

Before the
Federal Communications Commission
Washington, D.C. 20554

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|---|---|----------------------------------|
| In the Matter of |) | |
| |) | File No. 188-SAT-LOI-97 |
| ICO Services Limited |) | |
| |) | IBFS Nos. SAT-LOI-19970926-00163 |
| Letter of Intent to Provide |) | SAT-AMD-20000612-00107 |
| Mobile-Satellite Service in the 2 GHz Bands |) | SAT-AMD-20001103-00155 |

ORDER

Adopted: July 17, 2001

Released: July 17, 2001

By the Chief, International Bureau and the Acting Chief, Office of Engineering and Technology:

I. INTRODUCTION

1. By this *Order*, we grant the request of ICO Services Limited (ICO) to use spectrum in the 2 GHz band to provide Mobile-Satellite Service (MSS).¹ We also reserve spectrum in the 5 GHz and 7 GHz bands for ICO’s feeder links. This action is a significant step in assigning this spectrum for use by MSS providers and facilitates implementation of ICO’s proposed system’s technology and service offerings in the marketplace.

II. BACKGROUND

2. ICO proposes to construct, launch and operate a mobile-satellite system comprised of twelve satellites in non-geostationary satellite orbit (NGSO) with service links² in the 2 GHz MSS band and feeder links³ in the 5 GHz and 7 GHz bands.⁴ ICO proposes to use the 1990-2025 MHz and 2165-2200 MHz bands to serve customers in the United States and the 1985-2015 MHz and 2170-2200 MHz bands

¹ The term “2 GHz MSS Band” is used in this *Order* to refer to the 1990-2025 MHz (uplink) and 2165-2200 MHz (downlink) frequencies. These frequencies are allocated to the Mobile-Satellite Service (MSS) in the United States. See *Amendment of Section 2.106 of the Commission’s Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service*, ET Docket No. 95-18, First Report and Order and Further Notice of Proposed Rule Making, 12 FCC Rcd 7388 (1997), *aff’d on recon.*, Memorandum Opinion and Order and Third Notice of Proposed Rule Making and Order, 13 FCC Rcd 23949 (1998), *further proceedings*, Second Report And Order and Second Memorandum Opinion and Order, 15 FCC Rcd 12315 (2000) (*2 GHz Allocation & Relocation Proceeding*).

² “Service links” are the radio links that transmit a user’s messages in both directions between a user’s earth terminal and the system’s satellite(s).

³ “Feeder links” are the radio links that transmit a user’s messages in both directions between the system’s satellite(s) and its gateway earth station(s), connecting the MSS network with the public switched telephone network.

⁴ The “5 GHz band” refers to the Earth-to-space (uplink) frequencies at 5091-5250 GHz; the “7 GHz band” refers to the corresponding space-to-Earth (downlink) frequencies at 6700-7075 MHz.

to serve customers outside the United States.⁵ ICO proposes to use the 5150-5250 MHz and 6975-7075 MHz bands for feeder links. ICO plans to position twelve NGSO satellites in two orthogonal planes; each plane would include six satellites and would be inclined at 45 degrees to the equatorial plane.⁶ ICO's NGSO satellites would operate at an altitude of 10,355 kilometers with an orbital period of approximately 360 minutes.⁷ ICO proposes to rely on one ground spare satellite to compensate for satellite failures.⁸

3. ICO submitted its 2 GHz MSS Letter of Intent (LOI) on September 26, 1997.⁹ On March 19, 1998, we sought comment on ICO's LOI and other 2 GHz MSS applications.¹⁰ Various parties filed comments on ICO's letter and Boeing, Iridium, Constellation, and MCHI requested that we deny, defer or delay ICO's authorization, largely on grounds that ICO had not adequately demonstrated the requisite competitive showing for non-U.S. space station licensees.¹¹ ICO replied to these concerns by asserting that no undue market concentration, discrimination or cross-subsidization would occur due to the relationship between ICO and Inmarsat.¹²

⁵ Letter of Intent of ICO Services Limited, File No. 188-SAT-LOI-97; IBFS File NO. SAT-LOI-19970926-00163 at 2, 15 (September 26, 1997) (ICO Letter of Intent). The Members of the International Telecommunication Union (ITU) have divided the world into three Regions. Generally, Region 1 includes Africa, Europe, Northern and Western portions of Asia; Region 2 includes the Americas and Greenland; and Region 3 includes Southern portions of Asia, Australia and the South Pacific. See ITU Radio Regulations Article S5, Section I. Under ITU Radio Regulations, the 1980-2010 MHz and 2170-2200 MHz bands are allocated to MSS worldwide. *Id.* Article S5, Section IV. Region 2 allocations, however, vary slightly from those of the other regions. In Region 2, the 1980-1990 MHz band does not become available for MSS until January 1, 2005. *Id.* S5.389A. In addition, the 2010-2025 MHz and the 2160-2170 MHz bands, which the ITU already has identified for MSS use in Canada and the United States, will become available for MSS in the rest of Region 2 on January 1, 2002. *Id.* S5.389C, S5.389D.

⁶ ICO Letter of Intent at 9-10.

⁷ *Id.* at 13, 18-19.

⁸ ICO can operate its system with ten satellites, but will launch twelve satellites to compensate for any failures. If more than ten satellites survive launch, ICO will operate any surviving satellites. *Id.* at 9. In its Second Amendment, ICO appears to contemplate an additional on-ground spare to account for potential launch failures. See Second Amendment to ICO Services Limited Letter of Intent, SAT-AMD-20000612-00107 at 7 (June 12, 2000) (ICO Second Amendment) ("the procurement of the replacement satellite and an additional spare will maintain the probability of achieving, on a timely basis, the originally planned constellation of 12 satellites in orbit").

⁹ ICO Letter of Intent at 1. At the time of filing, ICO's parent company was a non-U.S. licensed space-station licensee. A satellite system being licensed by a foreign administration, and seeking to obtain spectrum for service to the United States, may file a Letter of Intent (LOI) requesting that the Commission "reserve" spectrum for that system. We consider an LOI request in a space-station processing round in anticipation that future earth station applications will seek authority to access the non-U.S.-licensed satellite system. See *Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, Report and Order, 12 FCC Rcd 24094, 24173-74 (1997) (*DISCO II Order*) (describing the procedures under which foreign-licensed satellite systems may provide service in the United States). The 2 GHz Band is the first in which we have acted on an LOI. In this document, the term "applicant" and "application" refers to all parties and their first submissions, respectively, that seek authority to operate 2 GHz MSS systems regardless of whether the filer submitted an application for a U.S.-licensed system or a letter of intent for authority to serve the U.S. market using 2 GHz MSS spectrum.

¹⁰ See Public Notice, Report No. SPB-119 (rel., March 19, 1998).

¹¹ BT Comments at 1; Constellation Comments at 9; Boeing Petition at 5; Iridium Comments at 19-30; WCA Comments at 3; MCHI Reply at 22; Constellation Reply at 6; Boeing Reply at 21. For a list of pleadings submitted in response to ICO's LOI, see Appendix A.

¹² ICO Reply at 11-16; ICO Response at 6-7.

4. On June 12, 2000, ICO amended its Letter of Intent to reflect changes in its ownership.¹³ The Commission subsequently adopted service rules for 2 GHz MSS systems.¹⁴ ICO then amended its application to address the requirements adopted in the *2 GHz MSS Order*.¹⁵ Finally, on March 8, 2001, ICO submitted an *ex parte* request in the service rules proceeding for 2 GHz MSS operators.¹⁶ In its letter, ICO requested that the Commission amend the 2 GHz MSS rules to enable 2 GHz MSS licensees to incorporate an “ancillary terrestrial component” into their MSS networks.¹⁷

III. DISCUSSION

5. Under rules adopted in the Commission’s *2 GHz MSS Order*, ICO must demonstrate that its system meets certain technical requirements. We address these requirements first. We then turn to ICO’s request for service links in the 2 GHz MSS band and for feeder links in the 5 GHz and 7 GHz bands. Next we review ICO’s implementation milestones, orbital debris mitigation strategy, relationship with Inmarsat, and other issues.

A. Technical Qualifications

1. Frequency Agility

6. Under the Commission’s service rules and policies, 2 GHz MSS systems must be capable of operating across at least seventy percent of the United States’ 2 GHz MSS allocation in the 1990-2025 MHz and 2165-2200 MHz bands.¹⁸ The Commission also requires that 2 GHz MSS systems be capable of operating without fixed frequency translations between the uplink and downlink frequencies in the service-link bands.¹⁹ ICO’s proposed system meets these requirements.²⁰

¹³ See Amendment to ICO Services Limited Letter of Intent, SAT-AMD-20000612-00107 (June 12, 2000) (ICO First Amendment). The ICO First Amendment disclosed the reorganization of the company pursuant to the bankruptcy proceedings, as well as the pending merger of Teledesic LLC into the newly formed ICO-Teledesic Global Limited (ITGL). In the context of disposing of ITGL’s transfer-of-control application and a related petition for declaratory ruling, we granted ICO an exemption from the space station “cut-off” rule, which allowed ICO to continue prosecuting its pending LOI to access the 2 GHz MSS frequency bands. For a thorough discussion of the ICO First Amendment, the transfer of control of ICO to ITGL, and the exemption to the “cut-off” rule, see *ICO-Teledesic Global Limited*, Memorandum Opinion, Order and Authorization, 16 FCC Rcd 6403 (Int’l Bur. 2001).

¹⁴ *The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band*, IB Docket No. 99-81, Report and Order, 15 FCC Rcd 16127 (2000) (*2 GHz MSS Order*).

¹⁵ ICO Second Amendment, footnote 8, *supra*. See Public Notice, Report No. SAT-00061 (rel. November 29, 2000) (*2 GHz MSS Amendment PN*).

¹⁶ See *Ex parte* Letter of New ICO Global Communications (Holdings) Ltd., IB Docket No. 99-81 (dated March 8, 2001) (ICO *Ex Parte* Letter). See also Letter of Craig McCaw to Donald Abelson, Chief, International Bureau (dated June 25, 2001).

¹⁷ ICO’s proposal for MSS licensees to use an ancillary terrestrial component (ATC) to supplement their satellite network is the subject of a separate, ongoing Commission proceeding; therefore, we do not address the issue of authorizing ATC for MSS networks in this *Order*.

¹⁸ *2 GHz MSS Order*, 15 FCC Rcd at 16152 ¶ 52.

¹⁹ *Id.* at 16152 ¶ 53.

²⁰ ICO Second Amendment at 6.

2. NGSO Coverage Requirements

7. Section 25.143(b)(2) of the Commission's rules requires NGSO 2 GHz MSS systems to provide continuous coverage throughout all fifty states, Puerto Rico and the U.S. Virgin Islands, i.e., that at least one satellite is visible at an elevation angle of at least five degrees at all times within this geographic area.²¹ In addition, at locations as far north as 70 degrees North Latitude and as far south as 55 degrees South Latitude, NGSO MSS systems must operate such that at least one satellite is visible at an elevation angle of at least five degrees for eighteen hours of every day.²² ICO's proposed system meets the system-coverage requirements necessary to provide 2 GHz MSS service in the United States.²³

B. Service-Link Spectrum

8. The *2 GHz MSS Order* adopted a hybrid band arrangement that divided the 2 GHz MSS uplink (1990-2025 MHz) and downlink (2165-2200 MHz) bands into segments of equal bandwidth based on the number of systems seeking assignments.²⁴ The Commission determined that providing 3.5 megahertz in each direction for the nine then-pending system proponents would be sufficient to commence operations.²⁵ The Commission provided that, in the event not all system proponents proceed toward authorization, the remaining system proponents would receive more than 3.5 megahertz of spectrum in each direction upon authorization.²⁶ In addition, the Commission reserved one additional spectrum segment in each direction for expansion of system(s) by operator(s) meeting certain criteria for service to unserved areas.²⁷ The following formula expresses the amount of spectrum available for each system in each direction of transmission:

$$35 \text{ megahertz} \div (\text{Number of System Proponents} + \text{One}) = \text{Size of Each Spectrum Segment}^{28}$$

There are currently eight 2 GHz MSS system proponents participating in this processing round.²⁹ We will not at this time, however, implement that portion of the Commission's *2 GHz MSS Order* that would give each system proponent access to more than 3.5 megahertz of spectrum in each direction on a primary basis. Subsequent to release of the *2 GHz MSS Order*, the Commission has received new proposals for use of the 2 GHz MSS bands.³⁰ Delaying the designation of additional spectrum will give the Commission the opportunity to consider these proposals. Therefore, in this *Order*, ICO will receive access to a spectrum segment of 3.5 megahertz, in each direction of transmission, on a primary basis, i.e.,

²¹ 47 C.F.R. § 25.143(b)(2)(iii).

²² 47 C.F.R. § 25.143(b)(2)(ii).

²³ ICO Second Amendment at 4.

²⁴ *2 GHz MSS Order*, 15 FCC Rcd at 16138 ¶ 16.

²⁵ *Id.* at 16139 ¶ 17.

²⁶ *Id.*

²⁷ *Id.* at 16146-47 ¶¶ 35-39.

²⁸ *Id.* at 16138 ¶ 16.

²⁹ See *2 GHz MSS Amendment PN*, Report No. SAT-00061.

³⁰ See ICO *Ex Parte* Letter, footnote 16 *supra*; Petition for Rulemaking of the Cellular Telecommunications & Internet Association (filed May 18, 2001) (CTIA Petition).

a “Selected Assignment.”³¹ ICO will choose its Selected Assignment such that the band edge of the assignment is an integer multiple of 3.88 megahertz from the band edge of the 2 GHz MSS band, which will allow the Commission to address the proposals before it.

9. ICO must identify the specific frequencies of its Selected Assignment when the first satellite in its system reaches its intended orbit and notify the Commission in writing of its selection.³² Consistent with the 2 GHz MSS Order, ICO also may elect to operate outside its Selected Assignment on a secondary basis with respect to other 2 GHz MSS operators, subject to certain conditions.³³

C. Feeder Links

10. ICO proposes feeder uplinks in the 5150-5250 MHz band and feeder downlinks in the 6975-7075 MHz frequency band.³⁴ In the United States, the 5150-5250 MHz and 6975-7075 MHz bands for which ICO seeks authority are not currently allocated for commercial NGSO satellite service, and the 6975-7075 MHz band is not allocated in the direction that ICO proposes. Internationally, however, the International Telecommunication Union (ITU) has identified the 5150-5250 MHz and 6700-7075 MHz bands for feeder link transmissions between earth stations and NGSO MSS satellites.³⁵ Moreover, the Commission has initiated a rulemaking proposing to amend the domestic Table of Frequency Allocations consistent with the international identification of the 5150-5250 MHz and 6700-7075 MHz bands for NGSO MSS feeder links (the “5, 7, 15 GHz Allocation Rulemaking”).³⁶ In the interim, we have waived Section 2.102(a) of the Commission’s rules, which prohibits frequency assignments that differ from the Table of Frequency Allocations,³⁷ to allow NGSO MSS licensees to use portions of these internationally allocated bands for NGSO MSS feeder links.³⁸

11. Consistent with these actions, we waive Section 2.102(a) of the Commission’s Rules to permit the proposed operations, pending completion of the 5, 7, 15 GHz Allocation Rulemaking.³⁹ Specifically, we

³¹ Systems must be implemented consistent with the plans for incumbent relocation adopted in the 2 GHz Allocation & Relocation Proceeding, Second Report And Order and Second Memorandum Opinion and Order, 15 FCC Rcd 12315, including the phased plan for relocation in the 1990-2025 MHz band.

³² 2 GHz MSS Order, 15 FCC Rcd at 16138 ¶ 16. A satellite’s intended orbit is the final orbit it will occupy to provide commercial service. *Id.* n.75.

³³ *Id.* at 16139-40 ¶ 19. The 1990-2025 MHz (Earth-to-space) and 2165-2200 MHz (space-to-Earth) bands are immediately adjacent to the 2025-2110 MHz (Earth-to-space, space-to-space) and 2200-2290 MHz (space-to-Earth, space-to-space) bands, respectively, where the Federal Government has extensive satellite network operations. To avoid the possibility of adjacent band interference, this potential interference situation needs to be considered by both non-Government and Government satellite operators when implementing their respective satellite systems near the band edges.

³⁴ ICO Second Amendment at 3.

³⁵ ITU Radio Regulations nn.S5.444A (allocating the 5091-5150 MHz band for assignment to NGSO MSS feeder uplinks until January 1, 2008, subject to coordination), S5.447A (allocating the 5150-5250 MHz band to NGSO MSS feeder uplinks, subject to coordination), S5.458B (allocating the 6700-7075 MHz band to NGSO MSS feeder downlinks, subject to coordination).

³⁶ See Amendment of Parts 2, 25 and 97 of the Commission’s Rules with Regard to the Mobile-Satellite Service Above 1 GHz, ET Docket No. 98-142, Notice of Proposed Rulemaking, 13 FCC Rcd 17107 (1998).

³⁷ 47 C.F.R. § 2.102(a).

³⁸ See, e.g., *L/Q Licensee, Inc.*, Order and Authorization, 11 FCC Rcd 16410, 16413-14 ¶ 8 (Int’l Bur. 1996).

³⁹ See *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).

waive Section 2.102(a) to permit ICO to operate its feeder uplink transmissions in the 5150-5250 MHz band. Similarly, we waive Section 2.102(a) to permit ICO to operate its feeder downlink transmissions in the 6975-7075 MHz band. ICO's proposed operations are consistent with the international allocation for these bands. We encourage ICO to operate in the lower portions of the 6975-7075 MHz band to minimize coordination requirements with the broadcast auxiliary service (BAS). In that regard, ICO's feeder link operations in the 7025-7075 MHz portion of the band must be on an unprotected, non-harmful interference basis relative to BAS pending the outcome of the Commission's domestic allocation proceeding.⁴⁰ This will permit broadcasters and cable operators to continue operating on two additional BAS channels while coordination issues are addressed in the pending allocation proceeding.

12. This authorization of feeder link spectrum is subject to any applicable restrictions or modifications that may be promulgated in the *5, 7, 15 GHz Allocation Rulemaking*. In addition, this authorization should not be construed as a license for Earth-to-space transmission in the 5150-5250 MHz band. Such authority must be requested in the context of an earth station application filed pursuant to Section 25.130 of the Commission's rules.⁴¹ As stated in the *2 GHz MSS Order*, ICO must coordinate with any other licensees authorized to use the same spectrum for feeder links.⁴² ICO also must coordinate its proposed NGSO satellite system operations with respect to licensed non-government and authorized Federal Government terrestrial systems, as necessary, in accordance with Section 25.272 of the Commission's rules.⁴³

13. The 5150-5250 MHz band also is allocated to the aeronautical radionavigation services (ARNS) on a primary basis in the United States and throughout the world.⁴⁴ Prior to authorization of an earth station, ICO's feeder link operations in the 5150-5250 MHz band must be coordinated through the Frequency Assignment Subcommittee of the Inter-department Radio Advisory Committee of the National Telecommunication and Information Administration (NTIA). In that regard, NTIA recommends that, to the extent practicable, any 2 GHz MSS operator using the 5091-5250 MHz band for feeder links locate its tracking, telemetry, and command (TT&C) signal in the middle or at the upper end of the 5091-5250 MHz band, to reduce the likelihood of interference to the adjacent Microwave Landing System operations in the adjacent 5030-5091 MHz band.⁴⁵ NTIA also has stated its concern about protecting Government passive service operations in the 6650-6675.2 MHz band from NGSO MSS space station transmissions in the 6700-7075 MHz band.⁴⁶ As this is an active issue in the *5, 7, 15 GHz Allocation Rulemaking*, ICO will be subject to any applicable rules that may be promulgated on this issue. Until such time, we expect the Executive Branch and NGSO MSS entities to work together to address the needs of both services.⁴⁷

⁴⁰ *Accord Verestar, Inc.*, Order and Authorization, DA 01-1195, at ¶ 9 (Sat. & Radiocomm. Div., rel. May 10, 2001) (licensee of ICO's feeder link gateway "has agreed to accept interference, if any, that it may receive from authorized stations" in the 6975-7075 MHz band while operating under special temporary authority granted therein).

⁴¹ 47 C.F.R. § 25.130.

⁴² See *2 GHz MSS Order*, 15 FCC Rcd at 16159 ¶ 72 (citing 47 C.F.R. § 25.203(k)).

⁴³ 47 C.F.R. § 25.272.

⁴⁴ 47 C.F.R. § 2.106 n. US260.

⁴⁵ See *2 GHz MSS Order*, 15 FCC Rcd at 16162-63 ¶ 77. Section 25.202(g) of the Commission's rules states that TT&C functions for U.S. domestic satellites "shall be conducted at either or both edges of the allocated band(s)," *i.e.*, at either or both edges of a frequency band assigned to a satellite licensee for communication. 47 C.F.R. § 25.202(g).

⁴⁶ See Letter from Associate Administrator, Office of Spectrum Management, NTIA, to Acting Chief, Office of Engineering and Technology, FCC (May 7, 2001).

⁴⁷ See 47 C.F.R. § 2.106, footnote S5.458A ("In making assignments in the band 6700-7075 MHz to space stations of the fixed-satellite service, administrations are urged to take all practicable steps to protect spectral line

D. Regulatory Classification

14. ICO requests that its satellite operations not be regulated as a common carrier.⁴⁸ Under the Communications Act, our Rules and the *2 GHz MSS Order*, we grant ICO's request and treat its space-station operations as non-common carrier.⁴⁹ We will address the regulatory classification of earth stations operating as part of ICO's system in connection with earth-station licensing.⁵⁰

E. Implementation Milestones

15. The *2 GHz MSS Order* adopted milestones for implementation that apply to 2 GHz MSS systems.⁵¹ Consistent with the *2 GHz MSS Order*, therefore, ICO must observe the following milestone requirements:

| Milestone | Deadline |
|---|-------------------------------|
| Enter Non-contingent Satellite Manufacturing Contract | 12 months after authorization |
| Complete Critical Design Review (CDR) | 24 months after authorization |
| Begin Physical Construction of All Satellites | 30 months after authorization |
| Complete Construction and Launch First Two Satellites in System | 42 months after authorization |
| Certify Entire System Operational | 72 months after authorization |

16. ICO must describe the status of system construction and operation in its annual reports, and file a certification with the Commission within ten days following each of the milestones specified above.⁵²

F. Orbital Debris Mitigation

17. Currently, the FCC addresses issues regarding orbital debris and satellite systems on a case-by-case basis, under the general "public interest, convenience and necessity" standard in the

observations of the radio astronomy service in the band 6650-6675.2 MHz from harmful interference from unwanted emissions.").

⁴⁸ ICO Letter of Intent at 67.

⁴⁹ See 47 U.S.C. § 332(c)(5); 47 C.F.R. § 332(c)(5); *2 GHz MSS Order*, 15 FCC Rcd at 16173 ¶ 95.

⁵⁰ We also note that the Commission will address issues concerning protection for aeronautical radionavigation in the 1559-1610 MHz band from the out-of-band emissions of 2 GHz MSS mobile earth terminals (METs) in the pending Global Mobile Personal Communications by Satellite (GMPCS) rulemaking, and the 2 GHz MSS METs will be subject to applicable rules and policies the Commission will adopt in that proceeding. *2 GHz MSS Order*, 15 FCC Rcd at 16196-97 ¶ 163 (citing *Amendment of Parts 2 and 25 to Implement the Global Mobile Personal Communications by Satellite (GMPCS) Memorandum of Understanding and Arrangements*, IB Docket No. 99-67, Notice of Proposed Rule Making, 14 FCC Rcd 5871 (1999)).

⁵¹ *2 GHz MSS Order*, 15 FCC Rcd at 16177-78 ¶ 100.

⁵² See 47 C.F.R. §§ 25.143(e)(1) (requiring satellite space station operators to file annual reports with the Commission every October 10), 25.143(e)(3) (requiring satellite space-station operators to file a certification with the Commission within 10 days of a system implementation milestone).

Communications Act.⁵³ To facilitate our orbital debris analysis, under Section 25.143(b)(1) of our rules, 2 GHz MSS system proponents are required to “describe the design and operational strategies that they will use, if any, to mitigate orbital debris.”⁵⁴ This rule also requires 2 GHz MSS system proponents to “submit a casualty risk assessment if planned post-mission disposal involves atmospheric re-entry of the spacecraft.”⁵⁵

18. In adopting this requirement, the Commission indicated that applicants may wish to consult the National Aeronautics & Space Administration (NASA)/Department of Defense (DoD) Guidelines on Debris Mitigation, as well as the ITU Recommendation on disposal of geostationary satellites.⁵⁶ The NASA/DoD Guidelines identify four main objectives: 1) controlling debris released during normal operations; 2) minimizing debris generated by accidental explosions; 3) selecting safe flight profiles and operational configurations; and 4) providing for post-mission disposal of space structures.

19. Under the NASA/DoD Guidelines, these objectives are accomplished by a number of means.⁵⁷ The first objective – controlling debris released during normal operations – is addressed by minimizing the amount of debris released in a planned manner during normal operations. The second objective – minimizing debris generated by accidental explosions – is addressed by limiting the risk to other space systems from accidental explosions both during mission operations and after completion of mission operations. For mission operations, this is accomplished through analysis of credible failure modes and development of methods to limit the probability they will occur. Post-mission, this is accomplished through depletion of all sources of stored energy on board the spacecraft when they are no longer required for mission operations or post-mission disposal. The third objective – selecting a safe flight profile and operational configuration – is addressed through estimating and limiting the probability of collision with large objects during orbital lifetime, and the probability of disabling collisions with small debris during mission operations.

20. The fourth objective in the NASA/DoD Guidelines – providing for post-mission disposal of space structures – is met by planning for disposal of a spacecraft at the end of mission life to minimize impact on future space operations. This is accomplished through one of two options relevant here. The first option is atmospheric reentry, *i.e.*, leaving the structure in an orbit in which it will remain in orbit for no longer than 25 years after mission completion. Under this option, it is also necessary to address the casualty risk from any portions of the spacecraft that may survive atmospheric reentry. The second option is maneuvering to a storage orbit. There are three suggested storage orbits. The first is between low and middle Earth orbit, *i.e.*, satellite perigee altitude above 2,000 kilometers and apogee altitude below 19,700 kilometers. The second is between middle and geosynchronous Earth orbit, *i.e.*, perigee altitude above 20,700 kilometers and apogee altitude below 35,300 kilometers. The third is above geosynchronous Earth orbit, *i.e.*, perigee altitude above 36,100 kilometers (or approximately 300 kilometers above geosynchronous altitude). In addition to the NASA/DoD guidelines, and as the

⁵³ 47 U.S.C. § 303.

⁵⁴ 47 C.F.R. § 25.143(b)(1), as amended by the *2 GHz MSS Order*, 15 FCC Rcd at 16205. The Commission also stated that it intends to commence a rulemaking proceeding proposing to explore orbital debris mitigation issues. *2 GHz MSS Order*, 15 FCC Rcd at 16188 ¶ 138.

⁵⁵ 47 C.F.R. § 25.143(b)(1), as amended by the *2 GHz MSS Order*, 15 FCC Rcd at 16205.

⁵⁶ See *2 GHz MSS Order*, 15 FCC Rcd at 16118 ¶ 138.

⁵⁷ See *The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band*, IB Docket No. 99-81, 14 FCC Rcd 4843, 4901-03 (1999) (Appendix C).

Commission observed in the *2 GHz MSS Order*,⁵⁸ the ITU has developed a recommendation concerning operations in the GSO.⁵⁹

21. Each of the 2 GHz MSS systems submitted a narrative statement concerning orbital debris mitigation. We note that, to the extent that the statements address debris mitigation issues involving launch vehicle operations, we have neither reviewed nor concluded the plans disclosed are appropriate.⁶⁰ We also note that, to the extent debris mitigation plans for MSS systems change, the system proponents should evaluate those changes to determine whether disclosure and/or prior approval is required.⁶¹

22. In its Second Amendment, ICO addressed orbital debris mitigation issues for operations, including debris release and accidental explosions.⁶² Specifically, ICO indicated that its satellites have been “designed to minimize the possibility of accidental explosion or collision during its operational lifetime.”⁶³ ICO also stated it proposed to use the HS601 satellite bus, which has been analyzed by NASA pursuant to its orbital debris mitigation guidelines in connection with NASA’s use of that bus for its tracking and data relay satellite system.⁶⁴ However, ICO did not specifically address limiting the probability of collision with large, known objects during satellite orbital lifetime. We expect ICO and other 2 GHz MSS systems to develop appropriate operational plans and procedures to minimize the possibility of collision with large, known objects.⁶⁵ ICO also addressed end-of-mission orbital debris mitigation issues, including defining a system disposal strategy and depletion of stored energy sources.⁶⁶

⁵⁸ *2 GHz MSS Order*, 15 FCC Rcd at 16118 ¶ 138.

⁵⁹ Recommendation ITU-R S.1003. The recommendation suggests, in pertinent part, that a geostationary satellite at the end of its life should be transferred before complete exhaustion of its propellant, to a “supersynchronous graveyard orbit that does not intersect the GSO,” with GSO defined as the mean earth radius of 42,164 kilometers plus or minus 300 kilometers. The recommendation also notes that what constitutes “an effective graveyard orbit” requires further studies. In this regard, we note that orbital perturbations due to solar and lunar gravitation, solar pressure, or other sources, may, over time, result in an inactive satellite’s orbit intersecting the GSO, as defined by the ITU recommendation, even if the initial disposal altitude does not intersect the GSO.

⁶⁰ The United States licensing authority for commercial launches is the Federal Aviation Administration. See 14 C.F.R. § 400 *et seq.*

⁶¹ See 47 C.F.R. §§ 1.65, 25.117(a). See also *2 GHz MSS Order*, 15 FCC Rcd at 16179 ¶ 108 (system modifications requiring prior FCC approval should be identified well in advance of the CDR milestone).

⁶² ICO Second Amendment at 9-10.

⁶³ *Id.*

⁶⁴ *Id.* at 10.

⁶⁵ See, e.g., Amendment to Pending Application of Iridium LLC, SAT-AMD-20001103-00156 (November 3, 2000) at Exhibit 1, p.2.

⁶⁶ ICO indicates that “[a]ll functions required to perform this maneuver will be operational at the end of the orbital life with a probability of 0.95.” See ICO Second Amendment at 10. The Commission has not addressed the level of reliability required for completion of end of life maneuvers. We note, however, that the NASA Safety Standard concerning orbital debris mitigation states that “when the probability of successfully performing the post-mission disposal maneuver can be structured to be 0.99 or greater the intent of the guidelines has been met.” NASA Safety Standard, *Guidelines and Assessment Procedures for Limiting Orbital Debris*, Document NSS 1740.14 (August 1995), available at <http://sn-callisto.jsc.nasa.gov/mitigate/nss1740/nss1740.html>. Given that the ICO system will include multiple satellites in each circular orbital plane, the risks associated with any failed end of life maneuver, particularly collisions and other potential fragmentation events, will immediately affect ICO. See R. Walker, *et al.*, *Orbital Debris Collision Risks to Satellite Constellations*, Paper Presented at the International Astronautical Federation, International Workshop on the Mission Design and Implementation of Satellite Constellations (Toulouse, France, November 17-19, 1997) (on file with the Federal Communications Commission). Accordingly,

However, in order to permit assessment of ICO's disposal plan and provide adequate information for potentially effected parties, we require ICO to supplement its narrative statement by providing greater specificity regarding the range of storage orbit parameters selected for disposal of its satellites. This information should be submitted no later than six months prior to the CDR milestone.⁶⁷

G. World Trade Organization Agreement, *DISCO II*, and Relationship with Inmarsat

23. In *DISCO II*, the Commission established a rebuttable presumption that entry by non-U.S. satellites licensed by World Trade Organization (WTO) members to provide services covered by U.S. commitments under the WTO Agreement on Basic Telecommunications Services (Basic Telecom Agreement) will promote competition in the U.S. market.⁶⁸ These commitments include the mobile satellite services. The United Kingdom, the licensing administration for ICO's system, is a WTO member. To the extent ICO's system will be providing MSS to customers in the United States, we therefore presume that ICO's entry into the U.S. market will further competition.⁶⁹

24. Boeing, Iridium and MCHI raise concerns under *DISCO II* about the possibility of competitive harm from ICO due to its historical relationship to Inmarsat.⁷⁰ Inmarsat was originally created as an intergovernmental satellite organization (IGO) to provide mobile satellite communications. Inmarsat had established ICO in 1995 for the purpose of creating a satellite system to provide hand-held mobile services on a global basis. Boeing asks us to condition ICO's authorization on what Boeing describes as "pro-competitive requirements necessitated by ICO's origins as an IGO initiative and ICO's continuing status as an IGO affiliate."⁷¹ Boeing speculates that ICO's ties to foreign telecommunication carriers and governments may "impede the ability of U.S.-licensed MSS systems to gain access in a sufficient number of countries to provide truly global service."⁷² Boeing also suggests that ICO may use certain unspecified "pre-existing [Inmarsat] coordination arrangements" to prevent other MSS systems from providing services on an equal basis.⁷³ Iridium and MCHI raise similar concerns.⁷⁴

we believe at this time that there are adequate incentives in place for ICO to insure the reliability of spacecraft end-of-life procedures.

⁶⁷ In addition, we would not anticipate issuing an authorization for handset operations in the United States until this issue has been resolved.

⁶⁸ *DISCO II Order*, 12 FCC Rcd at 24169-72 ¶¶ 175-182.

⁶⁹ *Accord ICO Comments* at 8.

⁷⁰ See Boeing Petition at 5; Boeing Reply at 21; Iridium Comments at 21; Consolidated Reply of Iridium LLC at 19-20; MCHI Comments at 23; MCHI Consolidated Reply at 16, 23.

⁷¹ Boeing Petition at 5; see also Boeing Reply at 21.

⁷² Boeing Petition at 6.

⁷³ *Id.*

⁷⁴ Iridium Comments at 21 (alleging we lack sufficient information to determine whether ICO will have an anti-competitive effect on the U.S. market); Consolidated Reply of Iridium LLC at 19-20 (citing limited success in obtaining market access as of 1998 in nations that directly or indirectly have invested in ICO); MCHI Comments at 23 (requesting that we deny or defer consideration of ICO's LOI "until the complex competitive concerns raised by ICO's origin and current ownership structure can be thoroughly evaluated"); MCHI Consolidated Reply at 16, 23 (alleging "clear" incentives for cross-subsidization between Inmarsat and ICO); see also Constellation Reply at 6 (supporting Iridium's concerns about the potential anti-competitive effects of allowing ICO to enter the U.S. market).

25. In response, ICO claims that the conditions that Boeing and Iridium propose are contrary to U.S. commitments in the WTO Basic Telecom Agreement and do not serve the public interest.⁷⁵ ICO asserts that the “very high risk to competition” test established in our *DISCO II Order* is only met where an opponent demonstrates that granting the application will result in “market concentration, discrimination, below average variable cost pricing, monopoly supply of service ... or where the applicant has market power and could use that power to raise prices or limit output in the U.S. satellite market.”⁷⁶ According to ICO, Boeing and Iridium’s arguments fail to meet this test.

26. Concerns from ICO’s competitors that the company might exercise undue market influence in the United States market through its relationship with Inmarsat have since been superseded. First, ICO’s ownership has changed since those comments were filed. Inmarsat had a 9.537 percent investment in ICO and one representative on its Board of Directors prior to ICO seeking protection under the bankruptcy code in August 1999.⁷⁷ ICO emerged from bankruptcy in May 2000, following completion of a \$1.2 billion investment led by a group of U.S. and international investors.⁷⁸ As a result, Inmarsat’s ownership interest in ICO has been reduced to less than one tenth of one percent.⁷⁹ In addition, the Open-Market Reorganization for the Betterment of International Telecommunications Act (ORBIT Act), prohibits reaffiliation of Inmarsat and ICO until fifteen years after Inmarsat privatization.⁸⁰ The ORBIT Act also prohibits Inmarsat from having any officers, directors, or employees who are officers, directors or employees of ICO.⁸¹ For these reasons, we reject requests that we deny, defer or condition ICO’s application due to the company’s prior relationship with Inmarsat.

H. Other Issues

1. In-Band TT&C

27. ICO proposes to provide tracking, telemetry and control (TT&C) on bands inside the system’s feeder link spectrum bands at 5150-5250 MHz and 6975-7075 MHz.⁸² To minimize interference, Section 25.202(g) of our rules generally requires space-station licensees to conduct TT&C operations at either or both edges of the bands that the applicant proposes to use for feeder links.⁸³ While ICO proposes to

⁷⁵ ICO Reply at 12.

⁷⁶ *Id.* (citing *DISCO II Order*, 12 FCC Rcd at 24113).

⁷⁷ See Letter from Cheryl A. Tritt, Counsel for ICO Services Limited to Magalie Roman Salas, Secretary, Federal Communications Commission, File No. 188-SAT-LOI-97 (September 27, 1999) (announcing ICO’s filing for voluntary bankruptcy protection).

⁷⁸ See Letter from Cheryl A. Tritt, Counsel for ICO Services Limited to Magalie Roman Salas, Secretary, Federal Communications Commission, File No. 188-SAT-LOI-97 (May 17, 2000) (announcing ICO’s emergence from bankruptcy protection with a significant investment from and under the control of Craig McCaw). See also ICO First Amendment at 3.

⁷⁹ See ICO Second Reply at 2; Comments of Inmarsat Ltd. on Comsat Corporation/Comsat Mobile Communications Amendments Filed to Demonstrate Compliance With the Open-Market Reorganization for the Betterment of International Telecommunications Act, File Nos. SES-AMD-20000501-00695 *et seq.*, at 9-10 (June 16, 2000). Inmarsat has indicated that it has written off the entire amount of this investment. Furthermore, Inmarsat has stated that no management ties or exclusive arrangements exist between Inmarsat entities and ICO. *Id.*

⁸⁰ 47 U.S.C. § 763c(1). Inmarsat privatized as a stock corporation in the United Kingdom on April 15, 1999. See, e.g., *Inmarsat Ventures Ltd.*, Memorandum Opinion and Order, FCC 01-193, at ¶ 4 & n.4 (rel. June 28, 2001).

⁸¹ 47 U.S.C. § 763c(2).

⁸² ICO Second Amendment at 5.

⁸³ 47 C.F.R. § 25.202(g) (requiring TT&C to “be conducted at either or both edges of the allocated band(s)”).

provide TT&C on bands well inside the system's feeder link spectrum, we will allow ICO to operate as proposed for four reasons. First, the requested TT&C frequencies remain consistent with the TT&C frequencies the ICO system will use on a global basis. Permitting ICO to operate on these TT&C frequencies in the United States will help permit global TT&C operations for the ICO system. Second, allowing operation on the proposed TT&C frequencies may facilitate coordination with the Globalstar system because no overlap will occur between ICO's TT&C frequencies and Globalstar's TT&C frequencies. Third, the Federal Aviation Administration has approved arrangements for protecting Microwave Landing Service operations against harmful interference from ICO's TT&C operations. Fourth, in 1999 and again in 2000 we provisionally permitted TT&C operations for the ICO system to be performed within the proposed feeder link bands, subject to an analysis that no unacceptable interference would occur to other authorized operations.⁸⁴ No facts have been brought to our attention that would cause us to reconsider our original decision. Consequently, we will allow ICO to conduct TT&C on the frequencies in its feeder link bands, provided that ICO causes no harmful interference to other authorized operations.

2. Waiver Requests

28. ICO asks us to waive Section 25.114(c)(9) and Sections 25.114(c)(17)-(21) of our Rules.⁸⁵ By their terms, these sections do not apply to 2 GHz NGSO MSS systems. Therefore, no waivers of these rules are necessary for ICO to implement its NGSO system in the 2 GHz MSS band.⁸⁶ We dismiss ICO's waiver requests.

3. Timing of Licensing

29. AT&T Wireless Services, Inc., Cingular Wireless LLC, Sprint PCS, and Verizon Wireless (Wireless Carriers) in a recent joint letter requested the Commission to defer grant of ICO's LOI and other pending 2 GHz MSS applications until (1) public comment is sought and received on the implications of ICO's March 8, 2001 *ex parte* letter proposing amendment of the 2 GHz MSS service rules to permit licensees to incorporate an "ancillary terrestrial component" into their 2 GHz MSS networks; and (2) the Commission considers a petition for rule making submitted by the Cellular Telecommunications & Internet Association (CTIA) requesting that the 2 GHz MSS bands be reallocated for other uses, such as terrestrial wireless services.⁸⁷ For the reasons set forth below, we deny the Wireless Carriers' request to defer action on ICO's LOI and the other 2 GHz MSS applications.

⁸⁴ See *U.S. Electroynamics Inc.*, 14 FCC Rcd 9808 (1999); *U.S. Electroynamics, Inc.*, 15 FCC Rcd 8610, 8613 n.9 (2000).

⁸⁵ ICO Letter of Intent at Exhibit D.

⁸⁶ See 47 C.F.R. §§ 25.114(c)(9) (requiring certain technical information "for satellites in geostationary-satellite orbit"), 25.114(c)(17) (requiring certain technical information "for fixed-satellite [service] space stations"), 25.114(c)(18) (requiring certain technical information "for authorizations in the Radiodetermination Satellite Service"), 25.114(c)(19) (requiring certain technical information "for authorizations in the Mobile-Satellite Service in the 1545-1559/1646.5-1660.5 MHz frequency bands"), 25.114(c)(20) (requiring certain technical information for Little LEO applications in the "non-voice, non-geostationary mobile-satellite service"), 25.114(c)(21) (requiring certain technical information "for authorizations in the 1.6/2.4 [Big LEO] Mobile-Satellite Service").

⁸⁷ Letter to Michael K. Powell, Chairman, Federal Communications Commission from Douglas Brandon, AT&T Wireless Services, Inc., Brian F. Fontes, Cingular Wireless, LLC, Luisa L. Lancetti, Sprint Corporation, and John T. Scott, III, Verizon Wireless, IB Docket No. 99-81 (dated June 13, 2001) (citing the ICO *Ex Parte* Letter and CTIA Petition). *Accord Ex parte* Letter of CTIA, IB Docket No. 99-81 (dated July 12, 2001). *But see Ex parte* Letter of Globalstar, L.P., IB Docket No. 99-81 (dated July 2, 2001) (objecting to the Wireless Carriers' request); *Ex parte* Letter of Celsat America, Inc., IB Docket No. 99-81 (dated June 25, 2001) (same).

30. The Wireless Carriers' request is made only ten months after the Commission established a band plan and service rules for 2 GHz MSS licenses. In making those decisions, the Commission determined that the 2 GHz MSS systems will enhance competition in mobile satellite and terrestrial communications services, complement wireless service offerings through expanded geographic coverage, and promote development of regional and global communications to unserved communities in the United States, including rural and Native American areas, as well as worldwide.⁸⁸ The Wireless Carriers request to defer is predicated on the argument that the ICO *Ex Parte* Letter demonstrates a dramatic change from how MSS was originally envisioned and raises questions as to the overall viability of MSS. They contend that we should treat the ICO *Ex Parte* Letter as a major amendment to ICO's LOI, requiring notice and comment. ICO did not, however, seek authority to provide ATC in the context of its LOI, and we do not grant such authority here. The Commission will decide separately whether and how to proceed with consideration of ICO's ATC concept. ICO may accept or reject this authorization with this understanding.

31. Further, we do not agree with the Wireless Carriers that either ICO's statements in support of its ATC proposal or CTIA's request to reallocate the 2 GHz MSS bands for other uses require deferral of action on ICO's LOI or the other 2 GHz MSS applications. The Wireless Carriers provide no credible information to demonstrate that the findings made by the Commission last year that 2 GHz MSS is in the public interest are called into question. The 2 GHz MSS applicants continue to pursue their proposed systems based upon amended applications consistent with the Commission's *2 GHz MSS Order*.⁸⁹ They should be given the opportunity to succeed or fail in the market on their own merits after expending vast resources over nearly a decade of effort in the ITU and through regulatory proceedings to get this opportunity.⁹⁰ A delay in issuance of the licenses would not be in the public interest where it would adversely affect the introduction of competition and new services.⁹¹

IV. ORDERING CLAUSES

32. Accordingly, IT IS ORDERED that Letter of Intent File No. 188-SAT-LOI-97; IBFS File Nos. SAT-LOI-19970926-00163, SAT-AMD-20000612-00107 and SAT-AMD-20001103-00155 IS

⁸⁸ *2 GHz MSS Order*, 15 FCC Rcd at 16128-29 ¶ 1, 16145-46 ¶¶ 33-34.

⁸⁹ See *Application of The Boeing Company Concerning Use of the 1990-2025/2165-2200 MHz and Associated Frequency Bands for a Mobile-Satellite System*, Order and Authorization, DA 01-1631 (Int'l Bur., rel. July 17, 2001); *Application of Celsat America, Inc. Concerning Use of the 1990-2025/2165-2200 MHz and Associated Frequency Bands for a Mobile-Satellite System*, Order and Authorization, DA 01-1632 (Int'l Bur., rel. July 17, 2001); *Application of Constellation Communications Holdings, Inc. Concerning Use of the 1990-2025/2165-2200 MHz and Associated Frequency Bands for a Mobile-Satellite System*, Order and Authorization, DA 01-1633 (Int'l Bur./OET, rel. July 17, 2001); *Application of Globalstar, L.P. For Authority to Launch and Operate a Mobile-Satellite Service System in the 2 GHz Band*, Order and Authorization, DA 01-1634 (Int'l Bur./OET, rel. July 17, 2001); *Application of Iridium LLC Concerning Use of the 1990-2025/2165-2200 MHz and Associated Frequency Bands for a Mobile-Satellite System*, Order and Authorization, DA 01-1636 (Int'l Bur., rel. July 17, 2001); *Application of Mobile Communications Holdings, Inc. Concerning Use of the 1990-2025/2165-2200 MHz and Associated Frequency Bands for a Mobile-Satellite System*, Order and Authorization, DA 01-1637 (Int'l Bur./OET, rel. July 17, 2001); *TMI Communications and Company, Limited Partnership, Letter of Intent to Provide Mobile-Satellite Service in the 2 GHz Bands*, Order, DA 01-1638 (Int'l Bur., rel. July 17, 2001).

⁹⁰ See, e.g., Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, *Memorandum Opinion and Order*, DA 01-842, at ¶ 8 (Mass Media Bur., rel. April 4, 2001).

⁹¹ See, e.g., Deferral of Licensing of MTA Commercial Broadband PCS, PP Docket No. 93-253, ET Docket No. 92-100, *Memorandum Opinion and Order*, 11 FCC Rcd 17052 (1996).

GRANTED, and ICO Services Limited IS RESERVED radio-frequency spectrum for its twelve-satellite non-geostationary satellite system in the 1990-2025/2165-2200 MHz bands in the United States, in accordance with the technical specifications set forth in its Letter of Intent, as amended, and the conditions set forth in the preceding paragraphs and consistent with our rules, unless specifically waived herein, and subject to the following conditions:

- a. ICO Services Limited must choose a Selected Assignment in the 1990-2025 MHz and 2165-2200 MHz frequency bands upon launch of one satellite into its authorized orbit and commencement of operations by that satellite;
- b. The Selected Assignment shall give ICO Services Limited access to 3.5 megahertz in each direction of transmission on a primary basis;
- c. The Selected Assignment shall be chosen such that the band edge of the assignment is an integer multiple of 3.88 megahertz from the band edge of the 2 GHz MSS band; and
- d. Operations in frequencies in these bands outside the Selected Assignment shall be on a secondary basis with respect to operations of other 2 GHz MSS systems.

33. IT IS FURTHER ORDERED that ICO Services Limited IS RESERVED radiofrequency spectrum in the 5150-5250 MHz band (Earth-to-space) and the 6975-7075 MHz band (space-to-Earth) for feeder link operations, in accordance with the technical specifications set forth in its application and consistent with our rules unless specifically waived herein, and subject to the following conditions:

- a. Section 2.102(a) of the Commission's rules, 47 C.F.R. § 2.102(a), IS WAIVED to permit ICO Services Limited to operate its feeder uplink transmissions in the 5150-5250 MHz band, and its feeder downlink transmissions in the 6975-7075 MHz band, in accordance with the terms of this *Order*, and subject to any applicable rules that may be promulgated in ET Docket No. 98-142, *Amendment of Parts 2, 25 and 97 of the Commission's Rules with Regard to the Mobile-Satellite Service Above 1 GHz*; and
- b. ICO Services Limited shall coordinate its feeder link operations in the 5150-5250 MHz band through the Frequency Assignment Subcommittee of the Interdepartment Radio Advisory Committee of the National Telecommunication and Information Administration.

34. IT IS FURTHER ORDERED that this *Order* shall become NULL and VOID with no further action required on the Commission's part in the event the space station is not constructed, launched and placed into operation in accordance with the technical parameters and terms and conditions of the authorization by the following dates:

| Milestone | Deadline |
|---|------------------|
| Enter Non-contingent Satellite Manufacturing Contract | July 17, 2002 |
| Complete Critical Design Review | July 17, 2003 |
| Begin Physical Construction of All Satellites | January 17, 2004 |
| Complete Construction and Launch First Two Satellites in System | January 17, 2005 |
| Certify Entire System Operational | July 17, 2007 |

35. IT IS FURTHER ORDERED that ICO Services Limited's requests for waivers, including waivers of Sections 25.114(c)(17)-(21) and Section 25.114(c)(9) of the Commission's Rules, ARE DISMISSED.

36. IT IS FURTHER ORDERED that the Petition to Condition Authorization and Hold in Abeyance of The Boeing Company IS DENIED.

37. IT IS FURTHER ORDERED that this *Order* is subject to change by summary order of the Commission on 30 days' notice and does not confer any permanent right to use the orbit and spectrum.

38. IT IS FURTHER ORDERED that ICO Services Limited may decline this ruling as conditioned within 30 days of the date of the release of this *Order*. Failure to respond within this period will constitute formal acceptance of the authorization as conditioned.

39. This *Order* is issued pursuant to Sections 0.241 and 0.261 of the Commission's rules on delegations of authority, 47 C.F.R. §§ 0.241, 0.261, and is effective upon release.

FEDERAL COMMUNICATIONS COMMISSION

Donald Abelson
Chief, International Bureau

Bruce A. Franca
Acting Chief, Office of Engineering and Technology

APPENDIX A

LIST OF PLEADINGS ADDRESSING ICO'S LETTER OF INTENT

Filed May 4, 1998

Comments of BT North America Inc. (BT Comments)
Comments of Constellation Communications, Inc. (Constellation Comments)
Petition to Condition Authorization and Hold in Abeyance of The Boeing Company (Boeing Petition)
Consolidated Comments and Petition to Deny of Iridium LLC (Iridium Comments)
Comments of the Wireless Cable Association International, Inc. (WCA Comments)
Consolidated Comments of ICO Services Limited (ICO Comments)
Petitions to Deny and Comments of Mobile Communications Holdings, Inc. (MCHI Comments)

Filed June 3, 1998

Consolidated Reply Comments of Mobile Communications Holdings, Inc. (MCHI Reply)
Consolidated Opposition and Reply Comments of Constellation Communications, Inc. (Constellation Reply)
Consolidated Reply of the Boeing Company (Boeing Reply)
ICO Services Limited Consolidated Reply Comments (ICO Reply)

Filed June 18, 1998

ICO Services Limited Consolidated Response to Reply Comments (ICO Response)
Response of the Wireless Communications Association International, Inc. (WCA Response)

Filed January 16, 2001

Reply Comments of ICO Services Limited (ICO Second Reply)