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RE: Notice of Proposed Rule Making, 47 CFR Parts 5, 25 and 97
Comments on Mitigation of Orbital Debris, IB Docket No. 02-54; FCC 02-80

Submitted electronically
July 16, 2002

Dear Sir or Madam:

The following are comments prepared by the National Remote Sensing and Space Law Center at the University of Mississippi School of Law (Center) in response to the *Notice of Proposed Rule Making (Mitigation of Orbital Debris, IB Docket No. 02-54, FCC 02-80):*

I. In General

1. The Center joins the Commission in its assessment that this is an appropriate time to consider issues related to orbital debris mitigation and to begin the rule-making process. The Center also joins Commissioner Michael J. Copps in commending the FCC International Bureau for its work in preparing the *Notice of Proposed Rule Making regarding Mitigation of Orbital Debris*. The Commissioner is correct in

stating "if we come up with the right orbital debris mitigation rules now, we can head off a potentially very costly [future] problem with far less costly precautions." This is a necessary and proper step to take at this time. Delay is undesirable.

2. The U.S. Government Orbital Debris Mitigation Standard Practices which currently apply to missions operated or procured by U.S. government agencies should be adapted and applied to new or replacement commercial satellite systems licensed by the FCC.

3. The proposed rules repeatedly raise the question of which is the better approach to approving debris mitigation plans: applying specific rules or using a case-by-case approach. Generally, using a case-by-case approach to regulation promotes confusion and lack of predictability. Accordingly, the FCC ought to adopt detailed rules regarding orbital debris mitigation plans that include specific definitions and which identify a minimum compliance threshold. However, noting the rapidity with which technology evolves, it may not be possible to articulate a specific set of rules that can remain valid and/or useful for a reasonable period of time. Therefore, it is recommended that the regulations contain a rebuttable presumption. This presumption should be clearly stated in the final rules that are adopted. It will be presumed that an operator must meet the compliance threshold contained in the specific rules. The operator's license application should state the debris mitigation methods that will meet the threshold. In the event that an operator seeks a reporting, compliance, or timeline exemption, then an it must be formally requested and specific supporting reasons to rebut the presumed threshold must be submitted. The threshold requirement should be reviewed periodically and revised, if necessary, as technology and practice require.

II. Re: Minimizing Debris Generated by Accidental Explosions (III. B. 2, para. 39 - 40)

Economic incentives will not always ensure that commercial satellite operators will comply with orbital debris mitigation practices. This can be the case long before the end of a satellite's life. For example, in the design phase an operator may decide to omit "hardening" and/or "shielding" of a satellite structure due to the additional cost of doing so and because of the resulting "weight penalty" that can reduce the amount of on-board revenue-generating payload. Given that limiting accidental explosions is, as stated in the proposed rules, "perhaps the single most important debris mitigation measure," satellite design decisions ought to be specifically addressed in the new rules. Guidelines for design decisions ought to be included. The guidelines should require the operator to perform and submit a cost-benefit analysis that weighs the environmental benefits of various forms of debris mitigation that can be incorporated in a satellite design versus the costs related to each of those forms.

III. Re: Post-Mission Disposal: Direct Retrieval (III. B. 4, para. 52)

Although direct retrieval is, to date, expensive and limited to a reusable vehicle, and of limited relevance to current missions, the FCC ought not dismiss the long-term possibilities of an option for direct retrieval. This is logical because space debris is, inherently, a long-term problem. It will continue to exist at a time when future technologies may make retrieval more practical and relatively inexpensive. Therefore, the FCC ought to consider a rule that promotes an economic incentive in retrieval by allowing the salvage of appropriate non-functioning U.S. national space craft and appropriate U.S. licensed spacecraft by a U.S. national.

Current international space treaties prohibit one nation from salvaging the space objects of another nation. However, if domestic law permits, space objects may be salvaged by the same nation that placed them in space, or by its properly licensed nationals. For example, one *Westar* and two *Intelsat* satellites were directly retrieved by the space shuttle. Intelsat is a self-insurer and agreed to have their satellites retrieved. In another case, an insurance company obtained title to an Indonesian satellite, *Palapa*, by paying for its loss. It was also retrieved by the shuttle pursuant to an agreement between the company and the U.S. As a legal matter, these events provide precedents for **intra**national salvage operations. As an economic and environmental matter, promoting the legal salvage of satellites can have the additional effect of encouraging the private sector to develop salvage technologies as shuttle alternatives.

Incremental steps that can be embodied in a new rule to promote the long-term possibilities of an option for direct retrieval and which will begin to provide the foundation for **intra**national salvage operations in the future include:

1. Requiring either a license for a specific salvage mission or a space salvage operator's license to ensure U.S. compliance with international legal obligations.
2. Requiring a technological and financial assessment of an entity seeking a salvage license.
3. Designating how to determine a point in time when an owner/operator has actively or constructively abandoned a satellite, making it available for salvage.
4. Designating how to determine a point in time when liability passes from an owner/operator to a salvor.
5. Supplying guidelines for determining whether or not a satellite is an appropriate candidate for salvage. For example, including a presumption that excludes National Technical Means ("NTMs") unless there is a specific RFP authorized for a specific retrieval.

IV. Re: Post-Mission Disposal: Storage Orbit (III. B. 4, para. 53)

Under the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* (Outer Space Treaty), the United States is prohibited from to appropriating space by "means of use or occupation, or by any other

means."[1] As stated in the proposed rules, "use of a storage orbit leaves the space object in orbit indefinitely." The Center notes that formalizing the routine use of a storage orbit in national legislation and regulations can be construed as appropriating space by use or occupation through the means of national legislation. That the alternative to indefinite storage, "removal of the space object entirely from orbit" is, as also stated in the proposed rules, "impracticable" does not eliminate the use or occupation question.

It is recommended that precedents regarding intentional, repeated, regular use of a particular orbit for a specific purpose be analyzed in relation to a codified storage orbit. For example, the International Space Station partners felt obliged to address the issue of the status of the indefinite use of a particular orbit for a specific purpose in the *Intergovernmental Agreement* that governs the use of the International Space Station. It states, "Nothing in this Agreement shall be interpreted as...constituting a basis for asserting a claim to national appropriation over outer space or over any portion of outer space."[2] Rules and regulations of the International Telecommunications Union will also be relevant here.

V. Re: Scope of Proposed Rules/Scope of Proposals (III. D/E. para. 62)

It is sufficient for parties utilizing the processes in Section 25.137 of the FCC rules to submit evidence that the satellite system's debris mitigation plans are subject to direct and effective regulatory oversight by the satellite system's national licensing authority, and that information regarding specific debris mitigation procedures should only be required in the absence of a showing of direct and effective oversight. However, "direct and effective oversight" can only be determined in cases where the national licensing authority itself has publicly-accessible, transparent regulations. If the regulations under which a debris mitigation plan was accepted are unavailable or not discernable by ordinary, prudent research then it may be necessary to require the operator to also submit a debris mitigation plan to the FCC.

VI. Re: Liability Issues and Insurance (III. C/D. para. 60 - 61)

As summarized in the request for comments, an international liability regime does already exist for personal injury or property damage caused in space. However, this regime only applies to nations. Absent a specific license or contract that establishes a relationship between a private entity and a nation, the private entity is not directly covered by this regime. Without a license or contract,

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es in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, T.I.A.S. 6347, 610 U.N.T.S. 205 (effective Oct. 10,1967), Art. 2.

of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, January 20, 1998, Article 2, 2. (c), International Rights and Obligations.

the operator's nation is responsible for the harm its private actors cause in space, including harm caused by space debris. The basis for determining legal responsibility is fault-based. Therefore requiring insurance is reasonable. At the same time, the evidentiary problem of proving which space object generated the debris that caused damage is significant. Over time, as more objects are placed in orbit, this will become even more difficult. This evidentiary problem reduces the likelihood that an insurer will have to pay claims under a given payload insurance policy, lessening the overall burden that would be placed on the industry by requiring payload insurance. Additionally, requiring insurance coverage for damages caused by payloads and/or the debris they generate will provide an economic incentive for debris mitigation measures that will reduce premiums. Accordingly, the Center recommends that consistent with its authority, the FCC ought to require operators to obtain a reasonable amount of insurance coverage for those risks that can be adequately addressed by insurance, through the satellite's end of life, including, most importantly, damages caused by a payload to another space object .

Thank you for the opportunity to comment on the proposed FCC rules regarding orbital debris mitigation. If you have any questions regarding these comments, please feel free to contact me.

Sincerely,

Prof. Joanne Irene Gabrynowicz, J.D.

Director