

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of:

Mitigation of Orbital Debris

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IB Docket No. 02-54

To: The Commission

PETITION FOR RECONSIDERATION

The Radio Amateur Satellite Corporation (AMSAT), pursuant to § 1.429 of the Commission's Rules [47 C.F.R. § 1.429], hereby respectfully petitions the Commission for reconsideration of its *Second Report and Order*, FCC 04-130, 69 Fed. Reg. 54581 (the R&O), as it relates to Part 97 of the Commission's Rules, and requests that the effective date of the revised § 97.207(g) adopted therein be stayed, pursuant to § 1.429(k) [47 C.F.R. § 1.429(k)], pending the final adjudication of this petition. This petition is timely filed. For its petition, AMSAT states as follows.

1. AMSAT filed comments and reply comments in this rulemaking proceeding.
2. The Rules, at § 97.3(a)(5) [47 C.F.R. § 97.3(a)(5)], define an *amateur station* as
"[a] station in an amateur radio service consisting of the apparatus necessary for carrying on radiocommunications."

A *space station*, at § 97.3(a)(40) [47 C.F.R. § 97.3(a)(40)], is defined as

"[a]n amateur station located more than 50 km above the Earth's surface."

3. Note that these definitions pertain strictly to the apparatus necessary for carrying on radiocommunications from space. They do not include the vehicle on which the amateur station is carried, be that a satellite, a rocket, an aerospace plane of some sort, or even a Space Shuttle or

the International Space Station¹. To argue otherwise would be to say, by analogy, that a passenger in an automobile, operating his amateur station in that vehicle with the owner/driver's permission, is necessarily responsible, and answerable to the Commission, for the operation and condition of the vehicle itself.

4. The Rules, at § 97.207(a) [47 C.F.R. § 97.207(a)], provide that

"[a]ny amateur station may be a space station. A holder of any class operator license may be the control operator of a space station, subject to the privileges of the class of operator license held by the control operator."

5. Amateur stations, and amateur operators, are inherently different from the Part 25 satellite systems to which most of the R&O is directed. The Rules, at § 97.3(a)(4) [47 C.F.R. § 97.3(a)(4)], define the *amateur service* as

"[a] radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest²."

6. Under the foregoing definition, an amateur must be a natural person, with no pecuniary interest in the communication or technical investigation carried out by the station he or she is operating. Specifically, § 97.113(a)(3) of the Rules [47 C.F.R. § 97.113(a)(3)] prohibits any communications "in which the station licensee or control operator has a pecuniary interest, including communications on behalf of an employer." While some amateur stations are club stations, § 97.5(b)(2) of the Rules [47 C.F.R. § 97.5(b)(2)] provides that

"[a] club station license grant may be held only by the person who is the license trustee designated by an officer of the club. The trustee must be a person who holds an Amateur Extra, Advanced, General, Technician Plus, or Technician operator license grant."

¹ Indeed, the term "OSCAR" itself is an acronym for "Orbiting Satellite Carrying Amateur Radio."

² This definition is taken directly from the *Radio Regulations*. See RR Number 1.56.

The individual grant holder, and/or the individual licensee who acts as control operator, neither of whom may be an employee of the club, is personally responsible to the Commission for the operation of the amateur station involved, but not for other aspects of the club's affairs such as the structural condition of its building, the pollution controls on its vehicles or the adequacy of its insurance coverage.

7. Under § 97.207(g) [47 C.F.R. § 97.207(g)] as it is currently in effect, i.e., prior to the orbital debris mitigation language inserted by the R&O, the license grantee – an individual amateur – of each space station must make two written pre-space notifications to the Commission's International Bureau, in accord with the provisions of Articles 9 and 11 of the *Radio Regulations*. Apart from the timing of these notifications, which is the subject of another rulemaking proceeding³, AMSAT has no problem with this requirement. It is clearly required by the *Radio Regulations*; its purpose is to assist other administrations, and their licensees, in radio frequency spectrum management by informing them of the orbits, frequencies and emissions to be used by forthcoming space stations, and, significantly in the present context, it is directly relevant to radio communications and, thus, to the license grantee's responsibilities under the Rules and the Communications Act. Compliance with this requirement is necessarily within the competence of the license grantee, because the subject matter of the notifications, cited above, consists entirely of information required to control and operate the station for whose operation he/she is responsible – the radio emissions and frequencies employed and the location of the space station (i.e., its orbit).

8. Contrast this with the information which would be required under the R&O. Not only are most amateur license grantees unlikely to have technical competence in such matters not related to radio communications – they certainly have not been examined for such under the

³ See AMSAT's comments, reply comments and further comments in WT Docket No. 04-140.

Commission's Rules – but the matters themselves pertain to the space vehicle in which the amateur station is located, not to the amateur station itself. In most cases, the license grantee will have no responsibility for the space vehicle, and as discussed at ¶ 6, *supra*, he or she may also be prohibited by the Commission's Rules from being an employee of the organization or institution which is responsible for said space vehicle.

9. To date, no spacecraft carrying a Commission-licensed amateur station has ever been owned, designed or constructed by the station's license grantee or control operator. Neither the Communications Act nor any other applicable legislation confers authority on the Commission to regulate the organizations or institutions which do build and own these spacecraft. Not only are they not license grantees under Part 97, but as institutions rather than individuals, they are prohibited under the *Radio Regulations*, as well as Part 97, from being such. Many of them are universities engaged in scientific research or engineering education. Sometimes they are other government agencies, e.g., those responsible for ISS and the Space Shuttle. In the case of AMSAT-OSCAR 51, known before its successful launch as AMSAT-OSCAR-E, the owner/builder was AMSAT itself, a District of Columbia scientific corporation. The license grantee of the amateur station aboard this spacecraft is not employed by AMSAT (indeed, he cannot be) but, as discussed earlier, serves as license grantee solely in his individual capacity.

10. In its comment cited by the R&O at ¶ 99, AMSAT stated that "a disclosure requirement can be met by builders of amateur radio satellites." This may be, albeit at substantial cost which we will address in our to-be-filed comments under the Paperwork Reduction Act. However, the R&O does not ask for disclosure by the builder of the satellite. It would hold the wrong party – the individual amateur who serves as license grantee of the amateur station aboard the spacecraft – responsible for compliance. That, we submit, is not a

proper nor even a lawful substitute for holding the correct party – the spacecraft owner - responsible, even if that means going to Congress to obtain appropriate statutory authority to do so, or, if Congress or the judicial system determines that another agency should do the job, handing it off to them.

11. The *Radio Regulations* say nothing about orbital debris mitigation, and contain no authority for the Commission to delay submitting a notification to the Radiocommunication Bureau because of concern about orbital debris. Indeed, conditioning or delaying the submission of such a notification for such reasons, as the R&O envisions, can be construed as being in derogation of Articles 9 and 11 of the *Radio Regulations* themselves.

12. The R&O, at ¶ 100, declines to exempt amateur space stations

"categorically from any need to address orbital debris mitigation because some amateur service space stations in low Earth orbit have expected post-mission orbital lifetimes that exceed the 25 year time period recommended by the U.S. Government Standard Practices and the IADC Guidelines and because the long orbital lifetimes of such amateur service satellites increases the probability that collisions between objects will occur thereby resulting in more orbital debris."

The paragraph goes on to say that the Commission recognizes

"that because most amateur service space craft are LEO spacecraft, post-mission disposal requirements may necessitate modifications in the current design and operation, either through the addition of propulsion systems or other strategies to cause a spacecraft to re-enter the Earth's atmosphere within 25 years of end of life, or by foregoing operations at higher orbital altitudes where the effects of atmospheric drag are not sufficiently strong by themselves to remove the space station from orbit within the 25-year time period. We [i.e., the Commission] believe, however, that the costs involved with these modifications are justified when balanced against the public interest in mitigating orbital debris."

13. No cost-benefit analysis is presented in the R&O, or elsewhere, to support or justify this conclusion. Indeed, one cannot be, because with respect to most of the LEO spacecraft concerned, the effect of requiring such "modifications" would be to prohibit the spacecraft

themselves and thus virtually end the Commission's 40-year history of supporting the amateur-satellite service, which has contributed so much to the development of advanced technology and to the education of several generations of electronics and aerospace professionals.

14. AMSAT-OSCAR 51, the AMSAT-owned spacecraft mentioned at ¶ 9, *supra*, is a cube approximately 9.5 inches (240 mm) on a side, with a total mass of 24.56 pounds (11.14 kg). It was built and launched for a total out-of-pocket cost of less than \$400,000.

15. Many spacecraft carrying amateur space stations are considerably smaller and less expensive than AMSAT-OSCAR 51. For example, the widely-used Cubesat platform, developed at Stanford University, builds the spacecraft into a cube approximately four inches (100 mm) on a side. The cost of a Cubesat obviously varies with its specific features, but is typically less than \$50,000, including launch.

16. AMSAT, and others, are actively exploring technical ways of accomplishing orbital debris mitigation. We shall continue to do so. However, we know of no presently available, proven technology for de-orbiting a satellite that is capable of being implemented in spacecraft such as AMSAT-OSCAR 51, Cubesats, and most other spacecraft designs that are within the financial reach of owners of spacecraft carrying amateur space stations. In particular, the addition of propulsion systems, as contemplated by the R&O, would drastically increase the size, mass and cost of such spacecraft. It must also be pointed out that the license grantee of the amateur space station aboard such spacecraft has no control over the inclusion, nature or effectiveness of orbital debris mitigation features on the spacecraft itself.

17. The R&O also mentions the possibility of launching such LEO satellites into orbits intended to meet the 25-year guideline discussed therein. While such orbits may become available and feasible in the future, they are not so today.

18. FCC-licensed amateur space stations, without exception, have either been part of satellites carried on launch vehicles as secondary payloads, or in some cases have ridden as secondary experiments aboard space vehicles whose primary purposes are not theirs. In neither case does the amateur space station license grantee have any control over the orbit chosen. To purchase a launch as the primary payload, and thus to exert such control, would cost many millions of dollars. Amateur space stations have been carried into space for 43 years, beginning with OSCAR I in 1961. In no case has one ever been the primary payload, for obvious financial reasons.

19. The R&O would require submission of an orbital debris mitigation plan, as well as the related information specified in § 97.207(g) as adopted therein. However, the R&O does not say what would constitute a plan acceptable to the Commission, nor does it specify what action the Commission might take if it finds the submitted plan to be unacceptable.

20. With all due respect, this puts the prospective owner and builder of the spacecraft in an impossible position. Without knowing in advance what it has to do in order to satisfy the Commission, it would be impossible for the owner/builder to estimate, budget for, and fund the cost of compliance. Nor would it be able to contract for a launch, in view of the unknown amount of time these compliance measures might consume. No prudent manager could authorize the construction of nor the making of a launch commitment for a satellite given such regulatory uncertainty.

21. It is for that reason that AMSAT believes that § 97.207(g) as adopted by the R&O would cause irreparable harm to those responsible for building and funding the many satellite projects currently in design and construction stages which are intended to carry amateur space stations. It would, in effect, put such projects in limbo indefinitely. With respect to those

projects which have already contracted for launches, it would place meeting their launch commitments in serious jeopardy, which would likely result in substantial additional costs and delay, or eliminate altogether, the benefits which would result from said projects. AMSAT therefore requests that the effective date of this rule be stayed, pursuant to § 1.429(k) of the Rules, pending the final adjudication of this petition.

RESPECTFULLY SUBMITTED,

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By  _____

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