



## PUBLIC NOTICE

FEDERAL COMMUNICATIONS COMMISSION  
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WASHINGTON, D.C. 20554

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Report No. IN 95-14

INTERNATIONAL ACTION

June 15, 1995

### FCC COMPLETES LICENSING FIRST LOW-EARTH ORBITING SATELLITE SYSTEM

The International Bureau has granted an application by Orbital Communications Corporation (ORBCOMM) to construct and operate up to 200,000 data mobile earth terminals in conjunction with its non-voice, non-geostationary (NVNG) mobile satellite service system (MSS). The Bureau's order completes the domestic licensing of the first low-Earth orbiting (LEO) satellite system and heralds the commencement of NVNG-based services on a worldwide basis.

ORBCOMM, a wholly owned subsidiary of Orbital Sciences Corporation, was licensed to launch and operate an MSS network in 1994. Its system will consist of 36 satellites operating in four inclined and two polar orbital planes, 775 kilometers above the earth. They will provide an assortment of data services, using technology that promises to bring access to rapid data exchange to virtually every location and person on Earth.

Action by the Chief, International Bureau, June 12, 1995, by Order and Authorization (DA 95-1309). Four gateway earth station authorizations were issued separately.

-FCC-

International Bureau Contact: James Talens at (202) 739-0750

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

In re Application of

ORRITAL COMMUNICATIONS  
CORP.

File No.  
2170-DSE-PL-94

For a Blanket License to Construct and Operate  
up to 200,000 Mobile Earth Stations

# ORDER AND AUTHORIZATION

Adopted: June 12, 1995;

Released: June 15, 1995

By the Chief, International Bureau:

## I. INTRODUCTION

1. This order completes the licensing of the first low-Earth orbiting (LEO) satellite system and heralds the commencement of non-voice, non-geostationary-based services on a worldwide basis. The technology embodied by this system promises to bring access to rapid data exchange to virtually every location and person on Earth.

2. Orbital Communications Corporation (ORBCOMM) has filed an application for a blanket license to construct and operate up to 200,000 data mobile earth terminals (METs) in conjunction with its non-voice, non-geostationary (NVNG) mobile satellite service (MSS) system.<sup>1</sup> In response to Public Notice, Report No. DS-1506 (February 15, 1995), STARSYS Global Positioning, Inc. (STARSYS) filed comments. For the reasons discussed below, we grant ORBCOMM's application, subject to certain conditions.

## II. BACKGROUND

3. ORBCOMM, a wholly owned subsidiary of Orbital Sciences Corporation, filed its domestic application to construct a LEO MSS system using frequency bands below 1 GHz in 1990. STARSYS and Volunteers in Technical Assistance (VITA) also filed applications that appeared mutually exclusive with ORBCOMM's application.<sup>2</sup> In order to resolve this potential incompatibility, ORBCOMM, STARSYS, and VITA independently reached agreement on a sharing program that would permit all three to implement their systems, and leave spectrum available for future entry.<sup>3</sup>

4. ORBCOMM's LEO system will consist of 36 satellites, operating in four inclined and two polar orbital planes, 775 kilometers above the earth. All of the satellites are designed to operate in the 148-149.9 MHz (uplink) and 137-138 MHz (downlink) frequency bands, and will have a four-year design life. The system will be capable of processing 60,000 messages per hour in each of the inbound and outbound directions. ORBCOMM's LEO system will employ a frequency division multiple access modulation technique. In addition, the company has developed a dynamic channel activity assignment system, which scans potential uplink channels and assigns subscriber traffic to frequencies that are not currently in use by other services. ORBCOMM's first two satellites were launched on April 3, 1995. Following correction of initial technical problems, ORBCOMM reports that its satellites are functioning.<sup>4</sup>

## III. DISCUSSION

5. *Radiation Hazard Assessment.* ORBCOMM states that the nominal output power of its METs is +7.0 dBW (EIRP), i.e., 5 watts. See Application, Exhibit 4. The METs will normally be held out from the body with the antenna pointed upward or away from the body, ORBCOMM further states. According to ORBCOMM, the limitation on transmit power imposed by ANSI C95.1-1992<sup>5</sup> is 27.5 V/m at the source of the transmission. ORBCOMM calculates its METs' field strength at 24.50 V/m, even without factoring in a duty cycle. *Id.*<sup>6</sup>

6. The currently applicable standard for these frequency bands under Commission Rules resides in ANSI C95.1-1982, and is 1 mW/cm<sup>2</sup>. ANSI C95.1-1982 summarily excludes devices operating at or below 5 watts. See 47 C.F.R. § 1.1307(b). However, in uncontrolled environ-

<sup>1</sup> ORBCOMM has been authorized to construct, launch, and operate an NVNG MSS system using the 137-138 MHz and 148-149.9 MHz frequency bands, subject to conditions. See Order and Authorization, 9 F.C.C. Rcd 6476 (1994) (Licensing Order).

<sup>2</sup> STARSYS's and VITA's applications are pending before the Commission. For a more detailed summary of the applications, see Licensing Order, *supra*, at 6476-77.

<sup>3</sup> The Joint Sharing Agreement, among other matters, provides that ORBCOMM will operate throughout the upper portion of the 148-149.9 MHz band, and STARSYS will operate in spread-spectrum system in the lower portion of that band until one or the other of the systems has reached saturation levels for its allotted frequencies. See Licensing Order, *supra*, at 6480. The Commission, at para. 22 of the Licensing Order, stated that "ORBCOMM will be required to vacate the lower portions of the band upon written notice from STARSYS that launch of its first operational satellite will occur within 30 days." In its comments, STARSYS asserts that ORBCOMM must be held to

use only frequencies above 148.905 MHz, as required by the Commission in the Licensing Order at para. 22, and that ORBCOMM's METs authorization must be conditioned on this requirement. Exhibit 8 to ORBCOMM's application states that, "Once Starys begins operations, ORBCOMM will limit its [sic] operations to the 148.905 MHz to 149.9 MHz frequency band subject to the joint sharing agreement dated August 7, 1992 between ORBCOMM, Starys and VITA." We interpret ORBCOMM's Exhibit 8 as acknowledgement, acceptance, and affirmation of the requirements imposed by the Commission in the Licensing Order, which apply equally to the use of ORBCOMM's METs just as they do to its space segment.

<sup>4</sup> See Orbital Sciences Corporation News Release, 1 June 1995.

<sup>5</sup> IEEE C95.1-1991, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

<sup>6</sup> Assuming 5 watts EIRP and a power density limit of 0.2 mW/cm<sup>2</sup>, the minimum permitted distance from the body is 14.6 cm.

ments the maximum permissible exposure permitted by the more recent 1992 ANSI standard is 0.2 mW/m<sup>2</sup>. Under this standard, as noted, the minimum operating distance from the human body permitted for continuous transmission by ORBCOMM's data METs is 44.6 cm. ORBCOMM claims the MET duty cycle will not exceed 1% per 15 minutes. Under these conditions, the permissible distance is substantially reduced (on the order of 1 inch) and these METs will comply with the more stringent 1992 standard. Therefore, we find that the METs are in compliance with Commission's Rules regarding radiation hazards. We note, however, that subsequent Commission action in ET Docket No. 93-62 may affect future ORBCOMM METs.<sup>7</sup>

#### IV. CONCLUSION

7. By this application, ORBCOMM seeks authorization for the user terminals of its LEO system, the first U.S. NVNG MSS system to offer personal messaging, industrial, marine, non-safety related search and rescue, and container-tracking communications services. We find, pursuant to Sections 309 and 319 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 309 and 319, that the public interest will be served by authorizing ORBCOMM to construct and operate up to 200,000 METs, as indicated by ORBCOMM in its application.

#### V. ORDERING CLAUSES

8. Accordingly, IT IS ORDERED that, pursuant to Section 0.261 of the Commission's rules on delegation of authority, 47 C.F.R. § 0.261, application File No. 2170-DSE-PL-94 IS GRANTED and ORBCOMM IS AUTHORIZED to construct and operate up to 200,000 mobile earth terminals throughout the United States, in accordance with the technical specifications set forth in its application and consistent with our rules.

#### FEDERAL COMMUNICATIONS COMMISSION

Scott Blake Harris  
Chief, International Bureau

<sup>7</sup> ET Docket No. 93-62 addresses revised standards for radiofrequency radiation emissions, including exposure guide-

lines for people using various kinds of radio transmitting devices.