



United States Federal Communications Commission (FCC)

Satellite Licensing and Enforcement Involving Non-Governmental Entities



U.S. FCC Satellite Licensing and Rules

- ▶ The U.S. FCC licenses non-governmental satellites that are utilizing radiocommunications. FCC issues three types of licenses for satellite operations— amateur, experimental, and “Part 25” (which are typically commercial).
- ▶ All three types of licenses require submission of information concerning radiofrequency and orbital technical parameters, an orbital debris mitigation plan, and draft International Telecommunication Union (ITU) filing materials.
 - ▶ Part 25 and experimental licenses also have application filing fees, and Part 25 licensees must pay annual regulatory fees.
- ▶ As part of its regulatory review the FCC considers whether the "public interest" would be served by a particular license grant.
- ▶ Licenses often include conditions, including conditions requiring that operations must be consistent with what is described in the submitted information.
- ▶ The FCC rules also include specific operational requirements.



U.S. FCC Satellite Licensing Legal Framework

A license is required for deployment and operation of satellite-based services in the United States by a non-federal operator.



Section 301 of the Communications Act of 1934, as amended, prohibits the use or operation of a radio frequency station except in accordance with a Commission-granted authorization.



Section 25.102(a) of the FCC's rules necessitates FCC approval for the operation of "energy or communications or signals by space or earth stations [satellites or ground stations]." Further, licensees must comply with all conditions placed on their licenses.





U.S. FCC Regulation Concerning Mitigation of Orbital Debris



- ▶ For 20 years, the U.S. FCC has had formal rules in place requiring satellite applicants to disclose plans to mitigate orbital debris.
 - ▶ These rules apply to all U.S. license satellite applicants as well as satellite operators seeking access to the U.S. market.
 - ▶ An applicant's plan must include information regarding spacecraft design and operations. The plan also must include information concerning post-mission disposal.
- ▶ The U.S. FCC rules also include operational requirements for satellite end-of-life.
- ▶ The U.S. FCC has updated its rules in recent years to address the evolving commercial satellite industry and changing space environment. The U.S. FCC continues to consider further updates to its rules and has also adopted conditions on specific satellite system licenses and grants to address orbital debris concerns related to deployment of satellite constellations.



Mitigation of Orbital Debris: Case Study of U.S. FCC Rules on Post-Mission Disposal

- ▶ Under FCC rules, geostationary orbit satellites must, at the end of their useful life, relocate to an orbit with a perigee sufficiently high that the satellite will not re-enter the geostationary region, based on a formula developed by the Inter-Agency Space Debris Coordination Committee.¹
 - (1) “Grandfathering” for satellites launched prior to March 18, 2002.
- ▶ For satellites in low-Earth orbit, maximum post-mission orbital lifetime is 5 years, but satellites should be disposed of as soon as practicable. This limit comes into effect for satellites launched after Sept. 29, 2024.
- ▶ All satellite operators must ensure, unless prevented by technical failures beyond their control, that stored energy sources on board are discharged.





U.S. FCC Enforcement Overview

- ▶ The U.S. FCC has a Bureau dedicated to enforcement. The Enforcement Bureau was created in 1999 by consolidating enforcement functions across the FCC into a single Bureau with several Divisions.
- ▶ EB plays a critical role in upholding the FCC's regulatory framework by focusing on:
 - ▶ Consumer Protection and Privacy;
 - ▶ Data Security, Cybersecurity, and Supply Chain Integrity
 - ▶ National Security, Public Safety, and Emergency Services, and Harmful Interference
 - ▶ Fraud targeting critical FCC-funded-and-administered programs
 - ▶ Fair Competition and Equal Opportunities

The Spectrum Enforcement Division is the group primarily responsible for addressing satellite licensing and operation investigations.



Recent FCC Enforcement Cases

- ▶ Swarm/L3Harris
 - ▶ Swarm Consent Decree (2018)
 - ▶ L3Harris Consent Decree (2019)
- ▶ DISH Consent Decree (2023)



Recent Cases

Swarm Consent Decree (2018)

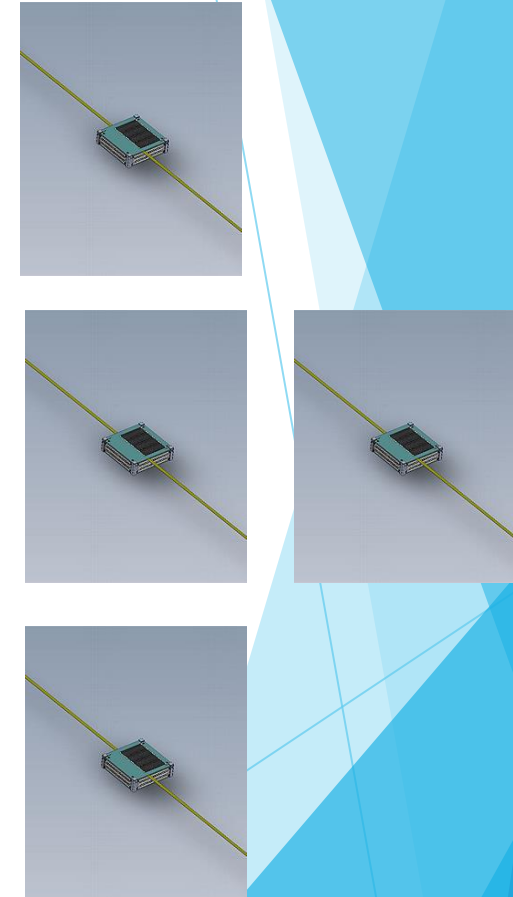
EB found that Swarm Technologies, Inc. violated the Commission's rules related to unauthorized satellite operations when it deployed and operated four small, "cube-sat," two-way communication satellites, which it called SpaceBEEs, without an FCC license.

Terms of Consent Decree

- ▶ To cease all unauthorized operations and seek proper licensing for future deployment and operations.
- ▶ To pay a \$900,000 civil penalty.
- ▶ Long-term compliance plan.

The FCC released an Enforcement Advisory alerting the industry that compliance with satellite licensing requirements is mandatory.

<https://docs.fcc.gov/public/attachments/DA-18-368A1.pdf>

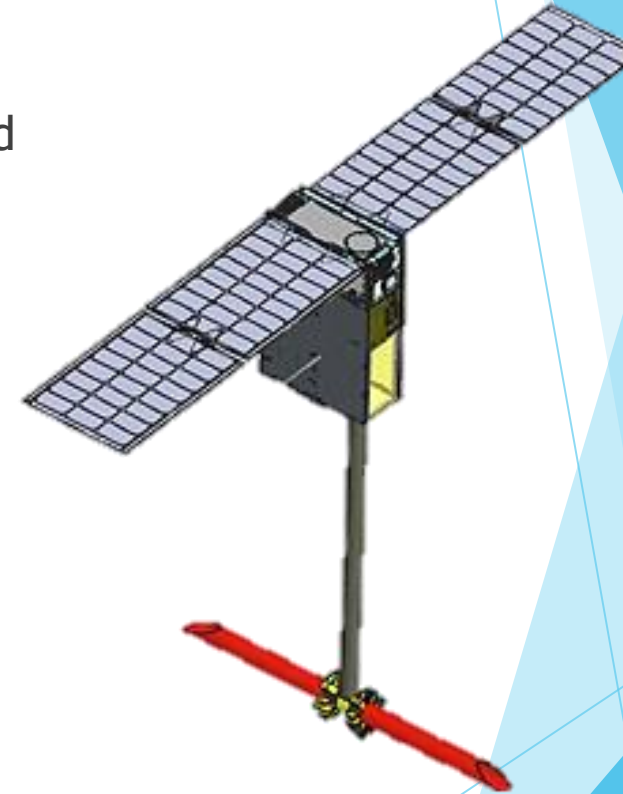




Recent Cases

L3Harris Consent Decree (2019)

- ▶ L3Harris sought an experimental license for a briefcase-sized satellite, called HSAT-1, in 2016.
- ▶ Thereafter L3Harris transmitted on an unauthorized frequency band outside the authorized range, resulting in 324 instances of unauthorized transmission over 13 days.
- ▶ There was no harmful interference to other licensees, and HSAT-1 operated within its authorization during communications to the ground station.
- ▶ Terms of Consent Decree included:
 - ▶ Payment of a \$100,000 civil penalty.
 - ▶ Implementation of a compliance plan.





Recent Cases

DISH Consent Decree (2023)

- ▶ DISH was authorized to deploy and operate the EchoStar-7 satellite in 2002 in geostationary orbit.
- ▶ DISH's orbital debris mitigation plan for the satellite, as modified, included a plan to reserve adequate fuel at satellite end of life to move the satellite to a disposal orbit at least 300 km above the geostationary arc.
- ▶ DISH notified the FCC in 2022 that the satellite was low on propellant. Ultimately DISH relocated the EchoStar-7 satellite to a disposal orbit of 122 km above the geostationary arc.
- ▶ Consent Decree: \$150,000 civil penalty, admission of the violation, and compliance plan for failure to properly dispose of the EchoStar-7 geostationary orbit satellite at the satellite's end-of-life as required by DISH's license terms and conditions.



Image from <https://spaceflightnow.com/news/0002/27newechostars/index.html>



DISH Consent Decree (2023) (continued)

Unlawful Conduct

- ▶ The U.S. FCC found violations of section 301 of the Communications Act (47 U.S.C. § 301) and section 25.102(a) of the Commission's rules (47 CFR § 25.102(a)) for failing to meet a license term.
 - ▶ DISH failed to maneuver the EchoStar-7 satellite per its orbital debris mitigation plan to a disposal orbit at least 300 km above its operational geostationary orbit, including not reserving adequate fuel for this task and not accounting for fuel gauging uncertainty, as outlined in its plan.
- ▶ As a Commission licensee, DISH was required to operate its satellite under the conditions set forth in its authorization as modified, including its orbital debris mitigation plan, but failed to do so.



DISH Consent Decree (2023) (continued) *Implications*

- ▶ EchoStar-7 is approx. 22,000 miles above the Earth and is moving at approx. 7,000 mph and is no longer under control.
 - ▶ Moving or refueling the satellite under these conditions is not currently practicable.
- ▶ Although the risk presented by a single satellite that is disposed too low is relatively small, risks accumulate with each failure. Consequently, it is important for operators to properly execute debris mitigation plans.



DISH Consent Decree (2023) (continued) *Penalty & Compliance Measures*

- ▶ DISH paid a \$150,000 penalty and admitted liability for violating its license terms.
- ▶ DISH agreed to a rigorous compliance plan to avoid recurring failures.
 - ▶ Develop and Improve Upon Propellant Tracking
 - ▶ Develop and Improve Upon End-of-Mission Disposal Plan
 - ▶ Satellite Disposal Planning

Principles from this Consent Decree are generally applicable to all companies that hold licenses with the FCC.



► Presented by:

Space Bureau

United States Federal Communications
Commission