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TASK II REPORT
 PLANNING ASSISTANCE
 FOR THE
 30/20 GHz PROGRAM

 WORLDWIDE SATELLITE
 MARKET DEMAND FORECAST

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30/20 GHz PROGRAM
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MARKET DEMAND FORECAST

NASA Contract No. NAS3-22461 Task 11
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SECTION I
INTRODUCTION

1.1 OVERVIEW OF WORLDWIDE SATELLITE MARKET FORECAST

Communications throughout the world has begun relying on satellites. The clearest example of this is Intelsat which has grown at a phenomenal rate (47%) since the first satellite was placed over the Atlantic in 1965. By the year 2000 nearly 154 nations will have an Intelsat terminal to handle international traffic. Besides this international satellite system growth, the future is very bright for domestic satellite systems. Developed countries are either planning or using satellites for heavy trunking and other wideband uses such as television. The purpose of this study is to quantify international and domestic/regional satellite communication markets with some degree of confidence.

Quantifying such dramatically developing markets, encompassing some 170 nations, proved to be a formidable task. The starting point for this study was the World Telecommunications Market Study report by Arthur D. Little. This is a comprehensive report prepared after extensive field work. It contains information on many aspects of telecommunications, one of which is satellite communications. A review of this portion of the report by NASA and Western Union lead to the conclusion that because of the dramatic changes taking place, this segment was far too conservative. For instance, direct broadcast systems were not included, however several countries have now announced intentions; U.S., Canada, Italy, France, Germany, and Japan. In addition, several countries have announced plans since the completion of the ADL study. For example, Mexico has recently announced a large domestic satellite system. They had told ADL they absolutely would not have a domestic satellite system. In addition, the Arthur D. Little study only covered the period 1980-1990 while NASA needed a projection to the year 2000. Using the Arthur D. Little report as an aide and a guide, the task was first subdivided into two major areas of concentration: the international sector; and the domestic and regional sector.

1.2 INTERNATIONAL APPROACH

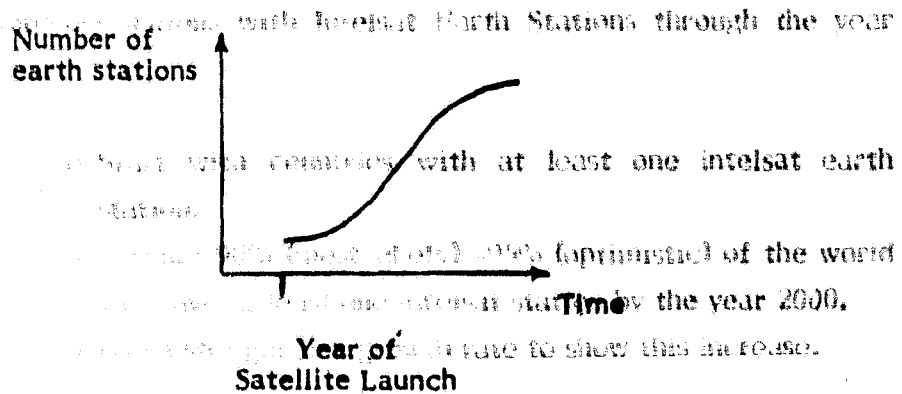
The basic approach throughout the study was to use available information to the fullest extent possible. Over 200 current trade magazine articles, numerous reports, actual plans, launch schedules and various in-house sources were examined. Long lead times are required for an extensive satellite system to be developed and implemented. Therefore, plans for the next five years for a satellite were considered to be very firm. Plans between 1985 and 1990 also should be good. After 1990 the accuracy of forecasting could be questioned, therefore in order to ensure useful planning numbers conservative but realistic approaches were taken in these cases.

The international sector was subdivided further into the international traffic and related hardware, and leased domestic service and its related hardware. To determine the satellites required for the international use Intelsat's half circuits of traffic were projected based on historical information. Using this traffic number with the amount of traffic future satellites could handle gave the number of satellites needed. To determine the future international earth stations required, projections of past growth rates and the new countries adding an earth station were considered. Leased domestic satellites were projected using historical growth rates. It was taken into consideration that in the late 1980's and through the 1990's the growth rate will slow because of domestic and regional systems forming. Leased domestic earth stations were projected in a similar manner. Many of the earth stations initially used for leased Intelsat will be used later with a domestic or regional system.

1.3 DOMESTIC AND REGIONAL APPROACH

Historical information for Intelsat was available and accurate, thus projections could be made in most cases. However, in the case of domestic or regional systems the direct information was not available and correlations were required. It was determined information could be gathered on every country, such as GNP, population, telephones, etc. This information could then be correlated with whether a country had announced a satellite system or not. The factors with the highest correlation could then be given weights and used in a standardized weighted listing of all the countries. All values are standardized with respect to

the world 1981 totals. Thus over time, one can see a country change relative to 1981. This resulted in a list of 75 countries that could possibly have a domestic satellite system by the year 2000. This became the basis for future satellite systems along with previously mentioned items such as announced plans, and launch schedules. Judgement also was used here, for example, South Africa will be isolated for political reasons. Once the projections of the nations which would launch satellites or participate in a regional system were made, it was relatively easy to project earth stations. The assumptions used are stated in the report and will not be repeated here, however, the basic growth curve is shown below.



Developed countries and countries which sponsor a regional system grow the fastest. The developing countries grow approximately one half as fast.

1.4 STATISTICS

All statistics throughout the report are given as both new growth and cumulative figures. Two different cases have been studied, the most likely and the optimistic. The difference between the two is that with the optimistic more domestic systems are formed as opposed to regional and these systems are implemented two to three years earlier than in the most likely case.

SECTION II
INTELSAT

2.1 INTERNATIONAL INTELSAT -- CURRENT AND PROJECTED

2.1.1 Nations with Intelsat Earth Stations

Guidelines and Assumptions

o To forecast nations with Intelsat Earth Stations through the year 2000:

- o Start with countries with at least one intelsat earth station.
- o Assume 90% (most likely) -95% (optimistic) of the world will have at least one intelsat station by the year 2000.
- o Use a straight line growth rate to show this increase.

o Actuals and Projection - New Growth

<u>Countries</u>	<u>Base 1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
ML*	108	10	13	23	154
O*	108	12	15	28	163

o Actuals and Projection - Cumulative after 1981

<u>Countries</u>	<u>Base 1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
ML*	108	10	23	46	154
O*	108	12	27	55	163

Guidelines and Assumptions

To forecast Intelsat Earth Stations through the year 2000:

- o Start with actual numbers.
- o Look at the growth rate for A and B Stations (31% after 14 years).
- o Project outward with a range about these growth rates.
- o Traffic projections warrant a slight increase in the growth of earth stations beginning in 1990 as countries add additional nodes.
- o Assume C earth stations will operate much as an A and, therefore, can be estimated as a percent of A.
- o Assume most of the new growth in wide band earth stations will be for C stations.

67% between 85 and 90

80% between 91 and 2000

Actuals and Projections - New Growth

<u>Earth Station Type</u>	<u>Projection Percentage</u>	<u>Base 1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
A	ML*	144	27	19	25	208
	O*	144	63	32	98	337
B	ML*	22	7	10	28	67
	O*	22	13	22	77	132
C	ML*	4	3	26	103	136
	O*	4	5	67	396	472

2.1.2

Intelsat Earth Stations (continued)ORIGINAL PAGE IS
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Projections - Cumulative after 1981

<u>Earth Station Type</u>	<u>Projection Percentage</u>	<u>Base 1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
A	ML* (4% to 1990 then 6%)	144	27	39	64	208
	O* (8% to 1990 then 10%)	144	63	95	193	337
B	ML* (6%)	22	7	17	45	67
	O* (10%)	22	13	35	112	134
C	ML* (See notes above)	4	3	29	132	136
	O* (See notes above)	4	5	72	468	502

ML*--Most Likely
O*--Optimistic

2.1.3 Intelsat's Half Circuits of Traffic

Guidelines and Assumptions

To forecast Intelsat half circuits through the year 2000:

- o Start with current numbers (see below).
- o Determine recent growth rates.
- o Project outward with a range about these growth rates.

Source: A Review of Intelsat Statistics

Fulltime Satellite Traffic		
<u>Year</u>	<u>Half Circuits</u>	<u>Growth Rate</u>
1972	7500	
1973	9815	32
1974	11510	18
1975	13370	16
1976	16520	24
1977	20205	23
1978	25280	25

Average Annual Growth Rate 22-23%

Source: FSI Cross-Impact of Foreign Satellite Communications on NASA's 30/20 GHz Program

In this report FSI forecasted international traffic to grow at 15 to 17 percent per year.

Source: R.J. Rush and C. Louis Cuccia, A Projection of the Development of High Capacity Communications Satellites in the 1980's

2.1.3 Intelsat's Half Circuits of Traffic (continued)

They report

<u>Intelsat Traffic</u>	<u>Average Annual Growth Rate</u>
Last two years	23%
Last seven years	24%
<u>Simplex Channel Growth Rate</u>	
1983-1993	16%

Actuals and Projections - New Growth (Thousands)

	<u>Projection Percentage</u>	<u>Base 1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
Half Circuits	ML*	47	56	123	701	927
	O*	47	70	174	1209	1500

Actual and Projections - Cumulative after 1981

	<u>Projection Percentage</u>	<u>Base 1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
Half Circuits	ML* (17%)	47	56	179	880	927
	O* (20%)	47	70	244	1453	1500

2.1.4 Satellite Required for International Traffic

Guidelines and Assumptions

To forecast satellites required for International Traffic through the year 2000:

- o Present system operation 80% of available circuits.
- o Intelsat V 1985 - can handle 24,000 half circuits/satellites.
- twelve V and VAs are planned before 1985.
- o Intelsat VI 1990 - can handle 80,000 half circuits/satellites.
- will operate at 70% of available circuits.
- o Intelsat VII - can handle 120,000 half circuits/satellites.
- will operate at 70% of available circuits.

Actual and Projections - New Growth

	<u>Projection Technique</u>	<u>Purpose</u>	<u>1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
Satellites	ML*	Primary	5	6	5	10	26
		Spare	5	3	3	3	14
		Total	10	9	8	13	40
	O*	Primary	5	7	7	16	35
		Spare	5	2	4	4	15
		Total	10	9	11	20	50

2.1.4 Satellites Required for International Traffic (continued)

Actual and Projections - Cumulative after 1981

Satellites	<u>Projection Technique</u>	<u>Purpose</u>	<u>1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
	ML*	Primary	5	6	11	21	26
		Spare	5	3	6	9	14
		Total	10	9	17	30	40
	O*	Primary	5	7	14	30	35
		Spare	5	2	6	10	15
		Total	10	9	20	40	50

2.2 LEASED DOMESTIC INTELSAT

2.2.1 Leased Transponders

Guidelines and Assumptions

To forecast leased transponders through the year 2000:

- o Start with actual numbers.
- o Determine the present growth rate (71% over last 7 years).
- o Project outward considering regional and domestic systems will slow down the pace.

Actuals and Projections -- New Growth

	<u>Projection Technique</u>	<u>Base 1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
Leased Transponders	ML* (30% thru 85 then 10%)	16	43	36	151	246
	O* (40% thru 85 then 15%)	16	70	86	527	699

Actuals and Projections -- Cumulative after 1981

	<u>Projection Technique</u>	<u>Base 1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
Leased Transponders	ML* (30% thru 85 then 10%)	16	43	79	230	246
	O* (40% thru 85 then 15%)	16	70	156	683	699

2.2.2 Satellites Required For Leased Domestic Service

Guidelines and Assumptions

To forecast satellites required:

- o Intelsat V - will have 27 bandwidth equivalent 36
1985 megahertz transponders
- twelve V and VAs are planned before 1985
- o Intelsat VI - will have 72 bandwidth equivalent 36
1990 megahertz transponders
- o Intelsat VII - will have 108 bandwidth equivalent 36
megahertz transponders
- o Leased Domestic Satellites - at least one per ocean by 1985.

Actuals and Projections -- New Growth

	<u>Projection Technique</u>	<u>1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
Satellites	ML*	2	3	3	4	12
	O*	2	3	3	7	15

Actuals and Projections -- Cumulative after 1981

	<u>Projection Technique</u>	<u>Base 1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
Satellites	ML*	2	3	6	10	12
	O*	2	3	6	13	15

2.2.3 Domestic Non-Standard Earth Stations for Use With Intelsat Satellite

Guidelines and Assumptions

To forecast domestic non-standard earth stations:

- o Start with actual numbers.
- o Determine the present growth rate.
- o Project outward considering regional and domestic system will slow down the pace.

Actuals and Projections -- New Growth

	<u>Projection Technique</u>	<u>Base 1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
ES	ML * 20% to 85 then 10%	191	205	241	1,017	1,654
	O* 30% to 85 then 15%	191	354	551	3,338	4,434

Actuals and Projections -- Cumulative after 1981

	<u>Projection Technique</u>	<u>Base 1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	<u>Total</u>
ES	ML * 20% to 85 then 10%	191	205	446	1,463	1,654
	O* 30% to 85	191	354	905	4,243	4,434

2.3 INTELSAT EXPENDITURES

2.3.1 Total Expenditures

Guidelines and Assumptions

To forecast expenditures through the year 2000:

o Estimated cost per earth station 1980 dollars:

A - \$6 million

B - \$3 million

C - \$3 million

NS - \$1.5 million

o Estimated cost per satellite 1980-81 dollars:

1980-1985 Intelsat V & VA \$33 million

1985-1990 Intelsat VI \$50 million

1990-2000 Intelsat VII \$80 million

o Estimated cost to launch:

Intelsat V & VA, VI \$40 million

Intelsat VII \$70 million

Actuals and Projections -- New Growth

Expenditure	Projection Technique	1981	1985	1990	2000	Total
	A/ES ML*	864	162	72	150	1,248
	O*	864	378	192	588	2,022
	B/ES ML*	66	21	30	84	201
	O*	66	39	66	231	402
	C/ES ML*	12	9	78	309	408
	O*	12	15	201	1,188	1,416
	NS/ES ML*	287	308	362	1,526	2,483
	O*	287	531	827	5,007	6,651
	Satellites ML*	360	396	550	1,360	2,666
	O*	360	396	700	2,160	3,616
	Launch ML*	--	90	240	700	1,030
	O*	--	90	360	1,100	1,550
	TOTAL ML*	1,589	986	1,332	4,129	8,034
	O*	1,589	1,550	2,246	10,274	15,657

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2.3.1 Total Expenditures (continued)

Actuals and Projections - Cumulative (Millions of 1980 Dollars)

Expenditure	Projection Technique	1981	1985	1990	2000	Total
A/ES ML*		864	162	234	384	1,248
	O*	864	378	570	1,158	2,022
B/ES ML*		66	21	51	135	201
	O*	66	39	105	336	402
C/ES ML*		12	9	87	396	408
	O*	12	15	216	1,404	1,416
NS/ES ML*		287	308	670	2,196	2,483
	O*	287	531	1,358	6,365	6,652
Satellites ML*		360	396	946	2,306	2,666
	O*	360	396	1,096	3,256	3,616
Launch ML*		--	90	330	1,030	1,030
	O*	--	90	450	1,550	1,550
TOTAL ML*		1,589	986	2,318	6,447	8,036
	O*	1,589	1,550	3,795	14,069	15,658

2.3.2 Regional Earth Station Expenditures

Guidelines and Assumptions

To forecast regional expenditures through the year 2000:

- o Determine the number of A, B and NS ES with the same ratio currently in effect.**
- o Determine C ES on the same percentage as A ES.**
- o Assume 5% of new NS ES will be in Oceania Region in 1985 and after.**

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2.3.2 Regional Earth Station Expenditures (continued)

Actuals and Projections -- New Growth

REGIONAL BREAKDOWN
MOST LIKELY CASE
(Millions 1980 Dollars)

	<u>1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	
A	69.6	13.0	5.8	12.1	NORTH AMERICA
B					
C	6.0	3.9	3.1	24.9	
N/S					
A	145.0	27.2	12.1	25.2	SOUTH AMERICA
B	9.0	2.9	4.1	11.5	
C			14.6	51.8	
N/S	56.6	57.9	68.0	286.7	
A	208.8	39.1	17.4	36.2	EUROPE
B	9.0	2.9	4.1	11.5	
C	6.0	3.9	17.2	74.7	
N/S	19.5	20.0	23.5	98.9	
A	133.4	25.0	11.1	23.2	AFRICA
B	30.0	9.5	13.6	38.2	
C			13.4	47.7	
N/S	132.8	135.7	159.5	672.3	
A	272.5	51.1	22.7	47.3	ASIA
B	9.0	2.9	4.1	11.5	
C		1.3	26.2	97.5	
N/S	78.1	79.8	93.8	395.5	
A	34.8	6.5	2.9	6.0	OCEANIA
B	9.0	2.9	4.1	11.5	
C			3.5	12.4	
N/S		14.7	17.2	72.7	
A	864.0	162.0	72.0	150.0	TOTAL
B	66.0	21.0	30.0	84.0	
C	12.0	9.0	78.0	309.0	
N/S	287.0	308.0	362.0	1526.0	

2.3.2 Regional Earth Station Expenditures (continued)

Actuals and Projections -- Cumulative After 1981

REGIONAL BREAKDOWN
MOST LIKELY CASE
(Millions 1980 Dollars)

	<u>1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	
A	69.6	13.0	18.8	30.9	NORTH AMERICA
B					
C	6.0	3.9	7.0	31.9	
N/S					
A	145.0	27.2	39.3	64.4	SOUTH AMERICA
B	9.0	2.9	7.0	18.4	
C			14.6	66.4	
N/S	56.6	57.9	125.9	412.6	
A	208.8	39.1	56.5	92.8	EUROPE
B	9.0	2.9	7.0	18.4	
C	6.0	3.9	21.0	95.7	
N/S	19.5	20.0	43.4	142.3	
A	133.4	25.0	36.1	59.3	AFRICA
B	30.0	9.5	23.2	61.4	
C			13.4	61.1	
N/S	132.8	135.7	295.2	967.5	
A	272.5	51.1	73.8	121.1	ASIA
B	9.0	2.9	7.0	18.4	
C		1.3	27.4	124.9	
N/S	78.1	79.8	173.6	569.1	
A	34.8	6.5	9.4	15.5	OCEANIA
B	9.0	2.9	7.0	18.4	
C			3.5	15.9	
N/S		14.7	31.9	104.6	
A	864.0	162.0	234.0	384.0	TOTAL
B	66.0	21.0	51.0	135.0	
C	12.0	9.0	87.0	396.0	
N/S	287.0	308.0	670.0	2196.0	

2.3.2 Regional Earth Station Expenditures (continued)

Actuals and Projections -- New Growth

REGIONAL BREAKDOWN
OPTIMISTIC CASE
(Millions 1980 Dollars)

	<u>1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	
A	69.6	30.4	15.5	47.4	NORTH AMERICA
B					
C	6.0	5.0	12.4	95.7	
N/S					
A	145.0	63.4	32.2	98.7	SOUTH AMERICA
B	9.0	5.3	9.0	31.5	
C			36.2	199.3	
N/S	56.6	99.8	155.4	940.7	
A	208.8	91.3	46.4	142.1	EUROPE
B	9.0	5.3	9.0	31.5	
C	6.0	8.3	43.9	287.0	
N/S	19.5	34.4	53.6	324.4	
A	133.4	58.3	29.6	90.8	AFRICA
B	30.0	17.7	30.0	105.0	
C			33.3	183.4	
N/S	132.8	233.9	364.3	2205.9	
A	272.5	119.2	60.6	185.5	ASIA
B	9.0	5.3	9.0	31.5	
C		1.7	66.5	374.7	
N/S	78.1	137.6	214.3	1297.6	
A	34.8	15.2	7.7	23.7	OCEANIA
B	9.0	5.3	9.0	31.5	
C			8.7	47.8	
N/S		25.3	39.4	238.4	
A	864.0	378.0	192.0	588.0	TOTAL
B	66.0	39.0	66.0	231.0	
C	12.0	15.0	201.0	1188.0	
N/S	287.0	531.0	827.0	5007.0	

2.3.2 Regional Earth Station Expenditures (continued)

Actuals and Projections -- Cumulative After 1981

REGIONAL BREAKDOWN
OPTIMISTIC CASE
(Millions 1980 Dollars)

	<u>1981</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>	
A	69.6	30.4	45.9	93.3	NORTH AMERICA
B					
C	6.0	5.0	17.4	113.1	
N/S					
A	145.0	63.4	95.6	194.3	SOUTH AMERICA
B	9.0	5.3	14.3	45.8	
C			36.2	235.6	
N/S	56.6	99.8	255.1	1195.9	
A	208.8	91.3	137.7	279.8	EUROPE
B	9.0	5.3	14.3	45.8	
C	6.0	8.3	52.2	339.2	
N/S	19.5	34.4	88.0	412.4	
A	133.4	58.3	88.0	178.8	AFRICA
B	30.0	17.7	47.7	152.7	
C			33.3	216.7	
N/S	132.8	233.9	598.3	2804.1	
A	272.5	119.2	179.8	365.3	ASIA
B	9.0	5.3	14.3	45.8	
C		1.7	68.1	442.9	
N/S	78.1	137.6	351.9	1649.5	
A	34.8	15.2	23.0	46.6	OCEANIA
B	9.0	5.3	14.3	45.8	
C			8.7	56.5	
N/S		25.3	64.7	303.1	
A	864.0	378.0	570.0	1158.0	TOTAL
B	66.0	39.0	105.0	336.0	
C	12.0	15.0	216.0	1404.0	
N/S	287.0	531.0	1358.0	6365.0	

SECTION III
DOMESTIC AND REGIONAL SATELLITE SYSTEMS

3.1 COUNTRIES CONSIDERED

See the computer printout pages that follow.

**ORIGINAL PAGE IS
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NORTH AMERICA

- 1 BAHAMAS**
- 2 BERMUDA**
- 3 CANADA**
- 4 UNITED STATES**

COUNTRIES CONSIDERED

**ORIGINAL PAGE IS
OF POOR QUALITY**

SOUTH AMERICA

- 1 ARGENTINA
- 2 BARBADOS
- 3 BELIZE
- 4 BOLIVIA
- 5 BRAZIL
- 6 CHILE
- 7 COLOMBIA
- 8 COSTA RICA
- 9 CUBA
- 10 DOMINICA
- 11 DOMINICAN REPUBLIC
- 12 ECUADOR
- 13 EL SALVADOR
- 14 FRENCH GUINEA
- 15 GRENADA
- 16 GUATEMALA
- 17 GUYANA
- 18 HAITI
- 19 HONDURAS
- 20 JAMAICA
- 21 MARTINIQUE
- 22 MEXICO
- 23 NICARAGUA
- 24 PANAMA
- 25 PARAGUAY
- 26 PERU
- 27 ST LUCIA
- 28 ST VINCENT
- 29 SURINAME
- 30 TRINIDAD AND TOBAGO
- 31 URAGUAY
- 32 VENEZUALA

COUNTRIES CONSIDERED

EUROPE

**ORIGINAL PAGE IS
OF POOR QUALITY**

- 1 ALBANIA
- 2 ANDORRA
- 3 AUSTRIA
- 4 BELGIUM
- 5 BULGARIA
- 6 CZECHOSLOVAKIA
- 7 DENMARK
- 8 EAST GERMANY
- 9 FINLAND
- 10 FRANCE
- 11 GREECE
- 12 GREENLAND
- 13 HUNGARY
- 14 ICELAND
- 15 IRELAND
- 16 ITALY
- 17 LICHTENSTEIN
- 18 LUXEMBOURG
- 19 MALTA
- 20 MONACO
- 21 NETHERLANDS
- 22 NORWAY
- 23 POLAND
- 24 PORTUGAL
- 25 ROMANIA
- 26 SAN MARINO
- 27 SPAIN
- 28 SWEDEN
- 29 SWITZERLAND
- 30 UNITED KINGDOM
- 31 WEST GERMANY
- 32 YUGOSLAVIA

COUNTRIES CONSIDERED

ORIGINAL PAGE 15
OF POOR QUALITY

AFRICA

1	ALGERIA	41	SOMALIA
2	ANGOLA	42	SOUTH AFRICA
3	BENIN	43	SUDAN
4	BOTSWANA	44	SWAZILAND
5	BURUNDI	45	TANZANIA
6	CAMERCON	46	TOGO
7	CAPE VERDE	47	TUNISIA
8	CENTRAL AFRICAN REPUBLIC	48	UGANDA
9	CHAD	49	UPPER VOLTA
10	COMOROS	50	ZAIRE
11	CONGO	51	ZAMBIA
12	DJIBOUTI	52	ZIMBABWE
13	EGYPT		
14	EQUATORIAL GUINEA		
15	ETHIOPIA		
16	GABON		
17	GAMBIA		
18	GHANA		
19	GUINEA		
20	GUINEA BISSAU		
21	IVORY COAST		
22	KENYA		
23	LESOTHO		
24	LIBERIA		
25	LIBYA		
26	MALAGASY REPUBLIC		
27	MALAWI		
28	MALI		
29	MAURITANIA		
30	MAURITIUS		
31	MOROCCO		
32	MOZAMBIQUE		
33	NAMIBIA		
34	NIGER		
35	NIGERIA		
36	RWANDA		
37	SAO TOME AND PRINCIPE		
38	SENEGAL		
39	SEYCHELLES		
40	SIERRA LEONE		

COUNTRIES CONSIDERED

ASIA

**ORIGINAL PAGE IS
OF POOR QUALITY**

- | | | | |
|----|----------------------|----|---------------------------|
| 1. | AFGHANISTAN | 41 | VIET NAM |
| 2 | BAHRAIN | 42 | YEMEN ARAB REPUBLIC |
| 3 | BANGLADESH | 43 | YEMEN DEMOCRATIC REPUBLIC |
| 4 | BHUTAN | | |
| 5 | BURMA | | |
| 6 | CAMBODIA | | |
| 7 | CHINA | | |
| 8 | CYPRUS | | |
| 9 | HONG KONG | | |
| 10 | INDIA | | |
| 11 | INDONESIA | | |
| 12 | IRAN | | |
| 13 | IRAQ | | |
| 14 | ISRAEL | | |
| 15 | JAPAN | | |
| 16 | JORDAN | | |
| 17 | KHMER REPUBLIC | | |
| 18 | KUWAIT | | |
| 19 | LAOS | | |
| 20 | LEBANON | | |
| 21 | MALAYASIA | | |
| 22 | MALDIVES | | |
| 23 | MONGOLIA | | |
| 24 | NEPAL | | |
| 25 | NORTH KOREA | | |
| 26 | OMAN | | |
| 27 | PAKISTAN | | |
| 28 | PHILLIPINES | | |
| 29 | QATAR | | |
| 30 | SAUDI ARABIA | | |
| 31 | SIKKIM | | |
| 32 | SINGAPORE | | |
| 33 | SOUTH KOREA | | |
| 34 | SOVIET UNION | | |
| 35 | SRI LANKA | | |
| 36 | SYRIA | | |
| 37 | TAIWAN | | |
| 38 | THAILAND | | |
| 39 | TURKEY | | |
| 40 | UNITED ARAB EMIRATES | | |

COUNTRIES CONSIDERED

**ORIGINAL PAGE IS
OF POOR QUALITY**

OCEANIA

- 1 AUSTRALIA
- 2 FIJI
- 3 FRENCH POLYNESIA
- 4 KIRIBATI
- 5 NAURU
- 6 NEW ZEALAND
- 7 PAPUA NEW GUINEA
- 8 SOLOMON ISLANDS
- 9 TONGA
- 10 TUVALU
- 11 VANUATU
- 12 WESTERN SAMOA

3.2

FACTORS CONSIDERED

- o Square Miles of Land
- o Number of Large Cities
- o Number of Medium Cities
- o Number of Small Cities
- o Total Population
- o Number of Miles of Microwave Transmission
- o Total Telecommunication Market in 1980-1981 Dollars
- o Number of Telephones
- o Number of Television Receivers
- o Number of Radio Receivers
- o Number of Telegrams Domestic
- o Number of Telegrams Foreign
- o GNP in 1980-1980 Dollars

3.3 FACTORS USED AND WEIGHTS

<u>Factor</u>	<u>Weight (%)</u>
GNP	20
Population	10
Square Miles	20
Equivalent Medium Size Cities*	15
Telecommunication Market	10
Telephones	15
Radio Receivers	5
Television Receivers	5

How Determined

1. Correlation
 - a. Demographic Factors
 - b. Communication Market Factors
2. Judgment
 - a. Domestic Political Factors
 - b. Geography Factors
 - c. Climate Factors
 - d. International Political Factors

* Equivalent Medium Size Cities are derived by algorithm from large cities and added to as medium size cities.

$(L_{avg}/M_{avg})(\#L) + \#M =$ equivalent number of medium size cities.

L_{avg} = average population of a large city of a specific country.

M_{avg} = average population of a medium size city of a specific country.

$\#L$ = the number of large cities.

$\#M$ = the number of medium size cities.

3.4 RANKING OF COUNTRIES

The computer printouts that follow are in a sequence of weighted standardized rankings for potential domestic/regional satellite systems.

WEIGHTED STANDARDIZED RANKINGS
FOR POTENTIAL DOMESTIC/REGIONAL SATELLITE SYSTEMS

	COUNTRY	1981	DOM SYS	LAUNCH DATE	REG SYS	1985	1990	2000
1	UNITED STATES	0.218	*	1975		0.251	0.302	0.454
2	SOVIET UNION	0.120	*			0.139	0.171	0.286
3	JAPAN	0.076	*	1978		0.096	0.133	0.307
4	CHINA	0.056	*	1983		0.059	0.065	0.081
5	WEST GERMANY	0.039	*	1985	4	0.044	0.052	0.074
6	CANADA	0.037	*	1972		0.040	0.044	0.058
7	INDIA	0.035	*	1982		0.037	0.040	0.048
8	BRAZIL	0.035	*	1985	2	0.040	0.048	0.083
9	FRANCE	0.035	*	1983	4	0.041	0.052	0.092
10	UNITED KINGDOM	0.030			4	0.034	0.042	0.064
11	AUSTRALIA	0.025	*	1985	8	0.027	0.029	0.036
12	ITALY	0.024	*		5	0.028	0.034	0.053
13	SPAIN	0.016			4	0.020	0.026	0.052
14	MEXICO	0.014	*	1985	1	0.017	0.021	0.041
15	ARGENTINA	0.013			2	0.015	0.019	0.046
16	INDONESIA	0.011	*	1976	7	0.012	0.014	0.020
17	POLAND	0.009			40	0.012	0.015	0.028
18	NETHERLANDS	0.009				0.010	0.012	0.019
19	TURKEY	0.008			5	0.010	0.012	0.023
20	NIGERIA	0.008			10	0.009	0.010	0.017
21	IRAN	0.008	*	1982	6	0.008	0.009	0.013
22	SAUDI ARABIA	0.007			6	0.009	0.011	0.026
23	SOUTH KOREA	0.007			7	0.010	0.015	0.044
24	ALGERIA	0.007			6	0.008	0.009	0.014
25	SWEDEN	0.007			3	0.007	0.008	0.010
26	EGYPT	0.007				0.007	0.007	0.008
27	BELGIUM	0.007			4	0.008	0.009	0.013
28	PAKISTAN	0.007				0.007	0.008	0.010
29	SWITZERLAND	0.006			4	0.007	0.007	0.009
30	EAST GERMANY	0.006			40	0.007	0.008	0.012
31	COLOMBIA	0.006	*	1987	1	0.007	0.008	0.012
32	YUGOSLAVIA	0.006			40	0.007	0.010	0.020
33	ZAIRE	0.006				0.006	0.006	0.006
34	SUDAN	0.006			6	0.006	0.006	0.006
35	ROMANIA	0.005			40	0.007	0.010	0.023
36	CZECHOSLOVAKIA	0.005			40	0.006	0.007	0.010
37	SOUTH AFRICA	0.005				0.006	0.006	0.007
38	PHILLIPINES	0.005			7	0.006	0.007	0.010
39	VENEZUALA	0.005			1	0.006	0.007	0.011
40	THAILAND	0.005			7	0.006	0.007	0.014
41	NORWAY	0.005			3	0.006	0.008	0.016
42	PERU	0.005			1	0.005	0.005	0.006
43	FINLAND	0.004			3	0.005	0.006	0.009
44	BANGLADESH	0.004				0.004	0.005	0.006
45	DENMARK	0.004			3	0.004	0.005	0.008
46	AUSTRIA	0.004			5	0.004	0.005	0.009
47	GREECE	0.004				0.005	0.006	0.015
48	CHILE	0.003			1	0.004	0.004	0.004
49	HUNGARY	0.003			40	0.004	0.005	0.008
50	BURMA	0.003				0.003	0.003	0.004

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WEIGHTED STANDARDIZED RANKINGS
FOR POTENTIAL DOMESTIC/REGIONAL SATELLITE SYSTEMS

COUNTRY	1981	DOM SYS	LAUNCH DATE	REG SYS	1985	1990	2000
51 NORTH KOREA	0.003				0.004	0.006	0.021
52 BULGARIA	0.003				0.003	0.004	0.007
53 TANZANIA	0.003				0.003	0.003	0.004
54 MALAYASIA	0.003			7	0.003	0.004	0.008
55 IRAQ	0.003			6	0.003	0.004	0.006
56 MOROCCO	0.002			6	0.003	0.003	0.004
57 AFGHANISTAN	0.002			40	0.002	0.002	0.002
58 NEW ZEALAND	0.002			8	0.003	0.003	0.004
59 PORTUGAL	0.002			4	0.003	0.003	0.005
60 KENYA	0.002			10	0.002	0.002	0.003
61 ISRAEL	0.002				0.002	0.003	0.004
62 CUBA	0.002				0.002	0.002	0.003
63 TAIWAN	0.002				0.002	0.002	0.003
64 ECUADOR	0.002			1	0.002	0.003	0.005
65 URAGUAY	0.001			2	0.001	0.002	0.002
66 IVORY COAST	0.001			4	0.002	0.002	0.003
67 SYRIA	0.001			6	0.001	0.002	0.002
68 GUATEMALA	0.001				0.001	0.001	0.002
69 IRELAND	0.001				0.001	0.001	0.002
70 TUNISIA	0.001			6	0.001	0.001	0.002
71 UNITED ARAB EMIRATES	0.001			6	0.001	0.001	0.002
72 SINGAPORE	0.001			7	0.001	0.002	0.004
73 DOMINICAN REPUBLIC	0.001				0.001	0.001	0.002
74 KUWAIT	0.001			6	0.001	0.001	0.003
75 LUXEMBOURG	0.000			4	0.000	0.000	0.001

3.5

DETERMINATION OF PROBABLE NEW SYSTEMS

Non-U.S. Market

1. Systems up to 1985:

- o ITU Schedules
- o Announced Plans
- o Launch Schedules
- o Arthur D. Little

2. Systems after 1985:

- o Announced Plans
- o Trade Magazines
- o Weighted Standardized Ranking and Change
- o Judgment

3.5

DETERMINATION OF PROBABLE NEW SYSTEMS (Continued)

1. "Earth Terminal Hardware Market Growing," Telecommunications, April 1979, C.E. White.
2. "The Next Decade," Satellite Communications, January 1981, Walter Morgan.
3. "Home Satellites Terminals," Satellite Communications December 1979, Lucy Huffman.
4. "Telecommunications Growth in the 1980's," Satellite Communications, June 1980, Joseph C. Bothwell, Jr.
5. "A Forecast of Public Service Satellite Communications," Satellite Communications, July 1979, Joseph Martino.
6. "Expanding Broadband Switched Communications Networks," Satellite Communications, January 1979, David H. Staelin.
7. "Teleconferencing Enters Its Growth Stage," Telecommunications, June 1980, Walt Sonnevile.
8. "Toward a New Era Satellite Communication Conference," Satellite Communications, October 1979, Stephen Shaw.
9. Satellite System Digest, Satellite System Engineering Inc.
10. Internal Services.

3.6 SIZE OF SATELLITE

Depends on How Used

1. Direct Broadcast
2. General Purpose

How Advanced the Telecommunications Market Is

1. New Market With Few Terrestrial Connections
2. Advance Market Needing More Wideband Capacity

Whether the Satellite Will Be Domestic or Regional

3.7 PROBABLE SATELLITE SYSTEMS

The computer printouts that follow is a list of probable domestic/
regional satellite systems.

PROBABLE SATELLITE SYSTEMS - MOST LIKELY

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REGION

CANADA	D	
MEXICO	D	
CHINA	D	
INDIA	D	
JAPAN	D	
PAKISTAN	D	
SOVIET UNION	D	
UNITED STATES	D	
MEXICO	P	1
BOLIVIA		1
CHILE		1
COLOMBIA		1
ECUADOR		1
PERU		1
VENEZUALA		1
BRAZIL	P	2
ARGENTINA		2
URAGUAY		2
DENMARK	P	3
FINLAND	P	3
ICELAND	P	3
NORWAY	P	3
SWEDEN	P	3
FRANCE	P	4
WEST GERMANY	P	4
BELGIUM		4
LUXEMBOURG		4
PORTUGAL		4
SPAIN		4
SWITZERLAND		4
UNITED KINGDOM		4
CAMEROON		4
CONGO		4
GABON		4
IVORY COAST		4
RWANDA		4
SENEGAL		4
ITALY	P	5
AUSTRIA		5
TURKEY		5
ALGERIA	P	6
SAUDI ARABIA	P	6
LIBYA		6

PROBABLE SATELLITE SYSTEMS - MOST LIKELY

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REGION

MAURITANIA		6
MOROCCO		6
SUDAN		6
TUNISIA		6
BAHRAIN		6
IRAN		6
IRAQ		6
JORDAN		6
KUWAIT		6
LEBANON		6
OMAN		6
QATAR		6
SYRIA		6
UNITED ARAB EMIRATES		6
YEMEN ARAB REPUBLIC		6
INDONESIA	P	7
MALAYASIA		7
PHILLIPINES		7
SINGAPORE		7
SOUTH KOREA		7
THAILAND		7
PAPUA NEW GUINEA		7
AUSTRALIA	P	8
NEW ZEALAND		8
KENYA	P	10
NIGERIA	P	10
GHANA		10
LIBERIA		10
NIGER		10
UGANDA		10
SOVIET UNION	P	40
CZECHOSLOVAKIA		40
EAST GERMANY		40
HUNGARY		40
POLAND		40
ROMANIA		40
YUGOSLAVIA		40
AFGHANISTAN		40

TOTAL

PROBABLE SATELLITE SYSTEMS - OPTIMISTIC

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	REGION	
CANADA	D	
MEXICO	D	
WEST GERMANY	D	
CHINA	D	
INDIA	D	
JAPAN	D	
PAKISTAN	D	
UNITED STATES	D	
COLOMBIA	P	1
BOLIVIA		1
CHILE		1
ECUADOR		1
PERU		1
VENEZUELA		1
BRAZIL	P	2
ARGENTINA		2
URAGUAY		2
DENMARK	P	3
FINLAND	P	3
ICELAND	P	3
NORWAY	P	3
SWEDEN	P	3
PORTUGAL	P	4
SPAIN	P	4
FRANCE	P	5
BELGIUM		5
LUXEMBOURG		5
SWITZERLAND		5
UNITED KINGDOM		5
CAMEROON	P	6
CONGO		6
GABON		6
IVORY COAST		6
RWANDA		6
SENEGAL		6
TOGO		6
ITALY	P	7
AUSTRIA		7
TURKEY		7
ALGERIA	P	8
SAUDI ARABIA	P	8
LIBYA		8

PROBABLE SATELLITE SYSTEMS - OPTIMISTIC

	REGION	
MAURITANIA		8
MOROCCO		8
SUDAN		8
TUNISIA		8
BAHRAIN		8
IRAN		8
IRAQ		9
JORDAN		8
KUWAIT		8
LEBANON		8
OMAN		8
QATAR		8
SYRIA		8
UNITED ARAB EMIRATES		8
YEMEN ARAB REPUBLIC		8
INDONESIA	P	9
MALAYASIA		9
PHILLIPINES		9
SINGAPORE		9
SOUTH KOREA		9
THAILAND		9
PAPUA NEW GUINEA		9
KENYA	P	10
NIGERIA	P	10
GHANA		10
LIBERIA		10
UGANDA		10
AUSTRALIA	P	11
NEW ZEALAND		11
SOVIET UNION	P	40
CZECHOSLOVAKIA		40
EAST GERMANY		40
HUNGARY		40
POLAND		40
ROMANIA		40
YUGOSLAVIA		40
AFGHANISTAN		40
TOTAL		

3.8

EARTH STATION ASSUMPTIONS

o Non-U.S.

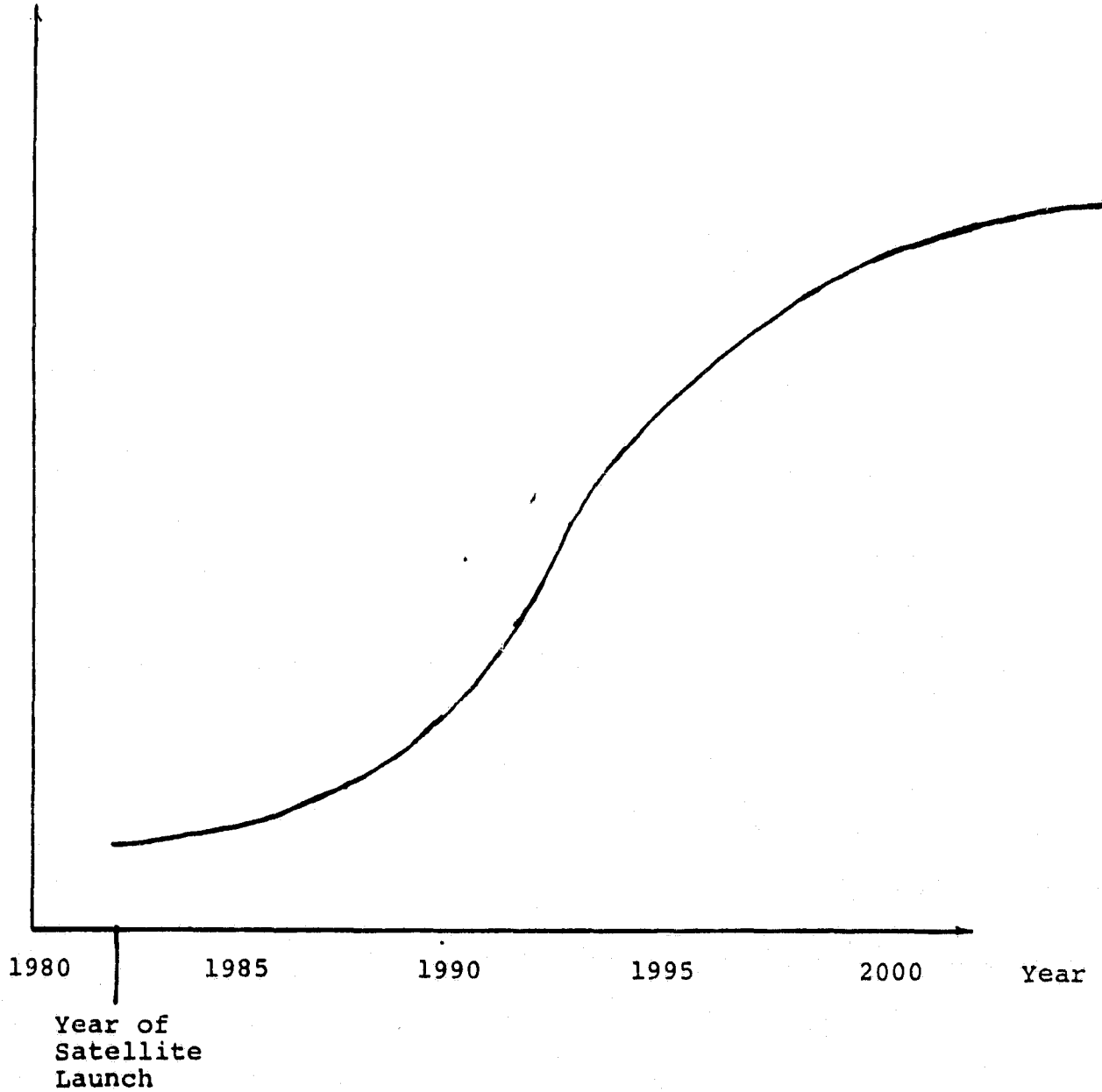
1. Main Station: Three TV and five message links
 - o One per satellite major population center
 - o At least two per satellite within country
2. Regional City Station: One TV and three message links
 - o One per major regional city
3. Small City Station: One TV and one message link
4. TV Receive Only Station: One per 20 small villages maximum
 - o One per small village over 3,000
5. Direct Broadcast Station:
 - o Starts at 1 per .1% of the population
 - o Grows at 20% per year
 - o Upper limit is 1 per five people
 - o Three stations are only used with a Direct Broadcast satellite

o U.S.

1. Main Station
 - o Heavy trunk station
2. Regional City Station
 - o Intermediate trunk station
3. Small City Station
 - o Industrial station
4. Direct Broadcast
 - o Direct transmission to the home

DOMESTIC & REGIONAL EARTH STATION GROWTH CURVE

Number of small
stations



3.9

NON-HARDWARE COMPONENTS ASSUMPTIONS

o Non-U.S.

1. Planning:

- o 50% of the initial planning for countries other than Europe, Japan and Communist systems will go to the U.S.
- o 20% of the planning will be done on systems never launched.

2. Launch:

- o 70% of satellites launched for countries other than Europe, Japan (after 1985) and Communist systems will be launched by the U.S.

3. Turnkey:

- o 50% of the turnkey market excluding Europe, Japan and Communist systems will be the U.S.

4. Operation:

- o 50% of the operations market excluding Europe, Japan and Communist systems will go to the U.S.

o U.S.

1. Planning:

- o \$100K/launch

2. Launch:

- o 100% on shuttle

3. Turnkey:

- o price includes

4. Operation:

- o \$3 million/year for all satellites total.

3.10 COST ESTIMATES

	<u>Non-U.S.</u>	<u>U.S.</u>
A. A Main Station 11-12 meter 3 TV and 5 message links	1.54 M	1.54 M
B. A Regional Station 11-12 meter 1 TV and 3 message links	1.020 M	1.02 M
C. A Small City 10 meter 1 TV and 1 message	.500 M	.05 M
D. A TV/RO 5 meter	.025 M	.025 M
E. A Direct Broadcast	.0005 M	.0005 M
F. Planning For a Satellite System (3 years) Planning For a Launch	5.00 M	.10 M
G. Launch shuttle	20 M	20 M
H. Operation Cost Per Year (First Generation) Operation Cost Per Year (Total)	3 M	3 M
I. Turnkey Earth Station ½ of Hardware Cost Added On for Non-U.S. only	--	--

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3.11 REGIONAL REPORTS

The computer printouts that follow in this Section 3.11 depict units and dollar expenditures by region for domestic/regional satellite systems.

NORTH AMERICA

		1981	1985	1990	2000	TOTAL
SATELLITES						
GENERAL PURPOSE	12 XP	6	4	0	0	10
	24 XP	8	14	22	63	107
	12 XP/GS	6	4	0	0	10
	24 XP/GS	8	14	22	63	107
DIRECT BROADCAST	MAIN	0	1	6	10	17
	GROUND SPARE	0	1	6	10	17
EARTH STATIONS						
MAIN		28	6	4	5	43
REGIONAL		126	38	53	121	338
SMALL		637	6423	12550	31500	51110
TV/RO		3716	11612	10223	11523	37074
DIRECT BROADCAST		0	43853	125268	4496529	4665650

SOUTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0	1	0	0	1
24 XP	0	1	0	2	3
12 XP/GS	0	1	0	0	1
24 XP/GS	0	1	0	2	3
DIRECT BROADCAST MAIN	0	0	0	1	1
GROUND SPARE	0	0	0	1	1
EARTH STATIONS					
MAIN	0	0	0	0	0
REGIONAL	0	12	0	0	12
SMALL	0	26	18	23	67
TV/RO	0	179	89	208	476
DIRECT BROADCAST	0	0	0	160786	160786

EUROPE

		1981	1985	1990	2000	TOTAL
SATELLITES						
GENERAL PURPOSE	12 XP	0	1	0	0	1
	24 XP	0	2	1	4	7
	12 XP/GS	0	1	0	0	1
	24 XP/GS	0	2	1	4	7
DIRECT BROADCAST	MAIN	0	1	3	4	8
	GROUND SPARE	0	1	3	4	8
EARTH STATIONS						
MAIN		0	13	10	0	23
REGIONAL		0	34	46	63	143
SMALL		0	462	416	528	1406
TV/RO		0	596	801	3453	4850
DIRECT BROADCAST		0	103811	510371	3188671	3802853

AFRICA

		1981	1985	1990	2000	TOTAL
SATELLITES						
GENERAL PURPOSE	12 XP	0	0	0	1	1
	24 XP	0	1	1	2	4
	12 XP/GS	0	0	0	1	1
	24 XP/GS	0	1	1	2	4
DIRECT BROADCAST MAIN		0	0	0	0	0
GROUND STATION		0	0	0	0	0
EARTH STATIONS						
MAIN		0	0	0	0	0
REGIONAL		0	14	1	9	24
SMALL		0	14	4	35	53
TV/RO		0	40	18	80	138
DIRECT BROADCAST		0	0	0	0	0

**MOST LIKELY
REGIONAL
DELTA**

**ORIGINAL PAGE IS
OF POOR QUALITY**

ASIA

		1981	1985	1990	2000	TOTAL
SATELLITES						
GENERAL PURPOSE	12 XP	0	4	0	1	5
	24 XP	3	3	3	9	18
	12 XP/GS	0	4	0	1	5
	24 XP/GS	3	3	3	9	18
DIRECT BROADCAST MAIN		0	0	1	2	3
GROUND SPARE		0	0	1	2	3
EARTH STATIONS						
MAIN		0	3	4	1	8
REGIONAL		0	39	58	55	152
SMALL		0	207	457	546	1210
TV/RO		0	625	1490	4962	7077
DIRECT BROADCAST		0	0	310169	5987480	6297649

OCEANIA

		1981	1985	1990	2000	TOTAL
SATELLITES						
GENERAL PURPOSE	12 XP	0	3	0	0	3
	24 XP	0	0	2	1	3
	12 XP/GS	0	3	0	0	3
	24 XP/GS	0	0	2	1	3
DIRECT BROADCAST	MAIN	0	0	1	1	2
	GROUND SPARE	0	0	1	1	2
EARTH STATIONS						
MAIN		0	3	0	0	3
REGIONAL		0	12	8	4	24
SMALL		0	44	26	35	105
TV/RO		0	25	20	114	159
DIRECT BROADCAST		0	0	31873	165476	197349

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	6	13	0	2	21
24 XP	11	21	29	81	142
12 XP/GS	6	13	0	2	21
24 XP/GS	11	21	29	81	142
DIRECT BROADCAST MAIN	0	2	11	18	31
GROUND SPARE	0	2	11	18	31
EARTH STATIONS					
MAIN	28	25	18	6	77
REGIONAL	126	149	166	252	693
SMALL	637	7176	13471	32667	53951
TV/RO	3716	13077	12641	20340	49774
DIRECT BROADCAST	0	147664	977681	13998942	15124287

NORTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	6	4	4	4	10
24 XP	8	14	36	99	107
12 XP/GS	6	4	4	4	10
24 XP/GS	8	14	36	99	107
DIRECT BROADCAST MAIN	0	1	7	17	17
GROUND SPARE	0	1	7	17	17
EARTH STATIONS					
MAIN	28	6	10	15	43
REGIONAL	126	38	91	212	338
SMALL	637	6423	18973	50473	51110
TV/RO	3716	11512	21835	33358	37074
DIRECT BROADCAST	0	43853	169121	4665650	4665650

MOST LIKELY
REGIONAL
CUMULATIVE AFTER 1981

ORIGINAL PAGE IS
OF POOR QUALITY

SOUTH AMERICA

	.1981	1985	1990	2000	TOTAL
<i>SATELLITES</i>					
<i>GENERAL PURPOSE</i>					
12 XP	0	1	1	1	1
24 XP	0	1	1	3	3
12 XP/GS	0	1	1	1	1
24 XP/GS	0	1	1	3	3
<i>DIRECT BROADCAST MAIN</i>	0	0	0	1	1
<i>GROUND SPARE</i>	0	0	0	1	1
<i>EARTH STATIONS</i>					
<i>MAIN</i>	0	0	0	0	0
<i>REGIONAL</i>	0	12	12	12	12
<i>SMALL</i>	0	26	44	67	67
<i>TV/RO</i>	0	179	268	476	476
<i>DIRECT BROADCAST</i>	0	0	0	150786	160786

EUROPE

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0	1	1	1	1
24 XP	0	2	3	7	7
12 XP/GS	0	1	1	1	1
24 XP/GS	0	2	3	7	7
DIRECT BROADCAST MAIN	0	1	4	8	8
GROUND SPARE	0	1	4	8	8
EARTH STATIONS					
MAIN	0	13	23	23	23
REGIONAL	0	34	80	143	143
SMALL	0	462	878	1406	1406
TV/RO	0	596	1397	4850	4850
DIRECT BROADCAST	0	103811	614182	3802853	3802853

AFRICA

		1981	1985	1990	2000	TOTAL
SATELLITES						
GENERAL PURPOSE	12 XP	0	0	0	1	1
	24 XP	0	1	2	4	4
	12 XP/GS	0	0	0	1	1
	24 XP/GS	0	1	2	4	4
DIRECT BROADCAST MAIN		0	0	0	0	0
	GROUND SPARE	0	0	0	0	0
EARTH STATIONS						
MAIN		0	0	0	0	0
REGIONAL		0	14	15	24	24
SMALL		0	14	18	53	53
TV/RO		0	40	58	138	138
DIRECT BROADCAST		0	0	0	0	0

ASIA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0	4	4	5	5
24 XP	3	3	6	15	18
12 XP/GS	0	4	4	5	5
24 XP/GS	3	3	6	15	18
DIRECT BROADCAST MAIN					
	0	0	1	3	3
GROUND SPARE					
	0	0	1	3	3
EARTH STATIONS					
MAIN	0	3	7	8	8
REGIONAL	0	39	97	152	152
SMALL	0	207	664	1210	1210
TV/RO	0	625	2115	7077	7077
DIRECT BROADCAST	0	0	310169	6297649	6297649

OCEANIA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0	3	3	3	3
24 XP	0	0	2	3	3
12 XP/GS	0	3	3	3	3
24 XP/GS	0	0	2	3	3
DIRECT BROADCAST MAIN	0	0	1	2	2
GROUND SPARE	0	0	1	2	2
EARTH STATIONS					
MAIN	0	3	3	3	3
REGIONAL	0	12	20	24	24
SMALL	0	44	70	105	105
TV/RO	0	25	45	159	159
DIRECT BROADCAST	0	0	31873	197349	197349

MOST LIKELY
TOTAL
CUMULATIVE AFTER 1981

ORIGINAL PAGE IS
OF POOR QUALITY

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	6	13	13	15	21
24 XP	11	21	50	131	142
12 XP/GS	6	13	13	15	21
24 XP/GS	11	21	50	131	142
DIRECT BROADCAST MAIN	0	2	13	31	31
GROUND SPARE	0	2	13	31	31
EARTH STATIONS					
MAIN	28	25	43	49	77
REGIONAL	126	149	315	567	693
SMALL	637	7176	20647	53314	53951
TV/RO	3716	13077	25718	46058	49774
DIRECT BROADCAST	0	147664	1125345	15124287	15124287

MOST LIKELY
REGIONAL
DELTA

ORIGINAL PAGE IS
OF POOR QUALITY

(1980 DOLLARS)

NORTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	132.00	88.00	0.00	0.00	220.00
24 XP	224.00	392.00	763.00	2205.00	3584.00
12 XP/GS	132.00	88.00	0.00	0.00	220.00
24 XP/GS	224.00	392.00	763.00	2205.00	3584.00
DIRECT BROADCAST MAIN	0.00	22.00	132.00	300.00	454.00
GROUND SPARE	0.00	22.00	132.00	300.00	454.00
EARTH STATIONS					
MAIN	43.12	9.24	6.16	7.70	66.22
REGIONAL	128.52	38.76	54.06	123.42	344.76
SMALL	76.50	395.50	753.00	1890.00	3115.00
TV/RO	92.90	290.30	255.58	288.08	926.85
DIRECT BROADCAST	0.00	21.93	62.63	2248.26	2332.83
NON HARDWARE					
PLANNING (EQ. UNITS)	10.00	1.70	2.70	7.00	21.40
LAUNCH (EQ. UNITS)	278.40	379.20	544.00	1442.00	2643.60
TURNKEY (EQ. UNITS)					
MAIN	1.16	0.00	0.00	0.00	1.16
REGIONAL	5.78	0.40	0.63	0.20	7.01
SMALL	10.91	2.82	0.00	0.00	13.73
TV/RO	0.11	0.08	0.15	0.15	0.48
OPERATION (EQ. UNITS)	12.00	12.00	15.00	30.00	69.00
TOTAL	1371.38	2155.93	3483.90	11046.81	18058.03

(1980 DOLLARS)

SOUTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	22.00	0.00	0.00	22.00
24 XP	0.00	28.00	0.00	70.00	98.00
12 XP/GS	0.00	22.00	0.00	0.00	22.00
24 XP/GS	0.00	28.00	0.00	70.00	98.00
DIRECT BROADCAST MAIN	0.00	0.00	0.00	30.00	30.00
GROUND SPARE	0.00	0.00	0.00	30.00	30.00
EARTH STATIONS					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	12.24	0.00	0.00	12.24
SMALL	0.00	13.00	9.00	11.50	33.50
TV/RO	0.00	4.48	2.23	5.20	11.90
DIRECT BROADCAST	0.00	0.00	0.00	80.39	80.39
NON HARDWARE					
PLANNING (EQ. UNITS)	0.00	18.00	0.00	0.00	18.00
LAUNCH (EQ. UNITS)	0.00	39.20	0.00	42.00	81.20
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	3.06	0.00	0.00	3.06
SMALL	0.00	3.24	2.22	2.90	8.36
TV/RO	0.00	1.16	0.58	1.36	3.10
OPERATION (EQ. UNITS)	0.00	3.00	15.00	9.00	27.00
TOTAL	0.00	197.38	29.02	352.35	578.75

MOST LIKELY
REGIONAL
DELTA

ORIGINAL PAGE IS
OF POOR QUALITY

(1980 DOLLARS)

EUROPE

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	22.00	0.00	0.00	22.00
24 XP	0.00	56.00	28.00	140.00	224.00
12 XP/GS	0.00	22.00	0.00	0.00	22.00
24 XP/GS	0.00	56.00	28.00	140.00	224.00
DIRECT BROADCAST MAIN	0.00	22.00	66.00	120.00	208.00
GROUND SPARE	0.00	22.00	66.00	120.00	208.00
EARTH STATIONS					
MAIN	0.00	20.02	15.40	0.00	35.42
REGIONAL	0.00	34.68	46.92	64.26	145.86
SMALL	0.00	231.00	208.00	264.00	703.00
TV/RO	0.00	14.90	20.03	86.33	121.25
DIRECT BROADCAST	0.00	51.91	255.19	1594.34	1901.43
NON HARDWARE					
PLANNING (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
LAUNCH (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	0.00	0.00	0.00	0.00
SMALL	0.00	0.00	0.00	0.00	0.00
TV/RO	0.00	0.00	0.00	0.00	0.00
OPERATION (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
TOTAL	0.00	552.51	733.53	2528.92	3814.96

(1980 DOLLARS)

AFRICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	0.00	0.00	30.00	30.00
24 XP	0.00	28.00	28.00	70.00	126.00
12 XP/GS	0.00	0.00	0.00	30.00	30.00
24 XP/GS	0.00	28.00	28.00	70.00	126.00
DIRECT BROADCAST MAIN	0.00	0.00	0.00	0.00	0.00
GROUND STATIONS	0.00	0.00	0.00	0.00	0.00
EARTH STATIONS					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	14.28	1.02	9.18	24.48
SMALL	0.00	7.00	2.00	17.50	26.50
TV/RO	0.00	1.00	0.45	2.00	3.45
DIRECT BROADCAST	0.00	0.00	0.00	0.00	0.00
NON HARDWARE					
PLANNING (EQ. UNITS)	3.00	6.00	3.00	6.00	18.00
LAUNCH (EQ. UNITS)	0.00	19.60	14.00	42.00	75.60
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	3.57	0.26	2.17	5.99
SMALL	0.00	1.81	0.47	4.40	6.68
TV/RO	0.00	0.26	0.11	0.52	0.90
OPERATION (EQ. UNITS)	0.00	3.00	7.50	12.00	22.50
TOTAL	3.00	112.52	94.80	295.77	496.10

(1980 DOLLARS)

ASIA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	88.00	0.00	30.00	118.00
24 XP	84.00	84.00	84.00	315.00	567.00
12 XP/GS	0.00	88.00	0.00	30.00	118.00
24 XP/GS	84.00	84.00	84.00	315.00	567.00
DIRECT BROADCAST MAIN	0.00	0.00	22.00	60.00	82.00
GROUND SPARE	0.00	0.00	22.00	60.00	82.00
EARTH STATIONS					
MAIN	0.00	4.62	6.16	1.54	12.32
REGIONAL	0.00	39.78	59.16	56.10	155.04
SMALL	0.00	103.50	228.50	273.00	605.00
TV/RO	0.00	15.63	37.25	124.05	176.93
DIRECT BROADCAST	0.00	0.00	155.08	2993.74	3148.82
NON HARDWARE					
PLANNING (EQ. UNITS)	21.00	15.00	6.00	3.00	45.00
LAUNCH (EQ. UNITS)	19.60	117.60	28.00	98.00	263.20
TURNKEY (EQ. UNITS)					
MAIN	0.00	1.16	0.00	0.00	1.16
REGIONAL	0.00	10.02	3.61	5.33	18.97
SMALL	0.00	25.89	17.63	26.72	70.23
TV/RO	0.00	4.06	2.87	11.49	18.41
OPERATION (EQ. UNITS)	9.00	18.00	28.50	42.00	97.50
TOTAL	217.60	699.25	734.76	4444.97	6146.57

MOST LIKELY
REGIONAL
DELTA

ORIGINAL PAGE IS
OF POOR QUALITY

(1980 DOLLARS)

OCEANIA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	66.00	0.00	0.00	66.00
24 XP	0.00	0.00	56.00	35.00	91.00
12 XP/GS	0.00	66.00	0.00	0.00	66.00
24 XP/GS	0.00	0.00	56.00	35.00	91.00
DIRECT BROADCAST MAIN	0.00	0.00	22.00	30.00	52.00
GROUND SPARE	0.00	0.00	22.00	30.00	52.00
EARTH STATIONS					
MAIN	0.00	4.62	0.00	0.00	4.62
REGIONAL	0.00	12.24	8.16	4.08	24.48
SMALL	0.00	22.00	13.00	17.50	52.50
TV/RO	0.00	0.63	2.50	2.85	3.98
DIRECT BROADCAST	0.00	0.00	15.94	82.74	98.67
NON HARDWARE					
PLANNING (EQ. UNITS)	6.00	3.00	0.00	0.00	9.00
LAUNCH (EQ. UNITS)	0.00	58.80	42.00	28.00	128.80
TURNKEY (EQ. UNITS)					
MAIN	0.00	1.16	0.00	0.00	1.16
REGIONAL	0.00	3.18	1.90	1.14	6.22
SMALL	0.00	5.51	3.22	4.36	13.10
TV/RO	0.00	0.16	0.13	0.74	1.03
OPERATION (EQ. UNITS)	0.00	4.50	6.00	0.00	10.50
TOTAL	6.00	247.79	246.86	271.40	772.05

MOST LIKELY
TOTAL
DELTA

(1980 DOLLARS)

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	132.00	286.00	0.00	60.00	478.00
24 XP	308.00	588.00	959.00	2835.00	4690.00
12 XP/GS	132.00	286.00	0.00	60.00	478.00
24 XP/GS	308.00	588.00	959.00	2835.00	4690.00
DIRECT BROADCAST MAIN	0.00	44.00	242.00	540.00	826.00
GROUND SPARE	0.00	44.00	242.00	540.00	826.00
EARTH STATIONS					
MAIN	43.12	38.50	27.72	9.24	118.58
REGIONAL	128.52	151.98	169.32	257.04	706.86
SMALL	76.50	772.00	1213.50	2473.50	4535.50
TV/RO	92.90	326.93	316.03	508.50	1244.35
DIRECT BROADCAST	0.00	73.83	488.84	6999.47	7562.14
NON HARDWARE					
PLANNING (EQ. UNITS)	40.00	43.70	11.70	16.00	111.40
LAUNCH (EQ. UNITS)	298.00	614.40	628.00	1652.00	3192.40
TURNKEY (EQ. UNITS)					
MAIN	1.16	2.31	0.00	0.00	3.47
REGIONAL	5.78	20.23	6.40	8.84	41.25
SMALL	10.91	39.27	23.53	38.38	112.09
TV/RO	0.11	5.73	3.83	14.26	23.92
OPERATION (EQ. UNITS)	21.00	40.50	72.00	93.00	226.50
TOTAL	1597.98	3965.38	5362.87	18940.22	29866.45

MOST LIKELY
REGIONAL
CUMULATIVE AFTER 1981

ORIGINAL PAGE IS
OF POOR QUALITY.

(1980 DOLLARS)

NORTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	132.00	88.00	88.00	88.00	220.00
24 XP	224.00	392.00	1155.00	3360.00	3584.00
12 XP/GS	132.00	88.00	88.00	88.00	220.00
24 XP/GS	224.00	392.00	1155.00	3360.00	3584.00
DIRECT BROADCAST MAIN	0.00	22.00	154.00	454.00	454.00
GROUND SPARE	0.00	22.00	154.00	454.00	454.00
EARTH STATIONS					
MAIN	43.12	9.24	15.40	23.10	66.22
REGIONAL	128.52	38.76	92.82	216.24	344.76
SMALL	76.50	395.50	1148.50	3038.50	3115.00
TV/RO	92.90	290.30	545.88	833.95	926.85
DIRECT BROADCAST	0.00	21.93	84.56	2332.83	2332.83
NON HARDWARE					
PLANNING (EQ. UNITS)	10.00	1.70	4.40	11.40	21.40
LAUNCH (EQ. UNITS)	278.40	379.20	923.20	2365.20	2643.60
TURNKEY (EQ. UNITS)					
MAIN	1.16	0.00	0.00	0.00	1.16
REGIONAL	5.78	0.40	1.03	1.24	7.01
SMALL	10.91	2.82	2.82	2.82	13.73
TV/RO	0.11	0.08	0.22	0.37	0.48
OPERATION (EQ. UNITS)	12.00	12.00	27.00	57.00	69.00
TOTAL	1371.38	2155.93	5639.83	16686.64	18058.03

MOST LIKELY
REGIONAL
CUMULATIVE AFTER 1981

(1980 DOLLARS)

SOUTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	22.00	22.00	22.00	22.00
24 XP	0.00	28.00	28.00	98.00	98.00
12 XP/GS	0.00	22.00	22.00	22.00	22.00
24 XP/GS	0.00	28.00	28.00	98.00	98.00
DIRECT BROADCAST MAIN	0.00	0.00	0.00	30.00	30.00
GROUND SPARE	0.00	0.00	0.00	30.00	30.00
EARTH STATIONS					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	12.24	12.24	12.24	12.24
SMALL	0.00	13.00	22.00	33.50	33.50
TV/RO	0.00	4.48	6.70	11.90	11.90
DIRECT BROADCAST	0.00	0.00	0.00	80.39	80.39
NON HARDWARE					
PLANNING (EQ. UNITS)	0.00	18.00	18.00	18.00	18.00
LAUNCH (EQ. UNITS)	0.00	39.20	39.20	81.20	81.20
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	3.06	3.06	3.06	3.06
SMALL	0.00	3.24	5.46	8.36	8.36
TV/RO	0.00	1.16	1.74	3.10	3.10
OPERATION (EQ. UNITS)	0.00	3.00	18.00	27.00	27.00
TOTAL	0.00	197.38	226.40	578.75	578.75

(1980 DOLLARS)

EUROPE

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	22.00	22.00	22.00	22.00
24 XP	0.00	56.00	84.00	224.00	224.00
12 XP/GS	0.00	22.00	22.00	22.00	22.00
24 XP/GS	0.00	56.00	84.00	224.00	224.00
DIRECT BROADCAST MAIN	0.00	22.00	88.00	208.00	208.00
GROUND SPARE	0.00	22.00	88.00	208.00	208.00
EARTH STATIONS					
MAIN	0.00	20.02	35.42	35.42	35.42
REGIONAL	0.00	34.68	81.60	145.86	145.86
SMALL	0.00	231.00	439.00	703.00	703.00
TV/RO	0.00	14.90	34.93	121.25	121.25
DIRECT BROADCAST	0.00	51.91	307.09	1901.43	1901.43
NON HARDWARE					
PLANNING (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
LAUNCH (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	0.00	0.00	0.00	0.00
SMALL	0.00	0.00	0.00	0.00	0.00
TV/RO	0.00	0.00	0.00	0.00	0.00
OPERATION (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
TOTAL	0.00	552.51	1286.04	3814.96	3814.96

(1980 DOLLARS)

AFRICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	0.00	0.00	30.00	30.00
24 XP	0.00	28.00	56.00	126.00	126.00
12 XP/GS	0.00	0.00	0.00	30.00	30.00
24 XP/GS	0.00	28.00	56.00	126.00	126.00
DIRECT BROADCAST MAIN					
GROUND SPARE	0.00	0.00	0.00	0.00	0.00
EARTH STATIONS					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	14.28	15.30	24.48	24.48
SMALL	0.00	7.00	9.00	26.50	26.50
TV/RO	0.00	1.00	1.45	3.45	3.45
DIRECT BROADCAST	0.00	0.00	0.00	0.00	0.00
NON HARDWARE					
PLANNING (EQ. UNITS)	3.00	6.00	9.00	15.00	18.00
LAUNCH (EQ. UNITS)	0.00	19.60	33.60	75.60	75.60
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	3.57	3.83	5.99	5.99
SMALL	0.00	1.81	2.28	6.68	6.68
TV/RO	0.00	0.26	0.37	0.90	0.90
OPERATION (EQ. UNITS)	0.00	3.00	10.50	22.50	22.50
TOTAL	3.00	112.52	197.32	493.10	496.10

MOST LIKELY
REGIONAL
CUMULATIVE AFTER 1981

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OF POOR QUALITY

(1980 DOLLARS)

ASIA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 KP	0.00	88.00	88.00	118.00	118.00
24 KP	84.00	84.00	168.00	483.00	567.00
12 KP/GS	0.00	88.00	88.00	118.00	118.00
24 KP/GS	84.00	84.00	168.00	483.00	567.00
DIRECT BROADCAST MAIN	0.00	0.00	22.00	82.00	82.00
GROUND STATION	0.00	0.00	22.00	82.00	82.00
EARTH STATIONS					
MAIN	0.00	4.62	10.78	12.32	12.32
REGIONAL	0.00	39.78	38.94	155.04	155.04
SMALL	0.00	103.50	332.00	605.00	605.00
TV/RO	0.00	15.63	52.88	176.93	176.93
DIRECT BROADCAST	0.00	0.00	155.08	3148.82	3148.82
NON HARDWARE					
PLANNING (EQ. UNITS)	21.00	15.00	21.00	24.00	45.00
LAUNCH (EQ. UNITS)	19.60	117.60	145.60	243.60	263.20
TURNKEY (EQ. UNITS)					
MAIN	0.00	1.16	1.16	1.16	1.16
REGIONAL	0.00	10.02	13.63	18.97	18.97
SMALL	0.00	25.89	43.51	70.23	70.23
TV/RO	0.00	4.06	6.93	18.41	18.41
OPERATION (EQ. UNITS)	9.00	18.00	46.50	88.50	97.50
TOTAL	217.60	699.25	1484.01	5928.97	6146.57

MOST LIKELY
REGIONAL
CUMULATIVE AFTER 1981

(1980 DOLLARS)

OCEANIA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	66.00	66.00	66.00	66.00
24 XP	0.00	0.00	56.00	91.00	91.00
12 XP/GS	0.00	66.00	66.00	66.00	66.00
24 XP/GS	0.00	0.00	56.00	91.00	91.00
DIRECT BROADCAST MAIN	0.00	0.00	22.00	52.00	52.00
GROUND STAKE	0.00	0.00	22.00	52.00	52.00
GROUND STATIONS					
MAIN	0.00	4.62	4.62	4.62	4.62
REGIONAL	0.00	12.24	20.40	24.48	24.48
SMALL	0.00	22.00	35.00	52.50	52.50
TV/RO	0.00	0.63	1.13	3.98	3.98
DIRECT BROADCAST	0.00	0.00	15.94	98.67	98.67
NON HARDWARE					
PLANNING (EQ. UNITS)	6.00	3.00	3.00	3.00	9.00
LAUNCH (EQ. UNITS)	0.00	58.80	100.80	128.80	128.80
TURNKEY (EQ. UNITS)					
MAIN	0.00	1.16	1.16	1.16	1.16
REGIONAL	0.00	3.18	5.08	6.22	6.22
SMALL	0.00	5.51	8.74	13.10	13.10
TV/RO	0.00	0.16	0.29	1.03	1.03
OPERATION (EQ. UNITS)	0.00	4.50	10.50	10.50	10.50
TOTAL	6.00	247.79	494.65	766.05	772.05

*MOST LIKELY
TOTAL
CUMULATIVE AFTER 1981*

*ORIGINAL FACE IS
OF POOR QUALITY*

(1980 DOLLARS)

	1981	1985	1990	2000	TOTAL
<i>SATELLITES</i>					
<i>GENERAL PURPOSE 12 XP</i>	132.00	286.00	286.00	346.00	478.00
<i>24 XP</i>	308.00	588.00	1547.00	4382.00	4690.00
<i>12 XP/GS</i>	132.00	286.00	286.00	346.00	478.00
<i>24 XP/GS</i>	308.00	588.00	1547.00	4382.00	4690.00
<i>DIRECT BROADCAST MAIN</i>	0.00	44.00	286.00	826.00	826.00
<i>GROUND SPARE</i>	0.00	44.00	286.00	826.00	826.00
<i>EARTH STATIONS</i>					
<i>MAIN</i>	43.12	38.50	66.22	75.46	118.58
<i>REGIONAL</i>	128.52	151.98	321.30	578.34	706.86
<i>SMALL</i>	76.50	772.00	1985.50	4459.00	4535.50
<i>TV/RO</i>	92.90	326.93	642.95	1151.45	1244.35
<i>DIRECT BROADCAST</i>	0.00	73.83	562.67	7562.14	7562.14
<i>NON HARDWARE</i>					
<i>PLANNING (EQ. UNITS)</i>	40.00	43.70	55.40	71.40	111.40
<i>LAUNCH (EQ. UNITS)</i>	298.00	614.40	1242.40	2894.40	3192.40
<i>TURNKEY (EQ. UNITS)</i>					
<i>MAIN</i>	1.16	2.31	2.31	2.31	3.47
<i>REGIONAL</i>	5.78	20.23	26.63	35.47	41.25
<i>SMALL</i>	10.91	39.27	62.80	101.18	112.09
<i>TV/RO</i>	0.11	5.73	9.56	23.81	23.92
<i>OPERATION (EQ. UNITS)</i>	21.00	40.50	112.50	205.50	226.50
<i>TOTAL</i>	1597.98	3965.38	9328.24	28268.47	29866.45

OPTIMISTIC
REGIONAL
DELTA

NORTH AMERICA

		1981	1985	1990	2000	TOTAL
SATELLITES						
GENERAL PURPOSE	12 XP	6	4	0	0	10
	24 XP	8	16	25	66	115
	12 XP/GS	6	4	0	0	10
	24 XP/GS	8	16	25	66	115
DIRECT BROADCAST MAIN		0	1	6	13	20
GROUND SPARE		0	1	6	13	20
EARTH STATIONS						
MAIN		28	7	4	5	44
REGIONAL		126	39	63	151	379
SMALL		637	6823	14750	89450	111660
TV/RO		3716	11812	10023	12523	38074
DIRECT BROADCAST		0	43853	131268	5600529	5775650

OPTIMISTIC
REGIONAL
DELTA

SOUTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0	3	1	0	4
24 XP	0	1	0	5	6
12 XP/GS	0	3	1	0	4
24 XP/GS	0	1	0	5	6
DIRECT BROADCAST MAIN	0	0	0	1	1
GROUND SPARE	0	0	0	1	1
EARTH STATIONS					
MAIN	0	0	0	0	0
REGIONAL	0	14	1	1	16
SMALL	0	29	18	26	73
TV/RO	0	197	104	211	512
DIRECT BROADCAST	0	0	0	231532	231532

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OPTIMISTIC
REGIONAL
DELTA

EUROPE

		1981	1985	1990	2000	TOTAL
<i>SATELLITES</i>						
<i>GENERAL PURPOSE</i>	12 XP	0	1	0	0	1
	24 XP	0	5	1	7	13
	12 XP/GS	0	1	0	0	1
	24 XP/GS	0	5	1	7	13
<i>DIRECT BROADCAST MAIN</i>		0	1	4	5	10
	<i>GROUND SPARE</i>	0	1	4	5	10
<i>EARTH STATIONS</i>						
<i>MAIN</i>		6	16	4	0	26
<i>REGIONAL</i>		12	42	39	67	160
<i>SMALL</i>		100	516	376	590	1582
<i>TV/RO</i>		214	647	842	4143	5846
<i>DIRECT BROADCAST</i>		0	103811	510371	3188671	3802853

OPTIMISTIC
REGIONAL
DELTA

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AFRICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0	0	2	1	3
24 XP	0	1	2	3	6
12 XP/GS	0	0	2	1	3
24 XP/GS	0	1	2	3	6
DIRECT BROADCAST MAIN					
GROUND SPARE	0	0	0	0	0
EARTH STATIONS					
MAIN	0	0	0	0	0
REGIONAL	0	7	17	1	25
SMALL	0	8	25	22	55
TV/RO	0	34	48	67	149
DIRECT BROADCAST	0	0	0	0	0

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OPTIMISTIC
REGIONAL
DELTA

ASIA

		1981	1985	1990	2000	TOTAL
SATELLITES						
GENERAL PURPOSE	12 XP	0	4	2	0	6
	24 XP	3	7	5	15	30
	12 XP/GS	0	4	2	0	6
	24 XP/GS	3	7	5	15	30
DIRECT BROADCAST MAIN		0	0	3	3	6
	GROUND SPARE	0	0	3	3	6
EARTH STATIONS						
MAIN		5	2	0	0	7
REGIONAL		51	54	30	45	180
SMALL		350	382	289	188	1209
TV/RO		1210	1545	2618	6553	11926
DIRECT BROADCAST		0	0	988828	7108496	8097324

OPTIMISTIC
REGIONAL
DELTA

OCEANIA

		1981	1985	1990	2000	TOTAL
SATELLITES						
GENERAL PURPOSE	12 XP	0	3	0	0	3
	24 XP	0	0	0	3	3
	12 XP/GS	0	3	0	0	3
	24 XP/GS	0	0	0	3	3
DIRECT BROADCAST MAIN		0	0	2	2	4
	GROUND SPARE	0	0	2	2	4
EARTH STATIONS						
MAIN		0	3	0	0	3
REGIONAL		0	11	8	5	24
SMALL		0	40	24	41	105
TV/RO		0	22	18	102	142
DIRECT BROADCAST		0	0	38248	198571	236819
SATELLITES						
GENERAL PURPOSE	12 XP	0	3	0	0	3
	24 XP	0	0	0	3	3
	12 XP/GS	0	3	0	0	3
	24 XP/GS	0	0	0	3	3
DIRECT BROADCAST MAIN		0	0	2	2	4
	GROUND SPARE	0	0	2	2	4
EARTH STATIONS						
MAIN		0	3	0	0	3
REGIONAL		0	11	8	5	24
SMALL		0	40	24	41	105
TV/RO		0	22	18	102	142
DIRECT BROADCAST		0	0	38248	198571	236819

**ORIGINAL PAGE IS
OF POOR QUALITY**

**OPTIMISTIC
TOTAL
DELTA**

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	6	15	5	1	27
24 XP	11	30	33	99	173
12 XP/GS	6	15	5	1	27
24 XP/GS	11	30	33	99	173
DIRECT BROADCAST MAIN	0	2	15	24	41
GROUND SPARE	0	2	15	24	41
EARTH STATIONS					
MAIN	39	28	8	5	80
REGIONAL	189	167	158	270	784
SMALL	1087	7798	15482	90317	114684
TV/RO	5140	14257	13653	23599	56649
DIRECT BROADCAST	0	147664	1568715	16327799	18144178

ORIGINAL PAGE IS
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OPTIMISTIC
REGIONAL
CUMULATIVE AFTER 1981

NORTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	6	4	4	4	10
24 XP	8	16	41	107	115
12 XP/GS	6	4	4	4	10
24 XP/GS	8	16	41	107	115
DIRECT BROADCAST MAIN	0	1	7	20	20
GROUND SPARE	0	1	7	20	20
EARTH STATIONS					
MAIN	28	7	11	16	44
REGIONAL	126	39	102	253	379
SMALL	637	6823	21573	111023	111660
TV/RO	3716	11812	21835	34358	38074
DIRECT BROADCAST	0	43853	175121	5775650	5775650

OPTIMISTIC
REGIONAL
CUMULATIVE AFTER 1981

SOUTH AMERICA

	1981	1985	1990	2000	TOTAL
<i>SATELLITES</i>					
GENERAL PURPOSE 12 XP	0	3	4	4	4
24 XP	0	1	1	6	6
12 XP/GS	0	3	4	4	4
24 XP/GS	0	1	1	6	6
DIRECT BROADCAST MAIN	0	0	0	1	1
GROUND SPARE	0	0	0	1	1
<i>EARTH STATIONS</i>					
MAIN	0	0	0	0	0
REGIONAL	0	14	15	16	16
SMALL	0	29	47	73	73
TV/RO	0	197	301	512	512
DIRECT BROADCAST	0	0	0	231532	231532

ORIGINAL PAGE IS
OF POOR QUALITY

OPTIMISTIC
REGIONAL
CUMULATIVE AFTER 1981

EUROPE

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0	1	1	1	1
24 XP	0	5	6	13	13
12 XP/GS	0	1	1	1	1
24 XP/GS	0	5	6	13	13
DIRECT BROADCAST MAIN	0	1	5	10	10
GROUND SPARE	0	1	5	10	10
EARTH STATIONS					
MAIN	6	16	20	20	26
REGIONAL	12	42	81	148	160
SMALL	100	516	892	1482	1582
TV/RO	214	647	1489	5632	5846
DIRECT BROADCAST	0	103811	614182	3802853	3802853

ORIGINAL PAGE IS
OF POOR QUALITY

DOMESTIC
REGIONAL
CUMULATIVE AFTER 1981

AFRICA

SATELLITES		1981	1985	1990	2000	TOTAL
GENERAL PURPOSE	12 KP	0	0	2	3	3
	24 KP	0	1	3	6	6
	12 KP/GS	0	0	2	3	3
	24 KP/GS	0	1	3	6	6
DIRECT BROADCAST	MAIN	0	0	0	0	0
	GROUND SPARE	0	0	0	0	0
EARTH STATIONS						
MAIN		0	0	0	0	0
REGIONAL		0	7	24	25	25
SMALL		0	8	33	55	55
TV/RO		0	34	82	149	149
DIRECT BROADCAST		0	0	0	0	0

ORIGINAL PAGE IS
OF POOR QUALITY

OPTIMISTIC
REGIONAL
CUMULATIVE AFTER 1981

ASIA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0	4	6	6	6
24 XP	3	7	12	27	30
12 XP/GS	0	4	6	6	6
24 XP/GS	3	7	12	27	30
DIRECT BROADCAST MAIN					
	0	0	3	6	6
GROUND SPARE					
	0	0	3	6	6
EARTH STATIONS					
MAIN	5	2	2	2	7
REGIONAL	51	54	84	129	180
SMALL	350	382	671	859	1209
TV/RO	1210	1545	4163	10716	11926
DIRECT BROADCAST	0	0	988828	8097324	8097324

ORIGINAL PAGE IS
OF POOR QUALITY

OPTIMISTIC
REGIONAL
CUMULATIVE AFTER 1981

OCEANIA

		1981	1985	1990	2000	TOTAL
<i>SATELLITES</i>						
<i>GENERAL PURPOSE</i>	12 XP	0	3	3	3	3
	24 XP	0	0	0	3	3
	12 XP/GS	0	3	3	3	3
	24 XP/GS	0	0	0	3	3
<i>DIRECT BROADCAST</i>	<i>MAIN</i>	0	0	2	4	4
	<i>GROUND SPARE</i>	0	0	2	4	4
<i>EARTH STATIONS</i>						
<i>MAIN</i>		0	3	3	3	3
<i>REGIONAL</i>		0	11	19	24	24
<i>SMALL</i>		0	40	64	105	105
<i>TV/RO</i>		0	22	40	142	142
<i>DIRECT BROADCAST</i>		0	0	38248	236819	236819

OPTIMISTIC
TOTAL
CUMULATIVE AFTER 1981

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	6	15	20	21	27
24 XP	11	30	63	162	173
12 XP/GS	6	15	20	21	27
24 XP/GS	11	30	63	162	173
DIRECT BROADCAST MAIN	0	2	17	41	41
GROUND SPARE	0	2	17	41	41
EARTH STATIONS					
MAIN	39	28	36	41	80
REGIONAL	189	167	325	595	784
SMALL	1087	7798	23280	113597	114684
TV/RO	5140	14257	27910	51509	56649
DIRECT BROADCAST	0	147664	1816379	18144178	18144178

**ORIGINAL PAGE IS
OF POOR QUALITY**

**OPTIMISTIC
REGIONAL
DELTA**

(1980 DOLLARS)

NORTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	132.00	88.00	0.00	0.00	220.00
24 XP	224.00	448.00	861.00	2310.00	3843.00
12 XP/GS	132.00	88.00	0.00	0.00	220.00
24 XP/GS	224.00	448.00	861.00	2310.00	3843.00
DIRECT BROADCAST MAIN	0.00	22.00	132.00	390.00	544.00
GROUND SPARE	0.00	22.00	132.00	390.00	544.00
EARTH STATIONS					
MAIN	42.62	10.00	6.16	7.70	66.48
REGIONAL	128.46	9.02	55.08	125.46	318.02
SMALL	76.50	419.50	885.00	5367.00	6748.00
TV/RO	92.40	295.30	250.58	313.08	951.35
DIRECT BROADCAST	0.00	21.93	65.63	2800.26	2887.83
NON HARDWARE					
PLANNING (EQ. UNITS)	10.00	1.70	2.30	7.50	21.50
LAUNCH (EQ. UNITS)	278.40	418.40	608.00	1556.00	2860.80
TURNKEY (EQ. UNITS)					
MAIN	1.16	0.00	0.00	0.00	1.16
REGIONAL	5.78	0.40	0.63	0.20	7.01
SMALL	10.91	2.82	0.00	0.00	13.73
TV/RO	0.11	0.08	0.15	0.15	0.48
OPERATION (EQ. UNITS)	12.00	12.00	15.00	30.00	69.00
TOTAL	1370.32	2307.15	3874.52	15807.35	23159.35

OPTIMISTIC
REGIONAL
DELTA

(1980 DOLLARS)

SOUTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	66.00	22.00	0.00	88.00
24 XP	0.00	28.00	0.00	175.00	203.00
12 XP/GS	0.00	66.00	22.00	0.00	88.00
24 XP/GS	0.00	28.00	0.00	175.00	203.00
DIRECT BROADCAST MAIN	0.00	0.00	0.00	30.00	30.00
GROUND SPARE	0.00	0.00	0.00	30.00	30.00
EARTH STATIONS					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	14.28	1.02	1.02	16.32
SMALL	0.00	14.50	9.00	13.00	36.50
TV/RO	0.00	4.93	2.60	5.28	12.80
DIRECT BROADCAST	0.00	0.00	0.00	115.77	115.77
NON HARDWARE					
PLANNING (EQ. UNITS)	6.00	21.00	0.00	0.00	27.00
LAUNCH (EQ. UNITS)	0.00	78.40	14.00	84.00	176.40
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	3.57	0.26	0.26	4.08
SMALL	0.00	3.59	2.33	3.18	9.10
TV/RO	0.00	1.28	0.67	1.38	3.33
OPERATION (EQ. UNITS)	0.00	7.50	22.50	19.50	49.50
TOTAL	6.00	337.05	96.37	653.37	1092.80

OPTIMISTIC
REGIONAL
DELTA

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(1980 DOLLARS)

EUROPE

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	22.00	0.00	0.00	22.00
24 XP	0.00	140.00	28.00	245.00	413.00
12 XP/GS	0.00	22.00	0.00	0.00	22.00
24 XP/GS	0.00	140.00	28.00	245.00	413.00
DIRECT BROADCAST MAIN	0.00	22.00	88.00	150.00	260.00
GROUND SPARE	0.00	22.00	88.00	150.00	260.00
EARTH STATIONS					
MAIN	9.24	24.64	6.16	0.00	40.04
REGIONAL	12.24	42.84	39.78	68.34	163.20
SMALL	50.00	258.00	188.00	295.00	791.00
TV/RO	5.35	16.18	21.05	103.58	146.15
DIRECT BROADCAST	0.00	51.91	255.19	1594.34	1901.43
NON HARDWARE					
PLANNING (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
LAUNCH (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	0.00	0.00	0.00	0.00
SMALL	0.00	0.00	0.00	0.00	0.00
TV/RO	0.00	0.00	0.00	0.00	0.00
OPERATION (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
TOTAL	76.83	761.56	742.18	2851.25	4431.82

OPTIMISTIC
REGIONAL
DELTA

ORIGINAL PAGE IS
OF POOR QUALITY

(1980 DOLLARS)

AFRICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	0.00	44.00	30.00	74.00
24 XP	0.00	28.00	56.00	105.00	169.00
12 XP/GS	0.00	0.00	44.00	30.00	74.00
24 XP/GS	0.00	28.00	56.00	105.00	189.00
DIRECT BROADCAST MAIN	0.00	0.00	0.00	0.00	0.00
GROUND SPARE	0.00	0.00	0.00	0.00	0.00
EARTH STATIONS					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	7.14	17.34	1.02	25.50
SMALL	0.00	4.00	12.50	11.00	27.50
TV/RO	0.00	0.85	1.20	1.68	3.73
DIRECT BROADCAST	0.00	0.00	0.00	0.00	0.00
NON HARDWARE					
PLANNING (EQ. UNITS)	3.00	9.00	15.00	0.00	27.00
LAUNCH (EQ. UNITS)	0.00	19.60	56.00	56.00	131.60
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	1.79	4.21	0.26	6.25
SMALL	0.00	1.06	3.03	2.74	6.83
TV/RO	0.00	0.22	0.31	0.44	0.97
OPERATION (EQ. UNITS)	0.00	3.00	13.50	28.50	45.00
TOTAL	3.00	102.65	323.09	371.63	800.37

OPTIMISTIC
REGIONAL
DELTA

ORIGINAL PAGE IS
OF POOR QUALITY

(1980 DOLLARS)

ASIA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	88.00	44.00	0.00	132.00
24 XP	84.00	196.00	140.00	525.00	945.00
12 XP/GS	0.00	88.00	44.00	0.00	132.00
24 XP/GS	84.00	196.00	140.00	525.00	945.00
DIRECT BROADCAST MAIN	0.00	0.00	66.00	90.00	156.00
GROUND SPARE	0.00	0.00	66.00	90.00	156.00
EARTH STATIONS					
MAIN	7.70	3.08	0.00	0.00	10.78
REGIONAL	52.02	55.08	30.60	45.90	183.60
SMALL	175.00	191.00	144.50	94.00	604.50
TV/RO	30.25	38.63	65.45	163.83	298.15
DIRECT BROADCAST	0.00	0.00	494.41	3554.25	4048.66
NON HARDWARE					
PLANNING (EQ. UNITS)	9.00	18.00	9.00	0.00	36.00
LAUNCH (EQ. UNITS)	0.00	156.80	70.00	126.00	352.80
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.77	0.00	0.00	0.77
REGIONAL	0.26	10.64	3.69	4.50	19.09
SMALL	0.31	27.47	18.85	23.51	70.14
TV/RO	0.02	4.17	3.14	12.57	19.91
OPERATION (EQ. UNITS)	0.00	6.00	7.50	13.50	27.00
TOTAL	442.56	1079.64	1347.14	5268.06	8137.40

OPTIMISTIC
REGIONAL
DELTA

ORIGINAL PAGE IS
OF POOR QUALITY

(1980 DOLLARS)

OCEANIA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	66.00	0.00	0.00	66.00
24 XP	0.00	0.00	0.00	105.00	105.00
12 XP/GS	0.00	66.00	0.00	0.00	66.00
24 XP/GS	0.00	0.00	0.00	105.00	105.00
DIRECT BROADCAST MAIN	0.00	0.00	44.00	60.00	104.00
GROUND SPARE	0.00	0.00	44.00	60.00	104.00
EARTH STATIONS					
MAIN	0.00	4.62	0.00	0.00	4.62
REGIONAL	0.00	11.22	8.16	5.10	24.48
SMALL	0.00	20.00	12.00	20.50	52.50
TV/RO	0.00	0.55	0.45	2.55	3.55
DIRECT BROADCAST	0.00	0.00	19.12	99.29	118.41
NON HARDWARE					
PLANNING (EQ. UNITS)	3.00	6.00	0.00	0.00	9.00
LAUNCH (EQ. UNITS)	0.00	58.80	28.00	70.00	156.80
TURNKEY (EQ. UNITS)					
MAIN	0.00	1.16	0.00	0.00	1.16
REGIONAL	0.00	2.69	2.21	1.19	6.10
SMALL	0.00	5.03	2.96	5.11	13.09
TV/RO	0.00	0.14	0.12	0.66	0.93
OPERATION (EQ. UNITS)	0.00	3.00	7.50	0.00	10.50
TOTAL	3.00	245.21	163.52	534.40	951.13

OPTIMISTIC
TOTAL
DELTA

**ORIGINAL PAGE IS
OF POOR QUALITY**

(1980 DOLLARS)

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	132.00	330.00	110.00	30.00	602.00
24 XP	308.00	840.00	1085.00	3465.00	5698.00
12 XP/GS	132.00	330.00	110.00	30.00	602.00
24 XP/GS	308.00	840.00	1085.00	3465.00	5698.00
DIRECT BROADCAST MAIN	0.00	44.00	330.00	720.00	1094.00
GROUND SPARE	0.00	44.00	330.00	720.00	1094.00
EARTH STATIONS					
MAIN	59.56	42.34	12.32	7.70	121.92
REGIONAL	192.72	139.58	151.98	246.84	731.12
SMALL	301.50	907.00	1251.00	5800.50	8260.00
TV/RO	128.00	356.43	341.33	589.98	1415.73
DIRECT BROADCAST	0.00	73.83	834.36	8163.90	9072.09
NON HARDWARE					
PLANNING (EQ. UNITS)	31.00	55.70	26.30	7.50	120.50
LAUNCH (EQ. UNITS)	278.40	732.00	776.00	1892.00	3678.40
TURKEY (EQ. UNITS)					
MAIN	1.16	1.93	0.00	0.00	3.08
REGIONAL	6.03	19.09	11.00	6.41	42.52
SMALL	11.22	39.96	27.16	34.55	112.89
TV/RO	0.13	5.89	4.39	15.20	25.61
OPERATION (EQ. UNITS)	12.00	31.50	66.00	91.50	201.00
TOTAL	1901.71	4833.25	6551.83	25286.07	38572.86

ORIGINAL PAGE IS
OF POOR QUALITY

OPTIMISTIC
REGIONAL
CUMULATIVE AFTER 1981

(1980 DOLLARS)

NORTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	132.00	88.00	88.00	88.00	220.00
24 XP	224.00	448.00	1309.00	3619.00	3843.00
12 XP/GS	132.00	88.00	88.00	88.00	220.00
24 XP/GS	224.00	448.00	1309.00	3619.00	3843.00
DIRECT BROADCAST MAIN	0.00	22.00	154.00	544.00	544.00
GROUND SPARE	0.00	22.00	154.00	544.00	544.00
EARTH STATIONS					
MAIN	42.62	10.00	16.16	23.86	66.48
REGIONAL	128.46	9.02	64.10	189.56	318.02
SMALL	76.50	419.50	1304.50	6671.50	6748.00
TV/RO	92.40	295.30	545.88	858.95	951.35
DIRECT BROADCAST	0.00	21.93	87.56	2887.83	2887.83
NON HARDWARE					
PLANNING (EQ. UNITS)	10.00	1.70	4.00	11.50	21.50
LAUNCH (EQ. UNITS)	278.40	418.40	1026.40	2582.40	2860.80
TURNKEY (EQ. UNITS)					
MAIN	1.16	0.00	0.00	0.00	1.16
REGIONAL	5.78	0.40	1.03	1.24	7.01
SMALL	10.91	2.82	2.82	2.82	13.73
TV/RO	0.11	0.08	0.22	0.37	0.48
OPERATION (EQ. UNITS)	12.00	12.00	27.00	57.00	69.00
TOTAL	1370.32	2307.15	6181.67	21789.02	23159.35

ORIGINAL PAGE IS
OF POOR QUALITY

OPTIMISTIC
REGIONAL
CUMULATIVE AFTER 1981

(1980 DOLLARS)

SOUTH AMERICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	66.00	88.00	88.00	88.00
24 XP	0.00	28.00	28.00	203.00	203.00
12 XP/GS	0.00	66.00	88.00	88.00	88.00
24 XP/GS	0.00	28.00	28.00	203.00	203.00
DIRECT BROADCAST MAIN	0.00	0.00	0.00	30.00	30.00
GROUND SPARE	0.00	0.00	0.00	30.00	30.00
EARTH STATIONS					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	14.28	15.30	16.32	16.32
SMALL	0.00	14.50	23.50	36.50	36.50
TV/RO	0.00	4.93	7.53	12.80	12.80
DIRECT BROADCAST	0.00	0.00	0.00	115.77	115.77
NON HARDWARE					
PLANNING (EQ. UNITS)	6.00	21.00	21.00	21.00	27.00
LAUNCH (EQ. UNITS)	0.00	78.40	92.40	176.40	176.40
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	3.57	3.83	4.08	4.08
SMALL	0.00	3.59	5.92	9.10	9.10
TV/RO	0.00	1.28	1.95	3.33	3.33
OPERATION (EQ. UNITS)	0.00	7.50	30.00	49.50	49.50
TOTAL	6.00	337.05	433.42	1086.80	1092.80

ORIGINAL PAGE IS
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OPTIMISTIC
REGIONAL
CUMULATIVE AFTER 1981

(1980 DOLLARS)

EUROPE

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	22.00	22.00	22.00	22.00
24 XP	0.00	140.00	168.00	413.00	413.00
12 XP/GS	0.00	22.00	22.00	22.00	22.00
24 XP/GS	0.00	140.00	168.00	413.00	413.00
DIRECT BROADCAST MAIN	0.00	22.00	110.00	260.00	260.00
GROUND SPARE	0.00	22.00	110.00	260.00	260.00
EARTH STATIONS					
MAIN	9.24	24.64	30.80	30.80	40.04
REGIONAL	12.24	42.84	82.62	150.96	163.20
SMALL	50.00	258.00	446.00	741.00	791.00
TV/RO	5.35	16.18	37.23	140.80	146.15
DIRECT BROADCAST	0.00	51.91	307.09	1901.43	1901.43
NON HARDWARE					
PLANNING (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
LAUNCH (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	0.00	0.00	0.00	0.00
SMALL	0.00	0.00	0.00	0.00	0.00
TV/RO	0.00	0.00	0.00	0.00	0.00
OPERATION (EQ. UNITS)	0.00	0.00	0.00	0.00	0.00
TOTAL	76.83	761.55	1503.74	4354.99	3-77 431.82

ORIGINAL PAGE IS
OF POOR QUALITY

OPTIMISTIC
REGIONAL
CUMULATIVE AFTER 1981

(1980 DOLLARS)

AFRICA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	0.00	44.00	74.00	74.00
24 XP	0.00	28.00	84.00	189.00	189.00
12 XP/GS	0.00	0.00	44.00	74.00	74.00
24 XP/GS	0.00	28.00	84.00	189.00	189.00
DIRECT BROADCAST MAIN	0.00	0.00	0.00	0.00	0.00
GROUND SPARE	0.00	0.00	0.00	0.00	0.00
EARTH STATIONS					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	7.14	24.48	25.50	25.50
SMALL	0.00	4.00	16.50	27.50	27.50
TV/RO	0.00	0.85	2.05	3.73	3.73
DIRECT BROADCAST	0.00	0.00	0.00	0.00	0.00
NON HARDWARE					
PLANNING (EQ. UNITS)	3.00	9.00	24.00	24.00	27.00
LAUNCH (EQ. UNITS)	0.00	19.60	75.60	131.60	131.60
TURNKEY (EQ. UNITS)					
MAIN	0.00	0.00	0.00	0.00	0.00
REGIONAL	0.00	1.79	5.99	6.25	6.25
SMALL	0.00	1.06	4.08	6.83	6.83
TV/RO	0.00	0.22	0.53	0.97	0.97
OPERATION (EQ. UNITS)	0.00	3.00	16.50	45.00	45.00
TOTAL	3.00	102.65	425.74	797.37	800.37

OPTIMISTIC
REGIONAL
CUMULATIVE AFTER 1981

(1980 DOLLARS)

		ASIA				
		1981	1985	1990	2000	TOTAL
SATELLITES						
GENERAL PURPOSE	12 XP	0.00	88.00	132.00	132.00	132.00
	24 XP	84.00	196.00	336.00	861.00	945.00
	12 XP/GS	0.00	88.00	132.00	132.00	132.00
	24 XP/GS	84.00	196.00	336.00	861.00	945.00
DIRECT BROADCAST MAIN		0.00	0.00	66.00	156.00	156.00
GROUND SPARE		0.00	0.00	66.00	156.00	156.00
EARTH STATIONS						
MAIN		7.70	3.08	3.08	3.08	10.78
REGIONAL		52.02	55.08	85.68	131.58	183.60
SMALL		175.00	191.00	335.50	429.50	604.50
TV/RO		30.25	38.63	104.08	267.90	298.15
DIRECT BROADCAST		0.00	0.00	494.41	4048.66	4048.66
NON HARDWARE						
PLANNING (EQ. UNITS)		9.00	18.00	27.00	27.00	36.00
LAUNCH (EQ. UNITS)		0.00	156.80	226.80	352.80	352.80
TURNKEY (EQ. UNITS)						
MAIN		0.00	0.77	0.77	0.77	0.77
REGIONAL		0.26	10.64	14.33	18.83	19.09
SMALL		0.31	27.47	46.32	69.83	70.14
TV/RO		0.02	4.17	7.31	19.88	19.91
OPERATION (EQ. UNITS)		0.00	6.00	13.50	27.00	27.00
TOTAL		442.56	1079.64	2426.78	7694.84	3-79 8137.40

OPTIMISTIC
REGIONAL
CUMULATIVE AFTER 1981

(1980 DOLLARS)

OCEANIA

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	0.00	66.00	66.00	66.00	66.00
24 XP	0.00	0.00	0.00	105.00	105.00
12 XP/GS	0.00	66.00	66.00	66.00	66.00
24 XP/GS	0.00	0.00	0.00	105.00	105.00
DIRECT BROADCAST MAIN	0.00	0.00	44.00	104.00	104.00
GROUND SPARE	0.00	0.00	44.00	104.00	104.00
EARTH STATIONS					
MAIN	0.00	4.62	4.62	4.62	4.62
REGIONAL	0.00	11.22	19.38	24.48	24.48
SMALL	0.00	20.00	32.00	52.50	52.50
TV/RO	0.00	0.55	1.00	3.55	3.55
DIRECT BROADCAST	0.00	0.00	19.12	118.41	118.41
NON HARDWARE					
PLANNING (EQ. UNITS)	3.00	6.00	6.00	6.00	9.00
LAUNCH (EQ. UNITS)	0.00	58.80	86.80	156.80	156.80
TURNKEY (EQ. UNITS)					
MAIN	0.00	1.16	1.16	1.16	1.16
REGIONAL	0.00	2.69	4.90	6.10	6.10
SMALL	0.00	5.03	7.98	13.09	13.09
TV/RO	0.00	0.14	0.26	0.93	0.93
OPERATION (EQ. UNITS)	0.00	3.00	10.50	10.50	10.50
TOTAL	3.00	245.21	413.72	948.13	3-80 951.13

OPTIMISTIC
TOTAL
CUMULATIVE AFTER 1981

ORIGINAL PAGE IS
OF POOR QUALITY

(1980 DOLLARS)

	1981	1985	1990	2000	TOTAL
SATELLITES					
GENERAL PURPOSE 12 XP	132.00	330.00	440.00	470.00	602.00
24 XP	308.00	840.00	1925.00	5390.00	5698.00
12 XP/GS	132.00	330.00	440.00	470.00	602.00
24 XP/GS	308.00	840.00	1925.00	5390.00	5698.00
DIRECT BROADCAST MAIN	0.00	44.00	374.00	1094.00	1094.00
GROUND SPARE	0.00	44.00	374.00	1094.00	1094.00
EARTH STATIONS					
MAIN	50.56	42.34	54.66	62.36	121.92
REGIONAL	192.72	139.58	291.56	538.40	731.12
SMALL	301.50	907.00	2158.00	7958.50	8260.00
TV/RO	128.00	356.43	697.75	1287.73	1415.73
DIRECT BROADCAST	0.00	73.83	908.19	9072.09	9072.09
NON HARDWARE					
PLANNING (EQ. UNITS)	31.00	55.70	82.00	89.50	120.50
LAUNCH (EQ. UNITS)	278.40	732.00	1508.00	3400.00	3678.40
TURNKEY (EQ. UNITS)					
MAIN	1.16	1.93	1.93	1.93	3.08
REGIONAL	6.03	19.09	30.08	36.49	42.52
SMALL	11.22	39.96	67.12	101.67	112.89
TV/RO	0.13	5.89	10.28	25.48	25.61
OPERATION (EQ. UNITS)	12.00	31.50	97.50	189.00	201.00
TOTAL	1901.71	4933.25	11385.07	36671.14	38572.86

3.12 COUNTRY REPORT

These reports contain country satellite system status, shown on the two printouts that follow.

Countries having a domestic satellite system are listed first and are indicated by a "D." Regional satellite systems follow and are indicated by a regional number. Countries designated "P" are primary regional sponsors. They are the primary reason for the existence of that regional system. Earth station growth rates for non-primary regional countries are only one half the growth rate for other countries. All units are cumulative after 1981. If a country has both a domestic satellite system and is part of a regional satellite system its earth stations will only be given once as a part of the domestic system.

ORIGINAL PAGE IS
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COUNTRY STATUS INSIGHT RMI 2000 - MOST LIKELY

REGION	SATELLITES			EARTH STATIONS			IRI
	GP/12	GL/24	DU	MAIN	REGIONAL	SMALL	
D	3	5	2	3	28	119	74
D	0	1	1	0	2	14	134
D	2	1	1	0	3	42	178
D	2	3	1	0	3	49	470
D	4	4	2	3	42	395	1792
D	1	1	0	0	2	8	47
D	1	1	1	5	78	648	4244
D	7	102	15	40	310	51000	37000
D							3990000
P	1	2	0	0	0	0	0
P	1	1	0	0	1	2	2
P	1	1	0	0	1	7	13
P	1	1	0	0	1	4	21
P	1	1	0	0	1	2	8
P	1	1	0	0	1	6	12
P	1	1	0	0	1	3	21
P	2	1	0	0	2	23	213
P	2	1	0	0	1	3	37
P	2	0	0	0	1	2	8
P	3	2	4	1	4	46	38
P	3	1	0	1	4	31	95
P	3	0	0	1	1	1	4
P	3	1	1	1	5	34	48
P	3	1	1	1	7	54	120
P	3	1	1	1	7	54	120
P	4	4	2	2	25	244	1332
P	4	4	2	2	31	312	995
P	4	1	0	1	3	32	20
P	4	0	0	1	0	2	2
P	4	1	1	1	2	9	55
P	4	1	1	1	5	60	129
P	4	4	1	1	4	39	2
P	4	1	1	1	11	151	97
P	4	0	0	0	1	1	1
P	4	0	0	0	1	1	1
P	4	0	0	0	1	0	1
P	4	0	0	0	1	0	1
P	4	0	0	0	1	0	1
P	4	0	0	0	1	0	1
P	4	0	0	0	1	0	1
P	4	0	0	0	1	1	1
P	5	1	1	2	21	182	1534
P	5	1	2	2	2	11	19
P	5	0	0	1	1	4	60
P	6	0	0	0	3	0	55
P	6	0	0	0	3	5	24
P	6	0	0	0	1	1	2

COUNTRY STATUS REPORT FOR 2000 - MOST LIKELY

REGION	SATELLITES			EARTH STATIONS			IM
	CP/12	GR/24	DIS	MAIN	REGIONAL	SMALL	
BARBADOS	6			0	1	0	0
BHARUATIA	6			0	1	0	0
BOLIVIA	6			0	1	0	0
BURUNDI	6			0	1	0	0
CHINA	6			0	1	0	0
COLOMBIA	6			0	1	0	0
CUBA	6			0	1	0	0
DEMOCRATIC REPUBLIC OF CONGO	6			0	1	0	0
DEMOCRATIC REPUBLIC OF THE CONGO	6			0	1	0	0
EGYPT	6			0	1	0	0
EL SALVADOR	6			0	1	0	0
ETHIOPIA	6			0	1	0	0
GUATEMALA	6			0	1	0	0
HONG KONG	6			0	1	0	0
HUNGARY	6			0	1	0	0
INDONESIA	6			0	1	0	0
IRAN	6			0	1	0	0
IRAQ	6			0	1	0	0
JAPAN	6			0	1	0	0
JORDAN	6			0	1	0	0
KAZAKHSTAN	6			0	1	0	0
KENYA	6			0	1	0	0
KOREA	6			0	1	0	0
LIBERIA	6			0	1	0	0
LIBYA	6			0	1	0	0
MACAU	6			0	1	0	0
MAURITIUS	6			0	1	0	0
MEXICO	6			0	1	0	0
MOROCCO	6			0	1	0	0
NETHERLANDS	6			0	1	0	0
NEW ZEALAND	6			0	1	0	0
NIGERIA	6			0	1	0	0
OMAN	6			0	1	0	0
PAKISTAN	6			0	1	0	0
PANAMA	6			0	1	0	0
PAPER NEW GUINEA	6			0	1	0	0
PERU	6			0	1	0	0
PHILIPPINES	6			0	1	0	0
RUSSIA	6			0	1	0	0
SOUTH AFRICA	6			0	1	0	0
SPAIN	6			0	1	0	0
THAILAND	6			0	1	0	0
TURKEY	6			0	1	0	0
UNITED STATES	6			0	1	0	0
UNITED KINGDOM	6			0	1	0	0
VIETNAM	6			0	1	0	0
YEMEN ARAB REPUBLIC	6			0	1	0	0
YUGOSLAVIA	6			0	1	0	0
ZAMBIA	6			0	1	0	0
ZIMBABWE	6			0	1	0	0
INDONESIA	7			0	3	15	120
MALAYSIA	7			0	1	5	18
PHILIPPINES	7			0	1	6	39
SINGAPORE	7			0	1	0	0
SOUTH KOREA	7			0	1	4	11
THAILAND	7			0	1	3	23
PAPUA NEW GUINEA	7			0	1	1	2
AUSTRALIA	8	3	2	3	22	101	196
NEW ZEALAND	8			0	1	3	11
KENYA	10			0	2	2	4
NIGERIA	10	1		0	3	25	35
CHINA	10			0	1	2	4
LIBERIA	10			0	1	0	0
NIGER	10			0	1	1	1
UGANDA	10			0	1	1	3
SOVIET UNION	40			0	0	0	0
CZECHOSLOVAKIA	40			1	3	26	42
EAST GERMANY	40			1	3	26	45
HUNGARY	40			1	3	16	28
POLAND	40			1	3	42	123
ARMENIA	40			1	3	24	75
YUGOSLAVIA	40			1	3	22	58
AFGHANISTAN	40			0	1	3	6
TOTAL		21	142	31	693	53521	49774 15124288

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COUNTRY STATUS REPORT FOR 2000 - OPTIMISTIC

COUNTRY	REGION	SATELLITES			DB	MAIN STATIONS			TV/RO	US
		CP/12	CP/24	DB		MAIN	REGIONAL	SMALL		
CANADA	D	3	9	2	3	28	110	74	675650	
MEXICO	D	2	2	1	0	3	15	134	231532	
WEST GERMANY	D	3	3	2	2	31	312	995	975136	
CHINA	D	2	2	1	0	3	42	178	924242	
INDIA	D	3	4	1	0	3	47	476	525257	
JAPAN	D	5	5	4	2	44	395	2012	1920485	
PAKISTAN	D	1	1	1	0	2	9	57	0	
UNITED STATES	D	7	106	18	41	351	111550	38000	5100000	
COLOMBIA	P	2	2		0	3	9	57	0	
BOLIVIA	P	1			0	1	2	2	0	
CHILE	P	1			0	1	7	19	0	
ECUADOR	P	1			0	1	2	8	0	
PERU	P	1			0	1	6	12	0	
VENEZUELA	P	1			0	1	2	21	0	
BRAZIL	P	2	2	2	0	3	23	213	0	
ARGENTINA	P	2			0	1	3	37	0	
URUGUAY	P	2			0	1	2	8	0	
IRELAND	P	3	2	4	1	5	46	50	42636	
FINLAND	P	3			1	4	31	59	77903	
ICELAND	P	3			0	1	1	5	3707	
NORWAY	P	3			1	6	34	64	66058	
SWEDEN	P	3			1	7	58	159	134298	
PORTUGAL	P	4	2	2	2	14	23	198	0	
SPAIN	P	4			2	13	158	464	0	
FRANCE	P	5	5	2	3	25	284	1332	845591	
BELGIUM	P	5			1	3	32	20	0	
LUXEMBOURG	P	5			1	0	2	2	0	
SWITZERLAND	P	5			1	4	39	2	0	
UNITED KINGDOM	P	5			1	11	151	97	0	
CANADIAN	P	6	2		0	3	2	2	0	
CUBA	P	6			0	1	1	1	0	
GHANA	P	6			0	1	0	1	0	
IVORY COAST	P	6			0	1	1	4	0	
AMANDA	P	6			0	1	0	0	0	
SENEGAL	P	6			0	1	2	2	0	
TOGO	P	6			0	1	1	1	0	
ITALY	P	7	1	1	2	21	182	1534	1599424	
AUSTRIA	P	7			1	2	11	19	0	
TURKEY	P	7			0	1	4	60	0	
ALGERIA	P	8			0	3	8	55	0	
SAUDI ARABIA	P	8	5		0	3	5	24	0	
LIBYA	P	8			0	1	1	2	0	

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COUNTRY STATUS REPORT FOR 2010 - OPTIMISTIC

REGION	SATELLITES		EARTH STATIONS			TV/NO	DW
	GP/12	GP/24	DB	PAIN	REGIONAL		
MAURITANIA	0			0	1	0	0
MOROCCO	3			0	1	0	0
SUDAN	0			0	1	0	0
TUNISIA	0			0	1	0	0
BAHRAIN	0			0	1	0	0
IRAN	0			0	1	0	0
IRAQ	0			0	1	0	0
JORDAN	0			0	1	0	0
KUWAIT	0			0	1	0	0
LEBANON	0			0	1	0	0
OMAN	0			0	1	0	0
QATAR	0			0	1	0	0
SYRIA	0			0	1	0	0
UNITED ARAB EMIRATES	0			0	1	0	0
YEMEN ARAB REPUBLIC	0			0	1	0	0
INDONESIA	9	5		0	2	16	0
MALAYSIA	9			0	1	5	0
PHILIPPINES	9			0	1	6	0
SINGAPORE	9			0	1	0	0
SOUTH KOREA	9			0	1	4	0
THAILAND	9			0	1	3	0
PAPUA NEW GUINEA	9			0	1	1	0
KENYA	10	1		0	2	2	0
NIGERIA	10			0	3	26	0
GHANA	10			0	1	2	0
LIBERIA	10			0	1	0	0
UGANDA	10			0	1	1	0
AUSTRIA	11	3		3	22	101	236819
NEW ZEALAND	11			0	1	3	0
SOVIET UNION	40	13		5	105	648	8863
CZECHOSLOVAKIA	40			1	4	36	87
EAST GERMANY	40			1	4	38	92
HUNGARY	40			1	3	23	58
POLAND	40			1	5	61	253
ROMANIA	40			1	3	36	155
YUGOSLAVIA	40			1	4	32	201
AFGHANISTAN	40			0	1	3	6
TOTAL		27	173	41	783	114683	56649 18144179

3.13 **TOTAL WORLD SATELLITE TELECOMMUNICATION MARKET**

The following computer printouts are summary reports of the total world satellite telecommunications market.

SATELLITE UNITS - WORLD REGIONS BETWEEN 1981-2000

BASED ON DATA

Most Likely

Earth Segment	NA		Most Likely		European		Africa		ASIA		Oceania		Total
	Units	Count	Units	Count	Units	Count	Units	Count	Units	Count	Units	Count	
Intelsat	5	11	15	10	1	2	13	20	7	0	0	0	64
A		6	6	20	1	1	0	0	0	0	0	0	44
B		22	32	41	2	2	9	2	6	17	0	0	130
C	10	275	95	645	2	2	7	2	379	1	0	0	1463
N/S					1	1	2	1	2	2	0	0	
Domestic					1	1	0	0	0	0	0	0	
Main (Large Main) *	15	0	23	8	1	1	0	1	8	0	0	0	49
Regional (Medium Main)	212	12	143	24	1	1	1	1	152	1	0	0	693
Small (Industrial)	50473	67	1406	53	0	0	0	0	1210	0	0	0	53314
RO	33358	476	4850	138	0	0	0	0	57077	18	0	0	46058
Direct Broadcast	4665650	160786	3802853	0	0	0	0	0	6297649	39	0	0	15124287
Space Segment					1	1	1	1	1	1	0	0	
Intelsat (world)					2	2	2	2	4	0	0	0	31
Primary					3	3	3	3	47	0	0	0	9
Spare					1	1	1	1	5	0	0	0	
Domestic					1	1	1	1	0	0	0	0	
General Purpose					22	22	22	22	101	100	230013	0	
small	10	1	1	105	1	1	1	1	608	5	0	0	21
large	107	3	7	4	4	4	4	4	30	15	0	0	142
Spare (small)	10	1	1	1	1	1	1	1	23	59	0	0	21
Spare (large)	107	3	7	4	4	4	4	4	61	5	0	0	142
Direct Broadcast	17	1	8	0	0	0	0	0	15	0	0	0	31
Spare	17	1	8	0	0	0	0	0	3	0	0	0	31

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* U.S. terms in parentheses

SATELLITE UNITS - WORLD REGIONS BETWEEN 1981-2000

Optimistic

	NA	SA	Europe	Africa	Asia	Oceania	Total
Earth Segment							
Intelsat							
A	8	16	47	30	61	8	170
B	0	5	15	51	15	15	101
C	6	12	113	72	147	19	369
N/S	0	730	274	1869	1100	202	4175
Domestic							
Main (Large Main)*	16	0	20	0	2	3	41
Regional (Medium Main)	253	16	148	25	129	24	595
Small (Industrial)	111023	73	1482	55	859	105	113597
RO	34358	512	5632	149	10716	142	51509
Direct Broadcast	5775650	231532	3802853	0	8097324	236819	18144178

Space Segment

Intelsat (world)

Primary
Spare

43
10

Domestic

General Purpose

small
large

4
107

21
162

Spare (small)
Spare (large)

4
107

21
162

Direct Broadcast

20

41

Spare

20

41

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MOST LIKELY
MILLIONS - 1980 US DOLLARS
DELTA

TOTAL WORLD TELECOMMUNICATIONS MARKET

	1981	1985	1990	2000	TOTAL
NORTH AMERICA					
INTEL ES EXPENDITURES	75.60	16.90	8.90	37.00	138.40
DOM SPACE EXPENDITURES	712.00	1004.00	1790.00	5010.00	8516.00
DOM ES EXPENDITURES	341.04	755.73	1131.43	4557.46	6785.66
DOM NON-HARDWARE EXPENDITURES	318.34	396.20	562.48	1479.35	2756.37
TOTAL	1446.98	2172.83	3492.80	11083.81	18196.43
SOUTH AMERICA					
INTEL ES EXPENDITURES	210.60	88.00	98.80	375.00	772.40
DOM SPACE EXPENDITURES		100.00		200.00	300.00
DOM ES EXPENDITURES		29.72	11.23	97.09	138.03
DOM NON-HARDWARE EXPENDITURES		67.67	17.79	55.26	140.71
TOTAL	210.60	285.38	127.82	727.35	1351.15
EUROPE					
INTEL ES EXPENDITURES	243.30	65.90	62.00	221.30	592.50
DOM SPACE EXPENDITURES		200.00	188.00	520.00	908.00
DOM ES EXPENDITURES		352.51	545.53	2008.92	2906.96
DOM NON-HARDWARE EXPENDITURES					
TOTAL	243.30	618.41	795.53	2750.22	4407.46
AFRICA					
INTEL ES EXPENDITURES	296.20	34.50	333.40	781.40	1445.50
DOM SPACE EXPENDITURES		56.00	56.00	200.00	312.00
DOM ES EXPENDITURES		22.28	3.47	28.68	54.43
DOM NON-HARDWARE EXPENDITURES	3.00	34.24	25.33	67.09	129.67
TOTAL	299.20	147.02	418.20	1077.17	1941.60
ASIA					
INTEL ES EXPENDITURES	359.60	135.10	146.70	551.70	1193.10
DOM SPACE EXPENDITURES	168.00	344.00	212.00	810.00	1534.00
DOM ES EXPENDITURES		163.53	486.15	3448.43	4098.11
DOM NON-HARDWARE EXPENDITURES	49.60	191.72	86.60	186.54	514.46
TOTAL	577.20	834.35	931.46	4996.67	7339.67

**MOST LIKELY
MILLIONS - 1980 US DOLLARS
DELTA**

TOTAL WORLD TELECOMMUNICATIONS MARKET

	1981	1985	1990	2000	TOTAL
OCEANIA					
INTEL ES EXPENDITURES	43.80	24.10	27.70	102.60	198.20
DOM SPACE EXPENDITURES		132.00	156.00	130.00	418.00
DOM ES EXPENDITURES		39.49	37.60	107.17	184.25
DOM NON-HARDWARE EXPENDITURES	6.00	76.31	53.26	34.24	169.80
TOTAL	49.80	271.89	274.56	374.00	970.25
INTELSAT SPACE SATELLITE	360.00	396.00	550.00	1360.00	2666.00
LAUNCH		90.00	240.00	700.00	1030.00
TOTAL	360.00	486.00	790.00	2060.00	3696.00
GRAND TOTALS					
INTELSAT EXP	1229.10	364.50	677.50	2069.00	4340.10
DOM SPACE	880.00	1836.00	2402.00	6870.00	11988.00
DOM ES	341.04	1363.24	2215.41	10247.75	14167.43
DOM NON HARDWARE	376.94	766.14	745.46	1822.47	3711.02
INTELSAT SPACE	360.00	486.00	790.00	2060.00	3696.00
TOTAL	3187.08	4815.88	6830.37	23069.22	37902.55

MOST LIKELY
MILLIONS - 1980 US DOLLARS
CUMULATIVE AFTER 1981

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TOTAL WORLD TELECOMMUNICATIONS MARKET

	1981	1985	1990	2000	TOTAL
NORTH AMERICA					
INTEL ES EXPENDITURES	75.60	16.90	25.80	62.80	138.40
DOM SPACE EXPENDITURES	712.00	1004.00	2794.00	7804.00	8516.00
DOM ES EXPENDITURES	341.04	755.73	1887.16	6444.62	6785.66
DOM NON-HARDWARE EXPENDITURES	318.34	396.20	958.68	2438.03	2756.37
TOTAL	1446.98	2172.83	5665.63	16749.44	18196.43
SOUTH AMERICA					
INTEL ES EXPENDITURES	210.60	88.00	186.80	561.80	772.40
DOM SPACE EXPENDITURES		100.00	100.00	300.00	300.00
DOM ES EXPENDITURES		29.72	40.94	138.03	138.03
DOM NON-HARDWARE EXPENDITURES		67.67	85.46	140.71	140.71
TOTAL	210.60	285.38	413.20	1140.55	1351.15
EUROPE					
INTEL ES EXPENDITURES	243.30	65.90	127.90	349.20	592.50
DOM SPACE EXPENDITURES		200.00	388.00	908.00	908.00
DOM ES EXPENDITURES		352.51	898.04	2906.96	2906.96
DOM NON-HARDWARE EXPENDITURES					
TOTAL	243.30	618.41	1413.94	4164.16	4407.46
AFRICA					
INTEL ES EXPENDITURES	296.20	34.50	367.90	1149.30	1445.50
DOM SPACE EXPENDITURES		56.00	112.00	312.00	312.00
DOM ES EXPENDITURES		22.28	25.75	54.43	54.43
DOM NON-HARDWARE EXPENDITURES	3.00	34.24	59.57	126.67	129.67
TOTAL	299.20	147.02	565.22	1642.40	1941.60
ASIA					
INTEL ES EXPENDITURES	359.60	135.10	281.80	833.50	1193.10
DOM SPACE EXPENDITURES	168.00	344.00	556.00	1366.00	1534.00
DOM ES EXPENDITURES		163.53	649.68	4098.11	4098.11
DOM NON-HARDWARE EXPENDITURES	49.60	191.72	278.33	464.86	514.46
TOTAL	577.20	834.35	1765.81	6762.47	7339.67

MOST LIKELY
MILLIONS - 1980 US DOLLARS
CUMULATIVE AFTER 1981

TOTAL WORLD TELECOMMUNICATIONS MARKET

	1981	1985	1990	2000	TOTAL
OCEANIA					
INTEL ES EXPENDITURES	43.80	24.10	51.80	154.40	198.20
DOM SPACE EXPENDITURES		132.00	283.00	418.00	418.00
DOM ES EXPENDITURES		39.49	77.08	184.25	184.25
DOM NON-HARDWARE EXPENDITURES	6.00	76.31	129.57	163.80	169.80
TOTAL	49.80	271.89	546.45	920.45	970.25
INTELSAT SPACE SATELLITE	360.00	396.00	946.00	2306.00	2666.00
LAUNCH		90.00	330.00	1030.00	1030.00
TOTAL	360.00	486.00	1276.00	3336.00	3696.00
GRAND TOTALS					
INTELSAT EXP	1229.10	364.50	1042.00	3111.00	4340.10
DOM SPACE	880.00	1836.00	4238.00	11108.00	11988.00
DOM ES	341.04	1363.24	3578.64	13826.39	14167.43
DOM NON HARDWARE	376.94	766.14	1511.60	3334.08	3711.02
INTELSAT SPACE	360.00	486.00	1276.00	3336.00	3696.00
TOTAL	3187.08	4815.88	11646.24	34715.47	37902.55

OPTIMISTIC
MILLIONS - 1980 US DOLLARS
DELTA

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TOTAL WORLD TELECOMMUNICATIONS MARKET

	1981	1985	1990	2000	TOTAL
NORTH AMERICA					
INTEL ES EXPENDITURES	75.60	35.40	27.90	143.10	282.00
DOM SPACE EXPENDITURES	712.00	1116.00	1986.00	5400.00	9214.00
DOM ES EXPENDITURES	339.98	755.75	1262.45	8613.50	10971.68
DOM NON-HARDWARE EXPENDITURES	318.34	435.40	626.08	1593.85	2973.67
TOTAL	1445.92	2342.55	3902.42	15750.45	23441.35
SOUTH AMERICA					
INTEL ES EXPENDITURES	210.60	168.50	232.70	74.50	686.30
DOM SPACE EXPENDITURES		188.00	44.00	410.00	642.00
DOM ES EXPENDITURES		33.71	12.62	135.06	181.39
DOM NON-HARDWARE EXPENDITURES	6.00	115.34	39.75	108.31	269.41
TOTAL	216.60	505.55	329.07	727.87	1779.10
EUROPE					
INTEL ES EXPENDITURES	243.30	139.30	152.90	785.00	1320.50
DOM SPACE EXPENDITURES		368.00	232.00	790.00	1390.00
DOM ES EXPENDITURES	76.83	393.56	510.18	2061.25	3041.82
DOM NON-HARDWARE EXPENDITURES					
TOTAL	320.13	900.86	895.08	3636.25	5752.32
AFRICA					
INTEL ES EXPENDITURES	296.20	309.90	457.40	2585.00	3648.50
DOM SPACE EXPENDITURES		56.00	200.00	270.00	526.00
DOM ES EXPENDITURES		11.99	31.04	13.70	56.73
DOM NON-HARDWARE EXPENDITURES	3.00	34.66	92.05	87.94	217.65
TOTAL	299.20	412.55	780.49	2956.63	4448.87
ASIA					
INTEL ES EXPENDITURES	359.60	263.80	350.30	1889.40	2863.10
DOM SPACE EXPENDITURES	168.00	568.00	500.00	1230.00	2466.00
DOM ES EXPENDITURES	264.97	287.79	734.96	3857.97	5145.69
DOM NON-HARDWARE EXPENDITURES	9.59	223.85	112.18	180.09	525.71
TOTAL	802.16	1343.44	1697.44	7157.46	11000.50

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OPTIMISTIC
MILLIONS - 1980 US DOLLARS
DELTA

TOTAL WORLD TELECOMMUNICATIONS MARKET

	1981	1985	1990	2000	TOTAL
OCEANIA					
INTEL ES EXPENDITURES	43.80	45.80	64.90	341.30	495.80
DOM SPACE EXPENDITURES		132.00	88.00	330.00	550.00
DOM ES EXPENDITURES		36.39	39.73	127.44	203.56
DOM NON-HARDWARE EXPENDITURES	3.00	76.82	40.78	76.97	197.57
TOTAL	46.80	291.01	233.42	875.70	1446.93
INTELSAT SPACE SATELLITE	360.00	396.00	700.00	2160.00	3616.00
LAUNCH		90.00	360.00	1100.00	1550.00
TOTAL	360.00	486.00	1060.00	3260.00	5166.00
GRAND TOTALS					
INTELSAT EXP	1229.10	962.70	1286.10	5818.30	9296.20
DOM SPACE	880.00	2428.00	3050.00	8430.00	14788.00
DOM ES	631.78	1519.18	2590.98	14808.91	19600.85
DOM NON HARDWARE	339.93	886.07	910.84	2047.16	4184.00
INTELSAT SPACE	360.00	486.00	1060.00	3260.00	5166.00
TOTAL	3490.81	6281.95	8897.93	34364.37	53035.06

OPTIMISTIC
BILLIONS - 1980 US DOLLARS
CUMULATIVE AFTER 1981

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TOTAL WORLD TELECOMMUNICATIONS MARKET

	1981	1985	1990	2000	TOTAL
NORTH AMERICA					
INTEL ES EXPENDITURES	75.60	35.40	63.30	206.40	282.00
DOM SPACE EXPENDITURES	712.00	1116.00	3102.00	8502.00	9214.00
DOM ES EXPENDITURES	339.98	755.75	2018.20	10631.70	10971.58
DOM NON-HARDWARE EXPENDITURES	318.34	435.40	1061.48	2655.33	2973.57
TOTAL	1445.92	2342.55	6244.97	21995.42	23441.35
SOUTH AMERICA					
INTEL ES EXPENDITURES	210.60	168.50	401.20	475.70	686.40
DOM SPACE EXPENDITURES		188.00	232.00	642.00	642.00
DOM ES EXPENDITURES		33.71	46.33	181.39	181.39
DOM NON-HARDWARE EXPENDITURES	6.00	115.34	155.10	263.41	269.41
TOTAL	216.60	505.55	834.62	1562.50	1779.10
EUROPE					
INTEL ES EXPENDITURES	243.30	139.30	292.20	1077.20	1320.50
DOM SPACE EXPENDITURES		368.00	600.00	1390.00	1390.00
DOM ES EXPENDITURES	76.83	393.56	903.74	2954.99	3041.52
DOM NON-HARDWARE EXPENDITURES					
TOTAL	320.13	900.86	1795.94	5432.19	5752.32
AFRICA					
INTEL ES EXPENDITURES	296.20	309.90	767.30	3352.30	3648.50
DOM SPACE EXPENDITURES		56.00	256.00	526.00	526.00
DOM ES EXPENDITURES		11.99	43.03	56.73	56.73
DOM NON-HARDWARE EXPENDITURES	3.00	34.66	126.71	214.65	217.65
TOTAL	299.20	412.55	1193.04	4149.67	4448.87
ASIA					
INTEL ES EXPENDITURES	359.60	263.80	614.10	2503.50	2863.10
DOM SPACE EXPENDITURES	168.00	568.00	1068.00	2298.00	2465.00
DOM ES EXPENDITURES	264.97	287.79	1022.75	4880.72	5145.69
DOM NON-HARDWARE EXPENDITURES	9.59	223.85	336.03	516.12	525.71
TOTAL	802.16	1343.44	3040.88	10198.34	11000.50

OPTIMISTIC
MILLIONS - 1980 US DOLLARS
CUMULATIVE AFTER 1981

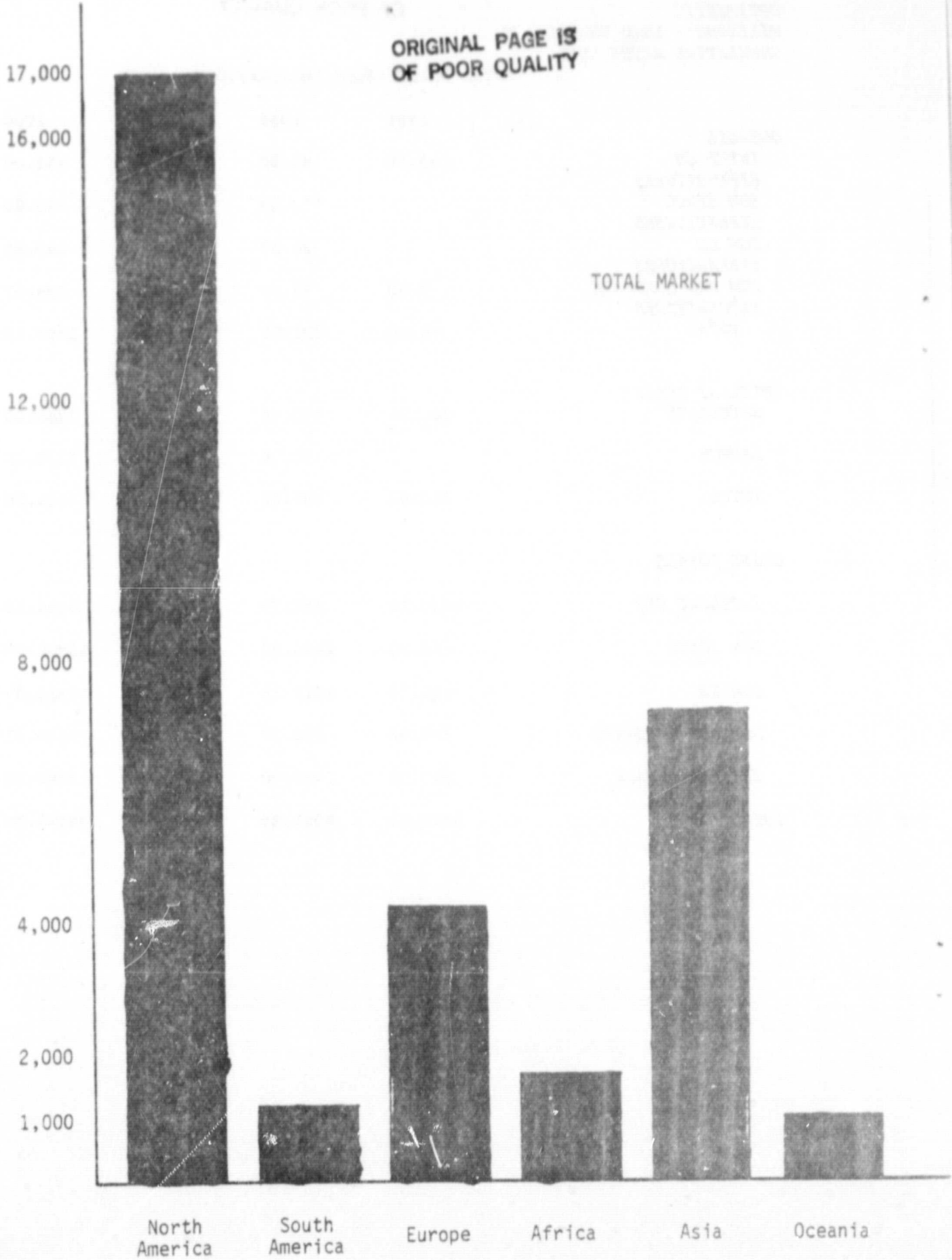
TOTAL WORLD TELECOMMUNICATIONS MARKET

	1981	1985	1990	2000	TOTAL
OCEANIA					
INTEL ES	43.80	45.80	110.70	452.00	495.
EXPENDITURES					
DOM SPACE		132.00	220.00	550.00	550.
EXPENDITURES					
DOM ES		36.39	76.12	203.56	203.
EXPENDITURES					
DOM NON-HARDWARE	3.00	76.82	117.60	194.57	197.
EXPENDITURES					
TOTAL	46.80	291.01	524.42	1400.13	1446.
INTELSAT SPACE					
SATELLITE	360.00	396.00	1096.00	3256.00	3616.
LAUNCH		90.00	450.00	1550.00	1550.
TOTAL	360.00	486.00	1546.00	4806.00	5166.
GRAND TOTALS					
INTELSAT EXP	1229.10	962.70	2248.80	8067.10	9296.
DOM SPACE	880.00	2428.00	5478.00	13908.00	14788.
DOM ES	681.78	1519.18	4110.16	18919.07	19600.
DOM NON HARDWARE	339.93	886.07	1796.91	3344.07	4184.
INTELSAT SPACE	360.00	486.00	1546.00	4806.00	5166.
TOTAL	3490.81	6281.95	15179.87	49544.24	53035.

ORIGINAL PAGE IS
OF POOR QUALITY

TOTAL MARKET

Millions 1981 Dollars



SECTION IV SUMMARY

4.1 WORLD MARKET

The worldwide satellite market demand forecast indicates that the market between 1981 and 2000 will be very large, between \$35 and \$50 billion. Of this amount between \$6 and \$14 billion will be spent on Intelsat and related hardware. The balance of the expenditures between \$29 and \$36 billion will be spent on domestic and regional systems.

4.2 U.S. MARKET

Approximately one half of the world market will be within the United States, between \$16 and \$20 billion. Information gathered during this review reveals that competition for this and the rest of the world satellite market will be keen with Japan and some European countries. Obviously the U.S. should protect its share of the market, especially within the U.S. This will require the U.S. to maintain its technological lead in this area.