Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of:

Amendment of Part 97 of the Commission's Rules	**)**	
Governing the Amateur Radio Services	**)**	**WT Docket No. 04-140**
	)	

To: The Commission

COMMENTS OF RAY SOIFER

Ray Soifer, pursuant to Sections 1.415 and 1.419 of the Commission's Rules [47 C.F.R. §§ 1.415 and 1.419], hereby respectfully submits comments in response to the *Notice of Proposed Rule Making and Order*, FCC 04-79, 69 Fed. Reg. 24996, released April 15, 2004 (the Notice). These comments are timely filed. For his comments, Ray Soifer states as follows.

1. I am an FCC-licensed amateur radio operator, holding an Amateur Extra Class license (W2RS) as well as a degree in Electrical Engineering from Massachusetts Institute of Technology. I maintain and operate stations utilizing all authorized amateur bands from 1.8 through 450 MHz, and have published numerous technical papers and articles in amateur and professional journals in the U.S. and overseas, including many on satellite and earth-moon-earth (moonbounce) communication.

2. With respect to high-frequency privileges, the Commission proposes to amend Part 97 of its Rules as requested by the American Radio Relay League, Inc. (ARRL) in a petition filed March 22, 2002. I support this proposal, noting the extensive licensee survey and consultations with numerous interested parties which went into it. While it is obviously impossible to satisfy everyone in a matter such as this, I believe that the ARRL proposal comes as close as possible.

In particular, I support the Commission's proposal to retain mandatory subbands based upon emission mode and bandwidth, because narrowband CW and data modes are rendered all but useless by the presence of co-channel SSB, and efficient use of spectrum requires that they be kept apart. The ARRL proposal would provide reasonable allocations for each, given the foreseeable usage trends.

3. The Commission proposes to amend § 97.201(b) of its Rules to allow auxiliary stations to transmit in the 2 m band, but not in the frequency segments of 144.0-144.5 and 145.8-146.0 MHz, which amateurs have voluntarily agreed to devote to weak-signal and satellite communications, respectively. The arguments presented in favor of this proposal are reasonable and sensible, and I support it.

4. At ¶¶ 24 and 25 of the Notice, however, the Commission proposes to allow spread spectrum transmission in the entire 1.25 m, 2 m and 6 m bands, including the 2 m weak-signal and satellite segments mentioned above as well as the segments 222.0 – 222.15 and 50.0 – 50.3 MHz, which are also devoted to weak-signal operation under generally accepted voluntary band plans. Spread spectrum is not widely used in the amateur services, and no showing has been made that the bands presently available for it are inadequate or insufficient. The most likely and promising amateur application for SS, wide-area networking using technology similar to or compatible with IEEE 802.11, requires wider bandwidth than is available at 1.25 m, 2 m or 6 m and is better suited to the microwave bands. However, if the Commission decides to allow SS in the 1.25 m, 2 m and 6 m bands, I suggest that the same logic be applied to it as to auxiliary stations, i.e., that SS be kept out of the weak-signal and satellite segments to keep their noise floors as low as possible. Voluntary arrangements are not well suited to the regulation of spread spectrum, because it is not possible for a station experiencing interference to identify the source

of SS transmissions unless equipped for the SS mode that is being transmitted, which few amateurs of today are, except possibly for IEEE 802.11 at 2.4 GHz. Thus, if the Commission chooses to go this route, I would propose modifying the proposal contained in the Notice to provide for SS transmission at 50.3 – 54.0, 144.5 – 145.8, 146 – 148 and/or 222.15 – 225 MHz.

5. The Commission proposes to allow amateur stations to retransmit communications between any manned spacecraft, including the International Space Station, and its associated earth stations, as is now permitted for space shuttle communications. Space shuttle communications have been retransmitted on amateur frequencies for many years, notably by the amateur radio club station at the NASA Goddard Space Flight Center, and to the best of my knowledge no adverse effects of any kind, such as harmful interference to other amateur stations, have ever resulted. Adoption of the Commission's proposal would extend the public benefits of such transmissions, discussed at ¶ 37 of the Notice, to the International Space Station and whatever manned space missions may follow it. I support this proposal.

6. As discussed at ¶¶ 73-77 of the Notice, the license grantee of a space station in the amateur-satellite service must file with the Commission written pre-space station notifications twenty-seven and five months before initiating space station transmissions, seven days following initiation of these transmissions, and no later than three months after termination of these transmissions[1]. As the Commission states at ¶ 73, these notifications are required so that the ITU Radiocommunication Bureau may be informed of space stations in the amateur-satellite service[2].

[1] 47 C.F.R. § 97.207 (g), (h), (i).

[2] The Notice refers to *Radio Regulations* No. 25.11 as it existed prior to WRC-03, when it required administrations authorizing space stations in the amateur-satellite service operating in bands shared with other services to inform the Radiocommunication Bureau. This language was removed from No. 25.11 by WRC-03, but space stations in the amateur-satellite service, whether or not operating in bands shared with other services, remain subject to the advance publication and notification requirements of Articles 9 and 11, respectively. See Resolution 642, and *Radio Regulations* Nos. 9.1, 11.3, and 11.4.

7. The Radio Amateur Satellite Corporation (AMSAT) requested that the two pre-space notifications be replaced by a single filing within thirty days after a launch commitment is obtained. The Commission agreed with AMSAT that the present requirement is impractical, but proposed instead, at ¶ 76, to require a single pre-space notification within thirty days after a launch vehicle is determined but no later than 90 days before the space station is integrated into the launch vehicle. The Commission states that this would provide adequate time before launch to make changes in the space station if it finds that the notification is deficient in some material way.

8. In practice, the determination of a launch vehicle and the obtaining of a launch commitment are generally synonymous, since a launch vehicle cannot be finally determined absent a definitive agreement to launch the spacecraft. The 30-day period proposed by AMSAT appears reasonable, but if a longer period is required for FCC review of pre-space notifications, a 60-day deadline would be more reasonable than 90 days, since the latter would still require waivers in many practical cases.

9. The Commission proposes, at ¶ 77, to require the submission of an orbital debris mitigation plan as part of the pre-space notification[3], and notes that the submission of a plan that is deficient in some way might require that the Commission take further action, such as modification of the licensee's station license grant, in connection with the space station. Also at ¶ 77, the Commission seeks comment on whether it should require an affirmative prior approval of amateur space station launches and operations, and on whether there are alternative processes, such as the use of licensing procedures based under or upon procedures in Part 25 of its Rules, that may help to address its own and amateur radio operators' concerns with the timing of amateur space station notification filings.

[3] See the proposed § 97.207(g) at 51-52.

10. With due respect, using the ITU notification process to address orbital debris mitigation is a bad idea. The purpose of notification 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, as expeditiously as possible and in a standard format compatible with an existing ITU database. 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. In addition, changes to a spacecraft's design and construction to accommodate orbital debris concerns would, in all likelihood, take far more time to accomplish than the 90 days envisioned by the Commission's proposal. In contrast, the choice of operating frequency within a particular band typically requires little more than a new crystal or software programming, and often is not finalized until several months before integration. In some cases, it can even be changed in orbit.

11. If the Commission wishes to require an orbital debris mitigation plan, and to take that plan into account in determining whether or not to authorize the launch or operation of the space station, a far more straightforward approach would be simply to require affirmative prior approval through an application and review process separate from ITU notification.

12. This raises two separate issues: what, if anything, should the Commission do about orbital debris mitigation in the amateur-satellite service, and, whether or not it takes on the orbital debris issue, are there other reasons why it should initiate an affirmative prior approval process for amateur space stations. If so, how should that process be structured?

13. A possible role for the Commission in overseeing orbital debris mitigation was explored in IB Docket No. 02-54, and the orbital debris language for § 97.207(g) proposed in the present Notice was taken, word for word, from the Commission's *Notice of Proposed*

Rulemaking in that proceeding[4]. The record, however, contains a variety of comments, many of which raised substantial issues with respect to the proposed requirements. See, in particular, the comments and reply comments of AMSAT. Nowhere in the public record has the Commission reviewed and responded to the comments submitted in that proceeding[5]. Instead, it simply restates its original proposal in the present Notice.

14. I strongly urge the Commission to go back and review the comments in IB Docket No. 02-54 and publish a detailed response before reaching a conclusion, possibly through a Second Notice of Proposed Rulemaking. This would give interested parties an opportunity to offer substantive comments after seeing the Commission's reasoning.

15. In the present Notice, the Commission gives no clue about how it would evaluate the orbital debris mitigation plans it wants to receive. What are the proposed requirements? What would differentiate a satisfactory plan from one that is not?

16. Who, indeed, would be responsible for the plan itself, and its implementation? The Commission's present proposal says it would be the amateur license grantee of the space station. However, § 97.113(a)(3) of the Rules effectively prohibits that person from being an employee of the organization which would operate the satellite, since all of the satellite's transmissions are deemed to be made by its license grantee and that section prohibits a license grantee from making transmissions on behalf of an employer.

17. As a practical matter, most spacecraft in the amateur-satellite service are too small to accommodate orbital debris mitigation features, and most of the available launches are to orbits that are high enough so that the spacecraft are likely to remain in orbit for centuries. To require

[4] FCC 02-80.
[5] On May 19, 2003, the Commission released a combined *First Report and Order*, FCC 03-102, covering IB Docket Nos. 02-34 and 02-54. This document was entirely devoted to licensing procedures under Part 25, and did not address orbital debris mitigation issues.

such spacecraft to have de-orbiting systems, or to launch to orbits that are likely to decay in a relatively short time, would, in effect, be to prohibit them. On the other hand, apart from the possibility of a direct collision, the risk to other spacecraft from such small satellites is minimal, since they typically carry no propulsion systems, dangerous chemicals or explosive devices[6].

18. Turning now to the issue of affirmative prior approval, I urge the Commission to return to its prior practice, pre-1988, of requiring prospective operators of space stations in the amateur-satellite service to apply for and obtain affirmative approval – in effect, a space station license – prior to launch and operation. This would permit the Commission to consider not only the technical characteristics of the proposed space station and associated command stations, but also whether their mission belongs in the amateur-satellite service and whether their proposed operating arrangements are accordance with the Rules. The application and approval process should determine, *inter alia*, whether the proposed command system is adequate "to ensure immediate cessation of their radio emissions by telecommand, whenever such cessation is required under the provisions of these Regulations"[7], and whether the prospective space station license grantee and the operators of associated command stations are in compliance with the no-pecuniary-interest provisions of the Rules, including the aforementioned 47 C.F.R. § 97.113(a)(3). Matters such as these need to be considered and passed upon by the Commission prior to launch, not after the fact when the only available remedy might be an order to cease operation after an enforcement action, which might not even be capable of being complied with if the command system turns out to be inadequate. As noted earlier, I propose that this process

[6] High-altitude elliptical-orbit satellites such as AMSAT-OSCAR 40 do have propulsion systems, and might usefully be incorporated into an orbital debris mitigation scheme. Small LEO satellites such as Cubesats and Microsats, which physically are cubes approximately 100 mm and 230 mm on a side, respectively, do not. The Cubesat and Microsat spaceframe designs are both commonly used for LEO satellites in the amateur-satellite service.
[7] *Radio Regulations*, No. 22.1.

be entirely independent of the ITU notification procedure, so that each may be dealt with within a time frame appropriate to itself.

19. The Commission's 1988 decision to cease issuing amateur space station licenses and adopt the present provision that "any amateur station may be a space station"[8] had its roots in the large number of waivers which the Commission found itself issuing to permit astronauts to operate from the space shuttle. I am not proposing that the Commission issue space station operator licenses, only station licenses. Thus, the amateur station aboard the International Space Station would only have to be approved once.

20. With respect to the application and approval process itself, I believe that Part 5 provides a more appropriate model than Part 25. The latter's complexity is indicated by the fees to be submitted with an application for authority to launch and operate a system of space stations, currently $339,730 for the initial application and $24,720 per amendment. Amateur space stations are far simpler than the commercial systems covered by Part 25, and are similar in many respects to the Experimental Service stations covered in Part 5. The $50 fee for a Part 5 application is more appropriate as well.

RESPECTFULLY SUBMITTED,

/s/

RAY SOIFER

60 Waldron Avenue

Glen Rock, NJ 07452-2831

E-mail: ray@soiferconsulting.com

June 15, 2004

[8] 47 C.F.R. § 97.207(a).