READ INSTRUCTIONS CAREFULLY BEFORE PROCEEDING

(1) LOCKBOX # 358210

FEDERAL COMMUNICATIONS COMMISSION
REMITTANCE ADVICE

PAGE NO. 1 OF 1

APPROVED BY OMB 3060-0589

SPECIAL USE

FCC USE ONLY

SECTION A - PAYER INFORMATION

(2) PAYER NAME(if paying by credit card, enter name exactly as it appears on your card): Orion Network Systems, Inc.

(3) TOTAL AMOUNT PAID (dollars and cents): $

(4) STREET ADDRESS LINE NO. 1: 2440 Research Boulevard

(5) STREET ADDRESS LINE NO. 2: Suite 400

MAY 1 8 1998

(6) CITY: Rockville

(7) STATE: MD

(8) ZIP CODE: 20850

(9) DAYTIME TELEPHONE NUMBER (include area code): (301) 258-3200

(10) COUNTRY CODE (if not in U.S.A.)

IF PAYER NAME AND THE APPLICANT NAME ARE DIFFERENT, COMPLETE SECTION B
IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159-C)

SECTION B - APPLICANT INFORMATION

(11) APPLICANT NAME(if paying by credit card, enter name exactly as it appears on your card): International Private Satellite Partners, L.P. d/b/a Orion Atlantic, L.P.

115-SAT-P/LA-98
S2357

(12) STREET ADDRESS LINE NO. 1: 2440 Research Boulevard

(13) STREET ADDRESS LINE NO. 2: Suite 400

(14) CITY: Rockville

(15) STATE: MD

(16) ZIP CODE: 20850

(17) DAYTIME TELEPHONE NUMBER (include area code): (301) 258-3200

(18) COUNTRY CODE (if not in U.S.A.)

COMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEETS (FORM 159-C)

SECTION C - PAYMENT INFORMATION

(19A) FCC CALL SIGN/OTHER ID	(20A) PAYMENT TYPE CODE (PTC)	(21A) QUANTITY	(22A) FEE DUE FOR (PTC) IN BLOCK 20A	FCC USE ONLY
	B N Y	1	$85,045	

(23A) FCC CODE 1 | (24A) FCC CODE 2

(19B) FCC CALL SIGN/OTHER ID	(20B) PAYMENT TYPE CODE (PTC)	(21B) QUANTITY	(22B) FEE DUE FOR (PTC) IN BLOCK 20B	FCC USE ONLY
			$	

(23B) FCC CODE 1 | (24B) FCC CODE 2

(19C) FCC CALL SIGN/OTHER ID	(20C) PAYMENT TYPE CODE (PTC)	(21C) QUANTITY	(22C) FEE DUE FOR (PTC) IN BLOCK 20C	FCC USE ONLY
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(23C) FCC CODE 1 | (24C) FCC CODE 2

(19D) FCC CALL SIGN/OTHER ID	(20D) PAYMENT TYPE CODE (PTC)	(21D) QUANTITY	(22D) FEE DUE FOR (PTC) IN BLOCK 20D	FCC USE ONLY
			$	

(23D) FCC CODE 1 | (24D) FCC CODE 2

SECTION D - TAXPAYER INFORMATION (REQUIRED)

(25) PAYER TIN: 052127141 8

(26) COMPLETE THIS BLOCK ONLY IF APPLICANT NAME IN B-11 IS DIFFERENT FROM PAYER NAME IN A-2)

APPLICANT TIN: 052164858 6

SECTION E - CERTIFICATION

(27) CERTIFICATION STATEMENT

I, _____ (PRINT NAME), Certify under penalty of perjury that the foregoing and supporting information are true and correct to the best of my knowledge, infomation and belief. SIGNATURE _____

SECTION F - CREDIT CARD PAYMENT INFORMATION

(28) ☐ MASTERCARD ☐ VISA

MASTERCARD/VISA ACCOUNT NUMBER:

EXPIRATION DATE: MONTH YEAR

I hereby authorize the FCC to charge my VISA or MASTERCARD for the service(s)/authorizations(s) herein described.

AUTHORIZED SIGNATURE

DATE

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FCC FORM 159 JULY 1997 (REVISED)

VERNER · LIIPFERT
BERNHARD · MCPHERSON AND HAND
CHARTERED

Writer's Direct Dial:
(202) 371-6111

901 - 15TH STREET, N.W.
WASHINGTON, D.C. 20005-2301
(202) 371-6000
FAX: (202) 371-6279

May 8, 1998

VIA HAND DELIVERY

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
International Bureau
P.O. Box 358210
Pittsburgh, PA 15251-5210

Dear Ms. Salas:

Transmitted herewith in triplicate is the application of International Private Satellite Partners, L.P. d/b/a Orion Atlantic, L.P. for a new hybrid C/Ku-Band satellite space station to be located at 37.5° W.L., with accompanying exhibits including FCC Form 312.

Also, enclosed is a check in the amount of $85,045 to cover the requisite application filing fee.

Kindly direct any questions regarding this matter to the undersigned.

Respectfully submitted,

Julian L. Shepard

Enclosures
cc: Mr. Thomas Tycz
Fern Jarmulnek, Esquire

HOUSTON, TEXAS
1111 BAGBY, SUITE 4700
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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

Application of
International Private Satellite Partners, L.P.
d/b/a Orion Atlantic, L.P.

for

Authority to Launch and Operate
a Hybrid Ku-Band/C-Band Separate International
Communications Satellite System
at 37.5 Degrees West Longitude

International Private Satellite Partners, L.P.
2440 Research Blvd., Suite 400
Rockville, Maryland 20850
(301) 258-3200

May 8, 1998

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

In the Matter of the Application of	)
	)
International Private Satellite Partners, L.P.	)
d/b/a Orion Atlantic, L.P.	) File No.
	)
For Authority to Launch and Operate	)
a Separate International Communications	)
Satellite System at 37.5 Degrees West Longitude	)

APPLICATION

International Private Satellite Partners, L.P., doing business as Orion Atlantic, L.P. ("Orion Atlantic"),[1/] pursuant to Sections 308, 309 and 319 of the Communications Act of 1934, as amended ("Communications Act") and Section 25.114 of the Commission's rules, hereby applies for authority to launch and operate on a non-common carrier basis a hybrid Ku-Band/C-Band separate international communications satellite space station at 37.5 degrees West Longitude (W.L.), thereby expanding its current authority to operate its F-1 Ku-Band satellite at 37.5 degrees W.L. by adding C-Band frequencies at this location. Loral Orion Network Systems, Inc. ("Loral Orion") previously supplied information to the Commission in support of U.S. C-Band filings at 37.5 degrees W.L. which the Commission forwarded to the ITU. The 37.5 degree W.L. location is currently an unassigned orbital location in the C-Band within the U.S.[2/]

1/ Orion Atlantic, L.P., with headquarters in Rockville, Maryland, is controlled by its general partner, Orion Network Services, Inc., a wholly owned subsidiary of Loral Orion Network Systems, Inc. (collectively "Loral Orion").

2/ On March 6, 1998, the Chief of the FCC's Satellite Radiocommunication Division, pursuant to delegated authority, granted Special Temporary Authority to Columbia

(continued...)

BACKGROUND

Orion Atlantic holds a Commission license to launch and operate a separate international satellite system consisting of two Atlantic Ocean Region ("AOR") satellites, located at 37.5° W.L. (Ku-Band), and 47° W.L. (hybrid Ku/Ka-Band).[3/] The Loral Orion F-1 satellite currently occupies the 37.5° W.L. orbital location and provides the full array of commercial Ku-Band international services between Europe and North America. As described below, Orion Atlantic seeks authority to launch and operate a hybrid C-Band/Ku-Band satellite at this location to make optimal and efficient use of the orbital resource. The addition of C band services at 37.5° W.L. would satisfy significant unfilled customers demand for C band connectivity between Latin America, the U.S., and Europe.

DETAILED INFORMATION IN SUPPORT OF THE APPLICATION

The following information is provided in accordance with the correspondingly-numbered subsections of Section 25.114(c) of the Commission's rules. An Index of the supporting Exhibits referenced herein is attached beneath this narrative portion of the application.

2/(...continued)
Communications Corporation to operate on C-Band frequencies from the 37.7° W.L. orbital location until further order of the Commission, but not beyond September 4, 1998.

3/ See Memorandum Opinion, Order, Authorization, 5 FCC Rcd 4937 (Aug. 6, 1990); Memorandum Opinion, Order, and Authorization 6 FCC Rcd 4201 (June 28, 1991); and Memorandum Opinion and Order, 9 FCC Rcd 2148 (May 11, 1994). Also, Loral Orion holds a Ku-Band space station authorization at 12° W.L. (File No. 204-SAT-ML-95). Orion Network Systems, Inc. holds conditional authorization to construct, launch, and operate a Ku-Band space station at 135° W.L. In addition, Orion Network Systems - Asia Pacific, Inc. a wholly-owned subsidiary of Orion Network Systems, Inc. is an applicant for a hybrid C-/Ku-Band satellite space station at 126° E.L. (File No. CSS-94-009).

(1) NAME, ADDRESS AND TELEPHONE NUMBER OF APPLICANT

Orion Atlantic L.P.
2440 Research Blvd., Suite 400
Rockville, MD 20850
301-258-3200

(2) NAME, ADDRESS AND TELEPHONE NUMBER OF COUNSEL

Thomas J. Keller, Esq.
Julian L. Shepard, Esq.
Verner, Liipfert, Bernhard, McPherson and Hand
901 15th Street, N.W.
Washington, D.C. 20005
Telephone: (202) 371-6060
Fax: (202) 371-6279

(3) TYPE OF AUTHORIZATION REQUESTED

Orion Atlantic, L.P. is requesting authorization from the Federal Communications Commission to launch and operate a separate international fixed communications satellite system in geostationary orbit.

(4) GENERAL DESCRIPTION OF OVERALL SYSTEM, FACILITIES, OPERATIONS AND SERVICES

Orion Atlantic, L.P. proposes to launch and operate a hybrid Ku-Band/C-Band satellite system for service in the Atlantic Ocean Region. The C-Band payload will build upon and expand Orion Atlantic's existing Ku-Band services at 37.5° W.L. which include high efficiency transmission for comprehensive satellite services supporting voice, video, and data, as well as next generation satellite news gathering terminals and full connectivity VSAT networks. The C-Band payload will support satellite transmissions for trans-Atlantic services and for intra-regional

services within North America, Europe, South America and Africa using two hemispherical coverage beams. Data rates up to 45 Mbits per transponder will be supported. Fully flexible switching onboard the satellite will provide interconnectivity for any transponder to be connected from any uplink beam to any downlink beam by ground telecommand.

(5) TECHNICAL DESCRIPTION OF RADIO FREQUENCIES AND POLARIZATION PLAN

Detailed descriptions of the radio frequencies; polarization plan (including beacon, telemetry and telecommand functions); center frequency and polarization of transponders (both receiving and transmitting frequencies); emission designators and allocated bandwidth of emission; final amplifier output power; identification of antenna beams that are connected or switchable to each transponder and TT&C function; receiving system noise temperature; the relationship between satellite receive antenna gain pattern and gain-to-temperature ratio and saturation flux density for each antenna beam; the gain of each transponder channel including any adjustable gain step capabilities; predicted receiver and transmitter channel filter response characteristics; and other the technical facilities are set forth in the attached Technical Exhibit (Exhibit 1) entitled "Technical Description of C/Ku-Band Satellite for 37.5 W.L. Orbital Position."

(6) INFORMATION REGARDING ORBITAL LOCATION

The requested orbital location is 37.5° W.L., a location which is currently assigned to Orion Atlantic for operation of a Ku-Band separate international satellite space station. Upon

grant of this application, Orion Atlantic would seek authority to relocate its existing Ku-band satellite currently operating at 37.5° W.L. to its other authorized Ku-band orbital assignment at 47° W.L. This efficient deployment plan would expand Loral Orion's coverage of CONUS and certain parts of Latin America and makes optimal use of Loral Orion's orbital and frequency resources.

Further, the deployment schedule for launch of Orion Atlantic's proposed hybrid satellite at 37.5° W.L. takes into account the Commission's recent grant of special temporary authority for operation of the INTELSAT 515 space station at 37.7° W.L. for a period of 180 days.[4/] The INTELSAT 515 satellite is an early generation INTELSAT satellite with a relatively short remaining useful life. Orion Atlantic proposes to launch the proposed hybrid C/Ku band satellite to the 37.5° W.L. location in December 2002, which is beyond the expected end of the useful life of the 515 satellite. Thus, the deployment plan described herein is consistent with the United States coordination effort on behalf of Columbia Communications while also maintaining maximum use of Atlantic Ocean Region orbital resources by an existing licensee. Although an earlier operational date would have been preferable, Orion Atlantic seeks to accommodate the various interests of all parties allowing for temporary operation of the 515 satellite. During this period of time, Columbia Communications has ample opportunity to successfully relocate to another orbital position, if extended operation of the 515 proves technically feasible.

4/ On March 6, 1998 the Commission granted Columbia Communications Corporation special temporary authority to operate the INTELSAT 515 satellite C band services at 37.7° W.L. as part of a coordination agreement between INTELSAT and Columbia.

(7) SPACE STATION ANTENNA GAIN CONTOURS

Information regarding the antenna gain contours is set forth in Exhibit 1.

(8) DESCRIPTION OF THE TYPES OF SERVICES TO BE PROVIDED, INTERFERENCE ANALYSIS AND AREAS TO BE SERVED

1. Services to be provided: A full range of video, voice and data services are anticipated, including but not limited to the following digital transmission services:

High efficiency transmission for comprehensive satellite services supporting voice, video, and data, news gathering terminals and full connectivity VSAT networks.

Information regarding the estimated number and geographic distribution of earth stations is set forth in Exhibit 1.

2. Interference analysis: Information regarding the interference analysis is set forth in Exhibit 1.

(9) INFORMATION REGARDING THE ACCURACY OF THE ORBITAL INCLINATION, ANTENNA AXIS ATTITUDE AND LONGITUDINAL DRIFT

Information on orbital inclination, antenna axis attitude and longitudinal drift is set forth in Exhibit 1.

(10) INFORMATION REGARDING POWER FLUX DENSITY

Information on power flux density is set forth in Exhibit 1.

(11) ARRANGEMENT FOR TRACKING, TELEMETRY AND CONTROL

Information on tracking, telemetry and control is set forth in Exhibit 1.

(12) PHYSICAL CHARACTERISTICS OF THE SPACE STATION

Information regarding the physical characteristics of the space station are set forth in Exhibit 1

(13) FINANCIAL QUALIFICATIONS

The estimated costs to construct, launch and operate the space station for one year are detailed in Exhibit 2. Orion Atlantic has access to sufficient financial resources, as reflected on the balance sheets attached as Exhibits 3 and 4, to meet these costs.

(14) NON-COMMON CARRIER OPERATION

Orion will operate all transponders on the proposed space station on a non-common carrier basis. The non-common carrier transactions will consist, typically, of private sales of transponder capacity and related satellite communications services.

(15) CONSTRUCTION AND LAUNCH MILESTONES

Attached as Exhibit No. 5 is a schedule showing the dates by which construction will be commenced and completed, the launch date, and the estimated date of placing the satellite into service.

(16) PUBLIC INTEREST CONSIDERATIONS

Grant of Orion Atlantic's application is in the public interest for several reasons. First the Commission's goals for separate satellite systems will be furthered by grant of the application.

Grant of this application would permit Loral Orion, one of the first separate systems, to continue to be responsive to the growing and changing needs of consumers. Recently, consumer demand has grown exponentially both for Ku-Band and C-Band satellite communications services. Loral Orion anticipates the need for additional Ku-Band capacity and C-Band capacity at this location to meet the growing demand and provide a wide range of services to domestic consumers. Loral Orion has consistently strived to meet customer demand in the design of the services now being offered in the transatlantic market. The success and reliability of Loral Orion's existing international system is well established. With the addition of C-Band frequencies, Loral Orion will continue to build upon its successful track record in the provision of state-of-the-art technology and services to users of satellite communications.

Second, the authorization of hybrid C/Ku-band service at 37.5° W.L. will make a significant contribution to the further development of global information infrastructure and significantly expands satellite coverage of Africa and Latin America. The proposed space station will supplement the proposed coverage of the Orion-F2 hybrid Ka/Ku-Band satellite by providing much needed C-Band coverage of Western Europe, Western Africa, Eastern United States, and Eastern South America.

Third, the addition of C-Band frequencies would also satisfy the Commission's objective of promoting maximum efficient use of orbital and spectrum resources. In 1990, Orion assisted the U.S. in protecting U.S. interests for commercial operators in C-Band frequencies at 37.5 W.L. by preparing for the FCC the AP3 materials. The U.S. subsequently submitted these materials to

the ITU establishing U.S. priority access to C-Band at 37.5° W.L.[5/] Loral Orion now seeks to implement its previously-expressed interest in C-Band services at the 37.5° W.L. location.

ORION'S LEGAL QUALIFICATIONS

Orion Atlantic's legal qualifications are documented fully in the attached FCC Form 312 (Exhibit 6), which is incorporated herein by reference.

CONCLUSION

Orion Atlantic believes that it has fully complied with all pertinent Commission rules and policies, and has provided the information required for the Commission to authorize the proposed system. To the extent that the Commission views any portion of this application as not fully compliant with current regulatory requirements, Orion Atlantic requests that the Commission grant any additional waivers that may be necessary.

For the reasons described above, Orion Atlantic respectfully requests that the Commission grant this application.

INTERNATIONAL PRIVATE SATELLITE PARTNERS, L.P.
d/b/a ORION ATLANTIC, L.P.[6/]

5/ See Establishment of Satellite Systems Providing International Communications, 101 F.C.C. 2d 1046 (1985), ¶¶ 68-86.

6/ See Exhibit 6 (FCC Form 312) for signature of officer of applicant, waiver regarding use of frequency, and certification.

Index of Exhibits

EXHIBIT 1

Technical Description
of
C/Ku-Band Satellite
for
37.5 WL Orbital Position

March 23, 1998

Exhibit 1

Technical Description of C/Ku-Band satellite for 37.5 WL

1. Introduction and Orbital Location

This document describes a new hybrid C and Ku-band satellite which will replace the existing ORION-1 satellite at 37.5° West Longitude. The existing ORION-1 is an all Ku-band satellite providing international communications services. This replacement satellite will provide a high power, high capacity space segment with a total of 60 transponders in C and Ku-bands and will enable additional services to be provided throughout the Atlantic Ocean Region.

The C-band payload provides 28 36-Mhz transponders to support various types of digital and analog signal transmissions for trans-Atlantic and intra-regional services within N. America, Europe, South America and Africa, using two hemispherical coverage beams. Digital transmissions for data rates up to 45 Mbits per transponder will be supported.

The Ku-band payload provides 32 54-Mhz transponders with four broad coverage regional beams to Europe, North America, South America and Africa.

In each frequency band, the communications traffic demand will be met with flexible switching onboard the satellite, which will allow transponder interconnectivity from any uplink beam to any downlink beam by ground command.

2. Satellite Coverages

The C-band receive (uplink) and transmit (downlink) beam coverages are provided with two Hemispherical beams. The East Hemi coverage for Europe and Africa, and the West Hemi coverage for North and South Americas.

The Ku-band receive and transmit beam coverages are provided with four broad regional beams for Europe (EU), Africa (AF), North America (NA), and South America (SA).

3. Frequency and Polarization Plans

3.1 C-Band Plan

The frequency bands employed are 5.850-6.425 GHz for uplink and 3.625-4.200 GHz for downlink. A 2-fold frequency reuse is achieved by means of orthogonal polarization between the two Hemi beams for both uplink and downlink. Each Hemi-beam provides

14 transponders in one polarization, for a total of 28 transponders for the two Hemi beams.

Table 1 shows the center frequency and polarization of the transponders. Each transponder has 36 MHz of usable bandwidth, and the spacing between the adjacent center frequencies is 40 Mhz, except one 50 MHz spacing between Transponder #8 and #9. The transponder numbers in Table 1 include designations for each beam (A or B).

Table 1. C-Band Transponder Frequency Plan

Transponder Number	Uplink		Downlink	
	Center Freq. GHz	Polarization	Center Freq. GHz	Polarization
1A 1B	5.870	V H	3.645	H V
2A 2B	5.910	V H	3.685	H V
3A 3B	5.950	V H	3.725	H V
4A 4B	5.990	V H	3.765	H V
5A 5B	6.030	V H	3.805	H V
6A 6B	6.070	V H	3.845	H V
7A 7B	6.110	V H	3.885	H V
8A 8B	6.150	V H	3.925	H V
9A 9B	6.200	V H	3.975	H V
10A 10B	6.240	V H	4.015	H V
11A 11B	6.280	V H	4.055	H V
12A 12B	6.320	V H	4.095	H V
13A 13B	6.360	V H	4.135	H V
14A 14B	6.400	V H	4.175	H V

The transponders #1 & #2 in the frequency range of 5.850-5.925 Ghz uplink and 3.600-3.700 Ghz downlink will be used for international intercontinental communications, subject to electromagnetic compatibility analysis in compliance with the US Table of Frequency Allocations (refer to US footenote 245).

3.2 Ku-Band Plan

The Ku-band payload for the four regional beam coverages provides a total of 32 transponders: 16 transponders for the North and South Americas, and another 16 transponders for Europe and Africa.

The frequency band employed for the uplink is 14.0-14.5 Ghz in all regions. The downlink frequency bands are: 11.7-12.2 GHz for the North and South Americas (ITU Region 2), and 11.45-11.7 Ghz and 12.5-12.75 Ghz for the Europe and Africa (ITU Region 1). The uplink frequency band employs a 4-fold frequency reuse by means of orthogonal polarization and spatial isolation of the four beams. The downlink band in each ITU Region employs a 2-fold frequency reuse by orthogonal polarizations.

The center frequency and polarization of the transponders assigned to the up and downlinks are shown in Table 2A and 2B for the ITU Regions 1 and 2, respectively. Each transponder has 54 MHz of usable bandwidth, and the spacing between the adjacent center frequencies is 63 Mhz, except one 61 MHz spacing between Transponders #4 and #5, for compatibility with the existing Orion-1 satellite. The transponder number includes a designation for the downlink coverage beam ("Eu" for Europe, "Af" for Africa, "Na" for North America and "Sa" for South America) and polarizations (A and B).

Table 2A. Ku-Band Transponder Frequency Plan for the Europe and Africa Beams (ITU Region 1)

Transponder Number	Uplink		Downlink	
	Center Freq. GHz	Polarization	Center Freq. GHz	Polarization
1EuA 1EuB or 1AfB	14.028	V H	12.528	H V
2EuA 2EuB or 2AfB	14.091	V H	12.591	H V
3EuA 3EuB or 3AfB	14.154	V H	12.654	H V
4EuA 4EuB or 4 AfB	14.217	V H	12.717	H V
5EuA 5AfB	14.278	V H	11.483	H V

6EuA 6AfB	14.341	V H	11.546	H V
7EuA 7AfB	14.404	V H	11.609	H V
8EuA 8AfB	14.467	V H	11.672	H V

Table 2B. Ku-Band Transponder Frequency Plan for the North America and South America Beams (ITU Region 2)

Transponder Number	Uplink		Downlink	
	Center Freq. GHz	Polarization	Center Freq. GHz	Polarization
1NaA 1NaB or 1SaB	14.028	V H	11.728	H V
2NaA 2AmB or 2SaB	14.091	V H	11.791	H V
3NaA 3AmB or 3SaB	14.154	V H	11.854	H V
4NaA 4AmB or 4SaB	14.217	V H	11.917	H V
5NaA 5SaB	14.278	V H	11.978	H V
6NaA 6SaB	14.341	V H	12.041	H V
7NaA 7SaB	14.404	V H	12.104	H V
8NaA 8SaB	14.467	V H	12.167	H V

Global Telecommand will be at 14.499 Ghz to provide compatibility with the existing Orion-1 TT&C networks. Telemetry and beacon carriers will be within the 11.450-11.451 GHz range for the purpose of payload status monitoring and earth station tracking functions.

4. Satellite Transmit Capability

4.1 C-Band Transmit

Figures 1A and 1B show the satellite transmit antenna gain contours of the East and West Hemi beams for -2, -4, -6, -8, -10, -15 and -20 dB relative to the peak gain.

The C-band payload includes a total of 28 simultaneously operating traveling wave tube amplifiers (TWTAs), each providing 55 Watts of saturated output power. The TWTAs reside in four 10-for-7 redundancy ring configurations.

A summary of the C-band EIRP budget for each beam is shown in Table 3.

Table 3. C-band Payload Transmit Performance

(a). East Hemi Beam

Parameter	Beam Peak	-6 dB Contour
Saturated TWTA output power	17.4dBW	17.4 dBW
Output circuit loss	-1.2 dB	-1.2 dB
Transmit antenna gain	29.2 dBi	23.2 dBi
EIRP	45.4 dBW	39.4dBW

(b). West Hemi Beam

Parameter	Beam Peak	-6 dB Contour
Saturated TWTA output power	17.4dBW	17.4 dBW
Output circuit loss	-1.2 dB	-1.2 dB
Transmit antenna gain	28.3 dBi	28.3 dBi
EIRP	44.5 dBW	38.5 dBW

Figure 1A. Satellite Transmit Antenna Gain Contours
C-Band East Hemi-Beam (Peak Gain = 29.2 dBi)

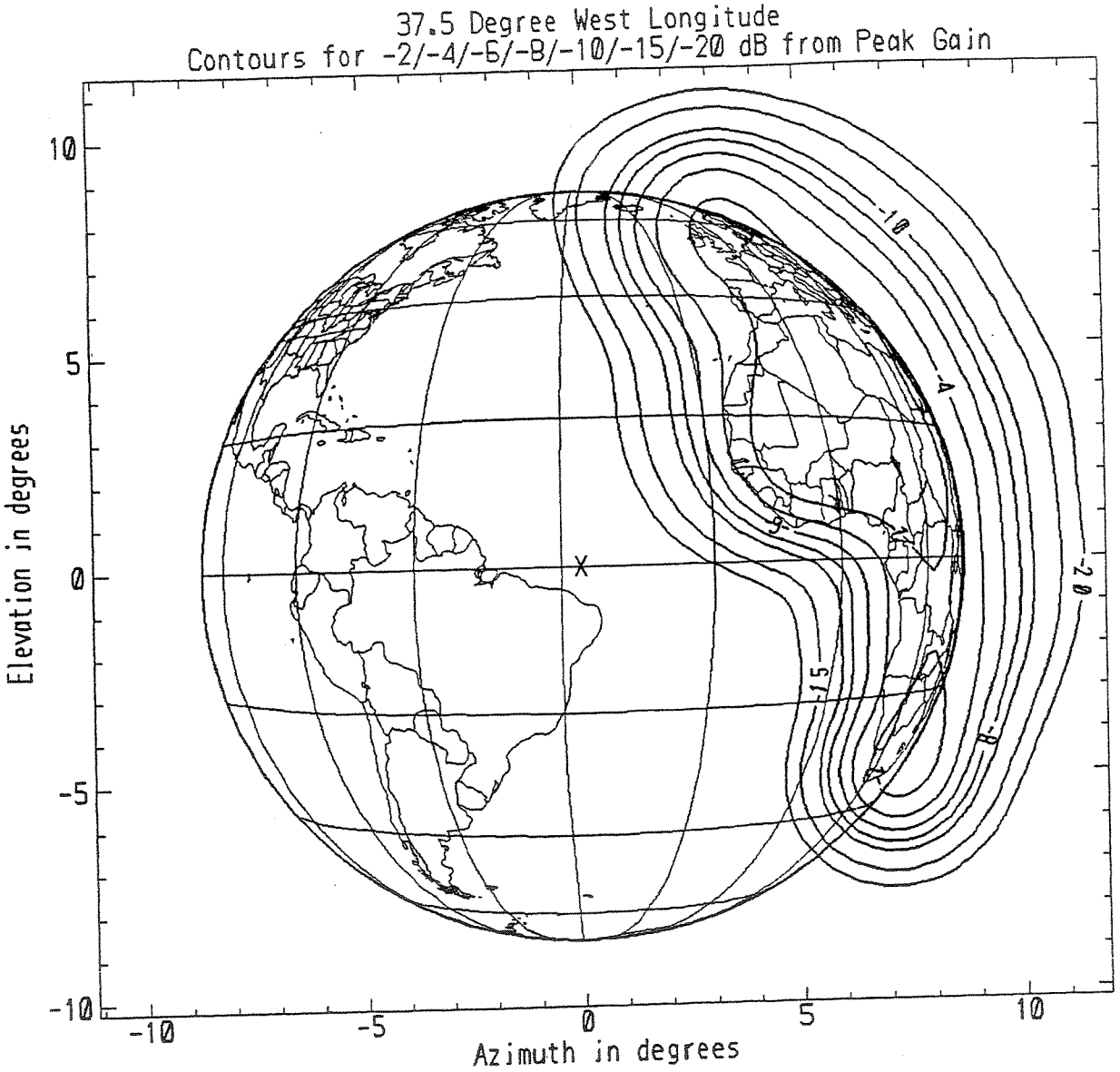
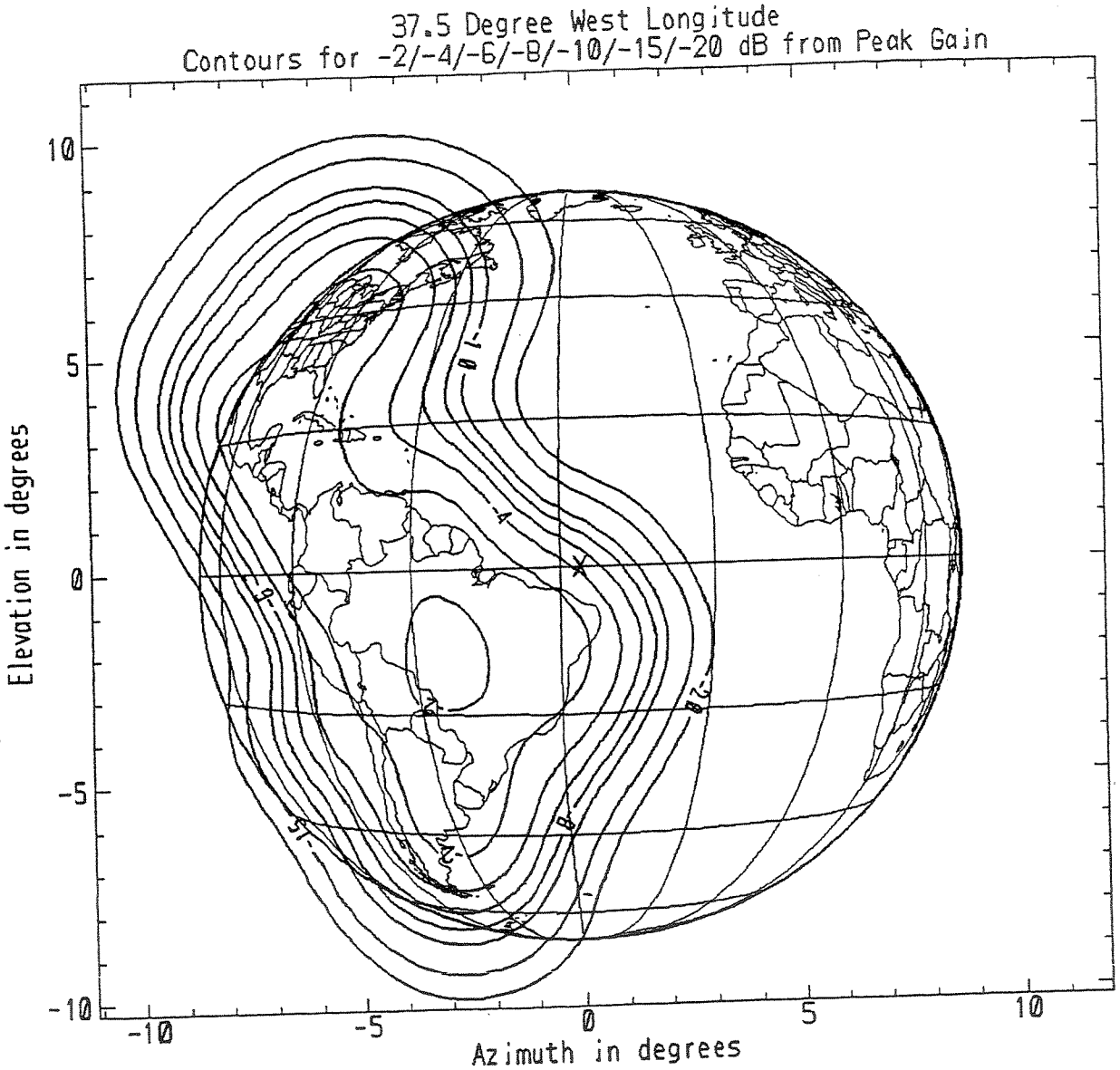


Figure 1B. Satellite Transmit Antenna Gain Contours
C-Band West Hemi-Beam (Peak Gain = 28.3 dBi)



4.2 Ku-Band Transmit

The Ku-band satellite antenna gain contours are shown in Figures 2A-2D for the EU, AF, NA and SA transmit beams. The peak gain and gain contours for -2, -4, -6, -8, -10, -15 and -20 dB relative to the peak gain are provided for each beam.

The Ku-band payload includes 32 simultaneously operating traveling wave tube amplifiers (TWTAs), each for 100 Watts of saturated output power. The TWTAs reside in four 12-for-8 redundancy ring configurations.

The K-band EIRP budget for each beam is summarized in Table 4.

Table 4. Ku-band Payload Transmit Performance

(a). EU Beam

Parameter	Beam Peak	-6 dB Contour
Saturated TWTA output power	20.0 dBW	20.0 dBW
Output circuit loss	-2.5 dB	-2.5 dB
Transmit antenna gain	38.3 dBi	32.3 dBi
EIRP	55.8 dBW	49.8 dBW

(b). AF Beam

Parameter	Beam Peak	-6 dB Contour
Saturated TWTA output power	20.0 dBW	20.0 dBW
Output circuit loss	-2.5 dB	-2.5 dB
Transmit antenna gain	36.6 dBi	30.6 dBi
EIRP	54.1 dBW	48.1 dBW

(c). NA Beam

Parameter	Beam Peak	-6 dB Contour
Saturated TWTA output power	20.0 dBW	20.0 dBW
Output circuit loss	-2.5 dB	-2.5 dB
Transmit antenna gain	37.4 dBi	31.4 dBi
EIRP	54.9 dBW	48.9 dBW

(d). SA Beam

Parameter	Beam Peak	-6 dB Contour
Saturated TWTA output power	20.0 dBW	20.0 dBW
Output circuit loss	-2.5 dB	-2.5 dB
Transmit antenna gain	35.8 dBi	29.8 dBi
EIRP	53.3 dBW	47.3 dBW

Figure 2A. Satellite Transmit Antenna Gain Contours
Ku-Band EU Beam (Peak Gain = 38.3 dBi)
Contours for -2, -4, -6, -8, -10, -15, and -20 dB from the Peak Gain

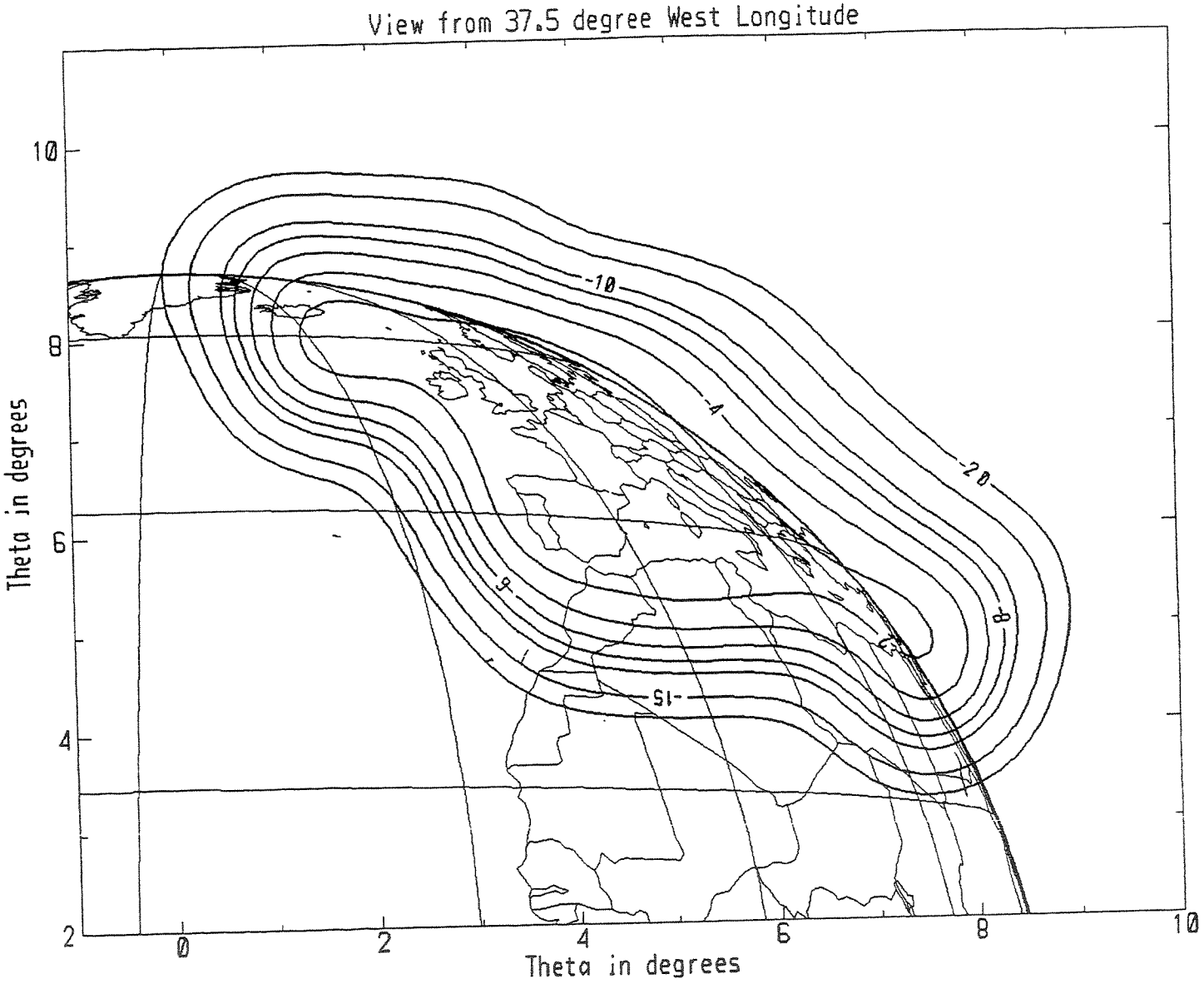


Figure 2B. Satellite Transmit Antenna Gain Contours
Ku-Band AF Beam (Peak Gain = 36.6 dBi)
Contours for -2, -4, -6, -8, -10, -15, and -20 dB from the Peak Gain

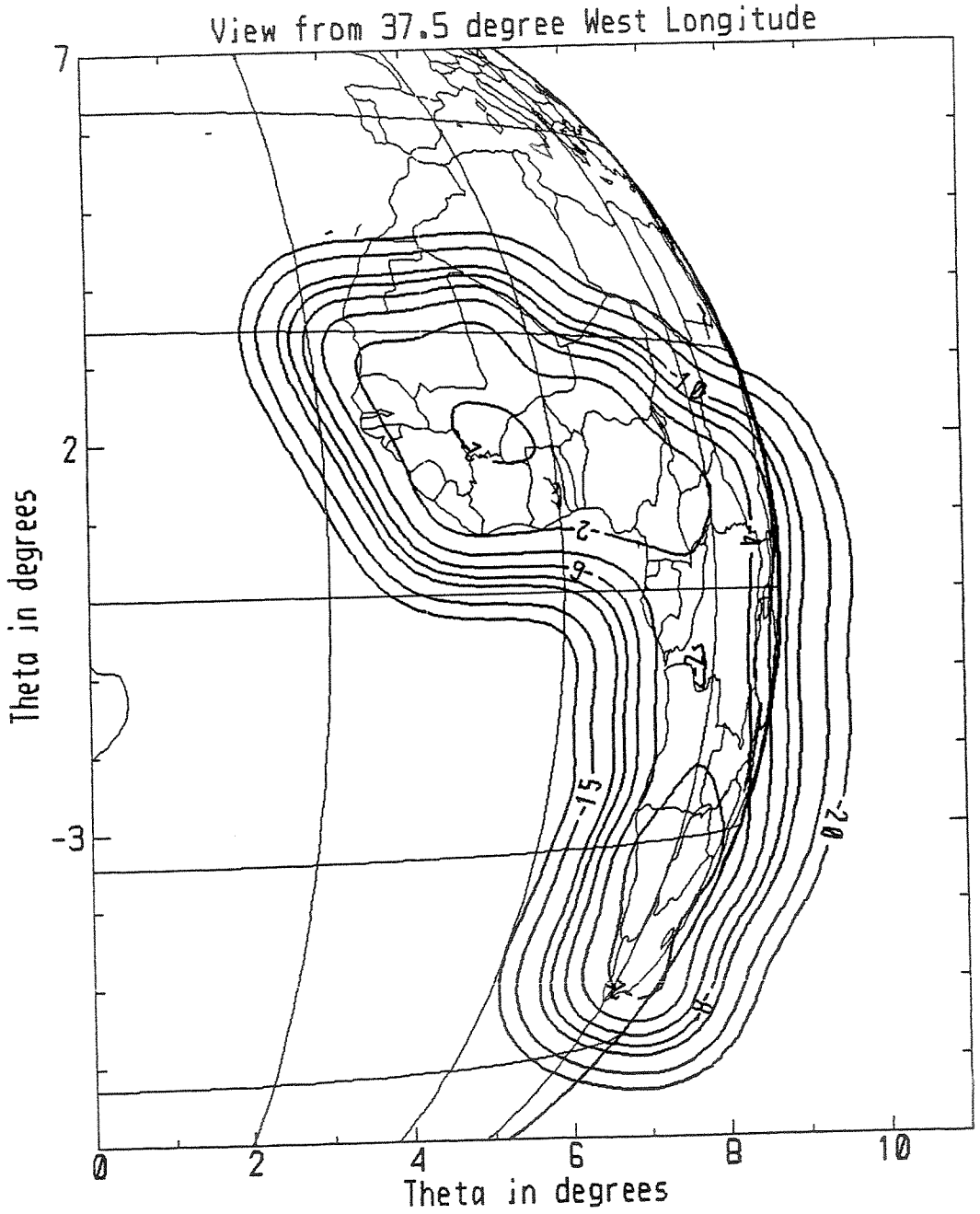


Figure 2C. Satellite Transmit Antenna Gain Contours
K-Band NA Beam (Peak Gain = 37.4 dBi)
Contours for -2, -4, -6, -8, -10, -15, and -20 dB from the Peak Gain

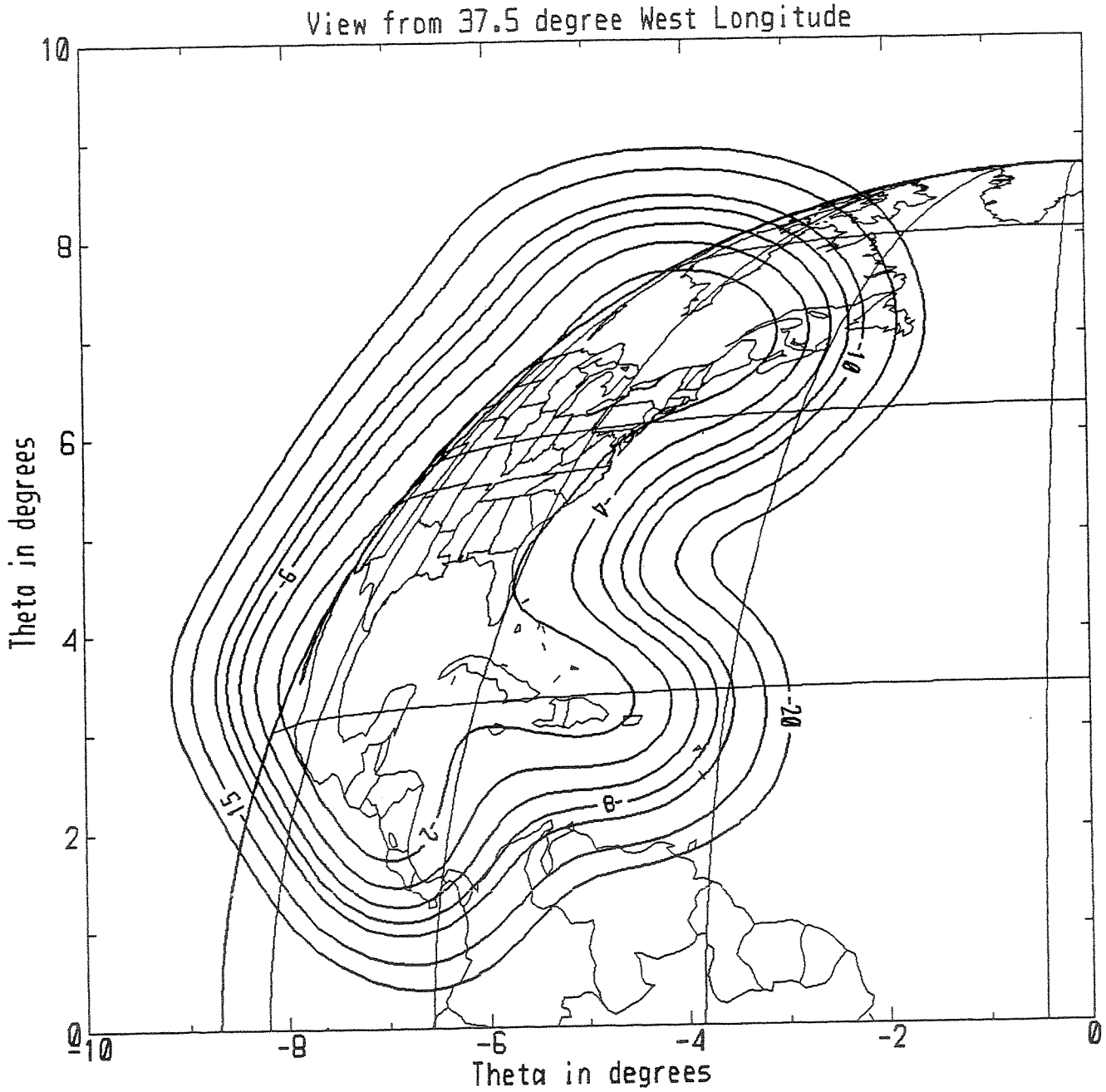
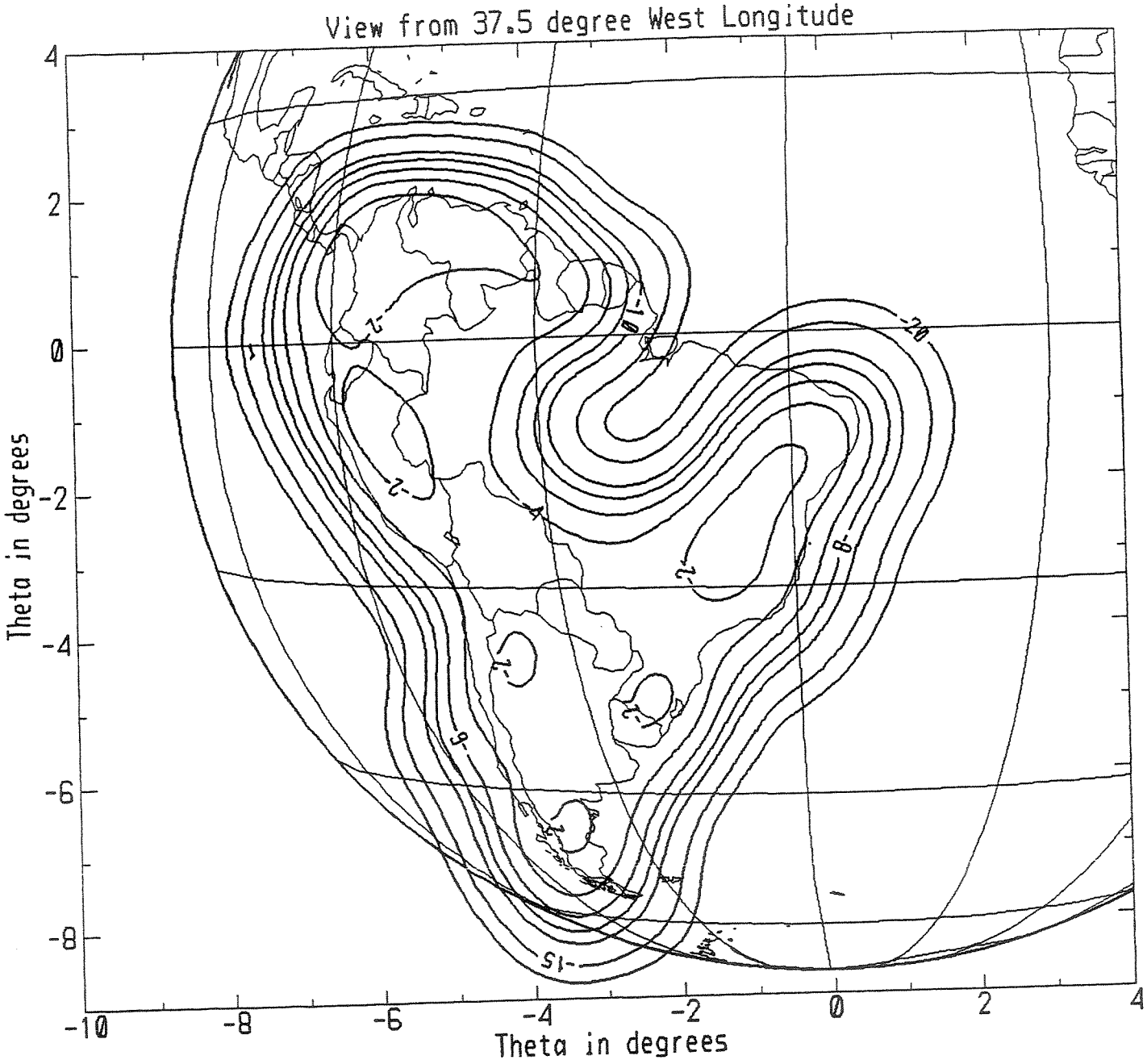


Figure 2D. Satellite Transmit Antenna Gain Contours
Ku-Band SA Beam (Peak Gain = 35.8 dBi)
Contours for -2, -4, -6, -8, -10, -15, and -20 dB from the Peak Gain



5. Satellite Receive Capability

5.1 C-Band Receive

The peak gain and gain contours for -2, -4, -6, -8, -10, -15 and -20 dB relative to the peak gain of the East and West Hemi beams are shown in Figures 3A and 3B.

The satellite receiving system noise temperature is approximately 600 K. Table 5 shows the budget for the system gain to noise temperature ratio (G/T).

Table 5. Satellite Receive Performance

(a). East Hemi Beam

Parameter	Beam Peak	-6 dB Contour
Receive antenna gain	28.7 dBi	22.7 dBi
System noise temperature	27.8 dBK	27.8 dBK
Receive G/T	0.9 dB/K	-5.1 dB/K

(a). West Hemi Beam

Parameter	Beam Peak	-6 dB Contour
Receive antenna gain	27.8 dBi	21.8 dBi
System noise temperature	27.8 dBK	27.8 dBK
Receive G/T	0 dB/K	-6 dB/K

Figure 3A. Satellite Receive Antenna Gain Contours
C-Band East Hemi-Beam (Peak Gain = 28.7 dBi)

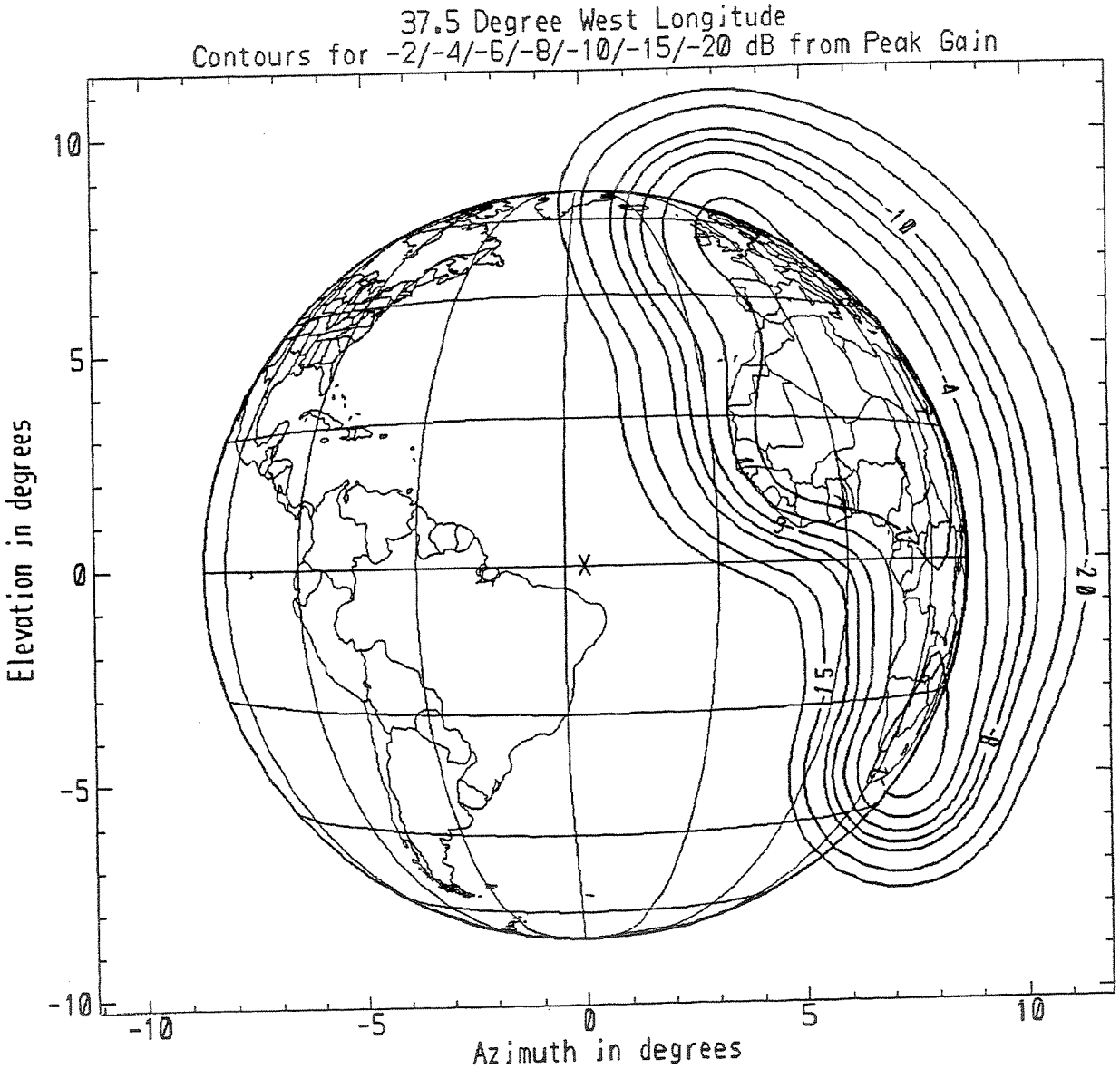
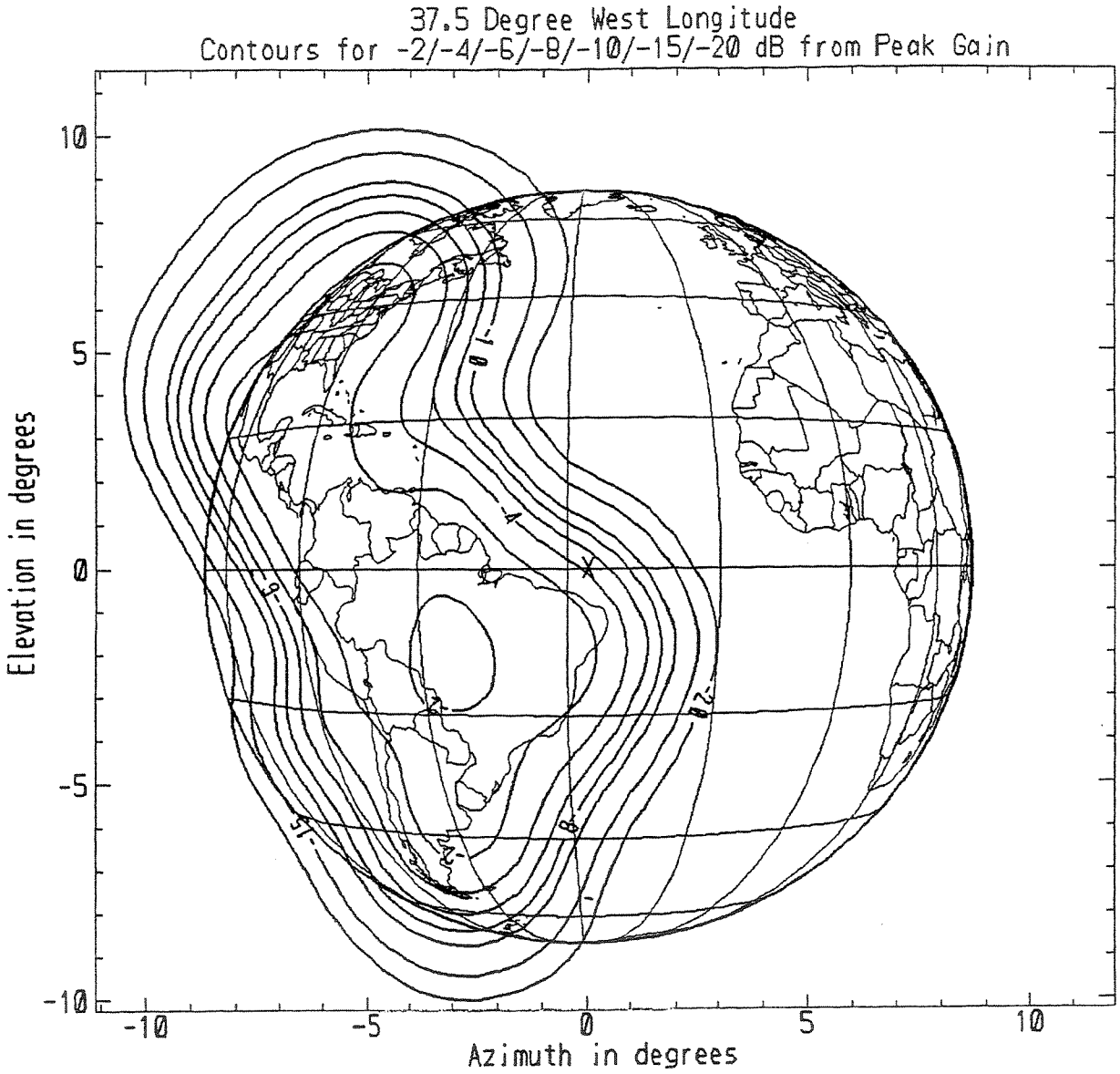


Figure 3B. Satellite Receive Antenna Gain Contours
C-Band West Hemi-Beam (Peak Gain = 27.8 dBi)



5.2 Ku-Band Receive

Figures 4A-4D show the satellite antenna gain contours of the receive beams (EU, AF, NA and SA) for -2, -4, -6, -8, -10, -15 and -20 dB relative to the peak gain.

The satellite receiving system noise temperature is approximately 600 K. The budget for the system receive performance, gain to noise temperature ratio (G/T), is given in Table 6 for each beam.

Table 6. Satellite Receive Performance

(a). EU Beam

Parameter	Beam Peak	-6 dB Contour
Receive antenna gain	37.8 dBi	31.8 dBi
System noise temperature	27.8 dBK	27.8 dBK
Receive G/T	10 dB/K	4 dB/K

(b). AF Beam

Parameter	Beam Peak	-6 dB Contour
Receive antenna gain	36.1 dBi	30.1 dBi
System noise temperature	27.8 dBK	27.8 dBK
Receive G/T	8.3 dB/K	2.3 dB/K

(c). NA Beam

Parameter	Beam Peak	-6 dB Contour
Receive antenna gain	36.9 dBi	30.9 dBi
System noise temperature	27.8 dBK	27.8 dBK
Receive G/T	9.1 dB/K	3.1 dB/K

(d). SA Beam

Parameter	Beam Peak	-6 dB Contour
Receive antenna gain	35.3 dBi	29.3 dBi
System noise temperature	27.8 dBK	27.8 dBK
Receive G/T	7.5 dB/K	1.5 dB/K

Figure 4A. Satellite Receive Antenna Gain Contours
Ku-Band EU Beam (Peak Gain = 37.8 dBi)
Contours for -2, -4, -6, -8, -10, -15, and -20 dB from the Peak Gain

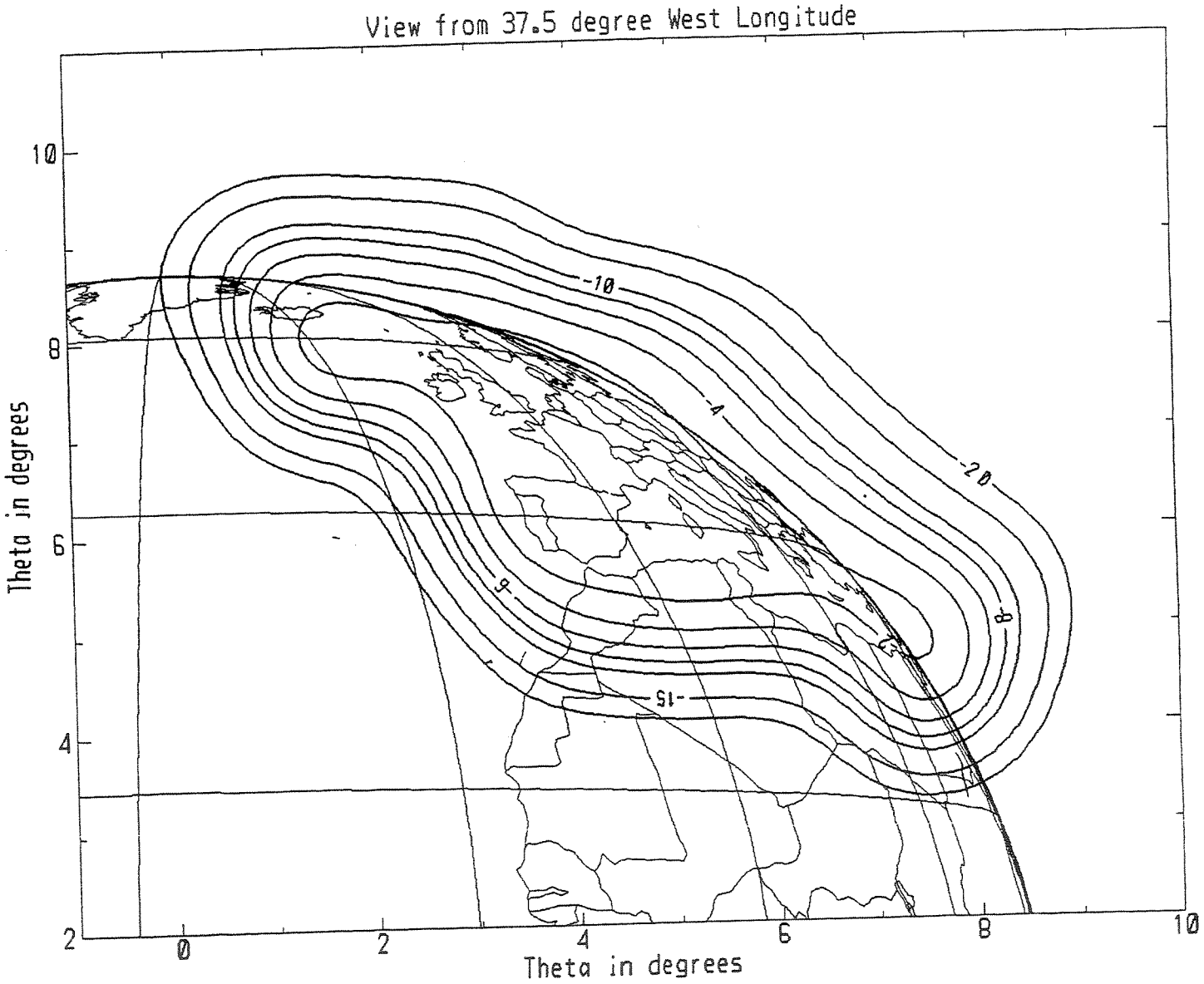


Figure 4B. Satellite Receive Antenna Gain Contours
Ku-Band AF Beam (Peak Gain = 36.1 dBi)
Contours for -2, -4, -6, -8, -10, -15, and -20 dB from the Peak Gain

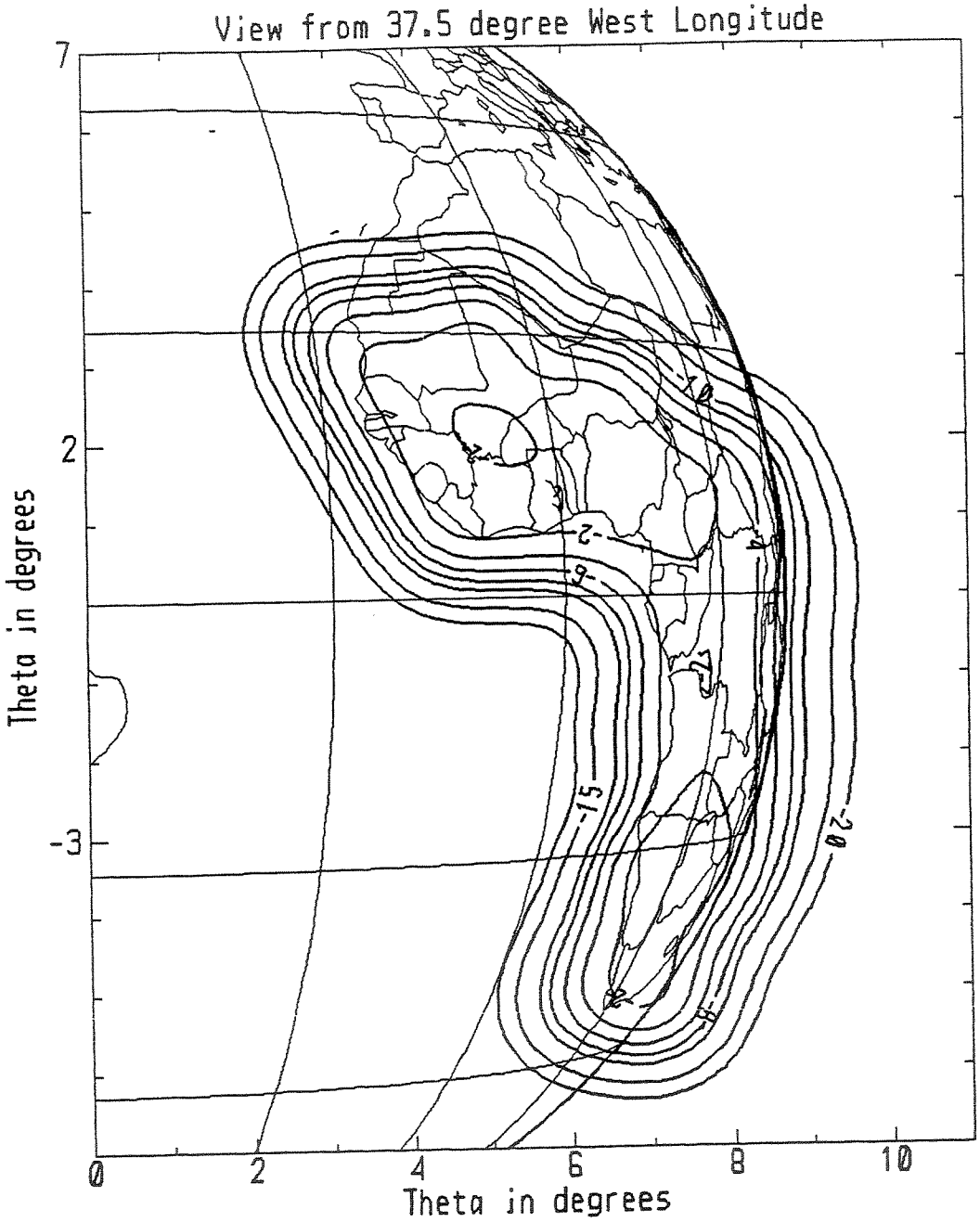


Figure 4C. Satellite Receive Antenna Gain Contours
Ku-Band NA Beam (Peak Gain = 36.9 dBi)
Contours for -2, -4, -6, -8, -10, -15, and -20 dB from the Peak Gain

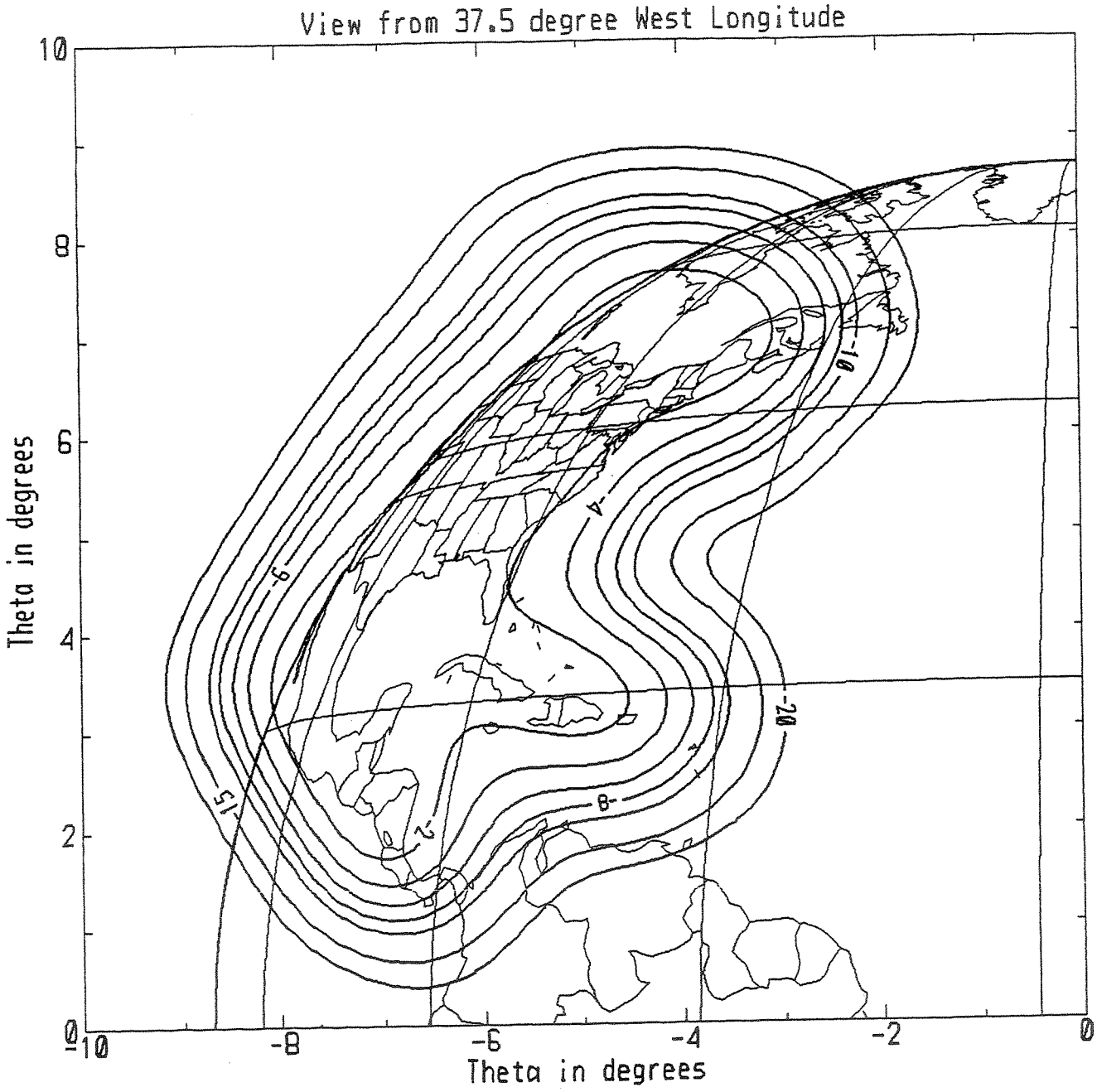
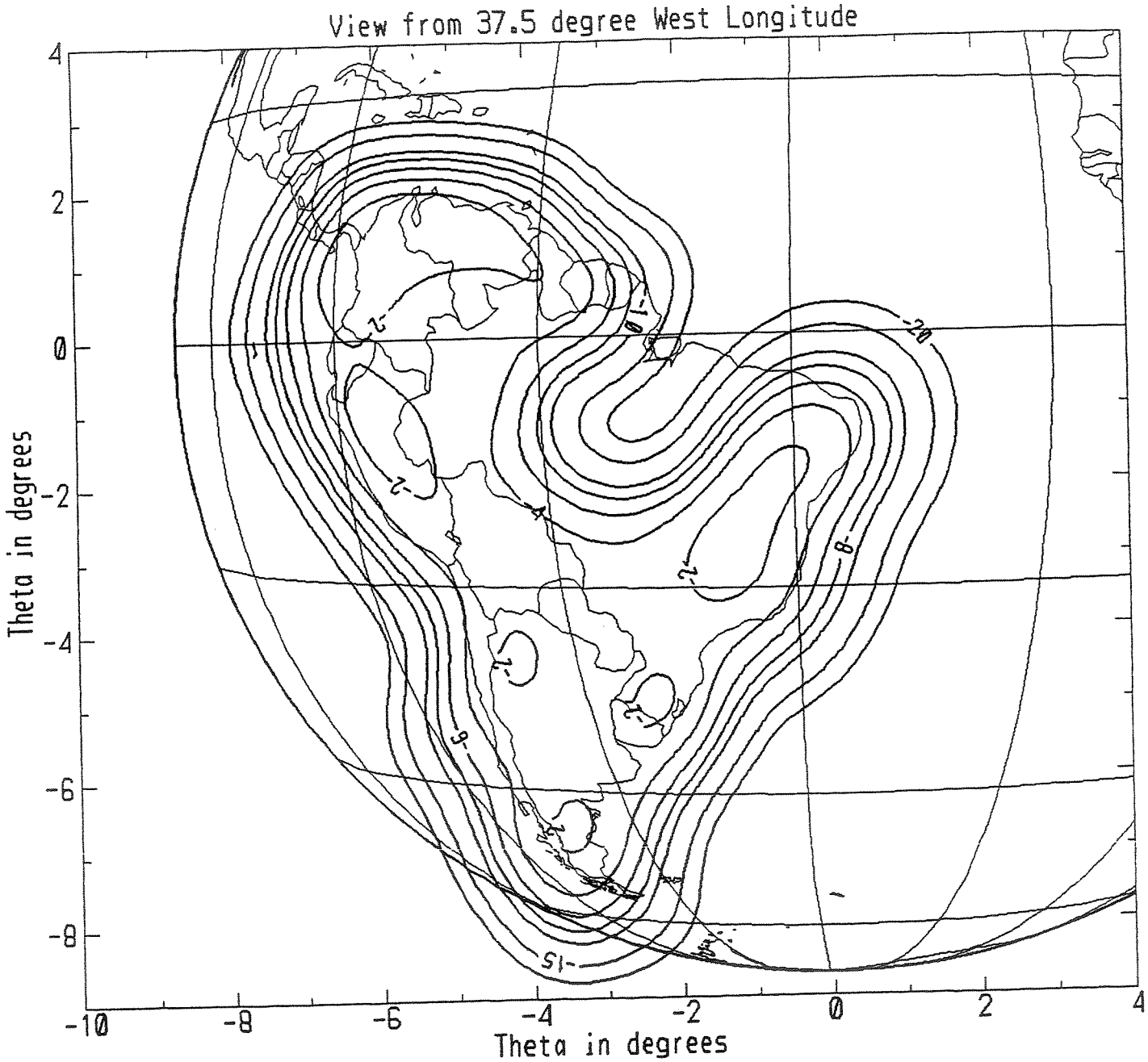


Figure 4D. Satellite Receive Antenna Gain Contours
Ku-Band SA Beam (Peak Gain = 35.3 dBi)
Contours for -2, -4, -6, -8, -10, -15, and -20 dB from the Peak Gain



6. Connectivity

There will be flexible switching onboard the satellite to provide up/downlink interconnectivity for trans-Atlantic and intra-regional communications services by ground telecommand.

In C-band, the East Hemi beam will provide 6 transponders dedicated to intra-regional services and 6 transponders switchable for trans-Atlantic services. Similarly, the West Hemi beam will provide 6 transponders dedicated to intra-regional services and 6 transponders switchable for trans-Atlantic services. Transponders #1 and #2 in each beam will have fixed connectivity for trans-Atlantic transmissions to comply with the US regulatory provisions defined in the US Table of Frequency Allocations.

In Ku-band, 8 transponders will be dedicated to N. America downlinks, 4 transponders dedicated to S. America downlinks, and 4 transponders switchable to North America or South America downlinks. Also, 8 transponders will be dedicated to Europe downlinks, 4 transponders dedicated to Africa downlinks, and 4 transponders switchable to Europe or Africa downlinks.

7. Transponder Gain Control and Saturation Flux Density

The gain of each transponder is independently controllable by ground command over a 20 dB range, in 1 dB gain steps.

The range of saturation flux density (SFD) related to the G/T value (dB/K) from any location within the receive coverage areas is adjustable between the following maximum and minimum values:

For C-band, $-(77 + G/T)$ to $-(97+G/T)$ dBW/m^2

For Ku-band, $-(74 + G/T)$ to $-(94+G/T)$ dBW/m^2

The corresponding gain of the transponder ranges from 115 dB to 135 dB in C-band, and 112 dB to 132 dB in Ku-band, depending on the gain setting.

8. Satellite Transponder Filter Response

The overall frequency response of a transponder is defined by the in-band and out-of-band attenuation masks shown in Figures 5A and 5B for C-band, and Figures 6A and 6B for Ku-band. The in-band attenuation, relative to the peak in-band gain, does not exceed the limit shown in Figures 5A and 6A. The out-of-band attenuation, relative to the peak in-band gain exceeds the limit shown in Figures 5B and 6B. The actual transponder filter characteristics will be finalized through detailed design optimizations.

Figure 5A. In-Band Filter Response for C-Band Transponders

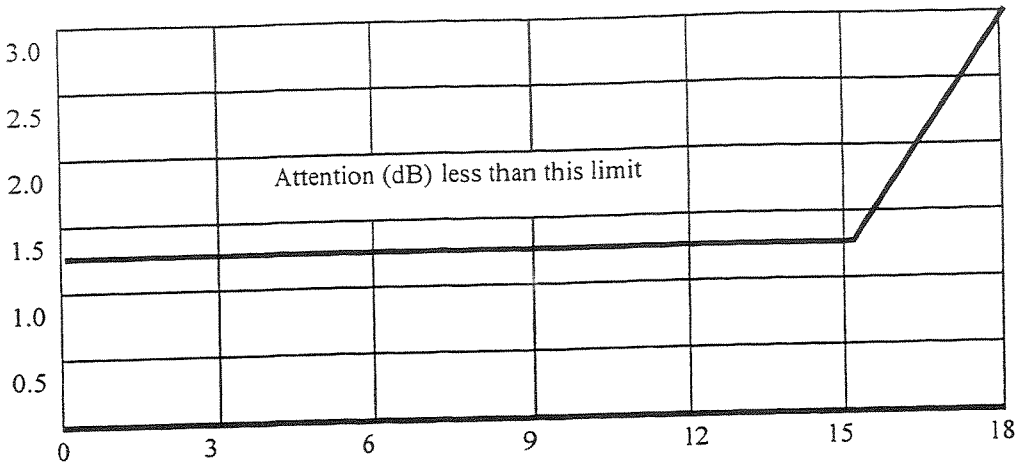


Figure 5B. Out-Of-Band Filter Response for C-Band Transponders

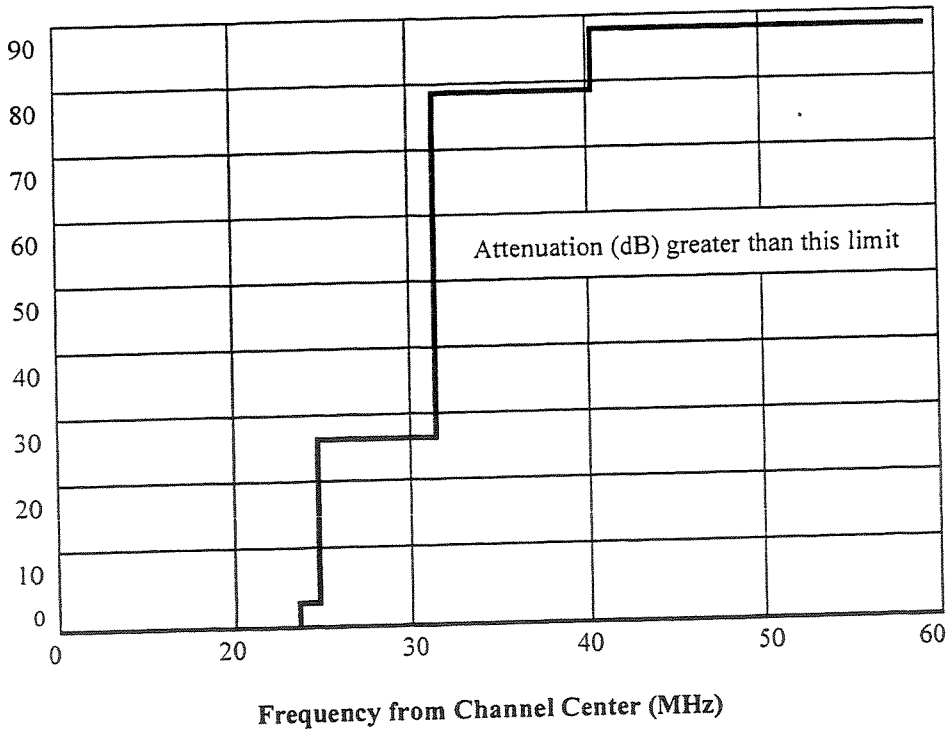


Figure 6A. In-Band Filter Response for Ku-Band Transponders

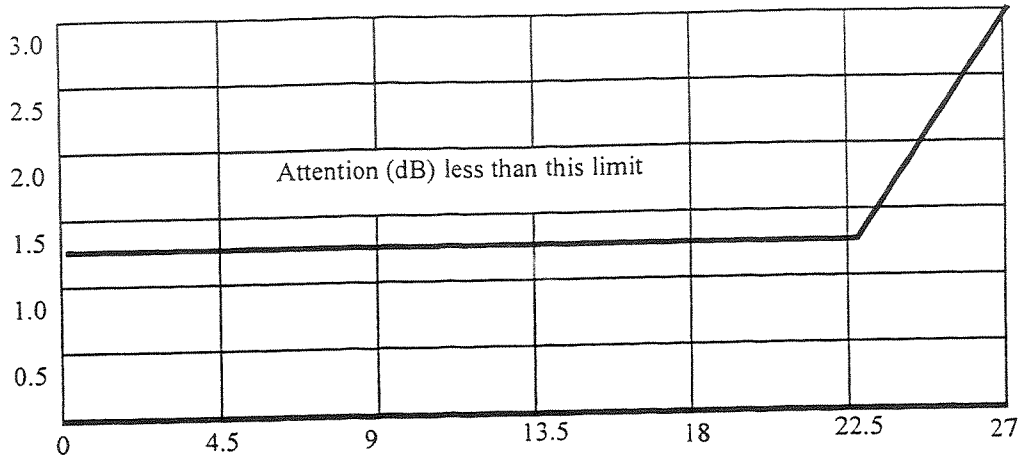
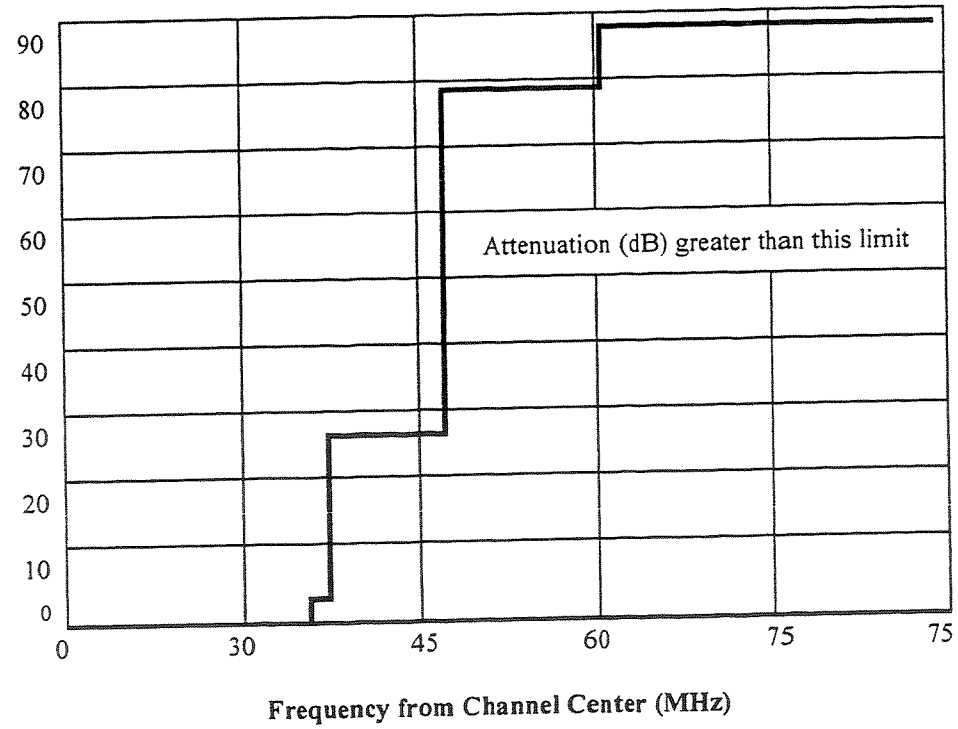


Figure 6B. Out-Of-Band Filter Response for Ku-Band Transponders



9. Unwanted Emissions

The unwanted out-of-band emissions will not exceed the mean output power limitations specified in the US Federal Regulations. Refer to CFR Section 25.202(f).

10. Emission Designators and Allocated Bandwidth of Emission

Table 7 shows a list of representative transmission types and their ITU emission designators. The allocated bandwidth is identified conventionally in each emission designator.

Table 7. Transmission Types and Emission Designators

Transmission Type	Emission Designator
Digital TDMA (60 Mb/s QPSK, FEC rate 3/4)	50M4G1W
Digital MCPC (45 Mb/s QPSK, REC rate 3/4)	36M0G7W
Digital MCPC (8.448 Mb/s QPSK, FEC rate 3/4)	7M00G7W
Digital SCPC (1.544 Mb/s QPSK, FEC rate 3/4)	1M30G1W
Digital SCPC (384 kb/s QPSK, FEC rate 1/2	500KG1W
Digital SCPC (64 kb/s QPSK, FEC rate 3/4)	56K0G1W
17.5 Mhz Analog TV with 2 Mhz EDS	17M5F3F
30 Mhz Analog TV with 2.5 Mhz EDS	30M0F3F
Telecommand and Ranging	800KFXD
Beacon	40K0N0X

The digital services include various types of multi-channel per carrier (MCPC) or single channel per carrier (SCPC) transmissions for digital voice, data, and compressed digital video for information rates from 64 kb/s up to 45 Mb/s in C-band and 60 Mb/s in Ku-band. Forward error correction codes (FECs) with 3/4 and 1/2 rates and Reed-Solomon concatenated outer codes will be used as applicable for the digital tramsmissions.

11. Earth Stations

A variety of earth stations ranging from 1.8 to 11 meters in diameter will operate using the C-band satellite capacity to support various communication services. In Ku-band, a number of VSAT networks with 1.2 to 2.4 m terminals on customer premises will be operated along with larger earth stations. Smaller terminals down to 0.85 m will be used for some Ku-band receive-only services.

At Ku-band, a small number of gateway earth stations (>5 meter) will be used primarily to support the high speed (up to 60 Mb/s) digital transmissions. A large number of smaller customer premises earth stations with 1.2-3.5 m aperture size will be used primarily to provide lower rate digital services (64 kb/s to 2 Mb/s).

The earth station networks will include various configurations of redundant transmission components to meet high availability requirement. Also, all earth stations accessing the satellite must adhere to Orion's established operational procedures. The sidelobe performance of all antennas larger than 1.8 m will meet the FCC requirements of 29-25log(θ) dBi, thus ensuring compatible operation with other adjacent satellite networks. The smaller 0.85 m Ku-band receive-only antenna will meet a 32-25log(θ) dBi sidelobe envelope. C-band antennas smaller than 1.8 m will meet 32-25log(θ) dBi.

All transmissions will be monitored by Orion's Communications Systems Monitor (CSM) which determines the frequency and power level of each carrier to ensure that they are within the authorized specifications. All operational procedures of the Orion satellite network will be compliant with the Commission's rules described in the CFR Sections 25.271 through 25.277.

12. Communications Services and Link Budgets

A full range of communications services will be provided to meet the various existing and new customers requirements. The range of services will include, but not limited to, the following:

- Digital single carrier and multi-carrier circuits ranging from 64 kb/s up to 60 Mb/s
- SCPC/FDMA and TDMA access techniques
- Star and meshed VSAT networks
- Spread spectrum networks using CDMA if necessary
- Digitally compressed video, ranging from 256 kb/s teleconferencing and 3 Mb/s entertainment quality to 8-20 Mb/s broadcast quality
- Analog TV-FM transmissions for video distribution and broadcasting.

High quality digital transmissions with extremely low bit error rates (BER) of better than 10^{-10} is achieved with the use of advanced FEC techniques, such as concatenated Reed-Solomon (RS) outer coding with Viterbi inner codes. Orion offers overall link availabilities of greater than 99.5 % for all services, VSAT networks included. Higher link availabilities are provided to meet customers demand as required.

12.1 C-Band Link Budgets

The sample C-band link budgets in Figures 7A-7C show representative digital transmissions between the earth stations located at the edge of coverage defined by -6 dB from the beam peak. The link budget includes a rain loss of 2 dB each for uplink and downlink fades, which provides high availability within the beam coverage regions.

Figure 7A shows a link budget for 64 Kb/s SCPC transmission. The transmission employs QPSK modulation with FEC rate-3/4 RS for error correction. The link budget

shows that the bandwidth-limited transponder loading of the 64 kb/s carriers is allowed for the maximum capacity using the 2.4 m VSAT networks with 6-Watt HPAs.

Figure 7B shows a sample link budget for 1.544 Mb/s transmission between 3.5 m earth stations located at the edge of satellite beam coverages. The transmission employs QPSK modulation and FEC rate-3/4 RS. 20 W-class HPA is required for the earth station.

Figure 7C shows a sample link budget for a single 45 Mb/s carrier per transponder transmission between 8 m earth stations using 30 Watts-class HPAs. The transmission parameters assumed QPSK modulation with conventional FEC rate-3/4.

In addition, a sample link budget for a full transponder TV-FM broadcast services in C-band from 10 m transmit to 7 m receive earth stations is shown in Figure 8. The overall link budget shows a minimum carrier-to-effective total noise ratio of 18.3 dB which provides video signal-to-noise ratio (S/N) of greater than 52.6 dB. The TV carrier was assumed to be NTSC format with 4.2 Mhz video bandwidth, and modulated with peak deviation of 9.4 Mhz. The weighting and emphasis factor provides 12.8 dB improvement.

12.2 Ku-Band Link Budgets

The sample link budgets for representative Ku-band digital carriers are shown in Figures 9A-9C. Figure 9A shows a link budget for 64 Kb/s SCPC transmission with QPSK modulation and FEC rate-1/2 RS for error correction. The 64 kb/s transmissions between 1.8 m VSATs equipped with 4 Watt HPAs allow the network to operate under bandwidth-limited, maximum transponder capacity loading condition.

Figure 9B shows a link budget for 1.544 Mb/s transmission using 2.4 m VSAT terminals located at the edge of satellite beam coverages. The carriers are QPSK-modulated with FEC rate-3/4 RS for error correction.

Figure 9C shows a link budget for a single 60 Mb/s carrier per transponder transmission between 5.5 m earth stations with 200 Watts-class HPAs. The link parameters are for QPSK modulation with conventional FEC rate-3/4.

Figure 10 shows a link budget for half transponder 26 Mhz TV-FM in Ku-band from 5.5 m transmit to 3.5 m receive earth stations. The overall link budget shows a minimum carrier-to-effective total noise ratio of 11.6 dB under uplink rain fade, which provides video signal-to-noise ratio (S/N) of greater than 47.3 dB for NTSC.

Figure 7A. C-Band Link Budget for 64 kb/s Transmission between 2.4 m Earth Stations

Link Analysis				
System parameters:	**Unit**	**Clear sky**	**Uplink Fade**	**Downlink Fade**
Uplink frequency	GHz	6.11	6.11	6.11
Data rate	kbps	64.00	64.00	64.00
Modulation		QPSK	QPSK	QPSK
FEC		Rate-3/4 RS	Rate-3/4 RS	Rate-3/4 RS
Occupied bandwidth	kHz	55.81	55.81	55.81
Downlink frequency	GHz	3.89	3.89	3.89
Required overall link Eb/No	dB	6.00	6.00	6.00
Required overall link C/N	dB	6.59	6.59	6.59
Earth terminal antenna	m	2.40	2.40	2.40
Transponder bandwidth	MHz	36.00	36.00	36.00
SFD	dBW/sq(m)	-83.00	-83.00	-83.00
Total PFD	dBW/sq(m)	-89.32	-91.32	-89.32
Uplink:		**Clear sky**	**Uplink fade**	**Clear sky**
Transmit power	dBW	6.68	6.68	6.68
Transmit loss	dB	1.50	1.50	1.50
Transmit antenna gain	dBi	41.00	41.00	41.00
Uplink free space loss	dB	200.10	200.10	200.10
Atmospheric loss	dB	0.20	0.20	0.20
Rain loss	dB	0.00	2.00	0.00
Satellite G/T	dB/K	-6.00	-6.00	-6.00
Boltzmann's constant	dBW/K/Hz	-228.60	-228.60	-228.60
Noise bandwidth	dBHz	47.47	47.47	47.47
Uplink thermal C/N	dB	21.01	19.01	21.01
Cross-pol C/I	dB	27.00	25.00	27.00
Copol C/I	dB	27.00	25.00	27.00
Intersystem interference C/I	dB	15.79	13.79	15.79
Uplink total C/(N+I)	dB	14.17	12.17	14.17
Downlink:		**Clear sky**	**Clear sky**	**Downlink fade**
Transmit power at saturation	dBW	17.40	17.40	17.40
Total output backoff	dB	2.84	4.16	2.84
Transmit output loss	dB	1.40	1.40	1.40
Transmit antenna gain	dBi	23.20	23.20	23.20
Number of carriers	dB	28.00	28.00	28.00
EIRP per carrier	dBW	8.36	7.04	8.36
Downlink free space loss	dB	196.60	196.60	196.60
Atmosperic loss	dB	0.20	0.20	0.20
Rain degradation	dB	0.00	0.00	2.00
Earth terminal G/T	dB/K	18.90	18.90	18.90
Boltzmann's constant	dBW/K/Hz	228.60	228.60	228.60
Downlink thermal C/N	dB	11.59	10.27	9.59
Intermodulation C/I	dB	16.30	16.30	16.30
Cross-pol C/I	dB	27.00	25.68	27.00
Copol C/I	dB	27.00	25.68	27.00
Intersystem interference C/I	dB	15.79	14.48	15.79
Downlink total C/(N+I)	dB	9.10	8.00	7.86
Total link C/(N+I)	dB	7.92	6.59	6.95
Total link Eb/(No+Io)	dB	7.33	6.00	6.35
Margin	dB	1.33	0.00	0.35

Figure 7B. C-Band Link Budget for 1544 kb/s Transmission between 3.5 m Earth Stations

Link Analysis				
System parameters:	**Unit**	**Clear sky**	**Uplink Fade**	**Downlink Fade**
Uplink frequency	GHz	6.11	6.11	6.11
Data rate	kbps	1,544.00	1,544.00	1,544.00
Modulation		QPSK	QPSK	QPSK
FEC		Rate-3/4 RS	Rate-3/4 RS	Rate-3/4 RS
Occupied bandwidth	kHz	1,321.66	1,321.66	1,321.66
Downlink frequency	GHz	3.89	3.89	3.89
Required overall link Eb/No	dB	6.00	6.00	6.00
Required overall link C/N	dB	6.68	6.68	6.68
Earth terminal antenna	m	3.50	3.50	3.50
Transponder bandwidth	MHz	36.00	36.00	36.00
SFD	dBW/sq(m)	-86.00	-86.00	-86.00
Total PFD	dBW/sq(m)	-92.89	-94.89	-92.89
Uplink:		**Clear sky**	**Uplink fade**	**Clear sky**
Transmit power	dBW	12.91	12.91	12.91
Transmit loss	dB	1.50	1.50	1.50
Transmit antenna gain	dBi	44.20	44.20	44.20
Uplink free space loss	dB	200.10	200.10	200.10
Atmospheric loss	dB	0.20	0.20	0.20
Rain loss	dB	0.00	2.00	0.00
Satellite G/T	dB/K	-6.00	-6.00	-6.00
Boltzmann's constant	dBW/K/Hz	-228.60	-228.60	-228.60
Noise bandwidth	dBHz	61.21	61.21	61.21
Uplink thermal C/N	dB	16.69	14.69	16.69
Cross-pol C/I	dB	27.00	25.00	27.00
Copol C/I	dB	27.00	25.00	27.00
Intersystem interference C/I	dB	15.88	13.88	15.88
Uplink total C/(N+I)	dB	12.90	10.90	12.90
Downlink:		**Clear sky**	**Clear sky**	**Downlink fade**
Transmit power at saturation	dBW	17.40	17.40	17.40
Total output backoff	dB	3.10	4.45	3.10
Transmit output loss	dB	1.40	1.40	1.40
Transmit antenna gain	dBi	23.20	23.20	23.20
Number of carriers	dB	15.00	15.00	15.00
EIRP per carrier	dBW	21.10	19.75	21.10
Downlink free space loss	dB	196.60	196.60	196.60
Atmosperic loss	dB	0.20	0.20	0.20
Rain degradation	dB	0.00	0.00	2.00
Earth terminal G/T	dB/K	21.10	21.10	21.10
Boltzmann's constant	dBW/K/Hz	228.60	228.60	228.60
Downlink thermal C/N	dB	12.79	11.44	10.79
Intermodulation C/I	dB	16.70	16.70	16.70
Cross-pol C/I	dB	27.00	25.66	27.00
Copol C/I	dB	27.00	25.66	27.00
Intersystem interference C/I	dB	15.88	14.53	15.88
Downlink total C/(N+I)	dB	9.84	8.74	8.71
Total link C/(N+I)	dB	8.09	6.68	7.31
Total link Eb/(No+Io)	dB	7.42	6.00	6.63
Margin	dB	1.42	0.00	0.63

Figure 7C. C-Band Link Budget for 45 Mb/s Transmission between 8 m Earth Stations

Link Analysis				
System parameters:	**Unit**	**Clear sky**	**Uplink Fade**	**Downlink Fade**
Uplink frequency	GHz	6.11	6.11	6.11
Data rate	kbps	45,000.00	45,000.00	45,000.00
Modulation		QPSK	QPSK	QPSK
FEC		Rate-3/4	Rate-3/4	Rate-3/4
Occupied bandwidth	kHz	36,000.00	36,000.00	36,000.00
Downlink frequency	GHz	3.89	3.89	3.89
Required overall link Eb/No	dB	7.50	7.50	7.50
Required overall link C/N	dB	8.47	8.47	8.47
Earth terminal antenna	m	8.00	8.00	8.00
Transponder bandwidth	MHz	36.00	36.00	36.00
SFD	dBW/sq(m)	-90.00	-90.00	-90.00
Total PFD	dBW/sq(m)	-93.98	-96.98	-93.98
Uplink:		**Clear sky**	**Uplink fade**	**Clear sky**
Transmit power	dBW	19.62	19.62	19.62
Transmit loss	dB	1.50	1.50	1.50
Transmit antenna gain	dBi	51.40	51.40	51.40
Uplink free space loss	dB	200.10	200.10	200.10
Atmospheric loss	dB	0.20	0.20	0.20
Rain loss	dB	0.00	3.00	0.00
Satellite G/T	dB/K	-6.00	-6.00	-6.00
Boltzmann's constant	dBW/K/Hz	-228.60	-228.60	-228.60
Noise bandwidth	dBHz	75.56	75.56	75.56
Uplink thermal C/N	dB	16.26	13.26	16.26
Cross-pol C/I	dB	27.00	24.00	27.00
Copol C/I	dB	27.00	24.00	27.00
Intersystem interference C/I	dB	17.67	14.67	17.67
Uplink total C/(N+I)	dB	13.49	10.49	13.49
Downlink:		**Clear sky**	**Clear sky**	**Downlink fade**
Transmit power at saturation	dBW	17.40	17.40	17.40
Total output backoff	dB	1.39	2.79	1.39
Transmit output loss	dB	1.40	1.40	1.40
Transmit antenna gain	dBi	23.20	23.20	23.20
Number of carriers	dB	0.00	0.00	0.00
EIRP per carrier	dBW	37.81	36.41	37.81
Downlink free space loss	dB	196.60	196.60	196.60
Atmosperic loss	dB	0.20	0.20	0.20
Rain degradation	dB	0.00	0.00	2.00
Earth terminal G/T	dB/K	28.20	28.20	28.20
Boltzmann's constant	dBW/K/Hz	228.60	228.60	228.60
Downlink thermal C/N	dB	22.24	20.85	20.24
Intermodulation C/I	dB	40.00	38.60	40.00
Cross-pol C/I	dB	27.00	25.60	27.00
Copol C/I	dB	27.00	25.60	27.00
Intersystem interference C/I	dB	17.67	16.27	17.67
Downlink total C/(N+I)	dB	15.66	14.26	15.14
Total link C/(N+I)	dB	11.43	8.97	11.23
Total link Eb/(No+Io)	dB	10.46	8.00	10.26
Margin	dB	2.96	0.50	2.76

Figure 8. C-Band Link Budget for 1/2-Transponder TV-FM Transmission from 10 m Uplink to 3.5 m Earth Stations

TV/FM LINK BUDGET		CLEAR SKY	UP-LINK FADE	DOWN-LINK FADE
UP-LINK				
EARTH STATION EIRP	(DBW)	82.7	82.7	82.7
PATH LOSS (CLEAR SKY)	(DB)	199.8	199.8	199.8
UP-LINK RAIN ATTENUATION	(DB)	0.0	2.0	0.0
SATURATION FLUX DENSITY	(DBW/M2)	-80.0	-80.0	-80.0
INPUT BACKOFF (TOTAL)	(DB)	0.0	2.0	0.0
INPUT BACKOFF (PER CARRIER)	(DB)	0.0	2.0	0.0
SATELLITE G/T	(DB/K)	-6.0	-6.0	-6.0
C/N - THERMAL NOISE	(DB)	32.1	30.1	32.1
C/I - COCHANNEL INTERFERRENCE	(DB)	27.0	25.0	27.0
C/I - ADJ. SATELLITE INTERFERENCE	(DB)	27.0	25.0	27.0
C/(N+I) UP-LINK	(DB)	23.4	21.4	23.4
DOWN-LINK	(DB)			
SATELLITE EIRP (TOTAL)	(DBW)	39.4	39.4	39.4
OUTPUT BACKOFF (TOTAL)	(DB)	0.0	0.3	0.0
OUTPUT BACKOFF (PER CARRIER)	(DB)	0.0	0.3	0.0
SATELLITE EIRP (PER CARRIER)	(DBW)	39.4	39.1	39.4
PATH LOSS (CLEAR SKY)	(DB)	196.2	196.2	196.2
DOWN-LINK RAIN DEGREDATION	(DB)	0.0	0.0	2.0
EARTH STATION POINTING ERROR	(DB)	0.5	0.5	0.5
EARTH STATION G/T (CLEAR-SKY)	(DB/K)	27.6	27.6	27.6
C/N THERMAL NOISE	(DB)	25.4	25.1	23.4
C/I - COCHANNEL INTERFERENCE	(DB)	27.0	26.7	27.0
C/I - ADJ. SATELLITE INTERFERENCE	(DB)	27.0	26.7	27.0
C/(N+I) DOWN-LINK	(DB)	21.6	21.3	20.7
C/(N+I) TOTAL	(DB)	19.4	18.3	18.8
REQUIRED SYSTEM MARGIN	(DB)	0.5	0.5	0.5
NET C/(N+I)	(DB)	18.9	17.8	18.3
NET C/(No+Io)	(DB-HZ)	92.3	91.3	91.7
VIDEO SIGNAL-TO-NOISE RATIO	(DB)	53.7	52.6	53.1
AUDIO SIGNAL-TO-NOISE RATIO	(DB)	65.0	63.9	64.4

E.S. RF POWER (WATTS/CARRIER)= 669.0

Figure 9A. Ku-Band Link Budget for 64 kb/s Transmission between 1.2 m Earth Stations

Link Analysis				
System parameters:	**Unit**	**Clear sky**	**Uplink Fade**	**Downlink Fade**
Uplink frequency	GHz	14.03	14.03	14.03
Data rate	kbps	64.00	64.00	64.00
Modulation		QPSK	QPSK	QPSK
FEC		Rate-1/2 RS	Rate-3/4 RS	Rate-3/4 RS
Occupied bandwidth	kHz	83.71	83.71	83.71
Downlink frequency	GHz	12.53	12.53	12.53
Required overall link Eb/No	dB	5.00	5.00	5.00
Required overall link C/N	dB	3.83	3.83	3.83
Earth terminal antenna	m	1.20	1.20	1.20
Transponder bandwidth	MHz	54.00	54.00	54.00
SFD	dBW/sq(m)	-86.00	-86.00	-86.00
Total PFD	dBW/sq(m)	-91.00	-95.00	-91.00
Uplink:		**Clear sky**	**Uplink fade**	**Clear sky**
Transmit power	dBW	4.00	4.00	4.00
Transmit loss	dB	1.00	1.00	1.00
Transmit antenna gain	dBi	42.80	42.80	42.80
Uplink free space loss	dB	207.10	207.10	207.10
Atmospheric loss	dB	0.50	0.50	0.50
Rain loss	dB	0.00	4.00	0.00
Satellite G/T	dB/K	1.50	1.50	1.50
Boltzmann's constant	dBW/K/Hz	-228.60	-228.60	-228.60
Noise bandwidth	dBHz	49.23	49.23	49.23
Uplink thermal C/N	dB	19.07	15.07	19.07
Cross-pol C/I	dB	24.00	20.00	24.00
Copol C/I	dB	24.00	20.00	24.00
Intersystem interference C/I	dB	13.03	9.03	13.03
Uplink total C/(N+I)	dB	11.54	7.54	11.54
Downlink:		**Clear sky**	**Clear sky**	**Downlink fade**
Transmit power at saturation	dBW	20.00	20.00	20.00
Total output backoff	dB	2.50	4.50	2.50
Transmit output loss	dB	2.50	2.50	2.50
Transmit antenna gain	dBi	29.80	29.80	29.80
Number of carriers	dB	27.00	27.00	27.00
EIRP per carrier	dBW	17.80	15.80	17.80
Downlink free space loss	dB	206.10	206.10	206.10
Atmosperic loss	dB	0.50	0.50	0.50
Rain degradation	dB	0.00	0.00	5.00
Earth terminal G/T	dB/K	20.60	20.60	20.60
Boltzmann's constant	dBW/K/Hz	228.60	228.60	228.60
Downlink thermal C/N	dB	11.17	9.17	6.17
Intermodulation C/I	dB	16.00	16.00	16.00
Cross-pol C/I	dB	24.00	22.00	24.00
Copol C/I	dB	24.00	22.00	24.00
Intersystem interference C/I	dB	13.03	11.03	13.03
Downlink total C/(N+I)	dB	7.98	6.24	4.89
Total link C/(N+I)	dB	6.40	3.83	4.04
Total link Eb/(No+Io)	dB	7.56	5.00	5.21
Margin	dB	2.56	0.00	0.21

Figure 9B. Ku-Band Link Budget for 1544 kb/s Transmission between 2.4 m Earth Stations

Link Analysis				
System parameters:	**Unit**	**Clear sky**	**Uplink Fade**	**Downlink Fade**
Uplink frequency	GHz	14.03	14.03	14.03
Data rate	kbps	1,544.00	1,544.00	1,544.00
Modulation		QPSK	QPSK	QPSK
FEC		Rate-3/4 RS	Rate-3/4 RS	Rate-3/4 RS
Occupied bandwidth	kHz	1,296.96	1,296.96	1,296.96
Downlink frequency	GHz	12.53	12.53	12.53
Required overall link Eb/No	dB	6.00	6.00	6.00
Required overall link C/N	dB	6.76	6.76	6.76
Earth terminal antenna	m	2.40	2.40	2.40
Transponder bandwidth	MHz	54.00	54.00	54.00
SFD	dBW/sq(m)	-82.00	-82.00	-82.00
Total PFD	dBW/sq(m)	-87.10	-91.10	-87.10
Uplink:		**Clear sky**	**Uplink fade**	**Clear sky**
Transmit power	dBW	14.30	14.30	14.30
Transmit loss	dB	1.50	1.50	1.50
Transmit antenna gain	dBi	48.90	48.90	48.90
Uplink free space loss	dB	207.10	207.10	207.10
Atmospheric loss	dB	0.50	0.50	0.50
Rain loss	dB	0.00	4.00	0.00
Satellite G/T	dB/K	1.50	1.50	1.50
Boltzmann's constant	dBW/K/Hz	-228.60	-228.60	-228.60
Noise bandwidth	dBHz	61.13	61.13	61.13
Uplink thermal C/N	dB	23.07	19.07	23.07
Cross-pol C/I	dB	24.00	20.00	24.00
Copol C/I	dB	24.00	20.00	24.00
Intersystem interference C/I	dB	15.96	11.96	15.96
Uplink total C/(N+I)	dB	14.17	10.17	14.17
Downlink:		**Clear sky**	**Clear sky**	**Downlink fade**
Transmit power at saturation	dBW	20.00	20.00	20.00
Total output backoff	dB	2.55	4.55	2.55
Transmit output loss	dB	2.50	2.50	2.50
Transmit antenna gain	dBi	29.80	29.80	29.80
Number of carriers	dB	15.00	15.00	15.00
EIRP per carrier	dBW	29.75	27.75	29.75
Downlink free space loss	dB	206.10	206.10	206.10
Atmosperic loss	dB	0.50	0.50	0.50
Rain degradation	dB	0.00	0.00	5.00
Earth terminal G/T	dB/K	25.50	25.50	25.50
Boltzmann's constant	dBW/K/Hz	228.60	228.60	228.60
Downlink thermal C/N	dB	16.12	14.12	11.12
Intermodulation C/I	dB	16.30	16.30	16.30
Cross-pol C/I	dB	24.00	22.00	24.00
Copol C/I	dB	24.00	22.00	24.00
Intersystem interference C/I	dB	15.96	13.96	15.96
Downlink total C/(N+I)	dB	10.90	9.39	8.73
Total link C/(N+I)	dB	9.23	6.76	7.64
Total link Eb/(No+Io)	dB	8.47	6.00	6.88
Margin	dB	2.47	0.00	0.88

Figure 9C. Ku-Band Link Budget for 60 Mb/s Transmission between 5.5 m Earth Stations

Link Analysis				
System parameters:	**Unit**	**Clear sky**	**Uplink Fade**	**Downlink Fade**
Uplink frequency	GHz	14.03	14.03	14.03
Data rate	kbps	60,000.00	60,000.00	60,000.00
Modulation		QPSK	QPSK	QPSK
FEC		Rate-3/4	Rate-3/4	Rate-3/4
Occupied bandwidth	kHz	50,400.00	50,400.00	50,400.00
Downlink frequency	GHz	12.53	12.53	12.53
Required overall link Eb/No	dB	7.50	7.50	7.50
Required overall link C/N	dB	8.26	8.26	8.26
Earth terminal antenna	m	5.50	5.50	5.50
Transponder bandwidth	MHz	54.00	54.00	54.00
SFD	dBW/sq(m)	-85.00	-85.00	-85.00
Total PFD	dBW/sq(m)	-87.30	-91.30	-87.30
Uplink:		**Clear sky**	**Uplink fade**	**Clear sky**
Transmit power	dBW	23.00	23.00	23.00
Transmit loss	dB	2.00	2.00	2.00
Transmit antenna gain	dBi	55.50	55.50	55.50
Uplink free space loss	dB	207.10	207.10	207.10
Atmospheric loss	dB	0.50	0.50	0.50
Rain loss	dB	0.00	4.00	0.00
Satellite G/T	dB/K	1.50	1.50	1.50
Boltzmann's constant	dBW/K/Hz	-228.60	-228.60	-228.60
Noise bandwidth	dBHz	77.02	77.02	77.02
Uplink thermal C/N	dB	21.98	17.98	21.98
Cross-pol C/I	dB	24.00	20.00	24.00
Copol C/I	dB	24.00	20.00	24.00
Intersystem interference C/I	dB	17.46	13.46	17.46
Uplink total C/(N+I)	dB	14.91	10.91	14.91
Downlink:		**Clear sky**	**Clear sky**	**Downlink fade**
Transmit power at saturation	dBW	20.00	20.00	20.00
Total output backoff	dB	0.92	3.15	0.92
Transmit output loss	dB	2.50	2.50	2.50
Transmit antenna gain	dBi	29.80	29.80	29.80
Number of carriers	dB	0.00	0.00	0.00
EIRP per carrier	dBW	46.38	44.15	46.38
Downlink free space loss	dB	206.10	206.10	206.10
Atmosperic loss	dB	0.50	0.50	0.50
Rain degradation	dB	0.00	0.00	5.00
Earth terminal G/T	dB/K	32.60	32.60	32.60
Boltzmann's constant	dBW/K/Hz	228.60	228.60	228.60
Downlink thermal C/N	dB	23.96	21.73	18.96
Intermodulation C/I	dB	40.00	37.77	40.00
Cross-pol C/I	dB	24.00	21.77	24.00
Copol C/I	dB	24.00	21.77	24.00
Intersystem interference C/I	dB	17.46	15.23	17.46
Downlink total C/(N+I)	dB	15.22	12.99	14.12
Total link C/(N+I)	dB	12.05	8.82	11.49
Total link Eb/(No+Io)	dB	11.30	8.06	10.73
Margin	dB	3.80	0.56	3.23

Figure 10. Ku-Band Link Budget for 26 MHz-Transponder TV-FM Transmission from 5.5 m Uplink to 3.5 m Earth Stations

TV/FM LINK BUDGET		CLEAR SKY	UP-LINK FADE	DOWN-LINK FADE
UP-LINK				
EARTH STATION EIRP	(DBW)	75.8	75.8	75.8
PATH LOSS (CLEAR SKY)	(DB)	207.5	207.5	207.5
UP-LINK RAIN ATTENUATION	(DB)	0.0	3.0	0.0
SATURATION FLUX DENSITY	(DBW/M2)	-84.3	-84.3	-84.3
INPUT BACKOFF (TOTAL)	(DB)	0.0	1.3	0.0
INPUT BACKOFF (PER CARRIER)	(DB)	3.0	6.1	3.0
SATELLITE G/T	(DB/K)	0.0	0.0	0.0
C/N - THERMAL NOISE	(DB)	22.7	19.7	22.7
C/I - COCHANNEL INTERFERRENCE	(DB)	24.0	21.0	24.0
C/I - ADJ. SATELLITE INTERFERENCE	(DB)	20.7	17.7	20.7
C/(N+I) UP-LINK	(DB)	17.5	14.4	17.5
DOWN-LINK	(DB)			
SATELLITE EIRP (TOTAL)	(DBW)	48.0	48.0	48.0
OUTPUT BACKOFF (TOTAL)	(DB)	1.3	1.6	1.3
OUTPUT BACKOFF (PER CARRIER)	(DB)	4.3	6.4	4.3
SATELLITE EIRP (PER CARRIER)	(DBW)	43.7	41.6	43.7
PATH LOSS (CLEAR SKY)	(DB)	205.9	205.9	205.9
DOWN-LINK RAIN DEGREDATION	(DB)	0.0	0.0	2.1
EARTH STATION POINTING ERROR	(DB)	0.5	0.5	0.5
EARTH STATION G/T (CLEAR-SKY)	(DB/K)	29.3	29.3	29.3
C/N THERMAL NOISE	(DB)	21.0	19.0	18.9
C/I - COCHANNEL INTERFERENCE	(DB)	24.0	21.9	24.0
C/I - ADJ. SATELLITE INTERFERENCE	(DB)	20.7	18.6	20.7
C/(N+I) DOWN-LINK	(DB)	16.9	14.8	16.0
C/(N+I) TOTAL	(DB)	14.2	11.6	13.6
REQUIRED SYSTEM MARGIN	(DB)	1.0	1.0	1.0
NET C/(N+I)	(DB)	13.2	10.6	12.6
NET C/(No+Io)	(DB-HZ)	87.3	84.8	86.8
VIDEO SIGNAL-TO-NOISE RATIO	(DB)	49.8	47.3	49.3
AUDIO SIGNAL-TO-NOISE RATIO	(DB)	60.0	57.4	59.4

E.S. RF POWER (WATTS/CARRIER) = 78.6

13. Station Keeping and Antenna Pointing Accuracy

The satellite will be station-kept with excursions not to exceed ±0.05° East-West and North-South of the nominal orbital location during the normal in-orbit operation throughout the spacecraft life.

14. Power Flux Density and Energy Dispersal Considerations

The highest satellite EIRP at the beam peak is 45.4 dBW in C-band. The corresponding power flux density (PFD) in any 4 kHz at the Earth's surface is:

$$PFD = 45.4 \text{ dBW} - 163.2 \text{ dB} + 10*\log(4/36000)$$
$$= -157.3 \text{ dBW/m}^2 \text{ in any 4 kHz.}$$

This PFD value is below the Power Flux Density Limit defined in FCC's FCR Section 25.208 and the ITU Radio Regulations 2566, which is -152 dBW/m^2 in any 4 kHz for angles of arrival between 0 and 5 degrees above the horizontal plane.

For 54-Mhz Ku-band transponders, the peak EIRP of the satellite downlink beam is maximum at 55.8 dBW in Europe for elevation angles larger than 10 degrees. The corresponding PFD limit in any 4 kHz bandwidth is -148.7 dBW/ m^2 at the earth's surface, which is below the PFD limit defined in the RR 2570 as follows:

$PFD = -150 + 0.5(\delta - 5) = -147.5$ dBW/ m^2 in any 4kHz band for angles of arrival δ 10 degrees above the horizontal plane.

For analog TV-FM transmissions, energy dispersal with peak-to-peak frequency deviation of 2 Mhz to 2.5 Mhz will be used. The sweep frequency of the energy dispersal waveform will be in accordance with the selected TV standard, i.e., 25 or 30 Hz triangular waveform superimposed on the baseband video waveform. In the case of analog TV transmission, compliance with the PFD limits will be ensured with necessary output backoff from saturation.

15. Frequency Tolerance

The accuracy of the frequency conversion between uplink and downlink transmissions is determined by the on-board local oscillator frequency stability. The frequency conversion error in C-band or Ku-band will not exceed ±5 in 10^6 under all circumstances throughout the in-orbit life.

16. Cessation of Emissions

Any one of the transponders can be individually turned on and off by ground command to enable cessation of emission from the satellite as required.

17. Interference Analysis

There are adjacent C/Ku-band satellites which are 3° away from 37.5° W, such as INTELSAT 319.5° E and INTELSAT 325.5° E. It will be necessary to coordinate with these satellites.

The Orion satellite networks are designed to be compatible with orbital spacing requirements for 2° typical. All earth stations accessing the satellite will meet the requisite antenna sidelobe performance standards of 29-25log(θ) dBi for co-pol and 19-25log(θ) dBi for cross-pol.

Interference assessment for representative transmission parameters indicates that there will be no serious interference problem between the Orion satellite network and other adjacent satellite networks at 3° orbital separation.

17.1 C-Band Interference Assessment

Tables 8A and 8B show the interference assessment for C-band single entry interferences between the Orion network and adjacent satellite networks which are separated by at least 3°.

Table 8A. C-band Interference into Orion Network

Uplink Interference:		
Interfering carrier	Digital MCPC	Analog TV-FM
Bandwidth	35.8 MHz	2 Mhz (EDS)
Power flux density (dBW/m^2)	-84	-84
Transmit antenna (m)	5	15
Sidelobe isolation (dB) for 3° spacing	30.6	39.9
Interferer spectral power flux density ($dBW/m^2/Hz$)	-190.1	-186.9
Orion carrier	SCPC	MCPC
Bandwidth	64 kHz	36 MHz
Power flux density (dBW/m^2)	-117.3	-94
Spectral power flux density ($dBW/m^2/Hz$)	-165.4	-169.5
Orion uplink C/I (dB)	24.7	17.4
Downlink Interference:		
Interfering carrier	Digital MCPC	Analog TV-FM
Carrier EIRP (dBW/carrier)	37	37

Sidelobe discrimination (dB)	20.7*	30.9**
Interferer spectral power density (dBW/Hz)	-59.2	-56.9
Orion carrier	SCPC 64 kb/s	Digital MCPC 36 MHz
Carrier EIRP (dBW/carrier)	8.4	31.7
Spectral power density (dBW/Hz)	-39.6	-43.9
Orion downlink C/I (dB)	19.6	13.0

Notes: * for 2.4 m, ** for 8 m receive terminals

Table 8B. C-Band Interference into Adjacent Satellite Network

Uplink Interference:		
Orion carrier	Digital SCPC	TV-FM
Bandwidth	64 kHz	2 Mhz (EDS)
Power flux density (dBW/m^2)	-113	-80
Transmit antenna (m)	2.4	10
Sidelobe discrimination (dB)	23.9	36.2
Interferer spectral power flux density ($dBW/m^2/Hz$)	-184.9	-179.2
Adjacent satellite carrier	SCPC	SCPC
Bandwidth	64 kHz	64 kHz
Power flux density (dBW/m^2)	-117.0	-117.0
Spectral power flux density ($dBW/m^2/Hz$)	-165.1	-165.1
Adjacent satellite uplink C/I (dB)	19.8	14.1
Downlink interference:		
Orion carrier	Digital SCPC	TV-FM
Carrier EIRP (dBW/carrier)	11.4	40.9
Sidelobe discrimination (dB)	20.7*	30.9**
Spectral power density (dBW/Hz)	-57.4	-53.0
Adjacent satellite carrier	SCPC	SCPC
Carrier EIRP (dBW/carrier)	10.4	10.4
Interferer spectral power density (dBW/Hz)	-37.7	-37.7
Adjacent satellite downlink C/I (dB)	19.7	15.3

Notes: * for 2.4 m, ** for 8 m receive terminals

The results in Table 8A and 8B show that the worst-case C/I ratio for the case of TV-FM signal interfering into small 64 kb/s SCPC is in the range of 13 to 15 dB. By using picture modulation of the TV-FM carrier at all times, the C/I margin can be improved by about 5 dB. Since the digital transmission performance can be met with Eb/No of 5-8 dB, depending on the FEC rates employed, the intersystem interferences do not introduce any appreciable degradation in the link performance for both uplink and downlink.

17.2 Ku-Band Interference Assessment

Tables 9A and 9B show the interference assessment for Ku-band single entry interferences between the Orion network and adjacent satellite networks.

Table 9A. Ku-band Interference into Orion Network

Uplink Interference:		
Interfering carrier	Digital MCPC	Analog TV-FM
Bandwidth	43.8 MHz	2 Mhz (EDS)
Power flux density (dBW/m^2)	-80.1	-79
Transmit antenna (m)	3.5	15
Sidelobe isolation (dB) for 3° spacing	35.1	47.2
Interferer spectral power flux density ($dBW/m^2/Hz$)	-191.6	-189.2
Orion carrier	SCPC	MCPC
Bandwidth	64 kHz	50.4 MHz
Power flux density (dBW/m^2)	-118	-87.3
Spectral power flux density ($dBW/m^2/Hz$)	-166.1	-164.3
Orion uplink C/I (dB)	25.5	24.9
Downlink Interference:		
Interfering carrier	Digital MCPC	Analog TV-FM
Carrier EIRP (dBW/carrier)	43	43.7
Sidelobe discrimination (dB)	23.9*	37.1**
Interferer spectral power density (dBW/Hz)	-57.3	-54.0
Orion carrier	SCPC 64 kb/s	Digital MCPC 50 MHz
Carrier EIRP (dBW/carrier)	17.8	46.4
Spectral power density (dBW/Hz)	-30.2	-30.5
Orion downlink C/I (dB)	27.1	23.5

Notes: * for 1.2 m, ** for 5.5 m receive terminals

Table 9B. Ku-Band Interference into Adjacent Satellite Network

Uplink Interference:		
Orion carrier	Digital SCPC	26 Mhz TV-FM
Bandwidth	64 kHz	2 Mhz (EDS)
Power flux density (dBW/m^2)	-112	-81.3
Transmit antenna (m)	1.8	5.5
Sidelobe discrimination (dB)	28.9	38.5
Interferer spectral power flux density (dBW/m^2 /Hz)	-188.9	-182.8
Adjacent satellite carrier	SCPC	SCPC
Bandwidth	64 kHz	64 kHz
Power flux density (dBW/m^2)	-114.0	-114.0
Spectral power flux density (dBW/m^2 /Hz)	-162.1	-162.1
Adjacent satellite uplink C/I (dB)	26.8	20.7
Downlink interference:		
Orion carrier	Digital SCPC	TV-FM
Carrier EIRP (dBW/carrier)	17.8	43.7
Sidelobe discrimination (dB)	27.4*	33.4**
Spectral power density (dBW/Hz)	-57.6	-52.7
Adjacent satellite carrier	SCPC	SCPC
Carrier EIRP (dBW/carrier)	10.8	10.8
Interferer spectral power density (dBW/Hz)	-37.3	-37.3
Adjacent satellite downlink C/I (dB)	20.3	15.4

Notes: * for 1.8 m, ** for 3.5 m receive terminals

The results in Table 9A and 9B show that the worst-case C/I ratio is 15.4 dB for the case of analog TV interfering into 64 kb/s SCPC. By picture modulating the TV-FM carrier at all times, the C/I margin can be improved by about 5 dB. Hence, the result indicates that there will be no serious interference problem with the adjacent satellite networks.

18. TT&C Arrangement

The existing Ku-band TT&C facility at Mt. Jackson in Virginia and Satellite Control Facility in Rockville, Maryland will be used with upgrades.

19. Spacecraft Characteristics

The major characteristics of the spacecraft are given in the table below.

Characteristics of Orion Satellite

Parameter	Characteristics
Spacecraft stabilization:	
Transfer Orbit	3-axis stabilized
On-station	3-axis stabilized
Mission life	15 years
Reliability:	75% of achieving full performance at end of life
Station keeping accuracy	±0.05° E-W and N-S
Antenna pointing accuracy	±0.05° normal
	±0.1° during station keeping maneuver
Eclipse capability	100%
Mass summary:	
Spacecraft dry mass	1950 kg
Propellant	2450 kg
Launch mass	4400 kg
Power summary:	
Spacecraft requirement	10830 W
Solar Array at EOL	11100 W
Solar Array at BOL	13000 W
Dimension:	
Spacecraft platform	Approx. 2.2 m x 2.2 m x 2.4 m
Solar array wing span	Approx. 26 m

A detailed breakdown of the satellite's mass and power budgets are given in the tables below.

Spacecraft Mass Budget Summary

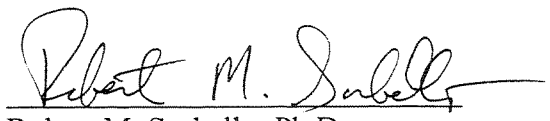
Parameter	Mass
Spacecraft dry mass:	1950 kg
Communications payload	550 kg
TT&C	50 kg
AOCS	130 kg
Structure	250 kg
Mechanism	115 kg
Propulsion	160 kg
Power (Solar array and batteries	495 kg
Thermal	125 kg
Others	75 kg
Propellant and pressurant	2450 kg
Total mass:	4400 kg

Spacecraft Power Budget Summary

Parameter	Power
Subsystem:	
Communication payload	9500 W
TT&C	100 W
Attitude & orbit control	110 W
Thermal (Equinox)	350 W
Battery charging	650 W
Other	120 W
Total requirement:	10830 W
Solar array power capability:	
Beginning-of-life (BOL)	13000 W
End-of-life (EOL)	11100 W
Margin at EOL:	270 W

Engineering Certification

I hereby certify that I am the technically qualified person responsible for the preparation of the engineering information contained in the Technical Exhibit of this Application, that I am familiar with Part 25 of the Commission's rules, and that the technical information is complete and accurate to the best of my knowledge.



Robert M. Sorbello, Ph.D.
Executive Director
Systems Engineering
Loral Orion Network Systems, Inc.

EXHIBIT 2

Exhibit No. 2

ESTIMATED CAPITAL REQUIREMENTS

Description	Estimated Costs
Spacecraft, launch and insurance*	$240 million
TT&C Construction**	$1 million
Operations (1st year)	$10 million

* Orion intends to use turnkey arrangements which result in a single, integrated price from the principal spacecraft and launch vendors.

** Upgrade of existing TT&C facilities

EXHIBIT 3

ITEM 8.

REPORT OF INDEPENDENT AUDITORS

The Board of Directors
Orion Network Systems, Inc.

We have audited the accompanying consolidated balance sheets of Orion Network Systems, Inc. as of December 31, 1997 and 1996, and the related consolidated statements of operations, changes in stockholders' equity (deficit), and cash flows for each of the three years in the period ended December 31, 1997. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the consolidated financial position of Orion Network Systems, Inc. at December 31, 1997 and 1996, and the consolidated results of its operations and its cash flows for each of the three years in the period ended December 31, 1997, in conformity with generally accepted accounting principles.

/s/ ERNST & YOUNG LLP

Washington, DC
February 20, 1998

ORION NETWORK SYSTEMS, INC.
CONSOLIDATED BALANCE SHEETS

	December 31, 1997	December 31, 1996
ASSETS		
Current assets:		
Cash and cash equivalents	$ 70,008,657	$ 32,187,807
Restricted assets	50,064,014	—
Accounts receivable (less allowance for doubtful accounts of $734,000 and $100,000 at December 31, 1997 and 1996, respectively)	11,780,972	6,473,316
Prepaid expenses and other current assets	6,846,598	3,583,403
Total current assets	138,700,241	42,244,526
Restricted and segregated assets	306,825,961	10,000,000
Property and equipment, at cost:		
Land	73,911	73,911
Telecommunications equipment	40,654,418	25,342,528
Furniture and computer equipment	8,626,501	4,849,711
Satellite and related equipment	322,159,088	321,247,346
	371,513,918	351,513,496
Less: accumulated depreciation	(77,079,857)	(68,224,957)
Satellite construction in progress	106,843,174	4,560,844
Net property and equipment	401,277,235	287,849,383
Deferred financing costs, net	22,510,041	12,918,233
Other assets, net	27,178,809	5,252,302
Total assets	$896,492,287	$358,264,444

See Notes to Consolidated Financial Statements.

ORION NETWORK SYSTEMS, INC.
CONSOLIDATED BALANCE SHEETS (CONTINUED)

	December 31, 1997	December 31, 1996
Liabilities and Stockholders' deficit		
Current liabilities:		
Accounts payable	$ 5,230,567	$ 6,411,028
Accrued liabilities	10,594,952	7,653,208
Other current liabilities	7,129,861	5,406,072
Interest payable	24,771,509	8,583,882
Current portion of long-term debt	6,406,143	34,975,060
Total current liabilities	54,133,032	63,029,250
Long-term debt	790,670,606	218,236,839
Other liabilities	21,803,582	46,402,299
Limited Partners' interest in Orion Atlantic	—	10,130,058
Commitments and contingencies		
Redeemable preferred stock:		
Series A 8% Cumulative Redeemable Convertible Preferred Stock, $.01 par value; 15,000 shares authorized; 6,933 and 13,871 shares issued and outstanding at December 31, 1997 and 1996, respectively, plus accrued dividends	8,613,508	16,097,880
Series B 8% Cumulative Redeemable Convertible Preferred Stock, $.01 par value; 5,000 shares authorized; 2,059 and 4,298 shares issued and outstanding at December 31, 1997 and 1996, respectively, plus accrued dividends	2,466,755	4,804,486
Series C 6% Cumulative Redeemable Convertible Preferred Stock, $.01 par value; 150,000 shares authorized; 82,641 and 0 shares issued and outstanding at December 31, 1997 and 1996, respectively, plus accrued dividends and accretion	65,653,949	—
Stockholders' deficit:		
Common stock, $.01 par value; 40,000,000 shares authorized; 15,959,089 and 11,244,665 issued and outstanding at December 31, 1997 and 1996, respectively	159,591	112,447
Capital in excess of par value	153,294,210	86,932,391
Treasury stock, 269,274 and 259,515 shares	(91,490)	—
Foreign currency translation adjustment	(955,800)	—
Accumulated deficit	(199,255,656)	(87,481,206)
Total stockholders' deficit	(46,849,145)	(436,368)
Total liabilities and stockholders' deficit	$ 896,492,287	$358,264,444

See Notes to Consolidated Financial Statements.

ORION NETWORK SYSTEMS, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS

	Year Ended December 31,		
	1997	1996	1995
Service revenue	$ 72,740,631	$ 41,847,292	$ 22,283,882
Operating expenses:			
Direct	26,531,298	15,457,260	16,968,926
Sales and marketing	19,423,372	11,465,040	8,613,399
Engineering and technical services	7,750,208	5,190,619	5,554,690
General and administrative	13,955,718	9,138,973	6,574,202
Depreciation and amortization	48,161,257	36,948,158	31,403,376
Total operating expenses	115,821,853	78,200,050	69,114,593
Loss from operations	(43,081,222)	(36,352,758)	(46,830,711)
Other expense (income):			
Interest income	(24,711,461)	(2,313,842)	(1,924,822)
Interest expense	83,769,168	27,764,126	24,738,446
Other	507,089	23,649	3,382,506
Total other expense, net	59,564,796	25,473,933	26,196,130
Loss before extraordinary loss on extinguishment of debt, minority interest and preacquisition loss of acquired subsidiary	(102,646,018)	(61,826,691)	(73,026,841)
Extraordinary loss on extinguishment of debt	(15,763,220)	—	—
Limited Partners' interest in the net loss of Orion Atlantic	12,042,978	34,631,281	46,111,663
Preacquisition loss of acquired subsidiary	626,246	—	—
Net loss	(105,740,014)	(27,195,410)	(26,915,178)
Preferred stock dividend, net of forfeitures	6,034,436	1,369,665	1,329,007
Net loss attributable to common stockholders	$(111,774,450)	$(28,565,075)	$(28,244,185)
Extraordinary loss per share, net of minority interest — basic and diluted	$ (.56)	$ —	$ —
Net loss per common share-basic and diluted	$ (9.60)	$ (2.62)	$ (3.07)
Weighted average common shares outstanding	11,639,711	10,951,823	9,103,505

See Notes to Consolidated Financial Statements.

ORION NETWORK SYSTEMS, INC.
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY (DEFICIT)

	Common Stock		Capital in Excess of Par Value	Accumulated Deficit	Treasury Stock[1]	Foreign Currency Translation	Total Stockholders' Equity (Deficit)
	Number of Shares	Amount					
Balance at December 31, 1994	7,045,523	$ 70,455	$ 33,952,062	$ (30,671,946)	$ —	$ —	$ 3,350,571
Issuance of common stock	4,002,941	40,030	50,960,330	—	—	—	51,000,360
Exercise of stock options and warrants	67,501	675	573,221	—	—	—	573,896
Preferred stock dividend, net of forfeitures	—	—	—	(1,329,007)	—	—	(1,329,007)
Net loss for 1995	—	—	—	(26,915,178)	—	—	(26,915,178)
Balance at December 31, 1995	11,115,965	111,160	85,485,613	(58,916,131)	—	—	26,680,642
Conversion of preferred stock to common stock	91,071	911	804,034	—	—	—	804,945
Issuance of stock warrants	—	—	300,000	—	—	—	300,000
Exercise of stock options and warrants	37,629	376	342,744	—	—	—	343,120
Preferred stock dividend, net of forfeitures	—	—	—	(1,369,665)	—	—	(1,369,665)
Net loss for 1996	—	—	—	(27,195,410)	—	—	(27,195,410)
Balance at December 31, 1996	11,244,665	112,447	86,932,391	(87,481,206)	—	—	(436,368)
Issuance of common stock	11,286	113	142,317	—	—	—	142,430
Conversion of preferred stock to common stock	3,351,728	33,517	38,811,976	—	—	—	38,845,493
Conversion of debentures to common stock	735,292	7,353	10,284,314	—	—	—	10,291,667
Issuance of common stock for the purchase of APSC	85,715	857	1,199,143	—	—	—	1,200,000
Issuance of common stock for interest payments	205,229	2,052	2,622,947	—	—	—	2,624,999
Issuance of common stock for preferred stock dividend payments	120,954	1,210	2,069,252	—	—	—	2,070,462
Issuance of warrants relating to Senior Notes and Senior Discount Notes, net	—	—	9,223,674	—	—	—	9,223,674
Exercise of stock options and warrants	176,489	1,765	1,764,295	—	—	—	1,766,060
Employee stock purchase plan	27,731	277	243,901	—	—	—	244,178
Preferred stock dividend and accretion, net of forfeitures	—	—	—	(6,034,436)	—	—	(6,034,436)
Foreign currency translation	—	—	—	—	—	(955,800)	(955,800)
Purchase of treasury stock	—	—	—	—	(91,490)	—	(91,490)
Net loss for 1997	—	—	—	(105,740,014)	—	—	(105,740,014)
Balance at December 31, 1997	15,959,089	$159,591	$153,294,210	$(199,255,656)	$(91,490)	$(955,800)	$ (46,849,145)

[1] Includes 269,274 treasury shares of which 259,515 are carried at no cost.

See Notes to Consolidated Financial Statements.

ORION NETWORK SYSTEMS, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year Ended December 31,		
	1997	1996	1995
Operating Activities			
Net loss	$(105,740,014)	$(27,195,410)	$(26,915,178)
Adjustments to reconcile net loss to net cash used in operating activities:			
Extraordinary loss on extinguishment of debt	15,763,220	—	
Depreciation and amortization	48,161,257	36,948,158	31,403,376
Amortization of deferred financing costs	2,409,787	2,130,588	2,130,588
Provision for bad debts	1,021,618	919,453	277,529
Accretion of interest	34,347,467	2,371,506	5,185,834
Interest earned on restricted assets	(18,203,066)	—	—
Limited Partners' interest in the net loss of Orion Atlantic and other minority interest	(12,042,978)	(34,631,281)	(46,089,010)
Gain on sale of assets	—	(54,738)	(59,301)
Changes in operating assets and liabilities:			
Accounts receivable	(2,922,508)	(2,203,171)	(4,915,257)
Prepaid expenses and other current assets	(2,277,177)	(285,895)	(3,147,592)
Other assets	(3,639,941)	(69,708)	(519,773)
Accounts payable and accrued liabilities	(2,639,393)	(3,621,847)	7,327,377
Other current liabilities	1,543,035	3,298,544	3,670,988
Interest payable	16,180,273	578,803	(885,106)
Net cash used in operating activities	(28,038,420)	(21,814,998)	(32,535,525)
Investing Activities			
Capital expenditures	(11,062,046)	(12,625,444)	(8,549,799)
Increase in restricted and segregated assets	(419,187,388)	(10,000,000)	—
Release of restricted and segregated assets	90,500,480	—	—
Satellite construction costs, including capitalized interest	(102,282,330)	(3,750,231)	(510,613)
Advance on DACOM contract, net	12,250,000	9,900,000	
Refund from satellite manufacturer	—	—	2,750,000
Purchase of Teleport Europe, net of cash acquired	(8,374,845)	—	—
Other	—	(37,865)	(558,817)
Net cash used in investing activities	(438,156,129)	(16,513,540)	(6,869,229)
Financing Activities			
Limited Partners' capital contributions	—	30,135,000	7,600,000
Redemption of Limited Partner interest	—	—	(4,450,000)
Debt and equity financing costs	(26,122,220)	(2,265,291)	—
Proceeds from issuance of redeemable preferred stock.	—	—	4,483,001
Proceeds from issuance of common stock, net of issuance costs	2,152,668	343,120	51,974,436
Treasury stock purchase	(91,490)	—	—
PPU borrowings	—	—	2,275,000
Proceeds from issuance of debt	770,397,000	—	—
Proceeds from senior notes payable banks and notes payable	—	—	18,918,984
Repayment of senior notes payable to banks and notes payable	(216,723,484)	(27,802,281)	(14,385,015)
Swap termination fee	(5,287,827)	—	—
Payment of satellite incentives	(18,620,886)	—	—
Other	(1,688,362)	14,994,212	16,881,102
Net cash provided by financing activities	504,015,339	15,404,760	83,297,508
Net increase (decrease) in cash and cash equivalents	37,820,850	(22,923,778)	43,892,754
Cash and cash equivalents at beginning of period	32,187,807	55,111,585	11,218,831
Cash and cash equivalents at end of period	$ 70,008,657	$ 32,187,807	$ 55,111,585

See Notes to Consolidated Financial Statements.

1. Organization.

Orion Network Systems, Inc.'s ("Orion" or the "Company") principal business is the provision of satellite communications for private communications networks and video distribution and other satellite transmission services. From its inception in 1982 through January 20, 1995, when Orion 1 commenced commercial operations, Orion was a development stage enterprise. Prior to January 1995, Orion's efforts were devoted primarily to monitoring the construction, launch and in-orbit testing of Orion 1, product development, marketing and sales of interim private communications network services, raising financing and planning Orion 2 and Orion 3.

Through January 31, 1997, Orion Satellite Corporation (whose name has been changed to Orion Network Services, Inc.) was the sole general partner in Orion Atlantic L.P. ("Orion Atlantic") and had a 41 2/3% equity interest in Orion Atlantic. As a result of Orion's control of Orion Atlantic, Orion's consolidated financial statements include the accounts of Orion Atlantic. All of Orion Atlantic's revenues and expenses are included in Orion's consolidated financial statements, with appropriate adjustment to reflect the interests of the Limited Partners in Orion Atlantic's losses prior to the Exchange as described below. Orion acquired all the remaining interests in Orion Atlantic on January 31, 1997 during the Exchange as described below. Orion's consolidated financial statements also include the accounts of all other subsidiaries of Orion.

All subsidiaries of Orion ("Subsidiary Guarantors"), other than inconsequential subsidiaries, have unconditionally guaranteed the Notes (as defined below) on a joint and several basis. No restrictions exist on the ability of Subsidiary Guarantors to pay dividends or make other distributions to Orion, except to the extent provided by law generally (e.g., adequate capital to pay dividends under state corporate laws).

Subsidiary Name	Jurisdiction of Organization or Incorporation
Asia Pacific Space and Communications, Ltd.	Delaware
International Private Satellite Partners, L.P. (doing business as Orion Atlantic, L.P.)	Delaware
Orion Network Systems-Asia Pacific, Inc. (formerly known as Orion Asia Pacific Corporation)	Delaware
Orion Network Systems-Europe, Inc. (formerly known as Orion Atlantic Europe, Inc.)	Delaware
Orion Oldco Services, Inc. (formerly known as Orion Network Systems, Inc.)	Delaware
OrionNet Finance Corporation	Delaware
OrionNet, Inc.	Delaware
Orion Network Services, Inc. (formerly known as Orion Satellite Corporation)	Delaware
Orion Network Systems-Europe GmbH (formerly known as Teleport Europe GmbH)	Federal Republic of Germany

Each of the Subsidiary Guarantors is a wholly owned subsidiary of the Company. The Subsidiary Guarantors comprise all of the direct and indirect subsidiaries of the Company (other than inconsequential subsidiaries).

Separate financial statements of the Subsidiary Guarantors are not presented because (a) such Subsidiary Guarantors have jointly and severally guaranteed the Notes on a full and unconditional basis, (b) the aggregate assets, liabilities, earnings and equity of the Subsidiary Guarantors are substantially equivalent to the assets, liabilities, earnings and equity of the Company on a consolidated basis and (c) management has determined that such information is not material to investors.

1. Organization. – *(Continued)*

In January 1997, Orion consummated a series of transactions that are described below.

Acquisition of Orion Atlantic Limited Partnership Interests in the Exchange

On January 31, 1997, the Company acquired all of the limited partnership interests which it did not already own in the Company's operating subsidiary, Orion Atlantic, that owns the Orion 1 satellite. Specifically, the Company acquired the Orion Atlantic limited partnership interests and other rights relating thereto held by British Aerospace Communications, Inc., COM DEV Satellite Communications Limited, Kingston Communications International Limited, Lockheed Martin Commercial Launch Services, Inc., MCN Sat US, Inc., an affiliate of Matra Hachette, and Trans-Atlantic Satellite, Inc., an affiliate of Nissho Iwai Corp. (collectively, the "Exchanging Partners"). The Company accounted for this transaction as an acquisition of minority interest, and as a result, approximately $34.3 million was allocated to the cost of the Orion 1 satellite and related equipment.

Pursuant to a Section 351 Exchange Agreement and Plan of Conversion (the "Exchange Agreement"), the Exchanging Partners exchanged (the "Exchange") their Orion Atlantic limited partnership interests for 123,172 shares of a newly created class of the Company's Series C 6% Cumulative Convertible Redeemable Preferred Stock (the "Series C Preferred Stock"). In addition, the Company acquired certain rights held by certain of the Exchanging Partners' to receive repayment of various advances (aggregating approximately $41.6 million at January 31, 1997). The 123,172 shares of Series C Preferred Stock issued in the Exchange are convertible into approximately 7 million shares of the Company's Common Stock. As a result of the Exchange, certain of the Exchanging Partners became principal stockholders of the Company.

The Merger

The Exchange was conducted on a tax-free basis by means of a Merger (defined below) that was consummated on January 31, 1997. Pursuant to the Exchange Agreement, Orion Oldco Services, Inc., formerly known as Orion Network Systems, Inc. ("Old Orion"), formed the Company as a new Delaware corporation with a certificate of incorporation, bylaws and capital structure substantially identical in all material respects with those of Old Orion. Also pursuant to the Exchange Agreement, the Company formed a wholly owned subsidiary, Orion Merger Company, Inc. ("Orion Merger Subsidiary"). Pursuant to an Agreement and Plan of Merger, Orion Merger Subsidiary was merged with and into Old Orion, and Old Orion became a wholly owned subsidiary of the Company (the "Merger"). On January 31, 1997, the effective time of the Merger, all of the stockholders of Old Orion received stock in the Company with substantially identical rights to the Old Orion stock they held prior to the effective time of the Merger. Following the Merger, the Company changed its name from Orion Newco Services, Inc. to Orion Network Systems, Inc. and the Company's wholly owned subsidiary, Orion Network Systems, Inc. , changed its name to Orion Oldco Services, Inc.

Financings

On January 31, 1997, the Company completed a $710 million bond offering (the "Bond Offering") comprised of approximately $445 million of Senior Note Units, each of which consists of one 11.25% Senior Note due 2007 (a "Senior Note") and one Warrant to purchase 0.8463 shares of common stock, par value $.01 per share ("Common Stock") of the Company (a "Senior Note Warrant"), and approximately $265.4 million of Senior Discount Note Units, each of which consists of one 12.5% Senior Discount Note due 2007 (a "Senior Discount Note," and together with the Senior Notes, the "Notes") and one Warrant to purchase 0.6628 shares of Common Stock of the Company (a "Senior Discount Note Warrant, and together with the Senior Note Warrants, the "Warrants"). Interest on the Senior Notes is payable semi-annually in cash on January 15 and July 15 of each year, commencing July 15,

1. Organization. – *(Continued)*

1997. The Senior Discount Notes do not pay cash interest prior to January 15, 2002. Thereafter, cash interest will accrue until maturity at an annual rate of 12.5% payable semi annually on January 15 and July 15 of each year, commencing July 15, 2002. The exercise price of the Warrants is $.01 per share of Common Stock of the Company. There were 697,400 Warrants issued in connection with the Notes (See Note 6).

On January 31, 1997, the Company also completed the sale of $60 million of its convertible junior subordinated debentures (the "Convertible Debentures") to two investors, British Aerospace Holdings, Inc. ("British Aerospace") and Matra Marconi Space UK Limited ("Matra Marconi Space"). British Aerospace purchased $50 million of the Convertible Debentures and Matra Marconi Space purchased $10 million of the Convertible Debentures (collectively, the "Convertible Debentures Offering," and together with the Bond Offering, the "Financings"). The Convertible Debentures mature in 2012, and bear interest at a rate of 8.75% per annum payable semi-annually in arrears solely in Common Stock of the Company. The Convertible Debentures are subordinated to all other indebtedness of the Company, including the Notes.

The net proceeds of the Bond Offering and Convertible Debentures Offering were used by the Company to repay the Orion 1 Credit Facility, pre-fund the first three years of interest payments on certain of the Notes, and will be used to build and launch two additional satellites, Orion 2 and Orion 3.

Acquisition of Teleport Europe

On March 26, 1997, Orion acquired German-based Teleport Europe GmbH (now known as Orion Network Systems-Europe GmbH) ("Orion Europe") a communications company specializing in private satellite networks for voice and data services. Orion purchased the shares of Orion Europe held by the German companies, Vebacom GmbH and RWE Telliance AG, now known as o.tel.o for approximately $9 million. In addition, Orion acquired Orion Europe's licenses and operating agreements to provide satellite network services in 40 countries, including 17 countries in which Orion previously did not provide service. The net purchase price of Orion Europe was $8.4 million and was allocated as follows:

Working capital deficit, net of cash acquired	$(.6)
Property and equipment.....	9.3
Other, net.....	(.3)
	$8.4

The proforma effect on net loss assuming the acquisition took place January 1, 1997 was not material.

2. Summary of Significant Accounting Policies

Consolidation Policy

The consolidated financial statements for the year ended December 31, 1997, include the accounts of Orion and its wholly-owned subsidiaries and Orion Financial Partnership (OFP), in which Orion holds a 50% interest. The consolidated financial statements for the years ended December 31, 1996 and 1995, include the accounts of Orion, its two wholly-owned subsidiaries OrionNet, Inc. (OrionNet) and Orion Network Services, Inc., its former 83% owned subsidiary, Asia Pacific Space and Communications Ltd. (Asia Pacific), the OFP, in which Orion holds a 50% interest, and Orion Atlantic, in which Orion held a 41 2/3% ownership interest. Orion Network Services, Inc. as the general partner of Orion Atlantic, exercised control of Orion Atlantic through the provisions of the partnership agreement. All significant intercompany accounts and transactions have been eliminated. In January 1997, all of the outside interest in these entities, except for outside interests of OFP, were acquired.

2. Summary of Significant Accounting Policies – *(Continued)*

Cash and Cash Equivalents

Orion considers all highly liquid investments with a maturity of three months or less when purchased to be cash equivalents. Cash and cash equivalents includes cash in banks and short term investments as follows:

	December 31,	
	1997	1996
Cash	$ 2,256,356	$ 2,627,477
Money market funds	2,543,600	14,213,484
Commercial paper	65,208,701	15,346,846
	$70,008,657	$32,187,807

The commercial paper held at December 31, 1997 matures between January and March 1998.

Restricted and Segregated Assets

Restricted and segregated assets consist of the following:

	December 31,	
	1997	1996
U.S. treasury notes	$117,800,000	$ —
Commercial paper	216,696,975	—
Time deposits 22,393,000	10,000,000	
Total restricted and segregated assets	356,889,975	10,000,000
Less: current portion	(50,064,014)	—
	$306,825,961	$10,000,000

Included in restricted and segregated assets is $3.7 million of accrued interest at December 31, 1997. The current portion represents interest to be paid on the Senior Notes in 1998. The commercial paper and U.S. treasury discount notes held at December 31, 1997 mature between January and March 1998 and January 1998 and January 2000, respectively.

Property and Equipment

Property and equipment are carried at cost. Depreciation expense is calculated using the straight-line method over their estimated useful lives as follows:

Satellite and related equipment	10.5years
Telecommunications equipment	2-7years
Furniture and computer equipment	2-7years

Costs incurred in connection with the construction and successful deployment of the Orion 1 satellite and related equipment are capitalized. Such costs include direct contract cost, allocated indirect costs, launch costs, launch insurance, construction period interest and the present value of satellite incentive payments. Similar costs for Orion 2 and Orion 3 are included in "Satellite construction in progress." Orion began depreciating the Orion 1 satellite over its estimated useful life commencing on the date of operational delivery in orbit (January 20, 1995).

2. Summary of Significant Accounting Policies – *(Continued)*

Deferred Financing Costs

Deferred financing costs related to the Financings include $22.6 million in fees paid to an investment banker and are being amortized over the period the debt is expected to be outstanding. Accumulated amortization at December 31, 1997 and 1996 was $2,289,925 and $9,122,000, respectively. Deferred financing costs of $10.5 million relating to the Orion 1 Credit Facility were expensed in January 1997 in connection with the Financings and are included in the caption "Extraordinary loss on extinguishment of debt".

Other Assets

Other assets consist principally of FCC license application costs, organization costs and goodwill. The Company amortizes the FCC license application costs related to Orion 1 over the estimated useful life of the satellite. Organization costs are amortized over five years. Goodwill is primarily amortized over the remaining useful life of Orion 1. Accumulated amortization at December 31, 1997 and 1996 was $6,214,359 and $3,150,000, respectively.

Other assets, net of amortization at December 31, 1997 and 1996, consist of the following:

	December 31,	
	1997	1996
Goodwill	$20,331,878	$1,412,546
Note receivable	3,038,901	—
FCC license application costs	1,781,097	1,639,054
Other	2,026,933	2,200,702
	$27,178,809	$5,252,302

Foreign Currency Translation

Results of operations for foreign entities, primarily the Company's Orion Network Systems-Europe GmbH subsidiary, are translated using average exchange rates during the period. Assets and liabilities are translated to U.S. dollars using the exchange rate in effect at the balance sheet date. The resulting translation adjustments are reflected in stockholders' equity (deficit).

Interest Rate Modification Agreement

Orion entered into an interest-rate swap and cap agreement to modify the interest characteristics of the Orion 1 Credit Facility from a floating to a fixed-rate basis. This agreement involved the receipt of floating rate amount in exchange for fixed-rate interest payments over the life of the agreement without an exchange of the underlying principal amount. The differential paid or received was accrued as interest rates changed and was recognized as an adjustment to interest expense. The fair value of the swap agreement was not recognized in the financial statements. This agreement was terminated in January 1997 in connection with the Financings discussed in Note 1. No such agreements were in place at December 31, 1997.

Revenue Recognition

Revenue is recognized as earned in the period in which telecommunications and related services are provided.

2. Summary of Significant Accounting Policies – *(Continued)*

The following summarizes the Company's domestic and foreign revenues for the years ended December 31, 1997, 1996 and 1995:

	Year Ended December 31,		
	1997	1996	1995
Revenues from unaffiliated customers			
United States	$30,927,234	$21,261,980	$ 8,528,736
Europe	37,720,990	14,571,979	8,056,146
Revenues from related parties	4,092,407	6,013,333	5,699,000
Total services revenue	$72,740,631	$41,847,292	$22,283,882

Income Taxes

The Company recognizes deferred tax assets and liabilities for the expected future consequences of temporary differences between financial reporting and tax bases of assets and liabilities using enacted tax rates that will be in effect when the differences are expected to reverse.

Following is a summary of components of deferred taxes at December 31, 1997 and 1996 (in thousands):

	December 31,	
	1997	1996
Deferred tax assets:		
Net operating loss carryforward	$ 61,648	$ 29,535
Accrued discount on Senior Discount Notes	11,917	—
Amortization of intangibles	2,947	466
Other	3,385	2,566
	79,897	32,567
Deferred tax liabilities:		
Depreciation	(16,289)	(299)
Other	(741)	(124)
	(17,030)	(423)
Net deferred tax asset	62,867	32,144
Valuation allowance	(62,867)	(32,144)
Net deferred tax asset, after valuation allowance	$ —	$ —

At December 31, 1997, Orion has approximately $162 million in net operating loss carryforwards which expire at varying dates from 2004 through 2012. The use of these loss carryforwards may be limited under the Internal Revenue Code as a result of ownership changes experienced by Orion. Due to uncertainty regarding its ability to realize the benefits of such net operating loss carryforwards and other net deferred tax assets, the Company has established a valuation allowance for the full amount of these net deferred tax assets.

Net Loss Per Common Share

Net loss per common share is based on the weighted average number of common shares outstanding during the period. In 1997, the Financial Accounting Standards Board issued Statement No. 128, Earnings per Share. Statement 128 replaced the calculation of primary and fully diluted earnings per

2. Summary of Significant Accounting Policies – *(Continued)*

share with basic and diluted earnings per share. Unlike primary earnings per share, basic earnings per share excludes any dilutive effects of options, warrants and convertible securities. The effect of such securities for all periods presented is anti-dilutive, and therefore has been excluded from the calculation of diluted earnings per share. The adoption of FASB 128 had no impact on the per share amounts previously presented.

Statements of Cash Flows

Non-cash investing and financing activities and supplemental cash flow information includes:

	Year Ended December 31,		
	1997	1996	1995
Property and equipment financed by capital leases	$ —	$ 482,452	$ 2,850,766
Preferred stock dividend, net of forfeitures	6,034,436	1,369,665	1,329,007
Conversion of redeemable preferred stock to common stock	38,845,493	804,945	9,000
Conversion of subordinated debentures to common stock	10,291,667	—	—
Premium on satellite due to redemption of L.P interest	—	—	3,066,925
Redemption of STET interest with notes payable	—	—	8,000,000
Reduction in amount due to satellite manufacturer	—	—	485,799
Satellite incentive obligation capitalized	—	—	14,816,406
Acquisition of Teleport Europe, net of cash acquired:			
Working capital deficit, net of cash acquired	683,567	—	—
Property and equipment	(9,346,584)	—	—
Other, net	288,172	—	—
Net cash used to acquire Teleport Europe	(8,374,845)	—	—
Issuance of Series C preferred stock	94,000,000	—	—
Issuance of common stock for preferred stock dividend	2,070,462	—	—
Issuance of common stock and warrants	13,406,631	300,000	—
Interest paid during the year	35,572,722	20,619,316	11,312,875

Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

Reclassifications

Certain prior year amounts have been reclassified to conform to the current year presentation.

3. Orion Atlantic

Orion Atlantic is a Delaware limited partnership formed to provide international private communications networks and basic transponder capacity and capacity services (including ancillary ground services) to businesses and institutions with trans-Atlantic and intra-European needs. The business was

3. Orion Atlantic – *(Continued)*

organized by Orion Network Services, the general partner of Orion Atlantic. The principal purposes of Orion Atlantic was to finance the construction, launch and operation of up to two telecommunications satellites in geosynchronous orbit over the Atlantic Ocean and to establish a multinational sales and service organization. Eight international corporations, including Orion, invested a total of $90 million in equity as limited partners in Orion Atlantic. Orion Atlantic through January 1997, was financed by a credit facility which provided up to $251 million for the first satellite from a syndicate of major international banks led by Chase Manhattan Bank, N.A. In addition to their equity investments, the Limited Partners had agreed to lease capacity on the satellites up to an aggregate $155 million and had entered into additional contingent capacity lease contracts ("contingent call") up to an aggregate $271 million, as support for repayment of the senior debt. The firm capacity leases and contingent calls were payable over a seven-year period after the Orion 1 satellite was placed in service. In July 1995, January and July 1996 the Limited Partners (excluding the Company) paid $7.6 million, $18.0 million and $12.1 million, respectively, pursuant to the contingent calls. As discussed in Note 1, in January 1997, the Company acquired all of the limited partnership interests it did not already own in Orion Atlantic.

Orion 1 — The fixed base price of Orion 1, excluding obligations relating to satellite performance, aggregated $227 million. In addition to the fixed base price, the contract required payments in lieu of a further contract price increase, aggregating approximately $44 million through 2006. Such payments are due, generally, if 24 out of 34 satellite transponders are operating satisfactorily. Shortly after acceptance of the satellite in January 1995, the Company filed a warranty claim with the satellite manufacturer relating to one transponder that was not performing in accordance with contract specifications. In August 1995, Orion Atlantic received a one time refund of $2.75 million which was applied as a mandatory prepayment to the senior notes payable - banks.

The Company believes that since Orion 1 is properly deployed and operational, based upon industry data and experience, payment of the obligation mentioned above is highly probable and the Company capitalized the present value of this obligation of approximately $14.8 million as part of the cost of the satellite. Payment of amounts due under this obligation were delayed until payment was permitted under the senior notes payable — banks. The present value was estimated by discounting the obligation at 14% over the expected term, assuming payment of the incentives begins upon expiration of the senior notes payable — banks in 2002.

Redemption of STET Partnership Interest; Issuance of New Interest to Orion. — In November 1995 Orion Atlantic redeemed the limited partnership interest held by STET (the "STET Redemption") for $11.5 million, including $3.5 million of cash and $8.0 million in 12%, promissory notes due through 1997. STET's firm and contingent capacity leases remained in place until released by the Banks under the Orion 1 Credit Facility. STET's existing contractual arrangements with Orion Atlantic were modified in a number of respects, including (i) a reduction of approximately $3.5 million in amounts due by Orion Atlantic to Telespazio S.p.A., an affiliate of STET, over a ten-year period under contracts relating to the construction of Orion 2, back-up tracking, telemetry and command services through a facility in Italy and engineering consulting services, (ii) the establishment of ground operations and distribution agreements between Orion Atlantic and Telecom Italia, a subsidiary of STET, relating to Italy, and the granting to Telecom Italia of exclusive marketing rights relating to Italy for a period ending December 1998 conditioned upon Telecom Italia achieving certain sales quotas, and (iii) canceling exclusive ground operations and sales representation agreements between Orion Atlantic and STET (or its affiliates) relating to Eastern Europe.

Orion Atlantic funded the STET Redemption by selling a new limited partnership interest to Orion for $8 million (including $3.5 million in cash and $4.5 million in 12% promissory notes due through 1997). In connection with the STET redemption, Orion agreed to indemnify Telecom Italia for payments which were made in July 1995 of $950,000 and which would be made in the future under its firm and contingent capacity agreements with Orion Atlantic and posted a $10 million letter of credit to

3. Orion Atlantic – *(Continued)*

support such indemnity. The Company accounted for this transaction as an acquisition of a minority interest and, as a result, approximately $3.1 million was allocated to the cost of the Orion 1 satellite and related equipment.

During 1995, Orion Atlantic entered into agreements with certain Limited Partners (including the Company) under which the participating Limited Partners voluntarily gave up their rights to receive capacity under their firm capacity agreements through January 1996. The participating Limited Partners continued to make payments for such capacity but have the right to receive refunds from Orion Atlantic out of cash available after operating costs and payments under the Credit Facility. At December 31, 1996, Orion Atlantic received $27.7 million (excluding payments from the Company) under the firm capacity agreements subject to refund, which amounts are included in "Other liabilities." In addition, services revenue included $4.1 million, $6.0 million and $5.7 million in 1997, 1996 and 1995 from Limited Partners pursuant to the firm capacity commitments, not subject to refund. In connection with the Exchange described in Note 1, such rights were acquired by the Company.

4. Commitments and Contingencies

Orion 1 — In November 1995, a portion of the Orion 1 satellite experienced an anomaly that resulted in a temporary service interruption, lasting approximately two hours, in the dedicated capacity serving the European portion of Orion Atlantic's services. Full service to all affected customers was restored using redundant equipment on the satellite. The Company believes, based on the data and the Telesat Report (issued by Telesat Canada, independent engineering consultants dated November 14, 1995), that, because the redundant component is functioning fully in accordance with specifications and the performance record of similar components is strong, the anomalous behavior is unlikely to affect the expected performance of the satellite over its useful life. Furthermore, there has been no effect on the Company's ability to provide services to customers. However, in the event that the currently operating component fails, Orion 1 would experience a significant loss of usable capacity. In such event, while the Company would be entitled to insurance proceeds of approximately $47 million and could lease replacement capacity and function as a reseller with respect to such capacity, the loss of capacity would have a material adverse effect on the Company.

Orion 2 — In July 1996, the Company signed a contract with Matra Marconi Space for the construction and launch of Orion 2 (which was amended and restated in January 1997) and in February 1997 commenced construction of that satellite. The contract provides for delivery in orbit of Orion 2 by June 1999, for a firm fixed price of $201 million, excluding launch insurance and incentive payments. Orion 2 will expand the Company's European coverage and extend coverage to portions of the Commonwealth of Independent States, Latin America and the Middle East.

Orion 3 — In January 1997, the Company entered into a satellite procurement contract with Hughes Space for the construction and launch of Orion 3, construction of which commenced in December 1996. The contract provides for delivery in orbit of Orion 3 by December 1998, for a firm fixed price of $208 million, excluding launch insurance and incentive payments. Orion 3 will cover broad areas of the Asia Pacific region including China, Japan, Korea, Southeast Asia, Australia, New Zealand, Eastern Russia and Hawaii.

In November 1996, Orion entered into a contract with DACOM Corp. ("DACOM"), a Korean communications company, under which DACOM will lease eight dedicated transponders on Orion 3 for 13 years, in return for approximately $89 million, which is payable over a period from December 1996 through six months following the lease commencement date for the transponders (which is scheduled to occur by January 1999). DACOM is to deposit funds with Orion in accordance with a milestone schedule. As of December 31, 1997, Orion had received $22.25 million from DACOM. This amount is included in "Other Liabilities". Orion maintains a $22.25 million letter of credit which will be released on August 1, 1998. Orion has an obligation to maintain a letter of credit for seven months beginning on the

4. Commitments and Contingencies – *(Continued)*

lease commencement date in the amount of $44.75 million. Prior to launch, payments are subject to refund pending the successful launch and commencement of commercial operation of Orion 3. DACOM maintains a $54.75 million letter of credit securing substantially all of DACOM's remaining payments.

Litigation — On November 9, 1996, Orion and Skydata Corporation ("Skydata") executed a letter with respect to the settlement in full of pending litigation and arbitration related to a patent dispute. As part of the settlement, Skydata granted Orion (and its affiliates) an unrestricted, world-wide paid-up license to make, have made, use or sell products or methods under the patent and all other corresponding continuation and reissue patents. Orion is to pay Skydata $437,000 over a period of two years as part of the settlement.

Other — Orion has entered into operating leases, principally for office space. Rent expense was $1,312,000, $915,000 and $735,000 during the years ended December 31, 1997, 1996 and 1995, respectively.

Future minimum lease payments are as follows:

1998	$1,588,800
1999	1,283,100
2000	185,100
2001	93,500
2002	46,000
Thereafter	552,500
	$3,749,000

5. Long-Term Debt

Long-term debt at December 31, 1997 and 1996 consists of the following:

	December 31, 1997	December 31, 1996
Senior notes (net of unamortized discount of $4.9 million)	$440,099,914	$ —
Senior discount notes (maturity value of $484 million)	292,336,605	—
Convertible junior subordinated debentures	50,000,000	—
Senior notes payable to banks	—	207,714,842
Notes payable - TT&C Facility	6,021,601	6,956,624
Satellite incentive obligations	6,478,533	22,373,746
Notes payable - STET	—	5,550,000
Notes payable - limited partners	—	8,050,000
Other	2,140,096	2,566,687
Total long-term debt	797,076,749	253,211,899
Less: current portion	6,406,143	34,975,060
Long-term debt less current portion	$790,670,606	$218,236,839

Total interest (including commitment fees and amortization of deferred financing costs) incurred for the years ended December 31, 1997, 1996 and 1995 was $91.1, $27.8, and $26.0 million, respectively. Capitalized interest for 1997 was $7.3 million. Aggregate annual maturities of long-term debt consist of the following (in thousands):

5. Long-Term Debt – *(Continued)*

1998	$ 6,406,143
1999	1,347,198
2000	1,177,692
2001	1,252,335
2002	1,582,997
Thereafter	785,310,384
	$797,076,749

Senior Notes and Senior Discount Notes — On January 31, 1997, the Company completed a $710 million bond offering (the "Bond Offering") comprised of approximately $445 million of Senior Note Units, each of which consists of one 11.25% Senior Note due 2007 (a "Senior Note") and one Warrant to purchase 0.8463 shares of common stock, par value $.01 per share ("Common Stock") of the Company (a "Senior Note Warrant"), and approximately $265.4 million of Senior Discount Note Units, each of which consists of one 12.5% Senior Discount Note due 2007 (a "Senior Discount Note," and together with the Senior Notes, the "Notes") and one Warrant to purchase 0.6628 shares of Common Stock of the Company (a "Senior Discount Note Warrant and together with the Senior Note Warrants, the "Warrants"). Interest on the Senior Notes is payable semi-annually in cash on January 15 and July 15 of each year, commencing July 15, 1997. The Senior Discount Notes do not pay cash interest prior to January 15, 2002. Thereafter, cash interest accrues until maturity at an annual rate of 12.5% payable semi-annually on January 15, and July 15 of each year, commencing July 15, 2002. The exercise price for the Warrants is $.01 per share of Common Stock of the Company. The Company made interest payments of $22,806,250 and $25,031,250 in July 1997 and January 1998 on the Senior Notes. The indentures supporting the Senior Notes and the Senior Discount Notes contain certain covenants which, among other things, restrict distributions to stockholders of the Company, the repurchase of equity interests in the Company and the making of certain other investments and restricted payments, the incurrence of additional indebtedness by the Company and its restricted subsidiaries , the creation of liens, certain asset sales, transaction with affiliates and related parties, and mergers and consolidations. The Company is in compliance with the requirements of such indentures.

Convertible Junior Subordinated Debentures — On January 31, 1997, in connection with the Financings discussed in Note 1, the Company completed the sale of $60 million of its convertible junior subordinated debentures (the "Convertible Debentures") to two investors, British Aerospace Holdings, Inc. ("British Aerospace") and Matra Marconi Space UK Limited ("Matra Marconi Space"). British Aerospace purchased $50 million of the Convertible Debentures and Matra Marconi Space purchased $10 million of the Convertible. The Convertible Debentures mature in 2012, and bear interest at a rate of 8.75% per annum to be paid semi-annually in arrears solely in Common Stock of the Company. The Convertible Debentures are subordinated to all other indebtedness of the Company, including the Notes. Matra Marconi Space converted their $10 million of Convertible Debentures and accrued interest into 735,292 shares of common stock in December 1997. Subsequent to year end, British Aerospace converted their $50 million of Convertible Debentures and accrued interest into approximately 3.6 million shares of common stock.

Senior Notes Payable to Banks - The senior notes payable to banks outstanding under a credit facility prior to repayment as described below, bore interest at 1.75% over the LIBOR. The Company entered into agreements with Chase Manhattan Bank, N.A. ("Chase") for interest rate hedging arrangements which fixed the maximum interest rate through November 1995 at 11.54%. Thereafter a self funding interest rate cap agreement was in place relating to a notional amount declining every six months from $150 million effective November 30, 1995 to $15.6 million effective March 31, 2001. Under the terms of the cap agreement, when LIBOR equaled or exceeded 5.5% Orion Atlantic paid Chase a

5. Long-Term Debt – *(Continued)*

fee equal to 3.3% per annum of the notional amount and received a payment from Chase in an amount equal to the difference between the actual LIBOR rate and 5.5% on the notional amount. In January 1997, the Company used the net proceeds of the Bond Offering and the Convertible Debenture Offering to repay the Orion 1 Credit Facility and terminated the hedging arrangement. The loss on termination of the hedging arrangement of $5.3 million is included in "Extraordinary loss on extinguishment of debt."

Note Payable — TT&C Facility — In June 1995 upon acceptance of the TT&C Facility, the Company refinanced $9.3 million from General Electric Credit Corporation as a seven-year term loan, payable monthly. The interest rate is fixed at 13.5%. The TT&C debt is secured by the TT&C Facility, the Satellite Control System Contract and Orion Atlantic's leasehold interest in the TT&C Facility land. The TT&C financing agreement contains customary representations, warranties and covenants regarding certain activities of the Company.

Satellite Incentive Obligations — The obligations relating to satellite performance have been recorded at the present value (discounted at 14%, the Company's estimated incremental borrowing rate for unsecured financing) of the required payments commencing at the originally scheduled maturity of the senior notes payable to banks and continuing through 2006. Under the terms of the construction contract, payment of the obligation is delayed until such time as payment is permitted under the senior notes payable to banks. During 1997, payments aggregating $18.6 million were made pursuant to this obligation.

Notes Payable — STET — In connection with the STET Redemption, the Company issued $8 million of promissory notes bearing interest at 12% per annum. Payments were due as follows: $2.5 million plus accrued interest paid on December 31, 1996; $3.5 million plus accrued interest on the earlier of December 31, 1997 or the refinancing of the senior notes payable to banks; and the remaining $2.0 million in monthly installments of $0.2 million plus accrued interest beginning January 1997. At December 31, 1997, the $8 million promissory notes issued in connection with the STET Redemption have been repaid.

Notes Payable — Limited Partners — In January 1997, the Company issued Series C Convertible Preferred Stock in exchange for the Preferred Participation Units (PPUs) aggregating $8.1 million due to certain former Limited Partners for development of Orion Atlantic's network services business. Holders of PPUs earned interest on aggregate amounts drawn at the rate of 30% per annum.

Interest payable at December 31, 1996 was $5.9 million and is included in "Other liabilities".

6. Redeemable Preferred Stock and Stockholders' Equity

The Company has authorized 1,000,000 shares of $0.01 par value preferred stock.

Redeemable Preferred Stock

In June 1994, Orion issued 11,500 shares of Series A 8% Cumulative Redeemable Convertible Preferred Stock at $1,000 per share and granted an option to purchase an additional 3,833 shares of similar preferred stock at $1,000 per share. Dividends on preferred stock accrue at 8% per year and are payable as and when declared. Orion may redeem the preferred stock at the amount invested plus accrued and unpaid dividends. Upon such a redemption, the preferred stockholders would receive a warrant to acquire at $8.50 per share the number of shares of common stock into which the preferred stock was convertible. The 11,500 shares issued are convertible into 1,352,941 shares of common stock ($8.50 per share). Upon conversion any accrued and unpaid dividends are forfeited. Orion may require conversion of the preferred stock if certain conditions are met. After Orion issued preferred stock (along with warrants and options to make an additional investment) in June 1994, the Directors and affiliates of Directors who purchased common stock in December 1993 and the institutions and other

6. Redeemable Preferred Stock and Stockholders' Equity – *(Continued)*

investors who purchased common stock in June 1994 each exercised its right to receive preferred stock (along with warrants and options to make an additional investment) in exchange for the common stock previously acquired and Orion issued an aggregate of 3,000 shares of Series A Preferred Stock and related options for 1,000 shares to such persons and entities. The 3,000 shares issued are convertible into 352,941 shares of common stock ($8.50 per share). Through December 31, 1997, 7,567 shares of preferred stock were converted into 890,235 shares of common stock. The remaining 6,933 shares outstanding are convertible into 815,647 shares of common stock at December 31, 1997.

The preferred stock has a liquidation preference equal to the amount invested plus accrued and unpaid dividends. Preferred stockholders are entitled to vote on an as-converted basis and have the right to put the stock to Orion upon a merger, change of control or sale of substantially all assets at the greater of liquidation value or fair value. The put expires upon the completion of a qualified public equity offering, as defined. If the preferred stock is not previously redeemed or converted to common stock, the preferred stockholders also have the right to put the stock to Orion as follows: 33 1/3% beginning in June 1999; 66 2/3% beginning in June 2000; and 100% beginning in June 2001.

In June 1995, certain Directors, affiliates of Directors, and certain holders of Series A Preferred Stock purchased 4,483 shares of Series B Preferred Stock for approximately $4.5 million. This purchase was pursuant to an option granted in June 1995 to purchase $1 of preferred stock similar to the Series A Preferred Stock for each $3 of Series A Preferred Stock purchased in June 1994, except that such similar preferred stock would be convertible at any time with Common Stock at a price within a range of $10.20 to $17.00 per share of common stock based upon when the option is exercised. The Series B Preferred Stock has rights, designations and preferences substantially similar to those of the Series A Preferred Stock, and is subject to similar covenants, except that the Series B Preferred Stock is convertible into 439,510 shares of Common Stock at an initial price of $10.20 per share, subject to certain anti-dilution adjustments, and purchases of Series B Preferred Stock did not result in the purchaser receiving any rights to purchase additional preferred stock. Through December 31, 1997, 2,424 shares of preferred stock were converted into 237,647 shares of common stock. The remaining 2,059 shares outstanding are convertible into 201,862 shares of common stock at December 31, 1997.

In January 1997, Orion issued 123,172 shares of Series C Cumulative Redeemable Preferred Stock to British Aerospace Communications, Inc., COM DEV Satellite Communications Limited, Kingston Communications International Limited, Lockheed Martin Commercial Launch Services, Inc., MCN Sat US, Inc., and Trans-Atlantic Satellite, Inc. in exchange for their Orion Atlantic partnership interests. Dividends on the preferred stock accrue at 6% per year and are distributable in the Company's common stock calculated based on the market price of such stock under a formula provided in the Certificate of Designations. The shares are convertible into approximately 7 million shares ($17.50 per share) of the Company's common stock. Through December 31, 1997, 40,531 shares of preferred stock, including dividends, were converted into approximately 2.4 million shares of common stock. Series C Cumulative Preferred Stock is recorded net of deferred offering costs of approximately $3.3 million. The Series C Cumulative Preferred Stock is subject to mandatory redemption at par value in 25 years. The difference between in carrying value and par value is being accreted over such period.

The preferred stock has a liquidation preference equal to the amount invested plus accrued and unpaid dividends. Preferred stockholders are entitled to vote on an as-converted basis and have the right to put the stock to Orion upon a merger, change of control or sale of substantially all assets at the greater of liquidation value or fair value.

Stockholders' Equity

1987 Employee Stock Option Plan - Under the 1987 Employee Stock Option Plan, 1,470,588 shares of common stock are reserved for issuance upon exercise of options granted. Shares of common stock

6. Redeemable Preferred Stock and Stockholders' Equity – *(Continued)*

may generally be purchased under this plan at prices not less than the fair market value, as determined by the Board of Directors, on the date the option is granted.

Stock options outstanding at December 31:

	1997	1996	1995
Range of exercise price	$ 8.16 - 12.29	$ 8.16 - 12.24	$ 5.44 - 12.24
Outstanding at beginning of year	911,663	971,469	804,056
Granted during year	400,670	122,750	380,069
Exercised	(81,383)	(37,629)	(60,928)
Canceled	(56,640)	(144,927)	(151,728)
Outstanding at end of year	1,174,310	911,663	971,469

In November 1993, stock options for 95,588 shares of common stock were granted to key executives which may be exercised only upon the achievement of certain business and financial objectives. At December 31, 1995, the executives had earned the right to exercise 40,441 of these options based on the achievement of such objectives. The remaining options were canceled during 1996.

Stock options vest annually over a one to five-year period. All options are exercisable up to seven years from the date of grant. The Company's 1987 Employee Stock Option Plan expired in 1997. No further shares are available for grant under this plan. There were 506,803 and 429,265 options exercisable at December 31, 1997 and 1996, respectively.

In July 1996, the Company granted, subject to shareholder approval, the Chairman of the Executive Committee 100,000 options at $9.83 per share. These options vested as follows, 50,000 on January 17, 1997 and 50,000 upon successful completion of either a refinancing of the Orion 1 satellite, financing for construction, launch and insurance for Orion 2 or Orion 3 or a substantial acquisition or relationship with a strategic partner. These requirements were met in January 1997.

Non-Employee Director Stock Option Plan — In 1996, Orion adopted a non-employee director stock option plan. Under this plan, 380,000 shares of common stock are reserved for issuance. During 1997, there were 80,000 options granted pursuant to this plan at $9.60 per share. At December 31, 1997, aggregate options outstanding pursuant to this plan totaled 270,000, of which, 180,000 were exercisable at prices ranging from $8.49 to $12.53 per share.

1997 Employee Stock Option Plan - In 1997, Orion adopted a second stock option plan. Under this plan, as amended, 1,300,000 shares of common stock are reserved for issuance upon exercise of options granted. Shares of common stock may be purchased under this plan at prices not less than the fair value as determined by the Board of Directors, on the date the option is granted.

Compensation expense relating to these plans was not significant.

6. Redeemable Preferred Stock and Stockholders' Equity – *(Continued)*

Stock options outstanding at December 31:

	1997
Range of exercise price	$9.30 - 17.06
Outstanding at beginning of year	—
Granted during year	556,000
Exercised	—
Canceled	(4,000)
Outstanding at end of year	552,000

There were 62,500 options exercisable at December 31, 1997.

The Company has elected to continue to follow Accounting Principles Board Opinion No. 25, "Accounting for Stock Issued to Employees" ("APB 25") and related Interpretations in accounting for its employee stock based award programs, because the alternative fair value accounting provided for under FASB Statement No. 123, "Accounting for Stock Based Compensation" ("SFAS 123") which is effective for awards after January 1, 1996 requires use of option valuation models that were not developed for use in valuing employee stock options. Under APB 25, when the exercise price of the employee award equals the market price of the underlying stock on the date of grant, as has been the case historically with the Company's awards, no compensation expense is recognized.

Pro forma information regarding net income and earnings per share is required by SFAS 123, and has been determined as if the Company had accounted for its stock options under the fair value method of that statement. The fair value of these options was estimated at the date of the grant using a Black-Scholes valuation model with the following assumptions:

	1997	1996	1995
Risk-free interest rate	6.5%	6.5%	6.5%
Expected dividend yield	0.0%	0.0%	0.0%
Expected life of option	6.5 years	5.8 years	5.8 years
Volatility of the Company's stock	69%	68%	68%

For purposes of adjusted pro forma disclosures, the estimated fair value of the options is amortized to expense over the option's vesting period. The effect of applying SFAS 123 on pro forma net loss is not necessarily representative of the effects on reported net loss for future years due to, among other things, (1) the vesting period of the stock options and the (2) fair value of additional stock options in future years. The Company's adjusted pro forma information for the years ended December 31, are as follows:

	1997	1996 (Net loss in thousands)	1995
Adjusted pro forma net loss	$(110,703)	$(28,031)	$(27,306)
Adjusted pro forma net loss per share	$ $(10.03)	$ (2.68)	$ (3.11)

401(k) Profit Sharing Plan — In September 1996, Orion amended the 401(k) profit sharing plan. Under this plan, 100,000 shares of common stock are reserved for issuance as the Company's discretionary match of employee contributions. The Company's matching contributions may be made in either cash or in the equivalent amount of the Company's common stock. During 1997, the Company issued 11,286 shares for the 1996 plan year.

6. Redeemable Preferred Stock and Stockholders' Equity – *(Continued)*

Stock Purchase Plan — In September 1996, Orion adopted an employee stock purchase plan. Under this plan, 500,000 shares of common stock are reserved for issuance. Shares of common stock are purchased under this plan through payroll deduction. The purchase price of each share of common stock purchased under the plan will be 85% of the fair market value of the common stock on the measurement date. During 1997, the Company issued 27,731 shares pursuant to the Plan.

Stock Warrants - In November 1996, Orion granted 50,000 warrants to DACOM to purchase shares of common stock at $14 per share. The warrants are exercisable for a six month period beginning six months after the commencement date, as defined in the Joint Investment Agreement, and ending one year after the commencement date and will terminate at that time or at any time the Joint Investment Agreement is terminated. The fair value of the warrants at the date of issue was $300,000 and was estimated using a Black Scholes valuation model.

Warrants outstanding at December 31:

	1997	1996	1995
Range of exercise price	$0.01 - 14.00	$9.79 - 14.00	$9.79 - 12.79
Outstanding at beginning of year	142,115	553,768	735,769
Granted during year	697,400	50,000	—
Exercised	(96,159)	—	—
Canceled	(2,806)	(461,653)	(182,001)
Outstanding at end of year	740,550	142,115	553,768

There were 690,550 and 92,115 warrants exercisable at December 31, 1997 and 1996, respectively.

The holders of preferred stock also hold warrants to purchase 1,017,509 shares of common stock at the conversion price of such preferred stock. These warrants do not become exercisable unless Orion exercises its right to repurchase the preferred stock at the liquidation value, plus accrued and unpaid dividends.

In January 1997, the Company issued Senior Note Warrants and Senior Discount Note Warrants to acquire 376,608 and 320,792 shares of common stock, respectively at $.01 per share in connection with the Bond Offering. The warrants were not exercisable prior to six months after the closing date of the Bond Offering and became separately transferable from the Notes six months from date of issuance. The estimated fair value of the warrants aggregating $9.6 million was allocated $5.2 million to Senior Notes and $4.4 million to Senior Discount Notes as debt discount. At December 31, 1997, 6,850 warrants were converted into 5,797 shares of common stock.

Shares Reserved for Issuance - The Company has 14,036,809 shares of common stock at December 31, 1997 reserved for issuance upon conversion of debentures and preferred stock, exercise of outstanding stock options and warrants, and common stock issued under the stock purchase and 401(k) profit sharing plans.

7. Fair Values of Financial Instruments

Other than amounts due under the Senior Notes and Senior Discount Notes, Orion believes that the carrying amount reported in the balance sheet of its other financial assets and liabilities approximates their fair value at December 31, 1997. The fair value of the Company's Senior Notes and Senior Discount was estimated to be approximately $511.8 million and $377.5 million, respectively. Based upon the conversion value at December 31, 1997 of the underlying common stock, the fair value of the Company's redeemable preferred stock was approximately $102.8 million.

8. Pending Acquisition of the Company By Loral

On October 7, 1997, Orion, Loral Space & Communications Ltd. ("Loral") and Loral Satellite Corporation, a wholly-owned subsidiary of Loral ("Merger Sub"), entered into an Agreement and Plan of Merger (as amended on February 11, 1998, the "Merger Agreement"), pursuant to which Merger Sub will merge with and into the Company, with the Company being the surviving corporation and thereby becoming a wholly-owned subsidiary of Loral (the "Loral Merger").

The Merger Agreement provides that (i) each share of Common Stock, excluding treasury shares and shares owned by Loral or its subsidiaries, will be converted into and exchanged for the right to receive the number of fully paid and nonassessable shares of common stock, par value $.01 per share, of Loral ("Loral Common Stock") equal to the Exchange Ratio (as described below), (ii) each share of the Company's Series A 8% Cumulative Redeemable Convertible Preferred Stock (the "Series A Preferred Stock"), Series B 8% Cumulative Redeemable Convertible Preferred Stock (the "Series B Preferred Stock" and together with the Series A Preferred Stock, the "Senior Preferred Stock") and Series C Preferred Stock (the Series C Preferred Stock and Senior Preferred Stock are hereinafter referred to as the "Senior Preferred Stock") will be converted into and exchanged for the right to receive the number of fully paid and nonassessable shares of Loral Common Stock equal to the Exchange Ratio multiplied by the number of shares of Common Stock into which such share of Preferred Stock was convertible immediately prior to the Effective Time of the Loral Merger, (iii) each outstanding stock option to purchase shares of Orion Common Stock will be converted into an option to acquire the number of shares of Loral Common Stock equal to the Exchange Ratio multiplied by the number of shares of Common Stock for which such option was exercisable, and (iv) each outstanding warrant to purchase shares of Orion Common Stock will be converted into a warrant to acquire the number of shares of Loral Common Stock equal to the Exchange Ratio multiplied by the number of shares of Common Stock for which such warrant was exercisable.

Pursuant to the terms of the Merger Agreement, the Exchange Ratio is determined as follows:

(i) if the average of the volume-weighted average trading prices of Loral Common Stock for the twenty consecutive trading days on which trading of Loral Common Stock occurs ending the tenth trading day immediately prior to the closing date for the Loral Merger (the "Determination Price") is less than $24.458 but greater than $16.305, the Exchange Ratio is the quotient obtained by dividing $17.50 by the Determination Price,

(ii) if the Determination Price is equal to or greater than $24.458, the Exchange Ratio is 0.71553 and

(iii) if the Determination Price is equal to or less than $16.305, the Exchange Ratio is 1.07329.

A meeting of Orion's shareholders has been scheduled for March 20, 1998 to vote to approve the Loral Merger. The Company expects the Loral Merger to close following a favorable shareholder vote, however, there can be no assurance that the Loral Merger will be consummated. Although not a condition of the Loral Merger, Orion intends to seek an Internal Revenue Service ruling as to eligibility for a tax-free exchange.

In the event the Loral Merger is completed, the Company will be obligated to make an offer to purchase all outstanding Senior and Senior Discount Notes (the "Notes") at a purchase price equal to 101% of their principal or accreted value, plus accrued and unpaid interest therein to the repurchase date. Since the Notes have traded in recent periods at prices above 101% of their principal amount, the Company does not anticipate that the holders of a material principal amount of the Notes will accept the repurchase offer.

In connection with the Merger Agreement, certain principal stockholders of Orion and members of Orion's management have agreed to vote in favor of the Loral Merger and have granted to Loral the right to purchase their securities in Orion for a price equal to the Loral Merger consideration under certain circumstances.

9. Condensed Financial Information of Orion

Presented below are condensed balance sheets of Orion (parent company only basis) at December 31, 1997 and 1996. All material contingencies, obligations and guarantees of Orion have been separately disclosed in the preceding notes to the financial statements.

CONDENSED BALANCE SHEETS OF ORION NETWORK SYSTEMS, INC.

	December 31, 1997	December 31, 1996
ASSETS		
Current assets:		
Cash and cash equivalents	$ —	$ 26,564,562
Restricted assets	50,064,014	—
Receivable from Orion Atlantic	—	253,088
Other current assets	—	766,784
Total current assets	50,064,014	27,584,434
Restricted and segregated assets	284,432,961	—
Investment in and advances to subsidiaries	460,571,744	(12,088,208)
Other assets	42,021,096	10,590,071
Total assets	$837,089,815	$ 26,086,297
LIABILITIES AND STOCKHOLDERS' DEFICIT		
Current liabilities:		
Notes and interest payable to Orion Atlantic	$ —	$ 2,327,427
Interest payable	24,768,229	—
Accounts payable and accrued liabilities	—	2,828,616
Total current liabilities	24,768,229	5,156,043
Long term debt	782,436,519	7,053
Other liabilities	—	457,203
Redeemable preferred stock	76,734,212	20,902,366
Stockholders' deficit	(46,849,145)	(436,368)
Total liabilities and stockholders' deficit	$837,089,815	$ 26,086,297

CONDENSED STATEMENTS OF OPERATIONS OF ORION NETWORK SYSTEMS, INC.

	Year Ended December 31, 1997	1996	1995
Services revenue	$ —	$ 34,000	$ —
Operating expenses and other income:			
General and administrative	2,170,102	3,832,286	3,171,305
Interest expense (income), net	57,069,304	(1,883,719)	(1,834,589)
Total operating expenses and other income	59,239,406	1,948,567	1,336,716
Equity in net losses of subsidiaries	46,500,608	25,280,843	25,578,462
Net loss	$(105,740,014)	$(27,195,410)	$(26,915,178)

9. Condensed Financial Information of Orion – *(Continued)*

CONDENSED STATEMENTS OF CASH FLOWS OF ORION NETWORK SYSTEMS, INC.

	Year Ended December 31,		
	1997	1996	1995
NET CASH USED IN OPERATIONS ...	$ (22,806,250)	$ (4,046,446)	$ (4,107,237)
INVESTING ACTIVITIES:			
Advances to subsidiaries	(407,092,800)	(15,528,710)	(8,664,024)
Capital expenditures		(504,729)	(597,698)
Increase in restricted and segregated assets	(406,937,388)	—	—
Release of restricted and segregated assets	90,500,480	—	—
Net cash used in investing activities	(723,529,708)	(16,033,439)	(9,261,722)
FINANCING ACTIVITIES:			
Proceeds from issuance of debt, net	744,274,780	—	—
Proceeds from issuance of redeemable preferred stock	—	—	4,483,001
Proceeds from issuance of common stock.	2,152,668	343,120	51,974,436
PPU funding	—	—	(455,000)
Repayment of notes payable	—	(2,496,300)	(37,792)
Purchase of treasury stock	(91,490)	—	—
Net cash (used in) provided by financing activities	746,335,958	(2,153,180)	55,964,645
Net (decrease) increase in cash and cash equivalents	—	(22,233,065)	42,595,686
Cash and cash equivalents at beginning of year	—	48,797,627	6,201,941
Cash and cash equivalents at end of year.	$ —	$ 26,564,562	$48,797,627

Basis of presentation — In these parent company-only condensed financial statements, Orion's investment in subsidiaries is stated at cost less equity in the losses of subsidiaries since date of inception or acquisition. Orion Network Systems, Inc. is presented for 1997 and Orion Oldco Services, Inc. is presented for 1996 and 1995, as a result of the Exchange, the Merger and the financings consummated January 31, 1997 all described in Note 1 of the Consolidated Financial Statements.

10. Pro Forma Condensed Consolidated Statement of Operations (Unaudited)

The following pro forma condensed consolidated statement of operations gives effect, as of January 1, 1997, to the Exchange, the Merger and the Financings consummated on January 31, 1997, all as described in Note 1 to the Consolidated Financial Statements and related transactions.

The unaudited pro forma condensed consolidated statement of operations does not purport to present the actual results of operations of the Company had the Transactions in fact occurred on the date specified, nor is it indicative of the results of operations that may be achieved in the future.

10. Pro Forma Condensed Consolidated Statement of Operations (Unaudited) – *(Continued)*

Pro Forma Condensed Consolidated Statement of Operations

	Year Ended December 31, 1997 (In thousands)
Service revenue	$ 72,741
Operating expenses	116,239
Other expense (income)	64,601
Net loss	(108,099)
Preferred stock dividend and accretion, net of forfeitures	(6,687)
Net loss attributable to common stockholders	(114,786)
Net loss per common share	(9.86)

11. Selected Quarterly Financial Data (Unaudited)

The following is a summary of the quarterly results of operations for the years ended December 31, 1997 and 1996 (in thousands except per share data):

	March 31,	June 30,	September 30,	December 31,
1997				
Revenues	$ 20,233	$ 16,687	$ 17,619	$ 18,202
Loss from operations	(8,317)	(10,915)	(11,270)	(12,579)
Net loss	(25,984)	(24,745)	(27,510)	(27,501)
Net loss per share	(2.48)	(2.42)	(2.63)	(2.11)
1996				
Revenues	$ 7,646	$ 10,123	$ 12,247	$ 11,831
Loss from operations	(10,155)	(8,963)	(7,151)	(10,084)
Net loss	(7,251)	(6,760)	(5,796)	(7,388)
Net loss per share	(0.70)	(0.65)	(0.55)	(0.72)

EXHIBIT 4

INDEPENDENT AUDITORS' REPORT

To the Shareholders of Loral Space & Communications Ltd.

We have audited the accompanying consolidated balance sheets of Loral Space & Communications Ltd. (a Bermuda company) and its subsidiaries (collectively, the "Company") as of December 31, 1997 and 1996 and the related consolidated statements of operations, shareholders' equity/invested equity and cash flows for the year ended December 31, 1997, the nine months ended December 31, 1996 and the year ended March 31, 1996. These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits.

We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, such consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Company as of December 31, 1997 and 1996, and the results of its operations and its cash flows for the year ended December 31, 1997, the nine months ended December 31, 1996 and the year ended March 31, 1996 in conformity with accounting principles generally accepted in the United States of America.

DELOITTE & TOUCHE LLP
New York, New York
March 6, 1998
(March 20, 1998 as to the fifth
paragraph of Note 3)

LORAL SPACE & COMMUNICATIONS LTD. AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS

(In thousands, except share data)

	December 31, 1997	December 31, 1996
ASSETS		
Current assets:		
Cash and cash equivalents	$ 226,547	$1,180,752
Contracts in process	468,134	
Inventories	98,325	
Other current assets	51,612	29,555
Total current assets	844,618	1,210,307
Property, plant and equipment, net	926,679	17,939
Cost in excess of net assets acquired, less amortization	361,411	
Long-term receivables	78,639	
Investments in affiliates	472,639	443,057
Deposits	154,970	
Other assets	165,980	28,023
	$3,004,936	$1,699,326
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities:		
Current portion of debt	$ 2,146	
Accounts payable	231,519	$ 10,708
Accrued employment costs	38,797	
Customer advances	68,287	
Accrued interest and preferred dividends	11,192	6,000
Other current liabilities	25,931	
Income taxes payable	25,934	2,311
Deferred income taxes	4,187	112
Total current liabilities	407,993	19,131
Deferred income taxes	99,696	4,611
Pension and other postretirement liabilities	48,398	19,723
Long-term liabilities	31,388	2,500
Long-term debt	433,252	
Minority interest	10,964	
Convertible preferred equivalent obligations ($600,000 principal amount)		583,292
Commitments and contingencies (Notes 6, 7 and 12)		
Shareholders' equity:		
Series A convertible preferred stock, $.01 par value; 150,000,000 shares authorized, 45,896,977 shares issued	459	459
Series B preferred stock, $.01 par value; 750,000 shares authorized and unissued		
6% Series C convertible redeemable preferred stock ($745,472 redemption value), $.01 par value; 20,000,000 shares authorized, 14,909,437 shares issued	733,762	
Common stock, $.01 par value; 750,000,000 shares authorized, 200,950,864 and 191,092,308 shares issued	2,010	1,911
Paid-in capital	1,216,128	1,058,822
Treasury stock, at cost; 101,053 shares	(1,680)	
Retained earnings	22,566	8,877
Total shareholders' equity	1,973,245	1,070,069
	$3,004,936	$1,699,326

See notes to consolidated financial statements.

LORAL SPACE & COMMUNICATIONS LTD. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF OPERATIONS

(In thousands, except per share amounts)

	Year ended December 31, 1997	Nine months ended December 31, 1996	Year ended March 31, 1996
Revenues	$1,312,591		
Management fee from affiliate		$ 5,088	$ 5,608
Costs and expenses	1,299,039	17,289	3,021
Operating income (loss)	13,552	(12,201)	2,587
Interest and investment income	49,069	34,699	
Interest expense	15,230	6,000	10,524
Gain on sale of K&F stock	79,591		
Income (loss) before income taxes, minority interest and equity in net loss of affiliates	126,982	16,498	(7,937)
Income taxes	34,871	2,912	(2,780)
Income (loss) before minority interest and equity in net loss of affiliates	92,111	13,586	(5,157)
Minority interest	(4,834)		
Equity in net loss of affiliates	(47,273)	(4,709)	(8,628)
Net income (loss)	40,004	8,877	(13,785)
Preferred dividends and accretion	(26,315)		
Net income (loss) applicable to common stockholders	$ 13,689	$ 8,877	$(13,785)
Earnings (loss) per share:			
Basic	$ 0.06	$ 0.04	$ (.08)
Diluted	$ 0.06	$ 0.04	$ (.08)
Weighted average shares outstanding:			
Basic	242,070	228,997	183,580
Diluted	243,591	229,396	183,580

See notes to consolidated financial statements.

LORAL SPACE & COMMUNICATIONS LTD. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY/INVESTED EQUITY

Year ended December 31, 1997, nine months ended December 31, 1996 and year ended March 31, 1996

(In thousands, except per share amounts)

	Series A Convertible Preferred Stock		6% Series C Convertible Redeemable Preferred Stock		Common Stock						
	Shares Issued	Amount	Shares Issued	Amount	Shares Issued	Amount	Paid-In Capital	Invested Equity	Treasury Stock	Retained Earnings	Total Shareholders' Equity
Balance March 31, 1995								$ 251,819			$ 251,819
Advances from Old Loral								116,362			116,362
Net loss								(13,785)			(13,785)
Incorporation of Loral Space & Communications Ltd.					12		$ 354,396	(354,396)			
Balance March 31, 1996					12		354,396	—			354,396
Advances from Old Loral							2,425				2,425
April 23, 1996 Distribution:											
Other assets transferred and liabilities assumed, net from Old Loral							4,070				4,070
Common stock issued to Old Loral shareholders and option holders					183,580	$1,836	254,152				255,988
Sale of Series A Convertible Preferred Stock	45,897	$459					343,541				344,000
Common stock issued to acquire interest in SS/L					7,500	75	100,238				100,313
Net income										$ 8,877	8,877
Balance December 31, 1996	45,897	459			191,092	1,911	1,058,822			8,877	1,070,069
Shares issued:											
Exercise of stock options and related tax benefits, net of shares tendered					208	2	2,015		$(1,680)		337
Employee savings plan					352	4	6,997				7,001
Acquisition of equity interest in SS/L			2,909	$149,600	8,043	80	130,820				280,500
Acquisition of Globalstar partnership interests					1,256	13	17,474				17,487
Mandatory exchange of Convertible Preferred Equivalent Obligations, net of unamortized issue costs			12,000	583,282							583,282
Preferred dividends $3.00 per share										(25,435)	(25,435)
Accretion to Series C Convertible Redeemable Preferred Stock redemption value				880						(880)	
Net income										40,004	40,004
Balance at December 31, 1997	45,897	$459	14,909	$733,762	200,951	$2,010	$1,216,128	$ —	$(1,680)	$ 22,566	$1,973,245

See notes to consolidated financial statements.

LORAL SPACE & COMMUNICATIONS LTD. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In thousands)

	Year ended December 31, 1997	Nine months ended December 31, 1996	Year ended March 31, 1996
Operating activities:			
Net income (loss)	$ 40,004	$ 8,877	$ (13,785)
Gain on the sale of K&F stock	(79,591)		
Equity in net loss of affiliates	47,273	4,709	8,628
Minority interest	4,834		
Deferred taxes	419	(926)	3,838
Accretion on GTL CPEOs	(1,739)		
Depreciation and amortization	62,764	1,051	
Changes in operating assets and liabilities, net of acquisitions:			
Contracts in process and inventories	(152,794)		
Deposits	(107,670)		
Other assets	(26,615)	(9,252)	
Accounts payable	69,574	(1,832)	
Customer advances	(57,778)		
Accrued expenses	(36,602)	(4,506)	
Taxes payable	24,873		
Long-term liabilities	(17,200)	(1,124)	
Cash used in operating activities	(230,248)	(3,003)	(1,319)
Investing activities:			
Acquisition of businesses, net of cash acquired	(545,642)		
Proceeds from the sale of K&F stock, net of expenses	79,591		
Investment in affiliates	(237,899)	(6,425)	(105,231)
Other assets	(63,482)		(9,800)
Proceeds from the sale of property, plant and equipment		5,003	
Capital expenditures	(255,340)	(540)	
Cash used in investing activities	(1,022,772)	(1,962)	(115,031)
Financing activities:			
Borrowings under revolving credit facility, net	32,812		
Proceeds from issuance of term loan	275,000		
Proceeds from convertible preferred equivalent obligations		583,292	
Proceeds from exercise of stock options and issuances to employee savings plan	7,338		
Contribution from minority partner	9,100		
Preferred dividends	(25,435)		
Proceeds from the Distribution		612,274	
Transaction expenses related to the Distribution		(12,286)	
Advances from Loral Corporation prior to the Distribution		2,425	116,362
Cash provided by financing activities	298,815	1,185,705	116,362
(Decrease) increase in cash and cash equivalents	(954,205)	1,180,740	12
Cash and cash equivalents — beginning of period	1,180,752	12	
Cash and cash equivalents — end of period	$ 226,547	$1,180,752	$ 12
Non-cash transactions:			
Mandatory exchange of Convertible Preferred Equivalent Obligations	$ 583,282		
Issuance of Series C Preferred Stock to acquire equity interest in SS/L	$ 149,600		
Issuance of Loral common stock to acquire equity interest in SS/L and Globalstar partnership interests	$ 148,387	$ 100,313	
Deferred purchase price to acquire Globalstar partnership interests	$ 24,787		
Assets transferred from Loral Corporation at the Distribution		$ 31,383	
Liabilities assumed from Loral Corporation at the Distribution		$ 27,313	
Transfer of GTL common stock to acquire equity interest in SS/L		$ 5,158	
Supplemental Information:			
Interest paid	$ 40,866		
Taxes paid	$ 8,901	$ 1,528	

See notes to consolidated financial statements.

1. Organization and Principal Business

Loral Space & Communications Ltd. and subsidiaries (the "Company" or "Loral") is one of the world's leading satellite companies, with substantial activities in satellite manufacturing and satellite-based communications services. Space Systems/Loral, Inc. ("SS/L") is a leading designer and manufacturer of space systems. Loral Skynet ("Skynet"), acquired March 14, 1997, is a leading provider of satellite communications services in the United States. Skynet owns and operates the Telstar satellite network and is expanding its business internationally. On November 17, 1997, a joint venture including Loral and another partner acquired 75% of SatMex, a satellite services provider to Mexico and South America. Loral also manages and is the largest equity owner of Globalstar, L.P. ("Globalstar"), a global, mobile satellite telephony system scheduled for service initiation in early 1999. Loral is pursuing additional satellite-based communications service opportunities including CyberStar, a proposed worldwide high-speed broadband data services system initially using leased Ku-band transponder capacity on Skynet's Telstar 5 satellite.

Loral was formed to effectuate the distribution of Loral Corporation's ("Old Loral") space and communications businesses (the "Distribution") to shareholders of Old Loral and holders of options to purchase Old Loral common stock pursuant to a merger agreement (the "Merger") dated January 7, 1996 between Old Loral and Lockheed Martin Corporation ("Lockheed Martin"). The Distribution of approximately 183.6 million shares of Loral common stock was made on April 23, 1996. In connection with the Distribution, Lockheed Martin contributed $612 million in cash to the Company. Of the amount contributed, $344 million represented the purchase of 45,896,977 shares of Loral Series A Convertible Preferred Stock ("Series A Preferred Stock"). Such stock is subject to certain voting limitations, restrictions on transfer and standstill provisions.

2. Summary of Significant Accounting Policies

Basis of Presentation

Loral operates on a December 31 fiscal year-end. The consolidated financial statements for the year ended December 31, 1997 and the nine months ended December 31, 1996, include the accounts of Loral Space & Communications Ltd. and its subsidiaries. The consolidated financial statements for the year ended December 31, 1997, include the results of SS/L for the full year and Skynet from March 14, 1997 (see Note 3). All intercompany transactions have been eliminated.

The space and communications operations of Old Loral (the "Space & Communications Operations") operated under a March 31 year-end. For the year ended March 31, 1996, the consolidated financial statements reflect that portion of the space and communications assets and operations included in Old Loral's historical financial statements that were spun-off to Loral.

Use of Estimates in Preparation of Financial Statements

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the amounts of expenses reported for the period. Actual results could differ from estimates.

A significant portion of Loral's revenue is associated with long-term contracts which require significant estimates. These estimates include forecasts of costs and schedules, estimating contract revenue related to contract performance (including orbital incentives) and the potential for component obsolescence in connection with long-term procurements. Other significant estimates include the estimated useful lives of the Company's satellites.

Cash and Cash Equivalents

Cash and cash equivalents consist of cash on hand and highly liquid investments with original maturities of three months or less.

2. Summary of Significant Accounting Policies — (continued)

Concentration of Credit Risk and Major Customers

Financial instruments which potentially subject Loral to concentrations of credit risk consist principally of cash and cash equivalents, foreign exchange contracts and contracts in process and long-term receivables. Loral's cash and cash equivalents are maintained with high-credit-quality financial institutions. Loral's customers are U.S. and foreign governments and large multinational corporations. The creditworthiness of such institutions is generally substantial and management believes that its credit evaluation, approval and monitoring processes mitigate potential credit risks.

Sales to foreign customers, primarily in Asia, represented 30% of revenues for the year ended December 31, 1997. Sales to the U.S. government represented 7% of revenues for the year ended December 31, 1997.

Inventories

Inventories consist principally of common subassemblies not specifically identified to contracts in process, and are valued at the lower of cost or market. Cost is determined using the first-in-first-out (FIFO) or average cost method.

Investments in Affiliates

Investments in affiliates are accounted for using the equity method. Income and losses of the affiliates are recorded based on Loral's beneficial interests. Intercompany profits arising from transactions between affiliates are eliminated to the extent of the Company's beneficial interests. Equity in losses of affiliates is not recognized after the carrying value has been reduced to zero, unless guarantees or other obligations exist.

In connection with Loral's investment in Globalstar, a development stage company, Loral capitalizes interest cost on its investment. At December 31, 1997 and 1996 the total amount of capitalized interest included in the investment in Globalstar was $23.5 million and $10.3 million, respectively.

Property, Plant and Equipment

Property, plant and equipment are stated at cost. Depreciation is provided primarily on the straight-line method over the estimated useful lives of the related assets. Leasehold improvements are amortized over the shorter of the lease term or the estimated useful life of the improvements.

Costs incurred in connection with the construction and successful deployment of the Company's satellites and related equipment are capitalized. Such costs include direct contract costs, allocated indirect costs, launch costs, launch insurance and construction period interest. Capitalized interest related to the construction of satellites for the year ended December 31, 1997 was $9.4 million. All capitalized satellite costs will be amortized over the estimated useful life of the related satellite. The estimated useful life of the satellites, ranging from 12 to 18 years, was determined by engineering analyses performed at the in-service date. Losses from unsuccessful launches and in-orbit failures of the Company's satellites, net of insurance proceeds, will be recorded in the period when the loss occurs.

Cost in Excess of Net Assets Acquired

The excess of the cost of purchased businesses over the fair value of net assets acquired is being amortized over 40 years using the straight-line method. Accumulated amortization was $10.8 million at December 31, 1997.

Valuation of Long-Lived Assets

The carrying value of Loral's long-lived assets is reviewed for impairment whenever events or changes in circumstances indicate that the asset may not be recoverable. Current and future profitability, as well as

2. Summary of Significant Accounting Policies — (continued)

current and future undiscounted cash flows, excluding financing costs, are primary indicators of recoverability. For the year ended December 31, 1997, there was no adjustment to the carrying value of Loral's long-lived assets resulting from these evaluations.

Other Assets

Other assets include a $25 million equity investment in CD Radio Inc. representing approximately 12% of CD Radio's equity. The Company accounts for this investment using the cost method.

Revenue Recognition

Revenue under long-term fixed-price contracts is recognized using the cost-to-cost percentage-of-completion method. Revenue includes estimated orbital incentives discounted to present value at the launch date. Costs include the development effort required for the production of high-technology satellites, non-recurring engineering and design efforts in early periods of contract performance, as well as the cost of qualification testing requirements.

Revenue under cost-reimbursable type contracts is recognized as costs are incurred; incentive fees are estimated and recognized over the contract term.

Contracts with the U.S. government are subject to termination by the U.S. government for convenience or for default. Other government contract risks include dependence on future appropriations and administrative allotment of funds and changes in government policies. Costs incurred under U.S. government contracts are subject to audit. Management believes the results of such audits will not have a material effect on Loral's financial position or results of operations.

Losses on contracts are recognized when determined. Revisions in profit estimates are reflected in the period in which the conditions that require the revision become known and are estimable.

In accordance with industry practice, contracts-in-process include unbilled amounts relating to contracts and programs with long production cycles, a portion of which may not be billable within one year.

Skynet provides satellite capacity under lease agreements that generally provide for the use of satellites and, in certain cases, earth stations for periods generally ranging from one year to the life of the satellite. Some of these agreements have certain obligations, including providing spare or substitute capacity, if available, in the event of satellite failure. If no spare or substitute capacity is available, the agreement may be terminated. Revenue under transponder lease agreements is recognized as services are performed.

Allocation of Certain Expenses

For the year ended March 31, 1996, the results of operations include allocations and estimates of certain expenses of Loral based upon estimates of actual services performed by Old Loral on behalf of Loral. The amount of corporate office expenses reflected in these financial statements has been estimated based primarily on the allocation methodology prescribed by government regulations pertaining to government contractors, which management of Loral believes to be a reasonable allocation method. However, the results of operations as presented herein may not be the same as would have occurred had the Space & Communications Operations been an independent entity.

Interest Expense

For the year ended March 31, 1996, interest was allocated to Loral based upon Old Loral's historical weighted average debt cost applied to the average investment in affiliates, which management believes to be a reasonable allocation method. Interest expense related to Old Loral's investment in Globalstar was capitalized because Globalstar has not commenced commercial operations.

2. **Summary of Significant Accounting Policies — (continued)**

Foreign Exchange Contracts

Loral enters into foreign exchange contracts as hedges against exchange rate fluctuations of future accounts receivable and accounts payable denominated in foreign currencies. Realized and unrealized gains and losses on foreign exchange contracts designated as hedges are deferred and recognized over the lives of the related contracts in process.

Stock-Based Compensation

As permitted by Statement of Financial Accounting Standards No. 123, "Accounting for Stock-Based Compensation," Loral accounts for stock-based awards to employees using the intrinsic value method in accordance with Accounting Principles Board Opinion No. 25, "Accounting for Stock Issued to Employees".

Income Taxes

Commencing with the Distribution, Loral is subject to U.S. Federal, state and local income taxation at regular corporate rates plus an additional 30% "branch profits" tax on any income that is effectively connected with the conduct of a U.S. trade or business. U.S. subsidiaries are subject to regular corporate tax on their worldwide income.

For the year ended March 31, 1996, the Space & Communications Operations were included in the consolidated U.S. Federal income tax return and certain combined and separate state and local income tax returns of Old Loral. However, for purposes of these financial statements, the provision (benefit) for income taxes is computed as if the Space & Communications Operations were a separate taxpayer. Accordingly, the provision (benefit) for income taxes is based upon reported income (loss) before income taxes. Current income tax liabilities (benefits) are considered to have been paid (received) by Old Loral and are recorded through the invested equity account with Old Loral.

Deferred income taxes for all periods presented reflect the tax effect of temporary differences between the carrying amount of assets and liabilities for financial and income tax reporting and are measured by applying tax rates in effect at the end of each year.

Earnings Per Share

In 1997, the Financial Accounting Standards Board issued Statement No. 128, "Earnings per Share" ("SFAS 128"). SFAS 128 replaced the calculation of primary and fully diluted earnings per share with basic and diluted earnings per share. Unlike primary earnings per share, basic earnings per share excludes any dilutive effects of options, warrants and convertible securities. Dilutive earnings per share is very similar to the previously reported fully diluted earnings per share. All earnings per share amounts have been presented and, where appropriate, restated to conform to the requirements of SFAS 128 (see Note 14).

Accounting Pronouncements

In June 1997, the Financial Accounting Standards Board issued Statement No. 130, "Reporting Comprehensive Income" ("SFAS 130") and Statement No. 131, "Disclosures About Segments of an Enterprise and Related Information" ("SFAS 131"), and in February 1998, issued Statement No. 132, "Employers' Disclosures About Pensions and Other Postretirement Benefits" ("SFAS 132"). SFAS 130 establishes standards for the reporting and display of comprehensive income and its components in a full set of general purpose financial statements. Comprehensive income is defined as the change in equity of a business enterprise during a period from transactions and other events and circumstances from nonowner sources. SFAS 131 establishes annual and interim reporting standards for an enterprise's business segments and related disclosures about its products, services, geographic areas and major customers. SFAS 132 expands and standardizes the disclosure requirements for pensions and other postretirement benefits. The Company is

2. Summary of Significant Accounting Policies — (continued)

required to adopt SFAS 130, SFAS 131 and SFAS 132 in 1998, and the Company's consolidated financial statements will reflect the appropriate disclosures.

Reclassifications

Certain reclassifications have been made to conform prior year amounts to current year presentation.

3. Acquisitions

SS/L

At April 1, 1996, Loral had an effective 32.7% interest in SS/L. In 1996, Loral made a strategic decision to increase its ownership of SS/L to 100%. The first step in implementing this decision was the acquisition by Loral in August 1996 of the 18.3% interest in SS/L owned by certain partnerships affiliated with Lehman Brothers (the "Lehman Partnerships") in exchange for 7.5 million newly issued shares of Loral common stock, 534,512 shares of common stock of GTL previously held by the Company and $4 million in cash. As a result of this transaction, the Company increased its interest in SS/L from 32.7% to 51%.

In February 1997, Loral agreed to acquire the remaining 49% of the common stock of SS/L held by four international aerospace and communications companies (the "Alliance Partners") for $374 million. In March 1997, Loral acquired 24.5% of SS/L's common stock for $93.5 million in cash and $93.5 million of Loral's Convertible Preferred Equivalent Obligations ("CPEOs"). In June 1997, the Company acquired the remaining 24.5% of SS/L's common stock for $187 million in the form of 8,042,922 shares of Loral common stock and 1,063,663 shares of Series C Convertible Redeemable Preferred Stock ("Series C Preferred Stock"). The aggregate purchase price of the 67.3% interest in SS/L acquired by Loral was $493.2 million. The purchase price represented $174.4 million in excess of SS/L's proportionate net book value which was allocated primarily to the incremental value of SS/L's investment in Globalstar of $62.2 million and cost in excess of net assets acquired of $105.9 million. The consolidated financial statements include the results of operations of SS/L since January 1, 1997, with a reduction for the earnings attributed to the minority shareholders.

Skynet

On March 14, 1997, Loral acquired Skynet from AT&T for $462.1 million in cash. The fair value of assets and liabilities recorded in connection with the purchase price allocation was $569.8 million and $107.7 million, respectively. Loral's consolidated financial statements include the results of operations of Skynet from the date of acquisition.

Had the acquisitions of SS/L, Skynet and the investment in SatMex (see Note 6) occurred on April 1, 1996 the unaudited pro forma revenue, net loss applicable to common stockholders and related basic and diluted loss per share for the year ended December 31, 1997 and the nine months ended December 31, 1996 would have been: $1.3 billion and $1.0 billion; $19.2 million and $26.1 million; $0.08 and $0.11, and, $0.08 and $0.11, respectively. These results, which are based on various assumptions, are not necessarily indicative of what would have occurred had the acquisitions been consummated as of April 1, 1996.

Orion

On March 20, 1998, Loral acquired all of the outstanding stock, as defined, of Orion Network Systems, Inc. ("Orion") in exchange for Loral common stock. Loral issued 17.9 million shares of its common stock and assumed existing Orion options and warrants to purchase 1.9 million shares of Loral common stock representing an aggregate purchase price of $467 million. Loral will include Orion's results from the date of acquisition using the purchase method of accounting. Orion is a provider of satellite-based communications services, focused primarily on private communications network services, Internet services and video distribution and other satellite transmission services. Orion provides multinational corporations with private communi-

3. Acquisitions — (continued)

cations networks designed to carry high speed data, fax, video teleconferencing, voice and other specialized services. Orion currently has one satellite in orbit and two satellites under construction.

Had the acquisitions of SS/L, Skynet, the investment in SatMex (see Note 6) and Orion occurred on April 1, 1996 the unaudited pro forma revenue, net loss applicable to common stockholders and related basic and diluted loss per share for the year ended December 31, 1997 and the nine months ended December 31, 1996 would have been: $1.4 billion and $1.0 billion; $95.4 million and $112.2 million; $0.36 and $0.43; and, $0.36 and $0.43, respectively. These results, which are based on various assumptions, are not necessarily indicative of what would have occurred had the acquisitions been consummated as of April 1, 1996.

4. Contracts-in-Process

	December 31, 1997 (In thousands)
U.S. government contracts:	
Amounts billed	$ 5,243
Unbilled contract receivables	10,274
	15,517
Commercial contracts:	
Amounts billed	194,997
Unbilled contract receivables	257,620
	452,617
	$468,134

Unbilled amounts include recoverable costs and accrued profit on progress completed which has not been billed. Such amounts are billed upon shipment of the product, achievement of contractual milestones, or completion of the contract and are reclassified to billed receivables.

Billed receivables relating to long-term contracts are expected to be collected within one year. Loral classifies the orbital component of unbilled receivables expected to be collected beyond one year as long term. Long-term receivable balances related to satellite orbital incentive payments at December 31, 1997 are scheduled to be received as follows (in thousands):

1999	$11,416
2000	10,792
2001	10,782
2002	10,657
Thereafter	34,992
	$78,639

Selling, general and administrative expenses for the year ended December 31, 1997 were $125.7 million and include independent research and development costs, which are expensed as incurred, of $56.8 million.

5. Property, Plant and Equipment

	December 31, 1997	December 31, 1996
	(In thousands)	
Land and land improvements	$ 24,999	
Buildings	58,443	
Leasehold improvements	10,234	$ 171
Equipment, furniture and fixtures	154,684	20,083
Satellites and earth stations	506,852	
Satellites under construction	233,204	
Construction in progress	29,823	
	1,018,239	20,254
Accumulated depreciation	(91,560)	(2,315)
	$ 926,679	$17,939

Depreciation expense was $52.0 million and $1.1 million for the year ended December 31, 1997 and the nine months ended December 31, 1996. No depreciation expense was allocated to the Space & Communications Operations of Old Loral for the year ended March 31, 1996.

6. Investments in Affiliates

	December 31, 1997	December 31, 1996
	(In thousands)	
Globalstar	$383,714	$175,639
SatMex	88,925	
SS/L		267,418
K&F		23,568
Deferred K&F gain		(23,568)
	$472,639	$443,057

Equity in net income (loss) of affiliates consists of (in thousands):

	Year ended December 31, 1997	Nine months ended December 31, 1996	Year ended March 31, 1996
Globalstar	$(42,503)	$(18,105)	$(20,980)
Tax benefit of Globalstar partnership losses (see Note 8)	1,626		8,308
SatMex	(6,396)		
SS/L		13,396	4,044
	$(47,273)	$ (4,709)	$ (8,628)

Globalstar

Loral is the managing partner of Globalstar. Globalstar will operate a worldwide, LEO satellite-based digital telecommunications system (the "Globalstar™ System") that is scheduled to commence service in early 1999. The Globalstar System is designed to enable local service providers to offer low-cost, high quality wireless voice telephony and data services in virtually every populated area of the world. Currently, Globalstar's designated service providers have agreed to offer service and seek all necessary regulatory approvals in more than 100 nations, accounting for about 88% of the world's population. On February 14, 1998, Globalstar launched the first four satellites of its 56 (including eight in-orbit spares) satellite constellation.

6. **Investments in Affiliates — (continued)**

In May 1997, Globalstar Telecommunications Limited ("GTL"), a public company that acts as a general partner of Globalstar, issued a two-for-one stock split. Accordingly, all GTL share amounts have been adjusted to reflect the two-for-one stock split. Prior to the two-for-one stock split, GTL's equity securities and convertible securities were represented by equivalent Globalstar partnership interests on a one-for-one basis. Globalstar's partnership interests were not affected by the GTL stock split and, accordingly, GTL's equity securities and convertible securities are now represented by equivalent Globalstar partnership interests on a two-for-one basis.

At December 31, 1997, Loral had a direct and indirect ownership of 20,962,211 (40.1%) ordinary partnership interests of the total 52,319,076 Globalstar ordinary partnership interests outstanding. A portion of Loral's investment in Globalstar is held in the form of 5,439,678 shares of GTL common stock. At December 31, 1997, the market value of the GTL shares, based on the last reported sales price, was $267.2 million.

On September 14, 1995, Old Loral in its capacity as managing general partner of Globalstar, granted certain officers of Old Loral, who were also officers of GTL and Globalstar, options to purchase 280,000 shares of the GTL common stock owned by Loral at an exercise price of $10.00 per share. On December 12, 1995, Loral granted non-employee directors of Loral options to purchase 400,000 shares of the GTL common stock owned by Loral at an exercise price of $16.69 per share. These options were immediately exercisable and expire 12 years from date of grant; no options were exercised or cancelled during the year. On October 9, 1996, Loral, in its capacity as managing general partner, granted certain officers of Loral, who were also officers of GTL and Globalstar, options to purchase 304,000 shares of the GTL common stock owned by Loral at an exercise price of $12.50 per share. Such options vest over a three-year period and expire 10 years from date of grant; no options were exercised or cancelled during the year.

On December 15, 1995, Globalstar entered into a $250 million credit agreement (the "Globalstar Credit Agreement") with a group of banks. Lockheed Martin, SS/L and certain other Globalstar partners have guaranteed $206.3 million, $11.7 million and $32.0 million of the Globalstar Credit Agreement, respectively. In addition, Loral agreed to indemnify Lockheed Martin for any liability in excess of $150 million. In exchange for the guarantee and indemnity, GTL issued warrants to purchase 8,370,636 shares of GTL common stock at $13.25 per share as follows: Loral and SS/L 2,275,044 warrants, Lockheed Martin 5,022,380 warrants and certain other Globalstar partners 1,073,212 warrants. In February 1997, GTL accelerated the vesting and exercisability of these warrants and the holders exercised such warrants. In addition, GTL distributed to the holders of its common stock rights to subscribe for and purchase 2,262,336 GTL shares for a price of $13.25 per share of which Loral received rights to purchase 318,344 shares and agreed to purchase all shares not purchased upon exercise of the rights. In March 1997, Loral exercised warrants to purchase 2,275,044 shares of common stock of GTL for $30.1 million and, in April 1997, Loral exercised its right as a shareholder in GTL to purchase an additional 350,348 shares of GTL common stock for $13.25 per share. GTL used the proceeds from the exercise of the warrants and the rights, to purchase additional Globalstar ordinary partnership interests.

In March 1996, Loral purchased $100 million principal amount of GTL 6½% Convertible Preferred Equivalent Obligations, due 2006 par value $50 per share, ("GTL CPEOs") for $97 million. In April 1996, Loral purchased an additional $2.5 million principal amount of the GTL CPEOs for $2.4 million. Such amounts are included in the investment in Globalstar. The GTL CPEOs must be redeemed by GTL on March 1, 2006. Loral, at its option, may convert its holdings of GTL's CPEO's into 3,153,846 shares of GTL common stock subject to adjustment for certain anti-dilution provisions. Loral's interest income for the year and nine months ended December 31, 1997 and 1996 includes $7.2 million and $5.5 million related to its investment in GTL CPEOs.

6. **Investments in Affiliates — (continued)**

During 1997, Loral acquired 2,208,372 Globalstar ordinary partnership interests from other Globalstar partners for $97.5 million in cash and 1,255,684 shares of Loral common stock. In addition, on October 21, 1997 Loral acquired 540,000 ordinary partnership interests of Globalstar from another Globalstar partner, for $24.8 million. The purchase price is payable in installments during 1998 and bears interest at 6%. Any unpaid balance at December 31, 1998 is due in cash.

Pursuant to the Globalstar partnership agreement, Loral is responsible for managing the operations of Globalstar and is entitled to receive a Managing Partner's Allocation on commencement of commercial operations.

SS/L is the prime contractor for the construction and launch of the satellite constellation under a contract valued at $1.4 billion. SS/L has awarded subcontracts to third parties, including other investors in Globalstar, for substantial portions of its obligations under the contract. Revenue recorded under the Globalstar contract for the year ended December 31, 1997 was $408.1 million. Billed and unbilled receivables from Globalstar at December 31, 1997, were $84.2 million.

Globalstar's current budgeted expenditures for the cost for the design, construction and development of the Globalstar System, including working capital, cash interest on borrowings and operating expenses, are approximately $2.7 billion. Globalstar has raised or received commitments for approximately $2.6 billion in equity, debt and vendor financing. In addition, Globalstar will purchase from SS/L eight additional spare satellites for $175 million that will increase Globalstar's ability to have at least 40 satellites in service during 1999, even in the event of launch failures. If the launch program is successful, the additional satellites will serve as ground spares, readily available for launch to replenish the constellation as needed in response to satellite attrition during the first generation, or to increase system capacity as required. If Globalstar were to experience a launch failure, the costs associated with the construction and launch of replacement satellites would be substantially covered by insurance, and in that event the cost of the additional satellites used as replacements, would be reimbursed to Globalstar.

SS/L provides Globalstar with approximately $310 million of the contract billings to be deferred as vendor financing. Of the $310 million, $90 million is interest bearing at the 30-day LIBOR rate plus 3% per annum. The remaining $220 million of vendor financing is non-interest bearing. Globalstar will repay the non-interest bearing portions as follows: $49 million following the launch and acceptance of 24 or more satellites (the "Preliminary Constellation"), $61 million upon the launch and acceptance of 48 or more satellites (the "Full Constellation"), and the remainder in equal installments over the five-year period following acceptance of the Preliminary and Full Constellations. SS/L's subcontractors have assumed a portion of this vendor financing which totals approximately $121 million and will be paid on similar terms. Payment of the $90 million interest bearing vendor financing will be deferred until December 31, 1998 or the Full Constellation Date, whichever is earlier. Thereafter, interest and principal will be repaid in twenty equal quarterly installments over the next five years. In addition, under the contract for the additional eight spare satellites, SS/L will provide an additional $43 million of vendor financing of which $19 million will be interest bearing. The repayment terms are substantially the same as the prior vendor financing. At December 31, 1997, $90 million was due under these arrangements, all of which was interest bearing.

SatMex

In connection with the privatization by the Federal Government of Mexico (the "Mexican Government") of its fixed satellite services business, Loral and Telefonica Autrey, S.A. de C.V. ("Telefonica Autrey") formed a joint venture, Firmamento Mexicano, S. de R.L. de C.V. ("Holdings"). Holdings acquired 75% of the outstanding capital stock of Satélites Mexicanos, S.A. de C.V. ("SatMex") for $646.8 million. The purchase price was financed by a Loral equity contribution of $94.6 million, a Telefoncia Autrey equity contribution of $50.9 million and debt issued by Holdings. As part of the acquisition, Holdings issued a

6. Investments in Affiliates — (continued)

$125.1 million seven year obligation bearing interest at 6.03% to the Mexican Government (the "Government Obligation") in consideration for the assumption by SatMex of the debt incurred by Holdings in connection with the acquisition. The debt of SatMex and Holdings is non-recourse to Loral and Telefonica Autrey. However, Loral and Telefonica Autrey have agreed to maintain assets in a collateral trust in an amount equal to the value of the Government Obligation through December 30, 2000 and, thereafter, in an amount equal to 1.2 times the Government Obligation until maturity. Loral has a 65% economic interest in Holdings and a 49% indirect economic interest in SatMex.

Loral, together with Telefonica Autrey, will be responsible for managing SatMex and will receive an aggregate management fee, based on a sliding scale, applied to SatMex's quarterly gross revenues up to a maximum of 3.75% of cumulative gross revenues. In addition, Loral Skynet will license certain intellectual property to SatMex for a fee of 1.5% of SatMex's gross revenues. Such fees were not significant for the year ended December 31, 1997.

SS/L

In 1997, Loral discontinued the use of the equity method of accounting for SS/L and consolidates SS/L's financial position and results of operations in its financial statements (see Note 3).

The SS/L stockholders' agreement provided for management fees to be paid to Loral, ranging from 0.5% to 1% of sales, as defined, depending upon SS/L's operating performance. Such management fees were $5.1 million and $5.6 million for the nine months ended December 31, 1996 and the year ended March 31, 1996, respectively. The stockholders' agreement also required SS/L to pay Loral an annual fee for overhead reimbursement, not to exceed 1% of SS/L's adjusted sales, as defined, for each fiscal year. This fee amounted to $2.7 million and $3.4 million for the nine months ended December 31, 1996 and for the year ended March 31, 1996, respectively.

At December 31, 1996, other current assets include $9.3 million due from SS/L primarily related to these management fees and overhead reimbursement.

K&F

Old Loral's 22.5% voting equity interest in K&F Industries, Inc. ("K&F") was transferred to Loral at the Distribution. Loral used the equity method to account for its investment in K&F; however, no income or loss was recognized due to K&F's financial position. In December 1997, Loral sold its 22.5% equity interest for $80.6 million and recorded a $79.6 million gain on the sale.

Summary Financial Data of Affiliates

The following table presents summary financial data for Globalstar at December 31, 1997 and 1996 and for each of the three years in the period ended December 31, 1997 and cumulative (in thousands):

	Year ended December 31,			Cumulative March 23, 1994 (commencement of operations) to December 31, 1997
	1997	1996	1995	
Statement of operations data:				
Revenues	$ —	$ —	$ —	$ —
Operating loss	88,071	61,025	80,226	257,349
Net loss	67,586	54,646	68,237	216,713
Preferred distributions	21,202	17,323		38,525
Net loss applicable to ordinary partnership interests	88,788	71,969	68,237	255,238

6. Investments in Affiliates — (continued)

	December 31, 1997	December 31, 1996
Balance sheet data:		
Current assets	$ 493,780	$ 21,786
Total assets	2,149,053	942,913
Current liabilities	143,810	75,267
Long-term debt	1,099,531	
Long-term liabilities	221,795	250,423
Redeemable preferred partnership interests	303,089	302,037
Ordinary partners' capital	380,828	315,186

The following table presents unaudited summary financial data for SatMex at December 31, 1997, and for the period November 17, 1997 (date of acquisition) through December 31, 1997 (in thousands):

	November 17, 1997 to December 31, 1997
Statement of operations data:	
Revenues	$ 12,540
Operating income	4,757
Net loss	13,058
	December 31, 1997
Balance sheet data:	
Current assets	$ 62,457
Total assets	936,554
Current liabilities	5,438
Long-term debt	570,000
Shareholders' equity	361,116

The following table presents summary financial data for SS/L at December 31, 1996 and for the nine months ended December 31, 1996 and the year ended March 31, 1996 (in thousands):

	Nine months ended December 31, 1996	Year ended March 31, 1996
Statement of operations data:		
Revenues	$1,017,653	$1,121,619
Operating income	54,011	22,054
Net income	31,025	12,367
		December 31, 1996
Balance sheet data:		
Current assets		$ 521,510
Total assets		1,059,064
Current liabilities		377,929
Long term debt		127,586
Other noncurrent liabilities		72,666
Minority interest		1,990
Shareholders' equity		478,893

7. Long-Term Debt

	December 31, 1997 (In thousands)
Term loan, 7.2%	$275,000
Revolving credit facility, 7.2%	55,000
Note purchase facility	88,234
Export-Import credit facility	17,164
Total debt	435,398
Less, current maturities	2,146
	$433,252

Loral SpaceCom Corporation ("Loral SpaceCom"), a wholly owned subsidiary of Loral, and SS/L have entered into an $850 million amended and restated credit and participation agreement (the "Credit Agreement") with a group of banks dated November 14, 1997. The Credit Agreement provides for a $275 million term loan facility, a $500 million revolving credit facility, of which up to $175 million may be used for letters of credit, and a separate $75 million letter of credit facility. Both the term loan facility and revolving credit facility are for a period of five years. The separate letter of credit facility runs for a two-year period. The term loan facility requires repayment in twelve consecutive quarterly installments beginning December 31, 1999. The first four installments are $18,750,000 each with the final eight installments being $25,000,000 each. Borrowings under the facilities are secured by the stock of Loral SpaceCom and SS/L and bear interest, at Loral SpaceCom's option, at various rates based on margins over the lead bank's base rate or the London Interbank Offer Rate ("LIBOR") for periods of one to six months. Loral SpaceCom pays a commitment fee on the unused portion of the facilities. The Credit Agreement contains customary covenants including an interest coverage ratio and debt to capitalization ratios. In addition, the Credit Agreement contains limitations on indebtedness, liens, guarantee obligations, asset sales, dividends, investments and transactions with affiliates. Under the terms of the Credit Agreement, Loral SpaceCom may pay dividends to its parent if the cumulative dividend payments do not exceed 50% of cumulative net income, as defined, and the ratio of funded debt to EBITDA, as defined, is less than three to one. Currently, Loral SpaceCom, a wholly owned subsidiary of Loral, has equity and intercompany debt of approximately $1.1 billion, of which approximately $200 million can be paid to its parent.

In 1994, SS/L entered into a $139.3 million note purchase facility (the "Note Purchase Facility") with an Italian bank. Borrowings are determined by formula and are made in accordance with a specified schedule through the earlier of June 30, 1998, or until the facility is fully disbursed. The outstanding principal is to be repaid on the earlier of twenty-three months from the final acceptance date of certain satellite deliveries or April 30, 2000. Interest is charged at a weighted average annual rate of 4.26% and is payable semiannually. All borrowings under this facility reduce the amount available under the Credit Agreement.

SS/L borrowed a total of $42.9 million under an export-import credit facility (the "EX-IM Facility") with a Japanese bank. The EX-IM Facility is fully secured by a letter of credit arrangement with another bank. At December 31, 1997, no amounts remained available for borrowing under this facility. The outstanding principal is to be repaid in semiannual installments through November 1, 2005. Interest is charged at LIBOR less ¼% and is payable semiannually on May 1 and November 1.

The aggregate maturities for the years 1998 through 2002 are as follows: $2,146,000, $20,896,000, $83,396,000, $102,146,000 and $220,380,000.

8. Income Taxes

The provision (benefit) for income taxes consists of the following (in thousands):

	Year ended December 31, 1997	Nine months ended December 31, 1996	Year ended March 31, 1996
Current:			
U.S. Federal	$27,204	$2,913	$(5,772)
State and local	7,248	925	(660)
	34,452	3,838	(6,432)
Deferred, principally U.S. Federal	419	(926)	3,652
Total provision (benefit) for income taxes	$34,871	$2,912	$(2,780)

The provision for income taxes excludes: current tax benefits related to the exercise of stock options, credited directly to Stockholders' Equity, of $0.5 million for the year ended December 31, 1997; a current tax benefit of $4.3 million and $0.2 million for the years ended December 31, 1997 and March 31, 1996, respectively, and, a deferred tax liability of $2.7 million and a benefit of $8.1 million for the years ended December 31, 1997 and March 31, 1996, respectively, related to the Globalstar partnership loss included in equity in net loss of affiliates.

The effective income tax rate differs from the statutory Federal income tax rate for the following reasons:

	Year ended December 31, 1997	Nine months ended December 31, 1996	Year ended March 31, 1996
Statutory U.S. Federal income tax rate	35.0%	35.0%	(35.0)%
State and local income taxes, net of Federal income tax	3.0	3.0	(4.0)
Foreign source income and losses taxed at lower rate	(13.3)	(21.3)	
Non-deductible amortization of cost in excess of net assets acquired	2.6		
Undistributed income of affiliates			4.0
Other, net	.2	1.0	
Effective income tax rate	27.5%	17.7%	(35.0)%

At December 31, 1997, the Company had net operating loss carryforwards of approximately $28.4 million and tax credit carryforwards of approximately $3.6 million which generally expire through 2012. For the twelve months ended December 31, 1997 and the nine months ended December 31, 1996, income before income taxes includes approximately $72 and $10 million, respectively, of foreign source income.

8. Income Taxes — (continued)

The significant components of the net deferred income tax liability are (in thousands):

	December 31, 1997	December 31, 1996
Postretirement benefits other than pensions	$(14,927)	
Inventoried costs	(37,457)	
Net operating loss and tax credit carryovers	(13,562)	
Compensation and benefits	(11,129)	$ 32
Other, net	(74)	251
Pension costs	5,957	52
Property, plant and equipment	54,838	4,388
Income recognition on long-term contracts	120,237	
Net deferred income tax liability	$103,883	$4,723

9. Shareholders' Equity

Series A Preferred Stock

Significant terms of the Company's Series A Preferred Stock include a liquidation preference of $.01 per share prior to pro rata participation with the common stock and the ability to convert to common stock upon the receipt of certain antitrust clearance or sales to an unaffiliated third party. The Series A Preferred Stock has the same voting rights as the Company's common stock except, it has no right to vote for the election of directors.

Series B Preferred Stock

The Series B Preferred Stock will, if issued, be junior to any other series of preferred stock which may be authorized and issued.

6% Series C Preferred Stock

On November 1, 1996, the Company sold $600 million of 6% Convertible Preferred Equivalent Obligations which, were mandatorily exchanged on June 5, 1997 into shares of the Company's Series C Preferred Stock resulting in a reclassification of these amounts into shareholders' equity. The Series C Preferred Stock has an aggregate liquidation preference equal to the aggregate redemption value and a mandatory redemption date of November 1, 2006. The Series C Preferred Stock is convertible into shares of common stock of the Company at a conversion price of $20 per share. At December 31, 1997, the outstanding Series C Preferred Stock was convertible into 37,273,593 shares of Loral common stock.

The Series C Preferred Stock, with respect to dividend rights and rights upon liquidation, winding up and dissolution, ranks *pari passu* with Loral's Series A Preferred Stock and senior to or *pari passu* with all other existing and future series of preferred stock of Loral and senior to Loral common stock. The Series C Preferred Stock is redeemable in cash or Loral common stock at any time, in whole or in part, at the option of the Company (at a premium which declines over time) commencing November 5, 1999.

Stock Plans

In April 1996, Loral established the 1996 Stock Option Plan. An aggregate of 12 million shares of common stock were reserved for issuance. Under this plan, options are granted at the discretion of the Company's Board of Directors to employees of the Company and its affiliates. Such options become

9. **Shareholders' Equity — (continued)**

exercisable as determined by the Board, generally over five years, and generally expire no more than 10 years from the date of the grant.

As discussed in Note 2, the Company continues to account for its stock-based awards using the intrinsic value method in accordance with Accounting Principles Board Opinion No. 25, "Accounting for Stock Issued to Employees" and its related interpretations. Accordingly, no compensation expense based on the fair value method has been recognized in the financial statements for employee stock arrangements.

Statement of Financial Accounting Standards No. 123, "Accounting for Stock-Based Compensation," ("SFAS 123") requires the disclosure of pro forma net income and earnings per share as though the Company had adopted the fair value method. Under SFAS 123, the fair value of stock-based awards to employees is calculated through the use of option pricing models, even though such models were developed to estimate the fair value of freely tradable, fully transferable options without vesting restrictions, which significantly differ from the Company's stock option awards. These models also require subjective assumptions, including future stock price volatility and expected time to exercise, which greatly affect the calculated values. The Company's calculations were made using the Black-Scholes option pricing model with the following weighted average assumptions for 1997 and 1996: expected life, 6 months following vesting; stock volatility, 25%; risk free interest rate, 5.5% to 6.55% based on date of grant; and no dividends during the expected term. The Company's calculations are based on a multiple option valuation approach and forfeitures are recognized as they occur. If the computed fair values of the 1997 and 1996 awards, including stock-based compensation awards to employees of the Company's affiliates, had been amortized to expense over the vesting period of the awards, pro forma net income applicable to common stockholders would have decreased by $4.4 million ($.02 per diluted share) and $4.1 million ($.02 per diluted share) to $9.3 million ($.04 per diluted share) and $4.8 million ($.02 per diluted share) for the year and nine months ended December 31, 1997 and 1996, respectively.

A summary of the status of the Company's stock option plans as of December 31, 1997 and 1996 and changes during the periods then ended is presented below:

	Shares	Weighted-Average Exercise Price
Outstanding at March 31, 1996	—	$ —
Granted (weighted average fair value $2.93 per share)	6,412,000	10.60
Forfeited	500	10.50
Outstanding at December 31, 1996	6,411,500	10.60
Granted (weighted average fair value $3.97 per share)	732,500	13.93
Exercised	207,750	10.50
Forfeited	175,800	12.98
Outstanding at December 31, 1997	6,760,450	$10.90
Options exercisable at December 31, 1997	2,014,250	$10.53
Options exercisable at December 31, 1996	1,200,000	$10.50

At December 31, 1997, the range of exercise prices and the weighted-average remaining contractual life of outstanding options was $10.50 to $20.47 and 8.4 years, respectively. The range for the options exercisable at December 31, 1997 was $10.50 to $15.94. All options granted during the year were non-qualified stock options. As of December 31, 1997, 5,031,800 shares of common stock were available for future grant under the Plan.

10. Pensions and Other Employee Benefits

Pensions

The Company maintains a pension plan and a supplemental retirement plan. These plans are defined benefit pension plans and members in certain locations may contribute to the pension plan in order to receive enhanced benefits. Eligibility for participation in these plans vary and benefits are based on members' compensation and/or years of service. In connection with the Distribution, Loral assumed the obligations of such members previously employed by Old Loral, in exchange for plan assets as defined. The Company's funding policy is to fund the pension plan in accordance with the Internal Revenue Code and regulations thereon and to fund the supplemental retirement plan on an actuarial basis, including service cost and amortization amounts. Contributions of $1.9 million were made for the year ended December 31, 1997, and no contributions were made for the nine months ended December 31, 1996. Plan assets are generally invested in U.S. government and agency obligations and listed stocks and bonds.

Pension cost includes the following components (in thousands):

	Year ended December 31, 1997	Nine months ended December 31, 1996
Service cost-benefits earned during the period	$ 6,538	$ 268
Interest cost on projected benefit obligation	14,277	1,410
Actual return on plan assets	(28,044)	(499)
Net amortization and deferral	11,619	(77)
Total pension cost	$ 4,390	$1,102

The following presents the plans' funded status and amounts recognized in the balance sheet (in thousands):

	December 31,		
	1997		1996
	Assets exceed accumulated benefits	Accumulated benefits exceed assets	Accumulated benefits exceed assets
Actuarial present value of benefit obligations:			
Vested benefits	$154,328	$ 24,210	$ 27,831
Accumulated benefits	$156,443	$ 24,226	$ 27,845
Effect of projected future salary increases	22,929	568	694
Projected benefits	179,372	24,794	28,539
Plan assets at fair value	189,546	8,467	9,450
Plan assets in excess of (less than) projected benefit obligation	10,174	(16,327)	(19,089)
Unrecognized prior service cost	(72)	88	
Unrecognized net loss (gain)	3,115	(1,048)	(445)
Prepaid (accrued) pension cost	$ 13,217	$ (17,287)	$(19,534)

The principal actuarial assumptions were:

	1997	1996
Discount rate	7.25%	7.75%
Rate of increase in compensation levels	4.50%	4.50%
Expected long-term rate of return on plan assets	9.50%	9.50%

10. Pensions and Other Employee Benefits — (continued)

Postretirement Health Care and Life Insurance Benefits

In addition to providing pension benefits, the Company provides certain health care and life insurance benefits for retired employees and dependents. Participants are eligible for these benefits when they retire from active service and meet the eligibility requirements for the Company's pension plan. These benefits are funded primarily on a pay-as-you-go basis with the retiree generally paying a portion of the cost through contributions, deductibles and coinsurance provisions.

Postretirement health care and life insurance costs include the following components (in thousands):

	Year ended December 31, 1997	Nine months ended December 31, 1996
Service cost - benefits earned during the period	$ 915	$13
Interest cost on accumulated postretirement benefit obligation	2,314	9
Actual return on plan assets	(136)	
Net amortization and deferral	(1,137)	
Total postretirement health care and life insurance costs	$ 1,956	$22

The following presents the plans funded status and amounts recognized in the balance sheet (in thousands):

	December 31, 1997	December 31, 1996
Actuarial present value of benefit obligations:		
Retirees	$16,695	$ —
Fully eligible active participants	3,864	30
Other active participants	15,451	148
Accumulated postretirement benefit obligations	36,010	178
Plan assets at fair value	2,022	
Accumulated postretirement benefit obligations in excess of plan assets	33,988	178
Unrecognized prior service cost	2,894	
Unrecognized net gain (loss)	(5,771)	11
Accrued postretirement health care cost	$31,111	$189
The principal actuarial assumptions were:		
Discount rate	7.25%	7.75%
Expected long-term rate of return on plan assets	9.50%	

The health care cost trend rates at December 31, 1997 and 1996, were assumed to be 9.96% and 10.59%, respectively, decreasing gradually to an ultimate rate of 5.50% by the year 2004. Changing the assumed health care cost trend rate by 1% in each year would change the accumulated postretirement benefit obligation at December 31, 1997 by approximately $6.7 million and the aggregate service and interest cost components for 1997 by approximately $0.8 million.

Employee Savings Plan

In April, 1996 the Company adopted the employee savings plan which provides that the Company match the contributions of participating employees up to a designated level. Under this plan, the matching

10. Pensions and Other Employee Benefits — (continued)

contributions in Loral common stock or cash were $5.6 million for the year ended December 31, 1997 and $0.1 million for the nine months ended December 31, 1996.

11. Financial Instruments

The following methods and assumptions were used to estimate the fair value of each class of financial instruments for which it is practicable to estimate fair value:

The carrying amount of cash and cash equivalents approximates fair value because of the short maturity of those instruments. The fair value of the Series C Preferred Stock and the CPEO's are based on market quotations and the fair value of the Company's long-term debt is based on carrying value due to the short-term variable interest rate on the outstanding borrowings.

The estimated fair values of the Company's financial instruments are as follows (in thousands):

	December 31, 1997	
	Carrying Amount	Fair Value
Cash and cash equivalents	$ 226,547	$ 226,547
Long-term debt, including current maturities	435,398	435,398
Series C Preferred Stock	733,762	916,930

	December 31, 1996	
	Carrying Amount	Fair Value
Cash and cash equivalents	$1,180,752	$1,180,752
Convertible Preferred Equivalent Obligations	583,292	681,000

Foreign Currency Hedges

At December 31, 1997, the Company had foreign currency exchange contracts (forwards and swaps) with several banks to purchase and sell foreign currencies, primarily Japanese yen, aggregating $175.1 million. Such contracts were designated as hedges of certain foreign contracts and subcontracts to be performed by SS/L through May 2006. The fair value of these contracts, based on quoted market prices, was $139 million at December 31, 1997. At December 31, 1997, deferred gains on forward contracts to sell foreign currencies, primarily yen, were $26.6 million and deferred losses on forward contracts to purchase foreign currencies, primarily yen, were $9.5 million.

The Company is exposed to credit-related losses in the event of nonperformance by counter parties to these financial instruments, but does not expect any counter party to fail to meet its obligation.

11. Financial Instruments — (continued)

The maturity of foreign currency exchange contracts held at December 31, 1997 is consistent with the contractual or expected timing of the transactions being hedged, principally receipt of customer payments under long-term contracts and payments to vendors under subcontracts. These foreign exchange contracts mature as follows (in thousands):

Years to Maturity	To Purchase		To Sell	
	At Contract Rate	At Market Rate	At Contract Rate	At Market Rate
1	$68,582	$59,937	$ 20,711	$14,766
2 to 5	5,804	4,939	65,276	48,975
6 to 10			14,750	10,385
	$74,386	$64,876	$100,737	$74,126

12. Commitments and Contingencies

The Company leases certain facilities equipment and transponder capacity under agreements expiring at various dates. Certain leases covering facilities contain renewal and or purchase options which may be exercised by the Company. Rent expense was $17.7 million for the year ended December 31, 1997.

Future minimum payments, by year and in the aggregate, under noncancelable operating leases with initial or remaining terms of one year or more consisted of the following at December 31, 1997 (in thousands):

1998	$16,257
1999	15,409
2000	14,963
2001	12,268
2002	6,355
Thereafter	33,389
	$98,641

At December 31, 1997, the Company had outstanding letters of credit of approximately $71.5 million.

Due to the long lead times required to produce purchased parts, SS/L has entered into various purchase commitments with suppliers. These commitments aggregated $973.1 million at December 31, 1997.

Prior to its acquisition by Loral, Skynet sold several transponders under which title to specific transponders was transferred to the customer upon the customer's acceptance. Under the terms of the contracts, Skynet continues to operate the satellites on which the transponders are located and provides a warranty for a period of 10 to 14 years, generally the economic life of the satellite. Depending on the contract, Skynet is required to replace transponders failing to meet operating specifications. All customers are entitled to a refund equal to the reimbursement value, as defined, in the event there is no repair or replacement. The reimbursement value is determined based on the original purchase price plus an interest factor from the time the payment is received to acceptance of the transponder by the customer, reduced on a straight-line basis over the warranty period. In case of satellite failure, the reimbursement value may be paid from proceeds received from insurance policies.

In 1997, two in-orbit satellites built by SS/L experienced solar array circuit failures. One of the customers has asserted that, in light of the failures and uncertainty as to further failures, it has not accepted the satellite. Loral believes that the customer was contractually required to accept the satellite at completion of in-orbit testing and that risk of loss has passed to the customer. In addition, another customer has requested

12. Commitments and Contingencies — (continued)

that SS/L structure an arrangement whereby the satellite under construction would be sold to another customer. Management believes that these matters will not have a material adverse effect on the financial condition or results of operations of Loral.

13. Related Party Transactions

In connection with contract performance, Loral provided services to and acquired services from Lockheed Martin for the year ended December 31, 1997. A summary of such transactions and balances is as follows (in thousands):

	Year ended December 31, 1997
Revenue from services sold	$ 3,550
Cost of purchased services	78,160
Balance at year end:	
Receivable	$ 80
Payable	29,589
Net payable	$29,509

Loral's sales to, purchases from, and balances with the Alliance Partners are as follows (in thousands):

	Year ended December 31, 1997
Revenue from services sold	$ 39,303
Cost of purchased services	147,777
Balance at year end:	
Receivable	$ 10,492
Payable	81,716
Net payable	$ 71,224

14. Earnings per Share

Basic earnings per share is computed based upon the weighted average number of shares of common stock and the Series A Preferred Stock outstanding. Diluted earnings per share excludes the assumed conversion of the Series C Preferred Stock as the effect would have been antidilutive. Earnings per share for the year ended March 31, 1996 is computed based on the number of shares issued to Old Loral's shareholders in the Distribution.

14. Earnings per Share — (continued)

The following table sets forth the computation of basic and diluted earnings per share:

	Year ended December 31, 1997	Nine months ended December 31, 1996	Year ended March 31, 1996
	(In thousands, except per share data)		
Numerator:			
Net income (loss)	$ 40,004	$ 8,877	$(13,785)
Preferred stock dividends and accretion	(26,315)		
Numerator for basic and diluted earnings per share — net income (loss) applicable to common stockholders	$ 13,689	$ 8,877	$(13,785)
Denominator:			
Weighted average shares:			
Common stock	196,173	186,799	183,580
Series A Preferred Stock	45,897	42,198	
Denominator for basic earnings per share	242,070	228,997	183,580
Effect of dilutive securities:			
Employee stock options	1,521	399	
Denominator for diluted earnings per share	243,591	229,396	183,580
Basic earnings per share	$ 0.06	$ 0.04	$ (.08)
Diluted earnings per share	$ 0.06	$ 0.04	$ (.08)

15. Quarterly Financial Information (Unaudited, in thousands, except per share amounts)

	Quarter ended			
	March 31,	June 30,	September 30,	December 31,*
Year ended December 31, 1997				
Revenues	$340,353	$291,148	$371,118	$309,972
Income before income taxes and equity in net loss of affiliates	19,476	3,120	9,663	94,723
Net income (loss)	(406)	(10,296)	(3,962)	54,668
Preferred dividends and accretion		(2,947)	(11,633)	(11,735)
Net income (loss) applicable to common shareholders	(406)	(13,243)	(15,595)	42,933
Earnings per share — basic	0.00	(0.06)	(0.06)	0.17
Earnings per share — diluted	0.00	(0.06)	(0.06)	0.17
Market price per share				
High	19½	17½	21	24¼
Low	14⅛	13	14 1/16	19

* The results of operations for the quarter ended December 31, 1997, include a $79.6 million gain on the sale of K&F stock.

15. **Quarterly Financial Information** (Unaudited, in thousands, except per share amounts) — (continued)

	Quarter ended		
	June 30,	September 30,	December 31,
Nine months ended December 31, 1996			
Revenues	$ 1,538	$ 1,837	$ 1,713
Income before income taxes and equity in net loss of affiliates	5,998	4,422	6,078
Net income	1,301	2,953	4,623
Earnings per share — basic	0.01	0.01	0.02
Earnings per share — diluted	0.01	0.01	0.02
Market price per share			
High	18 1/2	16 5/8	19 5/8
Low	10 1/2	11 1/8	15 1/4

EXHIBIT 5

Exhibit 5

Estimated Deployment Schedule

Satellite Construction Commences	April 20(
Satellite Construction Completed	October 2002
Satellite Launch	December 2002
Placement into Service	February 2003

EXHIBIT 6

FCC 312
Main Form

Approved by OMB 3060-0678
Est. Avg. Burden Hours Per Response: 10 Hrs.

FEDERAL COMMUNICATIONS COMMISSION
APPLICATION FOR SATELLITE SPACE AND EARTH STATION AUTHORIZATIONS

FCC Use Only
File Number:
Call Sign:

PAYOR AND FILING FEE INFORMATION

a. Payor Name			b. Daytime Telephone Number
Orion Network Systems, Inc.			(301) 258-3200
c. Mailing Street Address or P.O. Box			d. FCC Account Number
2440 Research Boulevard, Suite 400			0521271418
e. City	f. State	g. Zip Code	h. Country Code (if not U.S.A.)
Rockville	MD	20850-3223	

i. Payment Type Code	j. Quantity	k. Fee Due for Payment Type Code in (i)	l. Total Amount Paid	FCC Use Only
BNY	1	85,045	85,045	

APPLICANT INFORMATION

1. Legal Name of Applicant		2. Voice Telephone Number
International Private Satellite Partners, L.P.		(301) 258-3200
3. Other Name Used for Doing Business (if any)		4. Fax Telephone Number
Orion Atlantic, L.P.		
5. Mailing Street Address or P.O. Box	6. City	
2440 Research Boulevard, Suite 400	Rockville	
ATTENTION: Richard Shay, Esq.	7. State / Country (if not U.S.A.): MD	8. Zip Code: 20850

9. Name of Contact Representative (If other than applicant)		10. Voice Telephone Number
Thomas J. Keller, Esq. and Julian L. Shepard, Esq.		(202) 371-6060
11. Firm or Company Name		12. Fax Telephone Number
Verner, Liipfert, Bernhard, McPherson and Hand, Chartered		(202) 371-6279
13. Mailing Street Address or P.O. Box	14. City	
901 15th Street, N.W.	Washington	
ATTENTION: Julian L. Shepard, Esq.	15. State / Country (if not U.S.A.): D.C.	16. Zip Code: 20005

CLASSIFICATION OF FILING

17. Place an "X" in the box next to the classification that applies to this filing for both questions a. and b. Mark only one box for 17a and only one box for 17b.

- [ ] a1. Earth Station
- [X] a2. Space Station

- [X] b1. Application for License of New Station
- [ ] b2. Application for Registration of New Domestic Receive-Only Station
- [ ] b3. Amendment to a Pending Application
- [ ] b4. Modification of License or Registration
- [ ] b5. Assignment of License or Registration
- [ ] b6. Transfer of Control of License or Registration
- [ ] b7. Notification of Minor Modification
- [ ] b8. Other (Please Specify):

18. If this filing is in reference to an existing station, enter:
Call sign of station: N/A

19. If this filing is an amendment to a pending application enter:
(a) Date pending application was filed: N/A
(b) File number of pending application:

TYPE OF SERVICE

20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Place an "X" in the box(es) next to all that apply.

[X] a. Fixed Satellite [ ] b. Mobile Satellite [ ] c. Radiodetermination Satellite [ ] d. Earth Exploration Satellite [ ] e. Other (please specify) _____

21. STATUS: Place an "X" in the box next to the applicable status. Mark only one box.

[ ] a. Common Carrier [X] b. Non-Common Carrier

22. If earth station applicant, place an "X" in the box(es) next to all that apply.

[ ] a. Using U.S. licensed satellites [ ] b. Using Non-U.S. licensed satellites

N/A

23. If applicant is providing INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Mark only one box. Are these facilities:

[ ] a. Connected to the Public Switched Network N/A [ ] b. Not connected to the Public Switched Network

24. FREQUENCY BAND(S): Place an "X" in the box(es) next to all applicable frequency band(s).

[X] a. C-Band (4/6 GHz)

[X] b. Ku-Band (12/14 GHz) [ ] c. Other (Please specify) _____

TYPE OF STATION

25. CLASS OF STATION: Place an "X" in the box next to the class of station that applies. Mark only one box.

[ ] a. Fixed Earth Station [ ] b. Temporary-Fixed Earth Station [ ] c. 12/14 GHz VSAT Network [ ] d. Mobile Earth Station [X] e. Space Station [ ] f. Other (Specify) _____

If space station applicant, go to Question 27.

26. TYPE OF EARTH STATION FACILITY Mark only one box.

[ ] a. Transmit/Receive [ ] b. Transmit-Only [ ] c. Receive-Only N/A

PURPOSE OF MODIFICATION OR AMENDMENT

27. The purpose of this proposed modification or amendment is to: Place an "X" in the box(es) next to all that apply.

N/A

[ ] a -- authorization to add new emission designator and related service
[ ] b -- authorization to change emission designator and related service
[ ] c -- authorization to increase EIRP and EIRP density
[ ] d -- authorization to replace antenna
[ ] e -- authorization to add antenna
[ ] f -- authorization to relocate fixed station
[ ] g -- authorization to change assigned frequency(ies)
[ ] h -- authorization to add Points of Communication (satellites & countries)
[ ] i -- authorization to change Points of Communication (satellites & countries)
[ ] j -- authorization for facilities for which environmental assessment and radiation hazard reporting is required
[ ] k -- Other (Please Specify)

_____

ENVIRONMENTAL POLICY

28. Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307? [ ] YES [X] NO
If YES, submit the statement as required by Sections 1.1308 and 1.1311 of the Commission's rules, 47 C.F.R. §§ 1.1308 and 1.1311, as Exhibit A to this application.

A Radiation Hazard Study must accompany all applications as Exhibit B for new transmitting facilities, major modifications, or major amendments. Refer to OET Bulletin 65.

ALIEN OWNERSHIP

29. Is the applicant a foreign government or the representative of any foreign government?	☐ YES	☒ NO
30. Is the applicant an alien or the representative of an alien?	☐ YES	☒ NO
31. Is the applicant a corporation organized under the laws of any foreign government?	☐ YES	☒ NO
32. Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	☐ YES	☒ NO
33. Is the applicant a corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	☒ YES	☐ NO
34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as Exhibit C an identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote.		

BASIC QUALIFICATIONS

35. Does the applicant request any waivers or exemptions from any of the Commission's Rules? If Yes, attach as Exhibit D, copies of the requests for waivers or exceptions with supporting documents.	☒ YES	☐ NO
36. Has the applicant or any party to this application had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission? If Yes, attach as Exhibit E, an explanation of the circumstances.	☐ YES	☒ NO
37. Has the applicant, or any party to this application, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court?	☐ YES	☒ NO
38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition?	☐ YES	☒ NO
39. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceeding two items?	☐ YES	☒ NO
40. By checking Yes, the undersigned certifies, that neither the applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.	☒ YES	☐ NO

41. Description. (Summarize the nature of the application and the services to be provided).

The application seeks authority to launch and operate a hybrid C/Ku-Band fixed geostationary space station to be located at 37.5° W.L. to provide a full array of voice, video, and data non-common-carrier international satellite services in the Atlantic Ocean Region.

CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

42. Applicant is a (an): (Place an "X" in the box next to applicable response.)

☐ a. Individual ☐ b. Unincorporated Association ☒ c. Partnership ☐ d. Corporation ☐ e. Governmental Entity ☐ f. Other (Please specify) _____

43. Typed Name of Person Signing	44. Title of Person Signing
James B. Kaufman	Vice President & Assistant Secretary Orion Network Services, Inc. (Its General Partner)

45. Signature	46. Date
James B. Kaufman	May 8, 1998

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

EXHIBIT C

The applicant's ultimate parent, Loral Space & Communications Ltd., is a Bermuda company which is publicly traded on the New York Stock Exchange (NYSE:LOR).

EXHIBIT D

In 1985, the Commission instituted the "freeze" to permit the Commission to develop a sound orbital deployment plan that reflects established technical parameters and facilitates successful technical coordination of authorized space stations.[1/] The Freeze Order specifically applies to applications requesting orbital positions which are east of 60 degrees West Longitude and west of 30 degrees West Longitude in the 4, 6, 11, 12, or 14 GHz bands. Loral Orion, pursuant to Section 1.3 of the Commission's rules, 47 C.F.R. § 1.3, hereby petitions for a waiver, if necessary, of the Commission's "Freeze Order" adopted May 31, 1985.[2/]

Clearly, the Freeze Order should not apply to the Ku-band portion of the proposed satellite system, because if this proposed satellite system is granted, Orion intends to relocate the space station currently located at 37.5° W.L. Moreover, the Freeze Order should not apply to the C-band portion of this application because this application merely seeks the addition C-Band frequencies to the applicant's existing authority at 37.5° W.L. Previously, the Commission did not apply the Freeze Order to a similar application requesting, among other things, a change in authorized frequencies at an already assigned orbital location.[3/] To decide otherwise here would pose an unnecessary burden on parties seeking to expand existing satellite services at locations previously authorized. However, if the Commission decides to apply the Freeze Order to this

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1/ Processing of Pending Applications for Space Stations to Provide International Communications Service, FCC 85-296, 1985 FCC LEXIS 3202 (released June 6, 1985) ("Freeze Order").

2/ Id. at ¶4.

3/ In the Matter of PanAmSat for Modification of Conditional Authority to Construct a Subregional Western Hemisphere Satellite System, FCC 86-257, 60 R.R.2d 398 (released May 21, 1986), as interpreted In re the Petition of Systematics General Corporation, DA 87-1186, 2 FCC Rcd 18 (released Aug. 31, 1987), at ¶10.

application, grant of the requested waiver would be in the public interest for the same reasons that grant of the underlying application is in the public interest, and no party would be prejudiced by grant of the requested waiver.

CHECK NO. DATE

INVOICE	DESCRIPTION	DATE	P.O. NO.	GROSS AMT.	DISCOUNT	NET AMOUNT
	Space Station Application at 37.5 ° W.L.					
			TOTALS			

ORION NETWORK SYSTEMS, INC.

Orion Network Systems, Inc.
2440 Research Boulevard, Suite 400
Rockville, MD 20850-3238
(301) 258-8101 or (800) 78 ORION

NationsBank
NationsBank N.A.
Maryland

7-163
520

NO. 020501

PAY

DATE
May 6, 1998

CHECK NO.
020501

AMOUNT
$ 85,045.00

Eighty-five thousand fourty-five and no - cents

Dollars

TO THE ORDER OF Federal Communications Commission

R H Ammons L. T. Zaruba

NOT VALID AFTER 60 DAYS

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