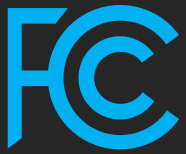


Updating FCC Regulations for Small Satellites

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CUBESAT DEVELOPERS WORKSHOP, April 24, 2019

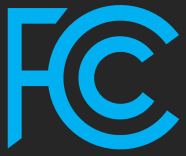
At the FCC, are cubesats special?



- Today, a qualified no.
 - Cubesats (and other small satellites) follow the same rules as any other satellite.
 - But, some factual scenarios are more prevalent with small satellites.
- In the Future?
 - The FCC is considering rule changes to provide an optional, small-satellite specific process to facilitate licensing of cubesats, other small satellites, and missions beyond earth orbit.

- **Three Satellite Processes (for non-Federal stations)**
 - “Part 25”--Regular Licensing
 - Experimental Licensing under Part 5 of the FCC Rules
 - Amateur Radio for communication by amateurs for permitted amateur radio purposes under Part 97 of the FCC Rules
- Process depends on the purpose of the satellite operations
- **Common features of all three processes:**
 - Orbital Debris Mitigation Plan Required
 - International Telecommunication Union (ITU) Filing (with ITU Cost recovery fees for Part 25 and most experimental)

Amateur Satellites



- FCC regulations permit amateur satellite operations if:
 - The station operates in appropriately allocated amateur frequency bands
 - The station apparatus is controlled by a person holding an amateur station license
 - The station is more than 50 km above the Earth's surface aboard “any craft that is documented or registered in the United States”
 - The communication is by amateurs for permitted amateur radio purposes (self-training, intercommunication and technical investigation carried out by amateurs, that is, duly authorized person interested in radio technique solely with a personal aim and without pecuniary interest)

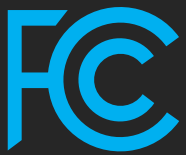
Amateur Satellites (cont'd)



- When is a craft “documented or registered in the United States”?
- The FCC requires a pre-launch filing including:
 - IARU Coordination letter
 - Detailed Technical description of the design and operation of the spacecraft
 - SpaceCap file (for ITU submission)
 - Orbital debris mitigation plan
- A craft is considered “documented” when these materials are sufficient to justify submitting the ITU filing, and recommending to the Department of State that, from an FCC perspective, the satellite is sufficiently supervised to warrant registration by the U.S. with UNCOPUOS, consistent with U.S. treaty obligations.

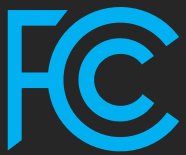
- Stations operating in the Experimental Radio Service:
 - May conduct the following types of operations:
 - Experimentation in scientific or technical radio research
 - Communications essential to a research project
 - Authorized NIB (non-interference, unprotected basis)
- Can be in any frequency band, but appropriately allocated bands may facilitate NIB operations
- Application filing fee \$70
- ITU cost recovery fees

Part 25 Licensing



- Primarily used for commercial services, but not limited to commercial service
- Requires a detailed technical and legal submission
- Application Fee
 - New NGSO: \$ 471,575.00/constellation
- Annual regulatory fees (FY 2018, recalculated annually)
 - NGSO: \$ 122,775/constellation
- ITU cost recovery fees

Small Satellite Licensing NPRM



- Notice of Proposed Rule Making adopted April 2018:
 - Seeks comment on special rules for small satellites:
 - A new application process for licensing Part 25 small satellites, involving lower application fee (\$30,000)
 - New process is optional—no changes proposed to FCC’s rules for the existing experimental, amateur processes
 - Proposed as an alternative for applicants, but would not replace existing licensing processes
- Comments and reply comments submitted fall of 2018; FCC staff analyzing and developing recommendations.

Small Satellite NPRM (cont'd.)

- Proposed criteria for small satellites eligible to use the process:
 - 10 or fewer satellites under a single authorization
 - Satellite mass of 180 kg or less
 - Satellites on-orbit for five years or less
 - Deployment at or below 400 km (below ISS) if the satellite lacks propulsion
 - Identifiable by unique marker (to assist in cataloging and tracking)
 - Physical dimensions 10cm X 10cm X 10cm or greater.
 - No operational debris
 - Probability of large object collision during orbital lifetime $<.001$
 - Disposal via atmospheric re-entry with $E_c=0$
- NPRM sought comment on whether any criteria should be adjusted for missions beyond Earth orbit

- FCC NPRM adopted November 15, 2018
 - First comprehensive look at the FCC’s orbital debris rules since their adoption in 2004
 - The proposed rule revisions are designed to improve and clarify the rules, based on experience gained in satellite licensing and improvements in mitigation guidelines and practices since 2004 (NASA guidelines, etc.)
 - Address market developments (large constellation deployments, etc.)
- Comments filed April 5, reply comments due May 6.

Additional Materials



- A public notice discussing small satellite licensing:
 - “Guidance on Obtaining Licenses for Small Satellites” dated March 15, 2013
<https://www.fcc.gov/document/guidance-obtaining-licenses-small-satellites>
- An enforcement advisory concerning licensing requirements:
 - “Compliance with Satellite Communications Licensing Requirements is Mandatory and Failure to Comply Can Result in Enforcement Action” dated April 12, 2018
<https://www.fcc.gov/document/enforcement-advisory-satellite-communications-licensing>

Thank You