

Do Orbital Debris Regulations Have a Negative Impact on the Growth of CubeSat Experiments and STEM?

The Radio Amateur Satellite Corporation (AMSAT)

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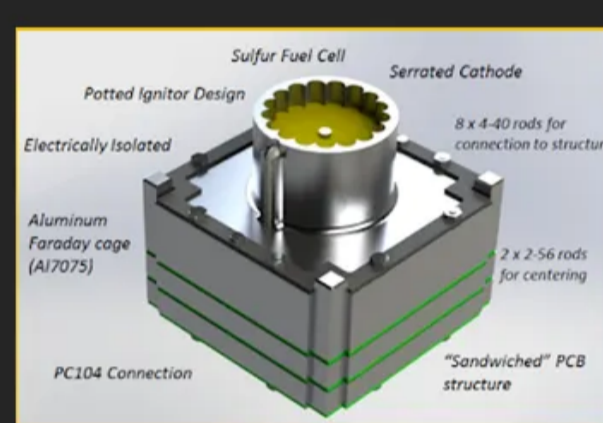
Proposed Regulations

In April 2020, the Federal Communications Commission (FCC) issued a Further Notice of Proposed Rulemaking (FNPRM) in their ongoing rulemaking process regarding the mitigation of orbital debris. If adopted as written, the regulations would impose the following new requirements:

1. Satellites deployed into low-earth orbit (LEO) with an altitude over 400 km would be required to have maneuvering capability.
2. Satellite licensees would be required to indemnify the United States Government against any costs resulting from a claim arising from the operation of their spacecraft.

Impact

While orbital debris regulations are vitally important to maintaining safety and usability of low-earth orbit, as written, these regulations would negatively impact CubeSat development in the United States by universities and non-profit institutions. Let's look at the impact of each of these changes:



The pulsed plasma thruster from HuskySat-1, developed at the Husky Satellite Lab at the University of Washington. This mission carried a communications system provided by AMSAT as HuskySat-

Maneuverability

Low-cost CubeSat propulsion systems are in the experimental stage and any reliable maneuvering system would be cost-prohibitive for the majority of university and non-profit CubeSat missions. Additionally, most propulsion systems add significant mass to a CubeSat and require significant power to operate, which reduces the available mass and power for other experiments.

Using a maneuvering system of unknown reliability may actually increase the chance of a collision.

In lieu of carrying a maneuvering system, CubeSats would be limited to orbits of 400 km or below. This would limit their orbital lifetimes to anywhere from 6 to 24 months, making any kind of long-term experiment impossible.

Additionally, by limiting the orbital altitude of CubeSats, those seeking to explore the characteristics of other regions of orbit would be unable to do so.

Indemnification

Under international treaty, the United States Government is liable for any claims made by other nations resulting from the operation of spacecraft licensed in the country. The FCC's proposal would require the licensees of spacecraft to indemnify the government against these potential costs. In practice, universities, particularly public universities, may be legally unable to indemnify a third-party.

Development Needs

There is an immediate need for devices available for the required functions, demonstrated to 0.9 probability in order to satisfy FCC acceptance, and designed in consideration of available volume and power in 3U and 6U CubeSats.

The increasing number of CubeSats, particularly, that are seeking access to orbit and bring the low cost opportunities for exploration and education to the U.S., can also bring benefits to the commercial market that would provide the needed low cost, low volume CubeSat specific systems. If the FCC adopts the proposed maneuverability regulation, the future of these missions is

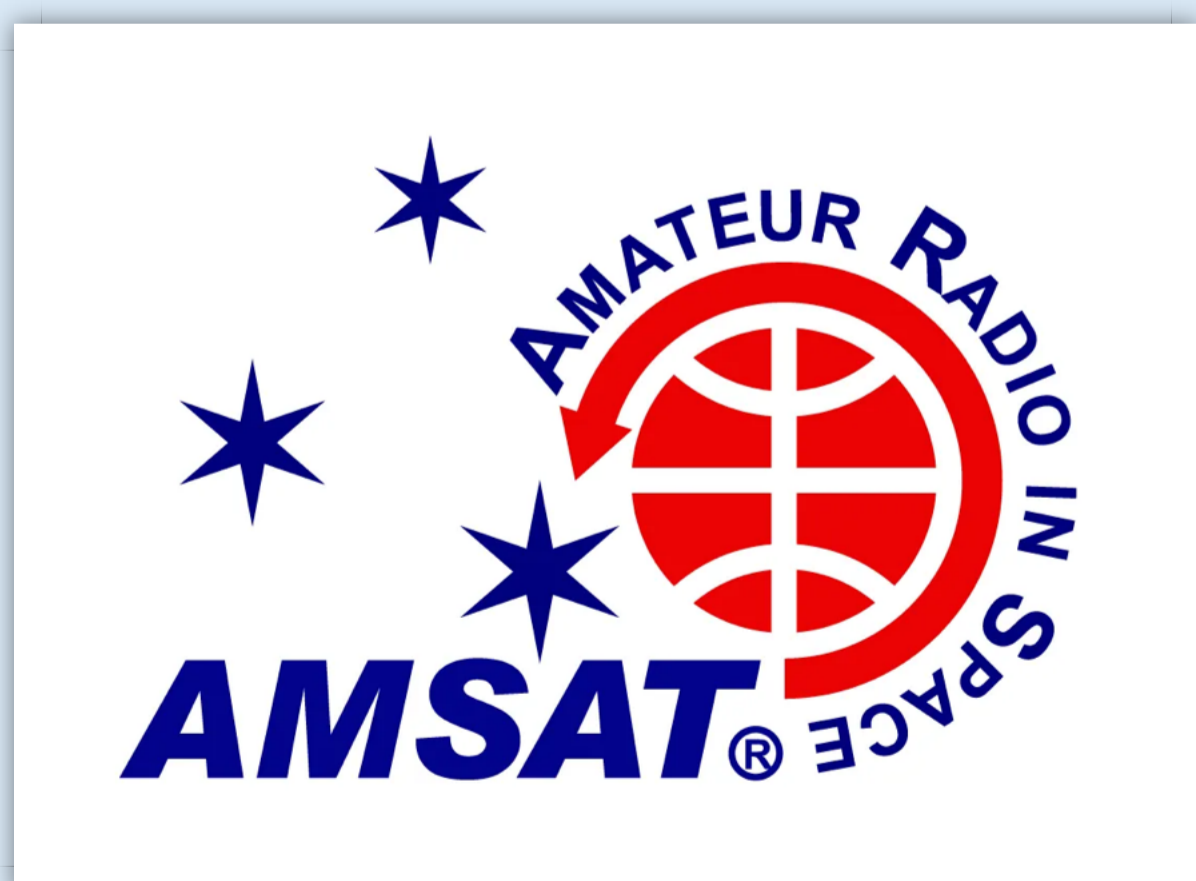


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About



The Radio Amateur Satellite Corporation, or AMSAT, is a worldwide group of Amateur Radio Operators (Hams). It was formed in the District of Columbia in 1969 as an educational organization.

For over 50 years, AMSAT groups in North America and elsewhere have played a key role in significantly advancing the state of the art in space science, space education, and space technology. The work now being done by AMSAT volunteers throughout the world will continue to have far-reaching, positive effects on the future of both Amateur Radio, as well as other governmental, scientific and commercial activities in the final frontier.



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