations/

Key Provisions: FCC SmallSat Proceeding

Order on Streamlining Licensing Procedures for Small Satellites

Federal Register Number: 2018-10943 IB Docket No.: 18-86

Approved August 1, 2019 and now in effect

License Part	FY 2020 Proposed Regulatory Fee (as of May 13, 2020)	Effect From New Rule
Part 25 (Commercial GSO)	$89,900 (per operational *station* in geostationary orbit)	Creates sub category below
Part 25 (Commercial NGSO)	$287,350 (per operational *system* in non-geostationary orbit)	New subcategory created with lower fee
Part 5 (Experiemental)		Not Affected
Part 97 (Amateur)		Not Affected

Key qualifying characteristics for new Part 25 subcategory:

- 10 or fewer satellites under a single authorization
- Total in-orbit lifetime of satellite(s) of six years or less
- Maximum individual satellite wet mass of 180 kg.
- Propulsion capabilities or deployment below 600 km altitude
- Ability to share use of authorized frequency band
- Relatively low risk from an orbital debris perspective

Key Provisions: FCC Orbital Debris Proceeding

NPRM: "Mitigation of Orbital Debris in the New Space Age"

Federal Register Number: 2019-02230 IB Docket No.: 18-313

- **Current Status:** Some measures adopted by FCC on April 24. Many items continued in Further Notice of Proposed Rulemaking, which will be open for industry comments
- **Key Drivers:**
  - Maintain and promote safety of the orbital operating domain
  - Address reliability and post mission disposal for large NGSO constellations
  - Adequacy of "25-year rule" (guidelines and requirement for disposal within 25 years of end of life)
- **Requirements Seeking Further Comment**
  - A performance bond for successful post-mission disposal
  - Probability of accidental explosions
  - Total probability of collisions with large objects
  - Maneuverability above a certain altitude in LEO
  - Post-mission orbital lifetime
  - Indemnification of the U.S. government against liability

Resources

- Register your satellite/payload with the 18th SPCS to contribute to space flight safety and receive conjunction assessment services: https://www.space-track.org/documentation#odr
- https://www.space-track.org/ - has a range of information on SSA services and registration best practices
- NASA Cubesat 101 Guide – discussion of "Basic Concepts and Processes for First-Time CubeSat Developers" - includes overview of regulatory requirements/agencies
- Mission planning guides (or similar material) provided by launch service providers (see e.g. Spaceflight's Mission Planning Guide version as of February 2019)
- DoD Range safety requirement documents, via NASA: https://kscsma.ksc.nasa.gov/RangeSafety/reqDocs/DoDlinks

Thank You!

ichristensen@swfound.org