Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
Migration of Orbital Debris	)	IB Docket No. 02-54
	)	

COMMENTS OF PANAMSAT CORPORATION

PanAmSat Corporation ("PanAmSat"), by its attorneys, hereby comments on the Notice of Proposed Rulemaking ("NPRM" or "Notice") in the above-captioned proceeding.[1]

PanAmSat owns and operates a global system comprised of C-band and Ku-band geostationary orbit ("GSO") fixed satellite service ("FSS") satellites.[2] These comments address orbital debris issues arising from the post-mission disposal of GSO satellites.[3]

INTRODUCTION AND SUMMARY

In the NPRM, the Commission proposes to adopt rules for the stated purpose of minimizing any potential negative impact of orbital debris on future space operations.[4] The Commission notes that, although there is no problem currently and there have been no documented satellite losses under the current policy, growth in orbital debris will continue and could have a negative impact on the usefulness of space for

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[1] *In the Matter of Mitigation of Orbital Debris*, Notice of Proposed Rulemaking, IB Docket Nos. 02-54, FCC 02-80, *released* March 14, 2002.
[2] PanAmSat also holds authorizations to launch and operate satellites in the Ka-band.
[3] PanAmSat is a member of the Satellite Industry Association, which is filing comments addressing a broad range of issues raised in the NPRM, including post-mission disposal issues.
[4] NPRM at ¶¶ 1-2.

communications.[5] Among other things, the Commission proposes rules for post-mission disposal of GSO satellites.[6]

PanAmSat supports the Commission's objective in proposing these rules, but believes regulations are unnecessary at this time. The voluntary efforts of industry, along with guidelines developed under the auspices of the International Telecommunication Union ("ITU") and the National Aeronautics and Space Administration ("NASA"), have been and are sufficient to address debris mitigation issues, without the need for Commission regulations. There have been no problems under the current voluntary procedures and the satellite industry has every incentive to address debris mitigation and the risk of collisions without regulatory mandates.

Should, however, the Commission nonetheless choose to promulgate a standard for post-mission disposal, it should adopt a standard based on the Interagency Space Debris Coordinating Committee ("IADC") formula.[7] The IADC formula is more flexible than the other options presented in the NPRM because it takes into account the specific parameters of particular spacecraft. PanAmSat suggests that GSO licensees be permitted to use a disposal orbit that is the lesser of: (1) the orbit produced by the IADC formula and (2) 300 km above the GSO orbit.

In any event, a Commission decision to adopt a disposal orbit standard should not apply to any satellite already in space prior to adoption of a final rule. Such a requirement would be inconsistent with the Commission's normal practice of applying new rules prospectively and would be unfair to the satellite industry and its customers.

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[5] *Id.*
[6] *Id.* at ¶¶ 52-59.
[7] NPRM at ¶ 54.

DISCUSSION

I. THE COMMISSION NEED NOT REGULATE THE POST-MISSION DISPOSAL OF GEOSTATIONARY ORBIT SATELLITES

PanAmSat applauds the Commission's determination to examine the potential for problems arising from orbital debris. Once the Commission has completed its examination, however, PanAmSat believes that the record will show that it is unnecessary to regulate the post-mission disposal of GSO satellites.

First, as the Commission has recognized, satellite operators have an economic incentive to maintain a safe environment for operating spacecraft.[8] This incentive arises from the substantial costs– totaling hundreds of millions of dollars per spacecraft – that are associated with constructing launching, and operating GSO satellites.

In the case of GSO satellites, this incentive is slot-specific. Under FCC policies, GSO operators have an "expectancy" that they will be permitted to operate a follow-on satellite at the same orbital location as its predecessor. If GSO operators do not dispose of their satellites safely at end of life, therefore, they will be placing their own replacement satellites at risk. Given the large investments at stake, the Commission's finding that the industry already has the appropriate incentives is well-founded.

Second, the Commission's experience demonstrates that these incentives are having the desired effect. The voluntary post-mission disposal policy regarding GSO spacecraft has worked well, as evidenced by the fact that there are no documented

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[8] The Commission has noted that "[a]s a general matter, many of these practices already have been adopted by satellite system operators, since they facilitate satellite system reliability and are thus in the economic interests of operators and their customers." *In the Matter of The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz* Band, Notice of Proposed Rulemaking, IB Docket No. 99-81, FCC 99-50, 14 FCC Rcd 4843, 4888 (1999). *See also* N. L. Johnson, "Protecting the GEO Environment: Policies and Practices," Space Policy (Elsevier Science Ltd., UK), Vol. 15 (1999), No. 3 (August), p. 127 **(**"Due to the potential consequences of collisions between large objects, both in the loss of high value assets and in the creation of numerous debris in near-GEO, the aerospace community recognizes the benefits of certain deployment and disposal practices.").

incidences of GSO satellites – which have been in existence since the early 1960s – having caused damage after they were decommissioned. The U.S. satellite industry, moreover, has worked on disposal orbit issues with the ITU, NASA, and other countries. Significant resources have been expended by the industry to study these issues and to adopt and implement recommendations.[9] U.S. satellite operators continually have refined their disposal orbit policies as in response to these studies and recommendations. Given that decommissioned GSO satellites have caused no damage and that the U.S. satellite industry is actively engaged in the disposal issue, regulation is a solution in search of a problem.

Third, the potential benefits of regulation, to the extent they exist, are minimal. The probability of a collision between GSO satellites is infinitesimal.[10] An unpublished study PanAmSat commissioned shows that –with the exception of a few satellites that are highly inclined, in highly eccentric orbit, or both – the apogees of GSO satellites uniformly are less than 100 km above the GSO orbit. GSO satellite operators routinely use a disposal orbit that is substantially above this level, so operating GSO satellites are amply protected.

At most, the disposal orbit standards proposed in the NPRM may facilitate the use of a "relocation corridor" above the GSO orbit, but there is no basis for believing

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[9] *See, e.g.*, N. L. Johnson, "Protecting the GEO Environment: Policies and Practices," Space Policy (Elsevier Science Ltd., UK), Vol. 15 (1999), No. 3 (August), p. 128 ("During the 1980's the International Telecommunication Union (ITU) began addressing the issue of end-of-mission disposal and supersynchronous graveyard orbits. In 1986 the ITU's International Consultative Committee for Radio (CCIR) assigned Question 34/4 to Study Group 4 to examine six questions associated with the potential for physical interference in GEO and with the removal of spacecraft from GEO. After many years of fact-finding and scientific discussion, the ITU concluded that some measures to limit the growth of the GEO satellite population were prudent."). *See also* Recommendation ITU-R S.1003, Environmental Protection of the Geostationary-Satellite Orbit, Question ITU-R 34/4 (1986).

[10] Although certain collision avoidance maneuvers in geostationary orbit have been performed since at least 1980 (and are normally executed when position uncertainties are greater than the calculated miss distance), in most cases the actual probabilities of collision are exceedingly small. *See* N. L. Johnson, "The Crowded Sky, The Danger of Collisions in Geostationary Orbit," *Spaceflight*, Vol. 24, Issue 12, December 1982, pp. 446-449.

that raising the GSO disposal orbit by use of such a corridor would provide any realistic benefit. Even if there were a benefit, moreover, it would be limited to a finite number of cases in which satellite operators were using an unusually elevated relocation orbit to achieve a high draft rate. The Commission should not burden all post-mission disposals to benefit a limited number of relocations of GSO spacecraft.

Finally, adopting GSO disposal regulations would impose real and substantial costs on the GSO industry and its customers. Regulations would lead to administrative costs for the Commission and increase regulatory burdens on the satellite industry. If the regulations took the form of a fixed standard for a GSO disposal orbit, they would deprive GSO operators of the flexibility to evaluate all relevant factors on a case-by-case basis. To the extent that the regulations mandated a disposal orbit that is inconsistent with current practices, moreover, they would force GSO operators to devote more fuel to post-mission operations, thereby shortening the useful lives of their satellites. These costs should not be imposed lightly, or in the absence of a demonstrable need.

II. IF THE COMMISSION WERE TO ADOPT A DISPOSAL ORBIT STANDARD, THE STANDARD SHOULD BE BASED UPON THE IADC FORMULA

If the Commission decides to adopt a disposal orbit standard notwithstanding the considerations discussed in the preceding section, it should base the standard upon the IADC post mission disposal formula described in the NPRM.[11] PanAmSat suggests that spacecraft licensees be permitted to use a minimum disposal orbit that is the lower of: (1) the disposal orbit under the IADC formula and (2) 300 km above the GSO orbit.

The IADC formula is an essential element of this proposal, since it takes into consideration specific features of a satellite and is not a rigid "one-size-fits-all"

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[11] In addition to the IADC formula, the NPRM solicited comment on the ITU and U.S. Government Standard Practices disposal recommendations, which generally use a disposal orbit with a perigee of 300 kilometers above GSO altitude, and on other possible guidelines. NPRM at ¶ 54.

approach, which would be costly and unnecessary.[12] In particular, the formula factors in the satellite's area to mass ratio. The greater the ratio, the more susceptible the spacecraft is to solar pressure that can move the spacecraft closer to the GSO orbit. Under the formula, therefore, spacecraft with a larger ratio would be relegated to a higher post-mission altitude above the GSO orbit. The IADC formula is preferable to a fixed standard because of the requisite flexibility it affords to space station licensees.

III. OPERATING GSO SATELLITES SHOULD BE GRANDFATHERED

If the Commission were to adopt a post-mission disposal orbit requirement for GSO satellites, it should not apply the requirement to any satellite that is already in orbit. Such a requirement would be contrary to the Commission's usual practice of applying new rules prospectively.[13]

Retroactive application of a new disposal orbit requirement also would be unfair to the satellite industry and its customers. GSO satellite operators have designed and implemented fuel budgets and mission plans that were developed under the rules that were in effect at the time. They had a reasonable expectation that the rules would not be altered after the fact. Satellite operators priced their transponders based on an anticipated mission life that took a fuel budget into account. Third parties issued debt to satellite operators, or purchased the operators' stock, based on business plans that were premised on a particular mission life. It would be inequitable to change, on an *ex post facto* basis, the rules on which these parties relied.

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[12] The IADC formula requires GSO satellite operators to maneuver satellites to an orbit with a perigee that is at an altitude of not less than 36,021 km +(1000·C_R·A/m), where C_R is the solar pressure radiation coefficient of the spacecraft, and A/m is the Area to mass ratio, in square meters per kilogram, of the spacecraft. *See* NPRM at Appendix B, § 25.282.

[13] The Commission should avoid the retroactive application of a new rule that "'takes away or impairs vested rights acquired under existing law, or creates a new obligation, imposes a new duty, or attaches a new disability in respect to transactions or considerations already past.' " *Nat'l Mining Ass'n v. United States Dep't of Interior*, 336 U.S. App. D.C. 134, (D.C. Cir. 1999) (*quoting Ass'n of Accredited Cosmetology Sch. v. Alexander*, 298 U.S. App. D.C. 310, (D.C. Cir. 1992)). *See also Bowen v. Georgetown University Hospital*, 488 U.S. 204 (1988).

CONCLUSION

In view of the foregoing, the Commission should not regulate post-mission disposal of GSO satellites. Nevertheless, if the Commission chooses to implement a post-mission disposal standard, it should permit licensees to use a disposal orbit that is the lesser of: (1) the orbit produced by the IADC formula and (2) 300 km above the GSO orbit. In any event, in-orbit spacecraft should be exempt from any new requirements.

Respectfully submitted,

PANAMSAT CORPORATION

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