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SATELLITE PROVIDED CUSTOMER PREMISES SERVICES: A FORECAST OF POTENTIAL DOMESTIC DEMAND THROUGH THE YEAR 2000

FINAL REPORT - VOLUME IV - SENSITIVITY ANALYSIS

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16. Abstract

The overall purpose of this study was to forecast the potential United States domestic telecommunications demand for satellite provided customer premises voice, data and video services through the year 2000, so that this information on service demand would be available to aid in NASA program planning.

To accomplish this overall purpose the following objectives were achieved:

a. Development of a forecast of the total domestic telecommunications demand

b. Identification of that portion of the telecommunications demand suitable for transmission by satellite systems

c. Identification of that portion of the satellite market addressable by CPS systems

d. Identification of that portion of the satellite market addressable by Ka-band CPS system.

e. Postulation of a Ka-band CPS network on a nationwide and local level.

The approach employed included the use of a variety of forecasting models, a parametric cost model, a market distribution model and a network optimization model. Forecasts were developed for: 1980, 1990, and 2000; voice, data and video services; terrestrial and satellite delivery modes; and C, Ku and Ka-bands.

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SECTION I
PURPOSE, PROCEDURES AND RESULTS

1.1 PURPOSE

In Volumes I through III of this forecast study of satellite-provided customer premises services, a series of forecasts starting with the baseline forecasts and ending with the overall satellite forecasts were developed. Key questions had to be answered in developing each set of forecasts, and in answering these questions key assumptions had to be made. These assumptions were delineated and were made on the basis of the best available information. While the assumptions concerning some of the more critical variables were varied, those related to one of the most critical variables, costs of satellite and terrestrial systems, were not. Such sensitivity analyses, however, were considered in this phase of the study which was designed to examine the effects of varying cost assumptions on the satellite forecasts. Specifically, the effects of varying the crossover distance, by varying the relative values of the terrestrial and satellite costs, were examined.

These relationships between the forecasts presented in Volumes I through III and those presented in this volume can be diagrammed as follows:

Volumes I-III

Forecasts: Baseline → Overall Satellite

Each Forecast: Key Questions → Assumptions → Forecast

Volume IV

Terrestrial-Cost/Satellite-Cost → Crossover-Distance → Satellite Forecasts

1.2 PROCEDURE

This purpose was accomplished by conducting the following steps.

a. Modifying the computer programs to integrate the trunking and CPS programs.

b. Developing programming procedures that would permit altering the trunking and satellite cost ratios.

c. Developing programming procedures that would permit the development of forecasts by operating speeds.

d. Developing crossover distances for trunking and CPS; composite crossover distances were also developed for CPS.

e. Developing high, expected and low estimates of the Trunking Maximum Net Addressable by service and by operating speed.

f. Developing the overall satellite forecasts and the trunking, CPS and Ka-band segments of the overall satellite forecasts, by service and by operating speed.

An extensive cost analysis was conducted to determine the crossover distances presented in Volumes I through III. The results of this cost analysis served as the beginning point for the cost sensitivity analysis discussed in this Volume. That is, the T=1.00S ratio is the formula that was used when developing the forecasts presented in Volumes I through III. This ratio was varied by either decreasing or increasing the T/S value. Six terrestrial to satellite cost ratios were used to examine the impact of varying this ratio on the satellite forecasts. These ratios were:

a. Terrestrial Cost (T) = 0.70 Satellite Costs (S)

b. T = 1.00S

c. T = 1.15S

d. T = 1.30S

e. T = 1.60S

f. T = 2.00S

These six ratios can be interpreted in the following manner (see Figure 1-1). Using T = NS as the general formula, T equals the terrestrial cost that corresponds to a specific distance and T also equals N times the satellite cost. The specific distance is the crossover distance. In Figure 1-1, if, T_1 is the terrestrial cost, the crossover distance is D_1, the value of N is 1.0 and $T_1 = S_1$. Since terrestrial costs are directly related to distance, the greater the value of N the greater the crossover distance, and as the crossover distance increases the amount of traffic addressable by satellite decreases. For example, in Figure 1-1, when N = 1.5, $T_2 = S_2 = 1.5S$, and the crossover distance is D_2, which is greater than D_1.

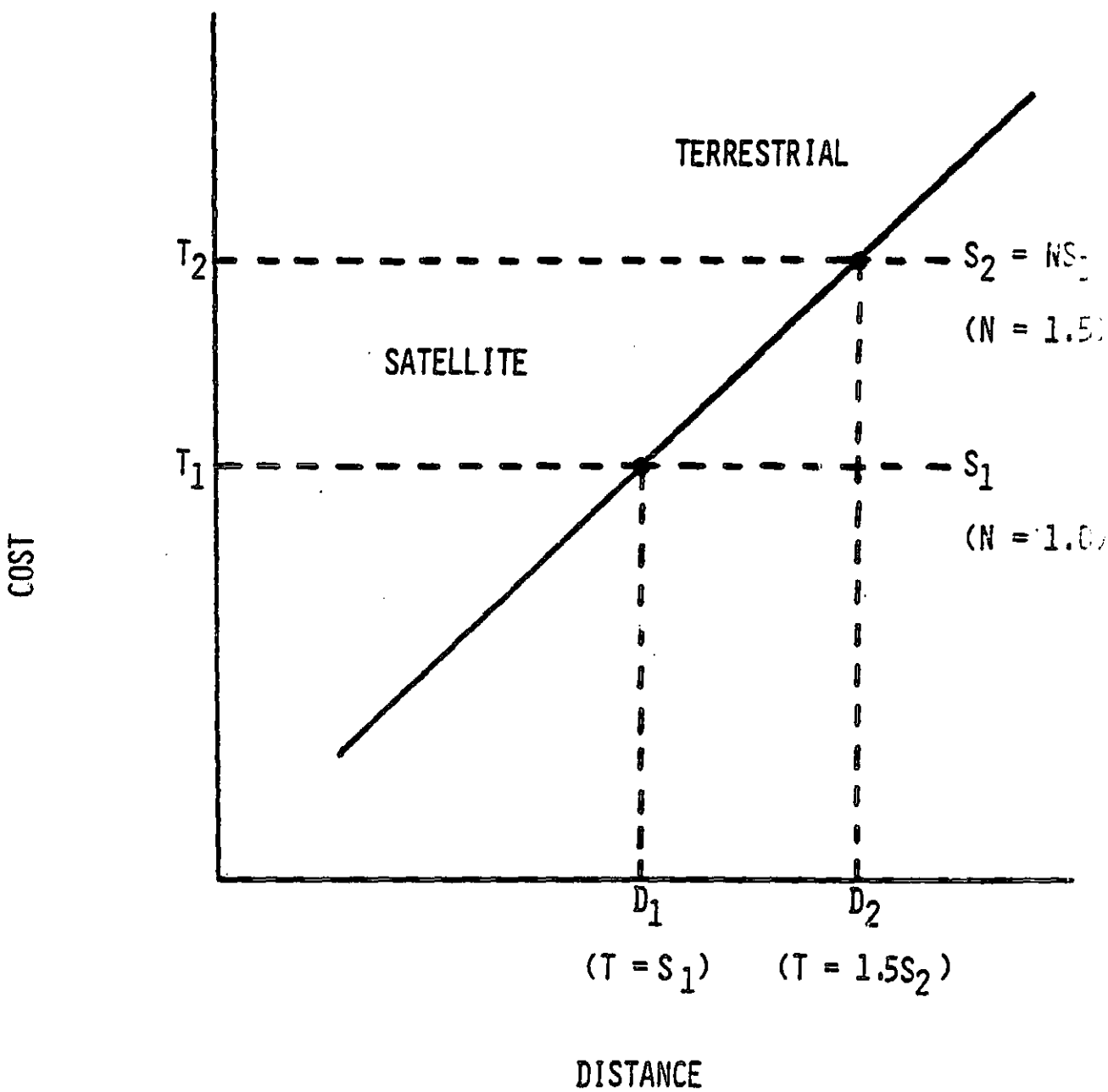

FIGURE 1-1. EXPLANATION OF TERRESTRIAL TO SATELLITE COST RATIOS

In summary, the crossover distance was determined by changing the satellite by a percentage of its forecasted cost S, (therefore, the general equation T = NS). The crossover distance could have been determined by changing the satellite cost by a percentage of the forecasted terrestrial cost (the general equation then would have been S = NT).

1.3 RESULTS

Some 35 tables were developed for each T/S ratio. These tables include information on: the overall satellite forecasts; the trunking, CPS and Ka-band portion of these overall forecasts; the trunking net addressable forecasts; and the Trunking and CPS crossover distances. Each forecast was developed by service and by operating speed. The 210 tables are presented in Section 2, Tabulated Data.

Tables 1-1 through 1-4 include summary data on the overall satellite forecasts and the trunking, CPS and Ka-band portions of the overall satellite forecasts. Forecasts are presented by service, year and cost ratio.

The 1990 and 2000 forecasts in Tables 1-1 through 1-3 are graphed in Figure 1-2. For both 1990 and 2000, as satellite costs increased, the overall satellite forecasts decreased in a nearly linear fahsion. The rate of this forecast decrease was greater for 1980 (67%) than for 1990 (45%) which, in turn, was greater than for 2000 (41%). The absolute amount of this forecast decrease was greater for 2000 (1279 Transponders) than for 1990 (608 Transponders) which, in turn, was greater than for 1980 (222 Transponders). For the year 2000, a 10% increase (from the original costs) in satellite costs resulted in about a 95 transponder decrease in overall satellite demand, while a 10% decrease in costs resulted in about a 108 transponder increase in demand.

Changing satellite costs (changing T/S ratio 1.00 to 2.00 or 1.00 to .70) had a greater impact on trunking than on CPS forecasts. For the year 2000, doubling the satellite costs resulted in a 40% decrease in trunking demand and a 11% decrease in CPS demand. For the year 2000, reducing the satellite costs by 30% resulted in a 14% increase in trunking demand and a 2.5% increase in CPS demand. That is, a 10% increase in costs resulted in a 89 transponder decrease in trunking demand and a 6 transponder decrease in CPS demand; a 10% decrease

TABLE 1-1

OVERALL SATELLITE FORECASTS

(TRANSPONDERS)

SERVICE	COST RATIO	YEAR 1980	1990	2000
VOICE	T=0.70S	254	792	2116
	T=1.00S	184	604	1824
	T=1.15S	154	526	1654
	T=1.30S	128	452	1508
	T=1.60S	85	330	1237
	T=2.00S	43	211	933
DATA	T=0.70S	16	215	574
	T=1.00S	13	204	542
	T=1.15S	11	201	536
	T=1.30S	10	198	526
	T=1.60S	7	192	489
	T=2.00S	5	191	486
VIDEO	T=0.70S	61	328	403
	T=1.00S	61	328	403
	T=1.15S	61	325	403
	T=1.30S	61	325	403
	T=1.60S	61	325	396
	T=2.00S	61	325	396
TOTAL	T=0.70S	331	1335	3093
	T=1.00S	258	1136	2768
	T=1.15S	227	1052	2593
	T=1.30S	199	974	2437
	T=1.60S	154	847	2121
	T=2.00S	109	727	1814

TABLE 1-2

TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS

(TRANSFONDERS)

SERVICE	COST RATIO	YEAR 1980	1990	2000
VOICE	T=0.70S	254	787	2093
	T=1.00S	184	601	1805
	T=1.15S	154	524	1639
	T=1.30S	128	451	1494
	T=1.60S	85	329	1229
	T=2.00S	43	211	924
DATA	T=0.70S	15	9	36
	T=1.00S	12	3	13
	T=1.15S	11	2	10
	T=1.30S	9	2	8
	T=1.60S	7	1	6
	T=2.00S	5	1	4
VIDEO	T=0.70S	61	323	393
	T=1.00S	61	323	393
	T=1.15S	61	323	393
	T=1.30S	61	323	393
	T=1.60S	61	323	393
	T=2.00S	61	323	393
TOTAL	T=0.70S	330	1119	2521
	T=1.00S	258	926	2211
	T=1.15S	226	849	2041
	T=1.30S	199	776	1895
	T=1.60S	153	653	1628
	T=2.00S	109	534	1321

TABLE 1-3

CPS SEGMENT OF OVERALL SATELLITE FORECASTS

(TRANSPONDERS)

SERVICE	COST RATIO	YEAR 1980	1990	2000
VOICE	T=0.70S	0	5	23
	T=1.00S	0	3	18
	T=1.15S	0	2	15
	T=1.30S	0	2	13
	T=1.60S	0	1	8
	T=2.00S	0	1	8
DATA	T=0.70S	0	206	538
	T=1.00S	0	202	529
	T=1.15S	0	199	526
	T=1.30S	0	196	518
	T=1.60S	0	191	483
	T=2.00S	0	190	482
VIDEO	T=0.70S	0	5	10
	T=1.00S	0	5	10
	T=1.15S	0	2	10
	T=1.30S	0	2	10
	T=1.60S	0	2	3
	T=2.00S	0	2	3
TOTAL	T=0.70S	0	215	571
	T=1.00S	0	210	557
	T=1.15S	0	203	551
	T=1.30S	0	200	541
	T=1.60S	0	193	493
	T=2.00S	0	193	493

TABLE 1-4

KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS (TRANSPONDERS)

SERVICE	COST RATIO	YEAR 1980	1990	2000
VOICE	T=0.70S	0	5	23
	T=1.00S	0	3	18
	T=1.15S	0	2	15
	T=1.30S	0	2	13
	T=1.60S	0	1	8
	T=2.00S	0	1	8
DATA	T=0.70S	0	196	498
	T=1.00S	0	190	498
	T=1.15S	0	188	490
	T=1.30S	0	184	483
	T=1.60S	0	180	449
	T=2.00S	0	180	448
VIDEO	T=0.70S	0	4	9
	T=1.00S	0	4	9
	T=1.15S	0	2	9
	T=1.30S	0	2	9
	T=1.60S	0	2	2
	T=2.00S	0	2	2
TOTAL	T=0.70S	0	205	530
	T=1.00S	0	192	518
	T=1.15S	0	192	514
	T=1.30S	0	188	505
	T=1.60S	0	183	459
	T=2.00S	0	182	459

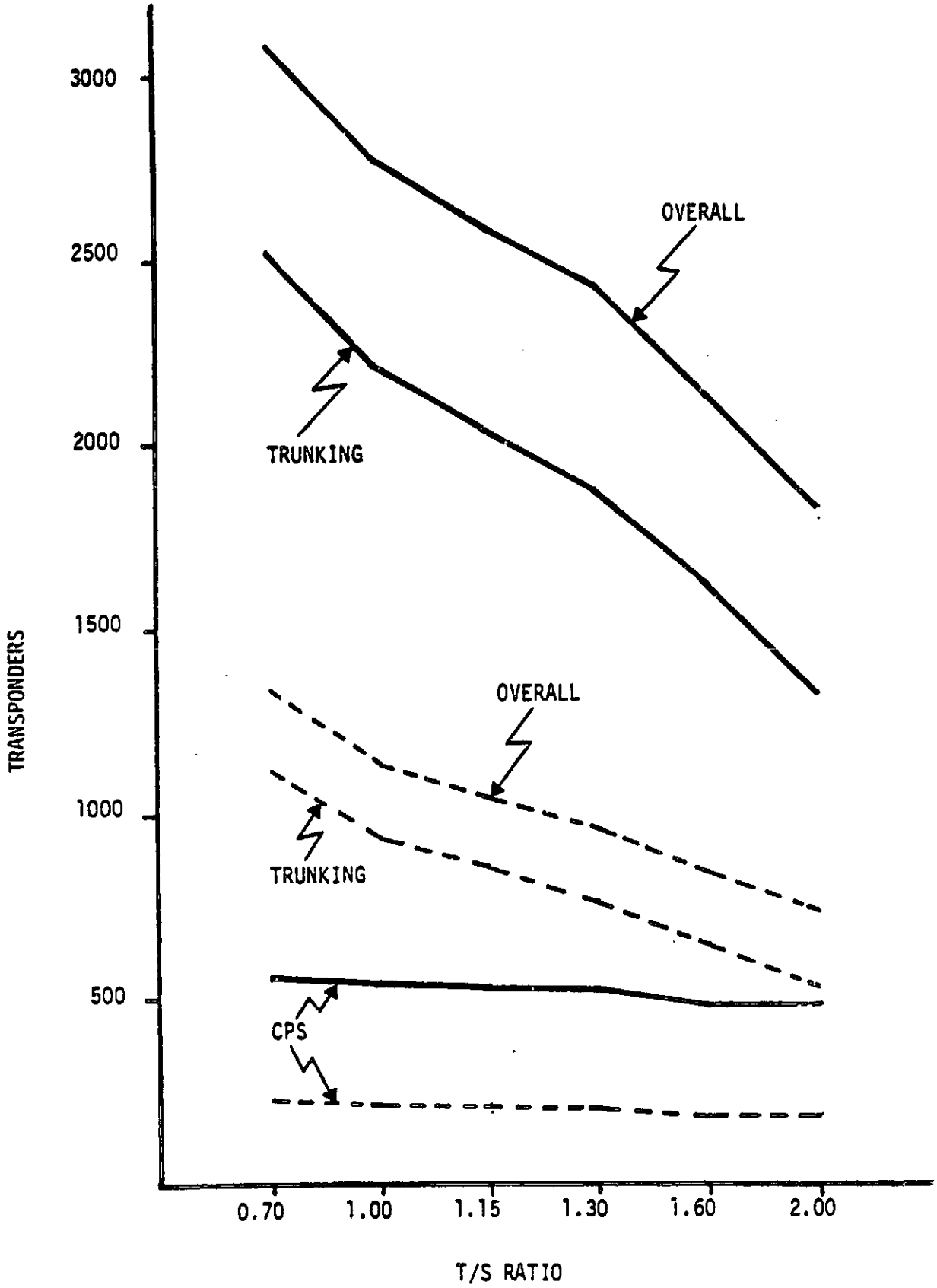

FIGURE 1-2. OVERALL SATELLITE, TRUNKING, AND CPS FORECASTS FOR 1990 (----) AND 2000 (—)

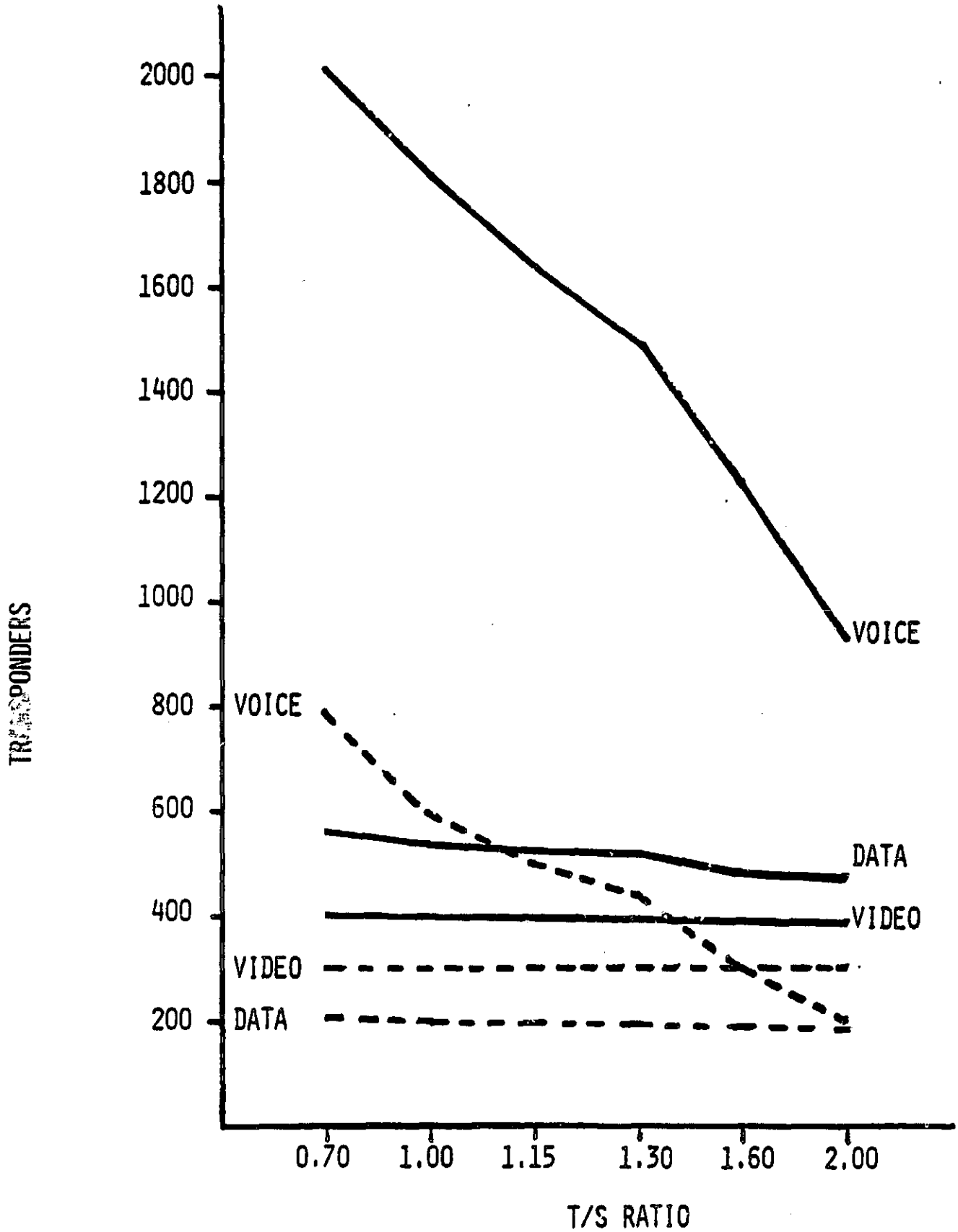

FIGURE 1-3. OVERALL SATELLITE VOICE, DATA AND VIDEO FORECASTS FOR 1990 (----) AND 2000 (—)

in costs resulted in a 103 transponder increase in trunking demand and a 5 transponder increase in CPS demand. Ka-Band CPS patterns were very similar to the CPS patterns.

The overall satellite voice, data and video forecasts are diagrammed in Figure 1-3. Changing satellite costs (changing T/S ratio from 1.00 to 2.00 or 1.00 to .70) had a greater impact on voice than on data, and a greater impact on data than on video. For the year 2000, doubling the satellite costs resulted in a 49% decrease in voice demand, a 10% decrease in data demand and 2% decrease in video demand. For the year 2000, reducing the satellite costs by 30% resulted in a 16 increase in voice demand, a 6% increase in data demand and a 0% increase in video demand. That is, a 10% increase in costs resulted in a 89 transponder decrease in voice demand, a 6 transponder decrease in data demand, and a .5 transponder decrease in video demand; a 10% decrease in costs resulted in a 97 transponder increase in voice demand, a 10 transponder increase in data demand, and a 0 transponder increase in video demand. The little or no impact on video demand resulted because the procedure used to estimate video trunking demand made this estimate insensitive to distance.

Tables 1-5 through 1-7 include summary data on the high, expected and low estimates of the Trunking Maximum Net Addressable. Forecasts are presented by service, year and cost ratio. The declines in traffic demand as the cost ratios increase are similar to those for the overall satellite forecasts. However, the trunking forecasts decline more rapidly: 108 versus 89 transponders per 10% increase in cost.

Table 1-8 shows the impacts of changing the satellite cost (T/S ratio 0.7 to 2.00) on the overall satellite forecasts by operating speed in the year 2000. A majority of the impact will be on 64 kbps traffic which is voice traffic that will be carried primarily on trunking systems.

These relationships among terrestrial to satellite cost ratios and the satellite forecasts can be used to estimate forecasts as assumptions concerning the crossover distance are varied. That is, the need for transponders can be determined using the various T/S cost ratios. However, one also should consider the interactions of the cost assumptions with assumptions concerning other key factors (e.g., technological advances or political concerns).

TABLE 1-5

TRUNKING MAXIMUM NET ADDRESSABLE

HIGH ESTIMATE

(TRANSPONDERS)

SERVICE	COST RATIO	YEAR 1980	1990	2000
VOICE	T=0.70S	254	1024	2642
	T=1.00S	184	781	2280
	T=1.15S	154	681	2070
	T=1.30S	128	586	1887
	T=1.60S	85	429	1552
	T=2.00S	43	274	1167
DATA	T=0.70S	15	160	330
	T=1.00S	13	132	288
	T=1.15S	11	110	247
	T=1.30S	90	94	206
	T=1.60S	7	66	140
	T=2.00S	5	39	81
VIDEO	T=0.70S	61	323	393
	T=1.00S	61	323	393
	T=1.15S	61	323	393
	T=1.30S	61	323	393
	T=1.60S	61	323	393
	T=2.00S	61	323	393
TOTAL	T=0.70S	330	1507	3365
	T=1.00S	258	1236	2960
	T=1.15S	226	1114	2709
	T=1.30S	198	1003	2486
	T=1.60S	153	818	2085
	T=2.00S	109	636	1641

TABLE 1-6

TRUNKING MAXIMUM NET ADDRESSABLE

EXPECTED ESTIMATE

(TRANSPONDERS)

SERVICE	COST RATIO	YEAR 1980	1990	2000
VOICE	T=0.70S	254	787	2093
	T=1.00S	184	601	1805
	T=1.15S	154	524	1639
	T=1.30S	128	451	1494
	T=1.60S	85	329	1229
	T=2.00S	43	211	924
DATA	T=0.70S	15	147	310
	T=1.00S	13	121	270
	T=1.15S	11	101	232
	T=1.30S	9	86	193
	T=1.60S	7	61	132
	T=2.00S	5	36	76
VIDEO	T=0.70S	61	323	393
	T=1.00S	61	323	393
	T=1.15S	61	323	393
	T=1.30S	61	323	393
	T=1.60S	61	323	393
	T=2.00S	61	323	393
TOTAL	T=0.70S	330	1257	2796
	T=1.00S	258	1045	2468
	T=1.15S	226	948	2263
	T=1.30S	198	860	2080
	T=1.60S	153	713	1754
	T=2.00S	109	570	1393

TABLE 1-7

TRUNKING MAXIMUM NET ADDRESSABLE

LOW ESTIMATE

(TRANSPONDERS)

SERVICE	COST RATIO	YEAR 1980	1990	2000
VOICE	T=0.70S	254	641	1656
	T=1.00S	184	489	1428
	T=1.15S	154	426	1296
	T=1.30S	128	367	1182
	T=1.60S	85	268	972
	T=2.00S	43	171	731
DATA	T=0.70S	15	134	290
	T=1.00S	13	111	252
	T=1.15S	11	92	217
	T=1.30S	9	78	181
	T=1.60S	7	55	123
	T=2.00S	5	33	71
VIDEO	T=0.70S	61	323	393
	T=1.00S	61	323	393
	T=1.15S	61	323	393
	T=1.30S	61	323	393
	T=1.60S	61	323	393
	T=2.00S	61	323	393
TOTAL	T=0.70S	330	1098	2339
	T=1.00S	258	922	2073
	T=1.15S	226	841	1906
	T=1.30S	198	768	1756
	T=1.605	153	646	1488
	T=2.00S	109	527	1195

TABLE 1-8

IMPACTS OF CHANGING THE SATELLITE COST (T/S RATIO .7 TO 2.00) ON THE OVERALL SATELLITE FORECASTS BY OPERATING SPEED FOR THE YEAR 2000

	NUMBER OF TRANSPONDERS BY T/S RATIO		REDUCTION IN FORECAST
SPEED	T=0.70S	T=2.00S	%
2.4 kbps	52.2	50.6	3
4.8 kbps	112.3	100.3	11
9.6 kbps	370.1	324.8	12
56 kbps	37.3	9.1	76
64 kbps	2113.3	931.4	56
1.544 Mbps	131.7	126.3	4
≥6.3 Mbps	147.5	147.4	0
	3092.0	1813.9	41

SECTION 2
TABULATED DATA

The tabulated data are presented in this section and are grouped into six sub-sections, one for each of the six terrestrial (T)/satellite (S) cost rates:

a. T = 0.70S
b. T = 1.00S
c. T = 1.15S
d. T = 1.30S
e. T = 1.60S
f. T = 2.00S

A list of the tables in each sub-section is presented at the beginning of each sub-section. Each sub-section includes 35 tables with identical titles, except the T/S rates changes for each group of 35 tables.

2.1 LIST OF TABLES: T = 0.70S

Table 2.1	Overall Satellite Forecasts by Service
Table 2.2	Trunking Segment of Overall Satellite Forecasts by Service
Table 2.3	CPS Segment of Overall Satellite Forecasts by Service
Table 2.4	Ka-Portion of CPS Segment of Overall Satellite Forecasts by Service
Table 2.5	Overall Satellite Forecasts by Operating Speed
Table 2.6	Trunking Segment of Overall Satellite Forecasts by Operating Speed
Table 2.7	CPS Segment of Overall Satellite Forecasts by Operating Speed
Table 2.8	Ka-Portion of CPS Segment of Overall Satellite Forecasts by Operating Speed
Table 2.9	Trunking Maximum Net Addressable by Service: High Estimate
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Table 2.11	Trunking Maximum Net Addressable by Service: Low Estimate
Table 2.12	Trunking Maximum Net Addressable by Operating Speed: High Estimate

Table 2.13 Trunking Maximum Net Addressable by Operating Speed: Expected Estimate

Table 2.14 Trunking Maximum Net Addressable by Operating Speed: Low Estimate

Table 2.15 Breakeven Distance in Miles for Trunking Networks

Table 2.16 CPS Composite Crossover Distance in Miles Unshared Earth Stations .995 Availability

Table 2.17 CPS Composite Crossover Distance in Miles Shared Earth Stations .995 Availability

Table 2.18 CPS Composite Crossover Distance in Miles Unshared Earth Stations .999 Availability

Table 2.19 CPS Composite Crossover Distance in Miles Shared Earth Stations .999 Availability

Table 2.20 1982 Crossover Distances in Miles for C-Band CPS Services (Unshared Earth Stations)

Table 2.21 1982 Crossover Distances in Miles for C-Band CPS Services (Shared Earth Stations)

Table 2.22 1982 Crossover Distances in Miles for Ku-Band CPS Services (Unshared Earth Stations)

Table 2.23 1982 Crossover Distances in Miles for Ku-Band CPS Services (Shared Earth Stations)

Table 2.24 1990 Crossover Distances in Miles for C-Band CPS Services (Unshared Earth Stations)

Table 2.25 1990 Crossover Distances in Miles for C-Band CPS Services (Shared Earth Stations)

Table 2.26 1990 Crossover Distances in Miles for Ku-Band CPS Services (Unshared Earth Stations)

Table 2.27 1990 Crossover Distances in Miles for Ku-Band CPS Services (Shared Earth Stations)

Table 2.28 1990 Crossover Distances in Miles for Ka-Band CPS Services (Unshared Earth Stations)

Table 2.29 1990 Crossover Distances in Miles for Ka-Band CPS Services (Shared Earth Stations)

Table 2.30 2000 Crossover Distances in Miles for C-Band CPS Services (Unshared Earth Stations)

Table 2.31 2000 Crossover Distances in Miles for C-Band CPS Services (Shared Earth Stations)

Table 2.32 2000 Crossover Distances in Miles for Ku-Band CPS Services (Unshared Earth Stations)

Table 2.33 2000 Crossover Distances in Miles for Ku-Band CPS Services (Shared Earth Stations)

Table 2.34 2000 Crossover Distances in Miles for Ka-Band CPS Services (Unshared Earth Stations)

Table 2.35 2000 Crossover Distances in Miles for Ka-Band CPS Services (Shared Earth Stations)

TABLE 2.1

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OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=0.75)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	4.8	66.3	223.5
MTS (BUSINESS)	12.1	211.7	758.7
PRIVATE LINE	235.5	504.9	1112.7
MOBILE	0.6	7.3	18.4
PUBLIC RADIO	0.2	0.5	0.6
COMMERCIAL AND RELIGIOUS	0.3	0.5	0.7
OCCASIONAL	0.5	0.5	0.6
CATV MUSIC	0.1	0.1	0.3
RECORDING	0.0	0.0	0.1
	254.1	791.8	2115.6
DATA			
DATA TRANSFER	0.0	0.6	3.2
BATCH PROCESSING	0.1	1.2	3.2
DATA ENTRY	11.1	104.3	223.6
REMOTE JOB ENTRY	0.3	11.8	50.6
INQUIRY/RESPONSE	0.2	5.5	19.9
TIMESHARING	0.2	2.5	6.1
USPS/EMSS	0.0	0.8	2.4
MAILBOX	0.0	0.8	2.2
ADMINISTRATIVE MESSAGES	2.8	67.0	225.2
FACSIMILE	0.6	10.6	8.7
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.1
T4X/TELEX	0.1	0.2	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	7.1	13.4
VIDEOTEXT/TELETEXT	0.0	2.1	9.3
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.3
	15.6	215.1	573.5
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	3[illegible].0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.1	160.8	255.4
	61.4	327.7	401.9

TABLE 2.2

ORIGINAL PAGE IS
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TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=0.75)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	4.8	66.3	223.5
MTS (BUSINESS)	12.1	209.8	750.5
PRIVATE LINE	235.5	502.0	1097.9
MOBILE	0.6	7.3	18.3
PUBLIC RADIO	0.2	0.5	0.6
COMMERCIAL AND RELIGIOUS	0.3	0.5	0.7
OCCASIONAL	0.5	0.5	0.6
CATV MUSIC	0.1	0.1	0.3
RECORDING	0.0	0.0	0.1
	254.1	787.0	2092.5
DATA			
DATA TRANSFER	0.0	0.5	2.9
BATCH PROCESSING	0.1	0.0	0.0
DATA ENTRY	11.1	0.0	0.0
REMOTE JOB ENTRY	0.3	0.0	19.1
INQUIRY/RESPONSE	0.0	0.0	0.0
TIMESHARING	0.1	1.1	2.3
USPS/EMSS	0.0	0.7	2.1
MAILBOX	0.0	0.0	0.0
ADMINISTRATIVE MESSAGES	2.7	0.0	0.0
FACSIMILE	0.6	4.8	0.0
COMMUNICATING WORD PROCESSORS	0.0	0.0	0.0
TWX/TELEX	0.1	0.2	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	0.0	0.0
VIDEOTEXT/TELETEXT	0.0	2.1	9.3
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.0	0.0
	15.1	9.4	35.9
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.8

TABLE 2.3

CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=0.7S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	1.9	8.2
PRIVATE LINE	0.0	2.9	14.8
MOBILE	0.0	0.0	0.1
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	4.8	23.1
DATA			
DATA TRANSFER	0.0	0.1	0.3
BATCH PROCESSING	0.0	1.2	3.2
DATA ENTRY	0.0	104.3	223.6
REMOTE JOB ENTRY	0.0	11.8	31.5
INQUIRY/RESPONSE	0.2	5.5	19.9
TIMESHARING	0.1	1.4	3.8
USPS/EMSS	0.0	0.1	0.3
MAILBOX	0.0	0.8	2.2
ADMINISTRATIVE MESSAGES	0.1	67.0	225.2
FACSIMILE	0.0	3.8	8.7
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.1
TWX/TELEX	0.0	0.0	0.0
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	7.1	13.4
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.3
	0.5	205.7	537.6
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.1	4.9	10.1
	0.1	4.9	10.1

TABLE 2.4

ORIGINAL PAGE IS
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KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=0.7S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	1.9	8.2
PRIVATE LINE	0.0	2.9	14.8
MOBILE	0.0	0.0	0.1
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	4.8	23.1
DATA			
DATA TRANSFER	0.0	0.1	0.3
BATCH PROCESSING	0.0	1.1	2.9
DATA ENTRY	0.0	108.3	223.1
REMOTE JOB ENTRY	0.0	12.3	31.4
INQUIRY/RESPONSE	0.0	5.7	19.8
TIMESHARING	0.0	1.5	3.8
USPS/EMSS	0.0	0.1	0.3
MAILBOX	0.0	0.7	1.9
ADMINISTRATIVE MESSAGES	0.0	58.3	189.1
FACSIMILE	0.0	0.7	8.2
COMMUNICATING WORD PROCESSORS	0.0	0.4	1.8
TWX/TELEX	0.0	0.0	0.0
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	6.7	12.3
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.3
	0.0	196.2	498.3
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.0	4.1	8.6
	0.0	4.1	8.6

TABLE 2.5

OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=0.75)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	9.5	43.9	52.2
4.8 KBPS	4.0	147.1	112.3
9.6 KBPS	2.1	22.8	370.1
56 KBPS	0.0	1.1	37.3
64 KBPS	253.0	790.2	2113.3
1.544 MBPS	2.6	82.2	131.7
6.3 MBPS	1.5	80.4	127.7
>6.3 MBPS	58.3	166.9	147.5
	331.1	1334.6	3092.0

TABLE 2.6

ORIGINAL PAGE IS
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TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=0.7S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	9.2	2.4	2.0
4.8 KBPS	3.9	4.1	7.2
9.6 KBPS	2.1	2.1	13.2
56 KBPS	0.0	0.7	12.1
64 KBPS	253.0	785.4	2090.2
1.544 MBPS	2.6	79.7	126.4
6.3 MBPS	1.5	77.9	122.6
46.3 MBPS	58.3	166.9	147.5
	330.5	1119.2	2521.2

TABLE 2.7

CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=0.7S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.3	41.6	50.2
4.8 KBPS	0.1	143.0	105.1
9.6 KBPS	0.1	20.7	356.8
56 KBPS	0.0	0.4	25.3
64 KBPS	0.0	4.8	23.1
1.544 MBPS	0.0	2.5	5.3
6.3 MBPS	0.0	2.4	5.1
46.3 MBPS	0.0	0.0	0.0
	0.6	215.4	570.8

TABLE 2.8

ORIGINAL PAGE IS
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KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=0.75)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.0	39.6	46.3
4.8 KBPS	0.0	136.3	97.2
9.6 KBPS	0.0	19.8	329.5
56 KBPS	0.0	0.4	25.1
64 KBPS	0.0	4.8	23.1
1.544 MBPS	0.0	2.1	4.5
6.3 MBPS	0.0	2.0	4.3
>6.3 MBPS	0.0	0.0	0.0
	0.0	205.1	530.0

TABLE 2.9

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=0.7S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	4.8	101.1	326.4
MTS (BUSINESS)	12.1	320.2	1096.2
PRIVATE LINE	235.5	592.0	1196.7
MOBILE	0.6	8.6	20.0
PUBLIC RADIO	0.2	0.6	0.6
COMMERCIAL AND RELIGIOUS	0.3	0.6	0.8
OCCASIONAL	0.5	0.6	0.7
CATV MUSIC	0.1	0.1	0.3
RECORDING		0.0	0.1
	253.8	1023.8	2641.7
DATA			
DATA TRANSFER	0.0	0.5	3.1
BATCH PROCESSING	0.1	0.9	1.9
DATA ENTRY	11.1	83.1	139.1
REMOTE JOB ENTRY	0.3	9.4	20.4
INQUIRY/RESPONSE	0.1	4.3	12.2
TIMESHARING	0.1	1.1	2.4
USPS/EMSS		0.8	2.2
MAILBOX	0.0	0.6	1.2
ADMINISTRATIVE MESSAGES	2.7	45.7	120.4
FACSIMILE	0.6	5.2	6.4
COMMUNICATING WORD PROCESSORS	0.0	0.3	1.1
TWX/TELEX	0.1	0.2	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	5.3	7.9
VIDEOTEXT/TELETEXT	0.0	2.3	9.9
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.2	2.1
	15.2	159.9	330.4
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.10

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=0.75)

ORIGINAL PAGE IS
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SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	4.8	66.3	223.5
MTS (BUSINESS)	12.1	209.8	750.5
PRIVATE LINE	235.5	502.0	1097.9
MOBILE	0.6	7.3	18.3
PUBLIC RADIO	0.2	0.5	0.6
COMMERCIAL AND RELIGIOUS	0.3	0.5	0.7
OCCASIONAL	0.5	0.5	0.6
CATV MUSIC	0.1	0.1	0.3
RECORDING		0.0	0.1
	253.8	787.0	2092.5
DATA			
DATA TRANSFER	0.0	0.5	2.9
BATCH PROCESSING	0.1	0.8	1.8
DATA ENTRY	11.1	76.3	130.5
REMOTE JOB ENTRY	0.3	8.6	19.1
INQUIRY/RESPONSE	0.1	4.0	11.4
TIMESHARING	0.1	1.1	2.3
USPS/EMSS		0.7	2.1
MAILBOX	0.0	0.5	1.1
ADMINISTRATIVE MESSAGES	2.7	42.0	112.9
FACSIMILE	0.6	4.8	6.0
COMMUNICATING WORD PROCESSORS	0.0	0.3	1.1
TWX/TELEX	0.1	0.2	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	4.8	7.4
VIDEOTEXT/TELETEXT	0.0	2.1	9.3
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.2	1.9
	15.2	146.9	310.0
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.11

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=0.75)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	4.8	45.8	138.7
MTS (BUSINESS)	12.1	144.9	465.6
PRIVATE LINE	235.5	442.0	1032.0
MOBILE	0.6	6.4	17.2
PUBLIC RADIO	0.2	0.4	0.5
COMMERCIAL AND RELIGIOUS	0.3	0.5	0.6
OCCASIONAL	0.5	0.4	0.6
CATV MUSIC	0.1	0.1	0.3
RECORDING		0.0	0.1
	253.8	640.5	1655.6
DATA			
DATA TRANSFER	0.0	0.4	2.7
BATCH PROCESSING	0.1	0.8	1.7
DATA ENTRY	11.1	69.5	121.9
REMOTE JOB ENTRY	0.3	7.9	17.9
INQUIRY/RESPONSE	0.1	3.6	10.7
TIMESHARING	0.1	1.0	2.1
USPS/EMSS		0.6	2.0
MAILBOX	0.0	0.5	1.0
ADMINISTRATIVE MESSAGES	2.7	38.2	105.5
FACSIMILE	0.6	4.3	5.6
COMMUNICATING WORD PROCESSORS	0.0	0.3	1.0
TWX/TELEX	0.1	0.2	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	4.4	6.9
VIDEOTEXT/TELETEXT	0.0	1.9	8.6
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.2	1.8
	15.2	133.8	289.6
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.12

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=0.7S)

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OPERATING SPEED	1980	1990	2000
2.4 KBPS	8.2	55.1	59.2
4.8 KBPS	4.5	72.0	110.3
9.6 KBPS	2.5	31.8	147.4
56 KBPS	0.0	0.9	12.1
64 KBPS	252.9	1021.9	2639.3
1.544 MBPS	2.5	80.1	126.5
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	330.2	1506.6	3364.9

TABLE 2.13

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=0.7S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	8.2	50.6	55.5
4.8 KBPS	4.5	66.1	103.5
9.6 KBPS	2.5	29.2	138.3
56 KBPS	0.0	0.8	11.3
64 KBPS	252.9	785.4	2090.2
1.544 MBPS	2.5	79.8	126.2
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	330.2	1256.7	2795.2

TABLE 2.14

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=0.7S)

ORIGINAL PAGE IS
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OPERATING SPEED	1980	1990	2000
2.4 KBPS	8.2	46.1	51.9
4.8 KBPS	4.5	60.2	96.7
9.6 KBPS	2.5	26.6	129.1
56 KBPS	0.0	0.7	10.6
64 KBPS	252.9	639.1	1653.5
1.544 MBPS	2.5	79.6	126.0
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	330.2	1097.2	2337.9

TABLE 2.15

BREAKEVEN DISTANCE IN MILES FOR TRUNKING NETWORKS
(T=0.75)

YR/BAND	OPERATING SPEEDS							
	2.4	4.8	9.6	56	T1	V1	V2	V3
1982								
C	5	1	1	1	45	360	260	173
KU	126	87	47	28	95	571	471	378
1990								
C	10	4	5	1	24	252	139	79
KU	19	2	1	3	32	278	164	87
KA	16	1	1	3	32	274	161	86
KA	16	1	1	1	25	243	130	75
2000								
C	13	9	12	2	23	274	152	84
KU	2	1	1	1	1	116	54	35
KA	3	1	1	4	34	255	133	76
KA	2	1	1	2	26	223	102	64

TABLE 2.16

CFS COMPOSITE CROSSOVER DISTANCE IN MILES
UNSHARED EARTH STATIONS .995 AVAILABILITY
(T=0.7S)

YR/BAND		OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	12	22	51	95	168	1761	1607	1479
	KU	45	111	258	342	224	3521	3303	3129
1990									
	C	2	6	21	44	145	1336	1186	1060
	KU	22	53	149	225	141	2437	2256	2142
	KA	1	2	11	48	123	1307	1168	1046
2000									
	C	1	1	3	23	139	1044	901	779
	KU	8	27	72	128	88	1635	1490	1387
	KA	1	1	1	22	60	812	677	593

TABLE 2.17

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .995 AVAILABILITY
(T=0.7S)

YR/BAND		OPERATING SPEEDS							
		2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	338	449	636	248	87	500	400	309
	KU	346	464	664	281	132	685	585	488
1990									
	C	136	235	402	164	66	372	269	196
	KU	137	238	409	172	77	417	304	221
	KA	170	298	512	233	103	553	440	337
2000									
	C	92	149	304	135	65	334	235	165
	KU	89	141	287	120	38	235	148	98
	KA	106	234	447	189	53	336	214	122

TABLE 2.18

CFS COMPOSITE CROSSOVER DISTANCE IN MILES
UNSHARED EARTH STATIONS .999 AVAILABILITY
(T=0.75)

YR/BAND		OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	26	58	144	205	218	2694	2502	2345
	KU	55	136	308	401	314	4276	4035	3847
1990									
	C	8	23	59	112	178	1908	1740	1592
	KU	29	71	197	281	199	3040	2822	2648
	KA	1	2	11	48	123	1307	1168	1046
2000									
	C	3	8	29	59	156	1484	1334	1208
	KU	13	38	101	171	115	2037	1879	1758
	KA	1	1	1	22	60	812	677	593

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TABLE 2.19
CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .999 AVAILABILITY
(T=0.75)

YR/BAND		OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	341	455	647	261	105	572	473	379
	KU	350	474	685	305	170	848	726	623
1990									
	C	142	248	429	195	110	546	435	331
	KU	140	246	423	189	101	513	399	304
	KA	170	298	512	233	103	553	440	337
2000									
	C	91	149	303	136	63	326	234	172
	KU	91	146	297	129	54	293	206	144
	KA	106	234	447	189	53	336	214	122

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TABLE 2.20

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 0.75)

C 1 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2388.0	1	1	1	1	208	108	66	20
LARGE	0.999	32000.0	2622.0	1	1	1	1	240	140	79	28
MEDIUM	0.995	6300.0	1046.5	1	1	1	1	612	512	417	129
MEDIUM	0.995	6300.0	1159.0	1	1	1	1	690	591	493	139
MEDIUM	0.995	6300.0	938.0	1	1	1	1	536	436	343	101
MEDIUM	0.999	6300.0	1116.0	1	1	1	1	660	560	464	132
SMALL	0.995	1544.0	394.0	1	1	1	1	1008	905	798	221
SMALL	0.999	1544.0	571.2	1	1	1	1	1858	1666	1475	380
SMALL	0.995	1544.0	404.7	1	1	1	1	1059	935	828	230
SMALL	0.999	1544.0	546.8	1	1	1	1	1741	1553	1364	350
SMALL	0.995	1544.0	592.0	1	1	1	1	1958	1763	1569	399
SMALL	0.999	1544.0	675.0	1	1	1	1	2356	2147	1947	473
MINI	0.995	64.0	201.0	291	500	1401	2459	22382	21482	20955	
MINI	0.999	64.0	243.4	659	1513	3708	5244	38863	37395	36590	
MINI	0.995	64.0	86.2	39	34	77	515	9094	8653	8343	
MINI	0.999	64.0	146.4	150	298	683	1392	16062	15381	14956	

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 0.75)

C J CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 5 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2388.0	332	436	610	218	325	225	139	44
LARGE	0.999	32000.0	2622.0	333	439	615	223	357	258	171	52
MEDIUM	0.995	6300.0	1046.5	347	467	671	288	7[illegible]	629	531	143
MEDIUM	0.995	6300.0	1159.0	350	473	682	302	8[illegible]	708	607	163
MEDIUM	0.995	6300.0	938.0	344	461	659	275	[illegible]3	553	457	124
MEDIUM	0.999	6300.0	1116.0	349	470	678	297	778	670	578	155

TABLE 2.21

TABLE 2.22

1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 0.75)

KU 1 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3878.0	1	1	1	1	413	313	225	71
LARGE	0.999	32000.0	4174.0	1	1	1	1	454	354	264	81
LARGE	0.999	32000.0	4246.0	1	1	1	1	464	364	274	83
MEDIUM	0.995	6300.0	1128.0	1	1	1	1	669	569	472	134
MEDIUM	0.999	6300.0	1424.0	1	1	1	1	876	776	673	185
MEDIUM	0.999	6300.0	1496.0	1	1	1	1	926	827	722	197
MEDIUM	0.995	6300.0	1236.0	1	1	1	1	744	644	546	152
MEDIUM	0.999	6300.0	1505.0	1	1	1	1	933	833	728	198
MEDIUM	0.999	6300.0	1592.0	1	1	1	1	994	894	787	217
SMALL	0.995	1544.0	551.0	1	1	1	1	1761	1573	1383	362
SMALL	0.999	1544.0	820.5	1	1	1	1	3054	2821	2610	630
SMALL	0.999	1544.0	907.5	1	1	1	8	3471	3224	3006	728
SMALL	0.995	1544.0	621.0	1	1	1	1	2097	1897	1701	425
SMALL	0.999	1544.0	733.0	1	1	1	1	2634	2416	2211	532
SMALL	0.999	1544.0	797.0	1	1	1	1	2941	2712	2503	604
SMALL	0.995	1544.0	611.0	1	1	1	1	2049	1851	1656	416
SMALL	0.999	1544.0	737.6	1	1	1	1	2656	2437	2232	537
SMALL	0.999	1544.0	760.2	1	1	1	1	2765	2542	2335	562
MINI	0.995	64.0	391.0	782	1912	4586	6175	44372	42715	41827	
MINI	0.999	64.0	502.5	1115	2847	6455	8356	57277	55175	54076	
MINI	0.999	64.0	566.5	1383	3383	7528	9607	64685	62327	61107	
MINI	0.995	64.0	179.0	234	467	1032	2029	19835	19024	18538	
MINI	0.999	64.0	355.0	609	1611	3982	5471	40206	38692	37872	
MINI	0.999	64.0	378.0	749	1003	4368	5921	42868	41262	40399	

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TABLE 2.23

1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 0.75)

KU 1 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3878.0	340	452	641	254	531	431	339	94
LARGE	0.999	32000.0	4174.0	341	455	647	261	571	472	378	104
LARGE	0.999	32000.0	4246.0	341	456	649	263	581	482	388	107
MEDIUM	0.995	6300.0	1128.0	349	471	679	298	786	686	506	157
MEDIUM	0.999	6300.0	1424.0	357	487	710	335	993	893	787	210
MEDIUM	0.999	6300.0	1496.0	359	490	718	343	1073	944	836	226
MEDIUM	0.995	6300.0	1236.0	352	477	691	312	862	762	659	176
MEDIUM	0.999	6300.0	1505.0	359	491	719	345	1084	950	842	228
MEDIUM	0.999	6300.0	1592.0	361	495	728	355	1186	1018	901	247

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TABLE 2.24

1990 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 0.75)

C 3 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1544.4	1	1	1	1	86	37	26	1
LARGE	0.999	32000.0	3213.4	1	1	1	1	319	205	109	59
MEDIUM	0.995	6300.0	573.5	1	1	1	1	272	158	85	47
MEDIUM	0.999	6300.0	698.2	1	1	1	1	371	258	160	72
MEDIUM	0.995	6300.0	841.2	1	1	1	1	485	371	270	100
MEDIUM	0.999	6300.0	954.2	1	1	1	1	575	461	357	122
SMALL	0.995	1544.0	297.1	1	1	1	1	780	667	556	172
SMALL	0.999	1544.0	410.2	1	1	1	1	1042	1034	912	245
SMALL	0.995	1544.0	321.8	1	1	1	1	861	747	634	192
SMALL	0.999	1544.0	302.5	1	1	1	1	798	684	573	177
SMALL	0.995	1544.0	546.0	1	1	1	1	1782	1571	1356	384
SMALL	0.999	1544.0	613.2	1	1	1	1	2149	1925	1704	453
MINI	0.995	64.0	130.3	40	152	579	1171	15943	15244	14797	
MINI	0.999	64.0	209.4	211	617	1625	2929	26347	25289	24672	
MINI	0.995	64.0	51.8	1	1	1	152	5618	5275	4998	
MINI	0.999	64.0	82.4	1	1	61	572	9643	9161	8818	

1990 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 0.75)

C 3 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1544.4	129	221	375	132	190	97	57	21
LARGE	0.999	32000.0	3213.4	138	241	414	178	451	338	237	86
MEDIUM	0.995	6300.0	573.5	137	238	407	170	404	291	191	74
MEDIUM	0.999	6300.0	698.2	140	245	422	187	503	390	280	99
MEDIUM	0.995	6300.0	841.2	145	254	439	207	617	504	398	126
MEDIUM	0.999	6300.0	954.2	148	260	453	223	707	594	485	149

TABLE 2.25

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TABLE 2.26

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 0.75)

KU 2 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1960.0	1	1	1	1	123	64	40	11
LARGE	0.999	32000.0	2132.3	1	1	1	1	150	77	45	17
LARGE	0.999	32000.0	2188.7	1	1	1	1	158	82	48	19
MEDIUM	0.995	6300.0	585.1	1	1	1	1	281	168	89	50
MEDIUM	0.999	6300.0	757.4	1	1	1	1	418	305	205	83
MEDIUM	0.999	6300.0	813.8	1	1	1	1	463	350	249	94
MEDIUM	0.995	6300.0	883.8	1	1	1	1	519	405	303	108
MEDIUM	0.999	6300.0	1034.4	1	1	1	1	639	525	419	137
MEDIUM	0.999	6300.0	1101.8	1	1	1	1	692	579	471	151
SMALL	0.995	1544.0	374.9	1	1	1	1	1033	919	801	209
SMALL	0.999	1544.0	525.5	1	1	1	1	1670	1463	1250	363
SMALL	0.999	1544.0	592.9	1	1	1	1	2038	1818	1599	432
SMALL	0.995	1544.0	435.1	1	1	1	1	1178	1115	990	271
SMALL	0.999	1544.0	510.6	1	1	1	1	1586	1382	1170	347
SMALL	0.999	1544.0	559.2	1	1	1	1	1854	1641	1425	397
SMALL	0.995	1544.0	451.3	1	1	1	1	1266	1073	1041	287
SMALL	0.999	1544.0	553.8	1	1	1	1	1825	1612	1397	392
SMALL	0.999	1544.0	517.1	1	1	1	1	1625	1419	1207	354
MINI	0.995	64.0	257.2	351	897	2536	3991	32633	31359	30639	
MINI	0.999	64.0	332.1	571	1348	3963	5656	42485	40870	39989	
MINI	0.999	64.0	381.3	716	1817	4900	6749	48955	47118	46131	
MINI	0.995	64.0	130.2	40	151	578	1169	15930	15231	14785	
MINI	0.999	64.0	257.9	353	902	2549	4007	32725	31448	30726	
MINI	0.999	64.0	275.8	406	1007	2890	4405	35080	33721	32961	

TABLE 2.27

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 0.75)

KU 2 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1960.0	131	226	385	144	255	141	80	37
LARGE	0.999	32000.0	2132.3	132	228	389	149	282	168	89	44
LARGE	0.999	32000.0	2188.7	132	229	390	150	291	177	94	46
MEDIUM	0.995	6300.0	585.1	137	238	409	172	413	300	200	76
MEDIUM	0.999	6300.0	757.4	142	249	429	196	550	437	333	110
MEDIUM	0.999	6300.0	813.8	144	252	436	204	595	482	377	121
MEDIUM	0.995	6300.0	883.8	146	256	444	213	651	538	431	135
MEDIUM	0.999	6300.0	1034.4	150	265	462	234	771	657	547	164
MEDIUM	0.999	6300.0	1101.8	152	269	470	244	825	711	599	177

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(I = 0.79)

KA 13 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4824.0	1	1	1	1	571	458	354	113
LARGE	0.999	32000.0	3480.0	1	1	1	1	361	247	149	61
LARGE	0.999	32000.0	2290.0	1	1	1	1	174	89	53	16
MEDIUM	0.999	6300.0	1103.6	1	1	1	1	694	580	472	143
MEDIUM	0.999	6300.0	839.0	1	1	1	1	483	370	268	92
MEDIUM	0.999	6300.0	604.8	1	1	1	1	297	183	97	46
SMALL	0.999	1544.0	409.7	1	1	1	1	1039	1033	911	235
SMALL	0.999	1544.0	344.9	1	1	1	1	936	822	707	203
SMALL	0.999	1544.0	287.5	1	1	1	1	749	636	526	157
MINI	0.999	64.0	118.5	1	29	233	975	14391	13745	13324	
MINI	0.999	64.0	115.8	1	22	202	937	14036	13402	12987	
MINI	0.999	64.0	113.4	1	16	173	905	13720	13098	12687	

TABLE 2-28

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TABLE 2.29

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 0.75)

KA 13 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4824.0	176	309	535	259	704	590	482	140
LARGE	0.999	32000.0	3480.0	168	293	503	222	493	379	278	88
LARGE	0.999	32000.0	2290.0	161	279	475	190	306	193	101	42
MEDIUM	0.999	6300.0	1103.6	180	318	553	281	826	713	600	170
MEDIUM	0.999	6300.0	839.0	172	302	522	244	615	502	396	118
MEDIUM	0.999	6300.0	604.8	166	288	494	211	429	316	216	73

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 0.75)

C 4 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1422.2	1	1	1	1	68	26	20	1
LARGE	0.999	32000.0	1497.7	1	1	1	1	76	30	22	1
MEDIUM	0.995	6300.0	451.1	1	1	1	1	163	85	48	29
MEDIUM	0.999	6300.0	239.3	1	1	1	1	48	21	17	1
MEDIUM	0.995	6300.0	793.5	1	1	1	1	456	334	227	101
MEDIUM	0.999	6300.0	837.1	1	1	1	1	493	371	263	110
SMALL	0.995	1544.0	249.5	1	1	1	1	648	526	413	148
SMALL	0.999	1544.0	323.1	1	1	1	1	904	782	661	211
SMALL	0.995	1544.0	280.9	1	1	1	1	757	635	519	175
SMALL	0.999	1544.0	340.7	1	1	1	1	965	844	721	226
SMALL	0.995	1544.0	525.8	1	1	1	1	1693	1472	1244	380
SMALL	0.999	1544.0	570.5	1	1	1	1	1955	1724	1492	429
MINI	0.995	64.0	77.0	1	1	67	574	9485	8995	8640	
MINI	0.999	64.0	136.8	44	215	769	1416	17926	17145	16651	
MINI	0.995	64.0	48.3	1	1	1	152	5434	5084	4795	
MINI	0.999	64.0	77.7	1	1	72	584	9584	9091	8733	

TABLE 2.30

TABLE 2.31

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 0.75)

C 4 CPS2
UTIL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	154
LARGE	0.995	32000.0	1422.2	88	136	278	113	158	83	47	2[illegible]
LARGE	0.999	32000.0	1497.7	88	137	280	115	171	89	51	2[illegible]
MEDIUM	0.995	6300.0	451.1	91	147	300	120	305	183	95	5[illegible]
MEDIUM	0.999	6300.0	239.3	87	134	272	110	124	66	40	1[illegible]
MEDIUM	0.995	6300.0	793.5	97	169	343	172	597	475	364	13[illegible]
MEDIUM	0.999	6300.0	837.1	98	172	349	178	634	512	400	139

TABLE 2.32

2000 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 0.75)

KU 3 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	1	1	1	1	26	15	11	[illegible]
LARGE	0.999	32000.0	1067.0	1	1	1	1	34	15	14	[illegible]
LARGE	0.999	32000.0	1106.1	1	1	1	1	38	17	15	[illegible]
MEDIUM	0.995	6300.0	310.6	1	1	1	1	84	35	25	[illegible]
MEDIUM	0.999	6300.0	419.2	1	1	1	1	136	72	40	22
MEDIUM	0.999	6300.0	458.3	1	1	1	1	169	88	50	30
MEDIUM	0.995	6300.0	611.1	1	1	1	1	300	178	92	62
MEDIUM	0.999	6300.0	712.7	1	1	1	1	387	265	160	84
MEDIUM	0.999	6300.0	759.4	1	1	1	1	427	305	198	94
SMALL	0.995	1544.0	253.8	1	1	1	1	663	541	427	152
SMALL	0.999	1544.0	355.4	1	1	1	1	1017	895	770	239
SMALL	0.999	1544.0	402.1	1	1	1	1	1179	1058	928	245
SMALL	0.995	1544.0	291.1	1	1	1	1	793	671	553	184
SMALL	0.999	1544.0	341.2	1	1	1	1	967	845	722	226
SMALL	0.999	1544.0	375.3	1	1	1	1	1086	964	837	215
SMALL	0.995	1544.0	314.4	1	1	1	1	874	752	632	203
SMALL	0.999	1544.0	384.1	1	1	1	1	1117	995	867	225
SMALL	0.999	1544.0	396.6	1	1	1	1	1160	1038	909	239
MINI	0.995	64.0	168.8	102	417	1172	2179	22443	21506	20938	
MINI	0.999	64.0	218.9	233	732	1983	3374	29514	28333	27650	
MINI	0.999	64.0	253.0	341	948	2680	4187	34327	32981	32218	
MINI	0.995	64.0	88.6	1	17	161	745	11125	10576	10194	
MINI	0.999	64.0	176.3	116	464	1112	2358	23501	22528	21943	
MINI	0.999	64.0	108.7	138	542	1366	2653	25252	24218	23604	

TABLE 2.33

2000 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 0.75)

KU 3 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	86	130	266	105	105	45	30	3
LARGE	0.999	32000.0	1067.0	87	132	269	107	116	54	35	7
LARGE	0.999	32000.0	1106.1	87	132	270	108	105	57	36	9
MEDIUM	0.995	6300.0	310.6	88	138	282	116	185	95	55	28
MEDIUM	0.999	6300.0	419.2	90	145	295	116	277	156	81	51
MEDIUM	0.999	6300.0	458.3	91	148	300	122	311	189	97	59
MEDIUM	0.995	6300.0	611.1	94	157	320	144	441	319	213	91
MEDIUM	0.999	6300.0	712.7	96	164	333	160	528	406	297	113
MEDIUM	0.999	6300.0	759.4	97	167	339	167	568	446	335	122

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TABLE 2.34

2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 0.75)

KA 14 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.63 0.84

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	1	1	1	1	149	78	44	12
MEDIUM	0.999	6300.0	541.8	1	1	1	1	241	119	71	35
SMALL	0.999	1544.0	229.5	1	1	1	1	578	456	345	118
MINI	0.999	64.0	77.0	1	1	1	416	9485	8995	8640	

TABLE 2.35

2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 0.75)

KA 14 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.06 0.66 0.84

	AVAIL	CHPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	104	230	440	181	290	168	88	41
MEDIUM	0.999	6300.0	541.8	107	237	453	197	382	260	155	64

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TABLE 2.36

ORIGINAL PAGE IS
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OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	3.4	50.6	193.7
MTS (BUSINESS)	8.8	161.5	654.2
PRIVATE LINE	170.8	384.8	957.8
MOBILE	0.4	5.6	15.9
PUBLIC RADIO	0.1	0.4	0.5
COMMERCIAL AND RELIGIOUS	0.2	0.4	0.6
OCCASIONAL	0.3	0.4	0.6
CATV MUSIC	0.0	0.1	0.2
RECORDING	0.0	0.0	0.1
	184.1	603.6	1823.7
DATA			
DATA TRANSFER	0.0	0.5	3.0
BATCH PROCESSING	0.1	1.1	3.1
DATA ENTRY	9.1	102.2	219.9
REMOTE JOB ENTRY	0.2	11.6	31.0
INQUIRY/RESPONSE	0.2	5.3	19.6
TIMESHARING	0.1	1.4	3.7
USPS/EMSS	0.0	0.6	2.2
MAILBOX	0.0	0.8	2.2
ADMINISTRATIVE MESSAGES	2.4	65.6	221.5
FACSIMILE	0.5	5.7	8.6
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.1
TWX/TELEX	0.0	0.2	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	6.7	13.2
VIDEOTEXT/TELETEXT	0.0	1.8	8.1
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.3
	12.8	204.4	541.6
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.1	160.8	255.4
	61.3	327.7	402.8

TABLE 2.37

TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=15)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	3.4	50.6	193.7
MTS (BUSINESS)	8.8	160.3	647.7
PRIVATE LINE	170.8	382.9	946.0
MOBILE	0.4	5.6	15.8
PUBLIC RADIO	0.1	0.4	0.5
COMMERCIAL AND RELIGIOUS	0.2	0.4	0.6
OCCASIONAL	0.3	0.4	0.6
CATV MUSIC	0.0	0.1	0.2
RECORDING	0.0	0.0	0.1
	184.1	600.6	1805.3
DATA			
DATA TRANSFER	0.0	0.4	2.7
BATCH PROCESSING	0.1	0.0	0.0
DATA ENTRY	9.1	0.0	0.0
REMOTE JOB ENTRY	0.2	0.0	0.0
INQUIRY/RESPONSE	0.0	0.0	0.0
TIMESHARING	0.0	0.0	0.0
USPS/EMSS	0.0	0.6	1.8
MAILBOX	0.0	0.0	0.0
ADMINISTRATIVE MESSAGES	2.2	0.0	0.0
FACSIMILE	0.5	0.0	0.0
COMMUNICATING WORD PROCESSORS	0.0	0.0	0.0
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	0.0	0.0
VIDEOTEXT/TELETEXT	0.0	1.8	8.1
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.0	0.0
	12.3	2.9	12.8
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.2	322.8	392.7

TABLE 2.38

ORIGINAL PAGE IS
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CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=1S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	1.2	6.5
PRIVATE LINE	0.0	1.8	11.8
MOBILE	0.0	0.0	0.1
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	3.0	18.4
DATA			
DATA TRANSFER	0.0	0.1	0.3
BATCH PROCESSING	0.0	1.1	3.1
DATA ENTRY	0.0	102.2	219.9
REMOTE JOB ENTRY	0.0	11.6	31.0
INQUIRY/RESPONSE	0.2	5.3	19.6
TIMESHARING	0.1	1.4	3.7
USPS/EMSS	0.0	0.1	0.3
MAILBOX	0.0	0.8	2.2
ADMINISTRATIVE MESSAGES	0.1	65.6	221.5
FACSIMILE	0.0	5.7	8.6
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.1
TWX/TELEX	0.0	0.0	0.0
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	6.9	13.2
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.3
	0.5	201.5	528.8
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.1	4.9	10.1
	0.1	4.9	10.1

TABLE 2.39

KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	1.2	6.5
PRIVATE LINE	0.0	1.8	11.8
MOBILE	0.0	0.0	0.1
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	3.0	18.4
DATA			
DATA TRANSFER	0.0	0.1	0.3
BATCH PROCESSING	0.0	1.0	2.9
DATA ENTRY	0.0	102.2	223.0
REMOTE JOB ENTRY	0.0	11.6	31.4
INQUIRY/RESPONSE	0.0	5.3	19.8
TIMESHARING	0.0	1.4	3.8
USPS/EMSS	0.0	0.1	0.3
MAILBOX	0.0	0.7	1.9
ADMINISTRATIVE MESSAGES	0.0	55.0	189.0
FACSIMILE	0.0	5.7	8.2
COMMUNICATING WORD PROCESSORS	0.0	0.4	1.8
TWX/TELEX	0.0	0.0	0.0
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	6.4	12.3
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.3
	0.0	190.1	498.0
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.0	4.1	8.6
	0.0	4.1	8.6

TABLE 2.40

ORIGINAL PAGE IS
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OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	7.7	41.3	51.1
4.8 KBPS	3.2	141.2	106.5
9.6 KBPS	1.7	21.0	356.8
56 KBPS	0.0	0.8	25.7
64 KBPS	183.4	602.4	1821.6
1.544 MBPS	2.2	81.8	131.3
6.3 MBPS	1.5	80.4	127.7
>6.3 MBPS	58.3	166.9	147.4
	258.2	1135.8	2768.1

TABLE 2.41

TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=13)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	7.4	0.6	1.7
4.8 KBPS	3.1	1.1	3.1
9.6 KBPS	1.7	0.7	5.8
56 KBPS	0.0	0.4	0.9
64 KBPS	183.4	599.4	1803.2
1.544 MBPS	2.2	79.3	126.1
6.3 MBPS	1.5	78.0	122.7
46.3 MBPS	58.3	166.9	147.4
	257.7	926.3	2210.9

TABLE 2.42

ORIGINAL PAGE IS
OF POOR QUALITY

CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=13)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.3	40.7	49.4
4.8 KBPS	0.1	140.1	103.4
9.6 KBPS	0.1	20.3	351.0
56 KBPS	0.0	0.4	24.9
64 KBPS	0.0	3.0	18.3
1.544 MBPS	0.0	2.5	5.3
6.3 MBPS	0.0	2.4	5.1
>6.3 MBPS	0.0	0.0	0.0
	0.5	209.4	557.3

TABLE 2.43

KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.0	38.4	46.3
4.8 KBPS	0.0	132.1	97.1
9.6 KBPS	0.0	19.2	329.3
56 KBPS	0.0	0.4	25.1
64 KBPS	0.0	3.0	18.3
1.544 MBPS	0.0	2.1	4.5
6.3 MBPS	0.0	2.1	4.3
>6.3 MBPS	0.0	0.0	0.0
	0.0	197.3	524.9

TABLE 2.44

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=1S

ORIGINAL PAGE IS
OF POOR QUALITY

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	3.4	77.2	282.9
MTS (BUSINESS)	8.8	244.6	946.1
PRIVATE LINE	170.8	451.6	1031.2
MOBILE	0.4	6.6	17.3
PUBLIC RADIO	0.1	0.4	0.6
COMMERCIAL AND RELIGIOUS	0.2	0.5	0.7
OCCASIONAL	0.3	0.4	0.6
CATV MUSIC	0.0	0.1	0.3
RECORDING		0.0	0.1
	184.1	781.4	2279.6
DATA			
DATA TRANSFER	0.0	0.4	2.9
BATCH PROCESSING	0.1	0.7	1.7
DATA ENTRY	9.1	68.6	121.5
REMOTE JOB ENTRY	0.2	7.8	18.0
INQUIRY/RESPONSE	0.1	3.4	8.7
TIMESHARING	0.1	0.9	2.0
USPS/EMSS		0.6	2.0
MAILBOX	0.0	0.5	1.0
ADMINISTRATIVE MESSAGES	2.2	38.0	105.7
FACSIMILE	0.5	4.3	5.6
COMMUNICATING WORD PROCESSORS	0.0	0.3	1.0
TWX/TELEX	0.0	0.2	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	4.4	6.7
VIDEOTEXT/TELETEXT	0.0	1.9	8.6
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.2	1.9
	12.5	132.2	287.7
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.45

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=1S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	3.4	50.6	193.7
MTS (BUSINESS)	8.8	160.3	647.7
PRIVATE LINE	170.8	382.9	946.0
MOBILE	0.4	5.6	15.8
PUBLIC RADIO	0.1	0.4	0.5
COMMERCIAL AND RELIGIOUS	0.2	0.4	0.6
OCCASIONAL	0.3	0.4	0.6
CATV MUSIC	0.0	0.1	0.2
RECORDING		0.0	0.1
	184.1	600.6	1805.3
DATA			
DATA TRANSFER	0.0	0.4	2.7
BATCH PROCESSING	0.1	0.7	1.6
DATA ENTRY	9.1	63.0	114.0
REMOTE JOB ENTRY	0.2	7.1	16.9
INQUIRY/RESPONSE	0.1	3.2	8.2
TIMESHARING	0.1	0.8	1.9
USPS/EMSS		0.6	1.8
MAILBOX	0.0	0.4	1.0
ADMINISTRATIVE MESSAGES	2.2	34.9	99.2
FACSIMILE	0.5	4.0	5.3
COMMUNICATING WORD PROCESSORS	0.0	0.3	0.9
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	4.0	6.5
VIDEOTEXT/TELETEXT	0.0	1.8	8.1
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.2	1.8
	12.5	121.4	269.9
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.46

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=13)

ORIGINAL PAGE IS
OF POOR QUALITY

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	3.4	34.9	120.1
MTS (BUSINESS)	8.8	110.7	401.8
PRIVATE LINE	170.8	337.2	889.3
MOBILE	0.4	4.9	14.9
PUBLIC RADIO	0.1	0.3	0.5
COMMERCIAL AND RELIGIOUS	0.2	0.4	0.6
OCCASIONAL	0.3	0.3	0.5
CATV MUSIC	0.0	0.1	0.2
RECORDING		0.0	0.1
	184.1	488.8	1428.1
DATA			
DATA TRANSFER	0.0	0.4	2.6
BATCH PROCESSING	0.1	0.6	1.5
DATA ENTRY	9.1	57.4	106.5
REMOTE JOB ENTRY	0.2	6.5	15.8
INQUIRY/RESPONSE	0.1	2.9	7.6
TIMESHARING	0.1	0.7	1.8
USPS/EMSS		0.5	1.7
MAILBOX	0.0	0.4	0.9
ADMINISTRATIVE MESSAGES	2.2	31.8	92.6
FACSIMILE	0.5	3.6	4.9
COMMUNICATING WORD PROCESSORS	0.0	0.2	0.9
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	3.6	6.0
VIDEOTEXT/TELETEXT	0.0	1.6	7.6
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.2	1.6
	12.5	110.6	252.1
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.47

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=1S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	7.5	39.3	44.5
4.8 KBPS	3.2	39.4	84.4
9.6 KBPS	1.7	22.7	145.5
56 KBPS	0.0	0.7	11.9
64 KBPS	183.4	779.9	2277.4
1.544 MBPS	2.2	79.6	126.3
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	257.9	1236.4	2960.0

TABLE 2.48

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=15)

ORIGINAL PAGE IS
OF POOR QUALITY

OPERATING SPEED	1980	1990	2000
2.4 KBPS	7.5	36.1	41.7
4.8 KBPS	3.2	63.7	79.2
9.6 KBPS	1.7	20.8	136.5
56 KBPS	0.0	0.6	11.1
64 KBPS	183.4	599.4	1803.2
1.544 MBPS	2.2	79.3	126.1
6.3 MBPS	1.5	78.0	122.7
46.3 MBPS	58.3	166.9	147.4
	257.9	1044.8	2468.0

TABLE 2.49

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=13)

OPERATING SPEED	1992	1990	2000
2.4 KBPS	7.5	32.9	39.0
4.8 KBPS	3.2	58.0	74.0
9.6 KBPS	1.7	19.0	127.5
56 KBPS	0.0	0.6	10.4
64 KBPS	183.4	487.7	1426.1
1.544 MBPS	2.2	79.2	125.9
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	257.9	922.2	2073.0

TABLE 2.50

ORIGINAL PAGE IS
OF POOR QUALITY

BREAKEVEN DISTANCE IN MILES FOR TRUNKING NETWORKS
(T=1S)

	OPERATING SPEEDS							
YR/BAND	2.4	4.8	9.6	56	T1	V1	V2	V3
1982								
C	95	161	311	116	93	587	487	393
KU	384	415	476	213	163	888	788	685
1990								
C	97	142	291	98	62	449	335	235
KU	117	134	170	104	74	485	371	270
KA	102	120	155	102	75	480	366	265
KA	100	116	149	98	64	436	322	222
2000								
C	95	131	277	90	61	489	367	259
KU	71	76	87	74	21	239	117	70
KA	72	83	104	96	76	462	340	233
KA	72	81	100	91	65	417	295	189

TABLE 2.51

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
UNSHARED EARTH STATIONS .995 AVAILABILITY
(T=15)

YR/BAND		OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	.32	48	115	163	284	2724	2535	2374
	KU	98	195	419	525	376	5274	4977	4764
1990									
	C	7	19	45	93	237	2096	1919	1779
	KU	41	103	266	359	245	3731	3488	3298
	KA	5	15	42	92	205	2006	1824	1659
2000									
	C	1	4	17	47	222	1703	1536	1389
	KU	20	50	146	222	140	2405	2237	2142
	KA	1	1	6	46	118	1283	1134	1007

TABLE 2.52

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CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .995 AVAILABILITY
(T=1S)

YR/BAND	OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980								
C	688	946	1603	601	154	800	689	587
KU	697	965	1667	647	227	1143	1004	862
1990								
C	402	634	1018	481	123	619	505	400
KU	404	639	1028	493	139	684	571	463
KA	481	776	1228	618	173	875	750	652
2000								
C	289	503	856	421	121	575	453	344
KU	283	490	832	393	82	415	303	224
KA	410	713	1023	581	109	579	457	346

TABLE 2.53

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CPS COMPOSITE CROSSOVER DISTANCE IN MILES
UNSHAPED EARTH STATIONS .999 AVAILABILITY
(T=18)

YR/BAND	OPERATING SPEEDS							
	2.4	4.8	9.6	56	T1	V1	V2	V3
1980								
C	.62	114	252	332	367	4066	3825	3640
KU	123	231	491	631	525	6461	6116	5856
1990								
C	19	41	127	194	292	2938	2738	2565
KU	51	137	334	440	316	4607	4338	4129
KA	5	15	42	92	205	2006	1824	1659
2000								
C	7	23	61	121	248	2318	2125	1978
KU	28	68	198	283	204	3069	2842	2661
KA	1	1	6	46	118	1283	1134	1007

TABLE 2.54

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .999 AVAILABILITY
(T=1S)

YR/BAND		OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	692	953	1628	619	185	956	820	688
	KU	705	982	1715	682	287	1454	1305	1156
1990									
	C	411	653	1056	525	177	872	759	645
	KU	409	649	1048	516	167	805	683	595
	KA	481	776	1228	618	173	875	750	652
2000									
	C	288	502	854	419	119	564	442	336
	KU	287	498	846	410	106	512	390	307
	KA	410	713	1023	581	109	579	457	346

TABLE 2.55

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = S)

C L CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2388.0	1	1	1	1	369	270	182	57
LARGE	0.999	32000.0	2622.0	1	1	1	1	416	316	227	68
MEDIUM	0.995	6300.0	1046.5	4	1	1	1	946	846	741	199
MEDIUM	0.995	6300.0	1159.0	5	1	1	1	1099	959	850	234
MEDIUM	0.995	6300.0	938.0	2	1	1	1	836	730	636	172
MEDIUM	0.999	6300.0	1116.0	5	1	1	1	1026	916	809	220
SMALL	0.995	1544.0	394.0	11	1	1	1	1852	1661	1469	375
SMALL	0.999	1544.0	571.2	23	1	1	1	3067	2834	2622	628
SMALL	0.995	1544.0	404.7	12	1	1	1	1926	1732	1539	539
SMALL	0.999	1544.0	546.8	21	1	1	1	2899	2672	2463	589
SMALL	0.995	1544.0	592.0	24	1	1	5	3209	2971	2757	661
SMALL	0.999	1544.0	675.0	31	1	1	30	3778	3520	3297	795
MINI	0.995	64.0	201.0	620	1214	3017	4178	32396	31142	30450	
MINI	0.999	64.0	343.4	1237	2919	6427	8157	55931	53875	52798	
MINI	0.995	64.0	86.2	196	284	549	982	13405	12815	12434	
MINI	0.999	64.0	146.4	419	729	1710	2653	23358	22425	21882	

TABLE 2.56

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 5)

C 1 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	*CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2388.0	678	927	1542	557	537	437	345	91
LARGE	0.999	32000.0	2622.0	680	930	1553	565	583	483	389	102
MEDIUM	0.995	6300.0	1046.5	700	970	1682	658	1191	1022	904	241
MEDIUM	0.995	6300.0	1159.0	704	978	1709	678	1380	1205	1021	277
MEDIUM	0.995	6300.0	938.0	696	962	1656	639	1009	905	798	207
MEDIUM	0.999	6300.0	1116.0	703	975	1699	670	1308	1135	971	263

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TABLE 2.57

1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = S)

KU 1 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3870.0	1	1	1	1	663	563	467	129
LARGE	0.999	32000.0	4174.0	1	1	1	1	721	621	523	143
LARGE	0.999	32000.0	4246.0	1	1	1	1	736	636	537	147
MEDIUM	0.995	6300.0	1128.0	5	1	1	1	1047	928	820	224
MEDIUM	0.999	6300.0	1424.0	9	1	1	1	1544	1363	1176	317
MEDIUM	0.999	6300.0	1496.0	10	1	1	1	1665	1480	1291	340
MEDIUM	0.995	6300.0	1236.0	6	1	1	1	1228	1058	.925	258
MEDIUM	0.999	6300.0	1505.0	10	1	1	1	1680	1494	1306	343
MEDIUM	0.999	6300.0	1592.0	11	1	1	1	1826	1636	1444	370
SMALL	0.995	1544.0	551.0	21	1	1	1	2928	2700	2490	596
SMALL	0.999	1544.0	820.5	44	1	1	90	4775	4483	4244	1028
SMALL	0.999	1544.0	907.5	52	7	1	145	5372	5059	4810	1168
SMALL	0.995	1544.0	621.0	26	1	1	12	3408	3163	2946	708
SMALL	0.999	1544.0	733.0	36	1	1	54	4176	3904	3674	888
SMALL	0.999	1544.0	797.0	42	1	1	80	4614	4328	4091	990
SMALL	0.995	1544.0	611.0	25	1	1	10	3339	3097	2881	692
SMALL	0.999	1544.0	737.6	37	1	1	55	4207	3935	3704	895
SMALL	0.999	1544.0	760.2	39	1	1	65	4362	4084	3851	931
MINI	0.995	64.0	391.0	1522	3489	7567	9487	63801	61474	60268	
MINI	0.999	64.0	502.5	2189	4824	10237	12602	82237	79274	77767	
MINI	0.999	64.0	566.5	2573	5590	11770	14390	92819	89491	87811	
MINI	0.995	64.0	179.0	539	970	2491	3564	28748	27630	26998	
MINI	0.999	64.0	355.0	1306	3058	6705	8481	57849	55727	54619	
MINI	0.999	64.0	378.0	1444	3333	7256	9123	61652	59399	58228	

TABLE 2.58

1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 5)

NO. 1 CPS2
FILL FAC = 0.9 , TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3878.0	689	949	1613	609	831	731	629	163
LARGE	0.999	32000.0	4174.0	692	953	1627	619	889	789	686	177
LARGE	0.999	32000.0	4246.0	692	954	1631	621	903	803	699	181
MEDIUM	0.995	6300.0	1128.0	703	976	1702	672	1328	1155	983	267
MEDIUM	0.999	6300.0	1424.0	714	998	1774	724	1825	1635	1443	360
MEDIUM	0.999	6300.0	1496.0	717	1006	1791	737	1946	1751	1558	383
MEDIUM	0.995	6300.0	1236.0	707	984	1728	691	1509	1330	1144	301
MEDIUM	0.999	6300.0	1505.0	717	1007	1794	738	1961	1766	1572	386
MEDIUM	0.999	6300.0	1592.0	721	1018	1815	754	2107	1907	1711	413

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TABLE 2.29

1990 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = S)

C S CPS
FILL FAC = 0.9 . TARIFF FACTORS 0.8 0.80
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1544.4	1	1	1	1	170	87	51	21
LARGE	0.999	32000.0	3213.4	1	1	1	1	544	430	327	112
MEDIUM	0.995	6300.0	573.5	1	1	1	1	477	363	262	96
MEDIUM	0.999	6300.0	698.2	1	1	1	1	618	505	399	131
MEDIUM	0.995	6300.0	841.2	1	1	1	1	781	667	557	171
MEDIUM	0.999	6300.0	954.2	1	1	1	1	910	796	681	202
SMALL	0.995	1544.0	297.1	1	1	1	1	1135	1090	966	261
SMALL	0.999	1544.0	410.2	1	1	1	1	2016	1796	1578	426
SMALL	0.995	1544.0	321.8	1	1	1	1	1327	1132	1077	297
SMALL	0.999	1544.0	302.5	1	1	1	1	1177	1114	990	268
SMALL	0.995	1544.0	546.0	1	1	1	4	3073	2818	2582	603
SMALL	0.999	1544.0	613.2	1	1	1	24	3597	3323	3078	726
MINI	0.995	64.0	130.3	177	515	1239	2424	23303	22350	21703	
MINI	0.999	64.0	209.4	509	1091	3391	4935	38165	36700	35889	
MINI	0.995	64.0	51.8	1	1	26	463	8554	8109	7703	
MINI	0.999	64.0	82.4	38	112	466	1063	14303	13660	13240	

TABLE 2.60

1990 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = S)

[illegible] CPS2
[illegible] = 0.9 , TARIFF FACTORS 0.8 0.08
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1544.4	392	614	979	435	359	246	148	59
LARGE	0.999	32000.0	3213.4	406	642	1035	501	733	619	510	151
MEDIUM	0.995	6300.0	573.5	403	637	1025	489	665	552	445	134
MEDIUM	0.999	6300.0	698.2	409	648	1046	514	807	694	582	169
MEDIUM	0.995	6300.0	841.2	415	660	1070	542	970	856	740	209
MEDIUM	0.999	6300.0	954.2	419	670	1090	565	1098	985	864	217

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TABLE 2.61

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = S)

KU A CPS
FILL FAC = 0.9 , TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1960.0	1	1	1	1	263	150	80	44
LARGE	0.999	32000.0	2132.3	1	1	1	1	302	188	99	53
LARGE	0.999	32000.0	2188.7	1	1	1	1	314	201	105	56
MEDIUM	0.995	6300.0	585.1	1	1	1	1	490	376	275	99
MEDIUM	0.999	6300.0	757.4	1	1	1	1	686	572	464	147
MEDIUM	0.999	6300.0	813.8	1	1	1	1	750	636	527	163
MEDIUM	0.995	6300.0	883.8	1	1	1	1	829	716	604	183
MEDIUM	0.999	6300.0	1034.4	1	1	1	1	1001	887	770	225
MEDIUM	0.999	6300.0	1101.8	1	1	1	1	1077	964	844	221
SMALL	0.995	1544.0	374.9	1	1	1	1	1741	1531	1317	374
SMALL	0.999	1544.0	525.5	1	1	1	1	2913	2664	2430	566
SMALL	0.999	1544.0	592.9	1	1	1	16	3438	3170	2928	689
SMALL	0.995	1544.0	435.1	1	1	1	1	2209	1984	1762	462
SMALL	0.999	1544.0	510.0	1	1	1	1	2793	2547	2316	538
SMALL	0.999	1544.0	559.2	1	1	1	8	3176	2917	2679	628
SMALL	0.995	1544.0	451.3	1	1	1	1	2336	2106	1882	486
SMALL	0.999	1544.0	553.8	1	1	1	7	3134	2876	2639	618
SMALL	0.999	1544.0	517.1	1	1	1	1	2848	2600	2368	551
MINI	0.995	64.0	257.2	710	1741	4692	6452	47146	45371	44414	
MINI	0.999	64.0	332.1	1024	2760	6730	8830	61219	58959	57771	
MINI	0.999	64.0	381.3	1175	3430	8069	10392	70464	67884	66545	
MINI	0.995	64.0	130.2	177	514	1236	2420	23284	22332	21765	
MINI	0.999	64.0	257.9	713	1751	4711	6475	47278	45498	44539	
MINI	0.999	64.0	275.8	768	1994	5198	7043	50641	48745	47731	

TABLE 2.62

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = S)

KU 2 CPS2
FILL FAC = 0.7 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1960.0	395	621	993	452	452	339	238	82
LARGE	0.999	32000.0	2132.3	397	624	998	458	491	377	275	91
LARGE	0.999	32000.0	2188.7	397	625	1000	461	503	390	288	94
MEDIUM	0.995	6300.0	585.1	404	638	1027	491	679	565	458	138
MEDIUM	0.999	6300.0	757.4	411	653	1056	526	875	761	647	186
MEDIUM	0.999	6300.0	813.8	413	658	1066	537	939	825	710	201
MEDIUM	0.995	6300.0	883.8	416	664	1078	551	1018	905	787	221
MEDIUM	0.999	6300.0	1034.4	423	677	1103	581	1112	1076	953	246
MEDIUM	0.999	6300.0	1101.8	426	682	1115	594	1241	1049	1027	270

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TABLE 2.63

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = S)

NO. 13 CPS
FILL FAC = 0.9 , TARIFF FACTORS 1 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4824.0	1	1	1	1	904	791	676	193
LARGE	0.999	32000.0	3480.0	1	1	1	1	604	490	385	119
LARGE	0.999	32000.0	2290.0	1	1	1	1	337	224	127	54
MEDIUM	0.999	6300.0	1103.6	1	1	1	1	1079	966	846	212
MEDIUM	0.999	6300.0	839.0	1	1	1	1	779	665	554	162
MEDIUM	0.999	6300.0	604.8	1	1	1	1	512	399	296	97
SMALL	0.999	1544.0	409.7	1	1	1	1	2012	1793	1574	415
SMALL	0.999	1544.0	344.9	1	1	1	1	1507	1305	1095	320
SMALL	0.999	1544.0	287.5	1	1	1	1	1060	1045	922	237
MINI	0.999	64.0	118.5	86	293	845	1900	21086	20209	19678	
MINI	0.999	64.0	115.8	79	271	820	1814	20579	19719	19197	
MINI	0.999	64.0	113.4	73	250	779	1738	20128	19284	18769	

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = S)

[illegible] CPS2
[illegible] = 0.9 TARIFF FACTORS 1 0.80
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4824.0	489	792	1280	656	1093	980	859	206
LARGE	0.999	32000.0	3480.0	478	769	1207	603	792	679	568	158
LARGE	0.999	32000.0	2290.0	468	749	1143	557	526	412	310	92
MEDIUM	0.999	6300.0	1103.6	496	805	1323	687	1244	1052	1029	261
MEDIUM	0.999	6300.0	839.0	484	782	1250	634	967	854	737	201
MEDIUM	0.999	6300.0	604.8	474	762	1185	587	701	508	479	135

TABLE 2.64

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TABLE 2.65

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CFS SERVICES (UNSHARED EARTH STATIONS)

(T = 6)

C 4 CFS
FILL FAC = 0.9 , TARIFF FACTORS 0.68 0.02
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1422.2	1	1	1	2	122	65	40	10
LARGE	0.999	32000.0	1497.7	1	1	1	1	140	74	41	23
MEDIUM	0.995	6300.0	451.1	1	1	1	1	331	209	106	70
MEDIUM	0.999	6300.0	239.3	1	1	1	1	101	41	29	6
MEDIUM	0.995	6300.0	793.5	1	1	1	1	749	627	511	172
MEDIUM	0.999	6300.0	837.1	1	1	1	1	802	680	562	185
SMALL	0.995	1544.0	249.5	1	1	1	1	1023	901	776	240
SMALL	0.999	1544.0	323.1	1	1	1	1	1322	1113	1131	310
SMALL	0.995	1544.0	280.9	1	1	1	1	1179	1057	928	244
SMALL	0.999	1544.0	340.7	1	1	1	1	1469	1255	1031	338
SMALL	0.995	1544.0	525.8	1	1	1	13	3016	2749	2499	577
SMALL	0.999	1544.0	570.5	1	1	1	26	3390	3110	2854	665
MINI	0.995	64.0	77.0	13	92	442	1062	14140	13497	13065	
MINI	0.999	64.0	136.8	171	596	1522	2817	26206	25139	24510	
MINI	0.995	64.0	48.3	1	1	20	459	8361	7909	7572	
MINI	0.999	64.0	77.7	15	95	455	1077	14289	13633	13199	

TABLE 2.66

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 5)

C-4 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1422.2	280	484	819	377	324	202	104	60
LARGE	0.999	32000.0	1497.7	280	485	821	381	342	220	117	64
MEDIUM	0.995	6300.0	451.1	287	499	849	414	533	411	301	111
MEDIUM	0.999	6300.0	239.3	278	480	811	369	274	153	84	47
MEDIUM	0.995	6300.0	793.5	303	531	912	487	951	829	706	213
MEDIUM	0.999	6300.0	837.1	305	535	920	496	1004	882	758	227

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TABLE 2.67

2000 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = S)

KU 3 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	1	1	1	1	65	27	19	1
LARGE	0.999	32000.0	1067.0	1	1	1	1	80	33	24	1
LARGE	0.999	32000.0	1106.1	1	1	1	1	85	36	25	1
MEDIUM	0.995	6300.0	310.6	1	1	1	1	160	83	47	28
MEDIUM	0.999	6300.0	419.2	1	1	1	1	292	170	89	60
MEDIUM	0.999	6300.0	458.3	1	1	1	1	340	218	114	72
MEDIUM	0.995	6300.0	611.1	1	1	1	1	526	404	295	118
MEDIUM	0.999	6300.0	712.7	1	1	1	1	650	528	415	148
MEDIUM	0.999	6300.0	759.4	1	1	1	1	707	585	470	162
SMALL	0.995	1544.0	253.8	1	1	1	1	1044	922	797	202
SMALL	0.999	1544.0	355.4	1	1	1	1	1592	1374	1147	361
SMALL	0.999	1544.0	402.1	1	1	1	1	1982	1751	1518	434
SMALL	0.995	1544.0	291.1	1	1	1	1	1054	1108	977	260
SMALL	0.999	1544.0	341.2	1	1	1	1	1473	1259	1035	338
SMALL	0.999	1544.0	375.3	1	1	1	1	1758	1535	1305	392
SMALL	0.995	1544.0	314.4	1	1	1	1	1249	1043	1089	296
SMALL	0.999	1544.0	384.1	1	1	1	1	1832	1606	1375	406
SMALL	0.999	1544.0	396.6	1	1	1	1	1936	1706	1474	425
MINI	0.995	64.0	168.8	315	884	2456	3908	32658	31369	30634	
MINI	0.999	64.0	218.9	541	1224	3919	5615	42760	41123	40222	
MINI	0.999	64.0	253.0	694	1721	4915	6776	49636	47761	46749	
MINI	0.995	64.0	88.6	32	162	651	1175	16487	15755	15285	
MINI	0.999	64.0	176.3	349	952	2675	4163	34170	32829	32069	
MINI	0.999	64.0	188.7	405	1063	3037	4586	36671	35243	34443	

TABLE 2.68

2600 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(1 = S)

NO 3 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	275	475	801	358	213	109	64	32
LARGE	0.999	32000.0	1067.0	276	477	805	362	239	117	70	39
LARGE	0.999	32000.0	1106.1	277	478	807	364	248	126	74	41
MEDIUM	0.995	6300.0	310.6	281	486	824	384	361	240	135	69
MEDIUM	0.999	6300.0	419.2	286	496	843	407	494	372	264	101
MEDIUM	0.999	6300.0	458.3	288	500	851	415	542	420	310	113
MEDIUM	0.995	6300.0	611.1	295	514	879	448	728	606	491	159
MEDIUM	0.999	6300.0	712.7	299	523	897	470	852	730	611	189
MEDIUM	0.999	6300.0	759.4	302	527	906	480	909	787	666	203

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TABLE 2.69

2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = S)

KA (1) CPS
FILL FAC = 0.9 TARIFF FACTORS 1 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0.84

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	1	1	1	1	311	109	97	52
MEDIUM	0.999	6300.0	541.8	1	1	1	1	442	320	213	84
SMALL	0.999	1544.0	329.5	1	1	1	1	923	801	680	202
MINI	0.999	64.0	77.0	1	1	109	904	14148	13497	13065	

TABLE 2.70

2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = S)

KA [illegible] [illegible]
[illegible] [illegible] TARIFF FACTORS = 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0.84

	AVAIL.	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	407	708	1007	569	513	391	282	93
MEDIUM	0.999	6300.0	541.8	412	710	1030	592	644	522	409	125

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TABLE 2.71

OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.15S)

ORIGINAL PAGE IS
OF POOR QUALITY

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	2.9	43.9	176.1
MTS (BUSINESS)	7.3	140.7	593.6
PRIVATE LINE	143.1	335.2	868.2
MOBILE	0.3	4.9	14.4
PUBLIC RADIO	0.1	0.3	0.5
COMMERCIAL AND RELIGIOUS	0.2	0.4	0.6
OCCASIONAL	0.3	0.3	0.5
CATV MUSIC	0.0	0.1	0.2
RECORDING	0.0	0.0	0.1
	154.2	525.8	1654.2
DATA			
DATA TRANSFER	0.0	0.4	2.9
BATCH PROCESSING	0.1	1.0	3.1
DATA ENTRY	7.8	101.4	218.6
REMOTE JOB ENTRY	0.2	11.5	30.4
INQUIRY/RESPONSE	0.2	5.3	19.4
TIMESHARING	0.1	1.1	3.7
USPS/EMSS	0.0	0.5	2.5
MAILBOX	0.0	0.8	2.2
ADMINISTRATIVE MESSAGES	2.1	64.9	219.4
FACSIMILE	0.4	5.4	8.3
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.0
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	6.8	13.0
VIDEOTEXT/TELETEXT	0.0	1.5	6.9
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.2
	11.0	201.4	535.9
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.1	157.7	255.4
	61.3	324.6	402.8

TABLE 2.72

ORIGINAL PAGE IS
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TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.15S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	2.9	43.9	176.1
MTS (BUSINESS)	7.3	139.8	588.1
PRIVATE LINE	143.1	333.8	858.3
MOBILE	0.3	4.9	14.4
PUBLIC RADIO	0.1	0.3	0.5
COMMERCIAL AND RELIGIOUS	0.2	0.4	0.6
OCCASIONAL	0.3	0.3	0.5
CATV MUSIC	0.0	0.1	0.2
RECORDING	0.0	0.0	0.1
	154.2	523.5	1638.9
DATA			
DATA TRANSFER	0.0	0.4	2.6
BATCH PROCESSING	0.1	0.0	0.0
DATA ENTRY	7.8	0.0	0.0
REMOTE JOB ENTRY	0.2	0.0	0.0
INQUIRY/RESPONSE	0.0	0.0	0.0
TIMESHARING	0.0	0.0	0.0
USPS/EMSS	0.0	0.5	0.0
MAILBOX	0.0	0.0	0.0
ADMINISTRATIVE MESSAGES	1.9	0.0	0.0
FACSIMILE	0.4	0.0	0.0
COMMUNICATING WORD PROCESSORS	0.0	0.0	0.0
TWX/TELEX	0.0	0.1	0.1
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	0.0	0.0
VIDEOTEXT/TELETEXT	0.0	1.5	6.9
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.0	0.0
	10.6	2.4	9.7
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.2	322.8	392.7

TABLE 2.73

CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=1.15S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	0.9	5.4
PRIVATE LINE	0.0	1.4	9.8
MOBILE	0.0	0.0	0.0
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	2.4	15.3
DATA			
DATA TRANSFER	0.0	0.0	0.3
BATCH PROCESSING	0.0	1.0	3.1
DATA ENTRY	0.0	101.4	218.6
REMOTE JOB ENTRY	0.0	11.5	30.4
INQUIRY/RESPONSE	0.2	5.3	19.4
TIMESHARING	0.1	1.1	3.7
USPS/EMSS	0.0	0.1	2.5
MAILBOX	0.0	0.8	2.2
ADMINISTRATIVE MESSAGES	0.1	64.9	219.4
FACSIMILE	0.0	5.4	8.3
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.0
TWX/TELEX	0.0	0.0	0.0
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	6.8	13.0
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.2
	0.4	199.0	526.2
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.1	1.7	10.1
	0.1	1.7	10.1

C-2

TABLE 2.74

KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.15S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	0.9	5.4
PRIVATE LINE	0.0	1.4	9.8
MOBILE	0.0	0.0	0.0
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	2.4	15.3
DATA			
DATA TRANSFER	0.0	0.0	0.3
BATCH PROCESSING	0.0	0.9	2.8
DATA ENTRY	0.0	101.4	218.6
REMOTE JOB ENTRY	0.0	11.5	30.4
INQUIRY/RESPONSE	0.0	5.3	19.4
TIMESHARING	0.0	1.1	3.7
USPS/EMSS	0.0	0.1	2.5
MAILBOX	0.0	0.7	1.8
ADMINISTRATIVE MESSAGES	0.0	54.6	185.3
FACSIMILE	0.0	5.0	7.7
COMMUNICATING WORD PROCESSORS	0.0	0.4	1.7
TWX/TELEX	0.0	0.0	0.0
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	6.2	11.9
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.2
	0.0	187.5	489.6
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.0	1.5	8.6
	0.0	1.5	8.6

TABLE 2.75

OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.15S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	6.9	40.9	50.5
4.8 KBPS	2.7	139.3	105.5
9.6 KBPS	1.4	20.4	353.2
56 KBPS	0.0	0.6	25.1
64 KBPS	153.7	524.8	1652.3
1.544 MBPS	2.1	80.0	131.2
6.3 MBPS	1.5	78.8	127.7
16.3 MBPS	58.3	166.9	147.4
	226.5	1051.8	2592.9

TABLE 2.76

TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.15S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	6.6	0.4	1.0
4.8 KBPS	2.6	1.0	1.9
9.6 KBPS	1.4	0.6	4.5
56 KBPS	0.0	0.3	0.8
64 KBPS	153.7	522.4	1637.0
1.544 MBPS	2.1	79.2	125.9
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	226.1	848.7	2041.3

TABLE 2.77

CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=1.15S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.3	40.5	47.5
4.8 KBPS	0.1	138.3	103.6
9.6 KBPS	0.1	19.8	348.7
56 KBPS	0.0	0.3	24.3
64 KBPS	0.0	2.4	15.3
1.544 MBPS	0.0	0.9	5.3
6.3 MBPS	0.0	0.9	5.1
>6.3 MBPS	0.0	0.0	0.0
	0.5	203.1	551.6

TABLE 2.78

KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.15S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.0	38.2	45.8
4.8 KBPS	0.0	130.3	96.1
9.6 KBPS	0.0	18.7	323.3
56 KBPS	0.0	0.3	24.2
64 KBPS	0.0	2.4	15.3
1.544 MBPS	0.0	0.7	4.5
6.3 MBPS	0.0	0.7	4.3
>6.3 MBPS	0.0	0.0	0.0
	0.0	191.4	513.5

TABLE 2.79

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=1.155)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	2.9	67.0	257.2
MTS (BUSINESS)	7.3	213.3	859.0
PRIVATE LINE	143.1	393.6	935.6
MOBILE	0.3	5.7	15.7
PUBLIC RADIO	0.1	0.4	0.5
COMMERCIAL AND RELIGIOUS	0.2	0.4	0.7
OCCASIONAL	0.3	0.4	0.6
CATV MUSIC	0.0	0.1	0.3
RECORDING		0.0	0.1
	154.2	681.0	2069.6
DATA			
DATA TRANSFER	0.0	0.4	2.8
BATCH PROCESSING	0.1	0.6	1.5
DATA ENTRY	7.8	57.3	103.7
REMOTE JOB ENTRY	0.2	6.5	16.4
INQUIRY/RESPONSE	0.1	2.9	7.0
TIMESHARING	0.1	0.7	1.8
USPS/EMSS		0.5	1.7
MAILBOX	0.0	0.4	0.9
ADMINISTRATIVE MESSAGES	1.9	31.8	90.6
FACSIMILE	0.4	3.6	4.8
COMMUNICATING WORD PROCESSORS	0.0	0.2	0.8
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	3.6	5.9
VIDEOTEXT/TELETEXT	0.0	1.6	7.4
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.2	1.6
	10.7	110.4	247.0
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.80

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=1.153)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	2.9	43.9	176.1
MTS (BUSINESS)	7.3	139.8	588.1
PRIVATE LINE	143.1	333.8	858.3
MOBILE	0.3	4.9	14.4
PUBLIC RADIO	0.1	0.3	0.5
COMMERCIAL AND RELIGIOUS	0.2	0.4	0.6
OCCASIONAL	0.3	0.3	0.5
CATV MUSIC	0.0	0.1	0.2
RECORDING		0.0	0.1
	154.2	523.5	1638.9
DATA			
DATA TRANSFER	0.0	0.4	2.6
BATCH PROCESSING	0.1	0.6	1.4
DATA ENTRY	7.8	52.6	97.3
REMOTE JOB ENTRY	0.2	6.0	15.4
INQUIRY/RESPONSE	0.1	2.7	6.6
TIMESHARING	0.1	0.7	1.7
USPS/EMSS		0.5	1.6
MAILBOX	0.0	0.4	0.8
ADMINISTRATIVE MESSAGES	1.9	29.2	85.0
FACSIMILE	0.4	3.3	4.5
COMMUNICATING WORD PROCESSORS	0.0	0.2	0.8
TWX/TELEX	0.0	0.1	0.1
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	3.3	5.5
VIDEOTEXT/TELETEXT	0.0	1.5	6.9
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.1	1.5
	10.7	101.4	231.8
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.81

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=1.15S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	2.9	30.3	109.3
MTS (BUSINESS)	7.3	96.5	364.9
PRIVATE LINE	143.1	293.9	806.8
MOBILE	0.3	4.3	13.5
PUBLIC RADIO	0.1	0.3	0.5
COMMERCIAL AND RELIGIOUS	0.2	0.3	0.6
OCCASIONAL	0.3	0.3	0.5
CATV MUSIC	0.0	0.0	0.2
RECORDING		0.0	0.1
	154.2	426.0	1296.3
DATA			
DATA TRANSFER	0.0	0.3	2.4
BATCH PROCESSING	0.1	0.5	1.3
DATA ENTRY	7.8	47.9	90.9
REMOTE JOB ENTRY	0.2	5.4	14.3
INQUIRY/RESPONSE	0.1	2.4	6.1
TIMESHARING	0.1	0.6	1.5
USPS/EMSS		0.4	1.5
MAILBOX	0.0	0.3	0.8
ADMINISTRATIVE MESSAGES	1.9	26.6	79.4
FACSIMILE	0.4	3.0	4.2
COMMUNICATING WORD PROCESSORS	0.0	0.2	0.7
TWX/TELEX	0.0	0.1	0.1
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	3.0	5.1
VIDEOTEXT/TELETEXT	0.0	1.3	6.5
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.1	1.4
	10.7	92.4	216.5
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.82

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=1.15S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	6.7	29.7	33.3
4.8 KBPS	2.6	62.9	64.5
9.6 KBPS	1.4	17.1	136.6
56 KBPS	0.0	0.6	11.2
64 KBPS	153.7	679.7	2067.5
1.544 MBPS	2.1	79.4	126.2
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	226.2	1114.2	2709.4

TABLE 2.83

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=1.15S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	6.7	27.3	31.3
4.8 KBPS	2.6	57.8	60.5
9.6 KBPS	1.4	15.7	128.2
56 KBPS	0.0	0.5	10.5
64 KBPS	153.7	522.4	1637.0
1.544 MBPS	2.1	79.2	125.9
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	226.2	947.7	2263.4

TABLE 2.84

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=1.15S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	6.7	24.8	29.2
4.8 KBPS	2.6	52.6	56.5
9.6 KBPS	1.4	14.3	119.7
56 KBPS	0.0	0.5	9.8
64 KBPS	153.7	425.1	1294.5
1.544 MBPS	2.1	79.0	125.7
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	226.2	841.2	1905.5

TABLE 2.85

BREAKEVEN DISTANCE IN MILES FOR TRUNKING NETWORKS
(T=1.15S)

YR/BAND	OPERATING SPEEDS							
	2.4	4.8	9.6	56	T1	V1	V2	V3
1982								
C	177	291	519	219	116	700	600	503
KU	513	583	710	331	197	1078	947	839
1990								
C	162	268	490	177	81	547	433	330
KU	207	259	350	188	95	588	475	370
KA	190	242	334	186	96	582	469	364
KA	188	238	326	177	83	532	418	315
2000								
C	145	252	466	148	80	597	475	363
KU	115	137	205	115	35	309	187	97
KA	100	150	238	159	98	566	444	333
KA	116	146	230	150	85	514	392	283

TABLE 2.86

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CPS COMPOSITE CROSSOVER DISTANCE IN MILES
UNSHARED EARTH STATIONS .995 AVAILABILITY
(T=1.155)

YR/BAND		OPERATING SPEEDS							
		2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	65	66	147	205	346	3217	3004	2832
	KU	150	239	500	627	459	6198	5862	5607
1990									
	C	11	26	66	123	294	2503	2304	2135
	KU	50	133	325	426	287	4384	4121	3916
	KA	8	23	51	120	253	2399	2207	2034
2000									
	C	2	7	25	59	276	2018	1841	1702
	KU	27	66	186	269	177	2849	2645	2500
	KA	1	3	16	58	131	1518	1365	1232

TABLE 2.87

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .995 AVAILABILITY
(T=1.15S)

YR/BAND		OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	863	1313	2199	777	193	1005	868	735
	KU	874	1350	2273	830	276	1399	1254	1105
1990									
	C	535	833	1329	639	144	705	629	520
	KU	537	839	1347	653	164	794	704	593
	KA	636	1014	1837	812	212	1043	918	803
2000									
	C	405	679	1131	569	135	695	573	459
	KU	398	665	1104	537	104	512	390	295
	KA	561	953	1643	776	137	699	577	462

TABLE 2.88

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
UNSHARED EARTH STATIONS .999 AVAILABILITY
(T=1.15S)

YR/BAND		OPERATING SPEEDS							
		2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	105	144	307	405	449	4809	4520	4292
	KU	181	288	583	759	631	7562	7180	6902
1990									
	C	25	59	161	241	349	3470	3242	3051
	KU	64	172	403	528	390	5372	5080	4874
	KA	8	23	51	120	253	2399	2207	2034
2000									
	C	1[illegible]	31	86	155	309	2765	2557	2386
	KU	36	89	247	340	250	3631	3386	3193
	KA	1	3	16	58	131	1518	1365	1232

TABLE 2.89

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .999 AVAILABILITY
(T=1.15S)

YR/BAND		OPERATING SPEEDS							
		2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	867	1328	2227	798	228	1184	1042	899
	KU	883	1378	2328	871	347	1776	1601	1445
1990									
	C	545	855	1399	690	219	1031	890	801
	KU	543	850	1385	680	206	1010	865	721
	KA	636	1014	1837	812	212	1043	918	803
2000									
	C	404	678	1062	567	134	683	561	447
	KU	402	674	1121	556	132	623	501	394
	KA	561	953	1643	776	137	699	577	462

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TABLE 2.90

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.156)

C 1 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2388.0	17	1	1	1	450	350	261	75
LARGE	0.999	32000.0	2622.0	17	1	1	1	503	403	312	88
MEDIUM	0.995	6300.0	1046.5	28	1	1	1	1191	1022	903	249
MEDIUM	0.995	6300.0	1159.0	31	1	1	1	1408	1232	1047	290
MEDIUM	0.995	6300.0	938.0	25	1	1	1	989	889	792	210
MEDIUM	0.999	6300.0	1116.0	30	1	1	1	1325	1152	981	274
SMALL	0.995	1544.0	394.0	42	1	1	1	2274	2069	1870	452
SMALL	0.999	1544.0	571.2	60	1	1	28	3671	3417	3196	767
SMALL	0.995	1544.0	404.7	43	1	1	1	2359	2150	1950	468
SMALL	0.999	1544.0	546.8	58	1	1	19	3479	3231	3013	722
SMALL	0.995	1544.0	592.0	62	1	1	38	3835	3575	3351	805
SMALL	0.999	1544.0	675.0	71	12	1	78	4489	4207	3972	959
MINI	0.995	64.0	201.0	785	1661	3826	5038	37308	35972	35198	
MINI	0.999	64.0	343.4	1632	3622	7747	9613	64465	62115	60898	
MINI	0.995	64.0	86.2	297	433	793	1350	15560	14896	14480	
MINI	0.999	64.0	146.4	553	944	2322	3284	27006	25948	25344	

TABLE 2.91

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.156)

C 1 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2388.0	852	1278	2129	727	643	543	447	114
LARGE	0.999	32000.0	2622.0	854	1285	2142	736	696	596	499	127
MEDIUM	0.995	6300.0	1046.5	877	1359	2290	843	1514	1334	1148	299
MEDIUM	0.995	6300.0	1159.0	882	1375	2321	866	1731	1544	1354	339
MEDIUM	0.995	6300.0	938.0	872	1344	2260	821	1304	1132	969	259
MEDIUM	0.999	6300.0	1116.0	880	1369	2309	857	1648	1464	1275	324

TABLE 2.92

1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.15S)

KU 1 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3878.0	22	1	1	1	788	688	588	158
LARGE	0.999	32000.0	4174.0	23	1	1	1	855	755	653	175
LARGE	0.999	32000.0	4246.0	23	1	1	1	871	771	669	179
MEDIUM	0.995	6300.0	1128.0	30	1	1	1	1348	1174	994	278
MEDIUM	0.999	6300.0	1424.0	38	1	1	1	1920	1726	1533	385
MEDIUM	0.999	6300.0	1496.0	39	1	1	1	2059	1860	1665	412
MEDIUM	0.995	6300.0	1236.0	33	1	1	1	1557	1375	1189	317
MEDIUM	0.999	6300.0	1505.0	40	1	1	1	2076	1877	1682	415
MEDIUM	0.999	6300.0	1592.0	42	1	1	1	2244	2039	1841	446
SMALL	0.995	1544.0	551.0	58	1	1	20	3512	3263	3044	730
SMALL	0.999	1544.0	820.5	86	36	1	181	5636	5314	5060	1227
SMALL	0.999	1544.0	907.5	95	54	23	253	6322	5976	5711	1388
SMALL	0.995	1544.0	621.0	65	5	1	52	4064	3796	3568	859
SMALL	0.999	1544.0	733.0	77	20	1	109	4946	4648	4406	1066
SMALL	0.999	1544.0	797.0	83	31	1	162	5451	5135	4885	1184
SMALL	0.995	1544.0	611.0	64	3	1	47	3985	3720	3493	840
SMALL	0.999	1544.0	737.6	77	20	1	113	4983	4683	4440	1074
SMALL	0.999	1544.0	760.2	80	24	1	132	5161	4855	4609	1116
MINI	0.995	64.0	391.0	1959	4278	9058	11142	73516	70853	69489	
MINI	0.999	64.0	502.5	2727	5813	12128	14725	94717	91324	89612	
MINI	0.999	64.0	566.5	3168	6694	13891	16781	106886	103073	101163	
MINI	0.995	64.0	179.0	69[illegible]	1358	3220	4331	33205	31933	31228	
MINI	0.999	64.0	355.0	1711	3782	8066	9906	66671	64244	62992	
MINI	0.999	64.0	378.0	1870	4099	8700	10725	71044	68467	67143	

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TABLE 2.93

1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.156)

KU 1 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3878.0	864	1319	2211	786	980	881	774	197
LARGE	0.999	32000.0	4174.0	867	1328	2227	798	1080	948	839	217
LARGE	0.999	32000.0	4246.0	868	1330	2231	801	1107	964	855	222
MEDIUM	0.995	6300.0	1128.0	880	1370	2313	860	1671	1486	1297	328
MEDIUM	0.999	6300.0	1424.0	893	1412	2395	919	2243	2038	1840	435
MEDIUM	0.999	6300.0	1496.0	896	1422	2416	934	2382	2173	1972	461
MEDIUM	0.995	6300.0	1236.0	885	1386	2343	881	1880	1688	1495	367
MEDIUM	0.999	6300.0	1505.0	896	1423	2418	935	2400	2189	1989	464
MEDIUM	0.999	6300.0	1592.0	900	1435	2442	953	2568	2352	2148	496

TABLE 2.94

1990 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.15S)

C 3 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.80
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1544.4	1	1	1	1	227	113	68	34
LARGE	0.999	32000.0	3213.4	1	1	1	1	656	543	436	139
MEDIUM	0.995	6300.0	573.5	1	1	1	1	579	465	361	120
MEDIUM	0.999	6300.0	698.2	1	1	1	1	742	628	519	160
MEDIUM	0.995	6300.0	841.2	1	1	1	1	929	815	700	206
MEDIUM	0.999	6300.0	954.2	1	1	1	1	1077	963	843	220
SMALL	0.995	1544.0	297.1	1	1	1	1	1490	1289	1079	326
SMALL	0.999	1544.0	410.2	1	1	1	1	2502	2267	2040	516
SMALL	0.995	1544.0	321.8	1	1	1	1	1711	1502	1288	367
SMALL	0.999	1544.0	302.5	1	1	1	1	1538	1335	1124	335
SMALL	0.995	1544.0	546.0	1	1	1	30	3719	3441	3194	753
SMALL	0.999	1544.0	613.2	1	1	1	67	4320	4022	3766	894
MINI	0.995	64.0	130.3	277	696	1799	3050	26983	25903	25276	
MINI	0.999	64.0	209.4	659	1546	4274	5938	44074	42405	41498	
MINI	0.995	64.0	51.8	6	20	110	619	10021	9526	9176	
MINI	0.999	64.0	82.4	79	234	691	1301	16633	15910	15452	

1990 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.15S)

C 3 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1544.4	523	811	1256	587	444	330	230	78
LARGE	0.999	32000.0	3213.4	539	843	1360	662	873	760	646	183
MEDIUM	0.995	6300.0	573.5	537	837	1341	649	796	683	571	164
MEDIUM	0.999	6300.0	698.2	543	849	1381	677	959	846	729	204
MEDIUM	0.995	6300.0	841.2	550	863	1427	710	1039	1033	911	230
MEDIUM	0.999	6300.0	954.2	555	874	1462	736	1287	1094	1054	276

TABLE 2.95

TABLE 2.96

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.158)

KU 2 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1960.0	1	1	1	1	334	220	123	60
LARGE	0.999	32000.0	2132.3	1	1	1	1	370	264	166	71
LARGE	0.999	32000.0	2188.7	1	1	1	1	392	279	180	74
MEDIUM	0.995	6300.0	585.1	1	1	1	1	594	481	376	124
MEDIUM	0.999	6300.0	757.4	1	1	1	1	819	706	594	179
MEDIUM	0.999	6300.0	813.8	1	1	1	1	893	780	665	198
MEDIUM	0.995	6300.0	883.8	1	1	1	1	985	871	754	220
MEDIUM	0.999	6300.0	1034.4	1	1	1	1	1099	1068	945	253
MEDIUM	0.999	6300.0	1101.8	1	1	1	1	1247	1054	1030	281
SMALL	0.995	1544.0	374.9	1	1	1	1	2186	1961	1740	457
SMALL	0.999	1544.0	525.5	1	1	1	22	3535	3264	3020	710
SMALL	0.999	1544.0	592.9	1	1	1	56	4139	3846	3593	852
SMALL	0.995	1544.0	435.1	1	1	1	1	2725	2482	2252	521
SMALL	0.999	1544.0	510.0	1	1	1	16	3396	3130	2888	678
SMALL	0.999	1544.0	559.2	1	1	1	37	3837	3555	3306	781
SMALL	0.995	1544.0	451.3	1	1	1	1	2870	2622	2389	555
SMALL	0.999	1544.0	553.8	1	1	1	34	3788	3508	3261	770
SMALL	0.999	1544.0	517.1	1	1	1	19	3460	3191	2949	693
MINI	0.995	64.0	257.2	889	2294	5770	7683	54403	52377	51301	
MINI	0.999	64.0	332.1	1208	3466	8114	10417	70587	68003	66662	
MINI	0.999	64.0	381.3	1592	4236	9653	12214	81218	78267	76753	
MINI	0.995	64.0	130.2	276	695	1796	3046	26961	25882	25255	
MINI	0.999	64.0	257.9	893	2305	5792	7708	54554	52523	51445	
MINI	0.999	64.0	275.8	979	2505	6352	8362	58422	56258	55116	

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TABLE 2.97

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.156)

KU 2 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1960.0	527	819	1282	606	551	437	334	104
LARGE	0.999	32000.0	2132.3	529	822	1293	613	595	482	377	115
LARGE	0.999	32000.0	2188.7	530	823	1296	616	610	496	391	119
MEDIUM	0.995	6300.0	585.1	537	838	1345	651	811	698	586	168
MEDIUM	0.999	6300.0	757.4	546	855	1400	691	1037	923	804	223
MEDIUM	0.999	6300.0	813.8	548	861	1418	704	1110	997	876	219
MEDIUM	0.995	6300.0	883.8	552	868	1440	720	1133	1088	965	247
MEDIUM	0.999	6300.0	1034.4	559	882	1488	754	1464	1264	1054	309
MEDIUM	0.999	6300.0	1101.8	562	889	1509	770	1611	1406	1194	337

TABLE 2.98

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.15S)

KA 13 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4824.0	1	1	1	1	1071	957	838	208
LARGE	0.999	32000.0	3480.0	1	1	1	1	725	611	502	149
LARGE	0.999	32000.0	2290.0	1	1	1	1	419	305	206	73
MEDIUM	0.999	6300.0	1103.6	1	1	1	1	1251	1058	1033	271
MEDIUM	0.999	6300.0	839.0	1	1	1	1	926	813	697	198
MEDIUM	0.999	6300.0	604.8	1	1	1	1	620	506	401	123
SMALL	0.999	1544.0	4[illegible]7	1	1	1	1	2498	2262	2036	505
SMALL	0.999	1544.0	344.9	1	1	1	1	1917	1702	1485	396
SMALL	0.999	1544.0	287.5	1	1	1	1	1403	1205	1121	300
MINI	0.999	64.0	118.5	150	460	1094	2470	24433	23441	22856	
MINI	0.999	64.0	115.8	137	434	1010	2371	23850	22878	22302	
MINI	0.999	64.0	113.4	125	411	1082	2283	23331	22377	21810	

TABLE 2.99

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.15S)

KA 13 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4324.0	646	1033	1897	855	1278	1084	1048	265
LARGE	0.999	32000.0	3480.0	633	1007	1813	794	942	829	713	193
LARGE	0.999	32000.0	2290.0	621	984	1738	740	636	522	416	117
MEDIUM	0.999	6300.0	1103.6	653	1048	1946	890	1615	1410	1198	328
MEDIUM	0.999	6300.0	839.0	640	1022	1862	829	1035	1030	908	219
MEDIUM	0.999	6300.0	604.8	629	999	1787	776	837	724	611	167

TABLE 2.100

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.155)

C 4 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1422.2	1	1	1	1	175	90	52	31
LARGE	0.999	32000.0	1497.7	1	1	1	1	196	101	59	36
MEDIUM	0.995	6300.0	451.1	1	1	1	1	415	293	187	90
MEDIUM	0.999	6300.0	239.3	1	1	1	1	118	63	39	17
MEDIUM	0.995	6300.0	793.5	1	1	1	1	895	774	653	208
MEDIUM	0.999	6300.0	837.1	1	1	1	1	957	835	712	223
SMALL	0.995	1544.0	249.5	1	1	1	1	1022	1089	958	254
SMALL	0.999	1544.0	323.1	1	1	1	1	1729	1507	1278	386
SMALL	0.995	1544.0	280.9	1	1	1	1	1324	1115	1132	310
SMALL	0.999	1544.0	340.7	1	1	1	1	1898	1670	1438	418
SMALL	0.995	1544.0	525.8	1	1	1	42	3677	3308	3127	732
SMALL	0.999	1544.0	570.5	1	1	1	69	4107	3803	3535	832
MINI	0.995	64.0	77.0	35	167	656	1175	16479	15747	15277	
MINI	0.999	64.0	136.8	269	706	2130	3518	30345	29136	28439	
MINI	0.995	64.0	48.3	1	2	94	612	9824	9322	8961	
MINI	0.999	64.0	77.7	37	174	670	1203	16641	15904	15431	

TABLE 2.101

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.155)

C 4 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1422.2	394	657	1080	519	407	285	179	78
LARGE	0.999	32000.0	1497.7	395	659	1091	522	428	306	200	84
MEDIUM	0.995	6300.0	451.1	403	675	1124	561	647	525	412	137
MEDIUM	0.999	6300.0	239.3	392	653	1080	509	350	228	124	54
MEDIUM	0.995	6300.0	793.5	421	711	1196	645	1128	1006	878	215
MEDIUM	0.999	6300.0	937.1	423	716	1013	656	1189	1067	937	234

TABLE 2.102

2000 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.155)

KU 3 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	1	1	1	1	85	36	25	1
LARGE	0.999	32000.0	1067.0	1	1	1	1	103	42	29	7
LARGE	0.999	32000.0	1106.1	1	1	1	1	109	48	32	10
MEDIUM	0.995	6300.0	310.6	1	1	1	1	218	111	61	42
MEDIUM	0.999	6300.0	419.2	1	1	1	1	370	248	144	79
MEDIUM	0.999	6300.0	458.3	1	1	1	1	425	303	197	93
MEDIUM	0.995	6300.0	611.1	1	1	1	1	639	518	405	145
MEDIUM	0.999	6300.0	712.7	1	1	1	1	782	660	543	180
MEDIUM	0.999	6300.0	759.4	1	1	1	1	848	726	606	196
SMALL	0.995	1544.0	253.8	1	1	1	1	1063	1113	982	261
SMALL	0.999	1544.0	355.4	1	1	1	1	2040	1806	1572	444
SMALL	0.999	1544.0	402.1	1	1	1	1	2488	2240	1998	528
SMALL	0.995	1544.0	291.1	1	1	1	1	1422	1210	1189	329
SMALL	0.999	1544.0	341.2	1	1	1	1	1903	1675	1443	419
SMALL	0.999	1544.0	375.3	1	1	1	1	2231	1991	1754	480
SMALL	0.995	1544.0	314.4	1	1	1	1	1646	1426	1198	370
SMALL	0.999	1544.0	384.1	1	1	1	1	2315	2073	1834	496
SMALL	0.999	1544.0	396.6	1	1	1	1	2436	2189	1948	518
MINI	0.995	64.0	168.8	435	1118	3205	4772	37766	36300	35492	
MINI	0.999	64.0	218.9	694	1712	4887	6735	49383	47517	46509	
MINI	0.999	64.0	253.0	871	2285	6033	8071	57290	55152	54014	
MINI	0.995	64.0	88.6	70	287	896	1630	19169	18345	17830	
MINI	0.999	64.0	176.3	473	1196	3457	5066	39505	37980	37133	
MINI	0.999	64.0	188.7	538	1205	3873	5552	42380	40756	39862	

TABLE 2.103

2000 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.156)

KU 3 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	389	648	1069	496	279	157	82	47
LARGE	0.999	32000.0	1067.0	390	650	1073	502	309	187	97	54
LARGE	0.999	32000.0	1106.1	391	651	1075	503	320	198	102	57
MEDIUM	0.995	6300.0	310.6	396	661	1095	526	450	328	221	89
MEDIUM	0.999	6300.0	419.2	401	672	1118	553	602	460	369	126
MEDIUM	0.999	6300.0	458.3	403	676	1126	562	657	535	422	140
MEDIUM	0.995	6300.0	611.1	412	692	1158	600	872	750	630	193
MEDIUM	0.999	6300.0	712.7	417	703	1179	625	1014	892	768	228
MEDIUM	0.999	6300.0	759.4	419	708	1189	636	1080	958	831	244

TABLE 2.104

2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.15S)

KA 14 CPS
FIL. FAC = 0.9 TARIFF FACTORS 1 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0.84

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	1	1	1	1	391	270	163	71
MEDIUM	0.999	6300.0	541.8	1	1	1	1	542	420	310	108
SMALL	0.999	1544.0	229.5	1	1	1	1	1096	974	847	201
MINI	0.999	64.0	77.0	1	33	300	1148	16479	15747	15277	

TABLE 2.105

2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.15S)

KA 14 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0.84

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	558	947	1624	762	624	502	389	118
MEDIUM	0.999	6300.0	541.8	564	958	1661	789	774	652	535	155

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TABLE 2.106

OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.35)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	2.4	37.6	160.4
MTS (BUSINESS)	6.1	121.1	541.2
PRIVATE LINE	119.1	288.4	791.3
MOBILE	0.3	4.2	13.2
PUBLIC RADIO	0.1	0.3	0.4
COMMERCIAL AND RELIGIOUS	0.1	0.3	0.6
OCCASIONAL	0.2	0.3	0.5
CATV MUSIC	0.0	0.0	0.2
RECORDING	0.0	0.0	0.1
	128.4	452.4	1507.8
DATA			
DATA TRANSFER	0.0	0.3	2.7
BATCH PROCESSING	0.0	1.0	3.0
DATA ENTRY	6.8	99.7	215.4
REMOTE JOB ENTRY	0.2	11.3	30.0
INQUIRY/RESPONSE	0.2	5.2	19.2
TIMESHARING	0.1	1.1	3.6
USPS/EMSS	0.0	0.4	2.4
MAILBOX	0.0	0.8	2.1
ADMINISTRATIVE MESSAGES	1.8	63.8	215.8
FACSIMILE	0.4	5.1	7.9
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.0
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	6.6	12.7
VIDEOTEXT/TELETEXT	0.0	1.3	5.8
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.2
	9.5	197.5	526.1
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.1	157.7	255.4
	61.3	324.6	402.8

TABLE 2.107

TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.3S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	2.4	37.6	160.4
MTS (BUSINESS)	6.1	120.5	536.4
PRIVATE LINE	119.1	287.4	782.7
MOBILE	0.3	4.2	13.1
PUBLIC RADIO	0.1	0.3	0.4
COMMERCIAL AND RELIGIOUS	0.1	0.3	0.5
OCCASIONAL	0.2	0.3	0.5
CATV MUSIC	0.0	0.0	0.2
RECORDING	0.0	0.0	0.1
	128.4	450.7	1494.4
DATA			
DATA TRANSFER	0.0	0.3	2.5
BATCH PROCESSING	0.0	0.0	0.0
DATA ENTRY	6.8	0.0	0.0
REMOTE JOB ENTRY	0.2	0.0	0.0
INQUIRY/RESPONSE	0.0	0.0	0.0
TIMESHARING	0.0	0.0	0.0
USPS/EMSS	0.0	0.4	0.0
MAILBOX	0.0	0.0	0.0
ADMINISTRATIVE MESSAGES	1.7	0.0	0.0
FACSIMILE	0.3	0.0	0.0
COMMUNICATING WORD PROCESSORS	0.0	0.0	0.0
TWX/TELEX	0.0	0.1	0.0
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	0.0	0.0
VIDEOTEXT/TELETEXT	0.0	1.3	5.8
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.0	0.0
	9.1	2.1	8.2
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.2	322.8	392.7

TABLE 2.108

CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=1.3S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	0.7	4.8
PRIVATE LINE	0.0	1.0	8.6
MOBILE	0.0	0.0	0.0
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	1.7	13.4
DATA			
DATA TRANSFER	0.0	0.0	0.3
BATCH PROCESSING	0.0	1.0	3.0
DATA ENTRY	0.0	99.7	215.4
REMOTE JOB ENTRY	0.0	11.3	30.0
INQUIRY/RESPONSE	0.2	5.2	19.2
TIMESHARING	0.1	1.1	3.6
USPS/EMSS	0.0	0.1	2.4
MAILBOX	0.0	0.8	2.1
ADMINISTRATIVE MESSAGES	0.1	63.8	215.8
FACSIMILE	0.0	5.1	7.9
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.0
TWX/TELEX	0.0	0.0	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	6.6	12.7
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.2
	0.4	195.5	517.9
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.1	1.7	10.1
	0.1	1.7	10.1

TABLE 2.109

KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.3S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	0.7	4.8
PRIVATE LINE	0.0	1.0	8.6
MOBILE	0.0	0.0	0.0
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	1.7	13.4
DATA			
DATA TRANSFER	0.0	0.0	0.2
BATCH PROCESSING	0.0	0.9	2.8
DATA ENTRY	0.0	99.7	215.4
REMOTE JOB ENTRY	0.0	11.3	30.0
INQUIRY/RESPONSE	0.0	5.2	19.2
TIMESHARING	0.0	1.1	3.6
USPS/EMSS	0.0	0.1	2.4
MAILBOX	0.0	0.6	1.8
ADMINISTRATIVE MESSAGES	0.0	53.8	182.7
FACSIMILE	0.0	4.8	7.3
COMMUNICATING WORD PROCESSORS	0.0	0.4	1.7
TWX/TELEX	0.0	0.0	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	6.1	11.7
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.3	3.2
	0.0	184.2	482.3
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.0	1.5	8.6
	0.0	1.5	8.6

TABLE 2.110

OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.3S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	6.1	40.5	50.2
4.8 KBPS	2.2	136.8	103.9
9.6 KBPS	1.2	19.5	345.9
56 KBPS	0.0	0.6	24.7
64 KBPS	127.9	451.4	1506.1
1.544 MBPS	2.0	79.9	130.9
6.3 MBPS	1.5	78.8	127.7
>6.3 MBPS	58.3	166.9	147.4
	199.2	974.4	2436.8

TABLE 2.111

TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.3S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	5.8	0.3	0.8
4.8 KBPS	2.1	0.9	1.4
9.6 KBPS	1.1	0.5	4.0
56 KBPS	0.0	0.3	0.8
64 KBPS	127.9	449.7	1492.7
1.544 MBPS	2.0	79.0	125.7
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	198.7	775.6	1895.4

TABLE 2.112

CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=1.35)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.3	40.2	49.4
4.8 KBPS	0.1	135.9	102.4
9.6 KBPS	0.1	19.0	341.9
56 KBPS	0.0	0.3	24.0
64 KBPS	0.0	1.7	13.4
1.544 MBPS	0.0	0.9	5.2
6.3 MBPS	0.0	0.9	5.1
>6.3 MBPS	0.0	0.0	0.0
	0.5	198.9	541.4

TABLE 2.113

KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.3S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.0	37.9	45.8
4.8 KBPS	0.0	128.1	95.2
9.6 KBPS	0.0	18.0	317.3
56 KBPS	0.0	0.3	23.9
64 KBPS	0.0	1.7	13.4
1.544 MBPS	0.0	0.7	4.5
6.3 MBPS	0.0	0.7	4.3
>6.3 MBPS	0.0	0.0	0.0
	0.0	187.4	504.4

TABLE 2.114

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=1.35)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	2.4	57.4	234.3
MTS (BUSINESS)	6.1	183.8	783.5
PRIVATE LINE	119.1	338.9	853.1
MOBILE	0.3	5.0	14.3
PUBLIC RADIO	0.1	0.3	0.5
COMMERCIAL AND RELIGIOUS	0.1	0.4	0.6
OCCASIONAL	0.2	0.3	0.5
CATV MUSIC	0.0	0.1	0.2
RECORDING		0.0	0.1
	128.4	586.3	1887.1
DATA			
DATA TRANSFER	0.0	0.3	2.6
BATCH PROCESSING	0.0	0.5	1.3
DATA ENTRY	6.8	48.6	86.2
REMOTE JOB ENTRY	0.2	5.5	14.1
INQUIRY/RESPONSE	0.1	2.4	5.5
TIMESHARING	0.1	0.6	1.5
USPS/EMSS		0.4	1.4
MAILBOX	0.0	0.3	0.7
ADMINISTRATIVE MESSAGES	1.7	27.0	75.4
FACSIMILE	0.3	3.1	4.0
COMMUNICATING WORD PROCESSORS	0.0	0.2	0.7
TWX/TELEX	0.0	0.1	0.1
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	3.1	4.9
VIDEOTEXT/TELETEXT	0.0	1.4	6.1
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.1	1.4
	9.3	93.7	206.0
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.115

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=1.3S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	2.4	37.6	160.4
MTS (BUSINESS)	6.1	120.5	536.4
PRIVATE LINE	119.1	287.4	782.7
MOBILE	0.3	4.2	13.1
PUBLIC RADIO	0.1	0.3	0.4
COMMERCIAL AND RELIGIOUS	0.1	0.3	0.5
OCCASIONAL	0.2	0.3	0.5
CATV MUSIC	0.0	0.0	0.2
RECORDING		0.0	0.1
	128.4	450.7	1494.4
DATA			
DATA TRANSFER	0.0	0.3	2.5
BATCH PROCESSING	0.0	0.5	1.2
DATA ENTRY	6.8	44.6	80.9
REMOTE JOB ENTRY	0.2	5.1	13.2
INQUIRY/RESPONSE	0.1	2.2	5.2
TIMESHARING	0.1	0.6	1.4
USPS/EMSS		0.4	1.3
MAILBOX	0.0	0.3	0.7
ADMINISTRATIVE MESSAGES	1.7	24.8	70.7
FACSIMILE	0.3	2.9	3.8
COMMUNICATING WORD PROCESSORS	0.0	0.2	0.7
TWX/TELEX	0.0	0.1	0.1
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	2.8	4.6
VIDEOTEXT/TELETEXT	0.0	1.3	5.8
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.1	1.3
	9.3	86.0	193.3
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.116

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=1.3S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	2.4	26.0	99.5
MTS (BUSINESS)	6.1	83.2	332.8
PRIVATE LINE	119.1	253.1	735.7
MOBILE	0.3	3.7	12.4
PUBLIC RADIO	0.1	0.3	0.4
COMMERCIAL AND RELIGIOUS	0.1	0.3	0.5
OCCASIONAL	0.2	0.3	0.4
CATV MUSIC	0.0	0.0	0.2
RECORDING		0.0	0.1
	128.4	366.8	1182.0
DATA			
DATA TRANSFER	0.0	0.3	2.3
BATCH PROCESSING	0.0	0.4	1.1
DATA ENTRY	6.8	40.6	75.6
REMOTE JOB ENTRY	0.2	4.6	12.3
INQUIRY/RESPONSE	0.1	2.0	4.8
TIMESHARING	0.1	0.5	1.3
USPS/EMSS		0.3	1.2
MAILBOX	0.0	0.3	0.7
ADMINISTRATIVE MESSAGES	1.7	22.6	66.1
FACSIMILE	0.3	2.6	3.5
COMMUNICATING WORD PROCESSORS	0.0	0.2	0.6
TWX/TELEX	0.0	0.1	0.1
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.1	2.6	4.3
VIDEOTEXT/TELETEXT	0.0	1.1	5.4
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.1	1.2
	9.3	78.3	180.5
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.117

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=1.3S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	5.9	23.6	25.0
4.8 KBPS	2.2	55.9	49.5
9.6 KBPS	1.1	13.6	120.0
56 KBPS	0.0	0.5	10.1
64 KBPS	127.9	585.1	1885.2
1.544 MBPS	2.0	79.2	125.9
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	198.9	1002.8	2485.9

TABLE 2.118

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=1.3S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	5.9	21.7	23.5
4.8 KBPS	2.2	51.3	46.4
9.6 KBPS	1.1	12.5	112.6
56 KBPS	0.0	0.4	9.5
64 KBPS	127.9	449.7	1492.7
1.544 MBPS	2.0	79.0	125.7
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	198.9	859.5	2080.4

TABLE 2.119

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=1.3S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	5.9	19.7	21.9
4.8 KBPS	2.2	46.8	43.4
9.6 KBPS	1.1	11.4	105.1
56 KBPS	0.0	0.4	8.9
64 KBPS	127.9	366.0	1180.4
1.544 MBPS	2.0	78.9	125.5
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	198.9	768.0	1755.3

TABLE 2.120

BREAKEVEN DISTANCE IN MILES FOR TRUNKING NETWORKS
(T=1.3S)

YR/BAND	OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1982								
C	263	421	728	323	140	814	714	613
KU	642	751	943	449	240	1344	1171	992
1990								
C	247	393	689	275	101	645	531	425
KU	297	383	531	288	116	692	578	470
KA	278	364	512	285	117	685	572	464
KA	276	360	503	275	103	622	515	409
2000								
C	227	372	655	240	99	704	582	467
KU	173	242	360	203	48	379	257	152
KA	176	257	397	253	119	669	547	433
KA	174	253	388	243	105	611	489	377

TABLE 2.121

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
UNSHARED EARTH STATIONS .995 AVAILABILITY
(T=1.3S)

YR/BAND		OPERATING SPEEDS							
		2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	106	90	179	249	413	3749	3496	3298
	KU	209	293	580	732	542	7121	6754	6483
1990									
	C	14	33	87	155	343	2910	2699	2519
	KU	62	163	383	497	340	4997	4752	4536
	KA	12	31	76	147	287	2792	2589	2408
2000									
	C	3	11	34	83	317	2372	2167	2004
	KU	33	78	227	316	214	3310	3074	2903
	KA	2	6	27	67	165	1701	1597	1458

TABLE 2.122

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .995 AVAILABILITY
(T=1.3S)

YR/BAND	OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980								
C	1061	1716	2794	957	231	1210	1067	924
KU	1081	1757	2878	1034	330	1700	1513	1350
1990								
C	668	1033	1827	797	177	871	728	639
KU	670	1039	1847	812	199	970	827	683
KA	792	1212	2446	1004	251	1268	1111	972
2000								
C	521	855	1340	717	167	772	694	576
KU	513	840	1289	681	126	608	486	375
KA	713	1094	2263	971	165	820	698	580

TABLE 2.123

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
UNSHARED EARTH STATIONS .999 AVAILABILITY
(T=1.35)

YR/BAND		OPERATING SPEEDS							
		2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	136	186	363	484	531	5551	5237	4993
	KU	248	354	688	894	738	8664	8244	7948
1990									
	C	31	76	195	289	417	3989	3718	3558
	KU	80	207	472	620	467	6200	5852	5609
	KA	12	31	76	147	287	2792	2589	2408
2000									
	C	15	39	110	194	356	3216	2988	2807
	KU	44	112	296	398	281	4193	3930	3727
	KA	2	6	27	67	165	1701	1597	1458

TABLE 2.124

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .999 AVAILABILITY
(T=1.3S)

YR/BAND		OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	1068	1732	2827	991	271	1413	1265	1117
	KU	1097	1788	2941	1102	418	2133	1932	1737
1990									
	C	680	1057	1907	855	258	1239	1094	942
	KU	677	1052	1891	843	247	1211	1057	917
	KA	792	1212	2446	1004	251	1268	1111	972
2000									
	C	520	854	1336	715	166	774	622	561
	KU	518	850	1320	703	145	698	612	497
	KA	713	1094	2263	971	165	820	698	580

TABLE 2.125

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.38)

C 1 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2388.0	46	1	1	1	531	431	339	94
LARGE	0.999	32000.0	2622.0	47	1	1	1	591	491	397	108
MEDIUM	0.995	6300.0	1046.5	62	1	1	1	1471	1293	1108	299
MEDIUM	0.995	6300.0	1159.0	66	1	1	1	1717	1530	1341	346
MEDIUM	0.995	6300.0	938.0	59	1	1	1	1234	1064	929	255
MEDIUM	0.999	6300.0	1116.0	64	1	1	1	1623	1440	1252	328
SMALL	0.995	1544.0	394.0	78	1	1	1	2697	2476	2271	536
SMALL	0.999	1544.0	571.2	99	31	1	70	4275	4001	3769	906
SMALL	0.995	1544.0	404.7	80	3	1	1	2792	2568	2361	559
SMALL	0.999	1544.0	546.8	96	25	1	57	4058	3791	3563	855
SMALL	0.995	1544.0	592.0	102	36	1	81	4461	4180	3945	949
SMALL	0.999	1544.0	675.0	119	55	4	145	5200	4894	4647	1123
MINI	0.995	64.0	201.0	949	2109	4634	5898	42391	40801	39946	
MINI	0.999	64.0	343.4	2026	4325	9067	11069	72999	70354	68998	
MINI	0.995	64.0	86.2	398	581	1060	1728	17715	16976	16525	
MINI	0.999	64.0	146.4	687	1259	2934	3915	30654	29470	28807	

TABLE 2.12S

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.35)

C 1 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2388.0	1041	1676	2715	897	749	649	550	137
LARGE	0.999	32000.0	2622.0	1044	1683	2730	907	809	709	608	152
MEDIUM	0.995	6300.0	1046.5	1086	1767	2898	1045	1837	1646	1450	356
MEDIUM	0.995	6300.0	1159.0	1095	1785	2933	1087	2083	1883	1688	402
MEDIUM	0.995	6300.0	938.0	1078	1750	2863	1005	1600	1417	1230	311
MEDIUM	0.999	6300.0	1116.0	1092	1778	2920	1071	1989	1793	1599	384

TABLE 2.127

1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(Y = 1.38)

KU 1 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3878.0	54	1	1	1	913	813	709	187
LARGE	0.999	32000.0	4174.0	56	1	1	1	988	889	782	208
LARGE	0.999	32000.0	4246.0	56	1	1	1	1012	907	800	213
MEDIUM	0.995	6300.0	1128.0	65	1	1	1	1649	1465	1277	333
MEDIUM	0.999	6300.0	1424.0	73	1	1	1	2096	2089	1890	454
MEDIUM	0.999	6300.0	1496.0	75	1	1	1	2453	2241	2039	483
MEDIUM	0.995	6300.0	1236.0	68	1	1	1	1885	1693	1500	377
MEDIUM	0.999	6300.0	1505.0	75	1	1	1	2473	2260	2058	487
MEDIUM	0.999	6300.0	1592.0	78	1	1	1	2662	2443	2238	528
SMALL	0.995	1544.0	531.0	96	26	1	59	4095	3827	3598	864
SMALL	0.999	1544.0	820.5	147	89	62	280	6497	6145	5877	1426
SMALL	0.999	1544.0	907.5	165	115	104	361	7272	6894	6613	1608
SMALL	0.995	1544.0	621.0	108	42	1	97	4719	4429	4190	1010
SMALL	0.999	1544.0	733.0	130	68	22	198	5717	5392	5137	1243
SMALL	0.999	1544.0	797.0	143	83	51	258	6287	5943	5679	1377
SMALL	0.995	1544.0	611.0	106	40	1	91	4630	4343	4106	989
SMALL	0.999	1544.0	737.6	131	69	24	203	5758	5432	5176	1253
SMALL	0.999	1544.0	760.2	135	75	34	224	5959	5626	5367	1300
MINI	0.995	64.0	391.0	2397	5066	10549	12798	83231	80233	78710	
MINI	0.999	64.0	502.5	3264	6802	14020	16848	107197	103373	101458	
MINI	0.999	64.0	566.5	3762	7798	16012	19172	120954	116655	114515	
MINI	0.995	64.0	179.0	844	1766	3949	5099	37662	36236	35458	
MINI	0.999	64.0	355.0	2116	4506	9428	11491	75492	72762	71365	
MINI	0.999	64.0	378.0	2295	4864	10144	12326	80436	77535	76057	

TABLE 2.128

1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.38)

KU 1 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3878.0	1064	1722	2808	964	1219	1049	920	240
LARGE	0.999	32000.0	4174.0	1068	1731	2827	977	1346	1172	993	264
LARGE	0.999	32000.0	4246.0	1070	1733	2831	980	1377	1202	1018	269
MEDIUM	0.995	6300.0	1128.0	1093	1780	2924	1075	2015	1818	1624	389
MEDIUM	0.999	6300.0	1424.0	1116	1826	3017	1185	2661	2442	2237	513
MEDIUM	0.999	6300.0	1496.0	1122	1838	3040	1211	2818	2594	2386	549
MEDIUM	0.995	6300.0	1236.0	1101	1797	2958	1115	2251	2046	1847	433
MEDIUM	0.999	6300.0	1505.0	1122	1839	3043	1215	2838	2613	2405	554
MEDIUM	0.999	6300.0	1592.0	1129	1853	3070	1247	3028	2796	2585	598

TABLE 2.129

1990 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.35)

C 3 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1544.4	1	1	1	1	283	169	90	47
LARGE	0.999	32000.0	3213.4	1	1	1	1	769	655	545	166
MEDIUM	0.995	6300.0	573.5	1	1	1	1	681	568	460	145
MEDIUM	0.999	6300.0	698.2	1	1	1	1	866	752	639	190
MEDIUM	0.995	6300.0	841.2	1	1	1	1	1077	964	844	219
MEDIUM	0.999	6300.0	954.2	1	1	1	1	1204	1013	1005	271
SMALL	0.995	1544.0	297.1	1	1	1	1	1844	1631	1415	391
SMALL	0.999	1544.0	410.2	1	1	1	3	2989	2737	2502	581
SMALL	0.995	1544.0	321.8	1	1	1	1	2094	1872	1652	438
SMALL	0.999	1544.0	302.5	1	1	1	1	1899	1684	1467	402
SMALL	0.995	1544.0	546.0	1	1	1	71	4364	4064	3807	903
SMALL	0.999	1544.0	613.2	1	1	1	103	5044	4721	4453	1062
MINI	0.995	64.0	130.3	376	878	2359	3676	30663	29456	28768	
MINI	0.999	64.0	209.4	808	2002	5157	6940	49984	48111	47107	
MINI	0.995	64.0	51.8	24	64	248	775	11489	10943	10569	
MINI	0.999	64.0	82.4	115	355	916	1699	18963	18159	17663	

TABLE 2.131

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.35)

KU 2 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1960.0	1	1	1	1	404	290	191	77
LARGE	0.999	32000.0	2132.3	1	1	1	1	454	341	240	89
LARGE	0.999	32000.0	2188.7	1	1	1	1	471	357	256	93
MEDIUM	0.995	6300.0	585.1	1	1	1	1	698	585	477	149
MEDIUM	0.999	6300.0	757.4	1	1	1	1	953	840	724	211
MEDIUM	0.999	6300.0	813.8	1	1	1	1	1037	923	804	206
MEDIUM	0.995	6300.0	883.8	1	1	1	1	1029	1026	905	239
MEDIUM	0.999	6300.0	1034.4	1	1	1	1	1403	1205	1120	309
MEDIUM	0.999	6300.0	1101.8	1	1	1	1	1570	1366	1155	340
SMALL	0.995	1544.0	374.9	1	1	1	1	2632	2391	2163	539
SMALL	0.999	1544.0	525.5	1	1	1	58	4157	3864	3610	855
SMALL	0.999	1544.0	592.9	1	1	1	99	4839	4523	4258	1014
SMALL	0.995	1544.0	435.1	1	1	1	13	3241	2980	2741	640
SMALL	0.999	1544.0	510.0	1	1	1	49	4000	3712	3461	818
SMALL	0.999	1544.0	559.2	1	1	1	79	4498	4193	3934	934
SMALL	0.995	1544.0	451.3	1	1	1	17	3405	3138	2897	679
SMALL	0.999	1544.0	553.8	1	1	1	75	4443	4140	3882	922
SMALL	0.999	1544.0	517.1	1	1	1	53	4071	3782	3529	835
MINI	0.995	64.0	257.2	1069	2847	6848	8913	61659	59383	58189	
MINI	0.999	64.0	332.1	1575	4172	9497	12004	79954	77048	75553	
MINI	0.999	64.0	381.3	2010	5042	11230	14035	91972	88651	86960	
MINI	0.995	64.0	130.2	376	874	2355	3672	30638	29432	28745	
MINI	0.999	64.0	257.9	1072	2860	6873	8942	61830	59549	58351	
MINI	0.999	64.0	275.8	1077	3176	7506	9601	66202	63770	62501	

TABLE 2.132

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.38)

KU 2 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1960.0	659	1016	1774	760	649	536	429	126
LARGE	0.999	32000.0	2132.3	661	1020	1787	768	700	586	478	139
LARGE	0.999	32000.0	2188.7	662	1021	1791	771	716	603	494	143
MEDIUM	0.995	6300.0	585.1	670	1038	1846	811	944	830	715	199
MEDIUM	0.999	6300.0	757.4	680	1057	1908	856	1128	1085	962	244
MEDIUM	0.999	6300.0	813.8	683	1064	1928	870	1267	1074	1042	270
MEDIUM	0.995	6300.0	883.8	687	1071	1953	888	1441	1242	1033	302
MEDIUM	0.999	6300.0	1034.4	695	1088	2007	927	1815	1603	1387	372
MEDIUM	0.999	6300.0	1101.8	699	1096	2032	945	1982	1764	1546	404

TABLE 2.133

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.38)

KA 13 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4824.0	1	1	1	1	1193	1002	999	260
LARGE	0.999	32000.0	3480.0	1	1	1	1	846	733	620	178
LARGE	0.999	32000.0	2290.0	1	1	1	1	500	386	284	92
MEDIUM	0.999	6300.0	1103.6	1	1	1	1	1574	1371	1159	331
MEDIUM	0.999	6300.0	839.0	1	1	1	1	1074	960	840	208
MEDIUM	0.999	6300.0	604.8	1	1	1	1	728	614	505	148
SMALL	0.999	1544.0	409.7	1	1	1	1	2984	2732	2497	568
SMALL	0.999	1544.0	344.9	1	1	1	1	2328	2098	1874	472
SMALL	0.999	1544.0	287.5	1	1	1	1	1747	1537	1323	363
MINI	0.999	64.0	118.5	242	626	1606	3040	27781	26673	26033	
MINI	0.999	64.0	115.8	227	597	1510	2928	27121	26036	25407	
MINI	0.999	64.0	113.4	214	571	1425	2829	26535	25470	24850	

TABLE 2.134

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.35)

KA 13 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4824.0	803	1246	2514	1053	1605	1400	1188	323
LARGE	0.999	32000.0	3480.0	788	1198	2419	984	1092	978	858	200
LARGE	0.999	32000.0	2290.0	775	1156	2334	924	746	632	522	142
MEDIUM	0.999	6300.0	1103.6	811	1273	2569	1093	1987	1769	1550	395
MEDIUM	0.999	6300.0	839.0	796	1226	2474	1024	1330	1135	1078	272
MEDIUM	0.999	6300.0	604.8	783	1184	2390	964	973	860	743	198

TABLE 2.135

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.35)

C 4 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1422.2	1	1	1	1	227	105	65	44
LARGE	0.999	32000.0	1497.7	1	1	1	1	251	129	75	50
MEDIUM	0.995	6300.0	451.1	1	1	1	1	499	377	268	110
MEDIUM	0.999	6300.0	239.3	1	1	1	1	163	85	48	28
MEDIUM	0.995	6300.0	793.5	1	1	1	1	1042	920	795	200
MEDIUM	0.999	6300.0	837.1	1	1	1	1	1111	989	862	222
SMALL	0.995	1544.0	249.5	1	1	1	1	1337	1128	1140	312
SMALL	0.999	1544.0	323.1	1	1	1	1	2136	1900	1664	462
SMALL	0.995	1544.0	280.9	1	1	1	1	1678	1457	1229	376
SMALL	0.999	1544.0	340.7	1	1	1	1	2328	2084	1846	498
SMALL	0.995	1544.0	525.8	1	1	1	82	4339	4026	3755	886
SMALL	0.999	1544.0	570.5	1	1	1	112	4825	4495	4216	1000
MINI	0.995	64.0	77.0	68	277	870	1571	18810	17998	17490	
MINI	0.999	64.0	136.8	367	977	2739	4219	34485	33133	32368	
MINI	0.995	64.0	48.3	1	26	197	765	11287	10734	10349	
MINI	0.999	64.0	77.7	71	285	806	1602	18993	18175	17664	

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TABLE 2.136

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.35)

C 4 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1422.2	509	831	1261	660	490	368	260	97
LARGE	0.999	32000.0	1497.7	509	833	1266	664	513	392	282	103
MEDIUM	0.995	6300.0	451.1	519	851	1327	707	761	639	523	169
MEDIUM	0.999	6300.0	239.3	504	826	1245	649	425	303	197	81
MEDIUM	0.995	6300.0	793.5	539	892	1459	803	1179	1183	1049	269
MEDIUM	0.999	6300.0	837.1	542	897	1476	815	1295	1088	1116	291

TABLE 2.137

2000 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.35)

KU 3 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	1	1	1	1	106	46	31	8
LARGE	0.999	32000.0	1067.0	1	1	1	1	116	62	39	17
LARGE	0.999	32000.0	1106.1	1	1	1	1	129	68	42	20
MEDIUM	.995	6300.0	310.6	1	1	1	1	276	154	81	56
MEDIUM	0.999	6300.0	419.2	1	1	1	1	448	326	219	98
MEDIUM	0.999	6300.0	458.3	1	1	1	1	510	388	279	113
MEDIUM	0.995	6300.0	611.1	1	1	1	1	753	631	514	173
MEDIUM	0.999	6300.0	712.7	1	1	1	1	914	792	671	212
MEDIUM	0.999	6300.0	759.4	1	1	1	1	988	866	742	231
SMALL	0.995	1544.0	253.8	1	1	1	1	1383	1173	1167	321
SMALL	0.999	1544.0	355.4	1	1	1	1	2487	2239	1997	528
SMALL	0.999	1544.0	402.1	1	1	1	13	2995	2729	2479	571
SMALL	0.995	1544.0	291.1	1	1	1	1	1789	1564	1334	397
SMALL	0.999	1544.0	341.2	1	1	1	1	2333	2090	1851	499
SMALL	0.999	1544.0	375.3	1	1	1	2	2704	2447	2203	503
SMALL	0.995	1544.0	314.4	1	1	1	1	2042	1808	1575	444
SMALL	0.999	1544.0	384.1	1	1	1	6	2799	2540	2293	526
SMALL	0.999	1544.0	39[illegible]6	1	1	1	11	2935	2671	2422	557
MINI	0.995	64.0	168.8	554	1250	3954	5637	42873	41232	40330	
MINI	0.999	64.0	218.9	848	2201	5856	7856	56006	53912	52795	
MINI	0.999	64.0	253.0	1047	2848	7150	9366	64945	62542	61279	
MINI	0.995	64.0	88.6	108	412	1141	2085	21851	20934	20376	
MINI	0.999	64.0	176.3	598	1392	4238	5969	44839	43130	42196	
MINI	0.999	64.0	188.7	671	1628	4709	6518	48090	46269	45281	

TABLE 2.138

2000 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.36)

KU 3 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	503	820	1225	635	345	223	119	62
LARGE	0.999	32000.0	1067.0	504	823	1234	641	379	257	152	70
LARGE	0.999	32000.0	1106.1	505	824	1237	643	391	269	164	73
MEDIUM	0.995	6300.0	310.6	510	835	1272	668	538	416	307	109
MEDIUM	0.999	6300.0	419.2	517	848	1314	699	711	589	474	152
MEDIUM	0.999	6300.0	458.3	519	852	1329	709	773	651	534	167
MEDIUM	0.995	6300.0	611.1	528	870	1388	752	1015	893	769	226
MEDIUM	0.999	6300.0	712.7	534	883	1428	780	1176	1054	925	228
MEDIUM	0.999	6300.0	759.4	537	888	1446	793	1089	1128	997	252

2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.35)

KA 14 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0.84

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	1	1	1	1	472	350	243	91
MEDIUM	0.999	6300.0	541.8	1	1	1	1	643	521	408	133
SMALL	0.999	1544.0	229.5	1	1	1	1	1119	1147	1014	255
MINI	0.999	64.0	77.0	.12	97	514	1314	10810	17998	17490	

TABLE 2.139

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TABLE 2.140

2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.3S)

KA 14 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0.84

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	710	1186	2242	956	735	613	497	144
MEDIUM	0.999	6300.0	541.8	716	1001	2283	986	905	783	662	186

2.5 LIST OF TABLES: T = 1.60S

Table 2.141 Overall Satellite Forecasts by Service

Table 2.142 Trunking Segment of Overall Satellite Forecasts by Service

Table 2.143 CPS Segment of Overall Satellite Forecasts by Service

Table 2.144 Ka-Portion of CPS Segment of Overall Satellite Forecasts by Service

Table 2.145 Overall Satellite Forecasts by Operating Speed

Table 2.146 Trunking Segment of Overall Satellite Forecasts by Operating Speed

Table 2.147 CPS Segment of Overall Satellite Forecasts by Operating Speed

Table 2.148 Ka-Portion of CPS Segment of Overall Satellite Forecasts by Operating Speed

Table 2.149 Trunking Maximum Net Addressable by Service: High Estimate

Table 2.150 Trunking Maximum Net Addressable by Service: Expected Estimate

Table 2.151 Trunking Maximum Net Addressable by Service: Low Estimate

Table 2.152 Trunking Maximum Net Addressable by Operating Speed: High Estimate

Table 2.153 Trunking Maximum Net Addressable by Operating Speed: Expected Estimate

Table 2.154 Trunking Maximum Net Addressable by Operating Speed: Low Estimate

Table 2.155 Breakeven Distance in Miles for Trunking Networks

Table 2.156 CPS Composite Crossover Distance in Miles Unshared Earth Stations .995 Availability

Table 2.157 CPS Composite Crossover Distance in Miles Shared Earth Stations .995 Availability

Table 2.158 CPS Composite Crossover Distance in Miles Unshared Earth Stations .999 Availability

Table 2.159 CPS Composite Crossover Distance in Miles Shared Earth Stations .999 Availability

Table 2.160 1982 Crossover Distances in Miles for C-Band CPS Services (Unshared Earth Stations)

Table 2.161 1982 Crossover Distances in Miles for C-Band CPS Services (Shared Earth Stations)

Table 2.162 1982 Crossover Distances in Miles for Ku-Band CPS Services (Unshared Earth Stations)

Table 2.163 1982 Crossover Distances in Miles for Ku-Band CPS Services (Shared Earth Stations)

Table 2.164 1990 Crossover Distances in Miles for C-Band CPS Services (Unshared Earth Stations)

Table 2.165 1990 Crossover Distances in Miles for C-Band CPS Services (Shared Earth Stations)

Table 2.166 1990 Crossover Distances in Miles for Ku-Band CPS Services (Unshared Earth Stations)

Table 2.167 1990 Crossover Distances in Miles for Ku-Band CPS Services (Shared Earth Stations)

Table 2.168 1990 Crossover Distances in Miles for Ka-Band CPS Services (Unshared Earth Stations)

Table 2.169 1990 Crossover Distances in Miles for Ka-Band CPS Services (Shared Earth Stations)

Table 2.170 2000 Crossover Distances in Miles for C-Band CPS Services (Unshared Earth Stations)

Table 2.171 2000 Crossover Distances in Miles for C-Band CPS Services (Shared Earth Stations)

Table 2.172 2000 Crossover Distances in Miles for Ku-Band CPS Services (Unshared Earth Stations)

Table 2.173 2000 Crossover Distances in Miles for Ku-Band CPS Services (Shared Earth Stations)

Table 2.174 2000 Crossover Distances in Miles for Ka-Band CPS Services (Unshared Earth Stations)

Table 2.175 2000 Crossover Distances in Miles for Ka-Band CPS Services (Shared Earth Stations)

TABLE 2.141

OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.65)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	1.6	27.4	131.4
MTS (BUSINESS)	4.1	88.6	444.4
PRIVATE LINE	79.1	210.6	648.9
MOBILE	0.2	3.1	10.9
PUBLIC RADIO	0.1	0.2	0.4
COMMERCIAL AND RELIGIOUS	0.1	0.2	0.5
OCCASIONAL	0.2	0.2	0.4
CATV MUSIC	0.0	0.0	0.2
RECORDING	0.0	0.0	0.1
	85.2	330.4	1237.1
DATA			
DATA TRANSFER	0.0	0.3	2.4
BATCH PROCESSING	0.0	0.9	2.1
DATA ENTRY	5.1	97.4	210.6
REMOTE JOB ENTRY	0.1	11.0	10.6
INQUIRY/RESPONSE	0.1	5.1	18.7
TIMESHARING	0.1	1.0	1.3
USPS/EMSS	0.0	0.4	2.1
MAILBOX	0.0	0.7	2.1
ADMINISTRATIVE MESSAGES	1.4	62.0	210.2
FACSIMILE	0.3	4.7	7.2
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.0
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	6.4	12.2
VIDEOTEXT/TELETEXT	0.0	0.9	3.9
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.2	3.1
	7.2	191.7	488.7
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.1	157.7	248.0
	61.3	324.6	395.5

TABLE 2.142

TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.6G)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	1.6	27.4	131.4
MTS (BUSINESS)	4.1	88.2	441.6
PRIVATE LINE	79.1	210.0	643.8
MOBILE	0.2	3.1	10.8
PUBLIC RADIO	0.1	0.2	0.4
COMMERCIAL AND RELIGIOUS	0.1	0.2	0.4
OCCASIONAL	0.2	0.2	0.4
CATV MUSIC	0.0	0.0	0.2
RECORDING	0.0	0.0	0.1
	85.2	329.4	1229.1
DATA			
DATA TRANSFER	0.0	0.3	2.2
BATCH PROCESSING	0.0	0.0	0.0
DATA ENTRY	5.1	0.0	0.0
REMOTE JOB ENTRY	0.1	0.0	0.0
INQUIRY/RESPONSE	0.0	0.0	0.0
TIMESHARING	0.0	0.0	0.0
USPS/EMSS	0.0	0.0	0.0
MAILBOX	0.0	0.0	0.0
ADMINISTRATIVE MESSAGES	1.3	0.0	0.0
FACSIMILE	0.3	0.0	0.0
COMMUNICATING WORD PROCESSORS	0.0	0.0	0.0
TWX/TELEX	0.0	0.0	0.0
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	0.0	0.0
VIDEOTEXT/TELETEXT	0.0	0.9	3.9
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.0	0.0
	6.8	1.1	6.2
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.2	322.8	392.7

TABLE 2.143

CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=1.6S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	0.4	2.9
PRIVATE LINE	0.0	0.6	5.2
MOBILE	0.0	0.0	0.0
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	1.0	8.1
DATA			
DATA TRANSFER	0.0	0.0	0.1
BATCH PROCESSING	0.0	0.9	2.1
DATA ENTRY	0.0	97.4	210.6
REMOTE JOB ENTRY	0.0	11.0	10.6
INQUIRY/RESPONSE	0.1	5.1	18.7
TIMESHARING	0.1	1.0	1.3
USPS/EMSS	0.0	0.4	2.1
MAILBOX	0.0	0.7	2.1
ADMINISTRATIVE MESSAGES	0.1	62.0	210.2
FACSIMILE	0.0	4.7	7.2
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.0
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	6.4	12.2
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.2	3.1
	0.3	190.6	482.6
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.1	1.7	2.7
	0.1	1.7	2.7

TABLE 2.144

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KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.6S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	0.4	2.9
PRIVATE LINE	0.0	0.6	5.2
MOBILE	0.0	0.0	0.0
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	1.0	8.2
DATA			
DATA TRANSFER	0.0	0.0	0.1
BATCH PROCESSING	0.0	0.8	2.0
DATA ENTRY	0.0	97.4	210.6
REMOTE JOB ENTRY	0.0	11.0	10.6
INQUIRY/RESPONSE	0.0	5.1	18.7
TIMESHARING	0.0	1.0	1.3
USPS/EMSS	0.0	0.4	2.1
MAILBOX	0.0	0.6	1.8
ADMINISTRATIVE MESSAGES	0.0	52.5	178.7
FACSIMILE	0.0	4.4	6.7
COMMUNICATING WORD PROCESSORS	0.0	0.4	1.7
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	5.9	11.3
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.2	3.1
	0.0	179.9	448.9
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.0	1.5	2.3
	0.0	1.5	2.3

TABLE 2.145

OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.6S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	4.8	39.9	49.2
4.8 KBPS	1.6	133.3	99.6
9.6 KBPS	0.8	17.9	329.3
56 KBPS	0.0	0.5	9.3
64 KBPS	84.9	329.7	1235.7
1.544 MBPS	1.8	79.6	126.7
6.3 MBPS	1.5	78.8	124.0
>6.3 MBPS	58.3	166.9	147.4
	153.7	846.7	2121.3

TABLE 2.146

TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.6S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	4.5	0.2	0.5
4.8 KBPS	1.5	0.6	0.9
9.6 KBPS	0.8	0.2	2.9
56 KBPS	0.0	0.1	0.7
64 KBPS	84.9	328.8	1227.6
1.544 MBPS	1.8	78.7	125.3
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	153.3	653.4	1627.9

TABLE 2.147

CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=1.6S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.2	39.7	48.8
4.8 KBPS	0.1	132.8	98.7
9.6 KBPS	0.0	17.7	326.4
56 KBPS	0.0	0.4	8.6
64 KBPS	0.0	1.0	8.0
1.544 MBPS	0.0	0.9	1.5
6.3 MBPS	0.0	0.9	1.4
>6.3 MBPS	0.0	0.0	0.0
	0.4	193.3	493.3

TABLE 2.148

KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=1.6S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.0	37.5	45.3
4.8 KBPS	0.0	125.3	91.7
9.6 KBPS	0.0	16.8	303.2
56 KBPS	0.0	0.4	8.6
64 KBPS	0.0	1.0	8.1
1.544 MBPS	0.0	0.7	1.2
6.3 MBPS	0.0	0.7	1.2
>6.3 MBPS	0.0	0.0	0.0
	0.0	182.4	459.4

TABLE 2.149

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=1.6S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	1.6	41.8	192.0
MTS (BUSINESS)	4.1	134.7	644.9
PRIVATE LINE	79.1	247.6	701.7
MOBILE	0.2	3.6	11.8
PUBLIC RADIO	0.1	0.2	0.4
COMMERCIAL AND RELIGIOUS	0.1	0.3	0.5
OCCASIONAL	0.2	0.2	0.4
CATV MUSIC	0.0	0.0	0.2
RECORDING		0.0	0.1
	85.2	428.6	1552.0
DATA			
DATA TRANSFER	0.0	0.3	2.4
BATCH PROCESSING	0.0	0.3	0.9
DATA ENTRY	5.1	34.2	58.1
REMOTE JOB ENTRY	0.1	3.9	10.6
INQUIRY/RESPONSE	0.1	1.7	3.4
TIMESHARING	0.0	0.4	1.1
USPS/EMSS		0.3	0.9
MAILBOX	0.0	0.2	0.5
ADMINISTRATIVE MESSAGES	1.3	19.0	50.7
FACSIMILE	0.3	2.2	2.7
COMMUNICATING WORD PROCESSORS	0.0	0.1	0.5
TWX/TELEX	0.0	0.1	0.1
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	2.2	3.3
VIDEOTEXT/TELETEXT	0.0	1.0	4.2
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.1	0.9
	6.9	65.9	140.3
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.150

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=1.6S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	1.6	27.4	131.4
MTS (BUSINESS)	4.1	88.2	441.6
PRIVATE LINE	79.1	210.0	643.8
MOBILE	0.2	3.1	10.8
PUBLIC RADIO	0.1	0.2	0.4
COMMERCIAL AND RELIGIOUS	0.1	0.2	0.4
OCCASIONAL	0.2	0.2	0.4
CATV MUSIC	0.0	0.0	0.2
RECORDING		0.0	0.1
	85.2	329.4	1229.1
DATA			
DATA TRANSFER	0.0	0.3	2.2
BATCH PROCESSING	0.0	0.3	0.9
DATA ENTRY	5.1	31.4	54.5
REMOTE JOB ENTRY	0.1	3.6	10.0
INQUIRY/RESPONSE	0.1	1.6	3.2
TIMESHARING	0.0	0.4	1.0
USPS/EMSS		0.2	0.9
MAILBOX	0.0	0.2	0.5
ADMINISTRATIVE MESSAGES	1.3	17.4	47.6
FACSIMILE	0.3	2.0	2.5
COMMUNICATING WORD PROCESSORS	0.0	0.1	0.4
TWX/TELEX	0.0	0.1	0.1
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	2.0	3.1
VIDEOTEXT/TELETEXT	0.0	0.9	3.9
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.1	0.9
	6.9	60.5	131.6
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.15

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=1.6S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	1.6	18.9	81.5
MTS (BUSINESS)	4.1	60.9	273.9
PRIVATE LINE	79.1	184.9	605.1
MOBILE	0.2	2.7	10.2
PUBLIC RADIO	0.1	0.2	0.3
COMMERCIAL AND RELIGIOUS	0.1	0.2	0.4
OCCASIONAL	0.2	0.2	0.4
CATV MUSIC	0.0	0.0	0.2
RECORDING		0.0	0.1
	85.2	268.1	972.2
DATA			
DATA TRANSFER	0.0	0.2	2.1
BATCH PROCESSING	0.0	0.3	0.8
DATA ENTRY	5.1	28.6	50.9
REMOTE JOB ENTRY	0.1	3.2	9.3
INQUIRY/RESPONSE	0.1	1.4	3.0
TIMESHARING	0.0	0.3	1.0
USPS/EMSS		0.2	0.8
MAILBOX	0.0	0.2	0.4
ADMINISTRATIVE MESSAGES	1.3	15.9	44.5
FACSIMILE	0.3	1.8	2.4
COMMUNICATING WORD PROCESSORS	0.0	0.1	0.4
TWX/TELEX	0.0	0.1	0.1
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	1.8	2.9
VIDEOTEXT/TELETEXT	0.0	0.8	3.7
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.1	0.8
	6.9	55.1	123.0
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.152

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=1.65)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	4.6	15.1	14.6
4.8 KBPS	1.5	41.8	29.8
9.6 KBPS	0.8	8.6	86.5
56 KBPS	0.0	0.3	8.2
64 KBPS	84.9	427.8	1550.5
1.544 MBPS	1.8	78.9	125.5
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	153.4	817.3	2085.1

TABLE 2.153

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=1.6S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	4.6	13.8	13.7
4.8 KBPS	1.5	38.4	28.0
9.6 KBPS	0.8	7.9	81.1
56 KBPS	0.0	0.3	7.6
64 KBPS	84.9	328.8	1227.6
1.544 MBPS	1.8	78.7	125.3
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	153.4	712.8	1753.4

TABLE 2.154

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=1.6S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	4.6	12.6	12.8
4.8 KBPS	1.5	34.9	26.1
9.6 KBPS	0.8	7.2	75.8
56 KBPS	0.0	0.3	7.1
64 KBPS	84.9	267.5	970.8
1.544 MBPS	1.8	78.6	125.1
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	153.4	646.1	1487.9

TABLE 2.155

BREAKEVEN DISTANCE IN MILES FOR TRUNKING NETWORKS
(T=1.6S)

YR/BAND	OPERATING SPEEDS							
	2.4	4.8	9.6	56	T1	V1	V2	V3
1982								
C	433	682	1235	530	187	1068	940	832
KU	900	1142	1664	686	327	1877	1685	1492
1990								
C	416	645	1086	471	139	841	728	615
KU	478	632	892	487	158	899	786	671
KA	454	608	869	483	159	891	777	663
KA	451	603	858	471	142	821	707	595
2000								
C	391	614	1033	426	137	919	797	676
KU	324	454	670	381	74	519	397	288
KA	329	472	715	442	162	876	754	634
KA	326	467	704	429	144	804	682	564

TABLE 2.156

CPS COMPOSITE CRO' OVER DISTANCE IN MILES
UNSHARED EARTH ST. IONS .995 AVAILABILITY
(T=1.6S)

YR/BAND		OPERATING SPEEDS							
		2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	221	174	263	352	550	4817	4529	4296
	KU	358	443	772	962	710	8979	8542	8237
1990									
	C	22	45	131	223	461	3740	3476	3252
	KU	08	223	500	650	465	6374	6021	5753
	KA	21	47	127	203	382	3601	3335	3098
2000									
	C	6	20	49	134	438	3043	2789	2660
	KU	46	119	309	412	277	4231	3966	3761
	KA	4	15	48	106	231	2253	2055	1874

TABLE 2.157

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .995 AVAILABILITY
(T=1.6S)

YR/BAND		OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	1627	2519	3986	1497	308	1620	1467	1315
	KU	1652	2570	4089	1616	444	2314	2106	1907
1990									
	C	934	1500	2824	1072	238	1190	1052	904
	KU	938	1512	2850	1094	266	1316	1174	1023
	KA	1085	1987	3663	1433	339	1721	1524	1364
2000									
	C	752	1123	2234	1013	232	1097	939	783
	KU	743	1127	2172	968	160	757	679	562
	KA	1017	1768	3503	1266	201	1062	940	814

TABLE 2.158

CFS COMPOSITE CROSSOVER DISTANCE IN MILES
UNSHARED EARTH STATIONS .999 AVAILABILITY
(T=1.6S)

YR/BAND		OPERATING SPEEDS							
		2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	289	303	511	655	695	7036	6671	6402
	KU	412	541	943	1176	969	10885	10383	10043
1990									
	C	43	112	264	404	555	5134	4826	4577
	KU	115	278	609	812	626	7854	7446	7160
	KA	21	47	127	203	382	3601	3335	3098
2000									
	C	23	53	157	283	478	4102	3810	3652
	KU	58	161	393	524	373	5294	5019	4794
	KA	4	15	48	106	231	2253	2055	1874

TABLE 2.159

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .999 AVAILABILITY
(T=1.65)

YR/BAND		OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	1637	2539	4026	1543	359	1881	1709	1553
	KU	1672	2609	4166	1706	565	2848	2622	2414
1990									
	C	949	1549	2923	1101	339	1665	1458	1328
	KU	946	1539	2903	1152	332	1656	1483	1313
	KA	1085	1987	3663	1433	339	1721	1524	1364
2000									
	C	752	1152	2230	1010	229	1099	940	785
	KU	749	1113	2210	995	205	973	817	665
	KA	1017	1768	3503	1266	201	1062	940	814

TABLE 2.160

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.68)

C 1 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2388.0	119	4	1	1	693	593	495	130
LARGE	0.999	32000.0	2622.0	122	6	1	1	766	666	567	148
MEDIUM	0.995	6300.0	1046.5	153	34	1	1	2033	1835	1641	401
MEDIUM	0.995	6300.0	1159.0	160	42	1	1	2335	2127	1928	457
MEDIUM	0.995	6300.0	938.0	147	26	1	1	1741	1554	1364	346
MEDIUM	0.999	6300.0	1116.0	158	39	1	1	2220	2016	1818	436
SMALL	0.995	1544.0	394.0	187	73	1	36	3541	3291	3072	729
SMALL	0.999	1544.0	571.2	230	140	69	192	5484	5168	4916	1184
SMALL	0.995	1544.0	404.7	190	76	1	43	3658	3405	3183	756
SMALL	0.999	1544.0	546.8	225	128	56	164	5217	4909	4662	1121
SMALL	0.995	1544.0	592.0	236	150	81	216	5712	5388	5133	1237
SMALL	0.999	1544.0	675.0	256	191	149	311	6622	6267	5997	1450
MINI	0.995	64.0	201.0	1451	3003	6250	7617	52395	50461	49442	
MINI	0.999	64.0	343.4	2815	5731	11706	13982	90067	86834	85198	
MINI	0.995	64.0	86.2	600	879	1852	2485	22025	21138	20616	
MINI	0.999	64.0	146.4	956	1957	4158	5176	37951	36515	35732	

TABLE 2.161

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.6S)

C 1 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2388.0	1602	2470	3889	1383	961	861	755	184
LARGE	0.999	32000.0	2622.0	1607	2479	3907	1404	1058	934	827	203
MEDIUM	0.995	6300.0	1046.5	1658	2582	4113	1645	2483	2270	2068	470
MEDIUM	0.995	6300.0	1159.0	1669	2604	4157	1696	2785	2562	2355	533
MEDIUM	0.995	6300.0	938.0	1648	2561	4071	1596	2191	1988	1791	415
MEDIUM	0.999	6300.0	1116.0	1665	2596	4141	1676	2670	2450	2245	506

TABLE 2.162

1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.6S)

KU 1 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3878.0	136	17	1	1	1272	1101	951	258
LARGE	0.999	32000.0	4174.0	140	20	1	1	1429	1252	1067	288
LARGE	0.999	32000.0	4246.0	141	20	1	1	1467	1289	1104	295
MEDIUM	0.995	6300.0	1128.0	158	39	1	1	2252	2047	1849	442
MEDIUM	0.999	6300.0	1424.0	176	60	1	11	3047	2815	2604	613
MEDIUM	0.999	6300.0	1496.0	180	65	1	19	3241	3002	2787	659
MEDIUM	0.995	6300.0	1236.0	165	47	1	1	2542	2327	2124	496
MEDIUM	0.999	6300.0	1505.0	181	66	1	21	3265	3025	2810	664
MEDIUM	0.999	6300.0	1592.0	186	72	1	33	3499	3251	3032	719
SMALL	0.995	1544.0	551.0	226	130	58	169	5263	4954	4706	1132
SMALL	0.999	1544.0	820.5	292	262	292	477	8218	7807	7511	1824
SMALL	0.999	1544.0	907.5	313	305	377	576	9172	8728	8417	2047
SMALL	0.995	1544.0	621.0	243	164	98	249	6030	5695	5435	1312
SMALL	0.999	1544.0	733.0	270	219	206	377	7258	6881	6600	1599
SMALL	0.999	1544.0	797.0	286	251	269	450	7960	7558	7267	1764
SMALL	0.995	1544.0	611.0	240	159	92	237	5921	5589	5331	1286
SMALL	0.999	1544.0	737.6	271	221	210	382	7309	6929	6648	1611
SMALL	0.999	1544.0	760.2	277	232	233	408	7557	7169	6884	1669
MINI	0.995	64.0	391.0	3271	6643	13530	16110	102660	98992	97151	
MINI	0.999	64.0	502.5	4339	8779	17802	21094	132157	127472	125148	
MINI	0.999	64.0	566.5	4952	10005	20254	23954	149088	143820	141219	
MINI	0.995	64.0	179.0	1241	2582	5407	6633	46575	44842	43918	
MINI	0.999	64.0	355.0	2926	5953	12151	14500	93136	89797	88111	
MINI	0.999	64.0	370.0	3147	6394	13032	15529	99220	95672	93886	

TABLE 2.163

1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.65)

NO 1 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3878.0	1631	2527	4003	1516	1722	1535	1346	327
LARGE	0.999	32000.0	4174.0	1637	2539	4026	1543	1879	1687	1494	357
LARGE	0.999	32000.0	4246.0	1638	2541	4032	1549	1917	1723	1531	364
MEDIUM	0.995	6300.0	1128.0	1666	2598	4145	1682	2702	2481	2276	514
MEDIUM	0.999	6300.0	1424.0	1695	2656	4260	1816	3497	3249	3031	700
MEDIUM	0.999	6300.0	1496.0	1702	2670	4288	1849	3691	3436	3214	745
MEDIUM	0.995	6300.0	1236.0	1677	2619	4187	1731	2992	2762	2551	581
MEDIUM	0.999	6300.0	1505.0	1703	2671	4292	1853	3715	3460	3237	751
MEDIUM	0.999	6300.0	1592.0	1712	2688	4326	1892	3949	3685	3459	805

TABLE 2.16A

1990 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.6S)

C 3 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1544.4	1	1	1	1	396	282	183	73
LARGE	0.999	32000.0	3213.4	1	1	1	1	994	880	763	220
MEDIUM	0.995	6300.0	573.5	1	1	1	1	886	772	659	193
MEDIUM	0.999	6300.0	698.2	1	1	1	1	1113	999	878	228
MEDIUM	0.995	6300.0	841.2	1	1	1	1	1420	1222	1013	310
MEDIUM	0.999	6300.0	954.2	1	1	1	1	1765	1555	1340	375
SMALL	0.995	1544.0	297.1	1	1	1	1	2554	2316	2089	522
SMALL	0.999	1544.0	410.2	1	1	1	50	3963	3677	3426	807
SMALL	0.995	1544.0	321.8	1	1	1	1	2861	2613	2380	549
SMALL	0.999	1544.0	302.5	1	1	1	1	2621	2381	2152	535
SMALL	0.995	1544.0	546.0	1	1	1	172	5655	5310	5032	1203
SMALL	0.999	1544.0	613.2	1	1	1	259	6492	6119	5827	1399
MINI	0.995	64.0	130.3	575	1191	3479	4928	38023	36562	35754	
MINI	0.999	64.0	209.4	1106	2913	6923	8946	61802	59522	58324	
MINI	0.995	64.0	51.8	80	186	543	1086	14424	13777	13355	
MINI	0.999	64.0	82.4	253	597	1393	2495	23623	22659	22086	

TABLE 2.163

1990 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.65)

C 3 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1544.4	918	1449	2723	1041	698	584	476	134
LARGE	0.999	32000.0	3213.4	941	1522	2869	1038	1291	1097	1056	269
MEDIUM	0.995	6300.0	573.5	936	1509	2843	1007	1110	1075	951	235
MEDIUM	0.999	6300.0	698.2	945	1536	2898	1072	1491	1290	1080	307
MEDIUM	0.995	6300.0	841.2	955	1568	2961	1145	1927	1712	1494	388
MEDIUM	0.999	6300.0	954.2	962	1593	3011	1204	2273	2045	1822	453

TABLE 2.166

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.65)

KU 2 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1960.0	1	1	1	1	545	431	328	109
LARGE	0.999	32000.0	2132.3	1	1	1	1	606	493	388	125
LARGE	0.999	32000.0	2188.7	1	1	1	1	627	513	407	130
MEDIUM	0.995	6300.0	585.1	1	1	1	1	907	794	679	199
MEDIUM	0.999	6300.0	757.4	1	1	1	1	1164	1107	983	262
MEDIUM	0.999	6300.0	813.8	1	1	1	1	1337	1141	1082	294
MEDIUM	0.995	6300.0	883.8	1	1	1	1	1550	1347	1136	334
MEDIUM	0.999	6300.0	1034.4	1	1	1	1	2010	1791	1573	420
MEDIUM	0.999	6300.0	1101.8	1	1	1	1	2216	1990	1768	459
SMALL	0.995	1544.0	374.9	1	1	1	25	3523	3252	3009	704
SMALL	0.999	1544.0	525.5	1	1	1	145	5400	5064	4790	1143
SMALL	0.999	1544.0	[illegible]	1	1	1	233	6239	5875	5587	1340
SMALL	0.995	1544.0	[illegible]	1	1	1	68	4273	3976	3721	879
SMALL	0.999	1544.0	[illegible]	1	1	1	125	5206	4877	4606	1098
SMALL	0.999	1544.0	[illegible]	1	1	1	189	5819	5469	5188	1241
SMALL	0.995	1544.0	451.3	1	1	1	81	4475	4171	3912	927
SMALL	0.999	1544.0	553.8	1	1	1	182	5752	5404	5124	1226
SMALL	0.999	1544.0	517.1	1	1	1	134	5295	4963	4690	1119
MINI	0.995	64.0	257.2	1493	3953	9004	11374	76172	73396	71964	
MINI	0.999	64.0	332.1	2309	5584	12265	15179	98689	95136	93336	
MINI	0.999	64.0	381.3	2844	6655	14407	17678	113480	109417	107374	
MINI	0.995	64.0	130.2	574	1189	3474	4923	37993	36533	35726	
MINI	0.999	64.0	257.9	1501	3969	9034	11410	76382	73599	72163	
MINI	0.999	64.0	275.8	1696	4358	9814	12319	81764	78795	77271	

TABLE 2.167

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.65)

KU 2 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	54	64	1544
LARGE	0.995	32000.0	1960.0	924	1467	2760	1067	847	733	621	171
LARGE	0.999	32000.0	2132.3	926	1475	2775	1078	909	795	680	186
LARGE	0.999	32000.0	2188.7	927	1477	2779	1082	929	815	700	191
MEDIUM	0.995	6300.0	585.1	937	1511	2848	1013	1145	1096	972	242
MEDIUM	0.999	6300.0	757.4	949	1549	2924	1102	1672	1464	1251	340
MEDIUM	0.999	6300.0	813.8	953	1562	2949	1131	1844	1631	1415	373
MEDIUM	0.995	6300.0	883.8	958	1577	2980	1167	2058	1837	1618	413
MEDIUM	0.999	6300.0	1034.4	968	1611	3046	1245	2518	2281	2054	499
MEDIUM	0.999	6300.0	1101.8	973	1626	3076	1280	2723	2480	2250	538

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TABLE 2.168

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.65)

KA 13 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4824.0	1	1	1	1	1752	1542	1327	362
LARGE	0.999	32000.0	3480.0	1	1	1	1	1089	976	855	211
LARGE	0.999	32000.0	2290.0	1	1	1	1	663	549	442	131
MEDIUM	0.999	6300.0	1103.6	1	1	1	1	2222	1995	1773	450
MEDIUM	0.999	6300.0	839.0	1	1	1	1	1413	1215	1006	299
MEDIUM	0.999	6300.0	604.8	1	1	1	1	943	830	714	200
SMALL	0.999	1544.0	407.7	1	1	1	8	3957	3671	3420	793
SMALL	0.999	1544.0	344.7	1	1	1	1	3149	2891	2654	604
SMALL	0.999	1544.0	287.5	1	1	1	1	2434	2200	1975	490
MINI	0.999	64.0	118.5	426	960	2630	4179	34475	33137	32387	
MINI	0.999	64.0	115.8	408	923	2512	4042	33664	32353	31617	
MINI	0.999	64.0	113.4	391	891	2408	3920	32942	31657	30932	

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.65)

KA 13 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4824.0	1116	2028	3747	1530	2259	2032	1809	441
LARGE	0.999	32000.0	3480.0	1098	1970	3630	1393	1451	1251	1042	289
LARGE	0.999	32000.0	2290.0	1082	1918	3526	1273	965	852	735	192
MEDIUM	0.999	6300.0	1103.6	1006	2062	3815	1609	2729	2485	2255	529
MEDIUM	0.999	6300.0	839.0	1108	2004	3698	1473	1921	1705	1488	377
MEDIUM	0.999	6300.0	604.8	1092	1952	3594	1352	1206	1015	1007	243

TABLE 2.169

TABLE 2.170

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.68)

C 4 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1422.2	1	1	1	1	332	211	107	69
LARGE	0.999	32000.0	1497.7	1	1	1	1	361	240	135	76
MEDIUM	0.995	6300.0	451.1	1	1	1	1	666	545	431	151
MEDIUM	0.999	6300.0	239.3	1	1	1	1	253	131	76	50
MEDIUM	0.995	6300.0	793.5	1	1	1	1	1231	1025	1079	292
MEDIUM	0.999	6300.0	837.1	1	1	1	1	1374	1163	1161	319
SMALL	0.995	1544.0	249.5	1	1	1	1	1967	1736	1503	430
SMALL	0.999	1544.0	323.1	1	1	1	12	2951	2686	2437	560
SMALL	0.995	1544.0	280.9	1	1	1	1	2387	2141	1902	509
SMALL	0.999	1544.0	340.7	1	1	1	19	3186	2913	2661	616
SMALL	0.995	1544.0	525.8	1	1	1	181	5662	5303	5010	1195
SMALL	0.999	1544.0	570.5	1	1	1	243	6259	5881	5578	1335
MINI	0.995	64.0	77.0	132	496	1161	2361	23472	22500	21915	
MINI	0.999	64.0	136.8	563	1260	3956	5621	42765	41127	40227	
MINI	0.995	64.0	48.3	20	106	470	1072	14213	13560	13127	
MINI	0.999	64.0	77.7	137	506	1194	2400	23698	22718	22129	

TABLE 2.171

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.65)

C 4 CPS2
UTIL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1422.2	737	1179	2136	943	655	534	420	135
LARGE	0.999	32000.0	1497.7	739	1181	2144	948	684	563	448	142
MEDIUM	0.995	6300.0	451.1	750	1010	2218	1001	990	868	744	217
MEDIUM	0.999	6300.0	239.3	734	1173	2117	929	576	454	343	115
MEDIUM	0.995	6300.0	793.5	775	1091	2380	1118	1773	1549	1319	376
MEDIUM	0.999	6300.0	837.1	778	1101	2401	1133	1916	1687	1455	403

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TABLE 2.172

2000 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.6S)

KU 3 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	1	1	1	1	154	81	46	25
LARGE	0.999	32000.0	1067.0	1	1	1	1	196	101	59	36
LARGE	0.999	32000.0	1106.1	1	1	1	1	211	108	63	39
MEDIUM	0.995	6300.0	310.6	1	1	1	1	392	270	165	84
MEDIUM	0.999	6300.0	419.2	1	1	1	1	604	482	371	136
MEDIUM	0.999	6300.0	458.3	1	1	1	1	681	559	445	155
MEDIUM	0.995	6300.0	611.1	1	1	1	1	979	857	734	228
MEDIUM	0.999	6300.0	712.7	1	1	1	1	1177	1055	926	242
MEDIUM	0.999	6300.0	759.4	1	1	1	1	1119	1147	1014	271
SMALL	0.995	1544.0	253.8	1	1	1	1	2024	1791	1558	441
SMALL	0.999	1544.0	355.4	1	1	1	25	3383	3103	2847	662
SMALL	0.999	1544.0	402.1	1	1	1	63	4007	3706	3440	808
SMALL	0.995	1544.0	291.1	1	1	1	1	2523	2273	2031	534
SMALL	0.999	1544.0	341.2	1	1	1	19	3193	2920	2667	617
SMALL	0.999	1544.0	375.3	1	1	1	41	3649	3360	3100	724
SMALL	0.995	1544.0	314.4	1	1	1	8	2835	2574	2327	533
SMALL	0.999	1544.0	384.1	1	1	1	49	3767	3474	3212	751
SMALL	0.999	1544.0	396.6	1	1	1	59	3934	3635	3370	791
MINI	0.995	64.0	168.8	794	2008	5451	7366	53089	51095	50026	
MINI	0.999	64.0	218.9	1155	3178	7792	10097	69252	66701	65367	
MINI	0.999	64.0	253.0	1329	3975	9385	11956	80254	77323	75809	
MINI	0.995	64.0	88.6	216	663	1703	2994	27214	26113	25467	
MINI	0.999	64.0	176.3	848	2103	5801	7774	55508	53431	52322	
MINI	0.999	64.0	188.7	937	2473	6381	8450	59509	57294	56120	

TABLE 2.173

2000 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.65)

KU 3 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	731	1165	2093	911	477	355	247	91
LARGE	0.999	32000.0	1067.0	732	1168	2103	919	519	397	288	101
LARGE	0.999	32000.0	1106.1	733	1169	2107	921	534	412	302	105
MEDIUM	0.995	6300.0	310.6	740	1183	2151	953	715	593	478	150
MEDIUM	0.999	6300.0	419.2	748	1002	2203	990	927	805	684	202
MEDIUM	0.999	6300.0	458.3	750	1011	2221	1003	1004	882	758	221
MEDIUM	0.995	6300.0	611.1	762	1048	2294	1056	1175	1180	1047	264
MEDIUM	0.999	6300.0	712.7	769	1072	2342	1090	1508	1293	1068	327
MEDIUM	0.999	6300.0	759.4	773	1083	2364	1106	1661	1441	1213	355

TABLE 2.174

2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 1.6S)

KA 14 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0.84

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	1	1	1	1	634	512	399	130
MEDIUM	0.999	6300.0	541.8	1	1	1	1	843	722	602	182
SMALL	0.999	1544.0	229.5	1	1	1	1	1699	1478	1249	363
MINI	0.999	64.0	77.0	.65	286	942	2105	23472	22500	21915	

TABLE 2.175

2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 1.6S)

KA 14 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0.84

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	1013	1755	3477	1236	957	835	712	196
MEDIUM	0.999	6300.0	541.8	1021	1780	3528	1296	1167	1045	915	205

2.6 LIST OF TABLES: T = 2.00S

Table 2.176 Overall Satellite Forecasts by Service

Table 2.177 Trunking Segment of Overall Satellite Forecasts by Service

Table 2.178 CPS Segment of Overall Satellite Forecasts by Service

Table 2.179 Ka-Portion of CPS Segment of Overall Satellite Forecasts by Service

Table 2.180 Overall Satellite Forecasts by Operating Speed

Table 2.181 Trunking Segment of Overall Satellite Forecasts by Operating Speed

Table 2.182 CPS Segment of Overall Satellite Forecasts by Operating Speed

Table 2.183 Ka-Portion of CPS Segment of Overall Satellite Forecasts by Operating Speed

Table 2.184 Trunking Maximum Net Addressable by Service: High Estimate

Table 2.185 Trunking Maximum Net Addressable by Service: Expected Estimate

Table 2.186 Trunking Maximum Net Addressable by Service: Low Estimate

Table 2.187 Trunking Maximum Net Addressable by Operating Speed: High Estimate

Table 2.188 Trunking Maximum Net Addressable by Operating Speed: Expected Estimate

Table 2.189 Trunking Maximum Net Addressable by Operating Speed: Low Estimate

Table 2.190 Breakeven Distance in Miles for Trunking Networks

Table 2.191 CPS Composite Crossover Distance in Miles Unshared Earth Stations .995 Availability

Table 2.192 CPS Composite Crossover Distance in Miles Shared Earth Stations .995 Availability

Table 2.193 CPS Composite Crossover Distance in Miles Unshared Earth Stations .999 Availability

Table 2.194 CPS Composite Crossover Distance in Miles Shared Earth Stations .999 Availability

Table 2.195 1982 Crossover Distances in Miles for C-Band CPS Services (Unshared Earth Stations)

Table 2.196 1982 Crossover Distances in Miles for C-Band CPS Services (Shared Earth Stations)

Table 2.197 1982 Crossover Distances in Miles for Ku-Band CPS Services (Unshared Earth Stations)
Table 2.198 1982 Crossover Distances in Miles for Ku-Band CPS Services (Shared Earth Stations)
Table 2.199 1990 Crossover Distances in Miles for C-Band CPS Services (Unshared Earth Stations)
Table 2.200 1990 Crossover Distances in Miles for C-Band CPS Services (Shared Earth Stations)
Table 2.201 1990 Crossover Distances in Miles for Ku-Band CPS Services (Unshared Earth Stations)
Table 2.202 1990 Crossover Distances in Miles for Ku-Band CPS Services (Shared Earth Stations)
Table 2.203 1990 Crossover Distances in Miles for Ka-Band CPS Services (Unshared Earth Stations)
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Table 2.205 2000 Crossover Distances in Miles for C-Band CPS Services (Unshared Earth Stations)
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Table 2.208 2000 Crossover Distances in Miles for Ku-Band CPS Services (Shared Earth Stations)
Table 2.209 2000 Crossover Distances in Miles for Ka-Band CPS Services (Unshared Earth Stations)
Table 2.210 2000 Crossover Distances in Miles for Ka-Band CPS Services (Shared Earth Stations)

TABLE 2.176

OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=2S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.8	17.7	98.2
MTS (BUSINESS)	2.1	56.9	335.6
PRIVATE LINE	39.8	134.5	489.4
MOBILE	0.1	2.0	8.2
PUBLIC RADIO	0.0	0.1	0.3
COMMERCIAL AND RELIGIOUS	0.0	0.1	0.3
OCCASIONAL	0.1	0.1	0.3
CATV MUSIC	0.0	0.0	0.1
RECORDING	0.0	0.0	0.0
	43.0	211.5	932.5
DATA			
DATA TRANSFER	0.0	0.2	2.1
BATCH PROCESSING	0.0	0.9	2.1
DATA ENTRY	3.3	97.4	210.6
REMOTE JOB ENTRY	0.1	11.0	10.6
INQUIRY/RESPONSE	0.1	5.1	18.7
TIMESHARING	0.1	1.0	1.3
USPS/EMSS	0.0	0.3	1.9
MAILBOX	0.0	0.7	2.1
ADMINISTRATIVE MESSAGES	0.9	62.0	210.2
FACSIMILE	0.2	4.4	6.8
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.0
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	6.3	12.1
VIDEOTEXT/TELETEXT	0.0	0.5	2.2
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.2	3.1
	4.9	190.8	485.9
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.1	157.7	248.0
	61.3	324.6	395.5

TABLE 2.177

TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=2S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.8	17.7	98.2
MTS (BUSINESS)	2.1	56.5	332.7
PRIVATE LINE	39.8	134.0	484.2
MOBILE	0.1	2.0	8.2
PUBLIC RADIO	0.0	0.1	0.3
COMMERCIAL AND RELIGIOUS	0.0	0.1	0.3
OCCASIONAL	0.1	0.1	0.3
CATV MUSIC	0.0	0.0	0.1
RECORDING	0.0	0.0	0.0
	43.0	210.6	924.4
DATA			
DATA TRANSFER	0.0	0.2	2.0
BATCH PROCESSING	0.0	0.0	0.0
DATA ENTRY	3.3	0.0	0.0
REMOTE JOB ENTRY	0.1	0.0	0.0
INQUIRY/RESPONSE	0.0	0.0	0.0
TIMESHARING	0.0	0.0	0.0
USPS/EMSS	0.0	0.0	0.0
MAILBOX	0.0	0.0	0.0
ADMINISTRATIVE MESSAGES	0.8	0.0	0.0
FACSIMILE	0.2	0.0	0.0
COMMUNICATING WORD PROCESSORS	0.0	0.0	0.0
TWX/TELEX	0.0	0.0	0.0
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	0.0	0.0
VIDEOTEXT/TELETEXT	0.0	0.5	2.2
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.0	0.0
	4.5	0.7	4.2
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL	0.0	0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.2	322.8	392.7

TABLE 2.17S

CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=2S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	0.4	2.9
PRIVATE LINE	0.0	0.6	[illegible].2
MOBILE	0.0	0.0	0.0
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	1.0	8.1
DATA			
DATA TRANSFER	0.0	0.0	0.1
BATCH PROCESSING	0.0	0.9	2.1
DATA ENTRY	0.0	97.4	210.6
REMOTE JOB ENTRY	0.0	11.0	10.6
INQUIRY/RESPONSE	0.1	5.1	18.7
TIMESHARING	0.1	1.0	1.3
USPS/EMSS	0.0	0.3	1.9
MAILBOX	0.0	0.7	2.1
ADMINISTRATIVE MESSAGES	0.1	62.0	210.2
FACSIMILE	0.0	4.4	6.8
COMMUNICATING WORD PROCESSORS	0.0	0.5	2.0
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	6.3	12.1
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.2	3.1
	0.3	190.1	481.7
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.1	1.7	2.7
	0.1	1.7	2.7

TABLE 2.179

KA PORTION OF CSS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=2S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.0	0.0	0.0
MTS (BUSINESS)	0.0	0.4	2.9
PRIVATE LINE	0.0	0.6	5.2
MOBILE	0.0	0.0	0.0
PUBLIC RADIO	0.0	0.0	0.0
COMMERCIAL AND RELIGIOUS	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
CATV MUSIC	0.0	0.0	0.0
RECORDING	0.0	0.0	0.0
	0.0	1.0	8.2
DATA			
DATA TRANSFER	0.0	0.0	0.1
BATCH PROCESSING	0.0	0.8	1.9
DATA ENTRY	0.0	97.4	210.6
REMOTE JOB ENTRY	0.0	11.0	10.6
INQUIRY/RESPONSE	0.0	5.1	18.7
TIMESHARING	0.0	1.0	1.3
USPS/EMSS	0.0	0.3	1.9
MAILBOX	0.0	0.6	1.8
ADMINISTRATIVE MESSAGES	0.0	52.5	178.7
FACSIMILE	0.0	4.0	6.3
COMMUNICATING WORD PROCESSORS	0.0	0.4	1.7
TWX/TELEX	0.0	0.1	0.2
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	5.8	11.2
VIDEOTEXT/TELETEXT	0.0	0.0	0.0
TELEMONITORING SERVICE	0.0	0.0	0.1
SECURE VOICE	0.0	0.2	3.1
	0.0	179.5	448.1
VIDEO			
NETWORK	0.0	0.0	0.0
CATV	0.0	0.0	0.0
OCCASIONAL	0.0	0.0	0.0
RECORDING CHANNEL	0.0	0.0	0.0
TELECONFERENCING	0.0	1.5	2.3
	0.0	1.5	2.3

TABLE 2.180

OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=2S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	3.3	40.6	50.6
4.8 KBPS	1.0	133.0	100.3
9.6 KBPS	0.5	16.7	324.8
56 KBPS	0.0	0.4	9.1
64 KBPS	42.8	211.1	931.4
1.544 MBPS	1.7	79.3	126.3
6.3 MBPS	1.5	78.8	124.0
>6.3 MBPS	58.3	166.9	147.4
	109.1	726.9	1813.9

TABLE 2.181

TRUNKING SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=2S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	3.1	0.1	0.2
4.8 KBPS	0.9	0.4	0.5
9.6 KBPS	0.5	0.1	1.8
56 KBPS	0.0	0.1	0.6
64 KBPS	42.8	210.1	923.3
1.544 MBPS	1.7	78.5	124.8
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	108.7	534.1	1321.4

TABLE 2.182

CPS SEGMENT OF OVERALL SATELITE FORECASTS
(TRANSPONDERS)
(T=2S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.2	40.4	30.4
4.8 KBPS	0.1	132.7	99.9
9.6 KBPS	0.0	16.6	322.9
56 KBPS	0.0	0.3	8.5
64 KBPS	0.0	1.0	8.0
1.544 MBPS	0.0	0.9	1.5
6.3 MBPS	0.0	0.9	1.4
>6.3 MBPS	0.0	0.0	0.0
	0.4	192.8	492.5

TABLE 2.183

KA PORTION OF CPS SEGMENT OF OVERALL SATELLITE FORECASTS
(TRANSPONDERS)
(T=2S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	0.0	38.2	46.8
4.8 KBPS	0.0	125.2	92.8
9.6 KBPS	0.0	15.7	300.0
56 KBPS	0.0	0.3	8.4
64 KBPS	0.0	1.0	8.1
1.544 MBPS	0.0	0.7	1.2
6.3 MBPS	0.0	0.7	1.2
>6.3 MBPS	0.0	0.0	0.0
	0.0	181.9	458.5

TABLE 2.184

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=2S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.8	27.0	143.4
MTS (BUSINESS)	2.1	86.2	486.0
PRIVATE LINE	39.8	158.0	527.8
MOBILE	0.1	2.3	8.9
PUBLIC RADIO	0.0	0.2	0.3
COMMERCIAL AND RELIGIOUS	0.0	0.2	0.4
OCCASIONAL	0.1	0.2	0.3
CATV MUSIC	0.0	0.0	0.1
RECORDING		0.0	0.1
	43.0	274.0	1167.3
DATA			
DATA TRANSFER	0.0	0.2	2.1
BATCH PROCESSING	0.0	0.2	0.6
DATA ENTRY	3.3	20.5	32.9
REMOTE JOB ENTRY	0.1	2.3	7.1
INQUIRY/RESPONSE	0.0	1.0	1.9
TIMESHARING	0.0	0.2	0.7
USPS/EMSS		0.1	0.5
MAILBOX	0.0	0.1	0.3
ADMINISTRATIVE MESSAGES	0.8	11.3	28.7
FACSIMILE	0.2	1.3	1.5
COMMUNICATING WORD PROCESSORS	0.0	0.1	0.3
TWX/TELEX	0.0	0.0	0.1
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	1.3	1.9
VIDEOTEXT/TELETEXT	0.0	0.6	2.4
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.0	0.5
	4.6	39.4	81.4
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.185

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=2S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.8	17.7	98.2
MTS (BUSINESS)	2.1	56.5	332.7
PRIVATE LINE	39.8	134.0	484.2
MOBILE	0.1	2.0	8.2
PUBLIC RADIO	0.0	0.1	0.3
COMMERCIAL AND RELIGIOUS	0.0	0.1	0.3
OCCASIONAL	0.1	0.1	0.3
CATV MUSIC	0.0	0.0	0.1
RECORDING		0.0	0.0
	43.0	210.6	924.4
DATA			
DATA TRANSFER	0.0	0.2	2.0
BATCH PROCESSING	0.0	0.2	0.5
DATA ENTRY	3.3	18.8	30.9
REMOTE JOB ENTRY	0.1	2.1	6.6
INQUIRY/RESPONSE	0.0	0.9	1.8
TIMESHARING	0.0	0.2	0.7
USPS/EMSS		0.1	0.5
MAILBOX	0.0	0.1	0.3
ADMINISTRATIVE MESSAGES	0.8	10.4	26.9
FACSIMILE	0.2	1.2	1.4
COMMUNICATING WORD PROCESSORS	0.0	0.1	0.3
TWX/TELEX	0.0	0.0	0.0
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	1.2	1.7
VIDEOTEXT/TELETEXT	0.0	0.5	2.2
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.0	0.5
	4.6	36.2	76.3
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.186

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=2S)

SERVICE	1980	1990	2000
VOICE			
MTS (RESIDENTIAL)	0.8	12.2	60.9
MTS (BUSINESS)	2.1	39.0	206.4
PRIVATE LINE	39.8	118.0	455.2
MOBILE	0.1	1.7	7.7
PUBLIC RADIO	0.0	0.1	0.3
COMMERCIAL AND RELIGIOUS	0.0	0.1	0.3
OCCASIONAL	0.1	0.1	0.3
CATV MUSIC	0.0	0.0	0.1
RECORDING		0.0	0.0
	43.0	171.3	731.3
DATA			
DATA TRANSFER	0.0	0.2	1.8
BATCH PROCESSING	0.0	0.2	0.5
DATA ENTRY	3.3	17.1	28.8
REMOTE JOB ENTRY	0.1	1.9	6.2
INQUIRY/RESPONSE	0.0	0.9	1.6
TIMESHARING	0.0	0.2	0.6
USPS/EMSS		0.1	0.5
MAILBOX	0.0	0.1	0.2
ADMINISTRATIVE MESSAGES	0.8	9.5	25.1
FACSIMILE	0.2	1.1	1.3
COMMUNICATING WORD PROCESSORS	0.0	0.1	0.2
TWX/TELEX	0.0	0.0	0.0
MAILGRAM/TELEGRAM/MONEY ORDERS	0.0	0.0	0.0
POINT OF SALE	0.0	1.1	1.6
VIDEOTEXT/TELETEXT	0.0	0.5	2.1
TELEMONITORING SERVICE	0.0	0.0	0.0
SECURE VOICE	0.0	0.0	0.5
	4.6	33.0	71.3
VIDEO			
NETWORK	10.0	42.9	42.0
CATV	34.0	82.4	68.2
OCCASIONAL	14.3	41.6	36.0
RECORDING CHANNEL		0.0	1.3
TELECONFERENCING	3.0	155.9	245.3
	61.3	322.8	392.7

TABLE 2.187

TRUNKING MAXIMUM NET ADDRESSABLE
HIGH ESTIMATE
IN TRANSPONDERS
(T=2S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	3.1	8.4	7.5
4.8 KBPS	1.0	26.1	15.8
9.6 KBPS	0.5	4.7	51.1
56 KBPS	0.0	0.2	5.8
64 KBPS	42.8	273.5	1166.1
1.544 MBPS	1.7	78.6	135.0
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	108.8	636.3	1641.4

TABLE 2.188

TRUNKING MAXIMUM NET ADDRESSABLE
EXPECTED ESTIMATE
IN TRANSPONDERS
(T=2S.

OPERATING SPEED	1980	1990	2000
2.4 KBPS	3.1	7.7	7.1
4.8 KBPS	1.0	24.0	14.9
9.6 KBPS	0.5	4.3	47.9
56 KBPS	0.0	0.2	5.4
64 KBPS	42.8	210.1	923.3
1.544 MBPS	1.7	78.5	124.8
6.3 MBPS	1.5	78.0	122.7
>6.3 MBPS	58.3	166.9	147.4
	108.8	569.6	1393.5

TABLE 2.189

TRUNKING MAXIMUM NET ADDRESSABLE
LOW ESTIMATE
IN TRANSPONDERS
(T=2S)

OPERATING SPEED	1980	1990	2000
2.4 KBPS	3.1	7.0	6.6
4.8 KBPS	1.0	21.8	13.9
9.6 KBPS	0.5	4.0	44.7
56 KBPS	0.0	0.2	5.1
64 KBPS	42.8	170.9	730.2
1.544 MBPS	1.7	78.4	124.7
6.3 MBPS	1.5	78.0	122.7
16.3 MBPS	58.3	166.9	147.4
	108.8	527.1	1195.3

TABLE 2.190

BREAKEVEN DISTANCE IN MILES FOR TRUNKING NETWORKS
(T=2S)

YR/BAND	OPERATING SPEEDS							
	2.4	4.8	9.6	56	T1	V1	V2	V3
1982								
C	661	1047	2136	806	264	1575	1393	1206
KU	1396	1870	2673	1001	444	2587	2370	2166
1990								
C	641	979	1799	732	191	1103	989	869
KU	719	964	1406	752	214	1088	1062	939
KA	689	934	1359	748	216	1071	1052	929
KA	686	928	1338	732	194	1077	964	844
2000								
C	610	936	1551	674	188	1014	1084	954
KU	526	736	1083	617	109	706	584	469
KA	532	759	1140	693	219	1152	1030	902
KA	528	752	1126	677	197	1062	940	814

TABLE 2.191

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
UNSHARED EARTH STATIONS .995 AVAILABILITY
(T=2S)

YR/BAND	OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980								
C	404	360	428	503	734	6243	5906	5649
KU	578	710	1103	1209	952	11465	10942	10593
1990								
C	37	78	194	331	625	4904	4616	4371
KU	132	303	656	868	633	8199	7797	7498
KA	33	70	193	284	541	4790	4476	4212
2000								
C	12	33	87	216	591	4078	3791	3548
KU	64	174	417	551	370	5412	5154	4925
KA	9	30	76	159	298	2990	2771	2577

TABLE 2.192

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .995 AVAILABILITY
(T=2S)

YR/BAND		OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	2381	3590	5576	2259	426	2249	2044	1845
	KU	2414	3654	5704	2408	610	3133	2897	2684
1990									
	C	1268	2361	4154	1670	328	1667	1494	1324
	KU	1276	2377	4186	1708	337	1824	1648	1475
	KA	1640	3019	5287	2266	458	2412	2179	1985
2000									
	C	1062	1781	3426	1339	313	1510	1362	1198
	KU	1049	1742	3349	1249	229	1105	948	791
	KA	1364	2803	5156	2111	268	1313	1224	1046

TABLE 2.193

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
UNSHARED EARTH STATIONS .999 AVAILABILITY
(T=2S)

YR/BAND		OPERATING SPEEDS 2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	491	538	768	898	925	9016	8583	8282
	KU	645	844	1349	1577	1278	13847	13243	12854
1990									
	C	70	165	377	561	746	6675	6295	6017
	KU	170	375	802	1089	831	10099	9608	9266
	KA	33	70	193	284	541	4790	4476	4212
2000									
	C	34	86	233	413	658	5402	5067	4803
	KU	83	226	523	700	528	6847	6464	6176
	KA	9	30	76	159	298	2990	2771	2577

TABLE 2.194

CPS COMPOSITE CROSSOVER DISTANCE IN MILES
SHARED EARTH STATIONS .999 AVAILABILITY
(T=2S)

YR/BAND		OPERATING SPEEDS							
		2.4	4.8	9.6	56	T1	V1	V2	V3
1980									
	C	2394	3615	5626	2317	503	2592	2375	2171
	KU	2438	3702	5801	2521	761	3800	3542	3318
1990									
	C	1299	2423	4277	1814	460	2388	2156	1931
	KU	1293	2410	4252	1785	435	2215	2061	1879
	KA	1640	3019	5287	2266	458	2412	2179	1985
2000									
	C	1061	1778	3421	1333	315	1533	1364	1199
	KU	1057	1765	3396	1304	279	1354	1211	1049
	KA	1364	2803	5156	2111	268	1313	1224	1046

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TABLE 2.195

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 2S)

C 1 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2386.0	268	84	1	1	908	808	704	179
LARGE	0.999	32000.0	2622.0	271	88	1	1.	1000	900	794	202
MEDIUM	0.995	6300.0	1046.5	311	159	14	10	2782	2558	2351	545
MEDIUM	0.995	6300.0	1159.0	319	176	29	26	3160	2923	2710	633
MEDIUM	0.995	6300.0	938.0	303	143	2	1	2417	2207	2005	467
MEDIUM	0.999	6300.0	1116.0	316	169	22	20	3015	2784	2573	599
SMALL	0.995	1544.0	394.0	353	243	112	130	4667	4379	4141	986
SMALL	0.999	1544.0	571.2	407	352	329	384	7096	6724	6446	1555
SMALL	0.995	1544.0	404.7	356	250	125	146	4814	4520	4280	1020
SMALL	0.999	1544.0	546.8	400	337	299	349	6761	6401	6129	1476
SMALL	0.995	1544.0	592.0	414	364	355	413	7381	6999	6717	1621
SMALL	0.999	1544.0	675.0	439	415	456	532	8519	8097	7797	1888
MINI	0.995	64.0	201.0	2163	4196	8405	9909	65734	63340	62103	
MINI	0.999	64.0	343.4	3868	7606	15225	17865	112824	108806	106799	
MINI	0.995	64.0	86.2	869	1446	2907	3494	27772	26686	26070	
MINI	0.999	64.0	146.4	1509	2088	5790	6858	47679	45907	44966	

TABLE 2.196

1982 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 2S)

C 1 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	2388.0	2351	3529	5454	2117	1408	1232	1047	259
LARGE	0.999	32000.0	2622.0	2357	3541	5477	2143	1563	1381	1194	208
MEDIUM	0.995	6300.0	1046.5	2421	3670	5735	2444	3344	3101	2885	652
MEDIUM	0.995	6300.0	1159.0	2435	3697	5789	2508	3722	3466	3244	741
MEDIUM	0.995	6300.0	938.0	2408	3643	5682	2382	2980	2750	2539	567
MEDIUM	0.999	6300.0	1116.0	2430	3686	5768	2483	3578	3327	3107	707

TABLE 2.197

1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 2S)

KU 1 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3878.0	290	116	1	1	1831	1640	1449	358
LARGE	0.999	32000.0	4174.0	294	125	1	1	2027	1829	1635	394
LARGE	0.999	32000.0	4246.0	295	127	1	1	2074	1875	1680	403
MEDIUM	0.995	6300.0	1128.0	317	171	24	21	3056	2823	2611	609
MEDIUM	0.999	6300.0	1424.0	339	216	75	80	4050	3783	3555	842
MEDIUM	0.999	6300.0	1496.0	345	226	88	95	4292	4016	3785	896
MEDIUM	0.995	6300.0	1236.0	325	187	42	42	3418	3173	2956	694
MEDIUM	0.999	6300.0	1505.0	345	228	89	97	4322	4046	3813	905
MEDIUM	0.999	6300.0	1592.0	352	241	107	125	4614	4328	4091	974
SMALL	0.995	1544.0	551.0	401	339	304	355	6819	6456	6183	1490
SMALL	0.999	1544.0	820.5	484	504	635	740	10513	10023	9690	2355
SMALL	0.999	1544.0	907.5	510	558	741	864	11706	11174	10821	2634
SMALL	0.995	1544.0	621.0	423	382	390	455	7778	7383	7094	1715
SMALL	0.999	1544.0	733.0	457	451	527	615	9314	8865	8551	2074
SMALL	0.999	1544.0	797.0	476	490	606	706	10191	9712	9384	2279
SMALL	0.995	1544.0	611.0	419	376	378	440	7641	7250	6964	1682
SMALL	0.999	1544.0	737.6	458	454	533	621	9377	8926	8611	2089
SMALL	0.999	1544.0	760.2	465	467	561	654	9606	9225	8905	2161
MINI	0.995	64.0	391.0	4437	8745	17505	20525	128565	124004	121739	
MINI	0.999	64.0	502.5	5772	11415	22845	26755	165437	159605	156736	
MINI	0.999	64.0	566.5	6539	12948	25910	30331	186601	180039	176824	
MINI	0.995	64.0	179.0	1899	3669	7352	8680	58459	56316	55198	
MINI	0.999	64.0	355.0	4006	7883	15781	18514	116660	112510	110440	
MINI	0.999	64.0	378.0	4282	8434	16882	19799	124266	119854	117659	

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1982 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 2S)

KU 1 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 1
CHANNEL UNIT COSTS = 4 4 4 4 0.768 7 10.4

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	3878.0	2387	3601	5597	2283	2393	2183	1983	444
LARGE	0.999	32000.0	4174.0	2394	3615	5625	2316	2589	2373	2169	481
LARGE	0.999	32000.0	4246.0	2396	3618	5632	2324	2637	2418	2214	489
MEDIUM	0.995	6300.0	1128.0	2431	3689	5774	2490	3618	3366	3145	717
MEDIUM	0.999	6300.0	1424.0	2467	3761	5918	2658	4612	4326	4089	949
MEDIUM	0.999	6300.0	1496.0	2476	3779	5953	2699	4854	4559	4319	1006
MEDIUM	0.995	6300.0	1236.0	2444	3716	5827	2552	3981	3716	3489	802
MEDIUM	0.999	6300.0	1505.0	2477	3781	5958	2704	4884	4589	4347	1013
MEDIUM	0.999	6300.0	1592.0	2488	3802	6000	2754	5177	4871	4625	1082

TABLE 2.198

TABLE 2.199

1990 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 25)

C 3 CPS
FILL FAC = 0.7 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1544.4	1	1	1	1	546	433	329	108
LARGE	0.999	32000.0	3213.4	1	1	1	1	1287	1093	1053	282
MEDIUM	0.995	6300.0	573.5	1	1	1	1	1061	1045	923	240
MEDIUM	0.999	6300.0	698.2	1	1	1	1	1537	1334	1123	329
MEDIUM	0.995	6300.0	841.2	1	1	1	1	2083	1861	1642	431
MEDIUM	0.999	6300.0	954.2	1	1	1	1	2514	2278	2051	512
SMALL	0.995	1544.0	297.1	1	1	1	26	3500	3229	2986	695
SMALL	0.999	1544.0	410.2	3	1	1	138	5261	4930	4658	1107
SMALL	0.995	1544.0	321.8	1	1	1	49	3884	3601	3351	785
SMALL	0.999	1544.0	302.5	1	1	1	31	3583	3310	3066	714
SMALL	0.995	1544.0	546.0	19	13	28	359	7376	6972	6666	1602
SMALL	0.999	1544.0	613.2	29	31	82	468	8423	7983	7659	1848
MINI	0.995	64.0	130.3	840	1975	4972	6598	47836	46037	45068	
MINI	0.999	64.0	209.4	1618	4128	9277	11620	77560	74736	73281	
MINI	0.995	64.0	51.8	181	406	938	1614	18337	17555	17069	
MINI	0.999	64.0	82.4	438	920	2365	3556	29836	28650	27984	

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TABLE 2.200

1990 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 2S)

C 3 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1544.4	1237	2298	4028	1523	924	810	695	184
LARGE	0.999	32000.0	3213.4	1282	2389	4210	1735	1921	1705	1488	380
MEDIUM	0.995	6300.0	573.5	1274	2373	4177	1697	1695	1487	1273	338
MEDIUM	0.999	6300.0	698.2	1292	2407	4246	1777	2171	1947	1725	427
MEDIUM	0.995	6300.0	841.2	1311	2447	4325	1869	2717	2474	2243	529
MEDIUM	0.999	6300.0	954.2	1327	2478	4387	1942	3148	2890	2653	587

TABLE 2.201

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 2S)

KU 2 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1960.0	1	1	1	1	732	619	509	153
LARGE	0.999	32000.0	2132.3	1	1	1	1	809	696	584	172
LARGE	0.999	32000.0	2188.7	1	1	1	1	835	721	609	179
MEDIUM	0.995	6300.0	585.1	1	1	1	1	1105	1072	949	248
MEDIUM	0.999	6300.0	757.4	1	1	1	1	1763	1553	1338	371
MEDIUM	0.999	6300.0	813.8	1	1	1	1	1978	1760	1542	412
MEDIUM	0.995	6300.0	883.8	1	1	1	1	2245	2018	1796	462
MEDIUM	0.999	6300.0	1034.4	1	1	1	1	2820	2574	2342	536
MEDIUM	0.999	6300.0	1101.8	1	1	1	11	3078	2822	2586	596
SMALL	0.995	1544.0	374.9	1	1	1	99	4711	4399	4136	978
SMALL	0.999	1544.0	525.5	16	8	16	325	7057	6664	6363	1528
SMALL	0.999	1544.0	592.9	26	25	66	435	8107	7678	7359	1773
SMALL	0.995	1544.0	435.1	6	1	1	178	5649	5305	5026	1198
SMALL	0.999	1544.0	510.0	16	4	10	300	6815	6431	6134	1471
SMALL	0.999	1544.0	559.2	21	16	39	380	7582	7171	6861	1651
SMALL	0.995	1544.0	451.3	8	1	1	205	5901	5548	5266	1257
SMALL	0.999	1544.0	553.8	20	15	34	371	7498	7090	6781	1631
SMALL	0.999	1544.0	517.1	17	6	14	312	6926	6538	6239	1497
MINI	0.995	64.0	257.2	2268	5428	11879	14655	95523	92079	90330	
MINI	0.999	64.0	332.1	3288	7468	15955	19411	123669	119255	117045	
MINI	0.999	64.0	381.3	3957	8805	18632	22535	142157	137106	134593	
MINI	0.995	64.0	130.2	839	1972	4967	6591	47798	46001	45033	
MINI	0.999	64.0	257.9	2278	5447	11917	14700	95786	92333	90580	
MINI	0.999	64.0	275.8	2522	5934	12891	15836	102512	98828	96964	

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TABLE 2.202

1990 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 2S)

NU 2 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.8 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	1960.0	1248	2321	4073	1576	1110	996	876	204
LARGE	0.999	32000.0	2132.3	1253	2330	4092	1598	1108	1074	950	228
LARGE	0.999	32000.0	2188.7	1255	2333	4098	1605	1151	1099	975	236
MEDIUM	0.995	6300.0	585.1	1276	2376	4183	1704	1739	1530	1316	346
MEDIUM	0.999	6300.0	757.4	1300	2423	4279	1815	2397	2165	1940	469
MEDIUM	0.999	6300.0	813.8	1308	2439	4310	1852	2612	2373	2144	510
MEDIUM	0.995	6300.0	883.8	1317	2458	4348	1897	2879	2631	2398	524
MEDIUM	0.999	6300.0	1034.4	1338	2500	4432	1994	3454	3186	2943	658
MEDIUM	0.999	6300.0	1101.8	1347	2519	4469	2037	3712	3434	3188	719

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 26)

KA L3 CPS
FILL FAC. = 0.9 TARIFF FACTORS 1 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4824.0	1	1	1	1	2497	2261	2035	499
LARGE	0.999	32000.0	3480.0	1	1	1	1	1487	1286	1076	310
LARGE	0.999	32000.0	2290.0	1	1	1	1	880	766	653	182
MEDIUM	0.999	6300.0	1103.6	1	1	1	1	3084	2829	2592	585
MEDIUM	0.999	6300.0	839.0	1	1	1	1	2074	1853	1634	420
MEDIUM	0.999	6300.0	604.8	1	1	1	1	1181	1117	992	252
SMALL	0.999	1544.0	409.7	1	1	1	78	5254	4923	4651	1093
SMALL	0.999	1544.0	344.9	1	1	1	21	4244	3948	3693	857
SMALL	0.999	1544.0	287.5	1	1	1	1	3350	3085	2844	647
MINI	0.999	64.0	118.5	671	1456	3995	5699	43402	41756	40860	
MINI	0.999	64.0	115.8	648	1382	3848	5528	42387	40776	39897	
MINI	0.999	64.0	113.4	628	1317	3717	5375	41485	39905	39040	

TABLE 2-203

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TABLE 2.204

1990 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 2S)

KA 13 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 0.88
CHANNEL UNIT COSTS = 1.15 1.15 1.15 1.15 0.3 2 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	4824.0	1666	3071	5391	2387	3131	2874	2637	570
LARGE	0.999	32000.0	3480.0	1630	2998	5245	2217	2121	1898	1678	408
LARGE	0.999	32000.0	2290.0	1597	2933	5115	2066	1227	1035	1019	240
MEDIUM	0.999	6300.0	1103.6	1688	3114	5476	2487	3719	3441	3194	708
MEDIUM	0.999	6300.0	839.0	1651	3041	5330	2316	2708	2466	2235	518
MEDIUM	0.999	6300.0	604.8	1619	2976	5200	2165	1915	1602	1397	351

TABLE 2.205

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 25)

C 4 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	36	64	64	64	1544
LARGE	0.995	32000.0	1422.2	1	1	1	1	473	351	243	103
LARGE	0.999	32000.0	1497.7	1	1	1	1	509	387	278	112
MEDIUM	0.995	6300.0	451.1	1	1	1	1	890	768	648	206
MEDIUM	0.999	6300.0	239.3	1	1	1	1	373	251	147	79
MEDIUM	0.995	6300.0	793.5	1	1	1	1	1887	1659	1427	414
MEDIUM	0.999	6300.0	837.1	1	1	1	1	2065	1831	1597	448
SMALL	0.995	1544.0	249.5	1	1	1	8	2807	2547	2300	526
SMALL	0.999	1544.0	323.1	1	1	1	66	4037	3735	3468	814
SMALL	0.995	1544.0	280.9	1	1	1	26	3331	3054	2799	649
SMALL	0.999	1544.0	340.7	1	1	1	84	4331	4019	3747	883
SMALL	0.995	1544.0	525.8	1	1	5	367	7425	7006	6684	1607
SMALL	0.999	1544.0	570.5	1	1	26	445	8172	7728	7393	1782
MINI	0.995	64.0	77.0	286	789	2085	3416	29688	28502	27815	
MINI	0.999	64.0	136.8	825	2084	5578	7490	53804	51786	50705	
MINI	0.995	64.0	48.3	74	271	833	1460	18114	17327	16830	
MINI	0.999	64.0	77.7	292	801	2126	3463	29971	28774	28083	

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TABLE 2.206

2000 CROSSOVER DISTANCES IN MILES FOR C-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 25)

C 4' CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL.	CAPAC	COST	2.4	4.8	9.6	[illegible]	64	64	64	1544
LARGE	0.995	32000.0	1422.2	1043	1720	3304	[illegible]	876	754	634	185
LARGE	0.999	32000.0	1497.7	1044	1724	3313	1208	913	791	669	194
MEDIUM	0.995	6300.0	451.1	1058	1771	3406	1316	1162	1172	1039	257
MEDIUM	0.999	6300.0	239.3	1039	1708	3280	1169	777	655	538	161
MEDIUM	0.995	6300.0	793.5	1090	1872	3609	1553	2564	2313	2071	519
MEDIUM	0.999	6300.0	837.1	1094	1885	3635	1583	2743	2486	2240	553

TABLE 2.207

2000 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 25)

NO 3 CPS
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	1	1	1	1	250	128	74	48
LARGE	0.999	32000.0	1067.0	1	1	1	1	302	180	93	61
LARGE	0.999	32000.0	1106.1	1	1	1	1	321	199	102	66
MEDIUM	0.995	6300.0	310.6	1	1	1	1	547	425	315	121
MEDIUM	0.999	6300.0	419.2	1	1	1	1	812	690	572	187
MEDIUM	0.999	6300.0	458.3	1	1	1	1	908	786	665	210
MEDIUM	0.995	6300.0	611.1	1	1	1	1	1139	1159	1026	274
MEDIUM	0.999	6300.0	712.7	1	1	1	1	1556	1339	1113	352
MEDIUM	0.999	6300.0	759.4	1	1	1	1	1747	1524	1295	388
SMALL	0.995	1544.0	253.8	1	1	1	10	2878	2616	2369	543
SMALL	0.999	1544.0	355.4	1	1	1	99	4577	4256	3981	940
SMALL	0.999	1544.0	402.1	1	1	1	151	5357	5010	4722	1123
SMALL	0.995	1544.0	291.1	1	1	1	34	3502	3218	2960	689
SMALL	0.999	1544.0	341.2	1	1	1	85	4339	4027	3755	885
SMALL	0.999	1544.0	375.3	1	1	1	105	4909	4577	4296	1018
SMALL	0.995	1544.0	314.4	1	1	1	58	3891	3594	3330	780
SMALL	0.999	1544.0	384.1	1	1	1	120	5057	4719	4436	1053
SMALL	0.999	1544.0	396.6	1	1	1	142	5266	4921	4634	1102
MINI	0.995	64.0	168.8	1113	3018	7447	9671	66709	64246	62954	
MINI	0.999	64.0	218.9	1595	4481	10373	13085	86913	83753	82131	
MINI	0.999	64.0	253.0	2093	5477	12365	15408	100665	97031	95183	
MINI	0.995	64.0	88.6	391	998	2763	4206	34366	33018	32255	
MINI	0.999	64.0	176.3	1181	3237	7805	10182	69734	67166	65825	
MINI	0.999	64.0	188.7	1154	3599	8609	11[illegible]27	74734	71994	70571	

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TABLE 2.208

2000 CROSSOVER DISTANCES IN MILES FOR KU-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T =.2S)

KU 3 CPS2
FILL FAC = 0.9 TARIFF FACTORS 0.68 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.995	32000.0	958.4	1034	1693	3250	1134	653	532	418	131
LARGE	0.999	32000.0	1067.0	1036	1699	3263	1149	706	584	469	143
LARGE	0.999	32000.0	1106.1	1037	1701	3267	1154	724	603	487	148
MEDIUM	0.995	6300.0	310.6	1045	1729	3322	1218	951	829	707	204
MEDIUM	0.999	6300.0	419.2	1055	1761	3387	1294	1031	1094	963	232
MEDIUM	0.999	6300.0	458.3	1059	1773	3410	1321	1191	1190	1056	262
MEDIUM	0.995	6300.0	611.1	1073	1818	3501	1426	1817	1592	1361	379
MEDIUM	0.999	6300.0	712.7	1082	1848	3561	1497	2233	1993	1756	457
MEDIUM	0.999	6300.0	759.4	1086	1862	3589	1529	2425	2178	1938	493

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2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (UNSHARED EARTH STATIONS)

(T = 25)

KA 14 CPS
FILL FAC = 0.9 TARIFF FACTORS 1 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0.84

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	1	1	1	1	849	728	608	182
MEDIUM	0.999	6300.0	541.8	1	1	1	1	1111	990	862	204
SMALL	0.999	1544.0	329.5	1	1	1	1	2472	2224	1983	507
MINI	0.999	64.0	77.0	166	579	1509	3159	29688	28502	27815	

TABLE 2.209

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TABLE 2-210

2000 CROSSOVER DISTANCES IN MILES FOR KA-BAND
CPS SERVICES (SHARED EARTH STATIONS)

(T = 2S)

KA 14 CPS2
FILL FAC = 0.9 TARIFF FACTORS 1 0.82
CHANNEL UNIT COSTS = 0.35 0.35 0.35 0.35 0.08 0.66 0.84

	AVAIL	CAPAC	COST	2.4	4.8	9.6	56	64	64	64	1544
LARGE	0.999	32000.0	2206.5	1356	2787	5124	2074	1093	1131	999	227
MEDIUM	0.999	6300.0	541.8	1372	2819	5187	2148	1533	1317	1092	309

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