

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

DA 95-130

In re Application of)	
)	
TRW Inc.)	File Nos. 20-DSS-P-91(12)
)	CSS-91-015
)	17-SAT-LA-95
for Authority to Construct, Launch, and Operate a)	18-SAT-AMEND-95
Low Earth Orbit Satellite System in the 1610-)	
1626.5 MHz/2483.5-2500 MHz Band)	
)	

ORDER AND AUTHORIZATION

Adopted: January 31, 1995

Released: January 31, 1995

By Chief, International Bureau:

I. Introduction

1. TRW Inc. ("TRW") has filed an application¹ to construct, launch, and operate a low-Earth orbit ("LEO") mobile satellite system in the 1.6/2.4 GHz frequency bands ("Big LEO" service).² On November 16, 1994, TRW amended its application in light of the rules and policies adopted by the Commission to govern the "Big LEO" service. By Public Notice, Report No. DS-1481 (November 21, 1994), we sought comment on TRW's amended application. Mobile

¹TRW first filed its application May 31, 1991. American Mobile Satellite Corporation, Ellipsat Corporation, and Motorola Satellite Communications, Inc. filed petitions to deny. ARJAY, Inc., Communications Satellite Corporation, and Constellation Communications, Inc., filed comments. TRW filed a responsive pleading. Thereafter, 3S Navigation and Litton Systems, Inc. filed comments, and Motorola Satellite Communications, Inc. and ARINC filed reply comments. The matters raised in these petitions and comments have, except as addressed in this Order, been separately addressed through the adoption of service rules for Big LEO systems, or have otherwise been rendered moot through amendments to TRW's application.

²TRW requests authority to construct a mobile satellite system capable of operating in the 1610-1626.5/2483.5-2500 MHz frequency bands and to operate the system in the United States in the 1610-1621.35/2483.5-2500 MHz frequency bands. See TRW, Amendment to Application for Authority to Construct Mobile Satellite Service above 1 GHz Satellite System (Nov. 16, 1994) at 4 ("TRW Amendment to Application").

Communications Holdings, Inc. ("MCHI") filed a Consolidated Petition to Deny and a Consolidated Reply, Hughes Communications Galaxy, Inc. ("HCG") filed Consolidated Comments and a Reply, and Constellation Communications, Inc. filed Consolidated Comments. For reasons discussed below, we grant TRW's application, as amended, subject to certain conditions.

2. TRW proposes to construct a satellite system known as "Odyssey," consisting of twelve satellites. The satellites will be deployed, four per orbit, in three circular orbits at an altitude of approximately 5,600 nautical miles. Two additional satellites will be maintained as ground spares. TRW expects the system will include two fixed gateway stations in the United States. The Odyssey system is expected to provide mobile voice and data satellite services and radiodetermination satellite services. TRW anticipates the services will be used by cellular telephone service providers; emergency service providers; businesses tracking their products through a distribution system; and owners and operators of aircraft using the position-determination technique.

II. Discussion

Financial Qualifications.

3. An applicant in the Big LEO service must demonstrate that it can meet the estimated costs of constructing all proposed satellites, launching them, and operating its system for one year after the launch of the first satellite.³ If an applicant relies on current assets or operating income to demonstrate its financial qualifications, the applicant must submit evidence of a management commitment to fund the system.⁴

4. In accordance with Sections 25.140(c), (d)(1) and (d)(3) of our rules, TRW provided: (1) cost estimates for launch, construction, and the first year of operation of the satellite system; (2) financial statements; and (3) a declaration by its Chief Financial Officer expressing management's commitment to construct, launch, and operate the Odyssey system.⁵ TRW's current assets and operating income are reported to be \$1,994 million and \$359 million respectively.⁶ The estimated cost of construction, launch, and first-year operation of the Odyssey system is \$1,844 million.⁷

³47 C.F.R. § 25.143(b)(3); 47 C.F.R. § 25.140(c) and (d).

⁴47 C.F.R. § 25.143(b)(3).

⁵TRW Amendment to Application at Attachment B.

⁶Id. at Attachment B at 3.

⁷Id. at Attachment B at Appendix 1.

5. Mobile Communications Holding, Inc. ("MCHI") alleges that TRW has failed to provide the Commission with information sufficient to demonstrate its compliance with our financial requirements. Specifically, MCHI claims that TRW cannot rely on its current assets and operating revenues because it intends to fund its system primarily from external sources rather than internal assets or income.⁸ MCHI submits that, based on TRW's stated intent to seek external financing, it cannot reasonably claim at the same time to rely on internal funding.⁹ MCHI also argues that TRW's reliance on internal assets, despite its intent to seek outside sources of funding, calls its candor into question.

6. In the recent Big LEO Order,¹⁰ the Commission stated that "[t]he availability of internal funds sufficient to cover a system's costs provides adequate assurance at the time the Commission acts on the application, that the system can be built and launched. Current assets . . . provide a general measure of a company's ability to finance the project itself or to raise funds from lenders and equity investors on the basis of its on-going operations."¹¹ TRW has submitted substantial evidence to show that it has current assets and operating income sufficient to construct and launch its system, and provided an unequivocal statement that it intends to spend the funds necessary to construct the proposed system. The Commission's rules and policies do not require more. We have also reviewed the alleged inconsistencies between TRW's statements to the Commission and its statements in its press release and have considered MCHI's allegation of TRW's failure to disclose in its SEC filings that it would use internal funds to construct, launch, and operate Odyssey. We conclude that the statements and the alleged omission raise no substantial, material question of fact concerning TRW's candor or financial qualifications.

Technical Qualifications.

7. Applicants seeking authority to construct, launch, and operate Big LEO systems also must

⁸MCHI, Consolidated Petition to Deny (Dec. 22, 1994) at 13 ("MCHI Consolidated Petition to Deny").

⁹Id. at Exhibit 8 (TRW press release dated November 15, 1994, announcing that TRW would fund 15 percent of the Odyssey system through joint venture with Teleglobe, Inc. and would fund the remaining 85 percent through vendor and debtor financing); see also id. at 31 (MCHI alleges that TRW's lack of commitment to fund the Odyssey system is demonstrated by TRW's failure to disclose, in its 1994 SEC filings, that it would use internal funds to construct, launch, and operate the Odyssey system).

¹⁰Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-25 MHz Frequency Band, 9 F.C.C. Rcd. 5936 (1994) ("Big LEO Order").

¹¹Id. at ¶ 31 (emphasis added).

meet certain technical requirements. These requirements include: (1) using a non-geostationary satellite system design; (2) providing mobile satellite service to all locations as far north as 70° latitude and as far south as 55° latitude for at least 75 percent of every 24-hour period; (3) providing continuous service throughout the fifty states, Puerto Rico, and the U.S. Virgin Islands; and (4) preventing unacceptable interference to other authorized users of the spectrum.¹²

8. TRW has satisfied the system design and coverage requirements. Upon completion, the Odyssey system will consist of twelve satellites travelling in three non-geostationary satellite orbits. At least one Odyssey satellite will be visible at all times in the fifty states, Puerto Rico, and the U.S. Virgin Islands.¹³ In accordance with Section 25.143(b)(2) of the Commission's rules, the Odyssey system will provide service to other areas between 70° North and 55° South latitudes at least 75 percent of the time.¹⁴

9. TRW's compliance with our rules on interference to other users requires more extensive discussion, however. Under Section 25.213(a) of the Commission's rules, TRW must protect the radio astronomy service ("RAS") in the 1610.6-1613.8 MHz band against harmful or unacceptable interference from Odyssey's Earth-to-space transmissions. Our rules require mobile earth stations operating within a fixed radius from RAS sites to terminate service during radio astronomy observation periods, unless the mobile-satellite service ("MSS") licensee otherwise agrees with the Electromagnetic Spectrum Management Unit ("ESMU") of the National Science Foundation. TRW proposes to comply with these rules by using beacon-actuated protection zones in lieu of fixed-radius protection zones where it has reached a coordination agreement with ESMU. In the absence of an agreement, TRW says it "will implement precision position determination techniques or completely shut down service in the relevant frequency bands . . . during periods of observation that have been duly notified to TRW."¹⁵

10. We are uncertain whether TRW proposes to use the "shut down" method in conjunction with or in lieu of precision position determination techniques. TRW's use of the "shut down" method in conjunction with position determination techniques would comply with our rules. However, the "shut down" method alone would not.¹⁶ Nonetheless, it is clear that TRW's

¹²47 C.F.R. § 25.143(b)(2); 47 C.F.R. § 25.213.

¹³TRW Amendment to Application at Attachment A at 5.

¹⁴Id.

¹⁵Id. at Attachment A at 10-11 (emphasis added).

¹⁶The "shut down" method requires precise knowledge of the satellite position and altitude, the orientation of the satellite, and the antenna pointing accuracy. TRW has not demonstrated how it would "shut down" the satellite antenna beams and how this would

proposed use of either the beacon-actuated protection zones where it has reached an agreement with ESMU, or the position determination technique satisfies Section 25.213(a). We have no reason to believe that TRW will fail to comply with these technical requirements.

11. TRW also must prevent harmful or unacceptable interference with the radio navigation-satellite service, aeronautical radionavigation systems, and fixed stations operating pursuant to Radio Regulation 730.¹⁷ To prevent interference with radionavigation-satellite services, TRW expects that "mobile earth stations that comply with the e.i.r.p. [equivalent isotropically radiated power] density levels . . . will be able successfully to operate with the Odyssey system."¹⁸ We remind TRW, however, that all its mobile earth stations must comply with the specific e.i.r.p. requirements stated in Section 25.213(b) of our rules in order to protect against unacceptable or harmful interference with radio-navigation-satellite services. In accordance with Sections 25.213(c) and (d), TRW has acknowledged its obligation to refrain from causing harmful or unacceptable interference to, or claim protection from, aeronautical radionavigation stations operating pursuant to Radio Regulation 732 and fixed service stations operating pursuant to Radio Regulation 730.¹⁹

Other Technical Issues

12. TRW requests authority to operate in the 1610-1622.60 MHz frequency band in the event we need to implement an interim sharing plan.²⁰ We grant its request to operate in the 1612-1622.60 MHz frequency band for the duration of our plan. The interim sharing plan will only be implemented, however, if the 1610-1612 MHz frequency band is unavailable for mobile satellite service operations when the first Big LEO system that is authorized to operate in that band is launched. Consequently, we deny TRW's request to operate in the 1610-1612 MHz frequency bands while the interim plan is in effect.

13. We also deny TRW's proposal to use the 3900-4000 MHz and 6170-6180 MHz portions of the C-band for telemetry, tracking, and command subsystem ("TT&C") during the launch,

prevent a terminal from transmitting during periods of radioastronomy observations. Without a detailed technical showing, we cannot determine that TRW's use of the "shut down" method independent of precision position determination techniques would comply with Section 25.213(a)(1).

¹⁷47 C.F.R. § 25.213(b), (c) & (d).

¹⁸TRW Amendment to Application at 11.

¹⁹Id. at 11 n.16, & 12.

²⁰TRW Amendment to Application at Attachment A at 2; Big LEO Order at ¶¶ 49-53.

deployment, orbit maintenance, and deorbiting phases of its space stations.²¹ These parts of the C-band are being used extensively by U.S.-licensed domestic and separate satellite geostationary, fixed-satellite service ("GSO/FSS") systems. The feasibility of sharing a common frequency band between non-GSO/FSS and GSO/FSS satellite systems has been studied extensively by the Negotiated Rulemaking Committee and Task Group 4/5 ("TG4/5") convened by the International Telecommunication Union ("ITU") to prepare for the upcoming World Radio Conference ("WRC-95").²² TG4/5 indicated that co-directional sharing between non-GSO/FSS and GSO/FSS in these frequency bands is not practical and may not even be possible. In the absence of a technical showing by TRW concerning interference and sharing in the 4/6 GHz band, we will not permit TRW to use the 3900-4000 MHz and 6170-6180 MHz bands for TT&C operations.

14. If TRW operates Odyssey within the technical parameters it proposes and in accordance with the restrictions stated above, we are satisfied that TRW will meet the technical requirements detailed in Sections 25.143(b)(2) and 25.213.

Feeder Links.

15. TRW has requested feeder links in the 29.7-30.0 GHz (Earth-to-space) and 19.8-20.1 GHz (space-to-Earth) frequency bands.²³ As stated in our Big LEO Order, we are not in a position to assign feeder link frequencies unconditionally to any licensee.²⁴ Therefore, we will grant qualified applicants the authority to construct, at their own risk, mobile satellite systems capable of operating on the feeder link frequencies they have requested. We believe this is the type of "conditional" license contemplated by the Big LEO Order.²⁵ We will defer acting on requests to launch and operate using specific feeder link frequencies until that spectrum is available for assignment to Big LEO feeder links, and sufficient spectrum is available to satisfy the feeder link

²¹Id. at Attachment A at 26 and Table 3. TRW also proposes that, during normal on-orbit operations, the TT&C functions will switch to the Ka-band feeder link frequencies.

²²ITU Task Group 4/5, Contribution to the Consolidated CPM Report to the WRC-95, December 5, 1994. (ITU Task Group 4/5 is a Task Group of Study Group 4 concerning the fixed satellite service.)

²³TRW Amendment to Application at 7.

²⁴Big LEO Order at ¶ 166; Accordingly, we will not implement a construction milestone until authority to launch and operate a mobile satellite system using specific feeder link spectrum is granted. See id. at ¶ 189.

²⁵Big LEO Order at ¶ 166.

requirements of all licensed Big LEO systems, regardless of frequency band.²⁶

16. Hughes Communications Galaxy, Inc. ("HCG") asserts that it is premature to license 28 GHz band (Ka-band) feeder links to TRW, whether conditionally or unconditionally.²⁷ HCG has filed an application for a domestic and global fixed satellite system that would use the 27.5-30.0 and 17.7-20.2 GHz frequency bands, some of the same frequencies proposed by TRW for feeder links. HCG argues that it is entitled to have its application considered concurrently and comparatively with TRW's feeder link proposal.²⁸ The Commission recently conducted a Negotiated Rulemaking Committee proceeding in an attempt to devise a sharing solution that would accommodate all services proposed in this band.²⁹ The negotiations concluded without the parties reaching a sharing arrangement.

17. We reject any assertion, however, that a license authorizing construction at the permittee's own risk would preordain the outcome of the ongoing 28 GHz Proceeding.³⁰ A grant of construction authority to TRW is in no way to be construed as a predisposition on any of the issues in the 28 GHz Proceeding, nor as a foreclosure of our options with respect to feeder link

²⁶Big LEO Order at ¶ 166. We will afford permittees and applicants an opportunity to revise their requested feeder link bands, if necessary. Consistent with our usual practice, we will place revised requests on public notice and will provide the public an opportunity to comment.

²⁷HCG, Consolidated Comments, (Dec. 22, 1994) at 2.

²⁸HCG, Reply, (Jan. 13, 1995) at 10.

²⁹Local Multipoint Distribution Service, 9 F.C.C. Rcd. 1394 (1994) ("28 GHz Proceeding").

³⁰The Commission has a number of issues related to allocations of spectrum for Big LEO feeder links separately before it in several pending proceedings, including the 28 GHz Proceeding and Preparation for the World Radio Conference, 9 F.C.C. Rcd. 2430 (1994). Moreover, TG4/5 convened to prepare for the upcoming WRC-95, has concluded that Big LEO feeder links should not be authorized in the 29.5-30.0 GHz frequency band. If this is done at WRC-95, any Big LEO feeder link operation in that band will be subject to Radio Regulation 2613; that is, LEO satellites will be required to cease operation if LEO operations cause unacceptable interference to a geostationary satellite fixed satellite service system. In addition, it may have to accept interference from future GSO/FSS systems after the launch and initiation of the Odyssey system.

assignments to other Big LEO licensees.³¹ All Big LEO applicants, including TRW, are on notice that any construction that they undertake in reliance on their individual feeder link requests in this proceeding is at their own risk.

18. HCG also argues that TRW's feeder link request constitutes a major amendment within the meaning of Section 25.116(b)(1) and (c)(1) of our Rules.³² In the Big LEO Order, the Commission afforded applicants the opportunity to amend their applications to bring them into conformance with newly adopted requirements and policies for satellite systems.³³ It noted, for example, that a change from a geostationary satellite system configuration to a non-geostationary satellite system configuration to meet our system design requirement, or a change in coverage patterns to conform with our satellite visibility requirements, would not affect a particular application's status in the processing group. The Commission also indicated, however, that "a change that is not necessary to bring the application into conformance with our rules and which would increase frequency conflicts," would render the application newly filed under Section 25.116 of our Rules.³⁴ As an example, it stated that a design change from a CDMA to a TDMA/FDMA system, which would not facilitate spectrum sharing, would be a major amendment. Such applications would be considered in a future processing group, after January 1996.

19. TRW redesigned its system to facilitate the spectrum sharing plan adopted in the Big LEO Order by increasing the number of end users that can be served simultaneously. It appears that TRW's feeder link requests were a consequence of this redesign. Therefore we do not believe the changes in TRW's feeder link proposal should be considered major. Furthermore, even if the amendment were considered major within the meaning of Section 25.116 of the Rules, we would waive that rule in this case because (1) the modified system serves public interest by increasing

³¹We note that this authorization does not permit TRW to construct and operate mobile satellite service earth terminals or gateway earth terminals. Gateway earth stations will be licensed in accordance with technical requirements for the frequency band to be used. Also, standards are currently being developed to assure that mobile satellite service earth terminals, the Global Positioning System, and the Global Orbiting Navigation Satellite System ("GLONASS") can co-exist in adjacent frequency bands. See Memorandum of Understanding Between the FCC, NTIA and FAA, Pubic Notice 50736, November 19, 1994.

³²TRW originally requested approximately 100 MHz of feeder link spectrum in each of the 29.5-30.0 and 19.7-20.2 GHz frequency bands. It now seeks 300 MHz of feeder link spectrum in the 29.7-30.0 and 19.8-20.1 GHz frequency bands.

³³Big LEO Order at ¶¶ 58 & 59.

³⁴Id. at ¶ 59 (emphasis added).

system capacity and spectrum-use efficiency in the service links; (2) feeder link spectrum is for a use ancillary to the use of Big LEO spectrum; (3) the service is at a relatively early stage of development in which its spectrum requirements are still being addressed; and (4) any third parties who might be adversely affected by feeder link allocations will have a full opportunity to address potential interference concerns in other pending proceedings in connection with any further amendments to or modifications of TRW's feeder link proposal. Accordingly, we decline to treat TRW's application as newly filed.

Regulatory Treatment.

20. In accordance with our authority under Section 332(c)(5) of the Communications Act, 47 U.S.C. § 332(c)(5), we grant TRW's request that it be regulated as a non-common carrier.³⁵ As we determined in our Big LEO Order, Big LEO space station licensees providing service directly to end users must be regulated as common carriers if the service offering meets the definition of commercial mobile radio service ("CMRS").³⁶ However, if a Big LEO licensee offers space segment capacity to a reseller or other entity who then offers CMRS to end users, we have the discretion to determine whether to require the licensee to offer such service on a common carriage basis or to permit the offering to be made on a private carriage basis.³⁷ We concluded in the Big LEO Order that there does not appear to be a need to impose common carrier requirements on Big LEO licensees offering space segment capacity to resellers.³⁸ Because TRW does not plan to provide space segment capacity on Odyssey directly to end users,³⁹ we will allow TRW to operate as a non-common carrier.

Legal Qualifications.

21. MCHI claims that TRW is not qualified to become a licensee because TRW owned 19.9 percent of the common stock of Engineering Technologies Inc. which was the parent company of Defense Systems, Inc.⁴⁰ Defense Systems, Inc. was, in turn, an original minority investor in Constellation Communications, Inc., another Big LEO applicant. This argument is wholly without merit. Our rules do not prohibit multiple-ownership of satellite systems.

³⁵47 C.F.R. § 332(c)(5).

³⁶Big LEO Order at ¶ 174.

³⁷Id. at ¶ 175.

³⁸Id. at ¶ 179.

³⁹TRW Amendment to Application at 13.

⁴⁰MCHI Consolidated Petition to Deny at 32 n.51.

Effect of Decisions on Other Applications

22. In other decisions released today, the Bureau defers action on the applications of MCHI and Constellation until January 1996. Based on the intraservice sharing plan adopted in the Big LEO Order, it may not be possible to grant all remaining applications for Big LEO licenses. Nonetheless, in granting TRW's application we insulate TRW from any mutual exclusivity that may arise among the remaining applicants. In other words, while TRW's license is conditional in some respects, it will not be affected in any way if the Commission determines that all three of the remaining applicants are qualified for the two remaining licenses that can be awarded for the currently available spectrum.

III. Ordering Clauses

23. Accordingly, IT IS ORDERED that Application File Nos. 20- DSS-P-91(12), CSS-91-015, 17-SAT-LA-95, and 18-SAT-AMEND-95 ARE GRANTED, and TRW Inc. IS AUTHORIZED to construct a mobile satellite system capable of operating in 1610-1626.5/2483.5-2500 MHz frequency bands in accordance with the technical specifications set forth in its applications and consistent with our rules unless specifically waived herein.

24. IT IS FURTHER ORDERED that TRW Inc. IS AUTHORIZED to launch and operate twelve low-Earth orbiting space stations and two technically identical spares during the license term for the purpose of providing a mobile satellite service in the United States in the 1610-1621.35/2483.5-2500 MHz frequency bands in accordance with the technical specifications set forth in its applications and consistent with our rules unless specifically waived herein. In the event the 1610-1612 MHz band is not available for mobile satellite service operations in the United States, TRW Inc. IS AUTHORIZED to operate in the 1612-1622.60/2483.5-2500 MHz bands.

25. IT IS FURTHER ORDERED that TRW Inc. IS AUTHORIZED to construct, at its own risk, a mobile satellite system capable of operating with feeder links in the 29.7-30.0/19.8-20.1 GHz frequency bands in accordance with technical specifications set forth in its applications and consistent with our rules unless specifically waived herein.

26. IT IS FURTHER ORDERED that TRW Inc. IS AUTHORIZED to offer space segment capacity on its satellite system on a non-common carriage basis.

27. IT IS FURTHER ORDERED that the license term for the space station constellation is ten years and will commence on the date the licensee certifies to the Commission that the first satellite in the system has been successfully placed into orbit and that the first transmission to or from that satellite in the authorized frequency bands has occurred.

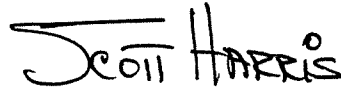
28. IT IS FURTHER ORDERED that this authorization is subject to the completion of

consultations under Article XIV of the INTELSAT Agreement and Article 8 of the INMARSAT Convention. Upon completion of these consultations, and notification by the Department of State that the United States has fulfilled its international obligations with respect to INTELSAT and INMARSAT, no further action by this Commission will be required.

29. IT IS FURTHER ORDERED that TRW Inc. will prepare any necessary submissions to the International Telecommunication Union (ITU) and to affected administrations in order to coordinate these space stations in accordance with the ITU Radio Regulations.

30. IT IS FURTHER ORDERED that the temporary assignment of any orbital planes, or of any particular frequencies, to TRW Inc. 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. Neither this authorization nor any right granted by this authorization, shall be transferred, assigned or disposed of in any manner, voluntarily or involuntarily, or by transfer of control of any corporation holding this authorization, to any person except upon application to the Commission and upon a finding by the Commission that the public interest, convenience and necessity will be served thereby.

FEDERAL COMMUNICATIONS COMMISSION

A handwritten signature in black ink that reads "Scott Harris". The signature is stylized, with a large, sweeping initial "S" and the name "Scott Harris" written in a cursive-like script.

Scott Blake Harris
Chief, International Bureau