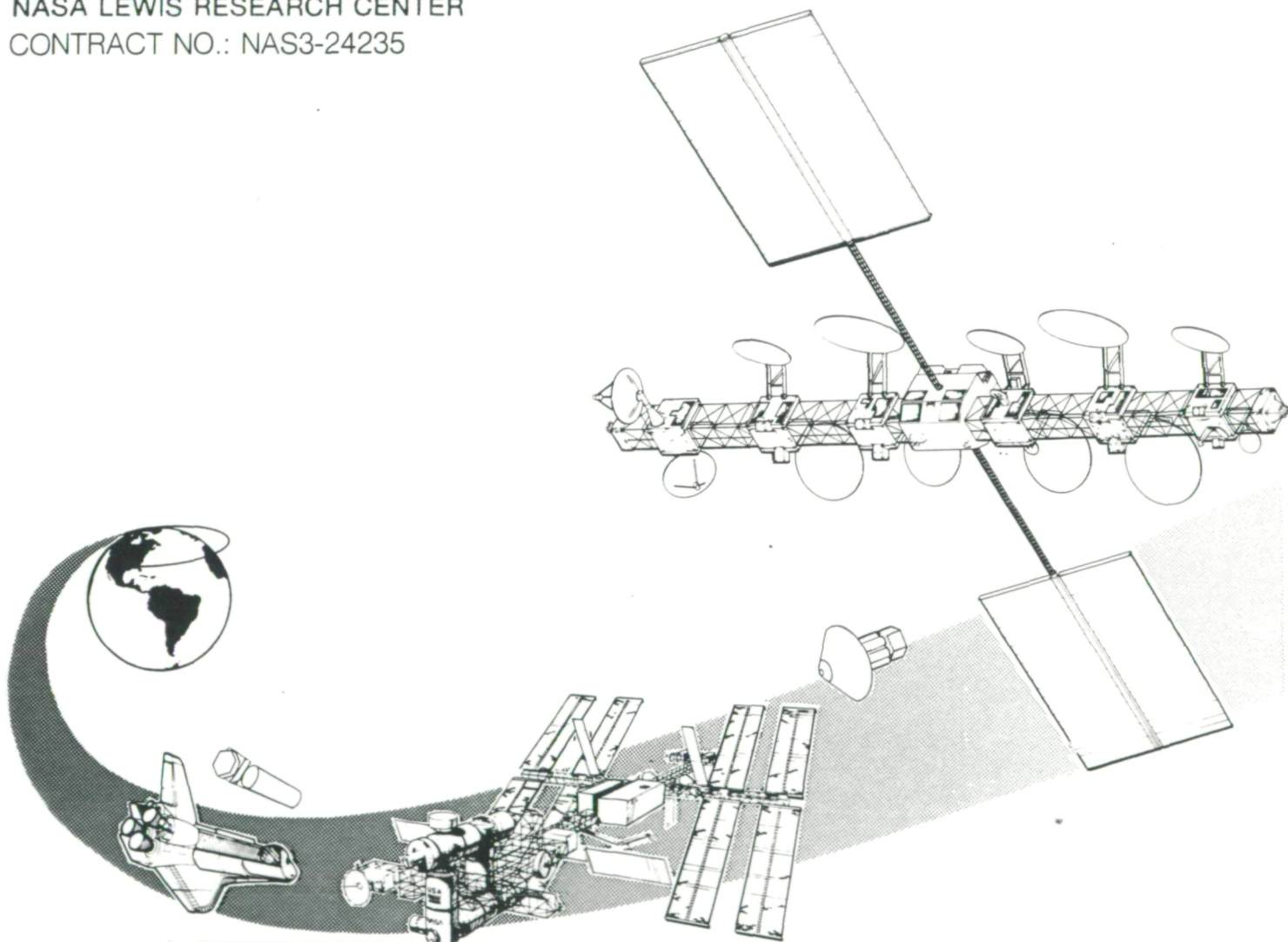


COMMUNICATION PLATFORM PAYLOAD DEFINITION STUDY FINAL REPORT

March 1986
Volume III - Addendum

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16. Abstract This is the Ford Aerospace & Communications Corporation Final Report for the Communication Platform Payload Definition (CPPD) Study program conducted for NASA Lewis Research Center under contract No. NAS3-24235. This report presents the results of the study effort leading to five potential platform payloads to service CONUS and WARC Region 2 traffic demand as projected to the year 2008. The report addresses establishing the data bases, developing service aggregation scenarios, selecting and developing 5 payload concepts, performing detailed definition of the 5 payloads, costing them, identifying critical technology, and finally comparing the payloads with each other and also with non-aggregated equivalent services.					
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APPENDIX A

NASA FSS TRAFFIC MODEL (for year 2008)

A-1 - DESCRIPTION

The various ways in which the NASA provided distribution between SMSAs was processed is described in Section 4.2.3.1.1. The two "intermediate" stages used for traffic (beam to beam being the final stage) were 84x84 and 20x20 matrices, the latter being used for the Ka-band fixed spot beams.

This appendix provides two "mapping" printouts, i.e., which SMSAs are in which region or spot beam. An 84x84 matrix for the total voice trunking traffic in 2008 is included, as well as a 20x20 matrix for year 2008 Ka fixed beam traffic. The latter represents 15,150,000 voice circuits, multiplied by a .6 digital/analog factor, and also includes 1,576,000 equivalent HVC for video conferencing. This total was then multiplied by .73 to obtain the traffic between the 20 fixed beams (see Figure 4.3.9). Distributions for the remaining 27% can be derived from the beam to beam matrix of Appendix G.1.1.



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A-2 - MAPPING OF FUTURE SYSTEMS, INC.
1984 NODES TO SMSA CONVERSION



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SMSA/FSI REGION MAPPING

AK1	3	
FAAR	FOAR	LIAR
AK2	1	
PIAR		
AL1	6	
ANAL	BIAL	FLAL CAAL HUAL TUAL
AL2	2	
MOAL	MVAL	
AZ2	2	
PHAZ	TUAZ	
CA1	3	
CHCA	RECA	YUCA
CA2	12	
BACA	ERCA	MOCA SOCA SECA SJCA SILCA SOCA SRCA VACA VICA
CA3	6	
ANCA	LOCA	OXCA RICA SNCA STCA
CO2	5	
COOO	DEOO	FOOO GCOO PUOO
CON	11	
BICT	BRCT	DACT FACT MECT NECT NLCT NOCT NMCT STCT WACT
DEL	1	
WIDE		
FL1	4	
ETEL	PAEL	PEEL TAEEL
FL2	3	
GAEL	JAEL	OCEL
FL3	11	
EREL	DAEL	FOEL FREEL LAEL MEEL MIEL OREL SAEL TAEEL WEEL
CA1	3	
ATCA	ATGE	COGA
GA2	4	
ALGA	AUGA	MAGA SAGA
ID2	1	
BOLD		
IL1	7	
ELIL	CHIL	CILIL KAIL PEIL ROIL SPIL
IL2	1	
DEIL		
IN1	11	
ANIN	ELIN	FOIN GAIN ININ KOIN LAIN MUIN SOIN TEIN
IN2	1	
EVIN		
IO1	1	
DEIA		
IO2	5	



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CEIA DAIA DUJA IOIW WAIA
 KS2 3
 LAKS TOKS WIKS
 KY1 1
 OKKY
 KY2 2
 LEKY LOKY
 LAJ 3
 ALLA MOLA SHLA
 LA2 4
 BALA LALA LKLA NELA
 MAS 10
 BOWA BRWA FAWA FIMA LAMA LOMA NEMA PIMA SPCT NOWA
 MD 4
 BAMD CUMD HAMD WADC
 ME1 2
 LEWE POME
 ME2 1
 BAME
 MI3 12
 ANMI BAMI BEMI BYMI DEMI FLMI GRMI JAMI KAMI LAMI MAMI SAMI
 MN1 1
 DUMN
 MN2 3
 MIMN ROMN SIMN
 MO1 4
 CONO KAMO SLMO STMO
 MO2 2
 JOMO SPMO
 MS2 3
 BIMS JAMS PAMS
 MT1 1
 GRMT
 MI2 1
 BIMT
 NC1 6
 ASNC BUNC CHNC GRNC HINC SANC
 NC2 4
 FANC JANC RANC WANC
 ND1 1
 BIND
 ND2 2
 FAND GRND
 NE2 3
 LINE OMNE SINE
 NH 3
 MANH NANH PONH
 NJ 8
 AJNJ JENJ LONJ NENJ NNJ PANJ TRNJ VINJ
 NW1 1



ALAM 1
NM2 1
LANM 1
NV1 1
RENV 1
NV2 1
LANV 4
NY1 4
BINY BUNY ELNY RONY
NY2 5
ALNY GLNY NANY SYNY UTNY
NY3 3
NENY NMYN PONY
OHI 8
CIOH COOH DAOH HAOH LIOH MAOH SPOH TOOH
OH2 7
AKOH CAOH CLOH LOOH NEOH STOH YOOH
OK1 2
ENOK LAOK 2
OK2 2
OKOK TUOK 4
OR1 4
EUOR MEOR POOR SAOR
PAL 6
ATPA ERPA JOPA PIPA SHPA STPA
PA2 8
ALPA HAPA LAPA NOPA PHPA REPA WIPA YOPA
RI 1
PRRI 3
SCI 3
ANSC GRSC RO SC
SC2 3
CHSC CO SC FOSC
SD2 1
SISD 3
TNI 3
CLIN METN NAIN 3
TN2 3
CHIN JOIN KNIN 1
TX1 1
ELIX 1
TX2 1
AMIX 3
TX3 3
ABIX LUTX WITX 8
TX4 8
AUTX KITX MITX ODIX SAUX SNTX VITX WATX
TX5 4
BRIX COIX LATX MCTX 9
TX6 9



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BETX BYTX DATX GATX HOTX LOTX SHIX TEIX TYTX
UTI 2
PRUT SAUT
VAL 3
DAVA LYVA ROVA
VAZ 5
CIVA NEVA NOVA PEVA RIVA
VT 1
BUVT
WAL 5
BEWA ERWA OLWA SEWA TAWA
WAZ 3
RIWA SPWA YAWA
WIL 2
EAWI WAWI
WI2 9
APWI CRWI JAWI KEMI LAWI MAWI MIWI RAWI SEMI
WV1 3
CERV HUVV PAVV
WV2 1
WRWV
WY2 1
CAWY



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A-3 - 84 x 84 TRAFFIC MATRIX FOR YEAR 2008



Total Voice Circuits -- 2008

AK1	AL1	Total =	128318	AL2	AZ2	666	1542	CA1	418
CA2	CA3	1434	1434	CO2	CO2	6066	2802	CON	2996
DEL	FL1	4064	4064	FL2	FL2	1396	1244	FL3	5312
GAL	GAL	504	504	ID2	ID2	1410	214	IL1	6000
IL2	IL1	2370	2370	IN2	IN2	5334	128	IO1	476
IO2	INI	96	96	KY2	KY2	154	1652	LA2	1410
MAS	KY1	1832	1832	ME1	ME1	3186	308	ME2	134
MI3	MD	2926	2926	MN2	MN2	282	2472	MS2	294
MI1	MN1	6524	6524	NC1	NC1	202	2910	NC2	1358
ND1	MI2	162	162	NE2	NE2	464	1296	NH	522
NJ	ND2	190	190	NM2	NM2	640	210	NV1	218
NV2	NM1	3594	3594	NY2	NY2	1684	2476	NY3	4470
OH1	NY1	534	534	OR1	OR1	3694	1044	PA1	2398
PA2	OH2	5194	5194	SC1	SC1	478	1010	SC2	1484
SD2	RI	4254	4254	TN2	TN2	822	1912	TX1	546
TX2	TN1	302	302	TX4	TX4	754	3132	TX5	1298
TX6	TX3	436	436	VA1	VA1	872	788	VA2	2072
VT	UT1	1396	1396	WA2	WA2	1362	572	WI1	502
WI2	WAL	166	166	WV2	WV2	1006	250	WY2	186
	WV1	3812	3812						

AK2	AZ2	Total =	32568	CA1	CA3	1804	1804	FL1	202
CO2	CO2	434	434	CON	CON	674	202	GAL	346
FL2	FL3	344	344	IL1	IL1	1556	748	IN1	1286
ID2	IL2	46	46	IO2	IO2	1776	82	MAS	746
IO1	IO1	160	160	ME1	ME2	346	480	MI3	1726
MD	ME1	976	976	MN2	MI2	60	24	MI1	28
MN1	MN2	60	60	NC1	MO1	658	66	ND1	28
MI2	NC1	38	38	NE2	NC2	802	342	NJ	1012
ND2	NE2	88	88	NV1	NH	440	108	NV2	146
NM1	NM2	166	166	NY2	NV1	34	48	OH1	1442
NY1	NY2	448	448	OR1	NY3	714	1448	PA2	1226
CH2	OR1	1006	1006	SC1	PA1	260	624	SD2	56
RI	SC1	138	138	TX1	SC2	246	422	TX3	172
TN2	TX1	446	446	TX5	TX2	140	88	VA1	170
TX4	TX5	790	790	VT	UT1	284	222	WA2	122
VA2	VT	562	562	WV1	WAL	28	342	WV2	50
WI1	WV1	88	88	WV2	WV1	882	234		
WY2	WV2	28	28						



AK1	1434	AZ2	2536	CA1	780	CA2	7202
CA3	10330	CO2	4270	CON	7530	DEL	1306
FL2	1604	FL3	15346	CA2	122	ID2	380
IL1	12558	IL2	602	IN1	9024	IO1	1090
IO2	3340	KS2	2772	LAI	1246	LA2	1128
MAS	7186	MD	8448	ME1	758	ME2	334
MI3	14940	MN1	540	MN2	4320	MO1	4086
MO2	1560	MT1	302	MT2	362	NC1	3064
NC2	4194	ND1	348	ND2	864	NE2	2908
NH	1290	NJ	9138	NM1	986	NM2	358
NV1	390	NV2	902	NY1	4104	NY2	6090
NY3	11048	OH1	9892	OH2	9386	OK1	1066
OK2	4086	OR1	1904	PAL	6256	PA2	10916
RI	1158	SC1	1448	SC2	1864	SD2	516
TX1	866	TX2	616	TX3	1840	TX4	6334
TX5	2320	TX6	12670	UTI	1464	VAI	2414
VA2	5860	VT	402	WAI	2496	WA2	1064
WI1	990	WI2	7734	WV1	1928	WV2	686
WX2	324						

Total = 104718

AL2

AK1	666	AZ2	928	CA1	356	CA2	2774
CA3	3644	CO2	1614	CON	2840	DEL	446
FL3	5006	GA2	570	ID2	160	IL1	4138
IL2	306	IN1	4164	IN2	244	IO1	384
IO2	1272	KS2	1046	KY1	198	KY2	1348
LAI	212	LA2	140	MAS	2682	MD	2740
ME1	324	ME2	146	MI3	4940	MN1	210
MN2	1446	MO1	2340	MO2	656	MI1	134
MT2	158	NC1	2356	NC2	1550	ND1	152
ND2	358	NE2	1046	NH	534	NJ	3188
NM1	374	NM2	172	NV1	162	NV2	334
NY1	1426	NY2	2090	NY3	3492	OH1	4198
OH2	3090	OK1	488	OK2	1442	OR1	742
PAL	2164	PA2	3696	RI	404	SC1	936
SC2	952	SD2	208	TN1	240	TN2	774
TX1	340	TX2	260	TX3	814	TX4	2806
TX5	1126	TX6	4888	UTI	554	VAI	908
VA2	2070	VT	170	WAI	958	WA2	444
WI1	402	WI2	2746	WV1	1028	WV2	258
WX2	146						

Total = 157378

AZ2

AK1	1542	AK2	434	AL1	2536	AL2	928
CA1	1782	CA2	11074	CA3	5532	CO2	4630
CON	3550	DEL	422	FL1	1502	FL2	1172
FL3	4670	GA1	1508	GA2	1458	ID2	632
IL1	4114	IL2	406	IN1	4660	IN2	424
IO1	552	IO2	2112	KS2	1764	KY1	372
KY2	1026	LAI	1470	LAI	2302	MAS	3294



MD	2160	ME1	532	ME2	254	MI3	5470
MN1	406	MN2	1928	MO1	2558	MO2	974
MS2	1264	MT1	480	MT2	536	NC1	2454
NC2	1412	ND1	434	ND2	838	NE2	1770
NH	828	NJ	3198	NV1	740	NY1	1574
NY2	2112	NY3	2534	OH1	3792	OH2	3056
OK1	1116	OK2	1790	OR1	2418	PAL	2304
PA2	3480	RI	410	SC1	1072	SC2	1238
SD2	468	TN1	1718	TN2	1472	TX2	766
TX3	2040	TX4	5446	TX5	2172	TX6	6106
UT1	2072	VA1	984	VA2	1920	VT	278
WA1	2776	WA2	1534	WI1	764	WI2	3872
WV1	1082	WV2	330		578		

Total = 74090

CAL	AK1	418	AL1	76	AL2	356
	AZ2	1782	CO2	11760	CON	1320
	DEL	234	FL1	346	FL3	2190
	GAL	766	ID2	410	IL1	2372
	IL2	96	IN2	1668	IO1	234
	IO2	512	KY1	578	KY2	534
	LAI	372	MAS	988	MD	1502
	ME1	116	MI3	52	MN1	120
	MN2	1216	MO2	1278	MS2	316
	MT1	134	NC1	154	NC2	494
	ND1	86	NE2	214	NH	210
	NJ	1706	NM2	476	NV2	930
	NY1	762	NY3	1226	OH1	1902
	OH2	1498	OK2	174	OR1	916
	PAL	958	RI	2004	SCI	344
	PA2	546	TN1	110	TN2	746
	SD2	372	TX3	166	TX4	1390
	TX1	452	TX6	2474	VA1	242
	TX5	854	VT	58	VA2	824
	VA2	166	WI1	1372	WA2	
	WV1	102	WV2		WV2	76

CA2	AK1	4064	AL1	1056	AL2	2774
	AZ2	11074	CO2	7150	CON	11330
	DEL	1508	FL2	3996	FL3	15220
	GAL	5000	ID2	4138	IL1	14480
	IL2	1108	IN2	14220	IO1	1726
	IO2	5850	KY1	4884	KY2	3470
	LAI	3792	MAS	6888	MD	8358
	ME1	1530	MI3	734	MN1	1228
	MN2	7134	MO2	8294	MS2	3334
	MT1	1678	NC1	1746	NC2	4292
	ND1	1258	NE2	2490	NH	2452
	NJ	11324	NM2	3218	NV2	1656



NY1	5394	NY2	7726	NY3	11390	QHL	12824
OH2	10360	OK1	2488	OK2	5640	OR1	11486
PAL	7456	PA2	12602	RI	1530	SCI	3170
SC2	3986	SD2	1292	TN1	5674	TN2	4904
TX1	2724	TX2	1682	TX3	4444	TX4	12742
TX5	5044	TX6	17348	UT1	7716	VAL	2776
VA2	6312	VT	794	WA1	14914	WA2	7078
WI1	2140	WI2	11896	WV1	3152	WV2	926
WY2	1566						

CA3	AK1	AK2	1804	AL1	10330	AL2	3644
	AZ2	CA1	11760	CA2	7150	CO2	16346
	CON	DEL	1664	FL1	6310	FL2	4764
	FL3	GAL	5718	GA2	6144	ID2	3308
	IL1	IL2	1728	IN1	19236	IN2	1746
	IO1	IO2	9022	KS2	6744	KY1	1610
	KY2	LAI	5804	LA2	8512	MAS	14014
	MD	ME1	2440	ME2	1184	MI3	21958
	MN1	MN2	7262	MO1	9442	MO2	3944
	MS2	MT1	2380	MT2	2496	NCL	9910
	NC2	ND1	1996	ND2	3768	NE2	6890
	NH	NJ	12810	NM1	4084	NM2	3158
	NV1	NY1	6432	NY2	8346	NY3	8436
	OH1	OH2	12232	OK1	4344	OK2	5906
	OR1	PAL	9534	PA2	13678	RI	1622
	SCI	SC2	4940	SD2	2002	TN1	6370
	TN2	TX1	3790	TX2	2662	TX3	7288
	TX4	TX5	8358	TX6	21570	UT1	8594
	VA1	VA2	7836	VT	1272	WA1	14192
	WA2	WI1	3394	WI2	16190	WV1	4616
	WY2		2556				

Total = 591568

CO2	AK1	AK2	674	AL1	4270	AL2	1614
	AZ2	CA1	1900	CA2	13346	CA3	16346
	CON	DEL	832	FL1	2222	FL2	1938
	FL3	GAL	2926	GA2	2298	ID2	946
	IL1	IL2	716	IN1	8784	IN2	756
	IO1	IO2	3966	KS2	3764	KY1	592
	KY2	LAI	2366	LA2	4112	MAS	5748
	MD	ME1	776	ME2	364	MI3	11124
	MN1	MN2	4996	MO1	6132	MO2	1802
	MS2	MT1	808	MT2	974	NCL	4456
	NC2	ND1	866	ND2	1638	NE2	4488
	NH	NJ	6146	NM2	914	NV1	872
	NV2	NY1	3008	NY2	4224	NY3	6356
	OH1	OH2	6048	OK1	1884	OK2	4494
	OR1	PAL	4220	PA2	6972	RI	822
	SCI	SD2	2222	SD2	1000	TN1	3608

Total = 285256



TX2	1590	TX2	122	TX3	2846
TX4	2758	TX6	11236	UT1	480
VA1	3476	VT	410	WA1	4540
WA2	1360	WI2	7590	WV1	1804
WV2	516				
Total =	375444				
AK1	2904	TX1			
AZ2	8026	TX5			
CO2	1530	VA2			
GA1	2316	WI1			
IL2	516				
IO2	2996	AK2	734	AL2	2840
LA1	3550	CA1	1320	CA3	15258
LAI	6000	FL1	3678	FL3	18510
MN2	6808	GA2	4972	ILL	18714
MT1	1052	IN1	18006	IO1	1474
ND1	4836	KS2	3296	KY2	5082
NM2	2740	LA2	6112	MN1	996
OH2	6916	MO1	7886	MS2	2736
PA1	528	MT2	602	NC2	7710
TN1	594	ND2	1528	NM1	1316
TX3	502	NV1	634	OHL	21486
UT1	19236	OK1	1258	OR1	3180
WA2	1202	SC1	5244	SD2	782
WV2	6642	TN2	7414	TX2	782
	2190	TX4	7132	TX6	12626
	2214	VA1	4594	WA1	4246
	1816	WI1	1766	WV1	5094
	1316	WY2	520		

AK1	49338	AL2	446		
AZ2	504	CA3	1664		
CO2	422	FL3	2688		
GA1	832	ILL	2514		
IL2	1012	IO1	216		
IO2	196	IO1	228		
LAI	868	KY2	194		
LAI	466	ME2	254		
MI3	4328	MO1	874		
MO2	310	MT2	92		
NC1	1308	ND2	112		
NE2	578	NM2	172		
NV1	98	OK1	2418		
OK2	550	SC2	476		
SD2	138	TX1	1152		
TX2	128	TX5	1120		
TX6	1782	WA2	578		
WI1	326	WY2	98		
Total =	146726				
AK1	1396	CA1	1502		
CA2	3996	CON	2222		
DEL	684	ILL	186		
IL2	308	IO1	466		
		CA1	346		
		CON	3678		
		ILL	5976		
		IO1	494		



IO2	1302	KS2	1250	KY1	290	KY2	1864
LAI	1028	LA2	606	MAS	3638	MD	4510
ME1	328	ME2	140	MI3	6810	MNI	234
MN2	2166	MO1	3238	MO2	660	MT1	134
MT2	162	NCL	4002	NC2	2054	ND1	134
ND2	366	NE2	1352	NH	572	NJ	4774
NM1	544	NM2	158	NV1	198	NV2	516
NY1	2012	NY2	3230	NY3	6358	OHI	5862
OH2	4336	OK1	436	OK2	2130	OR1	1002
PA1	2890	PA2	5692	RI	634	SC1	1002
SC2	1356	SD2	210	TN1	1902	TN2	1870
TX1	482	TX2	290	TX3	866	TX4	3366
TX5	1226	TX6	7210	UT1	786	VA1	998
VA2	2958	VT	170	WA1	1330	WA2	514
WI1	384	WI2	3318	WV1	1172	WV2	270
WY2	134						

FL2	AK1	344	AL1	1604	AZ2	1172
	CA1	3562	CA3	4764	CO2	1938
	CON	696	ID2	200	ILL	5046
	IL2	5076	IN2	466	IO1	446
	IO2	1146	KY1	360	KY2	1626
	LAI	3230	MAS	4058	MD	4264
	ME1	210	MI3	6474	MNI	264
	MN2	2602	MO2	670	MS2	1344
	MT1	186	NCL	3024	NC2	1632
	ND1	436	NE2	1222	NH	784
	NJ	450	NM2	196	NV1	204
	NV2	2058	NY2	3180	NY3	5500
	OHI	4262	OK1	502	OK2	1558
	OR1	3086	PA2	5688	RI	628
	SC1	244	TN1	2714	TN2	2528
	TX1	290	TX3	870	TX4	2976
	TX5	5434	UT1	694	VA1	1400
	VA2	246	WA1	1250	WA2	558
	WI1	3396	WV1	1406	WV2	360
	WY2					

Total = 140656

FL3	AK1	1556	AL1	15346	AL2	5006
	AZ2	2190	CA2	15220	CA3	18334
	CON	18510	DEL	2688	FL1	4496
	GA1	5300	ID2	922	ILL	19050
	IL2	20558	IN2	1896	IO1	1822
	IO2	4908	KY1	1552	KY2	5950
	LAI	12908	MAS	17238	MD	15498
	ME1	1030	MI3	25448	MNI	1178
	MN2	10016	MO2	2970	MS2	6930
	MT1	898	NCL	18232	NC2	10356

Total = 623128



ND1	890	ND2	2032	NE2	5074	NH	3648
NJ	19538	NM1	1858	NM2	964	NV1	936
NV2	1748	NY1	8256	NY2	12422	NY3	19508
OHL	20536	OH2	16482	OK1	2418	OK2	6002
OR1	4212	PAL	12306	PA2	21876	RI	2476
SC1	7346	SC2	7608	SD2	1128	TN1	9860
TN2	10472	TX1	1728	TX2	1322	TX3	4042
TX4	13352	TX5	5892	TX6	22442	UT1	2922
VAL	5712	VA2	13040	VT	1146	WA1	5432
WA2	2590	WI1	2252	WI2	14236	WV1	5664
WY2	1546	WY2	864				

GA1	Total =	202374
AK1	AK2	748
CA2	CA3	5718
DEL	FL3	9348
IL2	IN1	9266
IO2	KS2	2024
MAS	MD	6006
MI3	MN1	478
MO2	MS2	246
NC1	NC2	1148
NE2	NH	1340
NY2	NV1	322
NY2	NY3	6732
OK1	OK2	2296
PA2	RI	852
TX1	TX2	496
TX5	TX6	8196
VA2	VT	440
WI1	WI2	6168
WY2		

GA2	Total =	162546
AK1	AK2	346
AZ2	CA1	410
CO2	CON	4972
ID2	IL1	6894
IN2	IO1	552
KY1	KY2	1058
MAS	MD	6044
MI3	MN1	280
MO2	MS2	846
NC1	NC2	440
NE2	NH	802
NM2	NV1	216
NY2	NY3	7874
OK1	OK2	2028
PA2	RI	794
TN1	TX1	476



TX4	3204	TX5	TX6	1194	6382	UT1	820
VAL	390	VA2	VT	3036	242	WAI	1428
WA2	578	WI1	WI2	494	4044	WV1	862
WV2	408	WY2		160			
	Total =						
ID2	AK1	AK2	AL1	46	380	AL2	160
	AZ2	CA1	CA2	104	2870	CA3	3308
	CO2	CON	DEL	632	102	FL1	186
	FL2	FL3	CA1	922	324	GA2	208
	IL1	IL2	IN1	56	816	IN2	64
	IO1	IO2	KS2	296	286	KY1	42
	KY2	LAI	LA2	188	416	MAS	638
	MD	ME1	ME2	66	32	MI3	1192
	MN1	MN2	MO1	554	572	MO2	122
	MS2	MT2	NC1	122	472	NC2	230
	ND1	ND2	NE2	134	352	NH	116
	NJ	NM1	NM2	202	60	NV2	316
	NY1	NY2	NY3	524	940	OH1	844
	OH2	OK1	OK2	108	406	PA1	446
	PA2	RI	SC1	104	166	SC2	240
	SD2	TN1	TN2	380	318	TX1	152
	TX2	TX3	TX4	210	646	TX5	222
	TX6	VAL	VA2	134	380	VT	34
	WAI	WI1	WI2	102	700	WV1	162
	WV2	WY2		84			

IL1	AK1	AK2	AL1	1776	12558	AL2	4138
	AZ2	CA1	CA2	2372	14480	CA3	15432
	CO2	CON	DEL	18714	2514	FL1	5976
	FL2	FL3	CA1	19050	8374	GA2	6894
	ID2	KS2	LAI	6306	5188	LA2	8542
	MAS	MD	ME1	14202	2480	ME2	1140
	MN1	MN2	MO1	2932	3446	MO2	3232
	MS2	MT1	MT2	1028	1170	NC1	14442
	NC2	ND1	ND2	1412	3488	NE2	6146
	NH	NJ	NM1	18340	1838	NM2	1008
	NV1	NV2	NY1	1640	10242	NY2	12464
	NY3	OH2	OK1	4850	3024	OK2	6798
	OR1	PA1	PA2	12752	21468	RI	2240
	SC1	SC2	SD2	6510	1928	TN1	3042
	TN2	TX1	TX2	1586	1490	TX3	4294
	TX4	TX5	TX6	4660	19154	UT1	3104
	VAL	VA2	VT	10984	1396	WAI	5638
	WAI	WV1	WV2	1590	480	WV1	1172
	WV2						
	Total =						
IL2	AK1	AK2	AL1	82	602	AL2	306
	AZ2	CA1	CA2	96	1108	CA3	1728



CO2	716	CON	1052	DEL	196	FL1	308
FL2	344	FL3	1498	GAI	740	GA2	388
ID2	56	KS2	252	LAI	306	LA2	714
MAS	1040	MD	1302	ME1	92	ME2	40
MN1	102	MN2	938	MS2	278	MT1	40
MT2	50	NC1	1024	NC2	448	ND1	50
ND2	144	NE2	236	NH	166	NJ	1366
NM1	154	NM2	40	NV1	56	NV2	146
NY1	688	NY2	970	NY3	1850	OH2	558
OK1	128	OK2	678	OR1	296	PAL	986
PA2	1680	RI	180	SC1	326	SC2	482
SD2	90	TN2	260	TX1	128	TX2	84
TX3	228	TX4	760	TX5	248	TX6	1558
UTI	236	VA1	260	VA2	750	VT	50
WA1	396	WA2	152	WV1	166	WV2	92
WY2	42						

IN1	Total =	467118
AK1	AK2	1286
AZ2	CA1	1668
CO2	CON	18006
FL2	FL3	20558
ID2	IO1	1496
LA2	MAS	16970
ME2	MN1	1630
MO2	MS2	4158
NC1	NC2	7478
NE2	NH	3198
NM2	NV1	810
NY2	NY3	24850
OR1	PAL	3058
SC1	SC2	7226
TN2	TX1	1560
TX4	TX5	3730
VA1	VA2	12086
WA2	WI1	1130

IN2	Total =	38332
AK1	AL2	244
CA2	CA3	1746
DEL	FL1	466
GAI	GA2	584
KS2	LAI	416
MD	ME1	128
MN1	MN2	922
MT1	MT2	60
ND1	ND2	162
NJ	NM1	166
NV2	NY1	776
OH2	OK1	172



State	1208	PA2	1948	RI	204	SCI	336
PA1	1208	PA2	1948	RI	204	SCI	336
SC2	656	SD2	98	TX1	140	TX2	102
TX3	285	TX4	934	TX5	324	TX6	1850
UT1	252	VA1	388	VA2	958	VT	70
WA1	428	WA2	178	WI1	206	WI2	372
WY2	56						
Total = 52782							
AK1	476	AK2	160	AL1	1090	AL2	384
AZ2	552	CA1	234	CA2	1726	CA3	2164
CO2	1290	CON	1474	DEL	216	FL1	494
FL2	446	FL3	1822	GAI	758	GAI	552
ID2	112	IN1	1496	IN2	240	KY1	178
KY2	668	LA1	506	LA2	896	MAS	1402
MD	1274	ME1	180	ME2	82	MI3	3196
MS2	438	MT1	106	MT2	128	NCL	1158
NC2	578	ND1	154	ND2	170	NH	292
NJ	1578	NM1	240	NM2	102	NV1	106
NV2	212	NV1	810	NY2	1094	NY3	1712
OH1	2414	OH2	1770	OK1	332	OK2	498
OR1	494	PA1	1162	PA2	1840	RI	208
SC1	434	SC2	558	TN1	1044	TN2	802
TX1	194	TX2	176	TX3	470	TX4	1296
TX5	460	TX6	2196	UT1	396	VA1	386
VA2	884	VT	98	WA1	652	WA2	310
WV1	494	WV2	140	WY2	128		

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State	1272	AL2	3340	AL1	346	AK2	172962
AL2	1272	AL2	3340	AL1	346	AK2	172962
CA3	9022	CA3	5850	CA2	512	CA1	1832
FL1	1302	FL1	868	DEL	4836	CON	2112
GA2	1596	GA2	2942	GAI	6592	FL3	3966
KY2	1524	KY2	74	KY1	1338	KS2	1478
MD	5664	MD	4840	MAS	3134	LA2	296
MO2	70	MO2	4616	MI3	192	ME2	1362
NCL	4194	NCL	284	MT2	222	MT1	1178
NE	778	NE	790	ND2	302	ND1	1884
NV1	296	NV1	206	NM2	808	NM1	6208
NY3	8422	NY3	4450	NY2	3150	NY1	766
OK2	3348	OK2	646	OK1	7152	OH2	6574
RI	838	RI	7510	PA2	4266	PA1	1572
TN2	3172	TN2	3920	TN1	2012	SC2	1338
TX4	3656	TX4	1130	TX3	436	TX2	646
VA1	1074	VA1	1292	UT1	7278	TX6	1170
WA2	820	WA2	2114	WA1	242	VT	3232
			236	WY2	384	WV2	1546
Total = 147718							
AL1	578	AL2	1764	AZ2	1046	AL2	2772
CON	3296	CON	3764	CO2	6744	CA3	4884

KS2



DEL	516	FL1	1250	FL2	1146	FL3	4908
GAL	2024	GA2	1332	ID2	286	ILL	6306
IL2	252	IN1	5882	IN2	528	IO2	1338
KY1	366	KY2	1584	LAI	1540	LA2	2744
MAS	3194	MD	3170	ME1	368	ME2	172
MI3	7330	MN1	396	MN2	3170	MS2	1184
MT1	242	MT2	298	NC1	2808	NC2	1364
ND1	302	ND2	700	NH	614	NJ	3754
NM1	794	NM2	290	NV1	278	NV2	636
NY1	1828	NY2	2596	NY3	4432	OH1	5352
OH2	3920	OR1	1300	PA1	2562	PA2	4384
RI	500	SC1	1008	SC2	1394	SD2	278
TN1	2478	TN2	2038	TX1	632	TX2	250
TX3	430	TX4	4214	TX5	1342	TX6	5090
UT1	1130	VA1	832	VA2	2104	VT	196
WA1	1700	WA2	762	WI1	722	WI2	4684
WV1	1056	WV2	284	WY2	306		

KY1	Total =	30060
AK1	AL2	198
CA2	CA3	1610
DEL	FL1	290
GA2	ID2	42
KS2	LAI	274
MD	ME1	72
MN1	MN2	768
MS2	MT1	28
NC2	ND1	28
NH	NJ	1328
NV1	NV2	130
NY3	OH2	228
OR1	PA1	940
SC1	SC2	536
TX2	TX3	178
TX6	UT1	204
VT	WA1	334
WI2	WY2	28

KY2	Total =	112530
AK1	AK2	480
CA1	CA2	3470
CON	DEL	766
FL3	GA2	1058
IO2	KS2	1584
MAS	MD	4006
MN1	MN2	2366
MS2	MT1	218
ND1	ND2	652
NJ	NM1	442
NV2	NY1	2746



State	Value	Code	Value	Code	Value	Code	Value	Code	Value	Code
LAI	OKI	694	OK2	1644	ORI	1010	PAL	876		
	PA2	6470	RJ	634	SC1	776	SC2	1182		
	SD2	380	TXI	390	TX2	346	TX3	1020		
	TX4	3006	TX5	1196	TX6	5078	UTI	716		
	VA2	2518	VT	338	WAI	1308	WA2	650		
	WI1	876	WI2	1864	WY2	246				
	Total = 118244									
	AL1	1246	AL2	212	AZ2	1470	CAL	372		
	CA2	3792	CA3	5804	CO2	2366	CON	2740		
	DEL	466	FL1	1028	FL2	1302	FL3	5740		
	GAL	2398	GAL	1396	ID2	188	IL1	5188		
	IL2	306	INI	4314	IN2	416	IO1	506		
	IO2	1362	KS2	1540	KY1	274	KY2	1410		
	MAS	2690	MD	2986	ME1	272	ME2	122		
	MI3	5518	MN1	226	MN2	1986	MO1	3360		
	MO2	206	MT1	142	MT2	170	NC1	2744		
	NC2	1278	ND1	154	ND2	378	NE2	1442		
	NH	472	NJ	3342	NM1	584	NM2	196		
	NV1	196	NV2	502	NY1	1508	NY2	2290		
	NY3	4238	OH1	4470	OH2	3252	OK1	220		
	OK2	440	OR1	954	PAL	2140	PA2	3944		
	RI	448	SCL	946	SC2	1464	SD2	232		
	TN1	990	TN2	2134	TX1	528	TX2	374		
	TX3	618	TX4	1108	TX5	1124	UT1	780		
	VAL	706	VA2	1948	VT	144	WAI	1244		
	WAZ	508	WI1	390	WI2	3052	WV1			
	WV2	216	WY2	154				878		

State	Value	Code	Value	Code	Value	Code	Value	Code	Value	Code
LA2	AKI	238068	AL1	1128	AL2	140	AZ2	2302		
	CAL	1410	CA2	6888	CA3	8512	CO2	4112		
	CON	988	DEL	868	FL1	606	FL2	3230		
	FL3	6112	GAL	3848	GAL	3270	ID2	416		
	IL1	12908	IL2	714	IN1	8882	IN2	900		
	IL2	8542	IO2	3134	KS2	2744	KY1	734		
	IO1	896	MAS	5712	MD	5018	ME1	768		
	KY2	2496	MN3	10274	MN1	522	MN2	3180		
	ME2	352	MT1	1764	MT1	366	MT2	414		
	MO1	5234	MO2	3006	ND1	412	ND2	920		
	NC1	5798	NC2	1238	NJ	6340	NM1	972		
	NE2	2560	NE	428	NV2	828	NY1	2932		
	NM2	510	NV1	6270	OH1	8158	OH2	6162		
	NY2	4154	NY3	3780	ORI	1852	PAL	4392		
	OK1	1484	OK2	806	SC1	2358	SC2	3108		
	PA2	7214	RI	2726	TN2	4020	TX1	922		
	SD2	546	TN1	2408	TX4	5350	TX5	3290		
	TX2	752	TX3	1384	VA1	1884	VA2	4014		
	TX6	1444	UTI	2368	WAI	1152	WV1	1002		
	VT	400	WAI	2102	WY2	572	WY2	416		
	WV1	6250	WV1							



Ford Aerospace &
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MAS	AK1	AK2	Total =	378698	AL1	AL2	7186	10928	4058	638	1240	940	2260	7302	622	1576	632	18644	10732	6052	2202	2134	1846	1508
	AZ2	CA1	CA1	3294	CA2	CA3	10928	FL3	FL3	IL1	IO1	KY2	MI3	MO2	NC1	NE2	NV2	OK1	OK1	SC1	TN2	TX4	VA1	WI2
	CO2	FL1	FL1	5748	ID2	ID2	4058	GA2	GA2	IN1	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	GAL	GA2	GA2	6156	IN2	IN2	638	IN1	IN1	IN1	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	IL2	IN1	IN1	1040	IN2	IN2	1240	IN1	IN1	IN1	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	IO2	KS2	KS2	4840	KY1	KY1	940	IN1	IN1	IN1	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	LAL	LA2	LA2	2690	MD	MD	2260	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	MN1	MN2	MN2	1000	MI3	MI3	7302	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	MS2	MT1	MT1	2694	MI3	MI3	622	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	NC2	ND1	ND1	6988	MI3	MI3	1576	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	NM1	NM2	NM2	1248	MI3	MI3	632	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	NY1	OH1	OH1	1152	MI3	MI3	18644	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	OK2	OR1	OR1	3966	MI3	MI3	10732	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	SC2	SD2	SD2	5722	MI3	MI3	6052	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	TX1	TX2	TX2	1082	MI3	MI3	2202	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	TX5	TX6	TX6	2732	MI3	MI3	11892	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	VA2	WA1	WA1	13420	MI3	MI3	4166	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2
	WI2	WV1	WV1	12516	MI3	MI3	4700	IN2	IN2	IN2	IN2	KY1	MD	MO1	MT2	ND2	NV1	OH2	PA1	SC1	TN2	TX4	VA1	WI2

MD	AK1	AK2	Total =	268548	AL1	AL2	8448	8358	4264	616	1498	1356	2260	1032	3186	740	956	5768	294	5600	2390	1660	2134	
	AZ2	CA1	CA1	2160	CA2	CA3	8448	FL3	FL3	IL1	IO1	KY2	ME1	MN2	MT1	ND2	NM2	OK1	OK1	SC1	TN2	TX4	VA1	WI2
	CO2	FL1	FL1	4702	ID2	ID2	4264	GA2	GA2	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	GAL	GA2	GA2	6006	IN2	IN2	616	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	IL2	IN1	IN1	1302	IN2	IN2	1498	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	IO2	KS2	KS2	5664	IN2	IN2	1356	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	LAL	LA2	LA2	2986	IN2	IN2	2260	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	MN1	MN2	MN2	1308	IN2	IN2	1032	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	ME2	MO1	MO1	6164	IN2	IN2	3186	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	MO1	MO2	MO2	662	IN2	IN2	740	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	MT2	NC1	NC1	3406	IN2	IN2	956	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	NE2	NH	NH	588	IN2	IN2	5768	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	NV1	OR1	OR1	2946	IN2	IN2	294	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	OK2	OR2	OR2	4726	IN2	IN2	5600	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	SC2	SD2	SD2	872	IN2	IN2	2390	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	TX1	TX2	TX2	2970	IN2	IN2	1660	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	TX5	TX6	TX6	3298	IN2	IN2	2134	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	
	WA1	WA2	WA2	650	IN2	IN2	8448	IN1	IN1	IN1	IN2	KY1	MN2	MS2	ND1	NM1	OK1	OK1	SC1	TN2	TX4	VA1	WI2	

ME1	AK1	AK2	Total =	51790	AL1	AL2	758	1530	328	466	1894	368	768	976
	AZ2	CA1	CA1	308	CA2	CA3	758	FL2	FL2	ID2	IN2	KY1	MD	MO1
	CO2	DEL	DEL	532	CA2	CA3	1530	FL1	FL1	ID2	IN2	KY1	MD	MO1
	FL3	GAL	GAL	776	CA2	CA3	328	GA2	GA2	IN1	IN2	KY1	MD	MO1
	IL1	IL2	IL2	2250	IN1	IN1	466	IN1	IN1	IN1	IN2	KY1	MD	MO1
	IO1	IO2	IO2	2480	IN1	IN1	1894	IN1	IN1	IN1	IN2	KY1	MD	MO1
	IO2	LAL	LAL	180	IN1	IN1	368	IN1	IN1	IN1	IN2	KY1	MD	MO1
	KY2	LAI	LAI	614	IN1	IN1	768	IN1	IN1	IN1	IN2	KY1	MD	MO1
	MI3	MN1	MN1	3528	IN1	IN1	976	IN1	IN1	IN1	IN2	KY1	MD	MO1



MO2	166	MS2	256	MT1	46	MT2	56
NC1	1458	NC2	722	ND1	46	ND2	146
NE2	474	NJ	56	NM1	178	NM2	40
NV1	72	NV2	194	NY1	646	OH1	2496
OH2	2364	OK1	104	OK2	610	OR1	408
PA1	1696	PA2	884	SC1	488	SC2	696
SD2	68	TN1	840	TN2	878	TX1	152
TX2	84	TX3	216	TX4	796	TX5	266
TX6	1606	UT1	296	VA1	366	VA2	1504
WA1	560	WA2	200	WI1	146	WI2	1412
WV1	442	WV2	120	WY2	40		

ME2	Total =	26450	AL1	334	AL2	146	
AK1	134	AK2	24	CA2	734	CA3	1184
AZ2	254	CA1	52	FL1	140	FL2	210
CO2	364	DEL	228	GAI	200	ID2	32
FL3	1030	GAI	378	IN1	834	IN2	56
IL1	1140	IL2	40	KS2	172	KY1	28
IO1	82	IO2	192	LA2	352	MD	1308
KY2	276	LAL	122	MN2	460	MO1	472
MI3	1576	MN1	46	MT1	18	MT2	24
MO2	72	MS2	112	ND1	18	ND2	62
NC1	644	NC2	310	NM1	84	NM2	16
NE2	218	NJ	1052	NY1	720	OH1	1114
NV1	32	NV2	92	OK2	284	OR1	194
OH2	1030	OK1	40	SC1	210	SC2	310
PA1	724	PA2	2002	TN2	396	TX1	72
SD2	32	TN1	386	TX4	364	TX5	116
TX2	38	TX3	94	VA1	150	VA2	646
TX6	746	UT1	138	WI1	60	WI2	630
WA1	264	WA2	88	WY2	16		
WV1	184	WV2	48				

MI3	Total =	633844	AL1	1726	AL2	4940	
AK1	6524	AK2	2620	CA2	18436	CA3	21958
AZ2	5470	CA1	29562	DEL	4328	FL1	6810
CO2	11124	CON	25448	GAI	10986	GAI	8458
FL2	6474	FL3	594	IO1	3196	IO2	4616
ID2	1192	IN2	432	LAL	5518	LA2	10274
KS2	7330	KY1	18356	ME1	3528	ME2	1576
MAS	27090	MD	13208	MO1	13846	MO2	4226
MN1	2514	MN2	1116	MT2	1280	NC1	20472
MS2	5382	MT1	1452	ND2	3726	NE2	8880
NC2	10342	ND1	31194	NM1	2254	NM2	1060
NH	5780	NJ	2134	NY1	3934	NY2	18490
NV1	1146	NV2	2940	OK2	7810	OR1	5394
NY3	32070	OK1	29524	RI	3816	SC1	7594
PA1	1330	PA2	2014	TN1	12998	TN2	12940
SC2	8984	SD2	1588	TX3	4522	TX4	13340
TX1	1940	TX2					



TX5	5162	TX6	UT1	3836	VA1	5638
VA2	16044	VT	WAL	7130	WAZ	3406
WI1	1272	WI2	WV1	166	WY2	1198
Total = 40042						
AK1	282	AK2	AL1	540	AL2	210
AZ2	406	CA1	CA2	1228	CA3	1778
CO2	774	CON	DEL	166	FL1	234
FL2	264	FL3	GAI	478	GAZ	280
ID2	66	ILI	IL2	102	IN1	1630
IN2	110	KS2	KV1	66	KY2	410
LAI	226	LA2	MAS	1000	MD	1032
ME1	102	ME2	MI3	2514	MO1	980
MO2	172	MS2	MI1	56	MT2	72
NC1	730	NC2	ND1	88	NE2	502
NH	172	NJ	NMI	154	NM2	42
NV1	64	NV2	NY1	624	NY2	882
NY3	1596	OH1	OH2	1266	OK1	114
OK2	512	OR1	PA1	790	PA2	1428
RI	166	SC1	SC2	350	TN1	592
TN2	506	TX1	TX2	80	TX3	204
TX4	652	TX5	TX6	1216	UT1	270
VA1	198	VA2	VT	56	WAL	472
WAZ	194	WV1	WV2	72	WY2	56

TX5	2472	AK2	AL1	4320	AL2	1446
AZ2	1928	CA1	CA2	7134	CA3	7262
CO2	4996	CON	DEL	874	FL1	2166
FL2	1806	FL3	GAI	2720	GAZ	2370
ID2	554	ILI	IL2	938	IN1	10660
IN2	922	KS2	KV1	768	KY2	2366
LAI	1986	LA2	MAS	6450	MD	4730
ME1	976	ME2	MI3	13208	MO1	4150
MO2	1768	MS2	MI1	586	MT2	682
NC1	4666	NC2	ND1	60	NH	1546
NJ	6538	NM1	NM2	484	NV1	496
NV2	800	NY1	NY2	4528	NY3	5838
OH1	9392	OH2	OK1	1370	OK2	2778
OR1	2218	PA1	PA2	7424	RI	836
SC1	1912	SC2	TN1	3428	TN2	2928
TX1	736	TX2	TX3	1920	TX4	5100
TX5	1984	TX6	UT1	1616	VA1	1826
VA2	3716	VT	WAL	2926	WAZ	1554
WV1	2242	WV2	WV2	684		
Total = 270614						
AK2	66	AL1	AL2	2340	AZ2	2558
CA1	1278	CA2	CA3	9442	CO2	6132
CON	7886	DEL	FL1	3238	FL2	2602



FL3	10016	GAL	4368	GA2	3458	ID2	572
ILL	3446	IN1	6364	IN2	122	KY1	488
KY2	1658	LAI	3360	LA2	5234	MAS	7302
MD	6164	ME1	1026	ME2	472	MI3	13846
MN1	980	MN2	4150	MS2	2904	MT1	540
MT2	636	NC1	6636	NC2	3364	ND1	728
ND2	1682	NE2	516	NH	1652	NJ	7922
NM1	1184	NM2	600	NV1	546	NV2	986
NY1	4062	NY2	5312	NY3	7474	OHI	8292
OH2	9178	OK1	1052	OK2	808	OR1	2382
PAL	6194	PA2	9128	RI	990	SCI	2642
SC2	3140	SD2	474	TN1	1866	TN2	3208
TX1	994	TX2	996	TX3	2856	TX4	7600
TX5	2782	TX6	11850	UTI	1846	VAL	2390
VA2	4816	VT	560	WAI	3076	WA2	1562
WI1	2004	WI2	4612	WV1	3028	WV2	848
WY2	666						

Total = 79204

MO2

ALL	1560	AL2	656	AZ2	974	CA1	222
CA2	2502	CA3	3944	CO2	1802	CON	1742
DEL	310	FL1	660	FL2	670	FL3	2970
GAL	1338	GA2	724	ID2	122	ILL	3232
IN1	3078	IO2	70	KY1	66	KY2	1042
LAI	206	LA2	1764	MAS	1734	MD	2024
ME1	166	ME2	72	MI3	4226	MN1	172
MN2	1768	MS2	460	MT1	88	MT2	116
NC1	1682	NC2	758	ND1	106	ND2	278
NH	282	NJ	2220	NM1	398	NM2	106
NV1	128	NV2	338	NY1	1040	NY2	1552
NY3	2958	OHI	3298	OH2	2324	OR1	640
PAL	1452	PA2	2654	RI	300	SCI	550
SC2	844	SD2	190	TN1	346	TN2	1332
TX1	324	TX2	246	TX3	452	TX4	2128
TX5	634	TX6	2152	UTI	552	VAL	416
VA2	1222	VT	84	WAI	840	WA2	330
WI1	296	WI2	2475	WV1	564	WV2	134
WY2	98						

Total = 117364

MS2

AK1	294	AZ2	1264	CA1	316	CA2	3334
CA3	5184	CO2	1952	CON	2736	DEL	490
FL2	1344	FL3	6930	GAL	246	GA2	846
ID2	156	ILL	4912	IL2	278	IN1	4158
IN2	408	IO2	438	IO2	1178	KS2	1184
KY1	266	KY2	1464	MAS	2694	MD	3186
ME1	256	ME2	112	MI3	5382	MN1	202
MN2	1796	MO1	2904	MO2	460	MT1	118
MT2	140	NC1	3048	NC2	1384	ND1	128
ND2	322	NE2	1210	NH	448	NJ	3466



NM1	480	NM2	148	NV1	172	NV2	434
NY1	1504	NY2	2350	NY3	4490	OH1	4538
OH2	3290	OK1	456	OK2	2034	OR1	842
PA1	2170	PA2	4094	RI	460	SCI	1034
SC2	1686	SD2	190	TN1	862	TN2	1546
TX1	426	TX2	278	TX3	854	TX4	3296
TKS	1166	TX6	2414	UT1	674	VAL	730
VA2	2064	VT	138	WA1	1102	WA2	440
WI1	342	WI2	2798	WV1	894	WV2	212
WY2	122						

MT1							
	Total =	28632					
AK1	AK2	28	AL1	AL2	302	AL2	134
AZ2	CA1	134	CA2	CA3	1678	CA3	2380
CO2	CON	528	DEL	FL1	92	FL1	134
FL2	FL3	808	GAL	GA2	296	GA2	160
IL1	IL2	40	IN1	IN2	704	IN2	50
IO1	IO2	222	KS2	KY1	242	KY1	28
KY2	LA1	142	LA2	MAS	366	MAS	552
MD	ME1	46	ME2	MI3	18	MI3	1116
MN1	MN2	586	MO1	MO2	540	MO2	88
MS2	NC1	412	NC2	ND1	192	ND1	50
ND2	NE2	322	NH	NJ	84	NJ	690
NM1	NE2	32	NV1	NV2	88	NV2	208
NY1	NY2	500	NY3	OH1	986	OH1	790
OH2	OK1	66	OK2	OR1	380	OR1	568
PAL	PA2	812	RI	SCI	102	SCI	132
SC2	SD2	54	TN1	TN2	352	TN2	294
TX1	TX2	60	TX3	TX4	146	TX4	488
TK5	TX6	904	UT1	VAL	422	VAL	98
VA2	VT	24	WA1	WA2	826	WA2	80
WI1	WI2	602	WV1	WV2	124	WV2	32
WY2							

MT2							
	Total =	32038					
AK1	AK2	38	AL1	AL2	362	AL2	158
AZ2	CA1	154	CA2	CA3	1746	CA3	2496
CO2	CON	602	DEL	FL1	104	FL1	162
FL2	FL3	898	GAL	GA2	334	GA2	188
ID2	IL1	1170	IL2	IN1	50	IN1	828
IN2	IO1	128	IO2	KS2	284	KS2	298
KY1	KY2	246	LA1	LA2	170	LA2	414
MAS	MD	662	ME1	ME2	56	ME2	24
MI3	MN1	72	MN2	MO1	682	MO1	635
MO2	MS2	140	NC1	NC2	472	NC2	222
ND2	NE2	402	NH	NJ	98	NJ	760
NM1	NM2	42	NV1	NV2	92	NV2	226
NY1	NY2	546	NY3	OH1	1048	OH1	894
OH2	OK1	90	OK2	OR1	442	OR1	534
PAL	PA2	890	RI	SCI	110	SCI	154



SC2	240	SD2	TN1	402	TN2	328
TX1	134	TX2	TX3	184	TX4	584
TX5	190	TX6	UT1	98	VAl	116
VAl	382	VT	WAl	734	WAl	318
W11	96	W12	WV1	154	WV2	38
Total = 310278						
AK1	2910	AK2	AL1	3064	AL2	2356
AZ2	2454	CA1	CA2	7884	CA3	9910
CO2	4456	CON	DEL	1308	FL1	4002
FL2	3024	FL3	GAl	366	GAl	324
ID2	472	IL1	IL2	1024	IN1	14542
IN2	1124	IO1	IO2	4194	KS2	2808
KY1	552	LAl	LA2	5798	MAS	12368
MD	728	ME1	ME2	644	MI3	20472
MN1	730	MN2	MO1	6636	MO2	1682
MS2	3048	MT1	MT2	472	ND1	484
ND2	1172	NE2	NH	2436	NJ	14258
NM1	978	NM2	NV1	474	NV2	924
NY1	6798	NY2	NY3	16758	OH1	3320
OH2	3546	OK1	OK2	3432	OR1	2216
PA1	2462	PA2	RI	1840	SD2	646
TN1	3814	TX1	TX2	666	TX3	1960
TX4	6242	TX5	TX6	10966	UT1	1568
VT	774	WAl	WAl	1328	W11	1406
W12	9920	W12	W12			

NC2	342	AL2	4194	AL2	1550
AZ2	494	CA3	4292	CA3	5922
CO2	7710	DEL	284	FL1	2054
EL2	10356	GAl	1148	GAl	440
ID2	7392	IL2	448	IN1	7478
IN2	578	IO2	1884	KS2	1364
KY1	1932	LAl	1278	LA2	3006
MAS	722	ME2	310	MI3	10342
MN1	2514	MO1	3364	MO2	758
MS2	192	MT2	222	ND1	218
NE2	1544	NH	1236	NJ	7606
ND2	202	NV1	240	NV2	520
NM1	5956	NY3	11224	OH1	7432
NY2	532	OK2	1852	OR1	1170
OK1	4100	RI	1128	SD2	296
PA2	460	TX1	466	TX2	320
TN2	3102	TX5	1190	TX6	5704
TX4	378	WAl	1546	WAl	660
VT	4766	W11	88	W12	166
W12					
Total = 30550					



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AK1	190	AK2	28	AL1	348	AL2	152
AZ2	434	CA1	86	CA2	1258	CA3	1996
CO2	866	CON	594	DEL	112	FL1	134
FL2	180	FL3	890	GAL	352	GA2	170
ID2	64	IL1	1412	IL2	50	IN1	886
IN2	60	IO1	154	IO2	302	KS2	302
KY1	28	KY2	274	LAI	154	LA2	412
MAS	634	MD	740	ME1	46	ME2	18
MI3	1452	MN1	88	MN2	60	MO1	728
MO2	106	MS2	128	MT1	50	NCL	484
NC2	218	NE2	414	NH	88	NJ	808
NM1	156	NM2	28	NV1	60	NV2	166
NY1	384	NY2	596	NY3	1204	OR1	996
OH2	774	OK1	68	OK2	464	OR1	352
PA1	478	PA2	968	RI	116	SCI	146
SC2	244	TN1	434	TN2	356	TX1	114
TX2	64	TX3	148	TX4	508	TX5	154
TX6	1010	UT1	308	VA1	108	VA2	396
VT	24	WA1	182	WA2	182	WI1	102
WI2	822	WV1	146	WV2	34		

Total = 70024

ND2

AK1	88	AK2	864	AL2	358	AL2	358
AZ2	214	CA1	2490	CA3	3768	CA3	3768
CO2	1528	CON	266	FL1	366	FL1	366
FL2	436	FL3	806	GA2	446	GA2	446
ID2	134	IL1	3488	IN1	2326	IN1	2326
IN2	162	IO1	170	KS2	700	KS2	700
KY1	94	KY2	378	LA2	920	LA2	920
MAS	1576	MD	652	ME2	62	ME2	62
MI3	3726	MO1	1698	MS2	322	MS2	322
MT1	112	MT2	1682	NC2	544	NC2	544
NE2	562	NH	146	NCL	1172	NCL	1172
NM2	72	NV1	252	NM1	1940	NM1	1940
NY2	1422	NY3	126	NV2	322	NV2	322
OK1	182	OK2	2708	OH1	2446	OH2	1914
PA2	2302	RI	974	PA1	706	PA1	1192
TN1	992	TN2	276	SC1	378	SC2	574
TX3	356	TX4	832	TX2	146	TX2	146
UT1	574	TX5	1166	TX6	2216	TX6	2216
WA1	974	VA1	292	VT	74	VT	74
WV1	392	WA2	384	WI2	2172	WI2	2172
		WV2	98				

Total = 163116

NE2

AK1	440	AK2	2908	AL2	1046	AL2	1046
AZ2	712	CA1	5418	CA3	6890	CA3	6890
CO2	4488	CON	578	FL1	1352	FL1	1352
FL2	1222	FL3	2036	GA2	1476	GA2	1476
ID2	352	IL1	236	IN1	7094	IN1	7094
IN2	590	KY1	1680	LAI	1442	LAI	1442



LAZ	2560	MAS	3782	MD	3406	ME1	474
ME2	218	MI3	8880	MN1	502	MO1	516
MS2	1210	MT1	322	MT2	402	NCL	3064
NC2	1544	ND1	414	ND2	562	NH	776
NJ	4226	NML	790	NM2	316	NV1	328
NV2	678	NY1	2134	NY2	2938	NY3	4644
OR1	6030	OH2	4516	OK1	572	OK2	1410
OR2	1528	PAL	2996	PA2	4900	RI	560
SC1	1154	SC2	1492	TN1	2748	TN2	2114
TX1	622	TX2	568	TX3	1464	TX4	3930
TX5	1360	TX6	6568	UT1	1280	VA1	1002
VA2	2364	VT	260	WA1	2014	WA2	956
WI1	450	WI2	4926	WV1	1262	WV2	352
WY2	420						

Total = 83588

NH

AK1	522	AK2	108	AL1	1290	AL2	534
AZ2	828	CAL	210	CA2	2452	CA3	3754
CO2	1250	DEL	246	FL1	572	FL2	784
FL3	3648	GAL	1340	GAL	802	ID2	116
IL1	3972	IL2	166	IN1	3198	IN2	218
IO1	292	IO2	778	KS2	614	KY1	130
KY2	996	LAL	472	LA2	1238	MD	2404
MI3	5780	MN1	172	MN2	1546	MO1	1652
MO2	282	MS2	448	MT1	84	MT2	98
NC1	2436	NC2	1236	ND1	88	ND2	252
NE2	776	NJ	1152	NM1	286	NM2	76
NV1	122	NV2	302	NY1	702	OH1	4090
OH2	3916	OK1	190	OK2	952	OR1	666
PAL	2550	PA2	2160	SC1	832	SC2	1148
SD2	128	TN1	1350	TN2	1422	TX1	240
TX2	140	TX3	372	TX4	1324	TX5	456
TX6	2586	UT1	472	VA1	656	VA2	2548
WA1	900	WA2	340	WI1	266	WI2	2386
WV1	778	WV2	220	WY2	76		

Total = 382166

NJ

AK1	3594	AK2	1012	AL1	9138	AL2	3188
AZ2	3198	CAL	1706	CA2	11324	CA3	12810
CO2	6146	FL1	4774	FL2	4948	FL3	19538
GAL	7160	GAL	6302	ID2	740	IL1	18340
IL2	1366	IN1	21122	IN2	1596	IO1	1578
IO2	6208	KS2	3754	KY1	1328	KY2	5378
LAL	3342	LAL	6340	ME1	56	ME2	1052
MI3	31194	MN1	1202	MN2	6538	MO1	7922
MO2	2220	MS2	3466	MT1	690	MT2	760
NC1	14258	NC2	7606	ND1	808	ND2	1940
NE2	4226	NH	1152	NM1	1294	NM2	672
NV1	720	NV2	1260	OH1	23168	OH2	5992
OK1	1720	OK2	4070	OR1	3322	SC1	3516



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State	Count	State	Count	State	Count	State	Count	State	Count
SC2	7200	SD2	1008	TN1	6840	TN2	7990		
TX1	1152	TX2	932	TX3	2708	TX4	8158		
TX5	3374	TX6	13072	UT1	2220	VA1	852		
WA1	4382	WA2	2132	WI1	2336	WI2	14900		
WV1	5444	WV2	712						
	Total = 61362								
NW1	AK1	AK2	166	AL1	986	AL2	374		
	CAL	CA2	3218	CA3	4084	CON	1316		
	DEL	FL1	544	FL2	450	FL3	1858		
	GAL	GA2	540	ID2	202	IL1	1838		
	IL2	IN1	1848	IN2	166	IO1	240		
	IO2	KS2	794	KY1	134	KY2	442		
	LAL	LA2	972	MAS	1248	MD	956		
	ME1	ME2	84	MI3	2254	MN1	154		
	MV2	MO1	1184	MO2	398	MS2	480		
	MT1	MT2	188	NC1	978	NC2	528		
	ND1	ND2	310	NE2	790	NH	286		
	NJ	NY1	210	NV2	478	NY1	630		
	NY2	NY3	1234	OH1	1598	OH2	1254		
	OK1	OK2	940	OR1	790	PAL	902		
	PA2	RI	170	SC1	398	SC2	494		
	SD2	TN1	764	TN2	624	TX3	536		
	TX4	TX5	790	TX6	2744	UT1	790		
	VA1	VA2	756	VT	96	WAL	952		
	WA2	WI1	280	WI2	1532	WV1	402		
	WV2	WV2	218						

State	Count	State	Count	State	Count	State	Count	State	Count
NW2	AK1	AK2	34	AL1	358	AL2	172		
	CAL	CA2	1580	CA3	3158	CO2	914		
	CON	DEL	92	FL1	158	FL2	196		
	FL3	GAL	346	GA2	176	ID2	60		
	IL1	IL2	40	IN1	694	IN2	56		
	IO1	IO2	206	KS2	290	KY1	28		
	KY2	LAL	196	LA2	510	MAS	522		
	MD	ME1	40	ME2	16	MI3	1060		
	MN1	MN2	484	MO1	600	MO2	106		
	MS2	MT1	32	MT2	42	NC1	444		
	NC2	ND1	28	ND2	72	NE2	316		
	NH	NJ	672	NV1	72	NV2	262		
	NY1	NY2	480	NY3	978	OH1	798		
	OH2	OK1	96	OK2	560	OR1	328		
	PAL	PA2	796	RI	96	SC1	138		
	SC2	SD2	42	TN1	420	TN2	328		
	TX3	TX4	700	TX5	266	TX6	1470		
	UT1	VA1	96	VA2	346	VT	22		
	WAL	WA2	150	WI1	60	WI2	550		
	WV1	WV2	28	WV2*	32				
	Total = 29566								



NV1	AK1	29374	AK2	48	AL1	390	AL2	162
	AZ2	218	CA3	1464	CO2	872	CON	634
	DEL	740	FL1	198	FL2	204	FL3	936
	GAI	98	GA2	216	ILL1	976	IL2	56
	INI	322	IN2	64	IOL	106	IOL	296
	KS2	810	KY1	46	KY2	222	LAI	196
	LAI	278	MAS	632	MD	588	ME1	72
	LA2	428	MI3	1146	MN1	64	MN2	496
	ME2	32	MO2	128	MS2	172	MT1	88
	MO1	546	NC1	474	NC2	240	ND1	60
	MT2	92	NE2	328	NH	122	NJ	720
	ND2	126	NM2	72	NY1	334	NY2	510
	NM1	210	OH1	814	OH2	648	OK1	116
	NY3	888	OR1	618	PAL	438	PA2	828
	OK2	392	OR2	170	SC2	244	SD2	66
	RI	102	SC1	316	TX1	166	TX2	90
	TN1	372	TN2	696	TX5	252	TX6	1082
	TX3	228	TX4	138	VA2	382	VT	38
	TX6	566	VA1	424	WI1	102	WI2	678
	UT1	1002	WA2	46	WX2	74		
	WAI	166	WX2					
	WV1							

NV2	AK1	55436	AK2	146	AL1	902	AL2	334
	CAL	534	CA2	1656	CO2	1822	CON	1338
	DEL	930	FL1	516	FL2	428	FL3	1748
	GAI	166	GA2	522	ID2	316	IL1	1640
	IL2	574	IN1	1734	IN2	154	IOL	212
	IO2	146	KS2	636	KY1	130	KY2	398
	LAI	766	LA2	828	MAS	1260	MD	888
	LAI	502	LA2	92	MI3	2134	MN1	154
	ME1	194	ME2	92	MO2	338	MS2	434
	MV2	800	MO1	986	NC1	924	NC2	520
	MT1	208	MT2	226	NE2	678	NH	302
	ND1	166	ND2	322	NM2	262	NY1	616
	NJ	1260	NM1	478	OR1	1472	OH2	1192
	NY2	844	NY3	1118	OR2	1218	PAL	878
	OK1	360	OK2	674	OR1	390	SC2	466
	PA2	1390	RI	166	SC1	566	TX1	390
	PA2	172	TN1	658	TN2	1728	TX5	686
	SD2	244	TX3	638	TX4	734	VT	102
	TX2	2140	TX4	350	VA2	278	WI2	1464
	TX6	1344	VA1	716	WI1	228		
	WAI	394	WA2	116	WX2			
	WV1		WX2					

NY1	AK1	165746	AK2	448	AL1	4104	AL2	1426
	AZ2	1684	CA1	762	CA2	5394	CA3	6432
	CO2	1574	FL1	2012	FL2	2058	FL3	8256
	GAI	3008	IN1	2608	ID2	344	ILL1	10242
	IL2	3240	GA2	9702	IN2	776	IO1	810
	INI	688	INI					



IO2	3150	KS2	1828	KY1	624	KY2	2746
LAI	1508	LA2	2932	MAS	1152	ME1	646
ME2	720	MI3	3934	MN1	624	MN2	3562
MO1	4062	MO2	1040	MS2	1504	MT1	320
MT2	352	NC1	6798	NC2	3686	ND1	384
ND2	954	NE2	2134	NH	702	NM1	630
NM2	296	NV1	334	NV2	616	OH1	3642
OK1	778	OK2	2032	OR1	1584	SCL	2588
SC2	2958	SD2	490	TN1	3338	TN2	3712
TX1	548	TX2	430	TX3	1232	TX4	3736
TX5	1484	TX6	6154	UT1	1080	VA1	1478
VA2	2320	WA1	2094	WA2	990	WI1	1216
WI2	8238	WV1	490	WY2	328		

Total = 268260

NY2

AK1	2476	AK2	714	AL1	6090	AL2	2090
AZ2	2112	CA1	1226	CA2	7726	CA3	8346
CO2	4224	FL1	3230	FL2	3180	FL3	12422
GAI	4502	GA2	4114	ID2	524	IL1	12464
IL2	970	IN1	14656	IN2	1090	IO1	1094
IO2	4450	KS2	2596	KY1	928	KY2	3498
LAI	2290	LA2	4154	MI3	18490	MN1	882
MN2	4528	MO1	5312	MO2	1552	MS2	2350
MT1	500	MT2	546	NC1	9906	NC2	5956
ND1	596	ND2	1422	NE2	2938	NM1	872
NM2	480	NV1	510	NV2	844	OH1	14640
OH2	7930	OK1	1224	OK2	2676	OR1	2318
SC1	4118	SC2	4438	SD2	728	TN1	4438
TN2	5018	TX1	774	TX2	646	TX3	1894
TX4	5584	TX5	2338	TX6	8686	UT1	1524
VA1	3546	VA2	4884	WA1	3046	WA2	1522
WI1	1722	WI2	10686	WV1	4172	WV2	336
WY2	522						

AK1	422390	AK2	1448	AL1	11048	AL2	3492
AZ2	2534	CA1	2434	CA2	11390	CA3	8436
CO2	6356	FL1	6358	FL2	5500	FL3	19508
GAI	6732	GA2	7874	ID2	940	IL1	16408
IL2	1850	IN1	24850	IN2	1984	IO1	1712
IO2	8422	KS2	4432	KY1	1908	KY2	5146
LAI	4238	LA2	6270	MI3	32070	MN1	1596
MN2	5838	MO1	7474	MO2	2958	MS2	4490
MT1	986	MT2	1048	NC1	16758	NC2	11224
ND1	1204	ND2	2708	NE2	4644	NM1	1234
NM2	978	NV1	888	NV2	1118	OH1	22980
OH2	9358	OK1	2476	OK2	3428	OR1	3666
SC1	7778	SC2	7446	SD2	1390	TN1	6412
TN2	7598	TX1	1154	TX2	1182	TX3	3560
TX4	9696	TX5	4420	TX6	13150	UT1	2246

NY3

Total = 422390



VA1	3254	WAI	4712	WA2	2726	WI1	3360
WI2	17894	WV1	8482	WY2	1066		
Total = 426920							
AK1	5194	AK2	1442	AL1	9892	AL2	4198
AZ2	3792	CA1	1902	CA2	12824	CA3	14876
CO2	7724	CON	21486	DEL	2418	FL1	5862
FL2	5446	FL3	20536	GAI	7350	GA2	7608
ID2	844	IO1	2414	IO2	6574	KS2	5352
LAI	4470	LA2	8158	MAS	19270	MD	5768
ME1	2496	ME2	1114	MN1	1608	MN2	9392
MO1	8292	MO2	3298	MS1	4538	MT1	790
MT2	894	NC1	3320	NC2	7432	ND1	996
ND2	2446	NE2	6030	NH	4090	NJ	23168
NM1	1598	NM2	798	NV1	814	NV2	1472
NY1	3642	NY2	14640	NY3	22980	OK1	2266
OK2	5648	OR1	3732	PA2	17900	RI	2702
SC1	3828	SC2	7198	SD2	1372	TN1	5058
TN2	692	TX1	1390	TX2	1180	TX3	3444
TX4	10166	TX5	4026	TX6	16996	UT1	2648
VA1	322	VA2	8818	VT	1414	WAI	4900
WA2	2390	WI1	3076	WI2	3642	WY2	864

AK1	3694	AK2	1006	AL1	9386	AL2	3090
AZ2	3056	CA1	1498	CA2	10360	CA3	12232
CO2	6048	CON	19236	FL1	4336	FL2	4262
FL3	16482	GAI	7264	GA2	5692	ID2	666
IL1	4850	IL2	558	IN2	406	IO1	1770
IO2	7152	KS2	3920	KY1	228	LAI	3252
LA2	6162	MAS	18644	ME1	2364	ME2	1030
MN1	1266	MN2	7352	MO1	9178	MO2	2324
MS2	3290	MT1	622	MT2	702	NCL	3546
NC2	5368	ND1	774	ND2	1914	NE2	4516
NH	3916	NJ	5992	NM1	1254	NM2	606
NV1	648	NV2	1192	NY2	7930	NY3	9358
OK1	1656	OK2	4280	OR1	3018	RI	2670
SC1	5038	SC2	6332	SD2	1030	TN1	7380
TN2	2252	TX1	1090	TX2	890	TX3	2562
TX4	7700	TX5	3048	TX6	12846	UT1	2108
VA2	2586	VT	1388	WAI	3972	WA2	1904
WI1	2614	WI2	6638	WY2	666		
Total = 314060							

OH2
4 31

AK1	65078	AL2	488	AZ2	1116	CA1	174
AL1	1066	CA3	4344	CO2	1884	CON	1258
CA2	2488	FL1	436	FL2	502	FL3	2418
DEL	240	GA2	484	ID2	108	IL1	3024
GAI	980	IN1	2042	IN2	172	IO1	332
IL2	128	IN1	88	KY2	694	LAI	220
IO2	646	KY1					
Total = 65078							



LA2	1484	MAS	MD	1608	ME1	104
ME2	40	MI3	MN1	114	MN2	1370
MO1	1052	MS2	MT1	66	MT2	90
NC1	1200	NC2	ND1	68	ND2	182
NE2	572	NH	NJ	1720	NM1	478
NM2	96	NV1	NV2	360	NY1	778
NY2	1224	NY3	OH1	2266	OH2	1656
OR1	590	PAL	PA2	2058	RI	240
SCI	366	SC2	SD2	126	TN1	1358
TN2	938	TX1	TX4	734	TX5	588
TX6	1072	UT1	VA1	262	VA2	908
VT	54	WA1	WA2	280	WI1	170
WI2	1578	WV1	WV2	80	WY2	72

Total = 172014

OK2

AL1	1442	AZ2	CA1	1790	CA1	958
CA2	5906	CO2	CON	4494	CON	4302
DEL	2130	FL2	FL3	1558	FL3	6002
GA1	2028	ID2	IL1	406	IL1	6798
IL2	7150	IN2	IO1	714	IO1	498
IO2	604	KY2	LAL	1644	LAL	440
LA2	3966	MD	ME1	2946	ME1	610
ME2	7810	MN1	MN2	512	MN2	2778
MO1	2034	MT1	MT2	380	MT2	442
NC1	1852	ND1	ND2	464	ND2	974
NE2	952	NJ	NM1	4070	NM1	940
NM2	392	NV2	NY1	674	NY1	2032
NY2	3428	OH1	OH2	5648	OH2	4280
OR1	3070	PA2	RI	4554	RI	510
SCI	1702	SD2	TN1	648	TN1	2458
TN2	816	TX4	TX5	3384	TX5	2458
TX6	1270	VA1	VA2	1302	VA2	2522
VT	1990	WA2	WI1	1074	WI1	1030
WI2	1506	WV2	WY2	440	WY2	498

Total = 146034

OR1

AK1	1044	AK2	AL1	1904	AL2	742
AZ2	2418	CA1	CA2	11486	CA3	13290
CO2	3616	CON	DEL	446	FL1	1002
FL2	958	FL3	GA1	1422	GA2	1088
IL1	4316	IL2	IN1	3954	IN2	322
IO1	494	IO2	KS2	1300	KY1	248
KY2	1010	LAL	LA2	1852	MAS	3126
MO	2538	ME1	ME2	194	MI3	5394
MN1	348	MN2	MD1	2382	MO2	640
MS2	842	MT1	MT2	534	NC1	2216
NC2	1170	ND1	ND2	706	NE2	1528
NH	666	NJ	NM1	790	NM2	328
NV1	618	NV2	NY1	1584	NY2	2318
NY3	3666	OH1	OH2	3018	OK1	590



State	Code	Value	State	Code	Value	State	Code	Value
OK2	PA1	1584	PA2	PA1	2124	RI	RI	3746
SC1	SC2	846	SD2	SD2	1116	TN1	TN1	466
TN2	TX1	1404	TX2	TX2	640	TX3	TX3	1616
TX4	TX5	3108	TX6	TX6	1190	UT1	UT1	1060
VA1	VA2	730	VT	VT	1790	WA1	WA1	2056
WA2	WI1	160	WI2	WI2	578	WV1	WV1	64
WY2	WY2	246			416			848
	Total =	208430						
AK1	AK2	2398	AL1	AL1	624	AL2	AL2	2164
AZ2	CA1	2304	CA2	CA2	958	CA3	CA3	9534
CO2	CON	4220	FL1	FL1	1202	FL2	FL2	3086
FL3	GAI	12306	GA2	GA2	5262	ID2	ID2	446
IL1	IL2	12752	IN1	IN1	986	IN2	IN2	1208
IO1	IO2	1162	KS2	KS2	4266	KY1	KY1	940
KY2	LAI	876	LA2	LA2	2140	MAS	MAS	10732
ME1	ME2	1696	MI3	MI3	724	MN1	MN1	790
MN2	MO1	5118	MO2	MO2	6194	MS2	MS2	2170
MT1	MT2	394	NCL	NCL	446	NC2	NC2	2590
ND1	ND2	478	NE2	NE2	1192	NH	NH	2550
NM1	NM2	902	NV1	NV1	384	NV2	NV2	878
OK1	OK2	1026	OR1	OR1	3070	RI	RI	1702
SC1	SC2	1750	SD2	SD2	4744	TN1	TN1	5378
TN2	TX1	3456	TX2	TX2	780	TX3	TX3	1672
TX4	TX5	5222	TX6	TX6	2020	UT1	UT1	1502
VA2	VT	616	WA1	WA1	722	WA2	WA2	1272
WI1	WI2	1534			11022			

State	Code	Value	State	Code	Value	State	Code	Value
AK1	AK2	407238	AL1	AL1	1226	AL2	AL2	3696
AZ2	CA1	4254	CA2	CA2	2004	CA3	CA3	13678
CO2	FL1	6972	FL2	FL2	5692	FL3	FL3	21876
GAI	GA2	8286	ID2	ID2	7524	IL1	IL1	21468
IL2	IN1	1680	IN2	IN2	25942	IO1	IO1	1840
IO2	KS2	7510	KY1	KY1	4384	KY2	KY2	6470
LAI	LA2	3944	ME1	ME1	7214	ME2	ME2	2002
MI3	MN1	29524	MN2	MN2	1428	MD1	MD1	9128
MO2	MS2	2654	MT1	MT1	4094	MT2	MT2	890
NCL	NC2	10378	ND1	ND1	4100	ND2	ND2	2302
NE2	NH	4900	NM1	NM1	2160	NM2	NM2	796
NV1	NV2	828	OR1	OR1	1390	OK1	OK1	2058
OK2	OR1	4554	SC1	SC1	3746	SC2	SC2	8402
SD2	TN1	1198	TN2	TN2	7954	TX1	TX1	1294
TX2	TX3	1084	TX4	TX4	3176	TX5	TX5	3936
TX6	UT1	14870	WA1	WA1	2496	WA2	WA2	2444
WI1	WI2	2832			17894	WY2	WY2	852
	Total =	55888						
AK1	AK2	478	AL1*	AL1*	138	AL2	AL2	404
AZ2	CA1	410	CA2	CA2	248	CA3	CA3	1622



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CO2	822	FL1	634	FL2	628	FL3	2476
GAL	852	GA2	794	ID2	104	IL1	2240
IL2	180	INI	2640	IN2	204	IO1	208
IO2	838	KS2	500	KY1	176	KY2	634
LAI	448	LA2	806	MD	294	MI3	3816
MN1	166	MN2	836	MO1	990	MO2	300
MS2	460	MT1	102	MT2	110	NC1	1840
NC2	1128	ND1	116	ND2	276	NE2	560
NM1	170	NM2	96	NV1	102	NV2	166
OHL	2702	OH2	2670	OK1	240	OK2	510
OR1	466	PA1	1702	SC1	776	SC2	852
SD2	140	TN1	828	TN2	928	TX1	154
TX2	128	TX3	374	TX4	1092	TX5	466
TX6	1688	UT1	300	VA1	788	VA2	2020
WA1	608	WA2	306	WI1	326	WI2	1958
WV1	790	WV2	272	WY2	104		

AK1	1010	AK2	246	AL1	1448	AL2	936
AZ2	1072	CA1	344	CA2	3170	CA3	4534
CO2	1754	CON	5244	DEL	476	FL1	1002
FL2	952	FL3	7346	GAL	1004	GA2	494
ID2	166	IL1	5694	IL2	326	INI	5476
IN2	336	IO1	434	IO2	1338	KS2	1008
KY1	186	KY2	776	LAI	946	LA2	2358
MAS	4792	MD	1610	ME1	488	ME2	210
MI3	7594	MN1	240	MN2	1912	MO1	2642
MO2	550	MS2	1034	MT1	132	MT2	154
ND1	146	ND2	378	NE2	1154	NH	832
NJ	3516	NM1	398	NM2	138	NV1	170
NV2	390	NY1	2588	NY2	4118	NY3	7778
OHL	3828	OH2	5038	OK1	366	OK2	1458
OR1	846	PA1	1750	PA2	4408	RI	776
SD2	210	TN1	1762	TN2	378	TX1	350
TX2	232	TX3	662	TX4	2282	TX5	846
TX6	4376	UT1	626	VT	252	WAI	1118
WA2	472	WI1	434	WI2	3456	WY2	134

Total = 129110

SC1

AK1	1484	AK2	422	AL1	1864	AL2	952
AZ2	1238	CA1	546	CA2	3986	CA3	4940
CO2	2222	CON	6306	DEL	1044	FL1	1356
FL3	7608	ID2	240	IL1	6510	IL2	482
IN1	7226	IN2	656	IO1	558	IO2	2012
KS2	1394	KY1	536	KY2	1182	LAI	1464
LA2	3108	MAS	5722	MD	4726	ME1	696
ME2	310	MI3	8984	MN1	350	MN2	2194
MO1	3140	MO2	844	MS2	1686	MT1	210
MT2	240	ND1	244	ND2	574	NE2	1492
NH	1148	NJ	7200	NM1	494	NM2	238

Total = 171146

SC2



NV1	244	NV2	466	NY1	2958	NY2	4438
NY3	7446	OR1	1198	OR2	6332	OK1	628
OK2	1702	OR2	1116	PA1	4744	PA2	8402
RI	852	SD2	318	TN1	2454	TX1	446
TX2	342	TX3	1022	TX4	3278	TX5	1340
TX6	5688	UT1	784	VT	360	WA1	1446
WA2	682	WI1	678	WI2	4592	WV1	540
WV2	596	WV2	226				

SD2

AK1	302	AK2	56	AL1	516	AL2	208
AZ2	468	CA1	110	CA2	1292	CA3	2002
CO2	1000	CO2	782	DEL	138	FL1	210
FL2	244	FL3	1128	GA1	462	GA2	252
ID2	66	IL1	1928	IL2	90	IN1	1352
IN2	98	KS2	278	KY1	56	KY2	380
LAI	232	LA2	546	MAS	802	MD	894
ME1	68	ME2	32	MI3	2014	MO1	474
MO2	190	MS2	190	MI1	54	MI2	72
NC1	646	NC2	296	NH	128	NJ	1008
NV1	184	NM2	42	NV1	66	NV2	172
NY1	490	NY2	728	NY3	1390	OHI	1372
OH2	1030	OK1	126	OK2	648	OR1	352
PA1	638	PA2	1198	RI	140	SC1	210
SC2	318	TN1	606	TN2	476	TX1	138
TX2	92	TX3	222	TX4	702	TX5	216
TX6	1348	UT1	308	VA1	160	VA2	512
VT	40	WA1	472	WA2	190	WI2	978
WV1	220	WV2	56		60		

Total = 36964

TN1

AK1	822	AL2	240	AZ2	1718	CA1	888
CA2	5674	CA3	6370	CO2	3608	CON	6642
DEL	952	FL1	1902	FL2	2714	FL3	9860
GA2	1708	ID2	380	IL1	3042	IN1	3394
IO1	1044	IO2	3920	KS2	2478	LAI	990
LA2	2726	MAS	6052	MD	5600	ME1	840
ME2	386	MI3	12998	MN1	592	MN2	3428
MO1	1866	MO2	346	MT1	862	MT2	352
MT2	402	NC1	3814	NC2	3370	ND1	434
ND2	992	NE2	2748	NH	1350	NJ	6840
NV1	764	NM2	420	NV1	372	NV2	658
NY1	3338	NY2	4438	NY3	6412	OHI	5058
OH2	7380	OK1	1358	OK2	2458	OR1	1616
PA1	5378	PA2	7954	RI	828	SC1	1762
SC2	2454	SD2	606	TN2	558	TX1	684
TX2	630	TX3	1974	TX4	5800	TX5	2270
TX6	8514	UT1	1182	VA1	1950	VA2	4550
VT	448	WA1	2086	WA2	1050	WI1	1224
WV1	7942	WV2	1134		756	WV2	410

Total = 210760



TN2	AKI	187634	AK2	446	AL2	774	AZ2	1472
	CA1	1912	CA2	4904	CA3	5656	CO2	2904
	CON	746	DEL	1152	FL1	1870	FL2	2528
	FL3	10472	ID2	318	IL1	9074	IL2	260
	INI	3218	IO1	802	IO2	3172	KS2	2038
	LAI	2134	LA2	4020	MAS	6650	MD	4104
	ME1	878	ME2	396	MI3	12940	MN1	506
	MN2	2928	MO1	3208	MO2	1332	MS2	1546
	MT1	294	MT2	328	NC2	460	ND1	356
	ND2	832	NE2	2114	NH	1422	NJ	7990
	NM1	624	NM2	328	NV1	316	NV2	566
	NY1	3712	NY2	5018	NY3	7598	OH1	692
	OH2	2252	OK1	938	OK2	2274	OR1	1404
	PAL	3456	PA2	9186	RI	928	SCI	378
	SD2	476	TN1	558	TX1	560	TX2	474
	TX3	1444	TX4	4398	TX5	1784	TX6	7534
	UTI	990	VA2	2500	VT	472	WAI	1826
	WA2	896	WI1	1032	WI2	6884	WV2	240
	WY2	326						

TX1	AKI	54686	AK2	140	AL1	866	AL2	340
	CA1	546	CA2	2724	CA3	3790	CO2	1590
	CON	1134	DEL	154	FL1	482	FL2	410
	FL3	1728	GAL	582	GA2	476	ID2	152
	IL1	1586	IL2	128	IN1	1560	IN2	140
	IO1	194	IO2	646	KS2	632	KY1	112
	KY2	390	LAI	528	LA2	922	MAS	1082
	MD	872	ME1	152	ME2	72	MI3	1940
	MN1	120	MN2	736	MO1	994	MO2	324
	MS2	426	MI1	116	MI2	134	NCL	868
	NC2	466	ND1	114	ND2	236	NE2	622
	NH	240	NJ	1152	NV1	166	NV2	390
	NY1	548	NY2	774	NY3	1154	OH1	1390
	OH2	1090	OK1	382	OK2	816	OR1	640
	PAL	780	PA2	1294	RI	154	SCI	350
	SC2	446	SD2	138	TN1	684	TN2	560
	TX3	222	TX4	1440	TX5	810	TX6	2624
	UTI	566	VA1	302	VA2	670	VT	80
	WAI	778	WA2	382	WI1	220	WI2	1260
	WV1	342	WV2	98	WY2	146		
TX2	AKI	38900	AK2	88	AL1	616	AL2	260
	AZ2	436	CA1	166	CA2	1682	CA3	2662
	CO2	766	CON	782	DEL	128	FL1	290
	FL2	122	FL3	1322	GAL	496	GA2	310
	ID2	290	IL1	1490	IL2	84	INI	1168
		84						



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IN2	102	101	176	I02	436	KS2	250
KY1	66	LAI	346	LAI	374	LA2	752
MAS	772	ME1	798	ME1	84	ME2	38
MI3	1588	MN1	80	MN2	706	MO1	996
MO2	246	MS2	278	MT1	60	MT2	78
NC1	666	NC2	320	ND1	64	ND2	146
NE2	568	NH	140	NJ	932	NV1	90
NV2	244	NY1	430	NY2	646	NY3	1182
OH1	1180	OH2	890	OR1	410	PA1	584
PA2	1084	RI	128	SC1	232	SC2	342
SD2	92	TN1	630	TN2	474	TX4	788
TX5	430	TX6	1452	UT1	396	VA1	180
VA2	506	VT	42	WA1	520	WA2	216
WI1	130	WI2	934	WV1	226	WV2	60
WY2	78						

Total = 107472

TX3

AK1	754	AK2	172	AL1	1840	AL2	814
AZ2	2040	CA1	402	CA2	4444	CA3	7288
CO2	2846	CON	2190	DEL	378	FL1	866
FL2	870	FL3	4042	GAI	1528	GA2	894
ID2	210	IL1	4294	IL2	228	IN1	3290
IN2	286	IO1	470	IO2	1130	KS2	430
KY1	178	KY2	1020	LAI	618	LA2	2408
MAS	2202	MD	2390	ME1	216	ME2	94
MI3	4522	MN1	204	MN2	1920	MO1	2856
MO2	452	MS2	854	MT1	146	MT2	184
NC1	1960	NC2	926	ND1	148	ND2	356
NE2	1464	NH	372	NJ	2708	NM1	536
NM2	144	NV1	228	NV2	638	NY1	1232
NY2	1894	NY3	3560	OH1	3444	OH2	2552
OR1	1060	PA1	1672	PA2	3176	RI	374
SC1	662	SC2	1022	SD2	222	TN1	1974
TN2	1444	TX1	222	TX4	110	TX5	1152
TX6	1408	UT1	972	VA1	498	VA2	1478
VT	112	WA1	1362	WA2	552	WI1	336
WI2	2558	WV1	634	WV2	158	WY2	172

Total = 326402

TX4

AK1	3132	AK2	790	AL1	6334	AL2	2806
AZ2	5446	CA1	1390	CA2	12742	CA3	19322
CO2	8026	CON	7132	DEL	1120	FL1	3366
FL2	2976	FL3	13352	GAI	4754	GA2	3204
ID2	646	IL1	11914	IL2	760	IN1	10268
IN2	934	IO1	1296	IO2	3656	KS2	4214
KY1	660	KY2	3006	LAI	1108	LA2	5350
MAS	6966	MD	6838	ME1	796	ME2	364
MI3	13340	MN1	652	MN2	5100	MO1	7600
MO2	2128	MS2	3296	MT1	488	MT2	584
NC1	6242	NC2	3102	ND1	508	ND2	1166



NE2	3930	NH	1324	NJ	8158	NM1	1682
NM2	700	NV1	696	NV2	1728	NV1	3736
NM2	5584	NY3	9696	OH1	10166	OH2	7700
OK1	734	OK2	3384	OR1	3108	PAL	5222
PA2	9438	RI	1092	SC1	2282	SC2	3278
SD2	702	TN1	5800	TN2	4398	TX1	1440
TX2	788	TX3	110	TX5	684	TX6	2574
UT1	2626	VA1	1800	VA2	4660	VT	416
WA1	3958	WA2	1710	WI1	1140	WI2	7814
WV1	2142	WV2	566	WY2	562		

TXS	Total =	134192
AK1	AK2	284
AZ2	CA1	452
CO2	CON	2718
FL2	FL3	5892
ID2	IL1	4660
IN2	IO1	460
KY1	KY2	1196
MAS	MD	2970
MI3	MN1	220
MO2	MS2	1166
NC1	NC2	1190
NE2	NH	456
NM2	NV1	252
NY2	NY3	4420
OK1	OK2	2458
PA2	RI	466
SD2	TN1	2270
TX2	TX3	1152
UT1	VA1	624
WA1	WA2	594
WV1	WV2	190

AL1	2320	AL2	1126
CA3	5044	CA3	8358
FL1	470	FL1	1226
GA2	1972	GA2	1194
IN1	248	IN1	3730
KS2	1170	KS2	1342
LA2	1124	LA2	3290
ME2	266	ME2	116
MO1	1984	MO1	2782
MT2	154	MT2	190
ND2	154	ND2	372
NM1	3374	NM1	790
NY1	686	NY1	1484
OH2	4026	OH2	3048
PAL	1190	PAL	2020
SC2	846	SC2	1340
TX1	1784	TX1	810
TX6	684	TX6	2476
VT	1864	VT	140
WI2	352	WI2	2760
	164		

TX6	Total =	508870
AK1	AL1	12670
CA1	CA2	17348
CON	DEL	1782
FL3	GA1	8196
IL1	IL2	1558
IO1	IO2	7278
KY2	LA2	1444
ME1	ME2	746
MN2	MO1	11850
MT1	MT2	1044
ND1	ND2	2216
NJ	NM1	2744
NV2	NV1	6154
OH1	OH2	12846
OR1	PAL	9068

AZ2	4888	AZ2	6106
CO2	21570	CO2	11236
FL2	7210	FL2	5434
ID2	6382	ID2	1060
IN2	18918	IN2	1850
KY1	5090	KY1	1476
MD	11892	MD	10250
MN1	22268	MN1	1216
MS2	2152	MS2	2414
NC2	10966	NC2	5704
NH	6568	NH	2586
NV1	1470	NV1	1082
NY3	8686	NY3	13150
OK2	1072	OK2	3908
RI	14870	RI	1688



SC1	4376	SC2	5688	SD2	1348	TN1	8514
TN2	7534	TX1	2624	TX2	1452	TX3	1408
TX4	2574	TX5	2476	UTI	3602	VAL	3624
VA2	7948	VT	844	WA1	5810	WA2	2830
WI1	2312	WI2	14094	WV1	4170	WV2	1150
WY2	1080						

UT1	Total =	107190	AL2	1464	CA3	7716	FL1	296	GA2	1002	IN2	2974	KY1	1130	MAS	1384	MI3	138	MO2	1846	NCL	98	NE2	574	NM2	790	NY3	1524	OK2	560	RI	2496	TN1	308	TX3	396	VA1	3602	WA2	2438	WV2	636					
AK1	872	AK2	222	AL1	222	CA2	1158	DEL	2214	CAL	2922	IN1	236	KS2	1292	LA2	780	ME2	296	MO1	1616	MT2	422	ND2	308	NM1	2220	NY2	1080	OK1	2108	PA2	1502	SD2	784	TX2	566	TX6	978	WA1	156	WV1	2554				
AZ2	2072	CON	480	CON	694	FL3	3104	IL2	396	IO2	716	LA1	1660	MN1	270	MS2	674	NC2	840	NH	472	NV1	566	OHL	2648	OR1	2056	SC1	626	TN2	990	TX4	2626	VA2	1246	WI1	472										

VAL	Total =	89340	AL2	2414	CA3	2776	FL2	998	ID2	390	IN2	3658	KY1	832	ME1	4438	MN2	198	MT1	730	NE2	292	NM2	352	NY2	1478	OK2	262	TN1	160	TX4	498	VT	552	WV2	334					
AK1	788	AK2	170	AL1	170	CA2	242	FL1	4594	GA2	380	IN1	260	KS2	1074	MAS	1884	MN1	5638	MS2	416	ND2	108	NM1	852	NY1	350	OK1	322	SD2	788	TX3	180	TX6	3624	UTI	374	WI1	374		
AZ2	984	CAL	1530	CAL	2476	CON	2574	CON	7948	IL2	396	IO2	716	LA2	780	ME1	1660	MN2	270	MS2	674	NC2	840	NH	472	NV1	566	OHL	2648	OR1	2056	SC1	626	TN2	990	TX4	2626	VA2	1246	WI1	472



AK1	2072	AK2	562	AL1	5860	AL2	2070
AZ2	1920	CA1	854	CA2	6312	CA3	7836
CO2	3476	CON	878	FL1	2958	FL2	3370
FL3	13040	GAL	5134	GA2	3036	ID2	380
IL1	10984	IL2	750	IN1	12086	IN2	958
IO1	884	IO2	3232	KS2	2104	KY1	760
KY2	2518	LAI	1948	LA2	4014	MAS	13420
ME1	1504	ME2	646	MI3	16044	MV1	598
MN2	3716	MO1	4816	MO2	1222	MS2	2064
MI1	336	MI2	382	ND1	396	ND2	946
NE2	2364	NH	2548	NM1	756	NM2	346
NV1	382	NV2	734	NY1	2320	NY2	4884
OH1	8818	OH2	2586	OK1	908	OK2	2522
OR1	1790	PAL	616	RJ	2020	SD2	512
TN1	4550	TN2	2500	TX1	670	TX2	506
TX3	1478	TX4	4660	TX5	1864	TX6	7948
UT1	1246	VT	790	WA1	2358	WA2	1086
WI1	1134	WI2	7888	WY2	354		

Total = 26172

VT

AK1	28	AK2	402	AL1	402	AL2	170
AZ2	58	CA1	794	CA2	794	CA3	1272
CO2	170	FL1	246	FL2	246	FL3	1146
GAL	440	GA2	242	ID2	34	IL1	1396
IL2	50	IN1	1066	IN2	70	IO1	98
IO2	242	KS2	196	KY1	38	KY2	338
LAI	144	LA2	400	MD	946	MI3	2064
MN1	56	MN2	538	MO1	560	MO2	84
MS2	138	MT1	24	MT2	28	NCL	774
NC2	378	ND1	24	ND2	74	NE2	260
NM1	96	NM2	22	NV1	38	NV2	102
OH1	1414	OH2	1388	OK1	54	OK2	324
OR1	214	PAL	722	SCI	252	SC2	360
SD2	40	TN1	448	TN2	472	TX1	80
TX2	42	TX3	112	TX4	416	TX5	140
TX6	844	UT1	156	VA1	194	VA2	790
WA1	292	WA2	104	WI1	78	WI2	798
WV1	246	WV2	70	WY2	22		

Total = 188894

WAL

AK1	342	AK2	2496	AL1	2496	AL2	958
AZ2	2436	CA1	14914	CA2	14914	CA3	14192
CO2	4246	CON	578	DEL	578	FL1	1330
FL2	5432	GAL	1830	GA2	1830	GA2	1428
ID2	880	IL1	396	IN1	396	IN1	5236
IN2	428	IO1	2114	KS2	2114	KS2	1700
KY1	334	KY2	1244	LA2	1244	LA2	2368
MAS	4166	MD	560	ME1	560	ME2	264
MI3	7130	MN1	2926	MO1	2926	MO1	3076
MD2	840	MS2	826	MT2	826	MT2	734



NC1	2890	NC2	1546	ND1	490	ND2	974
NE2	2014	NH	900	NJ	4382	NM1	952
NM2	420	NV1	1002	NV2	1344	NY1	2094
NY2	3046	NY3	4712	OH1	4900	OH2	3972
OK1	780	OK2	1990	OR1	64	PAL	2820
PA2	4912	RI	608	SC1	1118	SC2	1446
SD2	472	TN1	2086	TN2	1826	TX1	778
TX2	520	TX3	1362	TX4	3958	TX5	1534
TX6	5810	UT1	2438	VA1	976	VA2	2358
VT	292	WI1	786	WI2	4502	WV1	1136
WY2	330	WY2	552				

AK1	572	AK2	122	AL1	1064	AL2	444
AZ2	1534	CA1	824	CA2	7078	CA3	8122
CO2	2316	CON	1816	DEL	286	FL1	514
FL2	558	FL3	2590	GAL	904	GA2	578
IL1	2914	IL2	152	IN1	2302	IN2	178
IO1	310	IO2	820	KS2	762	KY1	116
KY2	650	LA1	508	LA2	1152	MAS	1846
MD	1760	ME1	200	ME2	88	MI3	3406
MN1	194	MN2	1554	MO1	1562	MO2	330
MS2	440	MI1	80	MI2	318	NC1	1328
NC2	660	ND1	182	ND2	384	NE2	956
NH	340	NJ	2132	NM1	494	NM2	150
NV1	424	NV2	716	NY1	990	NY2	1522
NY3	2726	OH1	2390	OH2	1904	OK1	280
OK2	1074	OR1	160	PAL	1272	PA2	2444
RI	306	SC1	472	SC2	682	SD2	190
TN1	1050	TN2	896	TX1	382	TX2	216
TX3	552	TK4	1710	TX5	594	TX6	2830
UT1	1314	VA1	374	VA2	1086	VT	104
WI1	290	WI2	1954	WV1	458	WV2	122
WY2	208						

Total = 89282

WA2

AK1	502	AK2	88	AL1	990	AL2	402
AZ2	764	CA1	166	CA2	2140	CA3	3394
CO2	1360	CON	1766	DEL	326	FL1	384
FL2	484	FL3	2252	GAL	964	GA2	494
ID2	102	IN1	1130	IN2	206	KS2	722
KY1	110	IN2	876	LAI	390	LAI	1002
MAS	1816	KY2	2134	ME1	146	ME2	60
MI3	1272	MD	2004	ME2	296	MS2	342
MI1	74	MO1	96	MO2	1406	NC2	630
ND1	102	MO2	60	NC1	450	NH	266
NJ	2336	NE2	280	NE2	60	NV1	102
NV2	278	NM1	1216	NM2	1722	NY3	3360
OH1	3076	NY1	2614	NY2	170	OK2	1030
OK1	578	OH2	1534	OK1	2832	RI	326
OR1		PAL		RI			

Total = 65316

WI1



State	Value	State	Value	State	Value	State	Value
SC1	434	SC2	678	TN1	1224	TN2	1032
TX1	220	TX2	130	TX3	336	TX4	1140
TX5	352	TX6	2312	UT1	472	VA1	334
VA2	1134	VT	78	WA1	786	WA2	290
WV1	490	WV2	122	WV2	70		
Total = 371894							
AK1	3812	AK2	882	AL1	7734	AL2	2746
AZ2	3872	CA1	1372	CA2	11896	CA3	16190
CO2	7590	CON	12942	DEL	2062	FL1	3318
FL2	3396	FL3	14236	GAL	6168	GA2	4044
ID2	700	IN1	64	IN2	372	KS2	4684
KY1	272	KY2	1864	LAL	3052	LA2	6250
MAS	12516	MD	12754	ME1	1412	ME2	630
MI3	914	MO1	4612	MO2	2476	MS2	2798
MT1	602	MT2	724	NC1	9920	NC2	4766
ND1	822	ND2	2172	NE2	4926	NH	2386
NJ	14900	NM1	1532	NM2	550	NV1	678
NV2	1464	NV1	8238	NY2	10686	NY3	17894
OH1	3642	OH2	6638	OK1	1578	OK2	5638
OR1	3360	PAL	11022	PA2	17894	RI	1958
SC1	3466	SC2	4592	SD2	978	TN1	7942
TN2	6884	TX1	1260	TX2	934	TX3	2558
TX4	7814	TX5	2760	TX6	14094	UT1	2554
VA1	3120	VA2	7888	VT	798	WA1	4502
WA2	1954	WV1	4288	WV2	1240	WV2	648

State	Value	State	Value	State	Value	State	Value
AK1	1006	AK2	234	AL1	1928	AL2	1028
AZ2	1082	CA1	314	CA2	3152	CA3	4616
CO2	1804	CON	5094	FL1	1172	FL2	1406
FL3	5664	GAL	1040	GA2	862	ID2	162
IL1	1590	IL2	166	IO1	494	IO2	1545
KS2	1056	LAL	878	LA2	2102	MAS	4700
ME1	442	ME2	184	MI3	166	MN1	270
MN2	2242	MO1	3028	MO2	564	MS2	894
MT1	124	MT2	154	NC2	88	ND1	146
ND2	392	NE2	1262	NH	778	NJ	5444
NM1	402	NM2	128	NV1	166	NV2	394
NY1	490	NY2	4172	NV3	8482	OK1	360
OK2	1506	OR1	848	PA2	1682	RI	790
SC2	540	SD2	220	TN1	1134	TX1	342
TX2	226	TX3	634	TX4	2142	TX5	766
TX6	4170	UT1	636	VT	246	WA1	1136
WAZ	458	WV1	490	WV2	4288	WV2	128
Total = 23606							
AK1	250	AK2	50	AL1	686	AL2	258
AZ2	330	CA1	76	CA2	926	CA3	1450
CO2	516	CON	1316	FL1	270	FL2	360



FL3	1546	GA1	732	GA2	408	ID2	42
IL1	480	IL2	92	IO1	140	IO2	384
KS2	284	LAI	216	LAI	572	MAS	1508
ME1	120	ME2	48	MN1	72	MN2	692
MO1	848	MO2	134	MS2	212	MT1	32
MT2	38	NC2	166	ND1	34	ND2	98
NE2	352	NH	220	NM1	116	NM2	28
NV1	46	NV2	116	NY2	336	OK1	80
OK2	440	OR1	246	RI	272	SC2	596
SD2	56	TN1	756	TN2	240	TX1	98
TX2	60	TX3	158	TX4	566	TX5	190
TX6	1150	UT1	186	VT	70	WA1	330
WA2	122	WI1	122	WI2	1240	WY2	28
AK1	29276	AK2	28	AL1	324	AL2	146
AZ2	186	CA1	102	CA2	1566	CA3	2556
CON	578	DEL	98	FL1	134	FL2	172
FL3	520	GA1	332	GA2	160	ID2	84
IL1	864	IL2	42	IN1	752	IN2	56
IO1	1172	IO2	42	KS2	306	KY1	28
KY2	128	LAI	236	LA2	416	MAS	550
MD	246	ME1	154	ME2	16	MI3	1198
MN1	650	MN2	40	MO1	16	MO2	98
MS2	56	MT1	684	NCL	666	NC2	196
ND2	122	NE2	56	NH	440	NJ	712
NM1	106	NE2	420	NH	76	NV2	228
NY1	218	NM2	32	NV1	74	OH1	864
NY1	328	NY2	522	NY3	1066	OR1	416
OH2	666	OK1	72	OK2	498	SCL	134
PAL	404	PA2	852	RI	104	TN2	326
SC2	226	SD2	60	TN1	410	TX2	562
TX1	146	TX2	78	TX3	172	TX4	354
TX5	164	TX6	1080	VA1	92	VA2	70
VT	22	WA1	552	WA2	208	WI1	
WI2	648	WV1	128	WV2	28		

Total = 29276

Total For Matrix = 15150000



A-4 - 20 NODE WESTERN UNION FIXED K_a-BAND
TO SMSA MAPPING



SMSA/FIXED BEAM MAPPING

FX1	42	ALNY ALPA	ATNJ BAMD	BINY BRCT	BICT DACT	FAMA FIMA	HAPA HACT	JENJ LAPA
		LONJ MECT	NANY NECT	NENJ NMCT	NLCT NENY	NWJ NMPY	NOPA NOCT	PANJ
		PHPA PIMA	PONY PRRI	REPA SPTC	STCT TRNJ	VIWJ WACT	WIPA WIDE	YOPA
FX2	33	ANIN ANMI	BAMI BELN	CIIL CIOH	COOH DAOH	DEMI ELIN	FLMI FOIN	GAIN
		GRMI HAQH	ININ JAMI	KAMI KAIL	KOIN LAIN	LAMI LIOH	LOOH MAOH	MUIN
		NEOH SOIN	SPOH TEIN	TOOH				
FX3	19	BUNC CHWV	CHVA CUMD	DAVA FANC	GRNC GRSC	HAWD HINC	LYVA NEVA	NOVA
		PEIL RAWI	ROIL SHWI	SPIL WAIA				
FX4	15	AKOH AITPA	BUNY CAOH	CLOH ELNY	ERPA JOPA	PIPA RONY	SHPA SIPA	STOH
		YOOH						WEWV
FX5	20	APWI BLIL	CEIA CHIL	DAIA DEIL	DUIA GRMI	IOIM JAMI	KEMI LAWI	MAMI
		PEIL RAWI	ROIL SHWI	SPIL WAIA				
FX6	15	ALGA ANSC	ANAL ASNC	ATGE ATCA	AUGA CHNC	CHIN COSC	COGA GAAL	KVIN
		ROSC						MAGA
FX7	12	AUTX BETX	BYTX DATX	GATX HOTX	KITX LOTX	SNTX TYTX	VITX WATX	
FX8	13	EREL DAEL	FOEL FREL	GAEL JAEL	LAEL MEEL	OCFL OREL	SAFL TREL	WEEL
FX9	12	BAME BOVA	BRVA BUVT	GLNY LAVA	LEME LOMA	MANH NANH	POVE PONH	
FX10	7	CLTN EVIN	LEKY LOKY	NATN OMKY	SIMO			
FX11	11	BACA ERCA	LOCA MOCA	OXCA SJCA	STCA SOCA	SOCA VICA		
FX12	10	COMO JOMO	KAMO LAKS	LINE OMNE	STMO SPMO	TOKS WIKS		
FX13	10	ALLA BALA	BIMS JAMS	MOAL MOLA	NELA PAMS	PIAR TUAL		
FX14	6	DUMN EAMI	MIMN ROMN	SIMN WAMI				
FX15	6	BIAL FTFL	HUAL MNAL	PAFL PEFL				
FX16	8	CHCA RECA	RENV SACA	SECA SRCA	VACA YUCA			
FX17	9	ERWA OLWA	POOR RIMA	SACR SEWA	SPWA TAWA	YAWA		
FX18	6	ENOK LACK	OKOK SHIX	TUOK WITX				
FX19	6	CAWY COCO	DECO FOOC	GROO PUOC				



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EX20 5
FAAR FOAR LIAR METN TEIX



Ford Aerospace &
Communications Corporation

A-5 - 20 NODE TRAFFIC MATRIX



Ka Fixed Trunking (FVC) -- Year 2008

KA FIXED 1	Total = 1300169	61314	34877	KA FIXED 5	124112
KA FIXED 2	322543	61314	34877	KA FIXED 9	7471
KA FIXED 3	120118	67726	84006	KA FIXED 13	55743
KA FIXED 4	62913	58495	55822	KA FIXED 17	32207
KA FIXED 5	40803	36589	28488		
KA FIXED 6	30389	27675	28878		
KA FIXED 7	Total = 1078763	99595	20678	KA FIXED 5	11703
KA FIXED 8	322543	62392	59771	KA FIXED 9	52231
KA FIXED 9	81393	50808	58871	KA FIXED 13	50027
KA FIXED 10	10300	30325	23543	KA FIXED 17	26478
KA FIXED 11	33491	25774	28884		
KA FIXED 12	29956	99595	14207	KA FIXED 5	45810
KA FIXED 13	Total = 540853	29345	39152	KA FIXED 9	27641
KA FIXED 14	81314	24260	22225	KA FIXED 13	24658
KA FIXED 15	21229	24260	10765	KA FIXED 17	11819
KA FIXED 16	21985	15939	12582		
KA FIXED 17	15267	10673	14207	KA FIXED 5	39312
KA FIXED 18	12387	20678	26080	KA FIXED 9	21896
KA FIXED 19	Total = 372647	23624	20408	KA FIXED 13	18954
KA FIXED 20	34877	20439	9363	KA FIXED 17	10534
KA FIXED 1	36216	12549	10445		
KA FIXED 2	17249	9534	45910	KA FIXED 4	39312
KA FIXED 3	15616	11703	22095	KA FIXED 9	15871
KA FIXED 4	10666	28742	13985	KA FIXED 13	19272
KA FIXED 5	Total = 462321	11207	10758	KA FIXED 17	11950
KA FIXED 6	124112	12364	10547		
KA FIXED 7	33581	81393	21229	KA FIXED 4	36216
KA FIXED 8	8312	27534	22947	KA FIXED 9	16143
KA FIXED 9	8312	19718	18893	KA FIXED 13	15928
KA FIXED 10	2026	2036	8391	KA FIXED 17	8966
KA FIXED 11	2026	8604	8620		
KA FIXED 12	13806				
KA FIXED 13	Total = 478756				
KA FIXED 14	120118				
KA FIXED 15	33581				
KA FIXED 16	6054				
KA FIXED 17	11370				
KA FIXED 18	11015				



Ford Aerospace &
Communications Corporation

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KA FIXED 7 Total = 411000
 KA FIXED 1 67726
 KA FIXED 5 28742
 KA FIXED 10 16536
 KA FIXED 14 10216
 KA FIXED 18 5698
 KA FIXED 2 62392
 KA FIXED 6 27534
 KA FIXED 11 23355
 KA FIXED 15 12233
 KA FIXED 19 11626
 KA FIXED 3 29345
 KA FIXED 8 22279
 KA FIXED 12 20160
 KA FIXED 16 10211
 KA FIXED 20 6270
 KA FIXED 4 23624
 KA FIXED 9 11157
 KA FIXED 13 11705
 KA FIXED 17 10191

KA FIXED 8 Total = 404229
 KA FIXED 1 84006
 KA FIXED 5 22095
 KA FIXED 10 15090
 KA FIXED 14 7847
 KA FIXED 18 8173
 KA FIXED 2 59771
 KA FIXED 6 22947
 KA FIXED 11 16222
 KA FIXED 15 7439
 KA FIXED 19 6664
 KA FIXED 3 39152
 KA FIXED 7 22279
 KA FIXED 12 13051
 KA FIXED 16 6967
 KA FIXED 20 8208
 KA FIXED 4 26080
 KA FIXED 9 12143
 KA FIXED 13 18772
 KA FIXED 17 7323

KA FIXED 9 Total = 236484
 KA FIXED 1 7471
 KA FIXED 5 15871
 KA FIXED 10 9520
 KA FIXED 14 6548
 KA FIXED 18 4528
 KA FIXED 2 52231
 KA FIXED 6 16143
 KA FIXED 11 11862
 KA FIXED 15 4820
 KA FIXED 19 4401
 KA FIXED 3 27641
 KA FIXED 7 11157
 KA FIXED 12 8132
 KA FIXED 16 4801
 KA FIXED 20 4160
 KA FIXED 4 21896
 KA FIXED 9 12143
 KA FIXED 13 7781
 KA FIXED 17 5378

KA FIXED 10 Total = 238116
 KA FIXED 1 62913
 KA FIXED 5 8312
 KA FIXED 9 9520
 KA FIXED 14 8384
 KA FIXED 18 7376
 KA FIXED 2 10300
 KA FIXED 6 6054
 KA FIXED 11 11313
 KA FIXED 15 3467
 KA FIXED 19 5903
 KA FIXED 3 21985
 KA FIXED 7 16536
 KA FIXED 12 8769
 KA FIXED 16 5213
 KA FIXED 20 3001
 KA FIXED 4 17249
 KA FIXED 9 15090
 KA FIXED 13 11036
 KA FIXED 17 5695

KA FIXED 11 Total = 376490
 KA FIXED 1 58495
 KA FIXED 5 26868
 KA FIXED 9 11862
 KA FIXED 14 10052
 KA FIXED 18 11088
 KA FIXED 2 50808
 KA FIXED 6 19718
 KA FIXED 10 11313
 KA FIXED 15 7837
 KA FIXED 19 14883
 KA FIXED 3 24260
 KA FIXED 7 23355
 KA FIXED 12 17160
 KA FIXED 16 5786
 KA FIXED 20 7995
 KA FIXED 4 20439
 KA FIXED 9 16222
 KA FIXED 13 14528
 KA FIXED 17 23621

KA FIXED 12 Total = 315155
 KA FIXED 1 55822
 KA FIXED 5 13985
 KA FIXED 9 8132
 KA FIXED 14 8128
 KA FIXED 18 1968
 KA FIXED 2 58871
 KA FIXED 6 18893
 KA FIXED 10 8769
 KA FIXED 15 7251
 KA FIXED 19 10005
 KA FIXED 3 22225
 KA FIXED 7 20160
 KA FIXED 11 17160
 KA FIXED 16 7252
 KA FIXED 20 2667
 KA FIXED 4 20408
 KA FIXED 9 13051
 KA FIXED 13 12621
 KA FIXED 17 7787

KA FIXED 13 Total = 295558
 KA FIXED 1 55743
 KA FIXED 5 19272
 KA FIXED 9 7781
 KA FIXED 14 6968
 KA FIXED 18 7383
 KA FIXED 2 50027
 KA FIXED 6 15928
 KA FIXED 10 11036
 KA FIXED 15 291
 KA FIXED 19 6345
 KA FIXED 3 24658
 KA FIXED 7 11705
 KA FIXED 11 14528
 KA FIXED 16 5954
 KA FIXED 20 1485
 KA FIXED 4 18954
 KA FIXED 9 18772
 KA FIXED 12 12621
 KA FIXED 17 6107

KA FIXED 14 Total = 206100



KA FIXED 1 40803 KA FIXED 2 33491 KA FIXED 3 15267 KA FIXED 4 15616
 KA FIXED 5 2026 KA FIXED 6 11370 KA FIXED 7 10216 KA FIXED 8 7847
 KA FIXED 9 6548 KA FIXED 10 8384 KA FIXED 11 10052 KA FIXED 12 8128
 KA FIXED 13 6968 KA FIXED 15 4025 KA FIXED 16 4634 KA FIXED 17 5417
 KA FIXED 18 5299 KA FIXED 19 5591 KA FIXED 20 4418

KA FIXED 15 Total = 172740

KA FIXED 1 36589 KA FIXED 2 30325 KA FIXED 3 15939 KA FIXED 4 12549
 KA FIXED 5 11207 KA FIXED 6 2036 KA FIXED 7 12233 KA FIXED 8 7439
 KA FIXED 9 4820 KA FIXED 10 3467 KA FIXED 11 7837 KA FIXED 12 7251
 KA FIXED 13 291 KA FIXED 14 4025 KA FIXED 16 3180 KA FIXED 17 3324
 KA FIXED 18 4505 KA FIXED 19 3295 KA FIXED 20 2428

KA FIXED 16 Total = 172901

KA FIXED 1 28488 KA FIXED 2 23543 KA FIXED 3 10765 KA FIXED 4 9363
 KA FIXED 5 10758 KA FIXED 6 8391 KA FIXED 7 10211 KA FIXED 8 6967
 KA FIXED 9 4801 KA FIXED 10 5213 KA FIXED 11 5786 KA FIXED 12 7252
 KA FIXED 13 5954 KA FIXED 14 4634 KA FIXED 15 3180 KA FIXED 17 13282
 KA FIXED 18 4542 KA FIXED 19 6478 KA FIXED 20 3293

KA FIXED 17 Total = 205066

KA FIXED 1 32207 KA FIXED 2 26478 KA FIXED 3 11819 KA FIXED 4 10534
 KA FIXED 5 11950 KA FIXED 6 8966 KA FIXED 7 10191 KA FIXED 8 7323
 KA FIXED 9 5378 KA FIXED 10 5695 KA FIXED 11 23821 KA FIXED 12 7787
 KA FIXED 13 6107 KA FIXED 14 5417 KA FIXED 15 3324 KA FIXED 16 13282
 KA FIXED 18 4623 KA FIXED 19 6738 KA FIXED 20 3426

KA FIXED 18 Total = 180887

KA FIXED 1 30389 KA FIXED 2 29956 KA FIXED 3 12387 KA FIXED 4 10666
 KA FIXED 5 13806 KA FIXED 6 11015 KA FIXED 7 5698 KA FIXED 8 8173
 KA FIXED 9 4528 KA FIXED 10 7376 KA FIXED 11 11088 KA FIXED 12 1968
 KA FIXED 13 7383 KA FIXED 14 5299 KA FIXED 15 4505 KA FIXED 16 4542
 KA FIXED 17 4623 KA FIXED 19 6189 KA FIXED 20 1296

KA FIXED 19 Total = 186683

KA FIXED 1 27675 KA FIXED 2 25774 KA FIXED 3 10673 KA FIXED 4 9534
 KA FIXED 5 12364 KA FIXED 6 8604 KA FIXED 7 11626 KA FIXED 8 6664
 KA FIXED 9 4401 KA FIXED 10 5903 KA FIXED 11 14883 KA FIXED 12 10005
 KA FIXED 13 6345 KA FIXED 14 5591 KA FIXED 15 3295 KA FIXED 16 6478
 KA FIXED 17 6738 KA FIXED 18 6189 KA FIXED 20 3941

KA FIXED 20 Total = 152544

KA FIXED 1 28878 KA FIXED 2 28894 KA FIXED 3 12582 KA FIXED 4 10445
 KA FIXED 5 10547 KA FIXED 6 8620 KA FIXED 7 6270 KA FIXED 8 8208
 KA FIXED 9 4160 KA FIXED 10 3001 KA FIXED 11 7995 KA FIXED 12 2667
 KA FIXED 13 1485 KA FIXED 14 4418 KA FIXED 15 2428 KA FIXED 16 3293
 KA FIXED 17 3426 KA FIXED 18 1296 KA FIXED 19 3941

Total For Matrix = 7787462



**Ford Aerospace &
Communications Corporation**

A-6 - V AND H COORDINATES FOR 316 SMSA'S



PRESTORED SMSA CITIES (SHEET 1 OF 7)

CODE	DESCRIPTIVE NAME	VERTICAL COORDINATE	HORIZONTAL COORDINATE
1	ABTX ABILENE TX	8698	4513
2	AKOH AKRON OH	5637	2472
3	ALGA ALBANY GA	7649	1817
4	ALNY ALBANY-SCHENECTADY-TROY NY	4639	1629
5	ALNM ALBUQUERQUE NM	8549	5887
6	ALLA ALEXANDRIA LA	8409	3168
7	ALPA ALLENTOWN-BETHLEHEM-EASTON PA-NJ	5166	1585
8	ATPA ALTOONA PA	5460	1972
9	AMTX AMARILLO TX	8266	5076
10	ANCA ANAHEIM-SANTA ANA-GARDEN GROVE CA	9250	7810
11	ANIN ANDERSON IN	6173	2958
12	ANSC ANDERSON SC	6961	1894
13	ANMI ANN ARBOR MI	5602	2908
14	ANAL ANNISTON AL	7406	2304
15	APWI APPLETON-OSHKOSH WI	5589	3776
16	ASNC ASHEVILLE NC	6749	2001
17	ATGE ATHENS GE	7130	1948
18	ATGA ATLANTA GA	7260	2083
19	ATNJ ATLANTIC CITY NJ	5284	1284
20	AUGA AUGUSTA GA-SC	7089	1674
21	AUTX AUSTIN TX	9005	3996
22	BACA BAKERSFIELD CA	8497	8060
23	BAMD BALTIMORE MD	5510	1575
24	BAME BANGOR ME	3777	1322
25	BALA BATON ROUGE LA	8476	2874
26	BANI BATTLE CREEK MI	5713	3124
27	BYMI BAY CITY MI	5368	3085
28	BETX BEAUMONT-PORT ARTHUR-ORANGE TX	8777	3344
29	BEWA BELLINGHAM WA	6087	8933
30	BENI BENTON HARBOR MI	5850	3281
31	BINT BILLINGS MT	6391	6790
32	BIMS BILOXI-GULFPORT MS	8296	2481
33	BINY BINGHAMTON NY-PA	4943	1837
34	BIAL BIRMINGHAM AL	7518	2446
35	BIND BISMARK ND	5840	5736
36	BLIN BLOOMINGTON IN	6417	2984
37	BLIL BLOOMINGTON-NORMAL IL	6358	3483
38	BOLD BOISE CITY ID	7096	7869
39	BONA BOSTON MA	4422	1249
40	BRFL BRADENTON FL	8270	1116
41	BRWA BREMERTON WA	6349	8940
42	BRCT BRIDGEPORT CT	4841	1360
43	BICT BRISTOL CT	4730	1394
44	BRMA BROCKTON MA	4465	1205
45	BRTX BROWNSVILLE-HARLINGEN-SAN BENI TX	9820	3663
46	BYTX BRYAN-COLLEGE STATION TX	8827	3788
47	BUNY BUFFALO NY	5075	2326



PRESTORED SMSA CITIES (SHEET 2 OF 7)

CODE	DESCRIPTIVE NAME	VERTICAL COORDINATE	HORIZONTAL COORDINATE
48	BUNC BURLINGTON NC	6364	1588
49	BUVT BURLINGTON VT	4270	1808
50	CAOH CANTON OH	5676	2419
51	CAWY CASPER WY	6918	6297
52	CEIA CEDAR RAPIDS IA	6261	4021
53	CHIL CHAMPAIGN-URBAHA-RANTOUL IL	6371	3336
54	CHSC CHARLESTON-NORTH CHARLESTON SC	7021	1281
55	CHWV CHARLESTON WV	6152	2174
56	CHNC CHARLOTTE-GASTONIA NC	6657	1698
57	CHVA CHARLOTTESVILLE VA	5919	1683
58	CHTN CHATTANOOGA TN-GA	7098	2366
59	CIIL CHICAGO IL	5986	3426
60	CHCA CHICO CA	8057	8668
61	CIOH CINCINNATI OH-KY	6263	2679
62	CLTN CLARKSVILLE-HOPKINSVILLE TN-KY	6988	2837
63	CLOH CLEVELAND OH	5574	2543
64	COCO COLORADO SPRINGS CO	7679	5813
65	COMO COLUMBIA MO	6901	3841
66	COSC COLUMBIA SC	6901	1589
67	COGA COLUMBUS GA-AL	7556	2045
68	COOH COLUMBUS OH	5972	2555
69	COTX CORPUS CHRISTI TX	9475	3739
70	CUMD CUMBERLAND MD-WV	5650	1916
71	DATX DALLAS-FORT WORTH TX	8436	4034
72	DACT DANBURY CT	4829	1423
73	DAVA DANVILLE VA	6270	1640
74	DAIA DEVENPORT-ROCK ISLAND-MOLINE IA-IL	6273	3817
75	DAOH DAYTON OH	6113	2705
76	DAFL DAYTONA BEACH FL	7791	1032
77	DEIL DECATUR IL	6478	3413
78	DECO DENVER-BOULDER CO	7501	5899
79	DEIA DES MOINES IA	6471	4275
80	DEMI DETROIT MI	5536	2828
81	DUIA DUBUQUE IA	6088	3925
82	DUMN DULUTH-SUPERIOR MN-WI	5352	4530
83	EAWI EAU CLAIRE WI	5698	4261
84	ELTX EL PASO TX	9231	5655
85	ELIH ELKHART IN	5895	3168
86	ELNY ELMIRA NY	5029	1953
87	ENOK ENID OK	7783	4505
88	ERPA ERIE PA	5321	2397
89	EUOR EUGENE-SPRINGFIELD OR	7128	8954
90	EVIN EVANSVILLE IN-KY	6729	3019
91	FAMA FALL RIVER MA-RI	4543	1170
92	FAND FARGO-MOORHEAD ND-MN	5615	5182
93	FANC FAYETTEVILLE NC	6501	1385
94	FAAR FAYETTEVILLE-SPRINGDALE AR	7600	3872



PRESTORED SMSA CITIES (SHEET 3 OF 7)

CODE	DESCRIPTIVE NAME	VERTICAL COORDINATE	HORIZONTAL COORDINATE
95	FIMA FITCHBURG-LEOMINSTER MA	4459	1374
96	FLMI FLINT MI	5461	2993
97	FLAL FLORENCE AL	7344	2715
98	FOSC FORENCE SC	6744	1417
99	FOCO FORT COLLINS CO	7331	5965
100	FOFL FORT LAUDERDALE-HOLLYWOOD FL	8282	557
101	FRFL FORT MYERS FL	8359	904
102	FOAR FORT SMITH AR-OK	7752	3855
103	FTFL FORT WALTON BEACH FL	8097	2097
104	FOIN FORT WAYNE IN	5942	2982
105	FRCA FRESNO CA	8669	8239
106	GAAL GADSDEN AL	7355	2368
107	GAFL GAINESVILLE FL	7838	1310
108	GATX GALVESTON-TEXAS CITY TX	8985	3397
109	GAIN GARY-HAMMOND-EAST CHICAGO IN	6017	3354
110	GLNY GLENS FALLS NY	4515	1704
111	GRND GRAND FORKS ND-MN	5418	5297
112	GRMI GRAND RAPIDS MI	5628	3261
113	GRMT GREAT FALLS MT	6120	7281
114	GRCO GREELEY CO	7345	5895
115	GRWI GREEN BAY WI	5512	3747
116	GRNC GREENSBORO-WINSTON-SALEM-HIGH NC	6400	1638
117	GRSC GREENVILLE-SPARTANBURG SC	6250	1226
118	HAMD HAGERSTOWN MD	5555	1772
119	HAOH HAMILTON-MIDDLETOWN OH	6210	2718
120	HAPA HARRISBURG PA	5363	1733
121	HACT HARTFORD CT	4687	1373
122	HINC HICKORY NC	6611	1833
123	HOTX HOUSTON TX	8938	3536
124	HUVV HUNTINGTON-ASHLAND WV-KY	6212	2299
125	HUAL HUNTSVILLE AL	7267	2535
126	ININ INDIANAPOLIS IN	6272	2992
127	IOIW IOWA CITY IW	6313	3972
128	JAMI JACKSON MI	5663	3009
129	JAMS JACKSON MS	8035	2880
130	JAFL JACKSONVILLE FL	7649	1276
131	JANC JACKSONVILLE NC	6412	1131
132	JAWI JAMESVILLE-BELIOT WI	5970	3688
133	JENJ JERSEY CITY NJ	5006	1409
134	JOTH JOHNSON CITY-KINGSPORT-BRISTOL TN-VA	6595	2050
135	JOPA JOHNSTOWN PA	5542	2021
136	JOMO JOPLIN MO	7421	4015
137	KAMI KALAMAZOO-PORTAGE MI	5749	3177
138	KAIL KANKAKEE IL	6149	3381
139	KANO KANSAS CITY MO-KS	7027	4203
140	KEWI KENOSHA WI	5865	3526
141	KITX KILLEEN-TEMPLE TX	8832	4063



PRESTORED SMSA CITIES (SHEET 4 OF 7)

CODE	DESCRIPTIVE NAME	VERTICAL COORDINATE	HORIZONTAL COORDINATE
142	KNTN KNOXVILLE TN	6801	2251
143	KDIN KOKOMO IN	6135	3063
144	LAWI LA CROSSE WI	5874	4133
145	LALA LAFAYETTE LA	8587	2996
146	LAIN LAFAYETTE-WEST LAFAYETTE IN	6206	3167
147	LKLA LAKE CHARLES LA	8679	3202
148	LAFL LAKELAND-WINTER HAVEN FL	8084	1034
149	LAPA LANCASTER PA	5348	1626
150	LAMI LANSING-EAST LANSING MI	5584	3081
151	LATX LAREDO TX	9681	4099
152	LANM LAS CRUCES NM	9132	5742
153	LANV LAS VEGAS NV	8665	7411
154	LAKS LAWRENCE KS	7098	4294
155	LAMA LAWRENCE-HAVERHILL MA-NH	4373	1311
156	LAOK LAWTON OK	8178	4451
157	LEME LEWISTON-AUBURN ME	4042	1391
158	LEKY LEXINGTON-FAYETTE KY	6459	2562
159	LIOH LIMA OH	5921	2799
160	LINE LINCOLN NE	6823	4674
161	LIAR LITTLE ROCK-NORTH LITTLE ROCK AR	7721	3451
162	LONJ LONG BRANCH-ASBURY PARK NJ	5073	1348
163	LOTX LONGVIEW TX	8348	3660
164	LOOH LORAIN-ELYRIA OH	5623	2608
165	LOCA LOS ANGELES-LONG BEACH CA	9213	7878
166	LOKY LOUISVILLE KY-IN	6529	2772
167	LOMA LOWELL MA-NH	4399	1320
168	LUTX LUBBOCK TX	8598	4962
169	LYVA LYNCHBURG VA	6093	1703
170	MAGA MACON GA	7364	1865
171	MAWI MADISON WI	5887	3796
172	MANH MANCHESTER NH	4354	1388
173	MAOH MANSFIELD OH	5783	2575
174	MCTX MCALLEN-PHARR-EDINBURG TX	9856	3764
175	MEOR MEDFORD OR	7503	8892
176	MEFL MELBOURNE-TITUSVILLE-COCOA FL	7925	903
177	METN MEMPHIS TN-AR	7471	3125
178	NECT MERIDEN CT	4740	1358
179	MIFL MIAMI FL	8351	527
180	NITX MIDLAND TX	8934	4888
181	MIWI MILWAUKEE WI	5788	3589
182	MIMN MINNEAPOLIS-ST PAUL MN-WI	5781	4525
183	MOAL MOBILE AL	8167	2367
184	MOCA MODESTO CA	8499	8473
185	MOLA MONROE LA	8148	3218
186	MNAL MONTGOMERY AL	7692	2247
187	MUIN MUNCIE IN	6130	2925
188	MUMI MUSKEGON-NORTON SHORES-MUSKEGO MI	5622	3370



PRESTORED SMSA CITIES (SHEET 5 OF 7)

CODE	DESCRIPTIVE NAME	VERTICAL COORDINATE	HORIZONTAL COORDINATE
189	NANH NASHUA NH	4394	1356
190	NATN NASHVILLE-DAVIDSON TN	7010	2710
191	NANY NASSAU-SUFFOLK NY	4961	1355
192	NEMA NEW BEDFORD MA	4532	1131
193	NECT NEW BRITAIN CT	4715	1373
194	NENJ NEW BRUNSWICK-PERTH AMBOY-SAYR NJ	5085	1434
195	NWCT NEW HAVEN-WEST HAVEN CT	4792	1342
196	NLCT NEW LONDON-NORWICH CT-RI	4700	1242
197	NELA NEW ORLEANS LA	8483	2638
198	NENY NEW YORK NY-NJ	4997	1406
199	NWNJ NEWARK NJ	5015	1430
200	NEOH NEWARK OH	5904	2480
201	NWNY NEWBRGH-MIDDLETOWN NY	4915	1556
202	NEVA NEWPORT NEWS-HAMPTON VA	5908	1260
203	NOVA NORFOLK-VIRGINIA BEACH-PORTSMO VA-NC	5918	1223
204	NOPA NORTHEAST PENNSYLVANIA PA	5068	1719
205	NOCT NORWALK CT	4877	1379
206	OCFL OCALA FL	7909	1227
207	ODTX ODESSA TX	8982	4930
208	OKOK OKLAHOMA CITY OK	7947	4373
209	OLWA OLYMPIA WA	6469	8971
210	OMNE OMAHA NE-IA	6687	4595
211	ORFL ORLANDO FL	7954	1031
212	OWKY OWENSBORO KY	6731	2928
213	OXCA OXNARD-SIMI VALLEY-VENTURA CA	9205	8050
214	PAFL PANAMA CITY FL	8057	1914
215	PAWV PARKERSBURG-MARIETTA WV-OH	5976	2268
216	PAMS PASCAGOULA-MOSS POINT PATERSON MS	8273	2419
217	PANJ PATERSON-CLIFTON-PASSAIC NJ	4984	1452
218	PEFL PENSACOLA FL	8147	2200
219	PEIL PEORIA IL	6362	3592
220	PEVA PETERSBURG-COLONIAL HEIGHTS-HO VA	5961	1429
221	PHPA PHILADELPHIA PA-NJ	5251	1458
222	PHAZ PHOENIX AZ	9135	6748
223	PIAR PINE BLUFF AR	7803	3358
224	PIPA PITTSBURGH PA	5621	2185
225	PIMA PITTSFIELD MA	4626	1539
226	POME PORTLAND ME	4121	1334
227	POOR PORTLAND OR-WA	6799	8914
228	PONH PORTSMOUTH-DOVER-ROCHESTER NH-ME	3760	1431
229	PONY POUGHKEEPSIE NY	4821	1526
230	PRRI PROVIDENCE-WARWICK-PAWTUCKET RI-MA	4550	1219
231	PRUT PROVO-OREM UT	7680	7006
232	PUCO PUEBLO CO	7787	5742
233	RAWI RACINE WI	5837	3535
234	RANC RALEIGH-DURHAM NC	6344	1436
235	REPA READING PA	5258	1612



PRESTORED SMSA CITIES (SHEET 6 OF 7)

CODE	DESCRIPTIVE NAME	VERTICAL COORDINATE	HORIZONTAL COORDINATE	
236	RECA	REDDING CA	7880	8778
237	RENY	RENO NV	8064	8323
238	RIWA	RICHLAND-KENNEWICK WA	6583	8415
239	RIVA	RICHMOND VA	5906	1472
240	RICA	RIVERSIDE-SAN BERNARDINO-ONTAR CA	9172	7710
241	ROVA	ROANOKE VA	6196	1801
242	ROMN	ROCHESTER MN	5916	4326
243	RONY	ROCHESTER NY	4913	2195
244	ROIL	ROCKFORD IL	6022	3675
245	ROSC	ROCK HILL SC	6730	1692
246	SACA	SACRAMENTO CA	8304	8580
247	SAMI	SAGINAW MI	5404	3074
248	STMN	ST CLOUD MN	5721	4705
249	STMO	ST JOSEPH MO	6913	4301
250	SLMO	ST LOUIS MO-IL	6807	3482
251	SAOR	SALEM OR	6929	8958
252	SLCA	SALINAS-SEASIDE-MONTEREY CA	8722	8560
253	SANC	SALISBURY-CONCORD NC	6601	1679
254	SAUT	SALT LAKE CITY-OGDEN UT	7576	7065
255	SATX	SAN ANGELO TX	8944	4563
256	SNTX	SAN ANTONIO TX	9225	4062
257	SNCA	SAN DIEGO CA	9468	7629
258	SFCA	SAN FRANCISCO-OAKLAND CA	8492	8719
259	SJCA	SAN JOSE CA	8583	8619
260	STCA	SANTA BARBARA-SANTA MARIA-LOMP CA	9171	8150
261	SCCA	SANTA CRUZ CA	8664	8633
262	SRCA	SANTA ROSA CA	8354	8787
263	SAFL	SARASOTA FL	8295	1094
264	SAGA	SAVANNAH GA	7266	1379
265	SEWA	SEATTLE-EVERETT WA	6336	8896
266	SHPA	SHARON PA	5520	2348
267	SHWI	SHEBOYGAN WI	5633	3629
268	SHTX	SHERMAN-DENISON TX	8253	4072
269	SHLA	SHREVEPORT LA	8272	3495
270	SINE	SIOUX CITY NE-IA	6468	4768
271	SISD	SIOUX FALLS SD	6279	4900
272	SOIN	SOUTH BEND IN	5918	3206
273	SPWA	SPOKANE WA	6247	8180
274	SPIL	SPRINGFIELD IL	6539	3513
275	SPMO	SPRINGFIELD MO	7310	3836
276	SPOH	SPRINGFIELD OH	6049	2666
277	SPCT	SPRINGFIELD-CHICOPEE-HOLYOKE CT-MA	4620	1408
278	STCT	STAMFORD CT	4897	1388
279	STPA	STATE COLLEGE PA	5360	1933
280	STOH	STEURENVILLE-WEIRTON OH-WV	5689	2262
281	SOCA	STOCKTON CA	8435	8530
282	SYNY	SYRACUSE NY	4798	1990



PRESTORED SMSA CITIES (SHEET 7 OF 7)

CODE	DESCRIPTIVE NAME	VERTICAL COORDINATE	HORIZONTAL COORDINATE
283	TAWA TACOMA WA	6415	8906
284	TAFL TALLAHASSEE FL	7877	1716
285	TMFL TAMPA-ST PETERSBURG FL	8173	1147
286	TEIN TERRE HAUTE IN	6428	3145
287	TETX TEXARKANA TX-AR	8111	3626
288	TOOH TOLEDO OH-MI	5704	2820
289	TOKS TOPEKA KS	7110	4369
290	TRNJ TRENTON NJ	5164	1440
291	TUAZ TUCSON AZ	9345	6485
292	TUDK TULSA OK	7707	4173
293	TUAL TUSCALOOSA AL	7643	2535
294	TYTX TYLER TX	8417	3744
295	UTNY UTICA-ROME NY	4701	1878
296	VACA VALLEJO-FAIRFIELD-NAPA CA	8422	8699
297	VITX VICTORIA TX	9245	3748
298	VINJ VINELAND-MILLVILLE-BRIDGETON NJ	5320	1380
299	VICA VISALIA-TULARE-PORTERVILLE CA	8746	8139
300	WATX WACO TX	8706	3993
301	WADC WASHINGTON DC-MD	5622	1583
302	WACT WATERBURY CT	4761	1391
303	WAIA WATERLOO-CEDAR FALLS IA	6208	4167
304	WAWI WAUSAU WI	5542	4014
305	WEFL WEST PALM BEACH-BOCA RATON FL	8166	607
306	WHWV WHEELING WV-OH	5755	2241
307	WIKS WICHITA KS	7489	4520
308	WITX WICHITA FALLS TX	8326	4413
309	WIPA WILLIAMSPORT PA	5200	1873
310	WIDE WILMINGTON DE-NJ	5326	1485
311	WINC WILMINGTON NC	6559	1143
312	WOMA WORCESTER MA	4513	1330
313	YAWA YAKIMA WA	6533	8607
314	YOPA YORK PA	5402	1674
315	YOOH YOUNGSTOWN-WARREN OH	5557	2353
316	YUCA YUBA CITY CA	8181	8624



A-7 - LATITUDE AND LONGITUDE FOR SMSA CITIES



Ford Aerospace &
Communications Corporation

<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
ABTX	ABILENE TX	32.27	99.45
AKOH	AKRON OH	41.04	81.31
ALGA	ALBANY GA	31.37	84.10
ALNY	ALBANY-SCHENECTADY-TROY NY	42.40	73.49
ALNM	ALBUQUERQUE NM	35.05	106.38
ALLA	ALEXANDRIA LA	31.19	92.29
ALPA	ALLENTOWN-BETHLEHEM-EASTON PA-NJ	40.11	74.36
ATPA	ALTOONA PA	40.32	78.23
AMTX	AMARILLO TX	35.14	101.50
ANCA	ANAHEIM-SANTA ANA-GARDEN GROVE CA	33.50	117.56
ANIN	ANDERSON IN	40.05	85.14
ANSC	ANDERSON SC	34.30	82.39
ANMI	ANN ARBOR MI	42.18	83.43
ANAL	ANNISTON AL	33.38	85.50
APWI	APPLETON-OSHKOSH WI	44.17	88.24
ASNC	ASHEVILLE NC	35.35	82.35
ATGE	ATHENS GE	33.57	83.24
ATGA	ATLANTA GA	33.45	84.23
ATNJ	ATLANTIC CITY NJ	39.23	74.27
AUGA	AUGUSTA GA-SC	33.29	82.00
AUTX	AUSTIN TX	30.18	97.47
BACA	BAKERSFIELD CA	35.25	119.00
BAMD	BALTIMORE MD	39.18	76.38
BAME	BANGOR ME	44.49	68.47
BALA	BATON ROUGE LA	30.30	91.10
BAMI	BATTLE CREEK MI	42.20	85.01
BYMI	BAY CITY MI	43.35	83.52
BETX	BEAUMONT-PORT ARTHUR-ORANGE TX	30.04	94.06
BEWA	BELLINGHAM WA	48.45	122.29
BEMI	BENTON HARBOR MI	42.07	86.27
BIMT	BILLINGS MT	45.47	108.30
BIMS	BILOXI-GULFPORT MS	30.21	89.08
BINY	BINGHAMTON NY-PA	42.06	75.55
BIAL	BIRMINGHAM AL	33.30	86.55
BIND	BISMARCK ND	46.50	100.48
BLIN	BLOOMINGTON IN	39.10	86.31
BLIL	BLOOMINGTON-NORMAL IL	40.29	89.00
BOID	BOISE CITY ID	43.38	115.30
BOMA	BOSTON MA	42.20	71.05
BRFL	BRADENTON FL	27.29	82.33
BRWA	BREMERTON WA	47.34	122.40
BRCT	BRIDGEPORT CT	41.12	73.12
BICT	BRISTOL CT	41.41	72.57
BRMA	BROCKTON MA	48.10	104.55
BRTX	BROWNSVILLE-HARLINGEN-SAN BENI TX	25.54	97.30
BYTX	BRYAN-COLLEGE STATION TX	30.41	96.24
BUNY	BUFFALO NY	42.52	78.55
BUNC	BURLINGTON NC	36.05	79.27
BUVT	BURLINGTON VT	44.28	73.14
CAOH	CANTON OH	40.48	81.23
CAWY	CASPER WY	42.50	106.20
CEIA	CEDAR RAPIDS IA	41.59	91.39
CHIL	CHAMPAIGN-URBANA-RANTOUL IL	40.07	88.14



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CHSC	CHARLESTON -NORTH CHARLESTON SC	32.48	79.58
CHWV	CHARLESTON WV	38.23	81.40
CHNC	CHARLOTTE-GASTONIA NC	35.03	80.50
CHVA	CHARLOTTESVILLE VA	38.02	78.29
CHTN	CHATTANOOGA TN-GA	35.02	85.18
CIIL	CHICAGO IL	41.50	87.45
CHCA	CHICO CA	39.46	121.50
CIOH	CINCINNATI OH-KY	39.10	84.30
CLTN	CLARKSVILLE-HOPKINSVILLE TN-KY	36.50	87.30
CLOH	CLEVELAND OH	41.30	81.41
COCO	COLORADO SPRINGS CO	38.50	104.50
COMO	COLUMBIA MO	38.58	92.20
COSC	COLUMBIA SC	34.00	81.00
COGA	COLUMBUS GA-AL	32.28	84.59
COOH	COLUMBUS OH	39.59	83.03
COTX	CORPUS CHRISTITX	27.47	97.26
CUMD	CUMBERLAND MD-WV	39.40	78.47
DATX	DALLAS-FORT WORTH TX	32.47	96.48
DACT	DANBURY CT	41.24	73.26
DAVA	DANVILLE V	36.34	79.25
DAIA	DAVENPORT-ROCK ISLAND-MOLINE IA-IL	41.30	90.34
DAOH	DAYTON OH	39.45	84.10
DAFL	DAYTONA BEACH FL	29.11	81.01
DEIL	DECATUR IL	39.51	88.57
DECO	DENVER-BOULDER CO	39.45	105.00
DEIA	DES MOINES IA	41.35	93.35
DEMI	DETROIT MI	42.23	83.05
DUIA	DUBUQUE IA	42.31	90.41
DUMN	DULUTH-SUPERIOR MN-WI	46.45	92.10
EAWI	EAU CLAIRE WI	44.50	91.30
ELTX	EL PASO TX	31.45	106.30
ELIN	ELKHART IN	41.52	85.56
ELNY	ELMIRA NY	42.06	76.50
ENOK	ENID OK	36.24	97.54
ERPA	ERIE PA	42.07	80.05
EUOR	EUGENE-SPRINGFIELD OR	44.03	123.04
EVIN	EVANSVILLE IN-KY	38.00	87.33
FAMA	FALL RIVER MA-RI	41.42	71.08
FAND	FARGO-MOORHEAD ND-MN	46.52	96.49
FANC	FAYETTEVILLE NC	35.05	78.53
FAAR	FAYETTEVILLE-SPRINGDALE AR	36.03	94.10
FIMA	FITCHBURG-LEOMISTER MA	42.35	71.50
FLMI	FLINT MI	43.03	83.04
FLAL	FLORENCE AL	34.48	87.40
FOSC	FORENCE SC	34.12	79.44
FOCO	FORT COLLINS CO	40.35	105.05
FOFL	FORT LAUDERDALE-HOLLYWOOD FL	26.08	80.08
FRFL	FORT MYERS FL	26.39	81.51
FOAR	FORT SMITH AR-OK	35.22	94.27
PTFL	FORT WALTON BEACH FL	30.25	86.38
FOIN	FORT WAYNE IN	41.05	85.08
FRCA	FRESNO CA	36.41	119.47
GAAL	GADSDEN AL	34.00	86.00
GAFL	GAINESVILLE FL	29.37	82.21



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GATX	GALVESTON-TEXAS CITY TX	29.17	94.48
GAIN	GARY-HAMMOND-EAST CHICAGO IN	41.34	87.20
GLNY	GLENS FALLS NY	43.17	73.14
GRND	GRAND FORKS ND-MN	47.57	97.05
GRMI	GRAND RAPIDS MI	42.57	86.40
GRMT	GREATFALLS MT	47.30	111.6
GRCO	GREELEY CO	40.26	104.43
GRWI	GREEN BAY WI	44.32	88.00
GRNC	GREENSBORO-WINSTON -SALEM-HIGH NC	36.03	79.50
GRSC	GREENVILLE-SPARTANBURG SC	34.52	82.25
HAMD	HAGERSTOWN MD	39.39	77.44
HAOH	HAMILTON-MIDDLETOWN OH	39.23	84.33
HAPA	HARRISBURG PA	40.17	76.54
HACT	HARTFORD CT	41.45	72.42
HINC	HICKORY NC	35.44	81.23
HOTX	HOUSTON TX	29.45	95.25
HUWV	HUNTINGTON-ASHLAND WV-KY	38.24	82.26
HUAL	HUNTSVILLE AL	34.44	86.35
ININ	INDIANAPOLIS IN	39.45	86.10
IOIW	IOWA CITY IW	41.39	91.31
JAMI	JACKSON MI	42.15	84.24
JAMS	JACKSON MS	32.20	90.11
JAFL	JACKSONVILLE FL	30.20	81.40
JANC	JACKSONVILLE NC	34.45	77.26
JAWI	JANESVILLE-BELIOT WI	42.42	89.02
JENJ	JERSEY CITY NJ	40.44	74.04
JOTN	JOHNSON CITY-KINGSPORT-BRISTOL TN-VA	36.33	82.34
JOPA	JOHNSONTOWN PA	40.20	78.56
JOMO	JOPLIN MO	48.34	110.47
KAMI	KALAMAZOO-PORTAGE MI	42.17	85.36
KAIL	KANKAKEE IL	41.08	87.52
KAMO	KANSAS CITY MO-KS	39.05	94.37
KEWI	KENOSHA WI	42.34	87.34
KITX	KILLEEN-TEMPLE TX	31.08	97.44
KNTN	KNOXVILLE TN	36.00	83.57
KOIN	KOKOMO IN	40.30	86.09
LAWI	LA CROSSE WI	43.48	91.04
LALA	LAFAYETTE LA	30.12	92.18
LAIN	LAFAYETTE-WEST LAFAYETTE IN	40.25	86.54
LKLA	LAKE CHARLES LA	30.13	93.13
LAPL	LAKELAND-WINTER HAVEN FL	28.02	81.59
LAPA	LANCASTER PA	40.01	76.19
LAMI	LANSING-EAST LANSING MI	42.44	85.34
LATX	LAREDO TX	27.32	99.22
LANM	LAS CRUCES NM	32.18	106.47
LANV	LAS VEGAS NV	36.10	115.10
LAKS	LAWRENCE KS	38.58	95.15
LAMA	LAWRENCE-HAVERHILL MA-NH	42.41	71.12
LAOK	LAWTON OK	34.36	98.25
LEME	LEWISTON-AUBURN ME	44.06	70.14
LEKY	LEXINGTON-FAYETTE KY	38.02	84.30
LIOH	LIMA OH	40.43	84.06
LINE	LINCOLN NE	40.49	96.41
LIAR	LITTLE ROCK-NORTH LITTLE ROCK AR	34.42	92.17



Ford Aerospace &
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LONJ	LONG BRANCH-ASBURY PARK NJ	40.17	73.59
LOTX	LONGVIEW TX	32.30	94.45
LOOH	LORAIN-ELYRIA OH	41.28	82.11
LOCA	LOS ANGELES-LONG BEACH CA	34.00	118.15
LOKY	LOUISVILLE KY-IN	38.13	85.48
LOMA	LOWELL MA-NH	42.38	71.19
LUTX	LUBBOCK TX	33.35	101.53
LYVA	LYNCHBURG VA	37.24	79.09
MAGA	MACON GA	32.49	83.37
MAWI	MADISON WI	43.04	89.22
MANH	MANCHESTER NH	42.59	71.28
MAOH	MANSFIELD OH	40.46	82.31
MCTX	MCALLEN-PHARR-EDINBURG TX	26.13	98.15
MEOR	MEDFORD OR	42.20	122.52
MEFL	MELBOURNE-TITUSVILLE-COCOA FL	28.04	80.38
METN	MEMPHIS TN-AR	35.10	90.00
MECT	MERIDEN CT	42.32	72.48
MIFL	MIAMI FL	25.45	80.15
MITX	MIDLAND TX	32.00	102.09
MIWI	MILWAUKEE WI	43.03	87.56
MIMN	MINNEAPOLIS-ST PAUL MN-WI	45.00	93.15
MOAL	MOBILE AL	30.40	88.05
MOCA	MODESTO CA	37.37	121.00
MOLA	MONROE LA	32.31	92.06
MNAL	MONTGOMERY AL	32.22	86.20
MUIN	MUNCIE IN	40.11	85.22
MUMI	MUSKEGON-NORTON SHORES-MUSKEGO MI	43.13	86.15
NANH	NASHUA NH	42.44	71.28
NATN	NASHVILLE-DAVIDSON TN	36.10	86.50
NANY	NASSAU-SUFFOLK NY	42.31	73.36
NEMA	NEW BEDFORD MA	41.38	70.55
NECT	NEW BRITAIN CT	41.40	72.47
NENJ	NEW BRUNSWICK-PERTH AMBOY-SAYR NJ	40.29	74.27
NWCT	NEW HAVEN-WEST HAVEN CT	41.18	72.55
NLCT	NEW LONDON-NORWICH CT-RI	41.21	72.06
NELA	NEW ORLEANS LA	30.00	90.03
NENY	NEW YORK NY-NJ	40.40	73.50
NWNJ	NEWARK NJ	40.44	74.11
NEOH	NEWARK OH	40.03	82.25
NWNY	NEWBRGH-MIDDLETOWN NY	41.26	74.26
NEVA	NEWPORT NEWS-HAMPTON VA	36.59	76.26
NOVA	NORFOLK-VIRGINIA BEACH-PORTSMO VA-NC	36.54	76.18
NOPA	NORTHEAST PENNSYLVANIA PA	41.20	75.45
NOCT	NORWALK CT	41.07	73.25
OCFL	OCALE FL	29.11	82.09
ODTX	ODESSA TX	31.50	102.23
OKOK	OKLAHOMA CITY OK	35.28	97.33
OLWA	OLYMPIA WA	47.03	122.53
OMNE	OMAHA NE-IA	41.15	96.00
ORFL	ORLANDO FL	28.33	81.21
OWKY	OWENSBORO KY	37.45	87.05
OXCA	OXNARD-SIMI VALLEY-VENTURA CA	34.11	119.10
PAPL	PANAMA CITY FL	30.10	85.41
PAWV	PARKERSBURG-MARIETTA WV-OH	39.17	81.33



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PAMS	PASCAGOULA-MOSS POINT PATERSON MS	30.21	88.32
PANJ	PATERSON-CLIPTON-PASSAIC NJ	40.52	74.08
PEPL	PENSACOLA FL	30.26	87.12
PEIL	PEORIA IL	40.43	89.38
PEVA	PETERSBURG-COLONIAL HEIGHTS-HO VA	37.14	77.24
PHPA	PHILADELPHIA PA-NJ	40.00	75.10
PHAZ	PHOENIX AZ	33.30	112.03
PIAR	PINE BLUFF AR	34.13	92.00
PIPA	PITTSBURGH PA	40.26	80.00
PIMA	PITTSFIELD MA	38.23	75.26
POME	PORTLAND ME	43.41	70.18
POOR	PORTLAND OR-WA	45.32	122.40
PONH	PORTSMOUTH-DOVER-ROCHESTER NH-ME	43.03	70.47
PONY	POUGHKEEPSIE NY	41.43	73.56
PRRI	PROVIDENCE-WAWICK-PAWTUCKET RI-MA	39.42	75.53
PRUT	PROVO-OREM UT	40.15	111.40
PUCO	PUEBLO CO	38.17	104.38
RAWI	RACINE WI	42.42	87.50
RANC	RALEIGH-DURHAM NC	35.46	78.39
REPA	READING PA	40.20	75.55
RECA	REDDING CA	40.35	122.24
RENV	RENO NV	39.32	119.49
RIWA	RICHLAND-KENNEWICK WA	46.17	119.17
RIVA	RICHMOND VA	37.34	77.27
RICA	RIVERSIDE-SAN BERNADINO-ONTAR CA	33.59	117.22
ROVA	ROANOKE VA	37.15	79.58
ROMN	ROCHESTER MN	44.01	92.27
RONY	ROCHETER NY	43.12	77.37
ROIL	ROCKFORD IL	42.16	89.06
ROSC	ROCK HILL SC	34.55	81.01
SACA	SACRAMENTO CA	38.32	121.30
SAMI	SAGINAW MI	43.25	83.54
STMN	ST CLOUD MN	45.34	94.10
STMO	ST JOSEPH MO	39.45	94.51
SLMO	ST LOUIS MO-IL	38.40	90.15
SAOR	SALEM OR	44.57	123.01
SLCA	SALINAS-SEASIDE-MONTEREY CA	36.39	121.40
SANC	SALISBURY-CONCORD NC	35.20	80.30
SAUT	SALT LAKE CITY-OGDEN UT	40.45	111.55
SATX	SAN ANGELO TX	31.28	100.28
SNTX	SAN ANTONIO TX	29.25	98.30
SNCA	SAN DIEGO CA	32.45	117.10
SFCA	SAN FRANCISCO - OAKLAND CA	37.45	122.27
SJCA	SAN JOSE CA	37.20	121.55
STCA	SANTA BARBARA-SANTA MARIA-LOMP CA	34.25	119.41
SCCA	SANTA CRUZ CA	36.58	122.03
SRCA	SANTA ROSA CA	38.26	122.43
SAPL	SARASOTA FL	27.20	82.32
SAGA	SAVANNAH GA	32.04	81.07
SEWA	SEATTLE-EVERETT WA	47.35	122.20
SHPA	SHARON PA	41.16	80.30
SHWI	SHEBOYGAN WI	43.46	87.44
SHTX	SHERMON-DENISON TX	33.39	96.35
SHLA	SHREVEPORT LA	32.30	93.46



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SINE	SIOUX CITY NE-IA	42.30	96.28
SISD	SIOUX FALLS SD	43.34	96.42
SOIN	SOUTH BEND IN	41.40	86.15
SPWA	SPOKANE WA	47.40	117.25
SPIL	SPRINGFIELD IL	39.49	89.39
SPMO	SPRINGFIELD MO	37.11	93.19
SPOH	SPRINGFIELD OH	39.55	83.48
SPCT	SPRINGFIELD-CHICOPEE-HOLYOKE CT-MA	42.07	72.35
STCT	STAMFORD CT	41.03	73.32
STPA	STATE COLLEGE PA	40.48	77.52
STOH	STEUBENVILLE-WEIRTON OH-WV	40.22	80.39
SOCA	STOCKTON CA	37.59	121.20
SYNY	SYRACUSE NY	43.03	76.10
TAWA	TACOMA WA	47.16	122.30
TAFL	TALLAHASSEE FL	30.26	84.19
TMFL	TAMPA-ST PETERSBURG FL	27.58	82.38
TEIN	TERRE HAUTE IN	39.27	87.24
TETX	TEXARKANA TX-AR	33.28	94.02
TOOH	TOLEDO OH-MI	41.40	83.35
TOKS	TOPEKA KS	39.02	95.41
TRNJ	TRENTON NJ	40.15	74.43
TUAZ	TUCSON AZ	32.15	110.57
TUOK	TULSA OK	36.07	95.58
TUAL	TUSCALOOSA AL	33.12	87.33
TYTX	TYLER TX	32.22	95.18
UTNY	UTICA-ROME NY	43.06	75.15
VACA	VALLEJO-FAIRFIELD-NAPA CA	38.05	122.14
VITX	VICTORIA TX	28.49	97.01
VINJ	VINELAND-MILLVILLE-RIDGETON NJ	39.29	75.02
VICA	VISALIA-TULARE-PORTERVILLE CA	36.20	119.18
WATX	WACO TX	31.33	97.10
WADC	WASHINGTON DC-MD	38.55	77.00
WACT	WATERBURY CT	41.33	73.03
WAIA	WATERLOO-CEDAR FALLS IA	42.30	92.20
WAWI	WAUSAU WI	44.58	89.40
WEFL	WEST PALM BEACH-BOCA RATON FL	26.42	80.05
WHWV	WHEELING WV-OH	40.05	80.43
WIKS	WICHITA KS	37.43	97.20
WITX	WICHITA FALLS TX	33.55	98.30
WIPA	WILLIAMSPORT PA	41.16	77.03
WIDE	WILMINGTON DE-NJ	39.46	75.31
WINC	WILMINGTON NC	34.14	77.55
WOMA	WORCESTER MA	42.17	71.48
YAWA	YAKIMA WA	46.37	120.30
YOPA	YORK PA	39.57	76.44
YOOH	YOUNGSTOWN-WARREN OH	41.05	80.40
YUCA	YUBA CITY CA	39.09	121.36



APPENDIX B

INTELSAT TRAFFIC MODEL

B-1 - DESCRIPTION

The August 1984 INTELSAT Traffic Data Base (Ref. 9) was entered for the year 1995. Printouts for the AOR and POR for this year follow. Also included are outputs from the "Grouping" program - described in Section 4.2.3.1.1- which are useful in estimating such factors as ISL capacity requirements.

The INTELSAT traffic forecast was used primarily for international/regional payload design for Scenario VI-A, (with Canada on VI-B).



B-2 - ATLANTIC OCEAN REGION (AOR) TRAFFIC MODEL

The following pages are a listing of the AOR voice circuit traffic for 1995 as based upon the Intelsat forecast of August 1984.

The final pages of this section list the grouped country traffic for the AOR for year 1995.



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AOR Voice Circuits -- 1995

ALGERIA	Total =	174	IRAN	8	NORDIC GRP	57	TURKEY	15
CANADA		20	U.S.	45				
U.K.		29						
ANGOLA	Total =	424	CONGO	7	FRANCE	41	ITALY	36
BRAZIL		17	NORDIC GRP	6	PORTUGAL	209	SPAIN	12
MOZAMBIQUE		10	U.S.	17	U.S.S.R.	42	ZIMBABWE	4
U.K.		23						
ARGENTINA	Total =	1901	BELGIUM	19	BOLIVIA	33	BRAZIL	107
AUSTRIA		22	CHILE	55	COLUMBIA	44	EQUADOR	34
CANADA		62	GERMANY, FR	85	GREECE	20	GUATEMALA	14
FRANCE		57	ITALY	115	MEXICO	64	NETHERLANDS	46
ISRAEL		71	NORDIC GRP	53	PANAMA	19	PARAGUAY	25
NICARAGUA		16	SOUTH AF.	23	SPAIN	255	SWITZERLAND	41
PERU		29	U.S. (PR)	15	U.S.	459	VENEZUELA	76
U.K.		42						
AUSTRIA	Total =	552	BENIN	6	BOLIVIA	6	BRAZIL	29
ARGENTINA		22	CHILE	8	COLUMBIA	13	EQUADOR	5
CANADA		29	IRAQ	42	ISRAEL	12	IVORY COAST	7
IRAN		42	KENYA	13	KUWAIT	18	MEXICO	16
JORDAN		11	PERU	9	SAUDI AR.	40	SENEGAL	5
NIGERIA		25	U.S.	138	VENEZUELA	16	ZIMBABWE	4
SOUTH AF.		36						
BAHAMAS	Total =	320	ITALY	5	SPAIN	10	U.K.	94
CANADA		14						
U.S.		197						
BAHRAIN	Total =	315	GERMANY, FR	21	GREECE	10	SPAIN	8
CANADA		7	U.S.	103	YEMEN, A.R.	24		
U.K.		142						
BARBADOS	Total =	509	JAMAICA	62	U.K.	245	U.S.	161
CANADA		41						
BELGIUM	Total =	1593	BENIN	3	BRAZIL	50	CAMEROON	29
ARGENTINA		19	CONGO	14	CABON	20	GHANA	5
CANADA		89	ISRAEL	32	IVORY COAST	25	LEBANON	23
IRAN		30	MOZAMBIQUE	3	NIGERIA	28	SAUDI AR.	40
LIBERIA		5						



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SENEGAL	24	SOUTH AF.	44	SUDAN	3	TANZANIA	9
TOCO	11	U.A.E.	30	U.S.	961	UPPER VOLTA	3
YEMEN, A.R.	6	ZAIRE	72	ZIMBABWE	15		
Total =	198						
AUSTRIA	6	BELGIUM	3	FRANCE	95	CABON	21
IVORY COAST	7	SENEGAL	14	U.K.	44	U.S.	8
Total =	596						
ARGENTINA	33	AUSTRIA	6	BRAZIL	49	CANADA	10
CHILE	24	COLUMBIA	18	FRANCE	12	GERMANY, FR	21
ITALY	30	MEXICO	15	NETHERLANDS	5	PANAMA	10
SPAIN	45	U.K.	28	U.S.	271	VENEZUELA	19
Total =	2167						
ANGOLA	17	ARGENTINA	107	AUSTRIA	29	BELGIUM	50
BOLIVIA	49	CANADA	53	CHILE	78	COLUMBIA	50
EQUADOR	32	FRANCE	65	FRANCE (FG)	11	GERMANY, ER	114
GREECE	31	ISRAEL	37	ITALY	76	LEBANON	21
MEXICO	50	NETHERLANDS	44	NICARAGUA	25	NIGERIA	16
NORDIC GRP	75	PANAMA	24	PARAGUAY	30	PERU	48
PORTUGAL	41	SAUDI AR.	12	SOUTH AF.	18	SPAIN	49
SWITZERLAND	38	U.K.	68	U.S.	728	U.S.S.R.	3
VENEZUELA	78						
Total =	845						
BELGIUM	29	CANADA	17	CONGO	9	FRANCE	437
GABON	36	GERMANY, ER	47	GREECE	26	ITALY	23
IVORY COAST	22	NIGERIA	7	SENEGAL	18	SPAIN	18
SWITZERLAND	24	U.K.	49	U.S.	83		
Total =	3750						
ALGERIA	20	ARGENTINA	62	AUSTRIA	29	BAHAMAS	14
BAHRAIN	7	BARBADOS	41	BELGIUM	89	BOLIVIA	10
BRAZIL	53	CAMEROON	17	CHILE	79	COLUMBIA	47
COSTA RICA	20	CYPRUS	12	DOM. REP.	38	EQUADOR	32
EGYPT	20	EL SALVADOR	20	FRANCE	118	FRANCE (MA)	17
GABON	12	GERMANY, ER	220	GREECE	172	GUATEMALA	19
HAITI	33	HONDURAS	10	ICELAND	11	IRAN	27
IRAQ	11	IRELAND	32	ISRAEL	80	ITALY	281
IVORY COAST	18	JAMAICA	145	JORDAN	11	KENYA	32
KUWAIT	25	LEBANON	28	LIBYA	12	MALAWI	7
MOROCCO	138	NETHERLANDS	68	NICARAGUA	9	NIGERIA	30
NORDIC GRP	78	PANAMA	14	PERU	33	POLAND	33
PORTUGAL	21	QATAR	7	ROMANIA	13	SAUDI AR.	62
SENEGAL	12	SOUTH AF.	65	SPAIN	33	SWITZERLAND	68
TANZANIA	22	TRINIDAD	61	TUNISIA	9	TURKEY	18
U.A.E.	31	U.K. (BER)	31	U.K.	751	U.S. (PR)	20
URUGUAY	18	U.S.S.R.	43	VENEZUELA	59	YUGOSLAVIA	49
ZAIRE	11	ZIMBABWE	12				

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CHAD		Total =	1						
	U.S.		1						
CHILE		Total =	1167						
	ARGENTINA	55		AUSTRIA	8	BOLIVIA	24	BRAZIL	78
	CANADA	79		COLOMBIA	26	EQUADOR	32	FRANCE	59
	GERMANY, FR	47		GREECE	6	GUATEMALA	17	ISRAEL	15
	ITALY	42		MEXICO	21	NETHERLANDS	38	NORDIC GRP	28
	PANAMA	20		PARAGUAY	21	PERU	9	SOUTH AF.	12
	SPAIN	99		SWITZERLAND	28	U.K.	51	U.S.	303
	VENEZUELA	49							
COLUMBIA		Total =	2726						
	ARGENTINA	44		AUSTRIA	13	BOLIVIA	18	BRAZIL	50
	CANADA	47		CHILE	26	COSTA RICA	33	FRANCE	65
	GERMANY, FR	95		GUATEMALA	12	HONDURAS	12	ITALY	64
	MEXICO	86		NETHERLANDS	33	NICARAGUA	10	NORDIC GRP	15
	PANAMA	107		PERU	23	SPAIN	108	SWITZERLAND	25
	U.K.	76		U.S. (PR)	39	U.S.	1720	URUGUAY	5
CONGO		Total =	403						
	ANGOLA	7		BELGIUM	14	CAMEROON	9	FRANCE	243
	GABON	31		GERMANY, FR	11	ITALY	14	IVORY COAST	12
	SENEGAL	16		SPAIN	13	SWITZERLAND	15	U.S.	13
	U.S.S.R.	5							
COSTA RICA		Total =	469						
	CANADA	20		COLOMBIA	33	FRANCE	19	GERMANY, FR	14
	ITALY	27		PERU	9	SPAIN	39	U.K.	20
	U.S.	252		VENEZUELA	36				
CYPRUS		Total =	211						
	CANADA	12		ISRAEL	20	KUWAIT	31	SAUDI AR.	40
	SOUTH AF.	33		U.K.	26	U.S.	49		
DOM. REP.		Total =	557						
	CANADA	38		FRANCE	24	NETHERLANDS	9	SPAIN	36
	U.S.	450							
EQUADOR		Total =	900						
	ARGENTINA	34		AUSTRIA	5	BRAZIL	32	CANADA	32
	CHILE	32		FRANCE	30	GERMANY, FR	17	GUATEMALA	12
	ITALY	31		MEXICO	13	NETHERLANDS	11	NORDIC GRP	10
	PANAMA	27		PERU	3	SPAIN	94	SWITZERLAND	15
	U.K.	19		U.S. (PR)	7	U.S.	436	VENEZUELA	40
EGYPT		Total =	785						
	CANADA	20		IRAQ	50	JORDAN	44	KENYA	7
	KUWAIT	52		NETHERLANDS	62	NIGERIA	7	NORDIC GRP	27



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SAUDI AR.	88	SPAIN	33	SUDAN	37	SWITZERLAND	17
U.K.	79	U.S.	262				
EL SALVADOR	Total = 406						
CANADA	20	FRANCE	9	GERMANY, FR	15	SPAIN	25
SWITZERLAND	28	U.K.	17	U.S.	292		
ETHIOPIA	Total = 216						
FRANCE	28	GERMANY, FR	8	GREECE	8	ITALY	42
IVORY COAST	8	SAUDI AR.	41	U.K.	39	U.S.	42
FRANCE	Total = 5845						
ANGOLA	41	ARGENTINA	57	BENIN	95	BOLIVIA	12
BRAZIL	65	CAMEROON	437	CANADA	118	CHILE	59
COLUMBIA	65	CONGO	243	COSTA RICA	19	DOM. REP.	24
EQUADOR	30	EL SALVADOR	9	ETHIOPIA	28	FRANCE (FG)	24
GABON	312	GHANA	21	GUATEMALA	21	HAITI	21
IRAN	89	IRAQ	53	ISRAEL	12	IVORY COAST	86
JORDAN	28	KENYA	7	KUWAIT	63	LIBERIA	25
LIBYA	3	MALI	162	MAURITANIA	63	MEXICO	82
NICARAGUA	12	NIGER	83	NIGERIA	24	PANAMA	18
PARAGUAY	18	PERU	36	ROMANIA	8	SAUDI AR.	142
SENEGAL	41	SOUTH AF.	102	SUDAN	15	TANZANIA	12
TOGO	132	UGANDA	14	U.A.E.	83	U.K. (BER)	15
U.S. (PR)	17	U.S.	2381	UPPER VOLTA	68	URUGUAY	18
U.S.S.R.	2	VENEZUELA	75	YEMEN, A.R.	25	ZAIRE	110
ZIMBABWE	20						
FRANCE (FG)	Total = 58						
BRAZIL	11	FRANCE	24	U.S.	23		
FRANCE (MA)	Total = 56						
CANADA	17	U.S.	39				
GABON	Total = 645						
BELGIUM	20	BENIN	21	CAMEROON	36	CANADA	12
CONGO	31	FRANCE	312	ITALY	22	IVORY COAST	26
MOROCCO	7	SENEGAL	40	SWITZERLAND	12	TOGO	25
U.S.	39	U.S.	42				
GERMANY, FR	Total = 4468						
ARGENTINA	85	BAHRAIN	21	BOLIVIA	21	BRAZIL	114
CAMEROON	47	CANADA	220	CHILE	47	COLUMBIA	95
CONGO	11	COSTA RICA	14	EQUADOR	17	EL SALVADOR	15
ETHIOPIA	8	GHANA	40	GUATEMALA	34	ICELAND	16
IRAN	61	IRAQ	80	ISRAEL	62	IVORY COAST	5
JORDAN	54	KUWAIT	90	MALAWI	14	MEXICO	91
NICARAGUA	10	NIGERIA	67	PANAMA	18	PARAGUAY	36
PERU	21	QATAR	27	SAUDI AR.	122	SENEGAL	13
SOUTH AF.	114	TANZANIA	23	TOGO	18	TURKEY	109



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UGANDA	18	U.A.E.	106	U.K. (BER)	20	U.S. (PR)	36
U.S.	2298	UPPER VOLTA	14	URUGUAY	22	VENEZUELA	83
YEMEN, A.R.	21	ZIMBABWE	10				
GHANA	Total =						
BELGIUM	235	FRANCE	21	GERMANY, FR	40	ITALY	12
IVORY COAST	5	KENYA	5	NIGERIA	7	U.K.	89
U.S.	48						
GREECE	Total =						
ARGENTINA	1052	BAHRAIN	10	BRAZIL	31	CAMEROON	26
CANADA	20	CHILE	6	ETHIOPIA	8	ISRAEL	13
IVORY COAST	172	JORDAN	11	KOWAIT	51	MEXICO	6
NIGERIA	8	PANAMA	10	QATAR	9	SAUDI AR.	52
SENEGAL	11	SOUTH AF.	43	SUDAN	13	U.S. (PR)	9
U.S.	482	VENEZUELA	28	ZAIRE	11	ZIMBABWE	12
GUATEMALA	Total =						
ARGENTINA	552	CANADA	19	CHILE	17	COLOMBIA	12
EQUADOR	14	FRANCE	21	GERMANY, FR	34	ISRAEL	9
ITALY	12	NETHERLANDS	6	NORDIC GRP	8	SPAIN	41
U.K.	18	U.S. (PR)	33	U.S.	288		
HAITI	Total =						
CANADA	329	FRANCE	21	NETHERLANDS	3	SPAIN	7
U.S.	33						
HONDURAS	Total =						
CANADA	347	COLOMBIA	12	ITALY	8	SPAIN	12
U.S.	10	VENEZUELA	31				
ICELAND	Total =						
CANADA	341	GERMANY, FR	16	NETHERLANDS	7	NORDIC GRP	72
SPAIN	11	U.K.	84	U.S.	129		
IRAN	Total =						
ALGERIA	845	AUSTRIA	42	BELGIUM	30	CANADA	27
FRANCE	8	GERMANY, FR	61	ITALY	40	KUWAIT	44
LEBANON	89	LIBYA	8	NORDIC GRP	40	ROMANIA	3
SAUDI AR.	12	TURKEY	43	U.K.	83	U.S.	285
YUCOSLAVIA	20						
IRAQ	Total =						
AUSTRIA	666	CANADA	11	EGYPT	50	FRANCE	53
GERMANY, FR	42	ITALY	61	JORDAN	40	NORDIC GRP	22
SPAIN	80	SWITZERLAND	35	TUNISIA	12	U.K.	72
U.S.	32	U.S.S.R.	4				
IRELAND	Total =						
CANADA	484	SAUDI AR.	27	SOUTH AF.	24	U.S.	401
U.S.	32						



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EGYPT	62	GUATEMALA	6	HAITI	3	ICELAND	7
KUWAIT	40	MEXICO	69	NICARAGUA	14	PANAMA	5
PERU	19	SIERRA LEONE	3	SURINAM	153	TRINIDAD & TOBAGO	9
U.K. (BER)	10	U.S.	739	URUGUAY	7	VENEZUELA	38
NICARAGUA Total = 301							
ARGENTINA	16	BRAZIL	25	CANADA	9	COLUMBIA	10
FRANCE	12	GERMANY, FR	10	ITALY	15	NETHERLANDS	14
SPAIN	33	U.K.	9	U.S.	148		
NIGER Total = 124							
FRANCE	83	IVORY COAST	35	NIGERIA	6		
NIGERIA Total = 1156							
AUSTRIA	25	BELGIUM	28	BRAZIL	16	CAMEROON	7
CANADA	30	EGYPT	7	FRANCE	24	GERMANY, FR	67
GHANA	7	GREECE	11	ITALY	118	KENYA	13
NIGER	6	NORDIC GRP	44	SPAIN	66	SWITZERLAND	32
U.K.	263	U.S.	392				
NORDIC GRP Total = 4017							
ALGERIA	57	ANGOLA	6	ARGENTINA	53	BRAZIL	75
CANADA	78	CHILE	28	COLUMBIA	15	EQUADOR	10
EGYPT	27	GUATEMALA	8	ICELAND	72	IRAN	40
IRAQ	22	ISRAEL	70	IVORY COAST	12	JORDAN	27
KENYA	21	KUWAIT	32	LEBANON	17	LIBYA	53
MEXICO	36	MOROCCO	81	NIGERIA	44	PANAMA	5
PERU	14	SAUDI AR.	81	SUDAN	5	TANZANIA	15
TUNISIA	19	U.S.	2960	VENEZUELA	34		
PANAMA Total = 1018							
ARGENTINA	19	BOLIVIA	10	BRAZIL	24	CANADA	14
CHILE	20	COLUMBIA	107	EQUADOR	27	FRANCE	18
GERMANY, FR	18	GREECE	10	ISRAEL	9	ITALY	18
MEXICO	34	NETHERLANDS	5	NORDIC GRP	5	PARAGUAY	5
PERU	14	SPAIN	117	SWITZERLAND	9	U.K.	34
U.S.	446	VENEZUELA	55				
PARAGUAY Total = 327							
ARGENTINA	25	BRAZIL	30	CHILE	21	FRANCE	18
GERMANY, FR	36	ITALY	21	PANAMA	5	SPAIN	59
SWITZERLAND	15	U.K.	25	U.S.	72		
PERU Total = 1160							
ARGENTINA	29	AUSTRIA	9	BRAZIL	48	CANADA	33
CHILE	9	COLUMBIA	23	COSTA RICA	9	EQUADOR	3
FRANCE	36	GERMANY, FR	21	ITALY	54	MEXICO	18
NETHERLANDS	19	NORDIC GRP	14	PANAMA	14	SPAIN	78
SWITZERLAND	14	U.K.	39	U.S. (FR)	7	U.S.	628
URUGUAY	7	VENEZUELA	48				



POLAND					4	U.S.			240		
CANADA	Total =	277	MOROCCO								
		33									
PORTUGAL					41	CANADA		21	ISRAEL		10
ANGOLA	Total =	541	BRAZIL		62	U.S.		82	U.S.S.R.		2
MOZAMBIQUE		209	SOUTH AF.								
VENEZUELA		41									
		73									
QATAR					27	GREECE		9	SPAIN		16
CANADA	Total =	141	GERMANY, FR								
U.S.		7									
		82									
ROMANIA	Total =	143	FRANCE		8	IRAN		3	ISRAEL		15
CANADA		13	LEBANON		6	U.K.		11	U.S.		80
JORDAN		7									
SAUDI AR.	Total =	2969	BELGIUM		40	BRAZIL		12	CANADA		62
AUSTRIA		40	EGYPT		88	ETHIOPIA		41	FRANCE		142
CYPRUS		40	GREECE		52	IRAN		20	IRELAND		27
GERMANY, FR		122	KENYA		21	LEBANON		82	NORDIC GRP		81
JORDAN		21	SUDAN		20	SWITZERLAND		61	TUNISIA		34
SPAIN		123	U.A.E.		40	U.K.		547	U.S.		1171
TURKEY		61									
YEMEN, A.R.		21									
SENEGAL	Total =	395	BELGIUM		24	BENIN		14	CAMEROON		18
AUSTRIA		5	CONGO		16	FRANCE		41	GABON		40
CANADA		12	GREECE		10	ITALY		14	IVORY COAST		15
GERMANY, FR		13	SPAIN		19	TOGO		21	TUNISIA		11
LEBANON		15	U.S.		48	UPPER VOLTA		14	U.S.S.R.		6
U.K.		36									
ZAIRE		3									
SIERRA LEONE	Total =	149	U.K.		146						
NETHERLANDS		3									
SOUTH AF.	Total =	2253	AUSTRIA		36	BELGIUM		44	BRAZIL		18
ARGENTINA		23	CHILE		12	CYPRUS		33	FRANCE		102
CANADA		65	GREECE		43	IRELAND		24	ISRAEL		83
GERMANY, FR		114	MALAWI		84	PORTUGAL		62	SWITZERLAND		40
ITALY		88	U.S.		741						
U.K.		641									
SPAIN	Total =	2518	ARGENTINA		255	BAHAMAS		10	BAHRAIN		8
ANGOLA		12	BRAZIL		49	CAMEROON		18	CANADA		33
BOLIVIA		45	COLUMBIA		108	CONGO		13	COSTA RICA		39
CHILE		99	EQUADOR		94	EGYPT		33	EL SALVADOR		25
DOM. REP.		36	HAITI		7	HONDURAS		12	ICELAND		22
GUATEMALA		41									



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IRAQ	32	ISRAEL	48	IVORY COAST	14	KUWAIT	31	
MAURITANIA	32	MEXICO	225	NICARAGUA	33	NIGERIA	66	
PANAMA	117	PARAGUAY	59	PERU	78	QATAR	16	
SAUDI AR.	123	SENEGAL	19	TURKEY	40	U.A.E.	33	
U.K. (BER)	10	U.S. (PR)	28	U.S.	429	URUGUAY	34	
VENEZUELA	81	ZAIRE	11					
	Total =	241						
SUDAN	BEGIUM	3	EGYPT	37	FRANCE	15	GREECE	13
	ITALY	29	KENYA	18	NORDIC GRP	5	SAUDI AR.	20
	SWITZERLAND	42	U.K.	44	U.S.	15		
	Total =	153						
SURINAM	NETHERLANDS	153						
SWITZERLAND	Total =	2107						
ARGENTINA	41	BRAZIL	38	CAMEROON	24	CANADA	68	
CHILE	28	COLUMBIA	25	CONGO	15	EQUADOR	15	
EGYPT	17	EL SALVADOR	28	GABON	12	IRAQ	35	
ISRAEL	16	IVORY COAST	7	JORDAN	12	KENYA	20	
KUWAIT	42	LEBANON	33	MEXICO	41	NIGERIA	32	
PANAMA	9	PARAGUAY	15	PERU	14	SAUDI AR.	61	
SOUTH AF.	40	SUDAN	42	TANZANIA	6	TOGO	12	
U.K. (BER)	14	U.S. (PR)	12	U.S.	1279	URUGUAY	10	
VENEZUELA	35	ZIMBABWE	9					
TANZANIA	Total =	275						
BEGIUM	9	CANADA	22	FRANCE	12	GERMANY, FR	23	
ITALY	22	MOZAMBIQUE	9	NORDIC GRP	15	SWITZERLAND	6	
U.K.	131	U.S.	26					
	Total =	318						
TOGO	BEGIUM	11	FRANCE	132	GABON	25	GERMANY, FR	18
	ITALY	8	IVORY COAST	44	SENEGAL	21	SWITZERLAND	12
	U.K.	15	U.S.	32				
TRIN&TOBAGO	Total =	557						
CANADA	61	JAMAICA	68	NETHERLANDS	9	U.K.	140	
U.S.	279							
TUNISIA	Total =	181						
CANADA	9	IRAQ	12	IVORY COAST	7	JORDAN	12	
KUWAIT	7	NORDIC GRP	19	SAUDI AR.	34	SENEGAL	11	
TURKEY	7	U.S.	56	YUGOSLAVIA	7			
TURKEY	Total =	503						
ALGERIA	15	CANADA	18	GERMANY, FR	109	IRAN	43	
ISRAEL	14	LIBYA	21	SAUDI AR.	61	SPAIN	40	
TUNISIA	7	U.S.	175					



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UGANDA
FRANCE 14 GERMANY, FR 18 ITALY 9 U.K. 143
U.S. 28

U.A.E.
Total = 925
BELGIUM 30 CANADA 31 FRANCE 83 GERMANY, FR 106
ITALY 42 KUWAIT 72 SAUDI AR. 40 SPAIN 33
U.K. 218 U.S. 270

U.K. (ASC)
Total = 4
U.S. 4

U.K. (BER)
Total = 326
CANADA 31 FRANCE 15 GERMANY, FR 20 ITALY 14
JAMAICA 19 NETHERLANDS 10 SPAIN 10 SWITZERLAND 14
U.K. 52 U.S. 141

U.K.
Total = 16407
ALGERIA 29 ANGOLA 23 ARGENTINA 42 BAHAMAS 94
BAHRAIN 142 BARBADOS 245 BENIN 44 BOLIVIA 28
BRAZIL 68 CAMEROON 49 CANADA 751 CHILE 51
COLUMBIA 76 COSTA RICA 20 CYPRUS 26 ECUADOR 19
EGYPT 79 EL SALVADOR 17 ETHIOPIA 39 CABON 39
GHANA 89 GUATEMALA 20 ICELAND 84 IRAN 83
IRAQ 72 ISRAEL 125 IVORY COAST 146
JORDAN 94 KENYA 193 KUWAIT 52 LEBANON 82
LIBERIA 51 LIBYA 103 MALAWI 52 MEXICO 84
NICARAGUA 9 NIGERIA 263 PANAMA 34 PARAGUAY 25
PERU 39 ROMANIA 11 SAUDI AR. 547 SENEGAL 36
SIERRA LEONE 146 SOUTH AF. 641 SUDAN 44 TANZANIA 131
TOGO 15 TRINIDAD AND TOBAGO 143 U.A.E. 218
U.K. (BER) 52 U.S. (PR) 31 U.S. 10185 URUGUAY 24
VENEZUELA 63 YEMEN, A.R. 71 ZAIRE 20 ZIMBABWE 191

U.S. (PR)
Total = 320
ARGENTINA 15 CANADA 20 COLUMBIA 39 EQUADOR 7
FRANCE 17 GERMANY, FR 36 GREECE 9 GUATEMALA 33
ISRAEL 9 ITALY 17 MEXICO 24 PERU 7
SPAIN 28 SWITZERLAND 12 U.K. 16 VENEZUELA 16

U.S.
Total = 40221
ALGERIA 45 ANGOLA 17 ARGENTINA 459 AUSTRIA 138
BAHAMAS 197 BAHRAIN 103 BARBADOS 161 BELGIUM 961
BENIN 8 BRAZIL 271 BRITAIN 728 CAMEROON 83
CHAD 1 CHILE 303 COLUMBIA 1720 CONGO 13
COSTA RICA 252 CYPRUS 49 DOM. REP. 450 EQUADOR 436
EGYPT 262 EL SALVADOR 292 ETHIOPIA 42 FRANCE 2381
FRANCE (FC) 23 FRANCE (MA) 39 GABON 42 GERMANY, FR 2298
GHANA 48 GREECE 482 GUATEMALA 265
HONDURAS 274 ICELAND 129 IRAN 285 HAITI 265 IRAQ 152



IRELAND	401	ISRAEL	549	ITALY	980	IVORY COAST	49
JAMAICA	731	JORDAN	194	KENYA	116	KUWAIT	284
LEBANON	281	LIBERIA	106	LIBYA	82	MALAWI	69
MEXICO	5	MOROCCO	218	NETHERLANDS	739	NICARAGUA	148
NIGERIA	392	NORDIC CRP	2960	PANAMA	446	PARAGUAY	72
PERU	628	POLAND	240	PORTUGAL	82	QATAR	82
ROMANIA	80	SAUDI AR.	1171	SENEGAL	48	SOUTH AF.	741
SPAIN	429	SUDAN	15	SWITZERLAND	1279	TANZANIA	26
TOGO	32	TRIN&TOBAGO	279	TUNISIA	56	TURKEY	175
UGANDA	28	U.A.E.	270	U.K. (ASC)	4	U.K. (BER)	141
U.K.	10185	URUGUAY	120	U.S.S.R.	138	VENEZUELA	1187
YEMEN, A.R.	59	YUGOSLAVIA	140	ZAIRE	21	ZIMBABWE	46
UPPER VOLTA	Total = 105			GERMANY, FR	14	ITALY	6
BELGIUM	3	FRANCE	68				
SENEGAL	14						

URUGUAY	Total = 324						
CANADA	18	COLAMBIA	5	FRANCE	18	GERMANY, FR	22
ITALY	24	MEXICO	15	NETHERLANDS	7	PERU	7
SPAIN	34	SWITZERLAND	10	U.K.	24	U.S.	120
VENEZUELA	20						
U.S.S.R.	Total = 245						
ANGOLA	42	BRAZIL	3	CANADA	43	CONGO	5
FRANCE	2	IRAQ	4	PORTUGAL	2	SENEGAL	6
U.S.	138						

VENEZUELA	Total = 2592						
ARGENTINA	76	AUSTRIA	16	BOLIVIA	19	BRAZIL	78
CANADA	59	CHILE	49	COSTA RICA	36	EQUADOR	40
FRANCE	75	GERMANY, FR	83	GREECE	28	HONDURAS	31
ISRAEL	17	ITALY	225	LEBANON	41	MEXICO	69
NETHERLANDS	38	NORDIC CRP	34	PANAMA	55	PERU	48
PORTUGAL	73	SPAIN	81	SWITZERLAND	35	U.K.	63
U.S. (PR)	16	U.S.	1187	URUGUAY	20		
YEMEN, A.R.	Total = 292						
BAHRAIN	24	BELGIUM	6	FRANCE	25	GERMANY, FR	21
ITALY	58	KUWAIT	7	SAUDI AR.	21	U.K.	71
U.S.	59						

YUGOSLAVIA	Total = 209						
CAVADA	49	IRAN	10	KENYA	3	TUNISIA	7
U.S.	140						
ZAIRE	Total = 273						
BELGIUM	72	CANADA	11	FRANCE	110	GREECE	11
ITALY	7	KENYA	7	SENEGAL	3	SPAIN	11
U.K.	20	U.S.	21				



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ZIMBABWE	Total =	364								
ANGOLA		4	AUSTRIA	4	BELGIUM	15	CANADA	12		
FRANCE		20	GERMANY, FR	10	GREECE	12	ITALY	35		
KENYA		20	MALAWI	20	MOZAMBIQUE	12	SWITZERLAND	9		
U.K.		191								

Total For Matrix = 135026



Ford Aerospace &
Communications Corporation

B-3 - AOR GROUPED COUNTRY TRAFFIC



Group Distributions (AOR) -- 1995

Group 1 U.S.								
Group 2 CANADA								
Group 3 BAHAMAS FRANCE (MA) MEXICO	BARBADOS GUATEMALA NICARAGUA	COSTA RICA HAITI PANAMA	DOM. REP. HONDURAS TRINIDADTOBAGO	EL SALVADOR JAMAICA U.S. (PR)				
Group 4 ARGENTINA ECUADOR URUGUAY	BOLIVIA FRANCE (FG) VENEZUELA	ERAZIL PARAGUAY	CHILE PERU	COLUMBIA SURINAM				
Group 5 AUSTRIA GREECE POLAND TURKEY	BELGIUM IRELAND PORTUGAL U.K.	CYPRUS ITALY ROMANIA U.S.S.R.	FRANCE NETHERLANDS SPAIN YUGOSLAVIA	GERMANY, FR NORDIC GRP SWITZERLAND				
Group 6 ALGERIA CHAD GHANA JORDAN LIBYA MOZAMBIQUE SENEGAL TOGO YEMEN, A.R.	ANGOLA CONGO IRAN KENYA MALAWI NIGER SIERRA LEONE TUNISIA ZAIRE	BAHRAIN EGYPT IRAQ KUWAIT MALI NIGERIA SOUTH AE. UGANDA ZIMBABWE	BENIN ETHIOPIA ISRAEL LEBANON MAURITANIA QATAR SUDAN U.A.E.	CAMEROON CABON IVORY COAST LIBERIA MOROCCO SAUDI AR. TANZANIA UPPER VOLTA				
Group 7 ICELAND	U.K. (ASC)	U.K. (BER)						
1	3 3827 4 5947 5 24137	Totals	40221					
6 6036 7 274								
2	3 461 4 393 5 2128	Totals	3750					
6 726 7 42								
3	1 3827 2 461 3 442	Totals	8080					
4 943 5 2349 6 39								
7 19								



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4	1	5947	2	393	3	943	Totals
	4	2246	5	4242	6	300	14071
5	1	24137	2	2128	3	2349	Totals
	4	4242	5	396	6	12085	45673
	7	336					
6	1	5990	2	726	3	39	Totals
	4	300	5	12085	6	3420	22560
7	1	274	2	42	3	19	Totals
	5	336					671

Total (one-way) : 135026



B-4 - PACIFIC OCEAN REGION (POR) TRAFFIC MODEL

The following pages are a listing of the POR voice circuit traffic for 1995 as based upon the Intelsat forecast of August 1984.

The final page of this section lists the grouped country traffic for the POR for year 1995.



FOR Voice Circuits -- 1995

AUSTRALIA	Total =			3265						
CANADA		292			CHINA (PEK)	27	CHINA (TAI)	24	FRANCE (NC)	47
HONG KONG		389			INDONESIA	91	JAPAN	274	KOREA	49
MALAYSIA		188			MEXICO	22	NEW ZEALAND	285	PHILIPPINES	16
SINGAPORE		220			THAILAND	41	U.S. - GUAM	10	U.S. - HAW	50
U.S.		1240								
CANADA	Total =			889						
AUSTRALIA		292			CHINA (PEK)	11	CHINA (TAI)	45	HONG KONG	150
INDONESIA		24			JAPAN	87	KOREA	38	MALAYSIA	70
NEW ZEALAND		12			PHILIPPINES	59	SINGAPORE	77	THAILAND	11
U.S. - HAW		13								
CHINA (PEK)	Total =			609						
AUSTRALIA		27			CANADA	11	HONG KONG	142	JAPAN	49
MALAYSIA		20			PHILIPPINES	11	SINGAPORE	98	THAILAND	13
U.S. - HAW		4			U.S.	234				
CHINA (TAI)	Total =			1759						
AUSTRALIA		24			CANADA	45	INDONESIA	48	JAPAN	350
KOREA		113			MALAYSIA	117	NEW ZEALAND	9	SINGAPORE	42
THAILAND		79			U.S. - GUAM	2	U.S. - HAW	22	U.S.	908
FIJI	Total =			7						
U.S. - HAW		7								
FRANCE	Total =			160						
FRANCE (NC)		47			HONG KONG	12	JAPAN	6	NEW ZEALAND	14
AUSTRALIA		24			SINGAPORE	38	U.S.	19		
PHILIPPINES										
GERMANY, FR	Total =			2210						
HONG KONG		389			CANADA	150	CHINA (PEK)	142	FRANCE (NC)	12
AUSTRALIA		57			JAPAN	303	KOREA	187	NEW ZEALAND	24
INDONESIA		23			U.S. - GUAM	8	U.S. - HAW	40	U.S.	875
THAILAND										
INDIA	Total =			495						
INDONESIA										



ITALY												
AUSTRALIA	91	CANADA	24	CHINA (TAI)	48	HONG KONG	57					
JAPAN	143	KOREA	35	MALAYSIA	29	NEW ZEALAND	9					
THAILAND	5	U.S.-HAW	18	U.S.	36							
	Total =	4799										
JAPAN												
AUSTRALIA	274	CANADA	87	CHINA (PEK)	49	CHINA (TAI)	350					
FRANCE (NC)	6	HONG KONG	303	INDONESIA	143	MALAYSIA	154					
MEXICO	63	NEW ZEALAND	32	PHILIPPINES	60	SINGAPORE	384					
THAILAND	95	U.S.-GUAM	15	U.S.-HAW	180	U.S.	2604					
	Total =	2198										
KOREA												
AUSTRALIA	49	CANADA	38	CHINA (TAI)	113	HONG KONG	187					
INDONESIA	35	MALAYSIA	73	NEW ZEALAND	9	PHILIPPINES	35					
SINGAPORE	83	THAILAND	29	U.S.-GUAM	16	U.S.-HAW	34					
U.S.	1497											
	Total =	1247										
MALAYSIA												
AUSTRALIA	188	CANADA	70	CHINA (PEK)	20	CHINA (TAI)	117					
INDONESIA	29	JAPAN	154	KOREA	73	NEW ZEALAND	21					
U.S.-HAW	15	U.S.	560									
	Total =	85										
MEXICO												
AUSTRALIA	22	JAPAN	63									
	Total =	645										
NEW ZEALAND												
AUSTRALIA	285	CANADA	12	CHINA (TAI)	9	FRANCE (NC)	14					
HONG KONG	24	INDONESIA	9	JAPAN	32	KOREA	9					
MALAYSIA	21	PHILIPPINES	8	SINGAPORE	15	THAILAND	7					
U.S.-HAW	15	U.S.	185									
	Total =	863										
PHILIPPINES												
AUSTRALIA	16	CANADA	59	CHINA (PEK)	11	FRANCE (NC)	24					
JAPAN	60	KOREA	35	NEW ZEALAND	8	U.S.-GUAM	8					
U.S.-HAW	40	U.S.	602									
	Total =	1672										
SINGAPORE												
AUSTRALIA	220	CANADA	77	CHINA (PEK)	98	CHINA (TAI)	42					
FRANCE (NC)	38	JAPAN	384	KOREA	83	NEW ZEALAND	15					
THAILAND	86	U.S.-HAW	39	U.S.	590							
	Total =	695										
SRI LANKA												
THAILAND												
AUSTRALIA	41	CANADA	11	CHINA (PEK)	13	CHINA (TAI)	79					
HONG KONG	23	INDONESIA	5	JAPAN	95	KOREA	29					
NEW ZEALAND	7	SINGAPORE	86	U.S.-HAW	9	U.S.	297					
	Total =	695										
U.K. (BER)												



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U.K.									
U.S.-GUAM	Total =	275							
AUSTRALIA		10	CHINA (TAI)	2	HONG KONG	8	JAPAN	15	
KOREA		16	PHILIPPINES	8	U.S.-HAW	56	U.S.	160	
U.S.-HAW	Total =	543							
AUSTRALIA		50	CANADA	13	CHINA (PEK)	4	CHINA (TAI)	22	
FIJI		7	HONG KONG	40	INDONESIA	18	JAPAN	180	
KOREA		34	MALAYSIA	15	NEW ZEALAND	15	PHILIPPINES	40	
SINGAPORE		39	THAILAND	9	U.S.-GUAM	56	U.S.	1	
U.S.	Total =	9807							
AUSTRALIA		1240	CHINA (PEK)	234	CHINA (TAI)	908	FRANCE (NC)	19	
HONG KONG		875	INDONESIA	36	JAPAN	2604	KOREA	1497	
MALAYSIA		560	NEW ZEALAND	185	PHILIPPINES	602	SINGAPORE	590	
THAILAND		297	U.S.-GUAM	160					

Total For Matrix = 32223



B-5 - POR Grouped Country Traffic



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Group Distributions (POR) -- 1995

	U.S.	HAW	U.S.	JAPAN	INDONESIA	NEW ZEALAND	Totals
Group 1	1	1	2				10350
Group 2	5	2428					889
Group 3	1	13	4				85
Group 4	4	63	5				15189
Group 5	1	7908	2				5710
	4	4880	5				
	1	2428	2				
	4	1849	5				

Total (one-way) : 32223



APPENDIX C

TRAFFIC MODELS FOR CANADA, MEXICO, AND BRAZIL

As part of the study, Ford Aerospace developed some very rough distribution models (in addition to the total traffic requirements from Task 1 - see Section 2) for Canada, Mexico, and Brazil. This was done because of the multiple reuse required in these countries to meet year 2008 demands. Distributions for Canada and Brazil were developed to the province or state level, while Mexico was defined to consist of North, Central, and South regions. See section 2.3 for a description of how the distributions were derived. The subsequent printouts in this Appendix provide the resulting traffic matrices.



**Ford Aerospace &
Communications Corporation**

C-1 - CANADIAN TRAFFIC MODEL



Canada Voice -- Year 2008

ALBERTA Total = 10136
 ALBERTA 133
 NEWFOUNDLAND 214
 ONTARIO 2 630
 SASKAWAN 303
 BRITISH COL. 804
 N.W. TERR. 14
 PR. ED. IS. 46
 YUKON 7

BRITISH COL. Total = 13615
 ALBERTA 804
 NEWFOUNDLAND 287
 ONTARIO 2 846
 SASKAWAN 508
 MANITOBA 360
 NOVA SCOTIA 19
 QUEBEC 1 61
 ISL 10

MANITOBA Total = 6246
 ALBERTA 404
 NEWFOUNDLAND 130
 ONTARIO 2 383
 SASKAWAN 92
 MANITOBA 542
 NOVA SCOTIA 9
 QUEBEC 1 28
 ISL 4

NEW BRUN. Total = 3601
 ALBERTA 260
 N.W. TERR. 6
 QUEBEC 2 193
 MANITOBA 349
 ONTARIO 2 1418
 YUKON 148

NEWFOUNDLAND Total = 3423
 ALBERTA 214
 NEWFOUNDLAND 14
 ONTARIO 2 202
 SASKAWAN 122
 BRITISH COL. 287
 N.W. TERR. 5
 PR. ED. IS. 15
 YUKON 2

N.W. TERR. Total = 233
 ALBERTA 14
 NEWFOUNDLAND 5
 PR. ED. IS. 1
 ISL 19
 MANITOBA 19
 ONTARIO 1 7
 QUEBEC 1 42

NOVA SCOTIA Total = 4949
 ALBERTA 323
 N.W. TERR. 7
 QUEBEC 2 239
 MANITOBA 433
 ONTARIO 2 1761
 YUKON 184

ONTARIO 1 Total = 28197
 ALBERTA 3632

NEW BRUN. 404
 ONTARIO 1 323
 QUEBEC 2 1972
 ISL 901

NEW BRUN. 542
 ONTARIO 1 433
 QUEBEC 2 2648
 ISL 1210

NEW BRUN. 49
 ONTARIO 1 196
 QUEBEC 2 1198
 ISL 547

NEWFOUNDLAND 158
 QUEBEC 1 246
 ISL 3

NEW BRUN. 130
 ONTARIO 1 104
 QUEBEC 2 633
 ISL 289

NEW BRUN. 9
 ONTARIO 2 78
 SASKAWAN 11

NEWFOUNDLAND 196
 QUEBEC 1 305
 ISL 4

NEW BRUN. 2206

MANITOBA 4876

BRITISH COL. 4876

MANITOBA 1418



NEWFOUNDLAND	1165	N.W. TERR.	78	NOVA SCOTIA	1761	ONTARIO 2	3094
PR. ED. IS.	250	QUEBEC 2	2692	SASKWAN	2067	YUKON	40
ISL	4918						
ONTARIO 2	Total = 9853						
ALBERTA	630	BRITISH COL.	846	MANITOBA	383	NEW BRUN.	246
NEWFOUNDLAND	202	N.W. TERR.	14	NOVA SCOTIA	305	ONTARIO 1	3094
ONTARIO 2	537	PR. ED. IS.	43	QUEBEC 1	1867	QUEBEC 2	467
SASKWAN	359	YUKON	7	ISL	853		
PR. ED. IS.	Total = 703						
ALBERTA	46	BRITISH COL.	61	MANITOBA	28	NEWFOUNDLAND	15
N.W. TERR.	1	ONTARIO 1	250	ONTARIO 2	43	QUEBEC 1	136
QUEBEC 2	34	SASKWAN	26	YUKON	1	ISL	62
QUEBEC 1	Total = 14676						
ALBERTA	1972	BRITISH COL.	2648	MANITOBA	1198	NEW BRUN.	385
NEWFOUNDLAND	633	N.W. TERR.	42	NOVA SCOTIA	956	ONTARIO 2	1867
PR. ED. IS.	136	QUEBEC 2	1023	SASKWAN	1123	YUKON	22
ISL	2671						
QUEBEC 2	Total = 7555						
ALBERTA	493	BRITISH COL.	662	MANITOBA	300	NEW BRUN.	193
NEWFOUNDLAND	158	N.W. TERR.	11	NOVA SCOTIA	239	ONTARIO 1	2692
ONTARIO 2	467	PR. ED. IS.	34	QUEBEC 1	1023	QUEBEC 2	329
SASKWAN	281	YUKON	5	ISL	668		
SASKWAN	Total = 5781						
ALBERTA	303	BRITISH COL.	508	MANITOBA	92	NEW BRUN.	148
NEWFOUNDLAND	122	N.W. TERR.	8	NOVA SCOTIA	184	ONTARIO 1	2067
ONTARIO 2	359	PR. ED. IS.	26	QUEBEC 1	1123	QUEBEC 2	281
SASKWAN	43	YUKON	4	ISL	513		
YUKON	Total = 119						
ALBERTA	7	BRITISH COL.	10	MANITOBA	4	NEW BRUN.	3
NEWFOUNDLAND	2	NOVA SCOTIA	4	ONTARIO 1	40	ONTARIO 2	7
PR. ED. IS.	1	QUEBEC 1	22	QUEBEC 2	5	SASKWAN	4
ISL	10						
ISL	Total = 13450						
ALBERTA	901	BRITISH COL.	1210	MANITOBA	547	NEW BRUN.	352
NEWFOUNDLAND	289	N.W. TERR.	19	NOVA SCOTIA	437	ONTARIO 1	4918
ONTARIO 2	853	PR. ED. IS.	62	QUEBEC 1	2671	QUEBEC 2	668
SASKWAN	513	YUKON	10				

Total For Matrix = 122537



Ford Aerospace &
Communications Corporation

C-2 - MEXICO TRAFFIC MODEL



Mexico Voice -- Year 2008

MEXICO N.	Total =	7700			
MEXICO N.	1540	MEXICO C.	3850	MEXICO S.	2310
MEXICO C.	Total =	19250			
MEXICO N.	3850	MEXICO C.	9625	MEXICO S.	5775
MEXICO S.	Total =	11550			
MEXICO N.	2310	MEXICO C.	5775	MEXICO S.	3465

Total For Matrix = 38500



Ford Aerospace &
Communications Corporation

C-3 - BRAZIL TRAFFIC MODEL



South America Forecast -- 2008

ACRE	Total = 170										
ALACOAS	3	AMAZONAS	2	BAHIA	14	CEARA	8				
DIST. FED.	3	ESP. SANTO	3	COIAS	8	GUANABARA	5				
MARANHAO	6	MATO CR.	2	MINAS CER.	23	PARA	4				
PARAIBA	5	PARANA	10	PERNAMBUCO	10	PIAUI	3				
RIO DE JAN.	8	RIO CR. N.	3	RIO CR. S.	13	SANTA CAT.	5				
SAO PAULO	30	SERGIPE	2								

ALACOAS	Total = 1328										
ACRE	3	ALACOAS	24	AMAPA	1	AMAZONAS	13				
BAHIA	111	CEARA	62	DIST. FED.	26	ESP. SANTO	22				
COIAS	61	GUANABARA	36	MARANHAO	46	MATO CR.	17				
MINAS CER.	181	PARA	29	PARAIBA	37	PARANA	79				
PERNAMBUCO	76	PIAUI	23	RIO DE JAN.	63	RIO CR. N.	21				
RIO CR. S.	101	RONDONIA	1	RORAUAMA	1	SANTA CAT.	40				
SAO PAULO	240	SERGIPE	14								

AMAPA	Total = 70										
ALACOAS	1	AMAZONAS	1	BAHIA	6	CEARA	3				
DIST. FED.	1	ESP. SANTO	1	COIAS	3	GUANABARA	2				
MARANHAO	3	MATO CR.	1	MINAS CER.	10	PARA	2				
PARAIBA	2	PARANA	4	PERNAMBUCO	4	PIAUI	1				
RIO DE JAN.	3	RIO CR. N.	1	RIO CR. S.	5	SANTA CAT.	2				
SAO PAULO	13	SERGIPE	1								

AMAZONAS	Total = 755										
ACRE	2	ALACOAS	13	AMAPA	1	AMAZONAS	8				
BAHIA	63	CEARA	35	DIST. FED.	15	ESP. SANTO	12				
COIAS	35	GUANABARA	21	MARANHAO	26	MATO CR.	10				
MINAS CER.	103	PARA	16	PARAIBA	21	PARANA	45				
PERNAMBUCO	43	PIAUI	13	RIO DE JAN.	36	RIO CR. N.	12				
RIO CR. S.	57	RONDONIA	1	SANTA CAT.	23	SAO PAULO	136				
SERGIPE	8										

BAHIA	Total = 6263										
ACRE	14	ALACOAS	111	AMAPA	6	AMAZONAS	63				
BAHIA	522	CEARA	291	DIST. FED.	123	ESP. SANTO	104				
COIAS	288	GUANABARA	170	MARANHAO	217	MATO CR.	79				
MINAS CER.	854	PARA	135	PARAIBA	176	PARANA	373				
PERNAMBUCO	361	PIAUI	110	RIO DE JAN.	297	RIO CR. N.	101				
RIO CR. S.	475	RONDONIA	6	RORAUAMA	3	SANTA CAT.	187				
SAO PAULO	1131	SERGIPE	66								



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CEARA	ACRE	Total =	3488	ALAGOAS	62	AMAPA	3	AMAZONAS	35
	BAHIA		8	CEARA	162	DIST. FED.	68	ESP. SANTO	57
	CEARA		291	CUANABARA	95	MARANHAO	121	MAJO CR.	44
	COLAS		161	PARA	75	PARAIBA	98	PARANA	208
	MINAS GER.		476	PIAUI	61	RIO DE JAN.	165	RIO CR. N.	56
	PERNAMBUCO		201	RONDONIA	3	RORAUMA	1	SANTA CAT.	104
	RIO CR. S.		265	SERGIPE	37				
	SAO PAULO		630						

DIST. FED.	ACRE	Total =	1474	ALAGOAS	26	AMAPA	1	AMAZONAS	15
	BAHIA		3	CEARA	68	DIST. FED.	29	ESP. SANTO	24
	CEARA		123	CUANABARA	40	MARANHAO	51	MAJO CR.	19
	COLAS		68	PARA	32	PARAIBA	41	PARANA	88
	MINAS GER.		201	PIAUI	26	RIO DE JAN.	70	RIO CR. N.	24
	PERNAMBUCO		85	RONDONIA	1	RORAUMA	1	SANTA CAT.	44
	RIO CR. S.		112	SERGIPE	16				
	SAO PAULO		266						

ESP. SANTO	ACRE	Total =	1243	ALAGOAS	22	AMAPA	1	AMAZONAS	12
	BAHIA		3	CEARA	58	DIST. FED.	24	ESP. SANTO	21
	CEARA		104	CUANABARA	34	MARANHAO	43	MAJO CR.	16
	COLAS		57	PARA	27	PARAIBA	35	PARANA	74
	MINAS GER.		169	PIAUI	22	RIO DE JAN.	59	RIO CR. N.	20
	PERNAMBUCO		72	RONDONIA	1	RORAUMA	1	SANTA CAT.	37
	RIO CR. S.		94	SERGIPE	13				
	SAO PAULO		224						

COLAS	ACRE	Total =	3457	ALAGOAS	61	AMAPA	3	AMAZONAS	35
	BAHIA		8	CEARA	161	DIST. FED.	68	ESP. SANTO	57
	CEARA		288	CUANABARA	94	MARANHAO	120	MAJO CR.	44
	COLAS		159	PARA	75	PARAIBA	97	PARANA	206
	MINAS GER.		471	PIAUI	61	RIO DE JAN.	164	RIO CR. N.	56
	PERNAMBUCO		199	RONDONIA	3	RORAUMA	1	SANTA CAT.	103
	RIO CR. S.		262	SERGIPE	37				
	SAO PAULO		624						

CUANABARA	ACRE	Total =	2046	ALAGOAS	36	AMAPA	2	AMAZONAS	21
	BAHIA		5	CEARA	95	DIST. FED.	40	ESP. SANTO	34
	CEARA		170	CUANABARA	56	MARANHAO	71	MAJO CR.	26
	COLAS		94	PARA	44	PARAIBA	57	PARANA	122
	MINAS GER.		279	PIAUI	36	RIO DE JAN.	97	RIO CR. N.	33
	PERNAMBUCO		118	RONDONIA	2	RORAUMA	1	SANTA CAT.	61
	RIO CR. S.		155	SERGIPE	22				
	SAO PAULO		369						

MARANHAO	ACRE	Total =	2605	ALAGOAS	46	AMAPA	3	AMAZONAS	26
	BAHIA		6	CEARA	121	DIST. FED.	51	ESP. SANTO	43
	CEARA		217	CUANABARA	71	MARANHAO	90	MAJO CR.	33
	COLAS		120						



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MINAS GER.	355	PARA	56	PARAIBA	73	PARANA	155
PERNAMBUCO	150	PIAUJ	46	RIO DE JAN.	123	RIO CR. N.	42
RIO CR. S.	198	RONDONIA	3	ROAUMA	1	SANTA CAT.	78
SAO PAULO	470	SERGIPE	28				
Total =	953						
MATO CR.		ALAGOAS	17	AMAPA	1	AMAZONAS	10
ACRE	2	CEARA	44	DIST. FED.	19	ESP. SANTO	16
BAHIA	79	GUANABARA	26	MARANHAO	33	MATO CR.	12
COJAS	44	PARA	21	PARAIBA	27	PARANA	57
MINAS GER.	130	PIAUJ	17	RIO DE JAN.	45	RIO CR. N.	15
PERNAMBUCO	55	RONDONIA	1	SANTA CAT.	28	SAO PAULO	172
RIO CR. S.	72						
SERGIPE	10						
Total =	10243						
MINAS GER.		ALAGOAS	181	AMAPA	10	AMAZONAS	103
ACRE	23	CEARA	476	DIST. FED.	201	ESP. SANTO	169
BAHIA	854	GUANABARA	279	MARANHAO	355	MATO CR.	130
COJAS	471	PARA	221	PARAIBA	288	PARANA	610
MINAS GER.	1397	PIAUJ	180	RIO DE JAN.	485	RIO CR. N.	165
PERNAMBUCO	590	RONDONIA	10	ROAUMA	4	SANTA CAT.	306
RIO CR. S.	777	SERGIPE	108				
SAO PAULO	1850						
Total =	1623						
PARA		ALAGOAS	29	AMAPA	2	AMAZONAS	16
ACRE	4	CEARA	75	DIST. FED.	32	ESP. SANTO	27
BAHIA	135	GUANABARA	44	MARANHAO	56	MATO CR.	21
COJAS	75	PARA	35	PARAIBA	46	PARANA	97
MINAS GER.	221	PIAUJ	28	RIO DE JAN.	77	RIO CR. N.	26
PERNAMBUCO	93	RONDONIA	2	ROAUMA	1	SANTA CAT.	48
RIO CR. S.	123	SERGIPE	17				
SAO PAULO	293						
Total =	2109						
PARAIBA		ALAGOAS	37	AMAPA	2	AMAZONAS	21
ACRE	5	CEARA	98	DIST. FED.	41	ESP. SANTO	35
BAHIA	176	GUANABARA	57	MARANHAO	73	MATO CR.	27
COJAS	97	PARA	46	PARAIBA	59	PARANA	126
MINAS GER.	288	PIAUJ	37	RIO DE JAN.	100	RIO CR. N.	34
PERNAMBUCO	121	RONDONIA	2	ROAUMA	1	SANTA CAT.	63
RIO CR. S.	160	SERGIPE	22				
SAO PAULO	381						
Total =	4473						
PARANA		ALAGOAS	79	AMAPA	4	AMAZONAS	45
ACRE	10	CEARA	208	DIST. FED.	88	ESP. SANTO	74
BAHIA	373	GUANABARA	122	MARANHAO	155	MATO CR.	57
COJAS	206	PARA	97	PARAIBA	126	PARANA	266
MINAS GER.	610	PIAUJ	79	RIO DE JAN.	212	RIO CR. N.	72
PERNAMBUCO	257	RONDONIA	4	ROAUMA	2	SANTA CAT.	134
RIO CR. S.	339	SERGIPE	47				
SAO PAULO	807						



PERNAMBUCO Total = 4325
 ACRE 10 ALAGOAS
 BAHIA 361 CEARA
 COIAS 199 GUANABARA
 MINAS GER. 590 PARA
 PERNAMBUCO 249 PIAUI
 RIO CR. S. 328 RONDONIA
 SAO PAULO 781 SERGIPE

PIAUI Total = 1319
 ACRE 3 ALAGOAS
 BAHIA 110 CEARA
 COIAS 61 GUANABARA
 MINAS GER. 180 PARA
 PERNAMBUCO 76 PIAUI
 RIO CR. S. 100 RONDONIA
 SAO PAULO 238 SERGIPE

RIO DE JAN. Total = 3558
 ACRE 8 ALAGOAS
 BAHIA 297 CEARA
 COIAS 164 GUANABARA
 MINAS GER. 485 PARA
 PERNAMBUCO 205 PIAUI
 RIO CR. S. 270 RONDONIA
 SAO PAULO 642 SERGIPE

RIO CR. N. Total = 1208
 ACRE 3 ALAGOAS
 BAHIA 101 CEARA
 COIAS 56 GUANABARA
 MINAS GER. 165 PARA
 PERNAMBUCO 70 PIAUI
 RIO CR. S. 92 RONDONIA
 SERGIPE 13

RIO CR. S. Total = 5697
 ACRE 13 ALAGOAS
 BAHIA 475 CEARA
 COIAS 262 GUANABARA
 MINAS GER. 777 PARA
 PERNAMBUCO 328 PIAUI
 RIO CR. S. 432 RONDONIA
 SAO PAULO 1029 SERGIPE

RONDONIA Total = 72
 ALAGOAS 1 AMAZONAS
 DIST. FED. 1 ESP. SANTO
 MARANHAO 3 MATO CR.
 PARAIIBA 2 PARANA

76 AMAPA
 201 DIST. FED.
 118 MARANHAO
 93 PARAIIBA
 76 RIO DE JAN.
 4 RORAIMA
 46

23 AMAPA
 61 DIST. FED.
 36 MARANHAO
 28 PARAIIBA
 23 RIO DE JAN.
 1 RORAIMA
 14

63 AMAPA
 165 DIST. FED.
 97 MARANHAO
 77 PARAIIBA
 63 RIO DE JAN.
 4 RORAIMA
 38

21 AMAPA
 56 DIST. FED.
 33 MARANHAO
 26 PARAIIBA
 21 RIO DE JAN.
 1 SANTA CAT.

101 AMAPA
 265 DIST. FED.
 155 MARANHAO
 123 PARAIIBA
 100 RIO DE JAN.
 6 RORAIMA
 60

1 BAHIA
 1 COIAS
 1 MINAS GER.
 4 PERNAMBUCO

4 AMAZONAS
 85 ESP. SANTO
 150 MATO CR.
 121 PARANA
 205 RIO CR. N.
 2 SANTA CAT.

1 AMAZONAS
 26 ESP. SANTO
 46 MATO CR.
 37 PARANA
 63 RIO CR. N.
 1 SANTA CAT.

3 AMAZONAS
 70 ESP. SANTO
 123 MATO CR.
 100 PARANA
 168 RIO CR. N.
 1 SANTA CAT.

1 AMAZONAS
 24 ESP. SANTO
 42 MATO CR.
 34 PARANA
 57 RIO CR. N.
 36 SAO PAULO

5 AMAZONAS
 112 ESP. SANTO
 198 MATO CR.
 160 PARANA
 270 RIO CR. N.
 2 SANTA CAT.

6 CEARA
 3 GUANABARA
 10 PARA
 4 PIAUI

43
 72
 55
 257
 129

13
 22
 17
 79
 21
 39

36
 59
 45
 212
 57
 106

12
 20
 15
 72
 19
 218

57
 94
 72
 339
 92
 170

3
 2
 2
 1



RIO DE JAN. 4 RIO CR. N. 1 RIO CR. S. 6 SANTA CAT. 2
 SAO PAULO 13 SERGIPE 1

RORAIMA Total = 30
 ALAGOAS 1 BAHIA 3
 ESP. SANTO 1 COIAS 1
 MINAS GER. 4 PARA 1
 PERNAMBUCO 2 PIAUI 1
 SANTA CAT. 1 SAO PAULO 5

SANTA CAT. Total = 2242
 ACRE 5 ALAGOAS 40
 BAHIA 187 CEARA 104
 GOIAS 103 GUANABARA 61
 MINAS GER. 306 PARA 48
 PERNAMBUCO 129 PIAUI 39
 RIO CR. S. 170 RONDONIA 2
 SAO PAULO 405 SERGIPE 24

SAO PAULO Total = 13559
 ACRE 30 ALAGOAS 240
 BAHIA 1131 CEARA 630
 GOIAS 624 GUANABARA 369
 MINAS GER. 1850 PARA 293
 PERNAMBUCO 781 PIAUI 238
 RIO CR. S. 1029 RONDONIA 13
 SAO PAULO 2449 SERGIPE 143

SERGIPE Total = 795
 ACRE 2 ALAGOAS 14
 BAHIA 66 CEARA 37
 GOIAS 37 GUANABARA 22
 MINAS GER. 108 PARA 17
 PERNAMBUCO 46 PIAUI 14
 RIO CR. S. 60 RONDONIA 1
 SERGIPE 8 SANTA CAT. 1

ARGENTINA Total = 3390
 ARGENTINA 3390

BOLIVIA Total = 580
 BOLIVIA 580

CHILE Total = 4710
 CHILE 4710

COLUMBIA Total = 8960
 COLUMBIA 8960

ECUADOR Total = 580
 ECUADOR 580



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ECUADOR	580
PERU	Total = 330
	PERU 330
VENEZUELA	Total = 1490
	VENEZUELA 1490

Total For Matrix = 95145



APPENDIX D

TRAFFIC SURVEY BY SATELLITE SYSTEMS ENGINEERING (SSE)

D-1 - SCOPE OF SURVEY

SSE conducted a survey to determine the demand for those data services considered most suitable for transmission via non-FSS. Services included are as follows:

1. Remote Job Entry (RJE).

This is a process by which an operator can manipulate data for a specific job from a remote site. RJE involves both manipulation of received data and transmission of the output to the originator after processing.

In the industry survey SSE found that oil and gas companies engaged in gas and oil exploration at remote sites, and institutions of higher education were most likely to use remote job entry data services.

Interviews with oil and gas exploration companies, such as Geosource/SBS Communications, Inc., Drilling Information Service Company and Schlumberger Services, indicate that these companies have different levels of operation, ranging from strictly domestic to international services to over 95 countries. However, all these companies engage in seismic data collection, manipulation and transmission of data from remote locations. Typically, data is transmitted at 4.8 to 56 kbps using transportable antennas.

Interviews with the University of Maryland and the National Technological University also revealed a need for remote job entry and time sharing data services (explained below).



The University of Maryland provides instructional services to over 50 countries. It also has 15 locations in the U.S. that provide remote job entry capability using four channels and IBM computers. The University of Maryland expressed a need for providing remote job entry capability to their overseas locations.

The National Technical University plans to offer graduate engineering courses on a national basis. The University will provide interactive timesharing entry and remote job capability to students.

2. Inquiry/Response

This service is transmitted in a real time manner through operator entered inquiries. The industry survey conducted by SSE revealed that the most common application of this service will be made by companies engaged in ticket and reservation systems, such as for airline reservations and stock exchange quotations by brokerage firms such as Piper, Jeffers and Hopward, which SSE interviewed.

3. Timesharing

This process involves the shared use of centrally located computer facilities by several operators. The computer facilities can store, manipulate and transmit data simultaneously among several users generally on a real time basis. Transmission speeds vary from 1.2 to 9.6 kbps.

SSE interviewed Milliper Corporation and Prime Computers, Inc., which provide wide area network coverage for data transmission. At present, market service is provided only to large users. However, in a recent joint venture with Vitalink, Prime Computer hopes to market capability to many users via Vitalink's earth stations.

4. Point of Sale

This will involve payments made by consumers in stores, gas stations, etc., which will automatically be entered into the banking system, rather than being made by credit cards or check. Point of sale terminals will be used for credit authorization, sales transactions and some inquiry functions.

SSE's interviews with the oil and gas company ARCO, supermarket chains such as Safeway and Kroger, and department stores such as Sears, Montgomery Ward and K-Mart, reveal that as these companies have from several thousand operating centers, they will make extensive use of point of sale data services. The minimum capability for data transmission needed is 1.8 kbps, or about 100 characters of information.

In addition to the services mentioned above, SSE found that these companies would also use point of sale terminals for regulation of inventory flow. This application will make use of separate display terminals in each store. Purchase orders will be entered into existing databases. This will allow quantities and type of merchandise to be weighed, and costs could be calculated in terms of retail sales dollars. In the future when home shopping via television becomes widespread, inquiry/response and point of sale services are expected to become integrated.

3. Videotex/Teletext/Viewdata

Videotex is a generic term which subsumes Teletext and Viewdata. Both are electronic text systems which display textual information on a video screen. These systems require a computerized data base and transmission links to provide information to the people who want it. The data



base can be alpha-numeric and/or graphic. The information can be transmitted via a telephone line or a satellite. Teletext flashes pages of text on a TV screen. The user, by punching a code, can abstract some specific information from a text. Examples of services are news, sports, weather. Viewdata is an interactive service and will allow people to access a library of information such as restaurant and movie reviews, and of airline schedules. Although Videotex is still in its infancy, its interactive capability will make it possible to have services like home banking, tele-shopping, and advertising, because this service can operate over a wide range of transmission systems, from broadcast to terrestrial lines, or two-way cable systems.

SSE's interviews with Coca-Cola and Citibank indicate that they are interested in using some Videotex systems for advertising and home banking.

6. Telemonitoring Services

This provides electronic monitoring from a central location. These services are provided by the following companies SSE interviewed:

- ADT Security and Technicomsystems provide security and alarm systems.
- National Rural Utilities will provide telemonitoring services for instant meter readings.
- Railroad companies, such as Norfolk Southern and Southern Pacific, and transportation companies, in addition to mail and package delivery companies like United Parcel Service (UPS) and Federal Express, and long haul and trucking companies such as Leaseway Transportation and Mayflower, will use monitoring services for telemetry, control and dispatch.



7. Secure Voice

SEE's interviews with firms engaged in financial transactions (Citibank--electronic funds transfer; and Piper, Jeffers and Hopward--brokerage services) revealed these companies have a need to prevent interception of messages that might divulge proprietary or sensitive information on their daily transactions. As the trend toward replacement of telephone wires (which require a physical tap) with microwave radio and/or satellite transmission become more prevalent, the need to prevent interception of data will become more urgent. Secured voice services will provide encrypted dedicated private lines.



D-2 - CONCLUSIONS

- o From among the data service categories outlined, SSE estimates that in particular inquiry-response, point of sale, and videotext/teletext data services will become more integrated. This is because of the need to provide customers with the ease of product or service selection, purchase, and adjustment of account in one simple process.

- o SSE's industry survey also indicates that a great demand exists for telemonitoring and remote job entry services in the long-haul trucking, gas and oil exploration, and railroad industries. Express mail and package delivery companies like United Parcel Service and Federal Express also demonstrated this need. From the interviews and literature survey SSE expects this demand to be satisfied most economically by mobile communications satellites.

- o With advancing technological capabilities and proliferation of computer terminals, the demand for timesharing data services will also continue to increase. However, by 1990 and 2000 SSE estimates that a greater percentage of this service will be transmitted via fiber optics because most of the traffic will be urban areas. The satellite addressable demand for this service may decrease in 1990 and 2000.



- o SSE's industry survey also reveals that as more and more information is transmitted electronically, the need for secure voice services will increase significantly. This is because of the need for companies to prevent interception of transmission of proprietary information.

- o The thrust toward the provision and control of data services from a central location, such as with point of sale and inquiry response services, will give rise to the development of regional or central systems. This means that in the future more data traffic will be long-haul.

- o It is estimated that as single cell terrestrial cellular radio systems become more numerous, the pressure for mobile services from "roamer" traffic, with the demand from companies engaged in trucking and dispatch services, will increase. This in turn will provide impetus for the provision of integrated, ubiquitous mobile services. The future trend will be for satellite mobile services to be compatible with terrestrial cellular mobile radio services.

- o SSE's review of Western Union's demand forecast and NASA's synthesis, combined with SSE's own demand estimates for data traffic based on interviews with industry experts, shows only a very slight variation in end traffic demand forecasts. SSE, therefore, considers it reasonable to accept NASA's synthesis of traffic demand forecast for the data services listed above for the years 1990 and 2000.



D-3 - LIST OF INDUSTRY SURVEY RESPONDENTS



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APPENDIX E

SATELLITE SYSTEM PROFILES

The following profiles of current and projected satellite systems were prepared by Satellite Systems Engineering (SSE). The summary is as of January 1985.



System Name: INTELSAT V MCS

Operator: COMSAT GENERAL for INMARSAT

Number of Satellites: 4 maritime communication subsystem payloads on INTELSAT V spacecraft.

Date of Launch(es): May 1983, October 1983, March 1984

Orbital Position(s): 60 & 63 East, 53 & 18.5 West

Frequencies: 1.6, 6/1.5, 5 GHz

Total Bandwidth, MHz: 15 MHz,

Number of Transponders: Two 7.5 MHz channels, capacity about 7 voice circuits per spacecraft

Services Provided: Telephony, data, facsimile, and telex between costal earth stations and ships at sea.

Probability of Operation: Already operational

Discussion:



System Name: MARISAT

Operator: COMSAT GENERAL for INMARSAT

Number of Satellites: 3 in orbit

Date of Launch(es): February, June and October 1976

Orbital Position(s): 14.5 West, 72.5 and 176.5 East

Frequencies: 1.6, 6/1.5, 5 6 GHz

Total Bandwidth, MHz: 8 MHz

Number of Transponders: 2 4-MHz wide channels

Services Provided: Maritime mobile satellite services such as telephony, data, facsimile and telex.

Probability of Operation: Already operational

Discussion: Spacecraft formed first commercial maritime mobile service system. Transponders were subsequently leased by INMARSAT. MARISAT also carries a military payload not used by INMARSAT. Capacity only one voice circuit when military payload used.



System Name: MARECS

Operator: ESA for INMARSAT

Number of Satellites: 2 in orbit

Date of Launch(es): December 1981 and November 1984

Orbital Position(s): 24.5 West and 177.5 East

Frequencies: 1.6, 6/1.5, 5 GHz

Total Bandwidth, MHz: 11 MHz

Number of Transponders: 1 5.9 MHz mode ship to shore channel, 1 shore to ship 4.75 MHz channel. Capacity about 35 voice circuits.

Services Provided: Telephony, data, facsimile and telex services between coastal earth stations and ships at sea.

Probability of Operation: Already operational

Discussion: Spacecraft were built by MESN Consortium, headed by British Aerospace and based on OTS/ECS bus.



System Name: INTELSAT

Operator: International Telecommunication
Satellite Organization

Number of Satellites: 9 in orbit over AOR, 3 in orbit over
IOR, 2 in orbit over POR. 8
INTELSAT IV and IV-A spacecraft in
orbit were built by Hughes Aircraft
Co. 5 INTELSAT V's in orbit by Ford
Aerospace. 5 additional under
construction by Ford (INTELSAT V-A
and V-B series). 5 under construc-
tion by Hughes (INTELSAT VI series).

Date of Launch(es): First INTELSAT V launched December
1980. First INTELSAT V-A in March
1985. 1986 planned for INTELSAT VI.

Orbital Position(a): 1, 3, 18.5, 21.5, 24.5, 27.5, 31.
34.5, 50 and 53 West (AOR), 57, 60
and 63 East (IOR), and 174, 177 and
179 East (POR). 66 East (IOR) and
177 (POR) currently unoccupied.
Positions include spare domestic
lease and planned international
business service location.

Frequencies: 6/4 and 14/11 GHz

Total Bandwidth, MHz: 2000-3000 (Frequency reuse)

Number of Transponders: 12 C-band (INTELSAT IV)
20 C-band (INTELSAT IV-A)
21 C-band, 6 Ku-band (INTELSAT V)
32 C-band, 6 Ku-band (INTELSAT V-A)
38 C-band, 10 Ku-band (INTELSAT VI)
per satellite in each series

Services Provided: telephone, television, teletype and
data transmission, domestic leases,
international business services,
VISTA

Probability of Operation: already operational

Discussion: INTELSAT has been providing reliable
international telecommunication
services by satellite since the
early 1960s. INTELSAT V F-4 and F-8
each carry one additional maritime
transponder used by INMARSAT.

EMPLOYMENT OF INTELSAT IV, IV-A, AND V SERIES
 SPACECRAFT IN FEBRUARY 1985,
 Before launch of first V-A spacecraft

Service Area:	AOR	AOR	AOR	AOR	AOR	AOR	AOR	AOR	AOR	AOR	AOR	AOR	AOR
Service Type:	IBS	IBS	MPI	SPARE	SPARE	PRIMARY	SPARE	MP2	SPARE	SPARE	SPARE	SPARE	SPARE
Location: (East Long.)	307	310	325.5	329	332.5	335.5	338.5	341.5	356	356	359		
Spacecraft Series:	V	IV	V	IV-A	V	V	IV-A	V	IV-A	IV-A	IV	IV	IV
Number:	F-8	F-1	F-2	F-1	F-4	F-3	F-4	F-6	F-2	F-2	F-2	F-2	F-8

Service Area:	IOR	IOR	IOR	IOR	POR	FOR	POR		
Service Type:	SPARE	PRIMARY	MP	SPARE	PRIMARY	SPARE/MP	SPARE		
Location: (East Long.)	57	60	63	66	174	177	179/180		
Spacecraft Series:	V	V	V	IV-A	IV-A	IV-A	IV-A		
Number:	F-7	F-7	F-5	F-6	F-6	F-3			

IBS = International Business Service
 MP = Major Path

NOTE: INTELSAT V-A F-10 to be positioned at 332.5, INTELSAT V F-4 to be then moved. INTELSAT V-A F-11 to be positioned at 335.5 East after launch. INTELSAT V F-3 to be moved to 307 East.

Spare position may be used for domestic lease.





System Name: CYGNUS

Operator: Cygnus Satellite Corp.

Number of Satellites: 2 in orbit and a spare planned

Date of Launch(es): 1987 planned

Orbital Position(s): 43 and 45 West requested in pending applications to FCC

Frequencies: 14/11-12 GHz

Total Bandwidth, MHz: 1000 (Frequency reuse)

Number of Transponders: 16 active 54 MHz Ku-band transponders per satellite

Services Provided: voice, video and data transmission

Probability of Operation: low/medium

Discussion: Cygnus Satellite still has to obtain authorization, secure financing and show a customer base for its proposed transatlantic services. President Reagan has determined that private international systems are in the U.S. national interest and the FCC is determining how to process these applications. After FCC approval, these systems will still face the difficulty of international coordination; i.e., with INTELSAT, and obtaining foreign PTT correspondents.

System Name: ISI

Operator: International Satellite, Inc.

Number of Satellites: 2 in orbit planned

Date of Launch(es): 1987 planned

Orbital Position(s): 56 and 58 West requested in pending application to FCC

Frequencies: 14/11-12 GHz

Total Bandwidth, MHz: 2000 (dual frequency reuse)

Number of Transponders: 32 active 54 MHz Ku-band transponders per satellite

Services Provided: video distribution, data transmission, teleconferencing

Probability of Operation: low/medium

Discussion: International Satellite still has to obtain authorization and show a customer base for its proposed transatlantic services. President Reagan has determined that private international systems are in the U.S. national interest and the FCC is determining how to process these applications. After FCC approval, these systems will still face the difficulty of international coordination; i.e., with INTELSAT, and obtaining foreign PTT correspondents.

System Name: ORION

Operator: Orion Satellite Corp.

Number of Satellites: 2 in orbit planned

Date of Launch(es): 1987 planned

Orbital Position(s): 38.5, 37 and 50 West requested in pending application to FCC

Frequencies: 14/11 GHz

Total Bandwidth, MHz 1000 (frequency reuse)

Number of Transponders: 22 active 36-MHz Ku-band transponders per satellite

Services Provided: voice, video and data transmission services for private customers

Probability of Operation: low/medium

Discussion: Orion still has to obtain authorization, secure financing, and show a customer base for its proposed transatlantic services. President Reagan has determined that private international systems are in the U.S. national interest and the FCC is determining how to process these applications. After FCC approval, these systems will still face the difficulty of international coordination; i.e., with INTELSAT, and obtaining foreign PTT correspondents.



System Name: UNISAT

Operator: United Satellites, Ltd.

Number of Satellites: 3 possibly already under construction by British Aerospace-led consortium in England

Date of Launch(es): 1986/87 planned

Orbital Position(s): 31 West authorized for broadcast services

Frequencies: 14/11-12 and 17/11/12 GHz

Total Bandwidth, MHz: 1000 (frequency reuse)

Number of Transponders: 6 active 36-MHz Ku-Band and 2 active DBS transponders per satellite

Services Provided: telephone, telex, data and direct broadcast satellite services

Probability of Operation: low/medium

Discussion: Continued funding of project unclear. On the one hand, the BBC is interested in using the DBS channels. On the other hand, opponents state that the spacecraft will be too expensive and argue for buying from a U.S. spacecraft manufacturer.



System Name: Pacific Basin Satellite System

Operator: Pacific Telecommunications Council

Number of Satellites: 1 or 2 in orbit, 1 spare

Date of Launch(es): 1987 planned

Orbital Position(s): 160 possible, 1 FRB not yet notified

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 500

Number of Transponders: 8 to 12 per satellite

Services Provided: Telephony, telegraphs, data and television distribution

Probability of Operation: Medium

Discussion: Pacific Telecommunication Council has studied satellite system. If financing can be obtained a satellite could be launched as early as 1987. systems would have to be internationally coordinated to avoid interference.



System Name: ALASCOM AURORA

Operator: Alascom, Inc.

Number of Satellites: 1 in orbit/operational, 3 more planned, including ground spare

Date of Launch(es): Oct 1982
June 1989 and Feb 1991 planned

Orbital Position(s): 143 West occupied
137 and 141 West requested pending application to FCC

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 1000 (Frequency Reuse)

Number of Transponders: 24 active 36-MHz C-band transponders

Services Provided: message toll, private line, audio and video transmission; tele-conferencing, teletext and video-text planned.

Probability of Operation: System already is operational; 60% for 3 satellites

Discussion: Alascom Inc. is owned by Pacific Telecom. The company purchased RCA Satcom V in 1982 and renamed it AURORA. The ground segment currently comprises over 190 earth stations in Alaska. ALASCOM-3 would actually be a replacement for ALASCOM-1.

90

95

LOW	1	24	1	24
HIGH	3	72	3	72



System Name: AMERICAN SATELLITE

Operator: American Satellite Company

Number of Satellites: 2 or 3 under construction by
RCA Astro-Electronics
2 advanced hybrids planned

Date of Launch(es): 1985, 1986 and 1987 planned
1989 planned for 2nd Gen.

Orbital Position(s): 81 and 128 West authorized by FCC

Frequencies: 6/4 and 14/12 GHz
also 30/20 GHz for 2nd Gen

Total Bandwidth, MHz: 1500 with partial frequency reuse
3000 for 2nd Gen.

Number of Transponders: 12 36-MHz and 6 72-MHz C-band,
6 72-MHz Ku-band for first S/C,
24 C-band, 19 Ku-band and 3 Ka-band
transponders planned for 2nd Gen.

Services Provided: voice, video and data transmission,
in particular electronic mail,
videoconferencing and computer
network services planned

Probability of Operation: Ground segment already operational
using Western Union WESTAR satellites

Discussion: American Satellite has 10 years of
operational experience and an
extensive network of earth stations
installed for its private and
government customers. The company
is owned by Fairchild Industries and
Continental Telecom and has secured
a \$300 million credit line for its
planned satellite system.



System Name: CABLESAT GENERAL

Operator: Cablesat General Corp.

Number of Satellites: 2 in orbit and a ground spare
planned

Date of Launch(es): mid-80s planned

Orbital Position(s): one position each between
60-70 and 140-150 West requested in
pending application to FCC

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 1000 (Frequency Reuse)

Number of Transponders: 24 active 36-MHz transponders
per satellite

Services Provided: television and audio broadcast,
in particular to cable networks,
experimental amateur radio

Probability of Operation: Low

Discussion: Cablesat General has received
a turnkey proposal from RCA Astro-
Electronics to build the satellites
but has yet to obtain FCC license.
Financing and customer base need
to be demonstrated.



System Name: COLUMBIA COMMUNICATIONS

Operator: Columbia Communications Corp.

Number of Satellites: 2 planned

Date of Launch(es): mid 1980s planned

Orbital Position(s): 62.5 and 147.5 West requested in pending application to FCC

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 1000 (Frequency Reuse)

Number of Transponders: 24 active 36-MHz transponders per satellite

Services Provided: transponder services

Probability of Operation: low

Discussion: Columbia Communications plans to raise the required capital for its system by selling all transponders to individual partnerships. The company has yet to demonstrate this kind of financing works.



System Name: COMSTAR C-BAND

Operator: AT&T and GTE

Number of Satellites: 3 in orbit, of which two are colocated and nearing retirement

Date of Launch(es): July 1976, June 1978 and February 1981

Orbital Position(s): 76.5, 76, and 127 West occupied

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 1000 (Frequency Reuse)

Number of Transponders: 24 active 36-MHz C-band transponders per satellite

Services Provided: telephone, telegraph, data and television transmission

Probability of Operation: Already in operation

Discussion: These satellites are to be replaced by AT&T TELSTAR and GTE SPACENET systems, respectively.



System Name: COMSTAR KU-BAND

Operator: Comsat General Corp.

Number of Satellites: 3 in orbit planned

Date of Launch(es): April 1988, August 1988 and
January 1989 planned

Orbital Position(s): 93 and 101 West requested in
pending application to FCC

Frequencies: 14/12 GHz

Total Bandwidth, MHz: 1000 (Frequency Reuse)

Number of Transponders: 16 active 54-MHz transponders
per satellite

Services Provided: video distribution, private network
and transponder services

Probability of Operation: medium

Discussion: Comsat General still has to obtain
FCC authorization for its system,
demonstrate financing and customer
base. however, if the DBS industry
continues to evolve towards medium
power satellites, and STC is delayed
further, these satellites could have
a bright future.



System Name: DCBS

Operator: Palmer Associates

Number of Satellites: 2 in orbit planned initially (Phase I)*

Date of Launch(es): 1987 planned (Phase I)

Orbital Position(s): 119 to 132 West requested in pending application to FCC

Frequencies: 30/20 and 14/12

Total Bandwidth, MHz: 2000 (frequency reuse)

Number of Transponders: 3 Ka-band, undetermined number of Ku-band

Services Provided: Television distribution, data transmission, videoconferencing probable.

Probability of Operation: low

Discussion: Customer base and financing unclear

* 2 more planned for Phase 2 and a platform planned for Phase 3.



System Name: DIGISAT

Operator: Digital Telesat, Inc.

Number of Satellites: 3 planned

Date of Launch(es): 1988, 1989 and 1991 planned

Orbital Position(s): 57 and 134 West requested in pending application to FCC

Frequencies: 6/4 and 14/12 GHz

Total Bandwidth, MHz: 1000 (Frequency Reuse)

Number of Transponders: 24 active 36-MHz C or Ku-band transponders per satellite

Services Provided: voice, video and data transmission for digital networks, in particular cellular mobile radio and paging systems

Probability of Operation: low

Discussion: Digital Telesat has to demonstrate its financing and customer base. The system design calls for co-location of a C- and Ku-band satellite at 57 West, inter-satellite links and an additional Ku-band satellite at 134 West.



System Name: EQUASTAR

Operator: Equatorial Communication
Services, Inc.

Number of Satellites: 2 operational and a spare planned

Date of Launch(es): 1987 and 1988 planned

Orbital Position(s): 93 and 122 West requested in
pending application to FCC

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 1000 (Frequency Reuse)

Number of Transponders: 24 active 36-MHz transponders
per satellite

Services Provided: data transmission between
spread spectrum networks

Probability of Operation: ground segment already operational;
medium

Discussion: Equatorial is currently leasing
transponder space on Western Union
WESTAR satellites. Equatorial still
has to demonstrate customer base and
financing for its system. Typical
example of satellite user/earth
station manufacturer wanting
to put up own satellite system.



System Name: FEDNET

Operator: Federal Express Corp.

Number of Satellites: 2 in orbit plus a ground spare
planned

Date of Launch(es): Jan. and Mar. 1988 planned

Orbital Position(s): 101 and 134 West requested in
pending application to FCC

Frequencies: 14/12 GHz

Total Bandwidth, MHz: 2000 (2x frequency reuse)

Number of Transponders: 32 active 56-MHz and
16 active 112-MHz Ku-band
transponders per satellite

Services Provided: low-speed electronic document
and data transmission to on-premise
terminals

Probability of Operation: medium/high

Discussion: Still looking for interim capacity
for its ZAP-MAIL electronic mail
service.



System Name: FORDSAT

Operator: Ford Aerospace Satellite
Services, Inc.

Number of Satellites: 3 operational planned

Date of Launch(es): 1988 planned

Orbital Position(s): 73, 93 and 101 West requested in
pending application to FCC

Frequencies: 6/4 and 14/12 GHz

Total Bandwidth, MHz: 2000 (Dual frequency reuse)

Number of Transponders: 24 36-MHz C-band and
24 36-MHz Ku-band transponders
per satellite

Services Provided: transponder services for
independent telephone companies,
intracity TDMA networks, television
distribution

Probability of Operation: low/medium

Discussion: Ford has yet to announce a customer
base, secure financing and obtain
FCC authorization. Ford argues that
economics of sale will lower its
transponder costs, interconnectivity
between C and Ku band make system
attractive to users.



System Name: GALAXY (C-BAND)

Operator: Hughes Communications
Galaxy, Inc.

Number of Satellites: 3 in orbit built by Hughes Aircraft
Co. 1 more planned for launch in 1986.

Date of Launch(es): June 1983, September 1983,
and September 1984

Orbital Position(s): 74, 93.5 and 134 West occupied
137 West requested in pending
application to FCC

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 1000

Number of Transponders: 24 active 36-MHz C-band
transponders per satellite

Services Provided: telephony (up to 2500 FDM/FM
voice channels per transponder),
television distribution (to cable
operators) and data transmission
(1.5 Mb/s and 60 Mb/s digital)

Probability of Operation: already operational

Discussion: The Hughes GALAXY system
already has several customers
for television distribution and
telephony and has implemented
an earth station network in
several major cities in the U.S.



System Name: GALAXY (KU-BAND)

Operator: Hughes Communications
Galaxy, Inc.

Number of Satellites: 3 in orbit/operational planned

Date of Launch(es): 1987 and 1988 planned

Orbital Position(s): 73, 75 and 93 West requested in
pending application to the FCC

Frequencies: 14/12 GHz

Total Bandwidth, MHz: 1000 (Frequency reuse)

Number of Transponders: 16 active Ku-band transponders
per satellite

Services Provided: telephony (up to 4000 FDM/FM
voice channels per carrier),
data transmission (1.5 Mb/s and
up to 80 Mb/s) and video dis-
tribution to cable networks

Probability of Operation: medium

Discussion: Hughes has to demonstrate
customer base and financing
for this additional system.
Their track record is good.



System Name: HUGHES KA-BAND

Operator: Hughes Communications Galaxy, Inc.

Number of Satellites: 2 in orbit planned

Date of Launch(es): 1989 planned

Orbital Position(s): 91 and 93 West requested in pending application to FCC

Frequencies: 30/20

Total Bandwidth, MHz: 2000 (frequency reuse)

Number of Transponders: 32 active 20-W Ka-band TWTA's

Services Provided: Wideband data transmission, video-conferencing

Probability of Operation: low/medium

Discussion: System still requires authorization from FCC. Problem may arise due to FCC allocation of 18 GHz band to former terrestrial 12 GHz users and new DTS applicants. Only 500 MHz of planned satellite downlink band 19.7 to 20.2 GHz currently exclusively allocated to satellite users, the rest (17.7 to 19.7 GHz) must be shared.



System Name: GSTAR

Operator: GTE Satellite Corp.

Number of Satellites: 3 built by RCA Astro-Electronics,
or in final stages of construction

Date of Launch(es): First launch planned for April 1985,
1985 to 1987 planned for later
launches

Orbital Position(s): 103 and 106 West authorized
101 West requested in pending
application to FCC

Frequencies: 14/12 GHz

Total Bandwidth, MHz: 1000 (Frequency reuse)

Number of Transponders: 16 54-MHz Ku-band transponders
per satellite

Services Provided: full transponder audio and video
services, end-to-end digital
channels and private network
services

Probability of Operation: high

Discussion: GTE has gained operational
expertise with the COMSTAR
system and the installation
of earth station networks.
However, their customer base is
unknown, and there must be doubt
about the launch of the first
satellite unless their marketing
improves.



System Name: MARTIN MARIETTA

Operator: Martin Marietta Communications
Systems, Inc.

Number of Satellites: 2 in orbit planned, plus a
ground spare

Date of Launch(es): September 1988 planned

Orbital Position(s): 73 and 75 West requested in
pending application to FCC

Frequencies: 14/12 GHz

Total Bandwidth, MHz: 1000 (Frequency reuse)

Number of Transponders: 8 54-MHz Ku-band CONUS and
10 235-MHz Ku-band SPOT
transponders per satellite

Services Provided: voice, data, facsimile, tele-
conferencing and video services

Probability of Operation: medium

Discussion: The satellite system features
frequency reuse through dual
polarization and spacial isolation
of spot beams. Martin Marietta
still needs to show its customer base.



System Name: RCA SATCOM (C-BAND)

Operator: RCA American Communications, Inc.

Number of Satellites: 5 operational, 1 more under construction RCA Astro-Electronics, 3 more planned

Date of Launch(es): March 1976, Nov. 1981, Jan. 1982, April 1983, Sept. 1983 launched; May 1986, June 1989, June 1990 and Sept. 1992 planned.

Orbital Position(s): 67, 72, 83, 131 and 139 authorized by FCC, 61, 63 and 65 West requested in pending application to FCC

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 1000 (Frequency reuse)

Number of Transponders: 24 36-MHz C-band transponders per satellite

Services Provided: telephony, telegraph, data transmission and television distribution

Probability of Operation: already operational

Discussion: RCA is a well established operator and has also installed several earth station networks



System Name: RCA SATCOM (KU-BAND)

Operator: RCA American Communications, Inc.

Number of Satellites: 3 under construction by RCA
Astro- Electronics, 3 more planned

Date of Launch(es): March 1985, Oct. 1985 and May 1987
planned for initial system,
June 1989, June 1990 and Sept. 1992
planned for follow-on spacecraft

Orbital Position(s): 67, 77 and 87 West authorized by
FCC, 61, 63 and 65 West requested
in pending application to FCC

Frequencies: 14/12 GHz

Total Bandwidth, MHz: 1000 (Frequency reuse)

Number of Transponders: 16 54-Mhz Ku-band transponders
per satellite

Services Provided: voice and data transmission,
radio and television distribution

Probability of Operation: high

Discussion: RCA is a well established
operator, experienced in the
installation of earth station
networks.



System Name: SBS

Operator: Satellite Business Systems, Inc.

Number of Satellites: 4 in orbit/operational, 2 more under construction by Hughes Aircraft Co., 3 more planned

Date of Launch(es): Nov. 1980, Sep. 1981, Nov. 1982, Sep. 1984; 1 planned for launch in 1986, 2 planned for launch in 1987, one in 1988 and 1990

Orbital Position(s): 95, 97, 99, 101 and 124 West authorized by FCC

Frequencies: 14/12 GHz

Total Bandwidth, MHz: 500-1000 (Frequency reuse)

Number of Transponders: SBS 1-4: 10 43-MHz Ku-band transponders per satellite
SBS 5: additional 4 110-MHz Ku-band transponders on each satellite
SBS 6-9: 19 43-MHz Ku-band per satellite

Services Provided: digital voice, data, facsimile and videoconferencing, television distribution transponder services

Probability of Operation: already in operation

Discussion: SBS is an established operator with an extensive earth station in place.



System Name: SPACENET

Operator: GTE Spacenet Corp.

Number of Satellites: 3 built by RCA Astro-Electronics

Date of Launch(es): May 1984 launched; Nov. 1984,
March 1985 and 1986 planned

Orbital Position(s): 69, 91 and 120 West authorized
by FCC, 101 West requested in
pending application to FCC

Frequencies: 6/4 and 14/12 GHz

Total Bandwidth, MHz: 1500 (Partial frequency reuse)

Number of Transponders: 12 36-MHz and 6 72-MHz C-band
and 6 72-MHz Ku-band transponders
per satellite

Services Provided: SPRINT voice and data transmission,
switched and private line services

Probability of Operation: already operational

Discussion: GTE is a well-established operator
and its affiliate GTE Spacenet owns
the SPRINT earth station network,
which will use space segment on
SPACENET.



System Name: SPOTNET (C-BAND)

Operator: National Exchange, Inc.

Number of Satellites: 3 planned (2 in orbit
and a spare)

Date of Launch(es): 1987 planned

Orbital Position(s): 75 & 101 West

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 1000 (Frequency reuse)

Number of Transponders: 24 36-MHz C-band transponders
per satellite

Services Provided: high density point-to-point
trunking, broadcast audio and
video services, teleconferencing

Probability of Operation: low

Discussion: National Exchange still has to
demonstrate it can secure financing
and show a customer base.



System Name: SPOTNET (KU-BAND)

Operator: National Exchange, Inc.

Number of Satellites: 4 planned (2 colocated
pairs in orbit)

Date of Launch(es): 1987 planned

Orbital Position(s): 75 and 101 West requested in
pending application to FCC

Frequencies: 14/12 GHz

Total Bandwidth, MHz: 1000 (Frequency reuse)

Number of Transponders: 24 active 36-MHz transponders
per satellite

Services Provided: electronic mail, videoconferencing,
teletext

Probability of Operation: low

Discussion: National Exchange has yet to
demonstrate it has secured
financing and show a customer
base.



System Name: TELSTAR

Operator: American Telephone and Telegraph Co.

Number of Satellites: 2 in orbit/operational, 2 more under construction by Hughes

Date of Launch(es): July 1983 and Sep. 1984;
May 1985 and mid-1988 planned

Orbital Position(s): 76, 88.5 and 96 authorized by FCC, 127 West requested in pending application to FCC

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 1000 (Frequency reuse)

Number of Transponders: 24 active 36-MHz C-band transponders per satellite

Services Provided: SKYNET audio and television broadcast, 1.5 Mb/s data transmission, transponder lease, up to 3900 voice channels per transponder

Probability of Operation: already operational

Discussion: AT&T is a well-established operator servicing an extensive earth station network.



System Name: USAT

Operator: U.S. Satellite Systems, Inc.

Number of Satellites: 2 possibly already under construction by Hughes, 3 more planned, including ground spare

Date of Launch(es): Nov. 1986, March 1987, 2 in 1988/89 planned

Orbital Position(s): 73 and 83 West requested in pending application to FCC

Frequencies: 14/12 GHz

Total Bandwidth, MHz: 1000 (Frequency reuse)

Number of Transponders: 20 active 43-MHz Ku-band transponders per satellite

Services Provided: digital voice, data and video satellite transmission services

Probability of Operation: medium

Discussion: U.S. Satellite Systems has reportedly secured \$23 million, but has yet to show a customer base. In 1985, the FCC rescinded the conditional construction permit for the first two spacecraft. The other applications are still pending.



System Name: WESTAR (C-BAND)

Operator: Western Union Telegraph Co.

Number of Satellites: 4 in orbit/operational, a total of 7 in orbit planned

Date of Launch(es): Oct. 1974, Aug. 1979, Feb. 1982 and June 1982; additional launches planned in 1985, 1988, 1989

Orbital Position(s): 79, 91, 99 & 123 West occupied 87, 93 and 130 West requested in pending application to FCC

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 500-1000 (Frequency reuse)

Number of Transponders: Westar II & III: 12 active 36-MHz C-band transponders per satellite, all others 24 active C-band transponders

Services Provided: telephony, telegraph, data transmission, television distribution

Probability of Operation: already operational

Discussion: Western Union is a well-established operator with several customers and serves an extensive earth station network. It should be noted that Western Union's supply of available transponders will get a major boost when ASC switches over their dedicated system.



System Name: WESTAR (KU-BAND)

Operator: Western Union Telegraph Company

Number of Satellites: 3 in orbit planned

Date of Launch(es): 2 in 1988, 1 in 1989

Orbital Position(s): 87, 91 and 93 West requested in pending application to the FCC

Frequencies: 14/12 GHz

Total Bandwidth, MHz: 1000 (Frequency reuse)

Number of Transponders: 16 active 54-MHz Ku-band transponders per satellite

Services Provided: transponder lease for audio and video distribution, TELEX, TWX

Probability of Operation: medium

Discussion: Western Union is a well-established operator with several customers. However, the customer base for this Ku-band system remains unknown.



System Name: DBSC

Operator: Direct Broadcast Satellite Corporation

Number of Satellites: 2 or 3 to be built by Ford Aerospace & Communications Co.

Date of Launch(es): 1988 planned

Orbital Position(s): 101, 148 West requested, but not yet authorized by the FCC.

Frequencies: 17/12 GHz

Total Bandwidth, MHz: 1000

Number of Transponders: 6 active 2000 W. 1/2 CONUS and 12 active 45 W. spot beams

Services Provided: Direct broadcast satellite services, such as television, stereo broadcast, HDTV

Probability of Operation: low/medium

Discussion: DBSC still has to demonstrate a customer base. A \$177 million contract has been signed with Ford Aerospace, and timely payments are being made.

System Name: DVSS

Operator: Dominion Video Satellite Systems,
Inc.

Number of Satellites: 2 in orbit and 1 spare planned

Date of Launch(es): 1987 planned

Orbital Position(s): 119 West authorized

Frequencies: 17/12 GHz

Total Bandwidth, MHz: 500

Number of Transponders: 4 active 230 W. TWTA's

Services Provided: Direct broadcast satellite services
such as television and radio
broadcasting

Probability of Operation: low/medium

Discussion: Company has met due diligence and
signed contract with Hughes
Aircraft Co. for construction of
satellites based on HS-394 bus.
System cost is estimated at \$250
million. Satellites will have to
be co-located in orbit at 119 West
or other orbital position obtained
from FCC.



System Name: RCA-DBS

Operator: RCA American Communications

Number of Satellites: 2 in orbit planned

Date of Launch(es): late 1989 planned

Orbital Position(s): to be determined

Frequencies: 17/12 GHz

Total Bandwidth, MHz: 1000

Number of Transponders: 16 100 W. Transponders

Services Provided: Direct broadcast satellite services
such as HDTV, videotext

Probability of Operation: low/medium

Discussion: RCA has postponed its original plan
to provide DBS service in the mid-
80's.



System Name: STC-DBS

Operator: Satellite Television Corporation

Number of Satellites: 2 under construction by RCA Astro-Electronics

Date of Launch(es): 1986 planned

Orbital Position(s): 101 West authorized by FCC

Frequencies: 17/12 GHz

Total Bandwidth, MHz: 500

Number of Transponders: 3 active 200 W. TWTAs

Services Provided: Direct broadcast satellite services such as television and sound distribution, HDTV

Probability of Operation: low/medium

Discussion: COMSAT has reportedly "abandoned" project, status of satellites unclear.



System Name: USSB-DBS

Operator: U.S. Satellite Broadcasting Co.

Number of Satellites: 2 in orbit and 1 spare to be built
by RCA Astro-Electronics

Date of Launch(es): 1988 planned

Orbital Position(s): 10 and 148 West authorized by FCC

Frequencies: 17/12 GHz

Total Bandwidth, MHz: 500

Number of Transponders: 6 active 200 W. TWTA's

Services Provided: Direct broadcast satellite services
such as television and stereo
broadcast, HDTV

Probability of Operation: low/medium

Discussion: USSB has met FCC due diligence
requirement and signed \$100 - 150
million contract with RCA to build
satellites.



System Name: HUGHES-DBS

Operator: Hughes Communications Galaxy, Inc.

Number of Satellites: 2 in orbit planned

Date of Launch(es): 1989 and 1990 planned

Orbital Position(s): 119 West requested pending FCC authorization

Frequencies: 17/12 GHz

Total Bandwidth, MHz: 1000

Number of Transponders: 16 active 100 W. TWTA's

Services Provided: Direct broadcast satellite services such as television, voice and data transmissions, teleconferencing

Probability of Operation: low/medium

Discussion: Construction permit by FCC (2nd round DBS applicant). Design uses HS-394 bus.



System Name: NCN-DBS

Operator: National Christian Network

Number of Satellites: 2 in orbit and 1 spare planned

Date of Launch(es): 1987/88 planned

Orbital Position(s): 101, 148 West requested pending FCC authorization

Frequencies: 17/12 GHz

Total Bandwidth, MHz: 500

Number of Transponders: 6 active 230 W. TWTA's

Services Provided: Direct broadcast satellite services such as television program distribution.

Probability of Operation: low/medium

Discussion: Construction permit granted by FCC. (2nd round DBS applicant).

System Name: SDT-DBS

Operator: Satellite Development Trust

Number of Satellites: 3 including in orbit spare planned

Date of Launch(es): 1987 planned

Orbital Position(s): 61.5, 148 West requested pending
FCC authorization

Frequencies: 17/12 GHz

Total Bandwidth, MHz: 1000

Number of Transponders: 16 active 50 W. TWTA's

Services Provided: Direct broadcast satellite services
such as television distribution

Probability of Operation: low/medium

Discussion: Construction permit granted by FCC.
(2nd round DBS applicant).
Applicant design based on HS-393
bus. Customer base and financing
must be demonstrated (due
diligence).



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System Name: SSS-DBS

Operator: Satellite Syndicated Systems, Inc.

Number of Satellites: 2 in orbit and a spare planned

Date of Launch(es): 1989 planned

Orbital Position(s): 101, 148 West requested

Frequencies: 17/12 GHz

Total Bandwidth, MHz: 500

Number of Transponders: 6 active 230 W. TWTA's

Services Provided: Direct broadcast satellite services
such as television, voice and data.

Probability of Operation: low/medium

Discussion: Construction permit granted by FCC.
(2nd round DBS applicant).
Customer base and financing must be
demonstrated (due diligence).



System Name: NEX-DBS

Operator: National Exchange, Inc.

Number of Satellites: 2 planned

Date of Launch(es): 1988 and 1990 planned

Orbital Position(s): 101 West requested pending FCC authorization

Frequencies: 17/12 GHz

Total Bandwidth, MHz: 1000

Number of Transponders: 16 active 50 W. TWTA's

Services Provided: Direct broadcast satellite services such as television program distribution and data transmission.

Probability of Operation: low/medium

Discussion: Construction permit awarded by FCC. Customer base and financing must be demonstrated (due diligence).



System Name: ACC-DBS

Operator: Advanced Communciations Corporation

Number of Satellites: 3 including in orbit spare planned

Date of Launch(es): 1987 and 1988 planned

Orbital Position(s): 101 and 148 West requested pending
FCC authorization

Frequencies: 17/12 GHz

Total Bandwidth, MHz: 500

Number of Transponders: 6 active 200 W. TWTA's

Services Provided: Direct broadcast satellite services
such as television program
distribution

Probability of Operation: low/medium

Discussion: Conditional construction permit
authorized by FCC. Customer base
an financing must be demonstrated
(due diligence).



System Name: GEOSTAR

Operator: Geostar Corporation

Number of Satellites: 3 in orbit planned

Date of Launch(es): 1987 planned

Orbital Position(s): 70, 100, 130 West requested pending
FCC authorization

Frequencies: 1.6 GHz/ 2.5 GHz, and 5/6 GHz

Total Bandwidth, MHz: 160 MHz

Number of Transponders: 10 16 MHz wide channels

Services Provided: Radiodetermination services, e.g.
position location and ancillary
voice and message services.

Probability of Operation: low/medium

Discussion: Geostar still has to obtain FCC
authorization, find customers,
provide earth station networks and
space segment.



System Name: MOBILSAT

Operator: Mobile Satellite Corp.

Number of Satellites: 2 in orbit plus a ground spare
planned

Date of Launch(es): 1987 and 1988 planned

Orbital Position(s): 85 and 125 West requested in pending
application to FCC

Frequencies: 1.6/1.5 and 14/12 GHz and UHF

Total Bandwidth, MHz: 20 MHz required at UHF,
30 MHz at L-band and
360 MHz at Ku-band

Number of Transponders: 1 UHF, 1 L-band and 2 Ku-band
transponders per satellite

Services Provided: experimental land and aeronautical
mobile voice communications, inter-
exchange trunking

Probability of Operation: low/medium

Discussion: Mobile Satellite Corp. still
has to secure financing, show
a customer base and obtain
FCC authorization.



System Name: SKYLINK

Operator: Skylink Corporation

Number of Satellites: 2 to 3 in orbit planned

Date of Launch(es): 1987 planned

Orbital Position(s): 75, 105 and 135 West requested in pending application to FCC

Frequencies: 800 MHz band

Total Bandwidth, MHz:

Number of Transponders: 4

Services Provided: Land mobile radio communications in rural areas

Probability of Operation: low/medium

Discussion: This system is similar to proposed Canadian M-SAT system.



System Name: OMNINET

Operator: Omninet Corporation

Number of Satellites: 1 - 2 in orbit planned

Date of Launch(es): N.D.

Orbital Position(s): N.D.

Frequencies: 800/900 MHz, 1.6/1.5 and 14/12 GHz

Total Bandwidth, MHz: > 500 probable

Number of Transponders: N.D.

Services Provided: Land mobile radio communications

Probability of Operation: low/medium

Discussion: Company has not yet filed application to FCC



System Name: ANIK D (C-BAND)

Operator: Telesat Canada

Number of Satellites: 2 built by Hughes Aircraft Co. together with Spar Aerospace of Canada.

Date of Launch(es): August 1982 and November 1984

Orbital Position(s): 104.5 and 111.5 West

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 1000 (Frequency Reuse)

Number of Transponders: 24 active 36-MHz C-Band transponders

Services Provided: telephony, telegraph, data television transmission

Probability of Operation: Already in operation

Discussion: Government owned, several customers, established earth station network. Next generation likely around 1990, with 3-4 planned. 2nd ANIK O is in storage orbit.



System Name: ANIK C (KU-BAND)

Operator: Telesat Canada

Number of Satellites: 3 built by Hughes Aircraft Co. together with Spar Aerospace of Canada

Date of Launch(es): November 1982, June 1983
1985 planned

Orbital Position(s): 105, & 117.5 West occupied, 109 West planned

Frequencies: 14/12 GHz

Total Bandwidth, MHz: 1000 (Frequency Reuse)

Number of Transponders: 16 active 54-MHz Ku-band transponders per satellite

Services Provided: telephony, telegraph, data and video transmission, including low-power DBS

Probability of Operation: already in operation

Discussion: Government owned system with several customers and already established earth station network. Due to apparent overplanning ANIK C-1, scheduled for launch in February 1985, is up for sale. Telesat says they have no need for any capacity on the satellite. Spacecraft to be launched are placed into storage orbit.



System Name: Argentine Satellite System

Operator: Argentine Government

Number of Satellites: 1 or 2 in orbit planned

Date of Launch(es): late 80's/early 90's possible

Orbital Position(s): N.D.

Frequencies: 6/4 and/or 14/12 GHz

Total Bandwidth, MHz: 1000 MHz (frequency reuse)

Number of Transponders: N.D.

Services Provided: Telephony, data transmission,
television distribution

Probability of Operation: low/medium

Discussion: System is under study by Argentine
Space Agency. Funding as yet
unclear, Argentina has an
established earth station network
and leases transponders from
INTELSAT.



System Name: Andean Satellite System

Operator: ASETA

Number of Satellites: 1 or 2 planned

Date of Launch(es): 1989 planned

Orbital Position(s): 60 to 75 West

Frequencies: 6/4 GHz

Total Bandwidth, MHz: 500 to 1000

Number of Transponders: 12 to 24

Services Provided: Telephony, telegraph, data transmission, television distribution

Probability of Operation: low/medium

Discussion: This system has also been studied for a long time. After Columbia rejected the bids for proposal for a dedicated national satellite, it revived the then dormant ASETA program.



System Name: MORELOS

Operator: Mexican Government

Number of Satellites: 2 built or under final construction
by Hughes Aircraft Company

Date of Launch(es): June and September 1985 planned

Orbital Position(s): 113.5 and 116.5 West planned

Frequencies: 6/4 and 14/12 GHz

Total Bandwidth, MHz: 1500 (Partial frequency reuse)

Number of Transponders: 12 36-MHz and 6 72-MHz C-band,
and 4 108-MHz Ku-band transponders
per satellite

Services Provided: television distribution, telephony
and data transmission

Probability of Operation: high

Discussion: Mexico already has an extensive
earth station network in operation
and is using transponders leased
from INTELSAT for television
distribution.



System Name: PANAMSAT

Operator: Pan American Satellite Corp.

Number of Satellites: 1 in orbit and a spare planned

Date of Launch(es): 1987 planned

Orbital Position(s): 57 West requested in pending application to the FCC

Frequencies: 6/12 and 6/4 GHz

Total Bandwidth, MHz: 2000 (dual frequency reuse)

Number of Transponders: 12 active 72-MHz C/Ku-band and 24 active 36-MHz C-band transponders per satellite

Services Provided: Audio and video distribution between eastern U.S. (N.Y. and Miami) and the Carribbean, Central and South America, as well as intra-regional traffic in South and Central America.

Probability of Operation: low/medium

Discussion: Pan American Satellite still has to obtain authorization, must coordinate with INTELSAT, secure financing and demonstrate a customer base which would involve at least bilateral agreements. Recent INTELSAT decision to provide better Latin American coverage on advanced INTELSAT V spacecraft may detract potential customers.



System Name: SATCOL

Operator: Colombian Government

Number of Satellites: 2 to 3 planned

Date of Launch(es): late 1980s planned

Orbital Position(s): 76 and 75.4 West planned

Frequencies: 6/4 GHz (possibly also 14/12 GHz)

Total Bandwidth, MHz: 1000-1500 (Frequency reuse)

Number of Transponders: 24 36-MHz C-band transponders per satellite probable, possibly also some Ku-band transponders

Services Provided: telephony, television distribution, data transmission

Probability of Operation: low

Discussion: Program has experienced several delays. Colombia is currently leasing transponders from INTELSAT and has an earth station network for domestic services. Program may have been temporarily filed while ASETA or CONDOR project is pursued, as had been done in the past. See ASETA.



System Name: SBTS

Operator: Brazilian Government

Number of Satellites: 2 built by Spar Aerospace, Canada
with Hughes Aircraft Co.

Date of Launch(es): February 1985. Second launch
planned for August 1985.

Orbital Position(s): 65 West occupied, 60 West planned

Frequencies: 6/4 GHz

Total Bandwidth, MBz: 1000 (Frequency reuse)

Number of Transponders: 24 active 36-MHz C-band
transponders per satellite

Services Provided: telephone, telegraph and
data transmission, television
distribution

Probability of Operation: high

Discussion: Brazil is already leasing
several transponders from
INTELSAT and has an extensive
earth station network in place.



APPENDIX F

U.S. EARTH STATION POPULATION

The material for this appendix was prepared by the
Satellite Systems Engineering (SSE).



F-1 INTRODUCTION

The following report offers various data (quantities, characteristics, distribution etc.) on the current population of earth station in the U.S.

The report is divided into three sections: Section 1 analyses the total earth station population, both licensed and unlicensed, by type, size and geographical distribution; Section 2 gives more detail on the Receive Only (RO) earth stations; and Section 3 looks at the Transmit Receive (T/R) earth stations.

This analysis is based on a combination of sources: in-house data at SSE; contacts with satellite system operators and resellers, trade associations, industry periodicals and consultants, and users; and extensive use of the FCC data base of licensed earth stations.

As the population of earth stations is growing at a very rapid pace, this analysis is somewhat superficial, and should serve as a general overview of the industry, rather than as an in-depth study. The estimation of "backyard TVRO's" is especially approximate, and the range of guesses as to the installed base varies from 300,000 - 700,000.



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F-2 - TOTAL EARTH STATION POPULATION



CHART 1

Total Earth Station Population

(By Service)

		<u>Licensed</u>	<u>Unlicensed</u>	<u>Total</u>
Receive Only	TVRO	5707	506,793 ¹	512,500
	Audio/Data RO	710	5890	6,600
Transmit/ Receive	Carrier (i.e. shared use)	575		575
	Dedicated (On Premise)	615		615
Other		98		98
TOTALS		<u>7705</u>	<u>512,683¹</u>	<u>520,388</u>

1. Of this seemingly 'exact' number, 500,000 are unlicensed backyard TVRO's and represent a very approximate estimate.



ASSUMPTIONS

(for Chart 1)

- o Data on the licensed earth stations comes from the Facilities and Services Division of the FCC's Common Carrier Bureau, July 1984.
- o Data on the unlicensed earth stations comes from a variety of sources listed in the following charts on the specific services.
- o The numbers on unlicensed TVRO's are approximate at best as this industry is very loosely structured and growing fast.
- o All transmitting earth stations are licensed.
- o 90% of all T/R's operating in Alaska are owned by Alascom and are shared usage carriers. Very few T/R's in either Alaska or Hawaii are for private, dedicated use.

SOURCES: See all sources referenced in the following charts.



CHART 2-A

LICENSED EARTH STATIONS IN THE CONUS

(By Type & Region)

REGION	Audio R/O	TVRO	T/R	Other	Total
EASTERN	289	2,337	393	41	3,060
CENTRAL	277	2,245	264	18	2,804
ROCKY MTN.	55	449	77	11	592
WESTERN	78	635	208	23	944
TOTAL	699	5,666	942	93	7,400

CHART 2-B

LICENSED EARTH STATIONS IN ALASKA & HAWAII

	Audio R/O	TVRO	T/R	Other	Total
ALASKA	9	30	235	2	276
HAWAII	2	11	13	3	29
TOTAL	11	41	248	5	305



ASSUMPTIONS

(for Chart 2)

- o The East Coast has the heaviest percentage (41%) of all types of licensed earth stations, followed by the central region with 38%. Together, the Rocky Mountain and West Coast areas have 21% of all the licensed earth stations in the Continental U.S.
- o In Alaska, because of the large number of earth stations in the Alascom network, there is a much higher percentage of T/R's to RO's than in the CONUS.
- o Also, while the licensed earth stations include all the Transmit/Receive earth stations, they are only a very small percent at the Receive Only earth stations. See Section 2 for further on RO's.
- o The "Other" category consists of earth stations listed at the FCC but with no information on sizes, being a combination of developmental, temporary or earth stations in place since before 1978, when the FCC first asked for such details in license applications.

SOURCES: FCC Common Carrier Bureau;
Earth Station Application Lists.



CHART 3-A

LICENSED EARTH STATIONS IN THE CONUS

(BY TYPE & SIZE)

	TVRO	Audio RO	T/R	Other	Total
under 3.5 m.	188	612	--	26	826
3.6 - 7.0 m.	4,984	87	389	40	5,500
over 7.0 m.	494	--	553	27	1,074
TOTAL	5,666	699	942	93	7,400

CHART 3-B

LICENSED EARTH STATIONS IN ALASKA & HAWAII

(BY TYPE AND SIZE)

	TVRO	Audio RO	T/R	Other	Total
under 3.5 m.	3	--	22	1	26
3.6 - 7.0 m.	18	9	205	2	234
over 7.0 m.	20	2	21	2	45
TOTAL	41	11	248	5	305

"--" = less than 1% of the total.



ASSUMPTIONS

(for Chart 3)

- o Please note that because of the very small look angle in Alaska, combined with the problem of being outside the foot print of many of the satellites, the size of the antennas is much larger on the average than for the CONUS earth stations.
- o Also, while the licensed earth stations include all the Transmit/Receive earth stations, they are only a very small percent at the Receive Only earth stations. See Section 2 for further on RO's.
- o The "Other" category consists of earth stations listed at the FCC but with no information on sizes, being a combination of developmental, temporary or earth stations in place since before 1978, when the FCC first asked for such details in license applications.

SOURCES: FCC Common Carrier Bureau,
Earth Station Application Lists.



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F-3 - RECEIVE ONLY EARTH STATION POPULATION



CHART 4

RECEIVE ONLY EARTH STATION TOTALS

(LICENSED AND UNLICENSED)

COMMERCIAL TVRO'S	12,500
AUDIO RO'S	6,600
BACKYARD TVRO'S	500,000



ASSUMPTIONS

(for Chart 4)

- o The category of "Commercial TVRO's" includes the services of Broadcast TV (including networks, independent stations and public broadcasting stations), Cable TV, SMATV (Private Cable), Low power TV, Subscription TV, MDS and Videoconferencing. See Chart 5 for further information on these services.

- o The category of "Audio RO's" includes radio and data services, which are further broken down in Chart 6.

- o "Backyard TVRO's" while mainly those dishes privately owned, also include some commercial ownership such as motels, bars, trailer parks and a few apartment buildings. See Chart 7 for more detail.

SOURCES: See the sources given for the following three charts.

CHART 5

TVRO's

Type	Total #	3.5 m.	3.6-7.0 m.	7.1 m.
<u>Broadcast TV</u>				
Networks & Independents:	900	18	810	72
PBS:	195	--	18	177
<u>Cable TV:</u>	8,500	170	7,650	680
<u>SMATV:</u> (Private Cable)	1,500	1,125	375	--
<u>MDS:</u>	250	----- Do not know -----		
<u>LPTV:</u>	150	----- Do not know -----		
<u>STV:</u>	150	----- Do not know -----		
<u>Videoconferencing:</u>	750	----- 750 -----		
TOTAL =	12,500			

C-3



ASSUMPTIONS

(for Chart 5)

BROADCAST TV:

(Commercial Networks & Independents:)

- o As of August 6, 1984, out of 880 commercial TV stations, approximately 65% have 1 earth station; 30% have 2 earth stations, and a further 5% have 3 or more.

We estimate the total number to be approximately 900 earth stations.

(Public Broadcasting Systems:)

- o There are approximately 195 PBS affiliates, with each one having 1 earth station. There are 7 uplinks (T/R) in the network.

SOURCES: Robert Wold Company;
TV Fact Book (TV Week, Publishers);
American Broadcasting Company;
Columbia Broadcasting System;
National Broadcasting Company;
Public Broadcasting System.

CABLE:

- o There are an estimated 6,300 total cable systems in the U.S., (all with earth stations), and accounting for the small percent that have more than 1 earth station, there are a total of 8,500 dishes, as of August, 1984.
- o As far as which satellites are being looked at by the dishes, the following numbers have been suggested by the NCTA:

SATCOM III R:	approx. 7,600
SATCOM IV:	approx. 1,117
COMSTAR D IV:	approx. 120
WESTAR V:	approx. 641
GALAXY I:	approx. 1,747

These numbers are estimated from which programs are being watched (according to programmer's data). Because several programs are carried on more than one satellite, and because many earth stations have actuators enabling them to change direction easily, these numbers are illustrative only.

(Chart 5 Assumptions Cont'd)

SOURCES: National Cable Television Association;
TV Fact Book (TV Week, Publishers);
Society for Private and Commercial Earth Stations
(SPACE)

SMATV: ("Private Cable")

- o As of August 1984, the number of households passed by Private Cable systems is nearly 1 million, with an estimated 300,000 subscribers. Of the known Private Cable systems, each one has its own earth station, but very few, if any, have more than one dish. This makes the estimated number of systems (1,500) a fair approximation of the number of earth stations.
- o Because the Private Cable systems are constructed for the least possible cost, 75% of them are smaller than 3.5 meters in diameter.

SOURCES: National Satellite Cable Association;
Society for Private and Commercial Earth Stations
(SPACE).

MULTIPOINT DISTRIBUTION SYSTEMS (MDS):

- o While the number of MDS operating systems is approximately 300, the number of earth stations in use is estimated to be around 250, with some use of microwave relays for program delivery.

SOURCES: Richard Vega and Associates;
MDS Trade Association;
COMBAND Communications.

LOW POWER TV (LPTV):

- o As in MDS, the number of earth stations estimated to be used by LPTV Systems (150) is lower than the total estimated systems (400). In Alaska, where there are approximately 200 LPTV stations, distribution is mainly by microwave; and in CONUS, a number of LPTV stations generate their own programs.

SOURCES: LPTV Association;
Global Village Research Group.



(Chart 5 Assumptions Cont'd)

SUBSCRIPTION TV (STV):

- o The approximate number of STV systems in operation as of August, 1984 is 150, with one dish per system.

SOURCES: STV Association;
Richard Vega Associates.

VIDEOCONFERENCING:

- o The largest videoconferencing network is the HI-Net network with approximately 350 4.6 m. earth stations. Other include PSSC, Hilton, Satellite Age and many others.

SOURCES: HI-Net Network
Robert Wold & Associates;
PSSC;
1984 Satellite Directory



CHART 6

AUDIO RO'S

<u>SERVICE</u>	<u>TOTAL</u>
UPI, AP	1,650
NPR, Mutual, State Radios	2,350
ABC, CBS, NBC, RKO	2,100
MUZAC, Bonneville, Reuters, Commodity Reports	500
TOTAL	6,600



ASSUMPTIONS

(for Chart 6)

Audio/Data:

- o There are approximately 710 licensed audio/data receive only earth stations, and another 5,890 unlicensed earth stations. The type of service and satellite used is as follows:

WESTAR III, XPONDER 1: UPI = ~750 E.S.
AP = ~900 E.S.

WESTAR III, XPONDER 2: State Radio = ~1,300 E.S.

WESTAR IV, XPONDERS 1+2: NPR = ~250 E.S.

SATCOM IR : ABC, CBS, NBC
RKO = ~2,100 E.S.

VARIOUS SATELLITES : MUZAC, BONNEVILLE, = ~500 E.S.
REUTERS, COMMODITY REPORT etc.

- o The NPR earth stations are all 4.5 m. (18 uplinks and the rest downlinks only; the AP and UPI earth station are in the 3.0 m. range, and 90% of the remaining earth stations are in the 2.5 m. - 3.5 m. range.

SOURCES: Satellite Audio Report;
National Public Radio.



CHART 7

BACKYARD TVRO'S

	Under 3.5 m.	3.6-7.0 m.	Total
Commercial	60,000	15,000	75,000
Private	403,750	21,250	425,000

ASSUMPTIONS

(for Chart 7)

Backyard TVRO's:

- o There are an estimated 400,000 - 500,000 backyard TVRO's, with the number growing daily. Of these, 80-85% are for "backyard" use only i.e., for personal use, and the remaining 15-20% are situated at hotel/motels, bars, trailer parks and those apartments and condominiums who choose to stay out of the "legitimate" SMATV industry.

- o Note that approximately 20-25% of all Backyard TVRO's have an actuators, and that nearly half of all TVRO's being sold currently are sold with actuators. This means that the satellite direction of the dish can be changed by the push of a button, making an estimate of which satellites are being looked at nearly incalculable.

SOURCES: Society for Private & Commercial Earth Stations
(Space)
Satellite Television Technologies, Inc.
Brown & Finn Law Firm;
Satellite Dish Magazine;
Coop's Satellite Digest.



F-4 - TRANSMIT/RECEIVE EARTH STATION POPULATION



CHART 8

Transmit/Receive Earth Station
Shared Usage Only

SBS	Amsat	W.U	RCA	Carriers		AT&T	Hughes	Total
				GTE	Spacenet			
22	12	20	20	14	11	23	10	132

Voice & Data Resellers

Cylix	ISACOMM	Equatorial	Vitalink	Others	Total
35	23	5	5	50	118

Video Resellers (incl. videoconf.)

Wold	Bonneville	Hughes	Netcom	Others	Total
15	10	10	15	50	100

Grand Total = 350



ASSUMPTIONS

(for Chart 8)

- o All data is for CONUS only; the Alaska T/R earth stations are mostly Alascom and Alaska Bush networks.
- o The number of earth stations for the carriers represents each carrier's backbone network and includes multiple earth stations at single locations. Virtually all of these earth stations are larger than 7.0 m. (most are in the 10-13 m. range).
- o While Cylix and ISACOMM are the largest of the nationwide voice and data resellers, there are a number of regional networks (e.g., TCI, Western Telecommunications, etc.)
- o The four companies named as video resellers, e.g., WOLD, Bonneville, Hughes and Netcom, make their living from a combination of part-time uplinking for the TV networks and from videoconferencing. In addition, there are a number of regional companies owning a few uplinks for videoconferencing purposes only.

SOURCES: Direct contacts with carriers and resellers;
1984 Satellite Director (Phillips Publishing)
Satellite Marketing Digest.



CHART 9

Transmit/Receive Earth Station
Private Dedicated Use

Carrier Owned ES

<u>SBS</u>	<u>Amsat</u>	<u>Others</u>	<u>Total</u>
110	250	30	390

Reseller Owned ES

<u>Equat.</u>	<u>Vitalink</u>	<u>Others</u>	<u>Total</u>
10	10	10	30

Privately Owned ES

<u>Cable TV</u>	<u>Broadcast TV</u>	<u>Corp. Nets</u>	<u>Total</u>
100	30	20	170

Grand Total = 590



ASSUMPTIONS

(for Chart 9)

- o All data is for CONUS only; the Alaska T/R earth stations are mostly Alascom and Alaska bush networks.
- o The carrier-owned earth stations are those earth stations situated on customer premises for a customer's dedicated usage, but owned by the carrier and sold as a total package with the satellite capacity. The great majority of dedicated corporate networks fall into this category. Examples include Hercules, Inc. (10 sites - SBS); Gannet (15 sites - Amerisat); Traveller's Insurance (4 sites - Amerisat) and many others.
- o Vitalink and Equatorial in the next few months will greatly expand their business with recent FCC approval of their respective types of cheap low speed earth stations.
- o Most of the cable and broadcast industry uplinks are located in either California or New York. The 3 television networks are in the midst of going to an all satellite delivery system and will increase the number of T/R earth stations at their disposal.
- o As mentioned previously, virtually all the present private corporate networks have carrier owned earth stations on premises. Two examples of exception to this are Federal Express and Citicorp. This category will grow dramatically with the deregulation of the satellite industry and the dramatically decreasing costs in small, low-speed T/R earth stations.

SOURCES: FCC Common Carrier Bureau
Satellite Marketing Digest
Satellite Directory
Trade Publications
Direct Contacts with carriers, resellers and users.



APPENDIX G

PAYLOAD DETAILS FOR SCENARIO II

G-1 - KA-BAND FSS PAYLOAD

The total trunking digital voice and video conferencing forecasts were scaled by factor of .15 (N=6.7 satellites), and the traffic assigned to both the fixed and scan beams - the resulting Beam to Beam Matrix is included in this appendix. Abbreviations, such as "FX1" or "SCN3" are used to denote each beam. The "class" (KATRK) is used by the SNIPS programs to identify different traffic classes - in this case there was only one.

Also included is the corresponding transponder loading. Each line represents one transponder, identified by a Beam (FX1) and a channel(H-1). The code used for channel identifies is H/V for horizontal/vertical, first digit is the receiver number at that polarization and the last digit identifies the 500 MHz channel number(See Figure 5.2.3-1 of Vol. II). The "TO" column identifies the routing used. Here it is all SS/TDMA, except channel 1 for FX1 and FX2, which are hardwired.

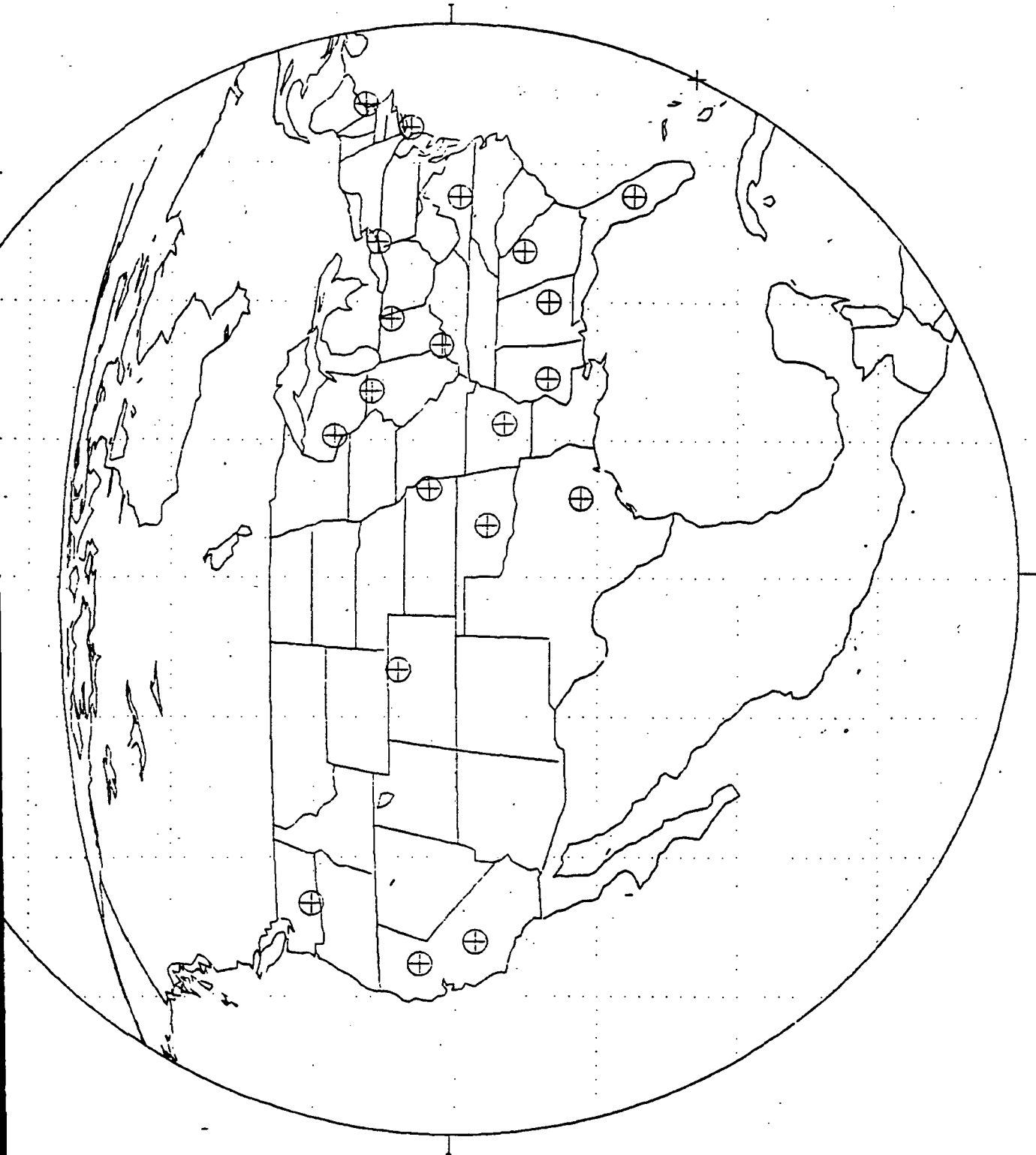


G-1.1 Ka-Band Fixed Beam Locations



Ka-Band Fixed Beam Locations

<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
01	NENY NEW YORK NY-NJ	40.40	73.50
02	FOIN FORT WAYNE IN	41.05	85.08
03	LYVA LYNCHBURG VA	37.24	79.09
04	ERPA ERIE PA	42.07	80.05
05	ROIL ROCKFORD IL	42.16	89.06
06	ATGE ATHENS GE	33.57	83.24
07	BYTX BRYAN-COLLEGE STATION TX	30.41	96.24
08	LAFI LAKELAND-WINTER HAVEN FL	28.02	81.59
09	POME PORTLAND ME	43.41	70.18
10	EVIN EVANSVILLE IN-KY	38.00	87.33
11	VICA VISALIA-TULARE-PORTERVILLE CA	36.20	119.18
12	LAKS LAWRENCE KS	38.58	95.15
13	JAMS JACKSON MS	32.20	90.11
14	EAWI EAU CLAIRE WI	44.50	91.30
15	MNAL MONTGOMERY AL	32.22	86.20
16	CHCA CHICO CA	39.46	121.50
17	YAWA YAKIMA WA	46.37	120.30
18	OKOK OKLAHOMA CITY OK	35.28	97.33
19	FOCO FORT COLLINS CO	40.35	105.05
20	LIAR LITTLE ROCK-NORTH LITTLE ROCK AR	34.42	92.17



CASE SATELLITE POSITION 101.0 WEST (100W, 37N) KA - FIXED
03/26/85 14.370



G-1.2 Beam To Beam Loading For Ka-Band Trunking



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Beam to Beam Matrix
Digital Voice and Video Conferencing
(Year 2008 Equivalent HVC)

Class = KATRK

From:

To:

FX1	FX2	48123	FX3	12132	FX4	5204	FX5	18517
	FX6	17922	FX7	10105	FX8	12534	FX9	1115
	FX10	9387	FX11	8727	FX12	8329	FX13	8317
	FX14	6088	FX15	5459	FX16	4250	FX17	4805
	FX18	4534	FX19	4129	FX20	4309	SCN2	6217
	SCN3	2218	SCN4	5997	SCN5	11841	SCN6	10209
FX2	FX1	48123	FX3	14860	FX4	3085	FX5	1746
	FX6	12144	FX7	9309	FX8	8918	FX9	7793
	FX10	1537	FX11	7581	FX12	8784	FX13	7464
	FX14	4997	FX15	4524	FX16	3513	FX17	3951
	FX18	4469	FX19	3846	FX20	4310	SCN1	1626
	SCN2	2930	SCN4	3909	SCN5	10436	SCN6	8825
FX3	FX1	12132	FX2	14860	FX4	2120	FX5	6835
	FX6	3167	FX7	4378	FX8	5841	FX9	4124
	FX10	3280	FX11	3620	FX12	3316	FX13	3679
	FX14	2278	FX15	2378	FX16	1606	FX17	1763
	FX18	1848	FX19	1592	FX20	1877	SCN1	770
	SCN2	150	SCN3	673	SCN4	1881	SCN5	4387
	SCN6	3998						
FX4	FX1	5204	FX2	3085	FX3	2120	FX5	5865
	FX6	5403	FX7	3525	FX8	3891	FX9	3267
	FX10	2574	FX11	3050	FX12	3045	FX13	2828
	FX14	2330	FX15	1872	FX16	1397	FX17	1572
	FX18	1591	FX19	1422	FX20	1558	SCN2	1425
	SCN4	1587	SCN5	3902	SCN6	3453		
FX5	FX1	18517	FX2	1746	FX3	6835	FX4	5865
	FX6	5010	FX7	4288	FX8	3297	FX9	2368
	FX10	1240	FX11	4009	FX12	2087	FX13	2876
	FX14	302	FX15	1672	FX16	1605	FX17	1783
	FX18	2060	FX19	1845	FX20	1574	SCN1	677
	SCN2	1325	SCN3	65	SCN4	1746	SCN5	3426
	SCN6	4219						
FX6								



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	FX1	17922	FX2	12144	FX3	3167	FX4	5403
	FX5	5010	FX7	4108	FX8	3424	FX9	2408
	FX10	903	FX11	2942	FX12	2819	FX13	2376
	FX14	1697	FX15	304	FX16	1252	FX17	1338
	FX18	1644	FX19	1284	FX20	1286	SCN1	600
	SCN2	314	SCN3	449	SCN4	866	SCN5	3691
	SCN6	3212						
FX7								
	FX1	10105	FX2	9309	FX3	4378	FX4	3525
	FX5	4288	FX6	4108	FX8	3324	FX9	1665
	FX10	2467	FX11	3485	FX12	3008	FX13	1746
	FX14	1524	FX15	1825	FX16	1523	FX17	1521
	FX18	850	FX19	1735	FX20	936	SCN1	375
	SCN2	1116	SCN3	330	SCN4	1513	SCN5	2341
	SCN6	4205						
FX8								
	FX1	12534	FX2	8918	FX3	5841	FX4	3891
	FX5	3297	FX6	3424	FX7	3324	FX9	1812
	FX10	2251	FX11	2420	FX12	1947	FX13	2801
	FX14	1171	FX15	1110	FX16	1039	FX17	1092
	FX18	1219	FX19	994	FX20	1225	SCN1	415
	SCN2	1076	SCN3	290	SCN4	651	SCN5	2965
	SCN6	2628						
FX9								
	FX1	1115	FX2	7793	FX3	4124	FX4	3267
	FX5	2368	FX6	2408	FX7	1665	FX8	1812
	FX10	1420	FX11	1770	FX12	1213	FX13	1161
	FX14	977	FX15	719	FX16	716	FX17	802
	FX18	675	FX19	657	FX20	621	SCN2	790
	SCN3	254	SCN4	908	SCN5	1497	SCN6	1776
FX10								
	FX1	9387	FX2	1537	FX3	3280	FX4	2574
	FX5	1240	FX6	903	FX7	2467	FX8	2251
	FX9	1420	FX11	1688	FX12	1308	FX13	1647
	FX14	1251	FX15	517	FX16	778	FX17	850
	FX18	1100	FX19	881	FX20	448	SCN1	353
	SCN2	788	SCN3	234	SCN4	746	SCN5	2538
	SCN6	1989						
FX11								
	FX1	8727	FX2	7581	FX3	3620	FX4	3050
	FX5	4009	FX6	2942	FX7	3485	FX8	2420
	FX9	1770	FX10	1688	FX12	2560	FX13	2168
	FX14	1500	FX15	1169	FX16	863	FX17	3554
	FX18	1654	FX19	2220	FX20	1193	SCN1	359
	SCN2	975	SCN3	339	SCN4	1056	SCN5	4845
	SCN6	5358						
FX12								
	FX1	8329	FX2	8784	FX3	3316	FX4	3045
	FX5	2087	FX6	2819	FX7	3008	FX8	1947
	FX9	1213	FX10	1308	FX11	2560	FX13	1883



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	FX14	1213	FX15	1082	FX16	1082	FX17	1162
	FX18	294	FX19	1493	FX20	398	SCN1	305
	SCN2	757	SCN3	282	SCN4	974	SCN5	2502
	SCN6	2954						
FX13								
	FX1	8317	FX2	7464	FX3	3679	FX4	2828
	FX5	2876	FX6	2376	FX7	1746	FX8	2801
	FX9	1161	FX10	1647	FX11	2168	FX12	1883
	FX14	1040	FX15	44	FX16	888	FX17	911
	FX18	1102	FX19	947	FX20	222	SCN1	284
	SCN2	894	SCN3	219	SCN4	1005	SCN5	2282
	SCN6	2372						
FX14								
	FX1	6088	FX2	4997	FX3	2278	FX4	2330
	FX5	302	FX6	1697	FX7	1524	FX8	1171
	FX9	977	FX10	1251	FX11	1500	FX12	1213
	FX13	1040	FX15	600	FX16	692	FX17	808
	FX18	791	FX19	834	FX20	659	SCN1	243
	SCN2	527	SCN3	225	SCN4	591	SCN5	1157
	SCN6	1762						
FX15								
	FX1	5459	FX2	4524	FX3	2378	FX4	1872
	FX5	1672	FX6	304	FX7	1825	FX8	1110
	FX9	719	FX10	517	FX11	1169	FX12	1082
	FX13	44	FX14	600	FX16	474	FX17	496
	FX18	672	FX19	492	FX20	362	SCN1	182
	SCN2	525	SCN3	136	SCN4	423	SCN5	1332
	SCN6	1249						
FX16								
	FX1	4250	FX2	3513	FX3	1606	FX4	1397
	FX5	1605	FX6	1252	FX7	1523	FX8	1039
	FX9	716	FX10	778	FX11	863	FX12	1082
	FX13	888	FX14	692	FX15	474	FX17	1982
	FX18	678	FX19	967	FX20	491	SCN1	159
	SCN2	381	SCN3	130	SCN4	475	SCN5	1786
	SCN6	3303						
FX17								
	FX1	4805	FX2	3951	FX3	1763	FX4	1572
	FX5	1783	FX6	1338	FX7	1521	FX8	1092
	FX9	802	FX10	850	FX11	3554	FX12	1162
	FX13	911	FX14	808	FX15	496	FX16	1982
	FX18	690	FX19	1005	FX20	511	SCN1	181
	SCN2	407	SCN3	146	SCN4	507	SCN5	1797
	SCN6	2884						
FX18								
	FX1	4534	FX2	4469	FX3	1848	FX4	1591
	FX5	2060	FX6	1644	FX7	850	FX8	1219
	FX9	675	FX10	1100	FX11	1654	FX12	294
	FX13	1102	FX14	791	FX15	672	FX16	678
	FX17	690	FX19	923	FX20	193	SCN1	164



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	SCN2	434	SCN3	141	SCN4	598	SCN5	1385
	SCN6	1943						
FX19	FX1	4129	FX2	3846	FX3	1592	FX4	1422
	FX5	1845	FX6	1284	FX7	1735	FX8	994
	FX9	657	FX10	881	FX11	2220	FX12	1493
	FX13	947	FX14	834	FX15	492	FX16	967
	FX17	1005	FX18	923	FX20	588	SCN1	155
	SCN2	373	SCN3	134	SCN4	473	SCN5	1922
	SCN6	2130						
FX20	FX1	4309	FX2	4310	FX3	1877	FX4	1558
	FX5	1574	FX6	1286	FX7	936	FX8	1225
	FX9	621	FX10	448	FX11	1193	FX12	398
	FX13	222	FX14	659	FX15	362	FX16	491
	FX17	511	FX18	193	FX19	588	SCN1	154
	SCN2	451	SCN3	133	SCN4	523	SCN5	1280
	SCN6	1336						
SCN1	FX2	1626	FX3	770	FX5	677	FX6	600
	FX7	375	FX8	415	FX10	353	FX11	359
	FX12	305	FX13	284	FX14	243	FX15	182
	FX16	159	FX17	181	FX18	164	FX19	155
	FX20	154	SCN2	191	SCN3	25	SCN4	211
	SCN5	398	SCN6	391				
SCN2	FX1	6217	FX2	2930	FX3	150	FX4	1425
	FX5	1325	FX6	314	FX7	1116	FX8	1076
	FX9	790	FX10	788	FX11	975	FX12	757
	FX13	894	FX14	527	FX15	525	FX16	381
	FX17	407	FX18	434	FX19	373	FX20	451
	SCN1	191	SCN2	132	SCN3	79	SCN4	424
	SCN5	902	SCN6	982				
SCN3	FX1	2218	FX3	673	FX5	65	FX6	449
	FX7	330	FX8	290	FX9	254	FX10	234
	FX11	339	FX12	282	FX13	219	FX14	225
	FX15	136	FX16	130	FX17	146	FX18	141
	FX19	134	FX20	133	SCN1	25	SCN2	79
	SCN4	161	SCN5	290	SCN6	337		
SCN4	FX1	5997	FX2	3909	FX3	1881	FX4	1587
	FX5	1746	FX6	866	FX7	1513	FX8	651
	FX9	908	FX10	746	FX11	1056	FX12	974
	FX13	1005	FX14	591	FX15	423	FX16	475
	FX17	507	FX18	598	FX19	473	FX20	523
	SCN1	211	SCN2	424	SCN3	161	SCN4	556
	SCN5	1419	SCN6	1192				
SCN5	FX1	11841	FX2	10436	FX3	4387	FX4	3902



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	FX5	3426	FX6	3691	FX7	2341	FX8	2965
	FX9	1497	FX10	2538	FX11	4845	FX12	2502
	FX13	2282	FX14	1157	FX15	1332	FX16	1786
	FX17	1797	FX18	1385	FX19	1922	FX20	1280
	SCN1	398	SCN2	902	SCN3	290	SCN4	1419
	SCN5	2638	SCN6	4827				
SCN6								
	FX1	10209	FX2	8825	FX3	3998	FX4	3453
	FX5	4219	FX6	3212	FX7	4205	FX8	2628
	FX9	1776	FX10	1989	FX11	5358	FX12	2954
	FX13	2372	FX14	1762	FX15	1249	FX16	3303
	FX17	2884	FX18	1943	FX19	2130	FX20	1336
	SCN1	391	SCN2	982	SCN3	337	SCN4	1192
	SCN5	4827	SCN6	4893				

SUMMARY

KATRK

FX1	230468
FX2	188680
FX3	92553
FX4	65966
FX5	80437
FX6	80563
FX7	71202
FX8	68335
FX9	40508
FX10	42175
FX11	69105
FX12	54797
FX13	51156
FX14	35257
FX15	29618
FX16	32030
FX17	36518
FX18	31652
FX19	33041
FX20	26638
SCN1	8218
SCN2	24565
SCN3	7290
SCN4	30392
SCN5	77786
SCN6	82427

Totals 1591377

G-1.3 Transponder Loading For Ka-Band Trunking



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OF POOR QUALITY

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Transponder Loading
Digital Voice and Video Conferencing

<u>From</u>	<u>To</u>	<u>Channel</u>	<u>Class</u>	<u>Circuits</u>
FX1	FX2	H1-1	KATRK	40000
FX1	SS	H1-2	KATRK	40000
FX1	SS	H1-3	KATRK	40000
FX1	SS	H1-4	KATRK	40000
FX1	SS	H1-5	KATRK	40000
FX2	FX1	H2-1	KATRK	40000
FX2	SS	H2-2	KATRK	34833
FX2	SS	H2-3	KATRK	40000
FX2	SS	H2-4	KATRK	35415
FX2	SS	H2-5	KATRK	38432
FX3	SS	V1-2	KATRK	40000
FX3	SS	V1-4	KATRK	22751
FX3	SS	V1-5	KATRK	29802
FX4	SS	V2-3	KATRK	29783
FX4	SS	V2-5	KATRK	36183
FX5	SS	H3-2	KATRK	16888
FX5	SS	H3-5	KATRK	40000
FX6	SS	H4-2	KATRK	39079
FX6	SS	H4-5	KATRK	40000
FX7	SS	V3-4	KATRK	35418
FX7	SS	V3-5	KATRK	35784
FX8	SS	H5-2	KATRK	34014
FX8	SS	H5-5	KATRK	34321
FX9	SS	H6-5	KATRK	40000
FX10	SS	H7-5	KATRK	38099
FX11	SS	H8-3	KATRK	34850
FX11	SS	H8-5	KATRK	34255
FX12	SS	V4-3	KATRK	30492
FX12	SS	V4-5	KATRK	24305
FX13	SS	V5-4	KATRK	28262
FX13	SS	V5-5	KATRK	22894
FX14	SS	H9-5	KATRK	35257
FX15	SS	H10-5	KATRK	29618
FX16	SS	H11-5	KATRK	32030
FX17	SS	H12-5	KATRK	36518
FX18	SS	V6-5	KATRK	31652
FX19	SS	H13-5	KATRK	33041
FX20	SS	V7-5	KATRK	26638
SCN1	SS	C1-1	KATRK	39194
SCN1	SS	C1-2	KATRK	0



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SCN2	SS	C2-1	KATRK	24565
SCN2	SS	C2-2	KATRK	0
SCN3	SS	C3-1	KATRK	34915
SCN3	SS	C3-2	KATRK	0
SCN4	SS	C4-1	KATRK	31876
SCN4	SS	C4-2	KATRK	0
SCN5	SS	C5-1	KATRK	40000
SCN5	SS	C5-2	KATRK	37786
SCN5	SS	C5-3	KATRK	0
SCN6	SS	C6-1	KATRK	40000
SCN6	SS	C6-2	KATRK	40000
SCN6	SS	C6-3	KATRK	2427

Totals

KATRK : 1591377



G-2 - KA-BAND SCAN PAYLOAD

The coverage of the six scan beams, relative to the 84 regions used for most beam design work, is shown. As in Appendix G-1.1, a Beam to Beam Matrix and a Transponder Loading are given; the scale factor used was .143 (7 satellites) although the interconnection shown on the printout is "SS", the routing is in fact through the BBP, but from a loading aspect, this is equivalent to on SS/TDMA switch. Channelization is to the 240 MHz level, i.e., "CI-3" is the third 500 MHz channel in Scan Beam 1, and it is broken down into "CI-3A" and "CI-3B".



G-2.1 Ka-Band Scan Beam Coverage



Ka-Band Scan Beam Coverages

Page 1

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
1	ALNY	ALBANY-SCHENECTADY-TROY NY	42.40	73.49
1	ALPA	ALLENTOWN-BETHLEHEM-EASTON PA-NJ	40.11	74.36
1	ATNJ	ATLANTIC CITY NJ	39.23	74.27
1	BAME	BANGOR ME	44.49	68.47
1	BINY	BINGHAMTON NY-PA	42.06	75.55
1	BOMA	BOSTON MA	42.20	71.05
1	BRCT	BRIDGEPORT CT	41.12	73.12
1	BICT	BRISTOL CT	41.41	72.57
1	BRMA	BROCKTON MA	42.06	71.01
1	BUVT	BURLINGTON VT	44.28	73.14
1	DACT	DANBURY CT	41.24	73.26
1	ELNY	ELMIRA NY	42.06	76.50
1	FAMA	FALL RIVER MA-RI	41.42	71.08
1	FIMA	FITCHBURG-LEOMISTER MA	42.35	71.50
1	GLNY	GLENS FALLS NY	43.17	73.14
1	HAPA	HARRISBURG PA	40.17	76.54
1	HACT	HARTFORD CT	41.45	72.42
1	JENJ	JERSEY CITY NJ	40.44	74.04
1	LAPA	LANCASTER PA	40.01	76.19
1	LAMA	LAWRENCE-HAVERHILL MA-NH	42.41	71.12
1	LEME	LEWISTON-AUBURN ME	44.06	70.14
1	LONJ	LONG BRANCH-ASBURY PARK NJ	40.17	73.59
1	LOMA	LOWELL MA-NH	42.38	71.19
1	MANH	MANCHESTER NH	42.59	71.28
1	MECT	MERIDEN CT	42.32	72.48
1	NANH	NASHUA NH	42.44	71.28
1	NANY	NASSAU-SUFFOLK NY	42.31	73.36
1	NEMA	NEW BEDFORD MA	41.38	70.55
1	NECT	NEW BRITAIN CT	41.40	72.47
1	NENJ	NEW BRUNSWICK-PERTH AMBOY-SAYR NJ	40.29	74.27
1	NWCT	NEW HAVEN-WEST HAVEN CT	41.18	72.55
1	NLCT	NEW LONDON-NORWICH CT-RI	41.21	72.06
1	NENY	NEW YORK NY-NJ	40.40	73.50
1	NWNJ	NEWARK NJ	40.44	74.11
1	NWNY	NEWBRGH-MIDDLETOWN NY	41.26	74.26
1	NOPA	NORTHEAST PENNSYLVANIA PA	41.20	75.45
1	NOCT	NORWALK CT	41.07	73.25
1	PANJ	PATERSON-CLIFTON-PASSAIC NJ	40.52	74.08
1	PHPA	PHILADELPHIA PA-NJ	40.00	75.10
1	PIMA	PITTSFIELD MA	38.23	75.26
1	POME	PORTLAND ME	43.41	70.18
1	PONH	PORTSMOUTH-DOVER-ROCHESTER NH-ME	43.03	70.47
1	PONY	POUGHKEEPSIE NY	41.43	73.56
1	PRRI	PROVIDENCE-WAWICK-PAWTUCKET RI-MA	39.42	75.53
1	REPA	READING PA	40.20	75.55
1	SPCT	SPRINGFIELD-CHICOPEE-HOLYOKE CT-MA	42.07	72.35
1	STCT	STAMFORD CT	41.03	73.32
1	SYNY	SYRACUSE NY	43.03	76.10
1	TRNJ	TRENTON NJ	40.15	74.43



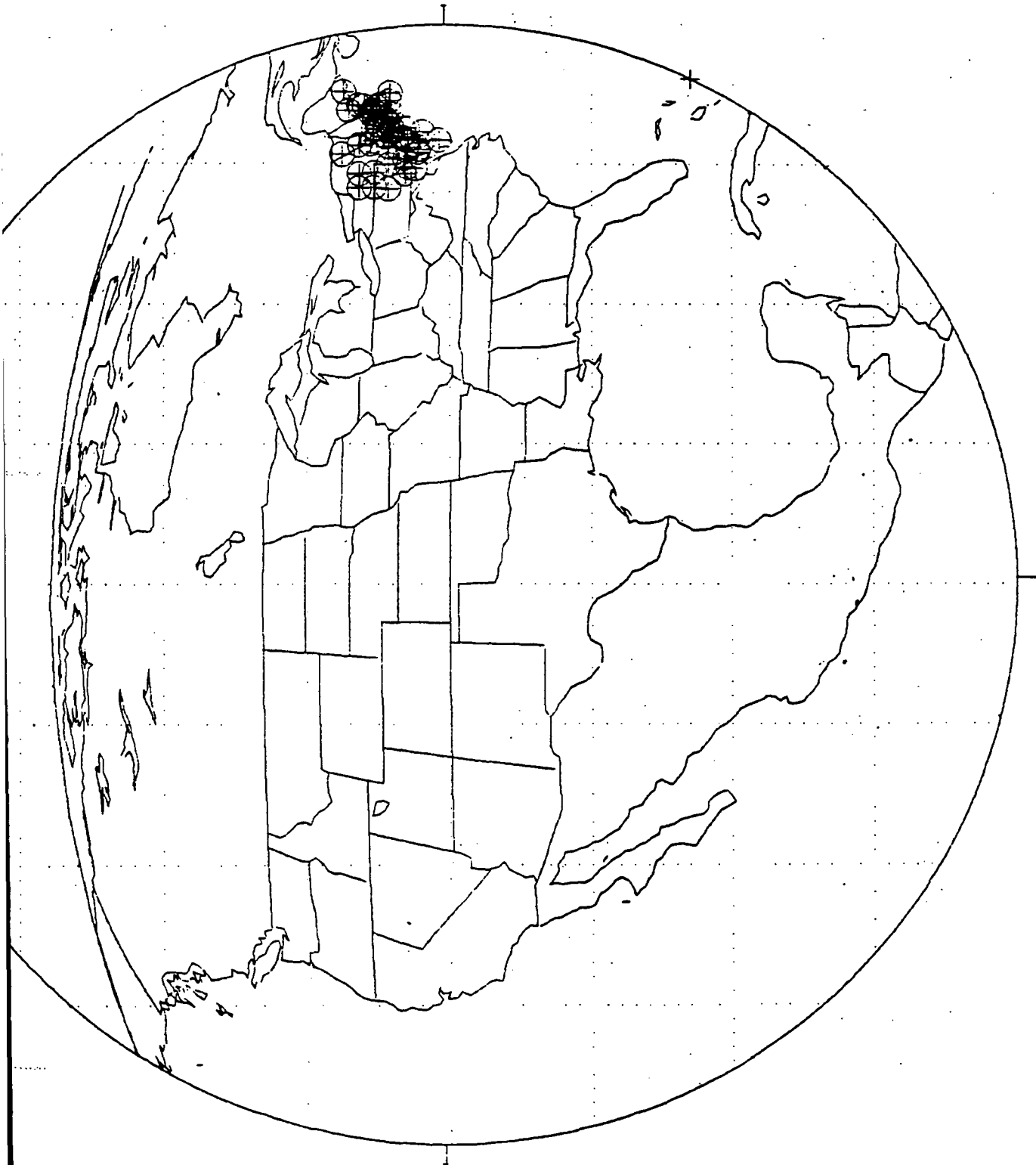
Ka-Band Scan Beam Coverages

Page 2

1	UTNY	UTICA-ROME NY	43.06	75.15
1	VINJ	VINELAND-MILLVILLE-RIDGETON NJ	39.29	75.02
1	WACT	WATERBURY CT	41.33	73.03
1	WIPA	WILLIAMSPORT PA	41.16	77.03
1	WIDE	WILMINGTON DE-NJ	39.46	75.31
1	WOMA	WORCESTER MA	42.17	71.48
1	YOPA	YORK PA	39.57	76.44



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CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 1 OF KA BAND

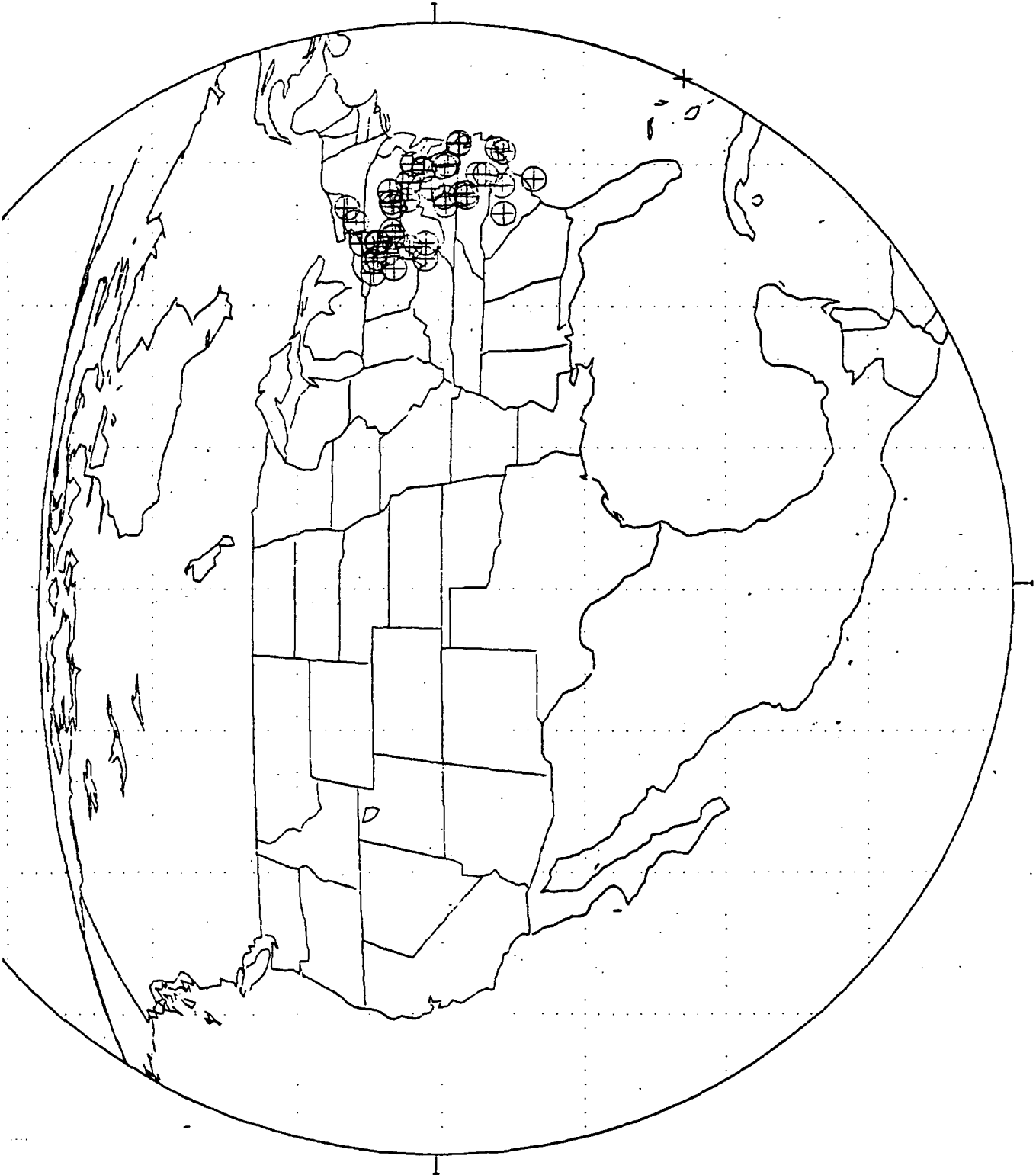
03/27/85 8.124



Ka-Band Scan Beam Coverages

Page 3

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
2	AKOH	AKRON OH	41.04	81.31
2	ATPA	ALTOONA PA	40.32	78.23
2	BAMD	BALTIMORE MD	39.18	76.38
2	BUNY	BUFFALO NY	42.52	78.55
2	BUNC	BURLINGTON NC	36.05	79.27
2	CAOH	CANTON OH	40.48	81.23
2	CHSC	CHARLESTON -NORTH CHARLESTON SC	32.48	79.58
2	CHWV	CHARLESTON WV	38.23	81.40
2	CHVA	CHARLOTTESVILLE VA	38.02	78.29
2	CLOH	CLEVELAND OH	41.30	81.41
2	COSC	COLUMBIA SC	34.00	81.00
2	CUMD	CUMBERLAND MD-WV	39.40	78.47
2	DAVA	DANVILLE V	36.34	79.25
2	ERPA	ERIE PA	42.07	80.05
2	FANC	FAYETTEVILLE NC	35.05	78.53
2	FOSC	FORENCE SC	34.12	79.44
2	GRNC	GREENSBORO-WINSTON -SALEM-HIGH NC	36.03	79.50
2	HAMD	HAGERSTOWN MD	39.39	77.44
2	HUWV	HUNTINGTON-ASHLAND WV-KY	38.24	82.26
2	JANC	JACKSONVILLE NC	34.45	77.26
2	JOPA	JOHNSONTOWN PA	40.20	78.56
2	LOOH	LORAIN-ELYRIA OH	41.28	82.11
2	LYVA	LYNCHBURG VA	37.24	79.09
2	NEOH	NEWARK OH	40.03	82.25
2	NEVA	NEWPORT NEWS-HAMPTON VA	36.59	76.26
2	NOVA	NORFOLK-VIRGINIA BEACH-PORTSMO VA-NC	36.54	76.18
2	PAWV	PARKERSBURG-MARIETTA WV-OH	39.17	81.33
2	PEVA	PETERSBURG-COLONIAL HEIGHTS-HO VA	37.14	77.24
2	PIPA	PITTSBURGH PA	40.26	80.00
2	RANC	RALEIGH-DURHAM NC	35.46	78.39
2	RIVA	RICHMOND VA	37.34	77.27
2	ROVA	ROANOKE VA	37.15	79.58
2	RONY	ROCHETER NY	43.12	77.37
2	SHPA	SHARON PA	41.16	80.30
2	STPA	STATE COLLEGE PA	40.48	77.52
2	STOH	STEUBENVILLE-WEIRTON OH-WV	40.22	80.39
2	WADC	WASHINGTON DC-MD	38.55	77.00
2	WHWV	WHEELING WV-OH	40.05	80.43
2	WINC	WILMINGTON NC	34.14	77.55
2	YOOH	YOUNGSTOWN-WARREN OH	41.05	80.40



CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 2 OF KA BAND

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Ka-Band Scan Beam Coverages

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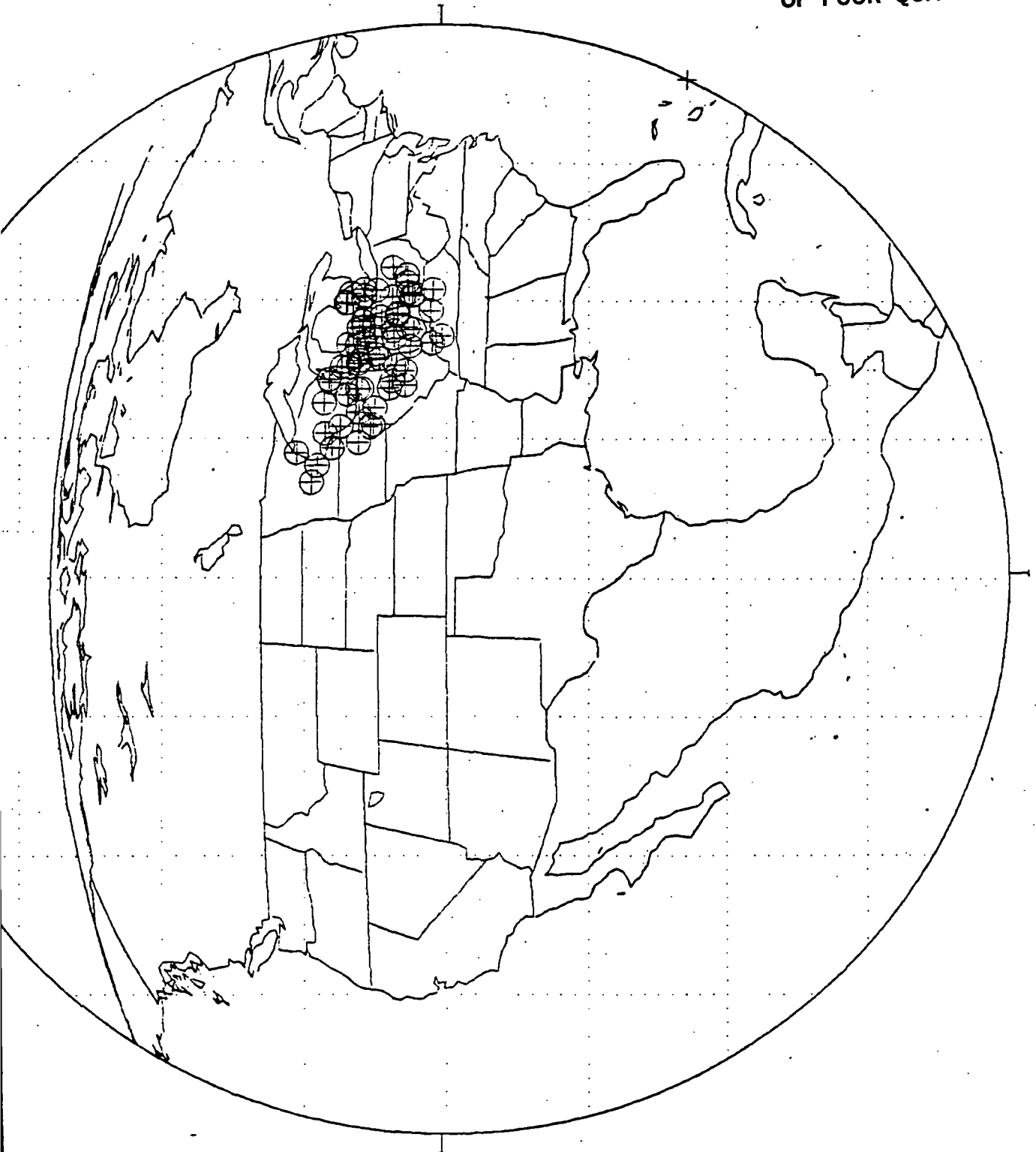
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3	ANIN	ANDERSON IN	40.05	85.14
3	ANMI	ANN ARBOR MI	42.18	83.43
3	APWI	APPLETON-OSHKOSH WI	44.17	88.24
3	BAMI	BATTLE CREEK MI	42.20	85.01
3	BYMI	BAY CITY MI	43.35	83.52
3	BEMI	BENTON HARBOR MI	42.07	86.27
3	BLIN	BLOOMINGTON IN	39.10	86.31
3	BLIL	BLOOMINGTON-NORMAL IL	40.29	89.00
3	CEIA	CEDAR RAPIDS IA	41.59	91.39
3	CHIL	CHAMPAIGN-URBANA-RANTOUL IL	40.07	88.14
3	CIIL	CHICAGO IL	41.50	87.45
3	CIOH	CINCINNATI OH-KY	39.10	84.30
3	COOH	COLUMBUS OH	39.59	83.03
3	DAIA	DAVENPORT-ROCK ISLAND-MOLINE IA-IL	41.30	90.34
3	DAOH	DAYTON OH	39.45	84.10
3	DEIL	DECATUR IL	39.51	88.57
3	DEMI	DETROIT MI	42.23	83.05
3	DUIA	DUBUQUE IA	42.31	90.41
3	DUMN	DULUTH-SUPERIOR MN-WI	46.45	92.10
3	EAWI	EAU CLAIRE WI	44.50	91.30
3	GRWI	GREEN BAY WI	44.32	88.00
3	ELIN	ELKHART IN	41.52	85.56
3	EVIN	EVANSVILLE IN-KY	38.00	87.33
3	FLMI	FLINT MI	43.03	83.04
3	FOIN	FORT WAYNE IN	41.05	85.08
3	GAIN	GARY-HAMMOND-EAST CHICAGO IN	41.34	87.20
3	GRMI	GRAND RAPIDS MI	42.57	86.40
3	HAOH	HAMILTON-MIDDLETOWN OH	39.23	84.33
3	ININ	INDIANAPOLIS IN	39.45	86.10
3	IOIW	IOWA CITY IW	41.39	91.31
3	JAMI	JACKSON MI	42.15	84.24
3	JAWI	JANESVILLE-BELIOT WI	42.42	89.02
3	KAMI	KALAMAZOO-PORTAGE MI	42.17	85.36
3	KAIL	KANKAKEE IL	41.08	87.52
3	KEWI	KENOSHA WI	42.34	87.34
3	KOIN	KOKOMO IN	40.30	86.09
3	LAWI	LA CROSSE WI	43.48	91.04
3	LAIN	LAFAYETTE-WEST LAFAYETTE IN	40.25	86.54
3	LAMI	LANSING-EAST LANSING MI	42.44	85.34
3	LEKY	LEXINGTON-FAYETTE KY	38.02	84.30
3	LIOH	LIMA OH	40.43	84.06
3	LOKY	LOUISVILLE KY-IN	38.13	85.48
3	MAWI	MADISON WI	43.04	89.22
3	MAOH	MANSFIELD OH	40.46	82.31
3	MIWI	MILWAUKEE WI	43.03	87.56
3	MIMN	MINNEAPOLIS-ST PAUL MN-WI	45.00	93.15
3	MUIN	MUNCIE IN	40.11	85.22
3	MUMI	MUSKEGON-NORTON SHORES-MUSKEGO MI	43.13	86.15
3	OWKY	OWENSBORO KY	37.45	87.05
3	PEIL	PEORIA IL	40.43	89.38
3	RAWI	RACINE WI	42.42	87.50



Ka-Band Scan Beam Coverages

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	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
3	ROMN	ROCHESTER MN	44.01	92.27
3	ROIL	ROCKFORD IL	42.16	89.06
3	SAMI	SAGINAW MI	43.25	83.54
3	SHWI	SHEBOYGAN WI	43.46	87.44
3	SOIN	SOUTH BEND IN	41.40	86.15
3	SPIL	SPRINGFIELD IL	39.49	89.39
3	SPOH	SPRINGFIELD OH	39.55	83.48
3	STMN	ST CLOUD MN	45.34	94.10
3	TEIN	TERRE HAUTE IN	39.27	87.24
3	TOOH	TOLEDO OH-MI	41.40	83.35
3	WAIA	WATERLOO-CEDAR FALLS IA	42.30	92.20
3	WAWI	WAUSAU WI	44.58	89.40



CASE 03/26/85 8.576
SATellite POSITION 101.0 WEST (100W, 37N)
ZONE 3 OF KA BAND



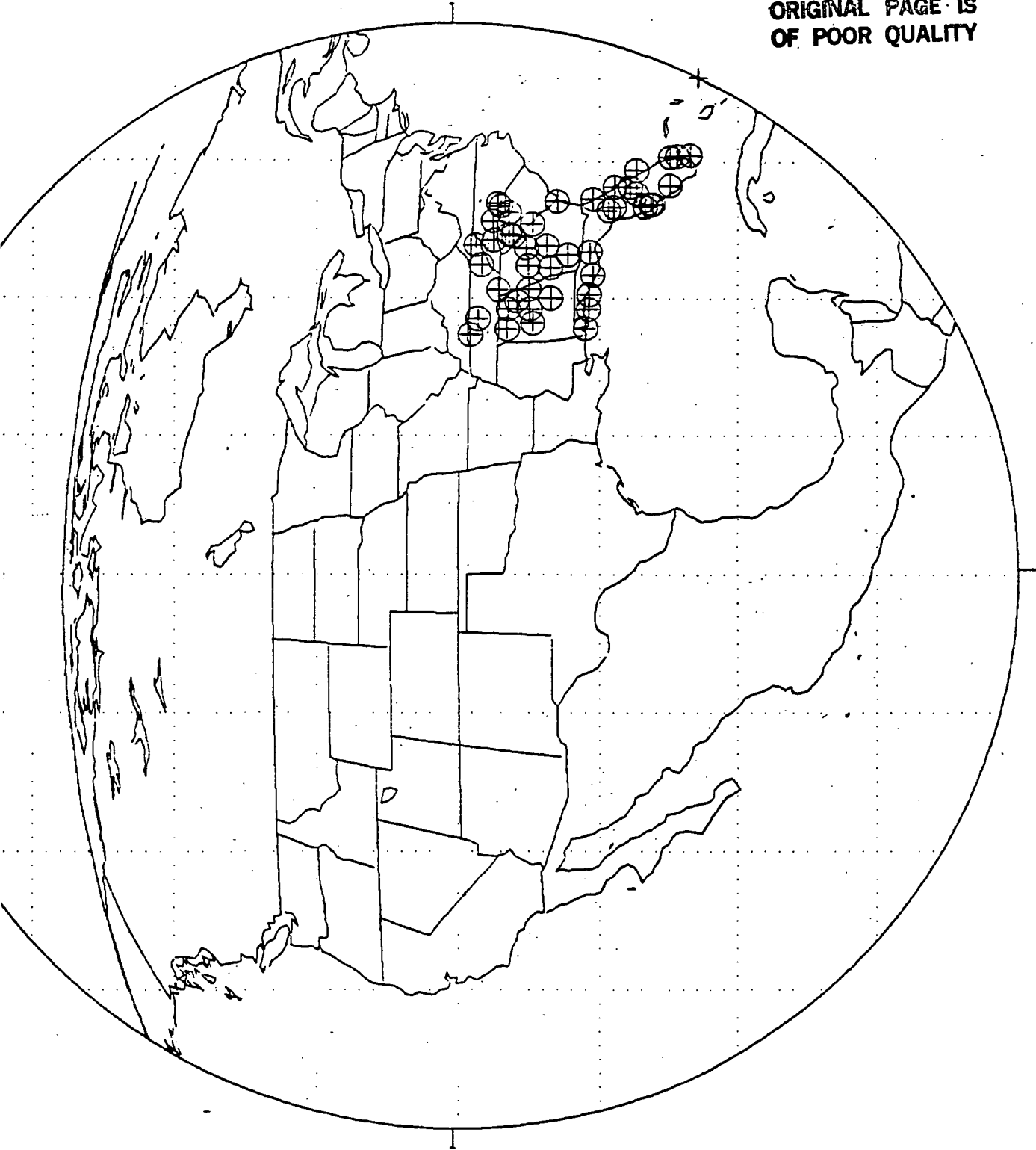
Ka-Band Scan Beam Coverages

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	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
4	ALGA	ALBANY GA	31.37	84.10
4	ANSC	ANDERSON SC	34.30	82.39
4	ANAL	ANNISTON AL	33.38	85.50
4	ASNC	ASHEVILLE NC	35.35	82.35
4	ATGE	ATHENS GE	33.57	83.24
4	ATGA	ATLANTA GA	33.45	84.23
4	AUGA	AUGUSTA GA-SC	33.29	82.00
4	BIAL	BIRMINGHAM AL	33.30	86.55
4	BRFL	BRADENTON FL	27.29	82.33
4	CHNC	CHARLOTTE-GASTONIA NC	35.03	80.50
4	CHTN	CHATTANOOGA TN-GA	35.02	85.18
4	CLTN	CLARKSVILLE-HOPKINSVILLE TN-KY	36.50	87.30
4	COGA	COLUMBUS GA-AL	32.28	84.59
4	DAFL	DAYTONA BEACH FL	29.11	81.01
4	FLAL	FLORENCE AL	34.48	87.40
4	FOFL	FORT LAUDERDALE-HOLLYWOOD FL	26.08	80.08
4	FRFL	FORT MYERS FL	26.39	81.51
4	FTFL	FORT WALTON BEACH FL	30.25	86.38
4	GAAL	GADSDEN AL	34.00	86.00
4	GAFL	GAINESVILLE FL	29.37	82.21
4	GRSC	GREENVILLE-SPARTANBURG SC	34.52	82.25
4	HINC	HICKORY NC	35.44	81.23
4	HUAL	HUNTSVILLE AL	34.44	86.35
4	JAFI	JACKSONVILLE FL	30.20	81.40
4	JOTN	JOHNSON CITY-KINGSPORT-BRISTOL TN-VA	36.33	82.34
4	KNTN	KNOXVILLE TN	36.00	83.57
4	LAFI	LAKELAND-WINTER HAVEN FL	28.02	81.59
4	MAGA	MACON GA	32.49	83.37
4	MEFL	MELBOURNE-TITUSVILLE-COCOA FL	28.04	80.38
4	MIFL	MIAMI FL	25.45	80.15
4	MOAL	MOBILE AL	30.40	88.05
4	MNAL	MONTGOMERY AL	32.22	86.20
4	NATN	NASHVILLE-DAVIDSON TN	36.10	86.50
4	OCFL	OCALA FL	29.11	82.09
4	ORFL	ORLANDO FL	28.33	81.21
4	PAFL	PANAMA CITY FL	30.10	85.41
4	PEFL	PENSACOLA FL	30.26	87.12
4	ROSC	ROCK HILL SC	34.55	81.01
4	SANC	SALISBURY-CONCORD NC	35.20	80.30
4	SAFL	SARASOTA FL	27.20	82.32
4	SAGA	SAVANNAH GA	32.04	81.07
4	TAFL	TALLAHASSEE FL	30.26	84.19
4	TMFL	TAMPA-ST PETERSBURG FL	27.58	82.38
4	TUAL	TUSCALOOSA AL	33.12	87.33
4	WEFL	WEST PALM BEACH-BOCA RATON FL	26.42	80.05



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CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 4 OF KA BAND
03/26/85 8.583



Ka-Band Scan Beam Coverages

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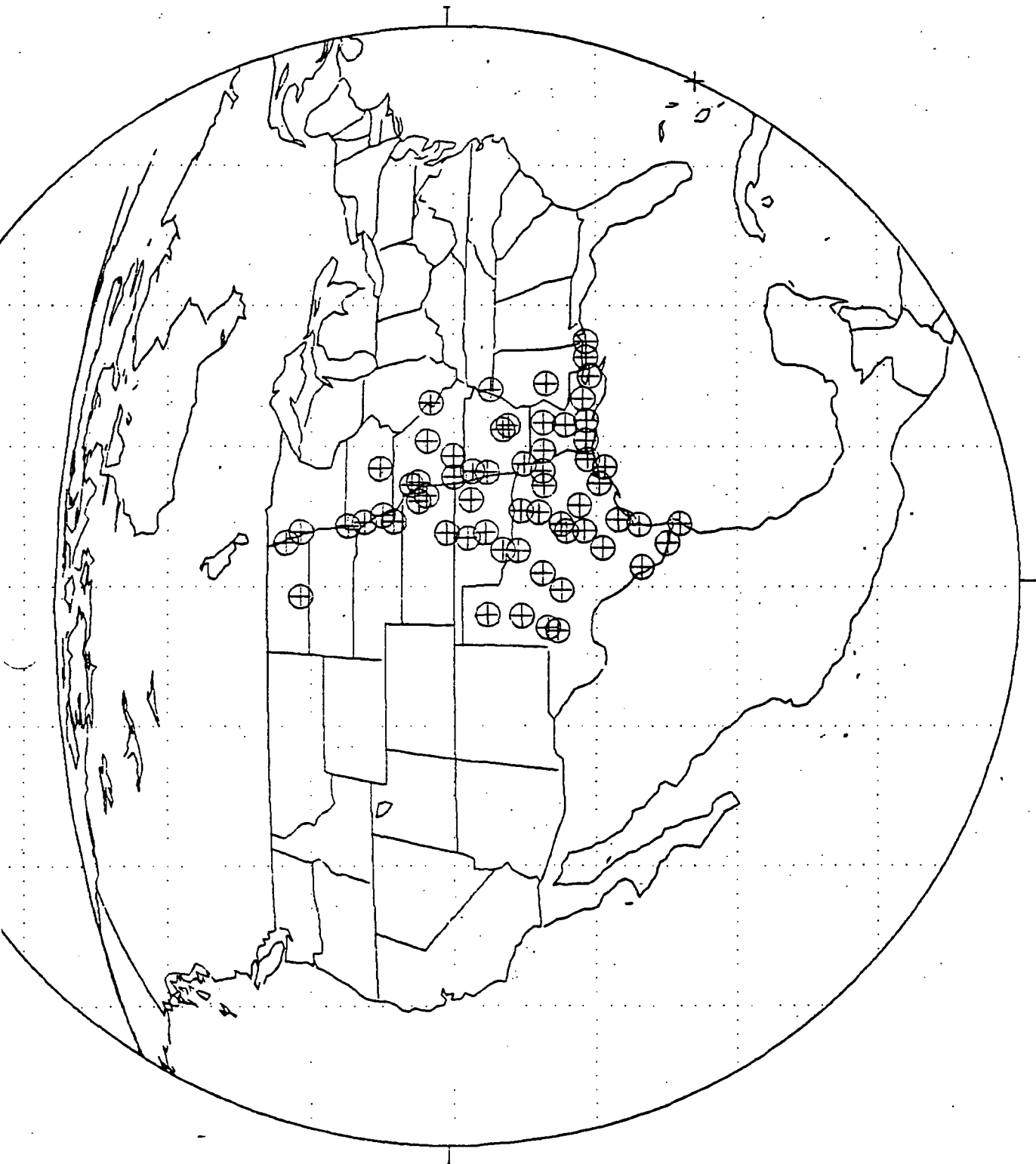
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5	ABTX	ABILENE TX	32.27	99.45
5	ALLA	ALEXANDRIA LA	31.19	92.29
5	AMTX	AMARILLO TX	35.14	101.50
5	AUTX	AUSTIN TX	30.18	97.47
5	BALA	BATON ROUGE LA	30.30	91.10
5	BETX	BEAUMONT-PORT ARTHUR-ORANGE TX	30.04	94.06
5	BIMS	BILOXI-GULFPORT MS	30.21	89.08
5	BIND	BISMARCK ND	46.50	100.48
5	BRTX	BROWNSVILLE-HARLINGEN-SAN BENI TX	25.54	97.30
5	BYTX	BRYAN-COLLEGE STATION TX	30.41	96.24
5	COMO	COLUMBIA MO	38.58	92.20
5	COTX	CORPUS CHRISTITX	27.47	97.26
5	DATX	DALLAS-FORT WORTH TX	32.47	96.48
5	DEIA	DES MOINES IA	41.35	93.35
5	ENOK	ENID OK	36.24	97.54
5	FAND	FARGO-MOORHEAD ND-MN	46.52	96.49
5	FAAR	FAYETTEVILLE-SPRINGDALE AR	36.03	94.10
5	FOAR	FORT SMITH AR-OK	35.22	94.27
5	GATX	GALVESTON-TEXAS CITY TX	29.17	94.48
5	GRND	GRAND FORKS ND-MN	47.57	97.05
5	HOTX	HOUSTON TX	29.45	95.25
5	JAMS	JACKSON MS	32.20	90.11
5	JOMO	JOPLIN MO	37.04	94.31
5	KAMO	KANSAS CITY MO-KS	39.05	94.37
5	KITX	KILLEEN-TEMPLE TX	31.08	97.44
5	LALA	LAFAYETTE LA	30.12	92.18
5	LKLA	LAKE CHARLES LA	30.13	93.13
5	LAKS	LAWRENCE KS	38.58	95.15
5	LATX	LAREDO TX	27.32	99.22
5	LAOK	LAWTON OK	34.36	98.25
5	LINE	LINCOLN NE	40.49	96.41
5	LIAR	LITTLE ROCK-NORTH LITTLE ROCK AR	34.42	92.17
5	LOTX	LONGVIEW TX	32.30	94.45
5	LUTX	LUBBOCK TX	33.35	101.53
5	MCTX	MCALLEN-PHARR-EDINBURG TX	26.13	98.15
5	METN	MEMPHIS TN-AR	35.10	90.00
5	MITX	MIDLAND TX	32.00	102.09
5	MOLA	MONROE LA	32.31	92.06
5	NELA	NEW ORLEANS LA	30.00	90.03
5	ODTX	ODESSA TX	31.50	102.23
5	OKOK	OKLAHOMA CITY OK	35.28	97.33
5	OMNE	OMAHA NE-IA	41.15	96.00
5	PAMS	PASCAGOULA-MOSS POINT PATERSON MS	30.21	88.32
5	PIAR	PINE BLUFF AR	34.13	92.00
5	SATX	SAN ANGELO TX	31.28	100.28
5	SNTX	SAN ANTONIO TX	29.25	98.30
5	SHTX	SHERMON-DENISON TX	33.39	96.35
5	SHLA	SHREVEPORT LA	32.30	93.46
5	SINE	SIOUX CITY NE-IA	42.30	96.28
5	SISD	SIOUX FALLS SD	43.34	96.42
5	SPMO	SPRINGFIELD MO	37.11	93.19



Ka-Band Scan Beam Coverages

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	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
5	STMO	ST JOSEPH MO	39.45	94.51
5	SLMO	ST LOUIS MO-IL	38.40	90.15
5	TETX	TEXARKANA TX-AR	33.28	94.02
5	TOKS	TOPEKA KS	39.02	95.41
5	TUOK	TULSA OK	36.07	95.58
5	TYTX	TYLER TX	32.22	95.18
5	VITX	VICTORIA TX	28.49	97.01
5	WATX	WACO TX	31.33	97.10
5	WITX	WICHITA FALLS TX.	33.55	98.30
5	WIKS	WICHITA KS	37.43	97.20



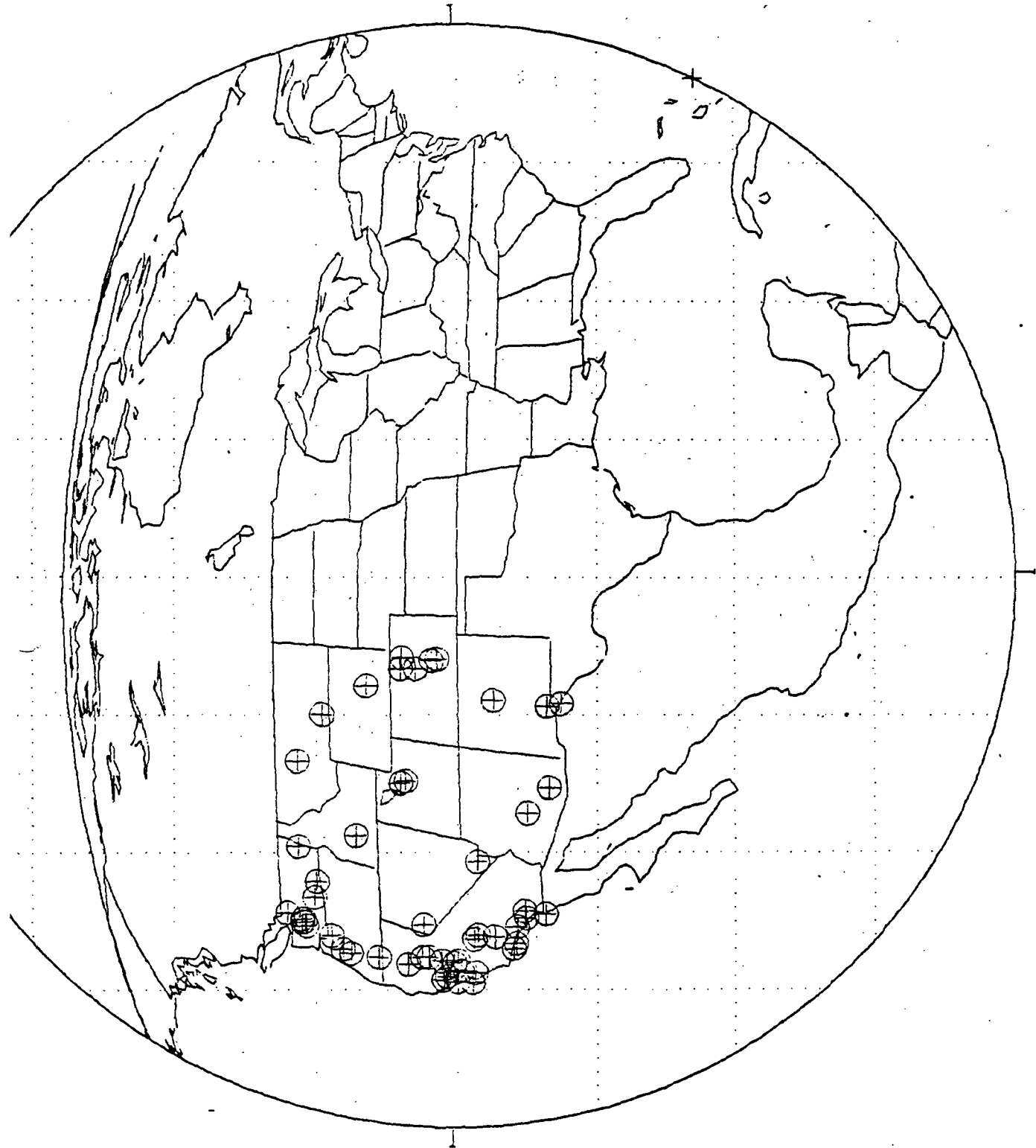
CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 5 OF KA BAND
03/26/85 8.591



Ka-Band Scan Beam Coverages

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	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
6	ALNM	ALBUQUERQUE NM	35.05	106.38
6	ANCA	ANAHEIM-SANTA ANA-GARDEN GROVE CA	33.50	117.56
6	BACA	BAKERSFIELD CA	35.25	119.00
6	BEWA	BELLINGHAM WA	48.45	122.29
6	BIMT	BILLINGS MT	45.47	108.30
6	BOID	BOISE CITY ID	43.38	115.30
6	BRWA	BREMERTON WA	47.34	122.40
6	CAWY	CASPER WY	42.50	106.20
6	CHCA	CHICO CA	39.46	121.50
6	COCO	COLORADO SPRINGS CO	38.50	104.50
6	DECO	DENVER-BOULDER CO	39.45	105.00
6	ELTX	EL PASO TX	31.45	106.30
6	EUOR	EUGENE-SPRINGFIELD OR	44.03	123.04
6	FOCO	FORT COLLINS CO	40.35	105.05
6	FRCA	FRESNO CA	36.41	119.47
6	GRMT	GREATFALLS MT	47.30	111.6
6	GRCO	GREELEY CO	40.26	104.43
6	LANM	LAS CRUCES NM	32.18	106.47
6	LANV	LAS VEGAS NV	36.10	115.10
6	LOCA	LOS ANGELES-LONG BEACH CA	34.00	118.15
6	MEOR	MEDFORD OR	42.20	122.52
6	MOCA	MODESTO CA	37.37	121.00
6	OLWA	OLYMPIA WA	47.03	122.53
6	OXCA	OXNARD-SIMI VALLEY-VENTURA CA	34.11	119.10
6	PHAZ	PHOENIX AZ	33.30	112.03
6	POOR	PORTLAND OR-WA	45.32	122.40
6	PRUT	PROVO-OREM UT	40.15	111.40
6	PUCO	PUEBLO CO	38.17	104.38
6	RECA	REDDING CA	40.35	122.24
6	RENV	RENO NV	39.32	119.49
6	RIWA	RICHLAND-KENNEWICK WA	46.17	119.17
6	RICA	RIVERSIDE-SAN BERNADINO-ONTAR CA	33.59	117.22
6	SACA	SACRAMENTO CA	38.32	121.30
6	SAOR	SALEM OR	44.57	123.01
6	SLCA	SALINAS-SEASIDE-MONTEREY CA	36.39	121.40
6	SAUT	SALT LAKE CITY-OGDEN UT	40.45	111.55
6	SNCA	SAN DIEGO CA	32.45	117.10
6	SFCA	SAN FRANCISCO - OAKLAND CA	37.45	122.27
6	SJCA	SAN JOSE CA	37.20	121.55
6	STCA	SANTA BARBARA-SANTA MARIA-LOMP CA	34.25	119.41
6	SCCA	SANTA CRUZ CA	36.58	122.03
6	SRCA	SANTA ROSA CA	38.26	122.43
6	SEWA	SEATTLE-EVERETT WA	47.35	122.20
6	SPWA	SPOKANE WA	47.40	117.25
6	SOCA	STOCKTON CA	37.59	121.20
6	TAWA	TACOMA WA	47.16	122.30
6	TUAZ	TUCSON AZ	32.15	110.57
6	VACA	VALLEJO-FAIRFIELD-NAPA CA	38.05	122.14
6	VICA	VISALIA-TULARE-PORTERVILLE CA	36.20	119.18
6	YAWA	YAKIMA WA	46.37	120.30
6	YUCA	YUBA CITY CA	39.09	121.36



CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 6 OF KA BAND

03/26/85 8.599



G-2.2 Beam Definition For Ka-Band Scan Beam To SMSA's



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BEAM COVERAGES

Beam: SCN1				
CON	DEL	MAS	ME1	ME2
NH	NJ	NY2	NY3	PA2
RI	VT			
Beam: SCN2				
MD	NC2	NY1	OH2	PA1
SC2	VA1	VA2	WV1	WV2
Beam: SCN3				
IL1	IL2	IN1	IN2	IO2
KY1	KY2	MI3	MN1	MN2
OH1	WI1	WI2		
Beam: SCN4				
AL1	AL2	FL1	FL2	FL3
GA1	GA2	NC1	SC1	TN1
TN2				
Beam: SCN5				
AK1	AK2	IO1	KS2	LA1
LA2	MO1	MO2	MS2	ND1
ND2	NE2	OK1	OK2	SD2
TX1	TX2	TX3	TX4	TX5
TX6				
Beam: SCN6				
AZ2	CA1	CA2	CA3	CO2
ID2	MT1	MT2	NM1	NM2
NV1	NV2	OR1	UT1	WA1
WA2	WY2			



G-2.3 Ka-Band Scan Beam To Beam Loading



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**Beam to Beam Matrix
CPS Voice, Data, and Video Conferencing**

Class = KACPS

From:

To:

SCN1	SCN1 6966	SCN2 120612	SCN3 362895	SCN4 240384
	SCN5 211389	SCN6 153021		
SCN2	SCN1 120612	SCN2 34050	SCN3 177637	SCN4 144295
	SCN5 165076	SCN6 111700		
SCN3	SCN1 362895	SCN2 177637	SCN3 67098	SCN4 244632
	SCN5 281960	SCN6 205518		
SCN4	SCN1 240384	SCN2 144295	SCN3 244632	SCN4 108270
	SCN5 206756	SCN6 134499		
SCN5	SCN1 211389	SCN2 165076	SCN3 281960	SCN4 206756
	SCN5 169432	SCN6 219138		
SCN6	SCN1 153021	SCN2 111700	SCN3 205518	SCN4 134499
	SCN5 219138	SCN6 220424		

SUMMARY

KACPS

SCN1 1095267
 SCN2 753370
 SCN3 1339740
 SCN4 1078836
 SCN5 1253751
 SCN6 1044300
 Totals 6565264



G-2.4 Ka-Band Scan Transponder Loading

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Transponder Loading
CPS Voice, Data, and Video Conferencing

<u>From</u>	<u>To</u>	<u>Channel</u>	<u>Class</u>	<u>Circuits</u>
SCN1	SS	C1-3A	KACPS	480000
SCN1	SS	C1-3B	KACPS	480000
SCN1	SS	C1-4A	KACPS	135267
SCN2	SS	C2-3A	KACPS	480000
SCN2	SS	C2-3B	KACPS	273370
SCN2	SS	C2-4A	KACPS	0
SCN3	SS	C3-3A	KACPS	480000
SCN3	SS	C3-3B	KACPS	480000
SCN3	SS	C3-4A	KACPS	379740
SCN4	SS	C4-3A	KACPS	480000
SCN4	SS	C4-3B	KACPS	480000
SCN4	SS	C4-4A	KACPS	118836
SCN5	SS	C5-4A	KACPS	480000
SCN5	SS	C5-4B	KACPS	480000
SCN5	SS	C5-5A	KACPS	293751
SCN6	SS	C6-4A	KACPS	480000
SCN6	SS	C6-4B	KACPS	480000
SCN6	SS	C6-5A	KACPS	84300

Totals

KACPS : 6565264



G-3 - C/KU-BAND PAYLOAD

A combined run for C and Ku-bands was done. Beam Coverages are defined with each of the 84 regions assigned to the smallest beam - see Section 4 of Vol. II for a description of the concept of nested beams and overflows. The beams Ku-W and Ku-E are nested within Ku-CNS, which in turn is nested within C-CNS. Thus traffic from AK1 to OH1 could be loaded to transponders connected either Ku-W to Ku-CNS, or Ku-CNS to Ku-CNS.

The Beam to Beam Matrix introduces multiple traffic classes. No traffic is originally assigned to ANVC; this class is used to differentiate between Ku and C-band transponders. Overflows from Ku-band to C-band also "overflow" from ANVK to ANVC classes (Analog Voice/C to Analog Voice/K). This is shown in the Transponder Loading.

There are also some channels designated as BDCST; these were manually precalculated (based on the scale factor of .0375, or $N=26.7$ satellites).



G-3.1 C And Ku-Band FSS Beam Coverage



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BEAM COVERAGES

Beam: C-CNS

Beam: KU-CNS

AL1	AL2	FL1	IN1	IN2
KY1	KY2	LA2	MI 3	MS2
OH1	TN1	TN2		

Beam: KU-W

AK1	AK2	AZ2	CA1	CA2
CA3	CO2	ID2	IL1	IL2
IO1	IO2	KS2	LA1	MN1
MN2	MO1	MO2	MT1	MT2
ND1	ND2	NE2	NM1	NM2
NV1	NV2	OK1	OK2	OR1
SD2	TX1	TX2	TX3	TX4
TX5	TX6	UT1	WA1	WA2
WI1	WI2	WY2		

Beam: KU-E

CON	DEL	FL2	FL3	GA1
GA2	MAS	MD	ME1	ME2
NC1	NC2	NH	NJ	NY1
NY2	NY3	OH2	PA1	PA2
RI	SC1	SC2	VA1	VA2
VT	WV1	WV2		



G-3.2 C And Ku-Band Beam To Beam Matrix



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Beam to Beam Matrix
Data and Analog Voice -- Scenario II
(KB/S or FVC)

Class = DATA

From:

To:

C-CNS						
KU-CNS						
	KU-CNS	4560	KU-W	15529	KU-E	19346
	KU-W		KU-CNS	15529	KU-W	34786
	KU-E		KU-CNS	19346	KU-W	33290
			KU-W	33290	KU-E	24406

Class = ANVK

From:

To:

C-CNS						
KU-CNS						
	KU-CNS	5174	KU-W	17625	KU-E	21974
	KU-W		KU-CNS	17625	KU-W	39508
	KU-E		KU-CNS	21974	KU-W	37796
			KU-W	37796	KU-E	27734

Class = ANVC

From:

To:

C-CNS
KU-CNS
KU-W
KU-E



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SUMMARY	DATA	ANVK	ANVC
C-CNS	0	0	0
KU-CNS	39435	44773	0
KU-W	83605	94929	0
KU-E	77042	87504	0
Totals	200082	227206	0



Ford Aerospace &
Communications Corporation

G-3.3 C And Ku-Band Transponder Loading



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Transponder Loading
Data, Analog Voice, and Broadcast Video
Scenario II

From	To	Channel	Class	Circuits
C-CNS		H-1	BDCST	
C-CNS		H-2	BDCST	
C-CNS		H-3	BDCST	
C-CNS		H-4	BDCST	
C-CNS	C-CNS	H-5	ANVC	6000
C-CNS	C-CNS	H-6	ANVC	6000
C-CNS	C-CNS	H-7	ANVC	6000
C-CNS	C-CNS	H-8	ANVC	6000
C-CNS	C-CNS	H-9	ANVC	6000
C-CNS	C-CNS	H-10	ANVC	6000
C-CNS	C-CNS	H-11	ANVC	6000
C-CNS	C-CNS	H-12	ANVC	6000
C-CNS	C-CNS	V-1	ANVC	6000
C-CNS	C-CNS	V-2	ANVC	6000
C-CNS	C-CNS	V-3	ANVC	6000
C-CNS	C-CNS	V-4	ANVC	6000
C-CNS	C-CNS	V-5	ANVC	6000
C-CNS	C-CNS	V-6	ANVC	6000
C-CNS	C-CNS	V-7	ANVC	6000
C-CNS	C-CNS	V-8	ANVC	6000
C-CNS	C-CNS	V-9	ANVC	6000
C-CNS	C-CNS	V-10	ANVC	6000
C-CNS	C-CNS	V-11	ANVC	6000
C-CNS	C-CNS	V-12	ANVC	6000
KU-CNS	SS	H-1	DATA	116477
KU-CNS		H-2	BDCST	
KU-CNS		H-3	BDCST	
KU-CNS		H-4	BDCST	
KU-CNS		H-5	BDCST	
KU-CNS	KU-CNS	H-6	ANVK	9000
KU-CNS	KU-CNS	H-7	ANVK	9000
KU-CNS	KU-CNS	H-8	ANVK	9000
KU-W	SS	V-1	DATA	48819
KU-W	KU-E	V-2	ANVK	9000
KU-W	KU-E	V-3	ANVK	9000
KU-W	KU-E	V-4	ANVK	9000
KU-W	KU-E	V-5	ANVK	9000
KU-W	KU-E	V-6	ANVK	1796
KU-W	KU-W	V-7	ANVK	4614
KU-W		V-8		
KU-E	SS	V-1	DATA	34786



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KU-E	KU-W	V-2	ANVK	9000
KU-E	KU-W	V-3	ANVK	9000
KU-E	KU-W	V-4	ANVK	9000
KU-E	KU-W	V-5	ANVK	9000
KU-E	KU-W	V-6	ANVK	1796
KU-E		V-7		
KU-E		V-8		

Totals

DATA	:	200082
ANVK	:	227206
ANVC	:	0



G-4 - LINK BUDGETS FOR SCENARIO II



TABLE 1 - SCENARIO II - C-BAND (FSS) - LINK BUDGET

MODULATION: CSSB, Suppressed Carrier (6000 HVC/36 MHz)

Mid-band Downlink Freq. =	3.95 GHz	Saturated EIRP = 36.0 dBW
Mid-band Uplink Freq. =	6.15 GHz	SFD = -84.0 dBW/m ²
Uplink Free Space Loss =	200.0 dB	Satellite Gain = 161.1 dB
No. of Channels, N =	6000	Satellite G/T = -2.1 dB/K
<hr/>		
Transmitter Power	10.0 dBW	10.00 Watts
Transmit Line Loss	1.3 dB	Allocation
Transmitting Antenna Gain	25.0 dBi	Gridded Reflector
Output Backoff	5.0 dB	
Net EIRP	<u>28.7 dBW</u>	
Total Load	22.6 dBm0	-15.2 + 10 Log N
Reference Power EIRP, Pr	<u>6.1 dBW</u>	Net EIRP - Total Load
Free Space Loss	196.1 dB	38700 km; 30° Elev
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
Net Path Loss	<u>196.6 dB</u>	
Power Flux Density	-134.0 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	50.1 dBi	10 m dish, 60% eff.
Receive Line Loss	0.1 dB	Allocation
System Noise Temperature	19.4 dB-K	
Receive G/T	<u>30.7 dB/K</u>	(Clear Sky)
Boltzmann's Constant	-228.6 dBW/Hz-K	
Downlink Pr/No	<u>68.8 dB-Hz</u>	
Uplink Pr/No	71.6 dB-Hz	Worst-case
Downlink Interference Pr/Io	68.8 dB-Hz	
Uplink Interference Pr/Io	68.9 dB-Hz	
Intermodulation Pr/IMo	68.9 dB-Hz	14.7 dB = P1/P3
Terrestrial Pr/Io	86.7 dB-Hz	
Cross-polarization Pr/Io	79.6 dB-Hz	
Overall Pr/No	<u>62.2 dB-Hz</u>	
Required Pr/No	61.9 dB-Hz	
Pr/No Margin	<u>0.3 dB-Hz</u>	



TABLE 2 - SCENARIO II - C-BAND (FSS) - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 6.15 GHz

Transmitter Power	29.0 dBW	800.00 Watts
Transmit Line Loss	0.1 dB	Allocation
Transmitting Antenna Gain	54.0 dBi	10 m dish, 60% eff.
Input Back-Off	3.0 dB	
	<hr/>	
Net EIRP	79.9 dBW	
Free Space Loss	200.0 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
	<hr/>	
Net Path Loss	200.5 dB	
Power Flux Density	-82.8 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	25.0 dBi	Gridded Reflector
Receive Line Loss	1.3 dB	Allocation
System Noise Temperature	27.1 dB-K	
	<hr/>	
Receive G/T	-2.1 dB/K	(Clear Sky)
Received Carrier Level	-95.6 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	105.9 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
	<hr/>	
Received C/N	33.4 dB	Worst-case



TABLE 3 - SCENARIO II - C (FSS) - DOWNLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 3.95 GHz

Transmitter Power	10.0 dBW	10.00 Watts
Transmit Line Loss	1.3 dB	Allocation
Transmitting Antenna Gain	25.0 dBi	Gridded Reflector
Output Back-Off	3.0 dB	
	<u>EIRP</u>	
	30.7 dBW	
Free Space Loss	196.1 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
	<u>Net Path Loss</u>	
	196.6 dB	
Power Flux Density	-132.0 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	50.1 dBi	10 m dish, 60% eff.
Receive Line Loss	0.1 dB	Allocation
System Noise Temperature	19.5 dB-K	
	<u>Receive G/T</u>	
	30.6 dB/K	(Clear Sky)
Received Carrier Level	-115.8 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	93.3 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
	<u>Received C/N</u>	
	20.7 dB	
Required C/N	18.0 dB	Studio Reception
	<u>Link Margin</u>	
	2.7 dB	
Overall C/N	20.5 dB	33.4 dB Uplink C/N
Weighted (S/N) _w Ratio	51.5 dB	CCIR Type M
Minimum (S/N) _w	48.0 dB	Quality: Excellent (TASO)
	<u>(S/N)_w Margin</u>	
	3.5 dB	



TABLE 4 - SCENARIO II - Ku-BAND (FSS) - LINK BUDGET

MODULATION: CSSB, Suppressed Carrier (6000 HVC/36 MHz)

Mid-band Downlink Freq. =	11.95 GHz	Saturated EIRP =	39.0 dBW
Mid-band Uplink Freq. =	14.25 GHz	SFD =	-84.0 dBW/m ²
Uplink Free Space Loss =	207.3 dB	Satellite Gain =	171.4 dB
No. of Channels, N =	6000	Satellite G/T =	1.3 dB/K
<hr/>			
Transmitter Power	5.4 dBW	3.50 Watts	
Transmit Line Loss	1.1 dB	Allocation	
Transmitting Antenna Gain	35.2 dBi	Gridded Reflector	
Output Backoff	5.0 dB		
Net EIRP	<u>34.5 dBW</u>		
Total Load	22.6 dBm0	-15.2 + 10 Log N	
Reference Power EIRP, Pr	<u>12.0 dBW</u>	Net EIRP - Total Load	
Free Space Loss	205.8 dB	38700 km; 30° Elev.	
Pointing Loss	0.5 dB	Allocation	
Atmospheric Degradation	0.1 dB		
Rain Margin	3.0 dB		
Net Path Loss	<u>209.4 dB</u>		
Power Flux Density	-128.2 dBW/m ²	(Clear Sky)	
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% eff.	
Receive Line Loss	0.2 dB	Allocation	
System Noise Temperature	22.3 dB-K		
Receive G/T	<u>34.4 dB/K</u>	(Clear Sky)	
Boltzmann's Constant	-228.6 dBW/Hz-K		
Downlink Pr/No	<u>65.6 dB-Hz</u>		
Uplink Pr/No	70.5 dB-Hz	Worst-case	
Downlink Interference Pr/Io	78.2 dB-Hz		
Uplink Interference Pr/Io	75.9 dB-Hz		
Intermodulation Pr/IMo	68.9 dB-Hz	14.7 dB = P1/P3	
Terrestrial Pr/Io	86.6 dB-Hz		
Cross-polarization Pr/Io	85.5 dB-Hz		
Overall Pr/No	<u>62.7 dB-Hz</u>		
Required Pr/No	61.9 dB-Hz		
Pr/No Margin	<u>0.8 dB-Hz</u>		



TABLE 5 - SCENARIO II - Ku (FSS) - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/54 MHz)

Mid-band Frequency = 14.25 GHz

Transmitter Power	29.0 dBW	800.00 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7 m dish, 60% eff.
Input Back-Off	3.0 dB	
Net EIRP	<u>84.0 dBW</u>	
Free Space Loss	207.3 dB	38700 km; 30 ⁰ Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>210.9 dB</u>	
Power Flux Density	-78.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	29.0 dBi	Gridded Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	
Receive G/T	<u>1.3 dB/K</u>	(Clear Sky)
Received Carrier Level	-97.8 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	103.0 dB-Hz	
Receiver IF Bandwidth	73.8 dB-Hz	24 MHz IF Bandwidth
Received C/N	<u>29.2 dB</u>	CONUS, Worst-case



TABLE 6 - SCENARIO II - Ku (FSS) - DOWNLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/54 MHz)

Mid-band Frequency = 11.95 GHz

Transmitter Power	5.4 dBW	3.50 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	35.2 dBi	Gridded Reflector
Output Back-Off	3.0 dB	
Net EIRP	<u>36.5 dBW</u>	
Free Space Loss	205.8 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>206.4 dB</u>	
Power Flux Density	-126.2 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% eff.
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-113.1 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	93.0 dB-Hz	
Receiver IF Bandwidth	73.8 dB-Hz	24 MHz IF Bandwidth
Received C/N	<u>19.2 dB</u>	
Required C/N	18.0 dB	Studio Reception
Link Margin	<u>1.2 dB</u>	
Overall C/N	18.8 dB	29.2 dB Uplink C/N
Weighted (S/N) _w Ratio	50.0 dB	CCIR Type M
Minimum (S/N) _w	48.0 dB	Quality: Excellent (TASO)
(S/N) _w Margin	<u>2.0 dB</u>	



TABLE 7 - SCENARIO II - Ku-BAND (FSS) - UPLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Information Data Rate = 108 Mb/s

Mid-band Frequency = 14.25 GHz

	Uncoded	Remarks
Transmitter Power	29.0 dBW	800.0 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7 m dish, 60% efficiency
EIRP	<u>87.0 dBW</u>	
Free Space Loss	207.3 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>210.9 dB</u>	
Power Flux Density	-75.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	29.0 dBi	Gridded Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	
Receive G/T	<u>1.3 dB/K</u>	(Clear Sky)
Received Carrier Level	-94.8 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>106.0 dB-Hz</u>	



TABLE 8 - SCENARIO II - Ku-BAND (FSS) - DOWNLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Mid-band Frequency = 11.95 GHz

	Uncoded	Remarks
Transmitter Power	5.4 dBW	3.5 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	35.2 dBi	Gridded Reflector
EIRP	<u>39.5 dBW</u>	
Free Space Loss	205.8 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>206.4 dB</u>	
Power Flux Density	-123.2 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% efficiency
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-110.1 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>96.0 dB-Hz</u>	
Information Bit Rate	80.3 dB-Hz	108 Mb/s
Implementation Loss	1.5 dB	Allocation
Required Eb/No	14.0 dB	BER=10 ⁻⁶
Required C/kT	<u>95.8 dB-Hz</u>	
=====		
C/kT Margin	0.2 dB	



TABLE 9 - SCENARIO II - Ku-BAND (DBS) - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (1 video/24 MHz)

Mid-band Frequency = 17.55 GHz

Transmitter Power	29.0 dBW	800.00 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	60.0 dBi	7 m dish, 60% eff.
Net EIRP	<u>88.8 dBW</u>	
Free Space Loss	209.1 dB	38700 km; 30 ⁰ Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>212.7 dB</u>	
Power Flux Density	-73.9 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	29.8 dBi	Solid Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.9 dB-K	
Receive G/T	<u>1.9 dB/K</u>	(Clear Sky)
Received Carrier Level	-94.1 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	106.6 dB-Hz	
Receiver IF Bandwidth	73.8 dB-Hz	24 MHz IF Bandwidth
Received C/N	<u>32.8 dB</u>	Mountain, Worst-case



TABLE 10 - SCENARIO II - Ku (DBS) - DOWNLINK BUDGET

MODULATION: FM-FDMA Video channel (1 video/24 MHz)

Mid-band Frequency = 12.45 GHz

Transmitter Power	8.1 dBW	6.50 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	31.4 dBi	Solid Reflector
Net EIRP	<u>38.4 dBW</u>	
Free Space Loss	206.1 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	2.0 dB	
Net Path Loss	<u>208.7 dB</u>	
Power Flux Density	-124.3 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	57.0 dBi	7 m dish, 60% eff.
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.5 dB/K</u>	(Clear Sky)
Received Carrier Level	-113.3 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	92.8 dB-Hz	
Receiver IF Bandwidth	73.8 dB-Hz	24 MHz IF Bandwidth
Received C/N	<u>19.0 dB</u>	
Required C/N	18.0 dB	Studio Reception
Link Margin	===== 1.0 dB	
Overall C/N	18.9 dB	32.8 dB Uplink C/N
Weighted (S/N) _w Ratio	50.1 dB	CCIR Type M
Minimum (S/N) _w	48.0 dB	Quality: Excellent (TASO)
(S/N) _w Margin	===== 2.1 dB	



TABLE 11 - SCENARIO II - Ka-BAND (FSS) - UPLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Mid-band Frequency = 28.75 GHz

	Uncoded	Remarks
Transmitter Power	23.0 dBW	200.0 Watts
Transmit Line Loss	1.0 dB	Allocation
Transmitting Antenna Gain	64.3 dBi	7 m dish, 60% efficiency
EIRP	<u>86.3 dBW</u>	
Free Space Loss	213.4 dB	38700 km; 30 ⁰ Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	1.0 dB	
Rain Margin	10.0 dB	
Net Path Loss	<u>224.9 dB</u>	
Power Flux Density	-76.4 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	53.0 dBi	Solid Reflector
Receive Line Loss	1.0 dB	Allocation
System Noise Temperature	28.8 dB-K	
Receive G/T	<u>24.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-85.6 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>114.2 dB-Hz</u>	



TABLE 12 - SCENARIO II - Ka-BAND (FSS) - DOWNLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Mid-band Frequency = 18.95 GHz

	Uncoded	Remarks
Transmitter Power	14.8 dBW	30.0 Watts
Transmit Line Loss	1.0 dB	Allocation
Transmitting Antenna Gain	53.0 dBi	Solid Reflector
EIRP	<u>66.8 dBW</u>	
Free Space Loss	209.8 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	1.0 dB	
Rain Margin	10.0 dB	
Net Path Loss	<u>221.3 dB</u>	
Power Flux Density	-96.0 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	60.7 dBi	7 m dish, 60% efficiency
Receive Line Loss	1.0 dB	Allocation
System Noise Temperature	26.0 dB-K	
Receive G/T	<u>34.7 dB/K</u>	(Clear Sky)
Received Carrier Level	-93.8 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>108.9 dB-Hz</u>	
Information Bit Rate	89.8 dB-Hz	960 Mb/s
Implementation Loss	2.0 dB	Allocation
Required Eb/No	14.0 dB	BER=10 ⁻⁶
Required C/kT	<u>105.8 dB</u>	
=====		
C/kT Margin	3.0 dB	



TABLE 13 - SCENARIO II - Ka-BAND (Scan) - UPLINK BUDGET

MODULATION: SS/TDMA/QPSK

CODING: Convolutional, r=1/2, k=7; Viterbi Decoding Algorithm, Q=8

Mid-band Frequency = 28.75 GHz

	Uncoded	Coded	Remarks
Transmitter Power	23.0	23.0 dBW	200.0 W uncoded; 200.0 W coded
Transmit Line Loss	1.0	1.0 dB	Allocation
Transmitting Antenna Gain	61.4	61.4 dBi	5 m dish, 60% efficiency
EIRP	<u>83.4</u>	<u>83.4 dBW</u>	
Free Space Loss	213.4	213.4 dB	38700 km; 30 ⁰ Elev. Angle
Pointing Loss	0.5	0.5 dB	Allocation
Atmospheric Degradation	1.0	1.0 dB	
Rain Margin	0.0	10.0 dB	
Net Path Loss	<u>214.9</u>	<u>224.9 dB</u>	
Power Flux Density	-79.3	-79.3 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	50.8	50.8 dBi	Solid Reflector
Receive Line Loss	1.0	1.0 dB	Allocation
System Noise Temperature	28.8	28.8 dB-K	
Receive G/T	<u>22.0</u>	<u>22.0 dB/K</u>	(Clear Sky)
Received Carrier Level	-80.7	-90.7 dBW	
Boltzmann's Constant	-228.6	-228.6 dBW/Hz-K	
Received C/kT	<u>119.1</u>	<u>109.1 dB-Hz</u>	
Information Bit Rate	86.8	83.8 dB-Hz	480 Mb/s; 240 Mb/s
Implementation Loss	2.0	2.0 dB	Allocation
Required Eb/No	10.5	6.5 dB	Coding Gain=4.0 dB; BER=10 ⁻⁶
Required C/kT	<u>99.3</u>	<u>92.3 dB</u>	
	=====	=====	
C/kT Margin	19.8	16.8 dB	



TABLE 14 - SCENARIO II - Ka-BAND (Scan) - DOWNLINK BUDGET

MODULATION: SS/TDMA/QPSK

CODING: Convolutional, r=1/2; k=7; Viterbi Decoding Algorithm, Q=8

Mid-band Frequency = 18.95 GHz

	Uncoded	Coded	Remarks
Transmitter Power	8.8	18.8 dBW	7.5 W uncoded; 75.0 W coded
Transmit Line Loss	1.0	1.0 dB	Allocation
Transmitting Antenna Gain	50.8	50.8 dBi	Solid Reflector
EIRP	58.6	68.6 dBW	
Free Space Loss	209.8	209.8 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5	0.5 dB	Allocation
Atmospheric Degradation	1.0	1.0 dB	
Rain Margin	0.0	10.0 dB	
Net Path Loss	211.3	221.3 dB	
Power Flux Density	-104.2	-94.2 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	61.4	61.4 dBi	5 m dish, 60% efficiency
Receive Line Loss	1.0	1.0 dB	Allocation
System Noise Temperature	26.0	26.0 dB-K	
Receive G/T	35.4	35.4 dB/K	(Clear Sky)
Received Carrier Level	-91.3	-91.3 dBW	
Boltzmann's Constant	-228.6	-228.6 dBW/Hz-K	
Received C/kT	111.3	111.3 dB-Hz	
Information Bit Rate	86.8	83.8 dB-Hz	480 Mb/s; 240 Mb/s
Implementation Loss	2.0	2.0 dB	Allocation
Required Eb/No	10.5	6.5 dB	Coding Gain=4.0 dB; BER=10 ⁻⁶
Required C/kT	99.3	92.3 dB	
	=====	=====	
C/kT Margin	12.0	19.0 dB	



APPENDIX H

PAYLOAD DETAILS FOR SCENARIO IV

H-1 - LINK BUDGETS FOR SCENARIO IV

The following tables show the projected link budgets for the Ku-Band FSS and Ku-Band DBS services.



TABLE 1 - SCENARIO IV - Ku-BAND (FSS) - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (1 video/24 MHz)

Mid-band Frequency = 14.25 GHz

Transmitter Power	29.0 dBW	800.00 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7 m dish, 60% eff.
Net EIRP	<u>87.0 dBW</u>	
Free Space Loss	207.3 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>210.9 dB</u>	
Power Flux Density	-75.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	29.0 dBi	Gridded Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	
Receive G/T	<u>1.3 dB/K</u>	(Clear Sky)
Received Carrier Level	-94.8 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	106.0 dB-Hz	
Receiver IF Bandwidth	73.8 dB-Hz	24 MHz IF Bandwidth
Received C/N	<u>32.2 dB</u>	CONUS, Worst-case



TABLE 2 - SCENARIO IV - Ku (FSS) - DOWNLINK BUDGET

MODULATION: FM-FDMA Video Channel (1 video/24 MHz)

Mid-band Frequency = 11.95 GHz

Transmitter Power	17.0 dBW	50.00 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	29.0 dBi	Gridded Reflector
Net EIRP	<u>44.9 dBW</u>	
Free Space Loss	205.8 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>206.4 dB</u>	
Power Flux Density	-117.9 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% eff.
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-104.8 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	101.4 dB-Hz	
Receiver IF Bandwidth	73.8 dB-Hz	24 MHz IF Bandwidth
Received C/N	<u>27.6 dB</u>	
Required C/N	18.0 dB	Studio Reception
Link Margin	<u>9.6 dB</u>	
Overall C/N	26.3 dB	32.2 dB Uplink C/N
Weighted (S/N) _w Ratio	57.5 dB	CCIR Type M
Minimum (S/N) _w	56.0 dB	Broadcast Quality
(S/N) _w Margin	<u>1.5 dB</u>	



TABLE 3 - SCENARIO IV - Ku-BAND (DBS) - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (1 video/24 MHz)

Mid-band Frequency = 17.55 GHz

Transmitter Power	27.0 dBW	500.00 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	60.0 dBi	7 m dish, 60% eff.
Net EIRP	<u>86.8 dBW</u>	
Free Space Loss	209.1 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>212.7 dB</u>	
Power Flux Density	-76.0 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	32.8 dBi	Solid Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.9 dB-K	
Receive G/T	<u>4.9 dB/K</u>	(Clear Sky)
Received Carrier Level	-93.1 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	107.6 dB-Hz	
Receiver IF Bandwidth	73.8 dB-Hz	24 MHz IF Bandwidth
Received C/N	<u>33.8 dB</u>	Mountain, Worst-case



TABLE 4 - SCENARIO IV - Ku (DBS) - DOWNLINK BUDGET

MODULATION: FM-FDMA Video channel (1 video/24 MHz)

Mid-band Frequency = 12.45 GHz

Transmitter Power	23.0 dBW	200.0 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	33.7 dBi	Solid Reflector
Net EIRP	<u>55.6 dBW</u>	
Free Space Loss	206.1 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>209.7 dB</u>	
Power Flux Density	-107.1 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	57.0 dBi	7 m dish, 60% eff.
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.5 dB/K</u>	(Clear Sky)
Received Carrier Level	-97.1 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	109.0 dB-Hz	
Receiver IF Bandwidth	73.8 dB-Hz	24 MHz IF Bandwidth
Received C/N	<u>35.2 dB</u>	
Required C/N	18.0 dB	Studio Reception
Link Margin	<u>17.2 dB</u>	
Overall C/N	31.4 dB	33.8 dB Uplink C/N
Weighted (S/N) _w Ratio	62.7 dB	CCIR Type M
Minimum (S/N) _w	56.0 dB	Broadcast Quality
(S/N) _w Margin	<u>6.7 dB</u>	



APPENDIX I

PAYLOAD DETAILS FOR SCENARIO V

I-1 - KU-BAND FSS PAYLOAD

In Scenario V, the Ku- and C-Band runs were made separately, and the overflow from Ku was loaded to C.

Beam coverages are defined, and the acronyms used on the printouts are correlated to beam numbers used in Figures 5.4.2-2 and 5.4.5-2 of Volume II. The C-band beams are also included here for proper assignment of traffic in areas not covered by Ku beams.

Following the transponder loading tables, is an overflow matrix; it is exactly the same format as the original beam to beam matrix, but contains traffic not loaded to the Ku-band transponders.

The first set of printouts is for the case where all broadcast video is carried by Scenario IV platforms. An identical set of printouts is included for the case where broadcast video uses Scenario V channels.

Scale factors used were .114 (N=8.8 satellites) for the case where no broadcast video is assigned, and .0875 (N= 11.4 satellites) if video is carried.



I-1.1 Ku-Band Beam Coverages



KU-BAND BEAMS:

<u>BEAM NO.</u>	<u>BEAM ACRONYM</u>	<u>BEAM DESCRIPTION</u>
1	NE-AC	Northeastern Section of U.S encircling NE-NYC
2	W-MW	Wisconsin, Iowa, and parts of Missouri/Illinois
3	SE-GC	Gulf Coast and inland section of Southeast
4	NE-NYC	Smaller Northeastern Section centered around New York
5	EONW	Southern Michigan, Ohio, Indiana (split)
6	NW-PC	Northwest quadrant of CONUS
7	SW-OC	Colorado/New Mexico, Arizona, and most of California/Nevada/Utah
8	SW-GC	Texas/Oklahoma
9	SE-AC	South Carolina, Georgia, and Florida



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BEAM COVERAGES

Beam: DUMMY					
Beam: NE-AC					
MD	ME1	ME2	NH	NY1	
NY2	PA1	PA2	VA2	VT	
WV2					
Beam: W-MW					
IL1	IL2	IO1	IO2	MO1	
WI1	WI2				
Beam: SE-CC					
AK2	AL1	AL2	FL1	LA1	
LA2	MS2				
Beam: NE-NYC					
CON	DEL	MAS	NJ	NY3	
RI					
Beam: E-MW1					
MI3	OH1	OR2			
Beam: NW-PC					
CA1	ID2	MN1	MN2	MT1	
MT2	ND1	ND2	NE2	NV1	
OR1	SD2	UT1	WA1	WA2	
WY2					
Beam: SW-PC					
AZ2	CA2	CA3	CO2	NM1	
NM2	NV2	TX2			
Beam: SW-CC					
MO2	OK2	TX1	TX3	TX4	
TX5	TX6				
Beam: SE-AC					
FL2	FL3	GA1	GA2	NC1	
NC2	SC1	SC2			
Beam: B1-NE					
Beam: B2-NE					
VA1	WV1	IN2	KY2	TN2	



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Beam: B3-MW
KY1

TN1

AK1

KS2

Beam: B4-W
OK1

Beam: E-MW2
IN1



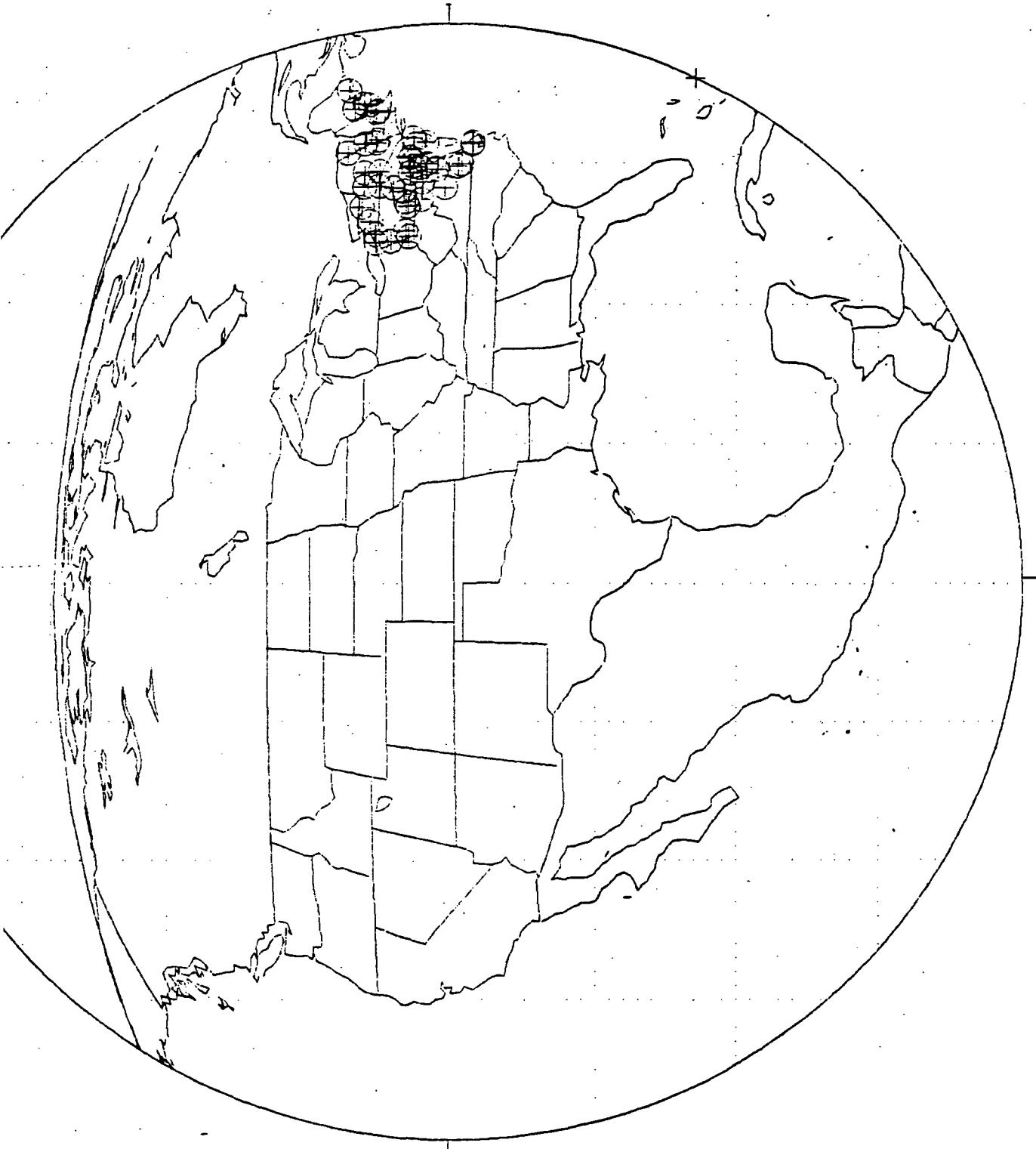
I-1.2 Ku-Band Beam Coverage To SMSA's



Ku-Band Beam Coverages

Page 1

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
1	ALNY	ALBANY-SCHENECTADY-TROY NY	42.40	73.49
1	ALPA	ALLENTOWN-BETHLEHEM-EASTON PA-NJ	40.11	74.36
1	ATPA	ALTOONA PA	40.32	78.23
1	BAMD	BALTIMORE MD	39.18	76.38
1	BAME	BANGOR ME	44.49	68.47
1	BINY	BINGHAMTON NY-PA	42.06	75.55
1	BUNY	BUFFALO NY	42.52	78.55
1	BUVT	BURLINGTON VT	44.28	73.14
1	CHVA	CHARLOTTESVILLE VA	38.02	78.29
1	CUMD	CUMBERLAND MD-WV	39.40	78.47
1	ELNY	ELMIRA NY	42.06	76.50
1	ERPA	ERIE PA	42.07	80.05
1	GLNY	GLENS FALLS NY	43.17	73.14
1	HAMD	HAGERSTOWN MD	39.39	77.44
1	HAPA	HARRISBURG PA	40.17	76.54
1	JOPA	JOHNSONTOWN PA	40.20	78.56
1	LAPA	LANCASTER PA	40.01	76.19
1	LEME	LEWISTON-AUBURN ME	44.06	70.14
1	MANH	MANCHESTER NH	42.59	71.28
1	NANH	NASHUA NH	42.44	71.28
1	NANY	NASSAU-SUFFOLK NY	42.31	73.36
1	NEVA	NEWPORT NEWS-HAMPTON VA	36.59	76.26
1	NOVA	NORFOLK-VIRGINIA BEACH-PORTSMO VA-NC	36.54	76.18
1	NOPA	NORTHEAST PENNSYLVANIA PA	41.20	75.45
1	PEVA	PETERSBURG-COLONIAL HEIGHTS-HO VA	37.14	77.24
1	PHPA	PHILADELPHIA PA-NJ	40.00	75.10
1	PIPA	PITTSBURGH PA	40.26	80.00
1	POME	PORTLAND ME	43.41	70.18
1	PONH	PORTSMOUTH-DOVER-ROCHESTER NH-ME	43.03	70.47
1	REPA	READING PA	40.20	75.55
1	RIVA	RICHMOND VA	37.34	77.27
1	RONY	ROCHETER NY	43.12	77.37
1	SHPA	SHARON PA	41.16	80.30
1	STPA	STATE COLLEGE PA	40.48	77.52
1	SYNY	SYRACUSE NY	43.03	76.10
1	UTNY	UTICA-ROME NY	43.06	75.15
1	VINJ	VINELAND-MILLVILLE-RIDGETON NJ	39.29	75.02
1	WADC	WASHINGTON DC-MD	38.55	77.00
1	WHWV	WHEELING WV-OH	40.05	80.43
1	WIPA	WILLIAMSPORT PA	41.16	77.03
1	YOPA	YORK PA	39.57	76.44

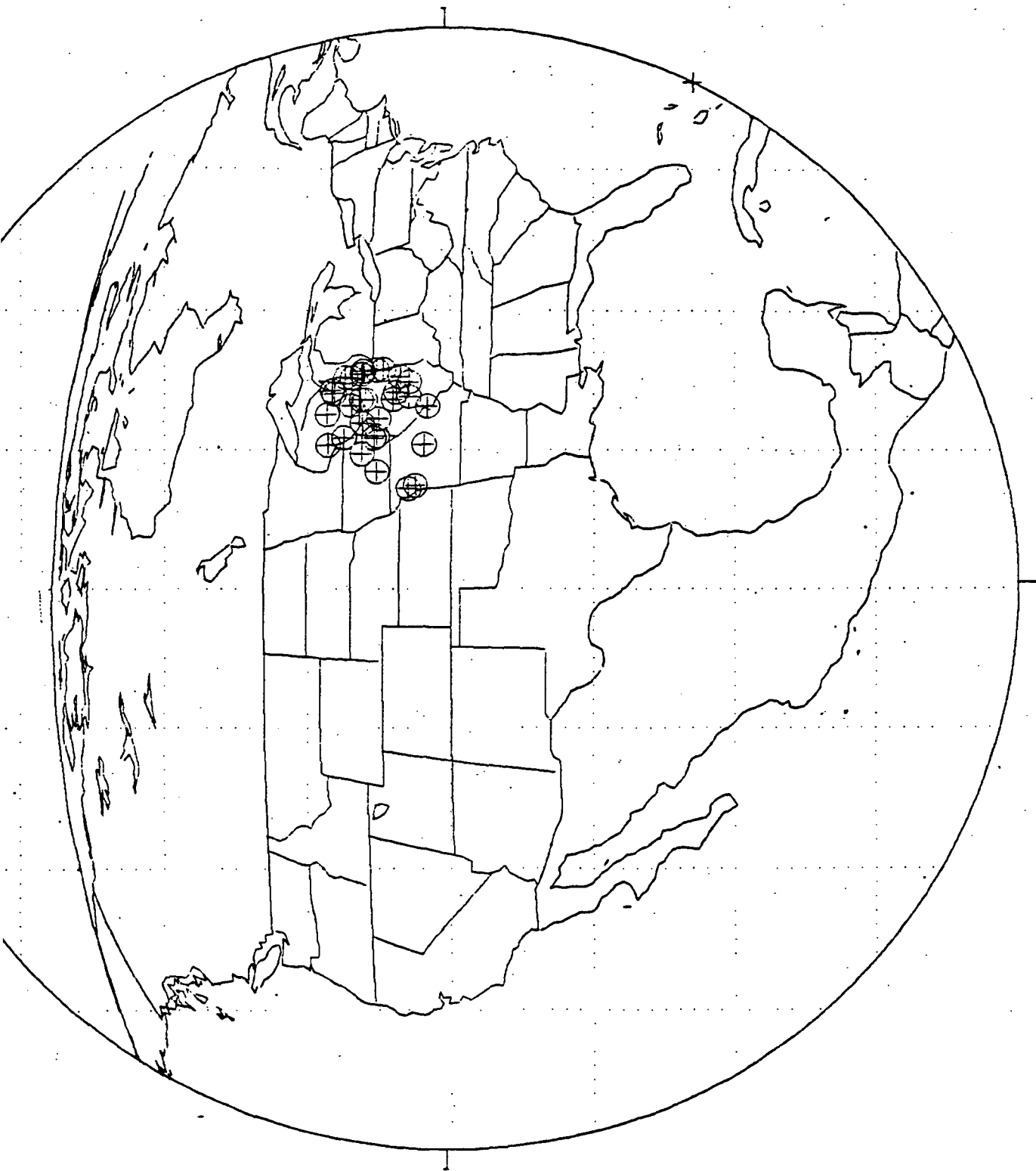


CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 1 OF KU BAND
03/18/85 15.525



Ku-Band Beam Coverages
Page 2

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
2	APWI	APPLETON-OSHKOSH WI	44.17	88.24
2	BLIL	BLOOMINGTON-NORMAL IL	40.29	89.00
2	CEIA	CEDAR RAPIDS IA	41.59	91.39
2	CHIL	CHAMPAIGN-URBANA-RANTOUL IL	40.07	88.14
2	CIIL	CHICAGO IL	41.50	87.45
2	COMO	COLUMBIA MO	38.58	92.20
2	DAIA	DAVENPORT-ROCK ISLAND-MOLINE IA-IL	41.30	90.34
2	DEIL	DECATUR IL	39.51	88.57
2	DEIA	DES MOINES IA	41.35	93.35
2	DUIA	DUBUQUE IA	42.31	90.41
2	EAWI	EAU CLAIRE WI	44.50	91.30
2	GRWI	GREEN BAY WI	44.32	88.00
2	IOIW	IOWA CITY IW	41.39	91.31
2	JAWI	JANESVILLE-BELIOT WI	42.42	89.02
2	KAIL	KANKAKEE IL	41.08	87.52
2	KAMO	KANSAS CITY MO-KS	39.05	94.37
2	KEWI	KENOSHA WI	42.34	87.34
2	LAWI	LA CROSSE WI	43.48	91.04
2	MAWI	MADISON WI	43.04	89.22
2	MIWI	MILWAUKEE WI	43.03	87.56
2	PEIL	PEORIA IL	40.43	89.38
2	RAWI	RACINE WI	42.42	87.50
2	ROIL	ROCKFORD IL	42.16	89.06
2	SHWI	SHEBOYGAN WI	43.46	87.44
2	SPIL	SPRINGFIELD IL	39.49	89.39
2	STMO	ST JOSEPH MO	39.45	94.51
2	SLMO	ST LOUIS MO-IL	38.40	90.15
2	WAIA	WATERLOO-CEDAR FALLS IA	42.30	92.20
2	WAWI	WAUSAU WI	44.58	89.40

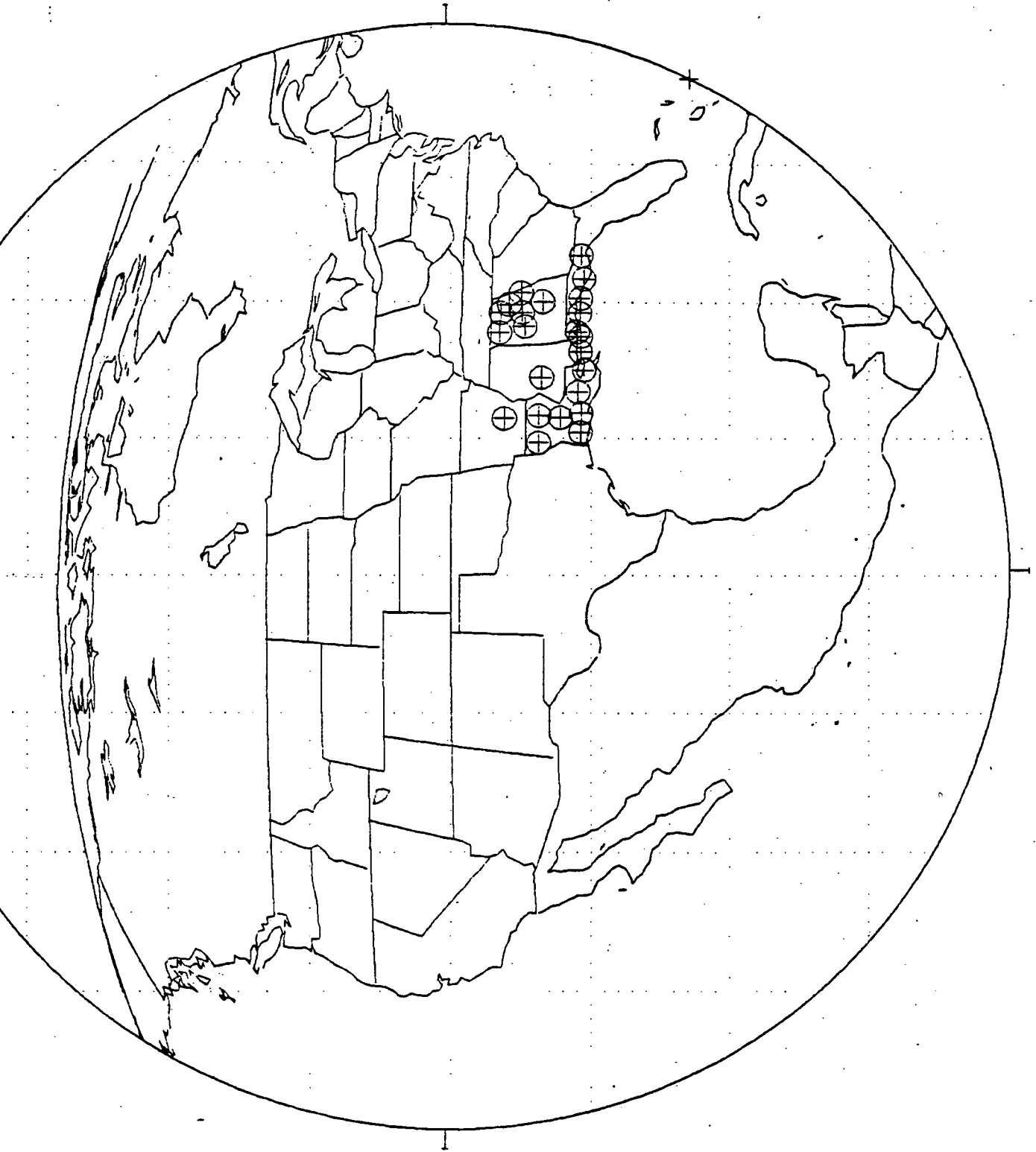


CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 2 OF KU BAND
03/26/85 14.295



Ku-Band Beam Coverages
Page 3

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
3	ALLA	ALEXANDRIA LA	31.19	92.29
3	ANAL	ANNISTON AL	33.38	85.50
3	BALA	BATON ROUGE LA	30.30	91.10
3	BIMS	BILOXI-GULFPORT MS	30.21	89.08
3	BIAL	BIRMINGHAM AL	33.30	86.55
3	FLAL	FLORENCE AL	34.48	87.40
3	FTFL	FORT WALTON BEACH FL	30.25	86.38
3	GAAL	GADSDEN AL	34.00	86.00
3	HUAL	HUNTSVILLE AL	34.44	86.35
3	JAMS	JACKSON MS	32.20	90.11
3	LALA	LAFAYETTE LA	30.12	92.18
3	LKLA	LAKE CHARLES LA	30.13	93.13
3	MOAL	MOBILE AL	30.40	88.05
3	MOLA	MONROE LA	32.31	92.06
3	MNAL	MONTGOMERY AL	32.22	86.20
3	NELA	NEW ORLEANS LA	30.00	90.03
3	PAFL	PANAMA CITY FL	30.10	85.41
3	PAMS	PASCAGOULA-MOSS POINT PATERSON MS	30.21	88.32
3	PEFL	PENSACOLA FL	30.26	87.12
3	PIAR	PINE BLUFF AR	34.13	92.00
3	SHLA	SHREVEPORT LA	32.30	93.46
3	TAFI	TALLAHASSEE FL	30.26	84.19
3	TUAL	TUSCALOOSA AL	33.12	87.33



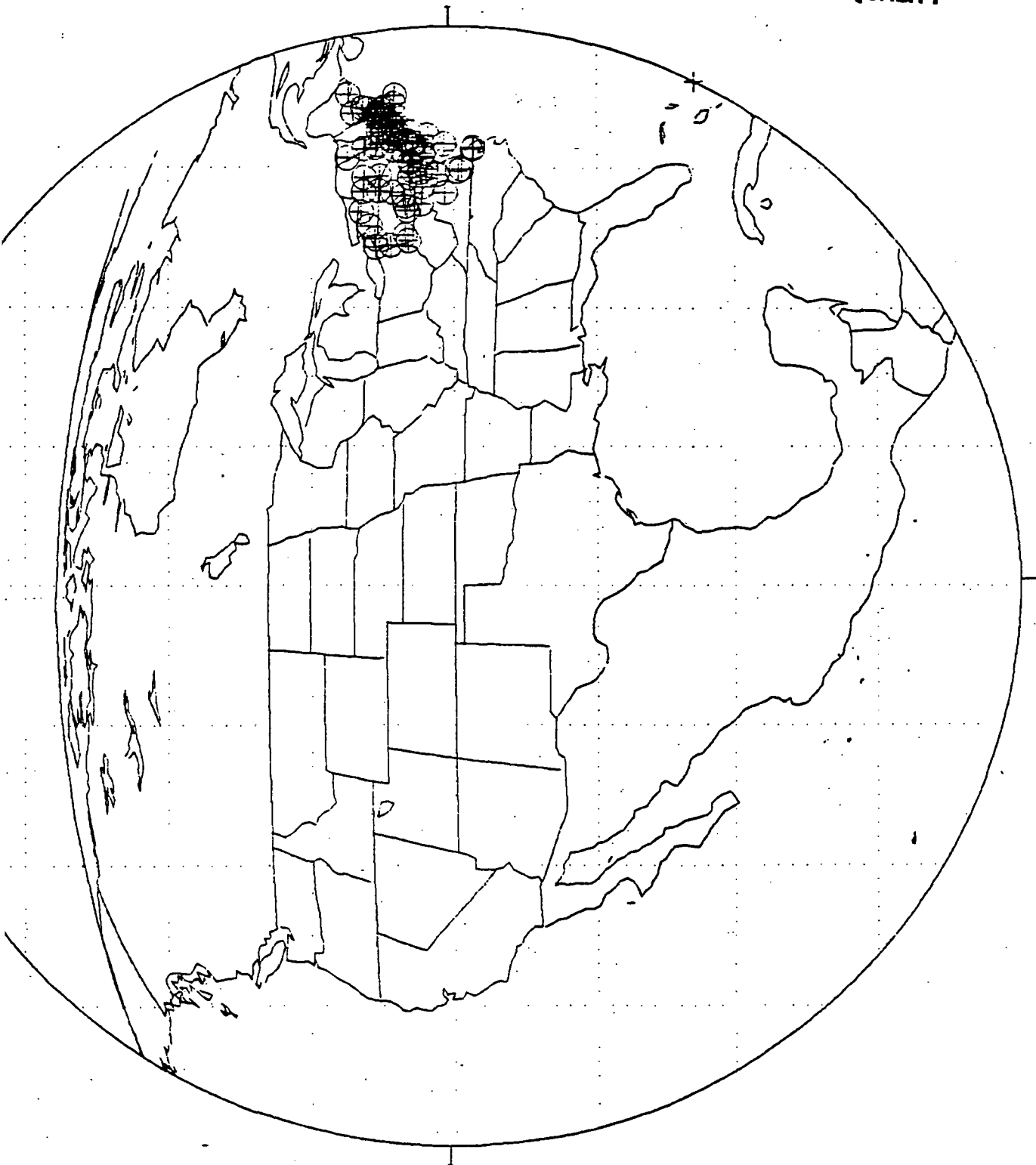
CASE ... SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 3 OF KU BAND
03/26/85 14.303



Ku-Band Beam Coverages
Page 4

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
4	ATNJ	ATLANTIC CITY NJ	39.23	74.27
4	BOMA	BOSTON MA	42.20	71.05
4	BRCT	BRIDGEPORT CT	41.12	73.12
4	BICT	BRISTOL CT	41.41	72.57
4	BRMA	BROCKTON MA	42.06	71.01
4	DACT	DANBURY CT	41.24	73.26
4	FAMA	FALL RIVER MA-RI	41.42	71.08
4	FIMA	FITCHBURG-LEOMISTER MA	42.35	71.50
4	HACT	HARTFORD CT	41.45	72.42
4	JENJ	JERSEY CITY NJ	40.44	74.04
4	LAMA	LAWRENCE-HAVERHILL MA-NH	42.41	71.12
4	LONJ	LONG BRANCH-ASBURY PARK NJ	40.17	73.59
4	LOMA	LOWELL MA-NH	42.38	71.19
4	MECT	MERIDEN CT	42.32	72.48
4	NEMA	NEW BEDFORD MA	41.38	70.55
4	NECT	NEW BRITAIN CT	41.40	72.47
4	NENJ	NEW BRUNSWICK-PERTH AMBOY-SAYR NJ	40.29	74.27
4	NWCT	NEW HAVEN-WEST HAVEN CT	41.18	72.55
4	NLCT	NEW LONDON-NORWICH CT-RI	41.21	72.06
4	NENY	NEW YORK NY-NJ	40.40	73.50
4	NWNJ	NEWARK NJ	40.44	74.11
4	NWNY	NEWBRGH-MIDDLETOWN NY	41.26	74.26
4	NOCT	NORWALK CT	41.07	73.25
4	PANJ	PATERSON-CLIFTON-PASSAIC NJ	40.52	74.08
4	PIMA	PITTSFIELD MA	38.23	75.26
4	PONY	POUGHKEEPSIE NY	41.43	73.56
4	PRRI	PROVIDENCE-WAWICK-PAWTUCKET RI-MA	39.42	75.53
4	SPCT	SPRINGFIELD-CHICOPEE-HOLYOKE CT-MA	42.07	72.35
4	STCT	STAMFORD CT	41.03	73.32
4	TRNJ	TRENTON NJ	40.15	74.43
4	WACT	WATERBURY CT	41.33	73.03
4	WIDE	WILMINGTON DE-NJ	39.46	75.31
4	WOMA	WORCESTER MA	42.17	71.48

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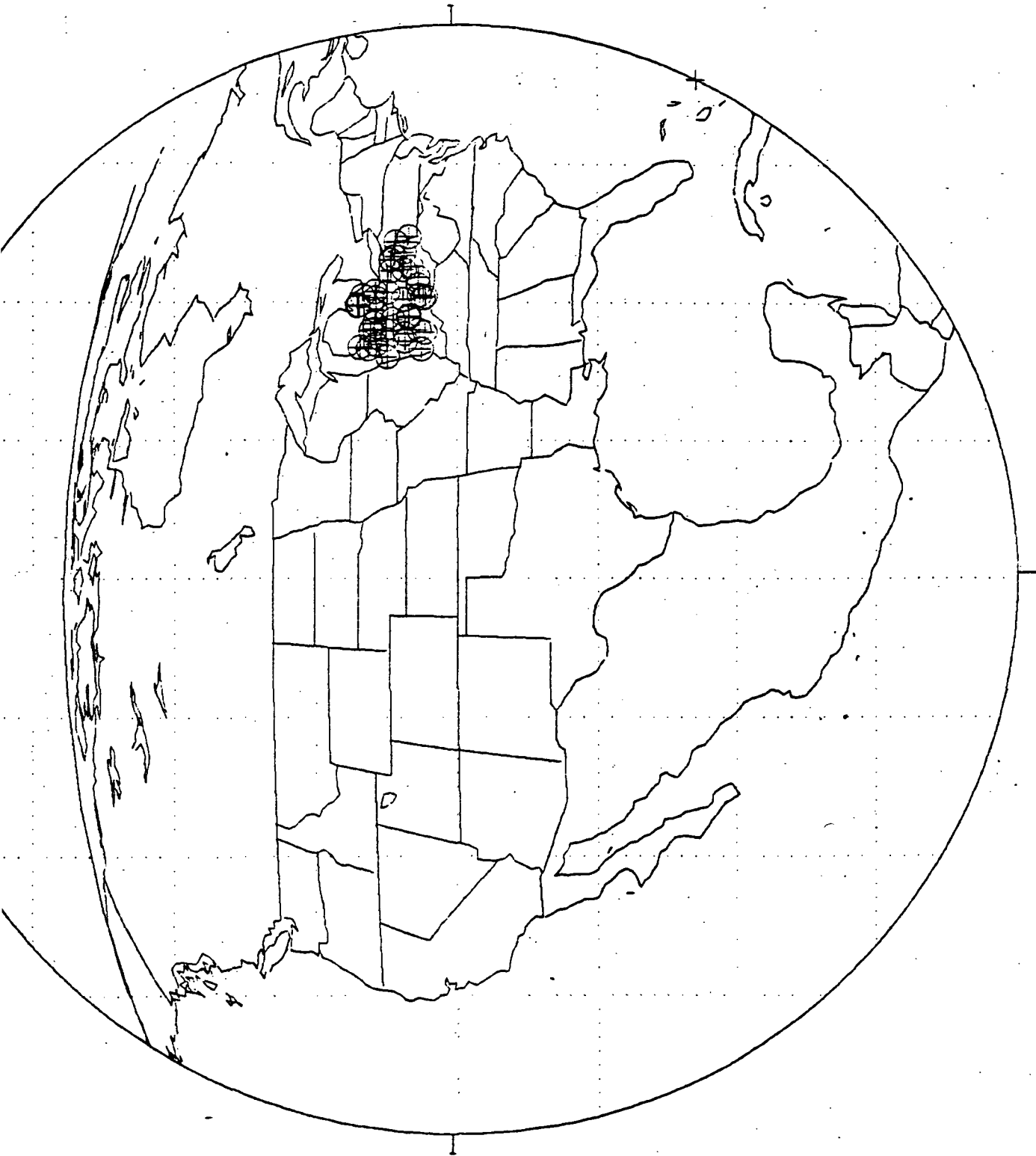


CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 4 OF KU BAND
03/26/85 14.311



Ku-Band Beam Coverages
Page 5

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
5	AKOH	AKRON OH	41.04	81.31
5	ANIN	ANDERSON IN	40.05	85.14
5	ANMI	ANN ARBOR MI	42.18	83.43
5	BAMI	BATTLE CREEK MI	42.20	85.01
5	BYMI	BAY CITY MI	43.35	83.52
5	BEMI	BENTON HARBOR MI	42.07	86.27
5	BLIN	BLOOMINGTON IN	39.10	86.31
5	CAOH	CANTON OH	40.48	81.23
5	CIOH	CINCINNATI OH-KY	39.10	84.30
5	CLOH	CLEVELAND OH	41.30	81.41
5	COOH	COLUMBUS OH	39.59	83.03
5	DAOH	DAYTON OH	39.45	84.10
5	DEMI	DETROIT MI	42.23	83.05
5	ELIN	ELKHART IN	41.52	85.56
5	FLMI	FLINT MI	43.03	83.04
5	FOIN	FORT WAYNE IN	41.05	85.08
5	GAIN	GARY-HAMMOND-EAST CHICAGO IN	41.34	87.20
5	GRMI	GRAND RAPIDS MI	42.57	86.40
5	HAOH	HAMILTON-MIDDLETOWN OH	39.23	84.33
5	ININ	INDIANAPOLIS IN	39.45	86.10
5	JAMI	JACKSON MI	42.15	84.24
5	KAMI	KALAMAZOO-PORTAGE MI	42.17	85.36
5	KOIN	KOKOMO IN	40.30	86.09
5	LAIN	LAFAYETTE-WEST LAFAYETTE IN	40.25	86.54
5	LAMI	LANSING-EAST LANSING MI	42.44	85.34
5	LIOH	LIMA OH	40.43	84.06
5	LOOH	LORAIN-ELYRIA OH	41.28	82.11
5	MAOH	MANSFIELD OH	40.46	82.31
5	MUIN	MUNCIE IN	40.11	85.22
5	MUMI	MUSKEGON-NORTON SHORES-MUSKEGO MI	43.13	86.15
5	NEOH	NEWARK OH	40.03	82.25
5	SAMI	SAGINAW MI	43.25	83.54
5	SOIN	SOUTH BEND IN	41.40	86.15
5	SPOH	SPRINGFIELD OH	39.55	83.48
5	STOH	STEUBENVILLE-WEIRTON OH-WV	40.22	80.39
5	TEIN	TERRE HAUTE IN	39.27	87.24
5	TOOH	TOLEDO OH-MI	41.40	83.35
5	YOOH	YOUNGSTOWN-WARREN OH	41.05	80.40



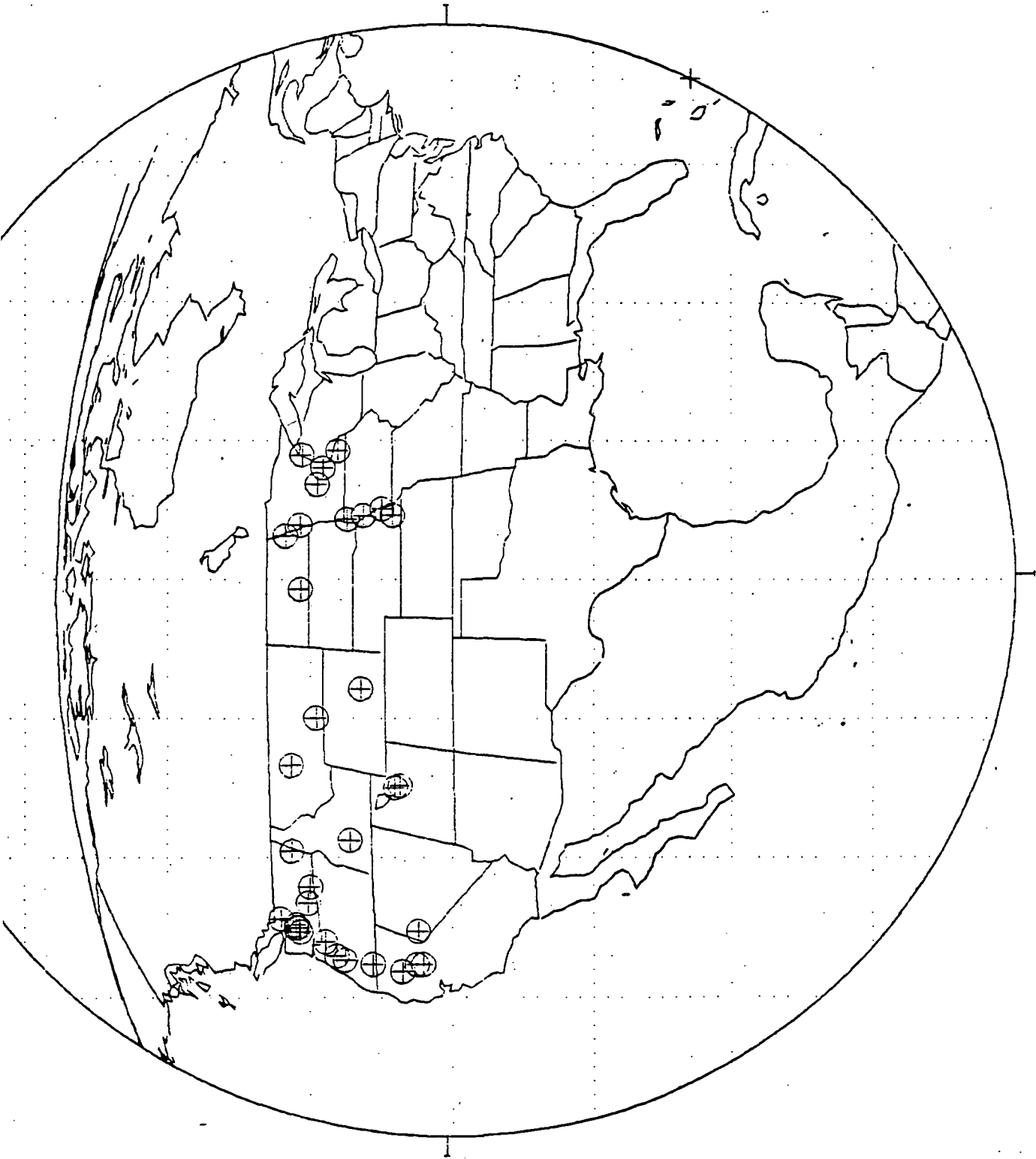
CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 5 OF KU BAND

03/26/85 14.318



Ku-Band Beam Coverages
Page 6

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
6	BEWA	BELLINGHAM WA	48.45	122.29
6	BIMT	BILLINGS MT	45.47	108.30
6	BIND	BISMARCK ND	46.50	100.48
6	BOID	BOISE CITY ID	43.38	115.30
6	BRWA	BREMERTON WA	47.34	122.40
6	CAWY	CASPER WY	42.50	106.20
6	CHCA	CHICO CA	39.46	121.50
6	DUMN	DULUTH-SUPERIOR MN-WI	46.45	92.10
6	EUOR	EUGENE-SPRINGFIELD OR	44.03	123.04
6	FAND	FARGO-MOORHEAD ND-MN	46.52	96.49
6	GRND	GRAND FORKS ND-MN	47.57	97.05
6	GRMT	GREATFALLS MT	47.30	111.6
6	LINE	LINCOLN NE	40.49	96.41
6	MEOR	MEDFORD OR	42.20	122.52
6	MIMN	MINNEAPOLIS-ST PAUL MN-WI	45.00	93.15
6	OLWA	OLYMPIA WA	47.03	122.53
6	OMNE	OMAHA NE-IA	41.15	96.00
6	POOR	PORTLAND OR-WA	45.32	122.40
6	PRUT	PROVO=OREM UT	40.15	111.40
6	RECA	REDDING CA	40.35	122.24
6	RENV	RENO NV	39.32	119.49
6	RIWA	RICHLAND-KENNEWICK WA	46.17	119.17
6	ROMN	ROCHESTER MN	44.01	92.27
6	SAOR	SALEM OR	44.57	123.01
6	SAUT	SALT LAKE CITY-OGDEN UT	40.45	111.55
6	SEWA	SEATTLE-EVERETT WA	47.35	122.20
6	SINE	SIOUX CITY NE-IA	42.30	96.28
6	SISD	SIOUX FALLS SD	43.34	96.42
6	SPWA	SPOKANE WA	47.40	117.25
6	STMN	ST CLOUD MN	45.34	94.10
6	TAWA	TACOMA WA	47.16	122.30
6	YAWA	YAKIMA WA	46.37	120.30
6	YUCA	YUBA CITY CA	39.09	121.36



CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 6 OF KU BAND
03/26/85 14.326

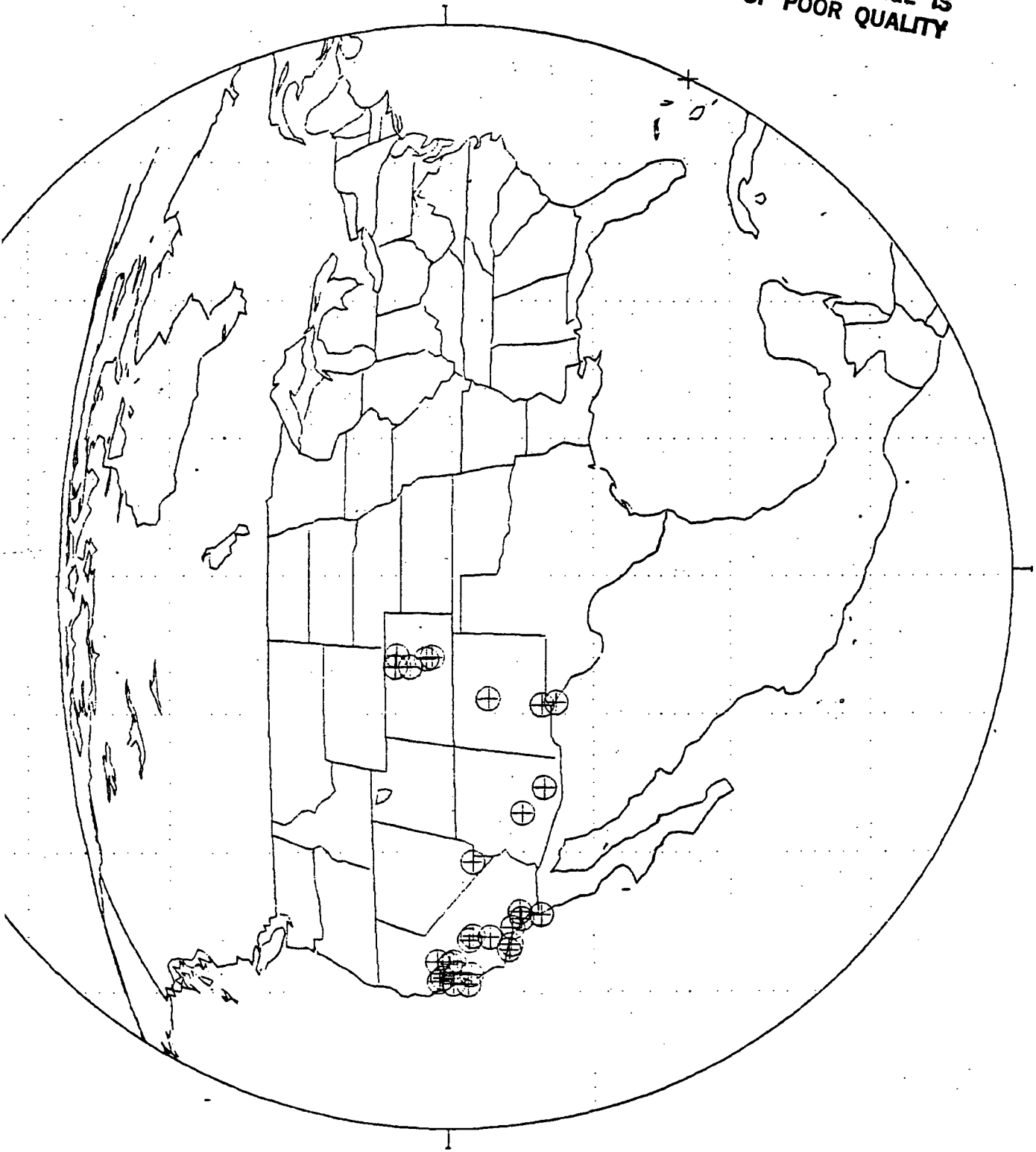


Ku-Band Beam Coverages

Page 7

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
7	ALNM	ALBUQUERQUE NM	35.05	106.38
7	ANCA	ANAHEIM-SANTA ANA-GARDEN GROVE CA	33.50	117.56
7	BACA	BAKERSFIELD CA	35.25	119.00
7	COCO	COLORADO SPRINGS CO	38.50	104.50
7	DECO	DENVER-BOULDER CO	39.45	105.00
7	ELTX	EL PASO TX	31.45	106.30
7	FOCO	FORT COLLINS CO	40.35	105.05
7	FRCA	FRESNO CA	36.41	119.47
7	GRCO	GREELEY CO	40.26	104.43
7	LANM	LAS CRUCES NM	32.18	106.47
7	LANV	LAS VEGAS NV	36.10	115.10
7	LOCA	LOS ANGELES-LONG BEACH CA	34.00	118.15
7	MOCA	MODESTO CA	37.37	121.00
7	OXCA	OXNARD-SIMI VALLEY-VENTURA CA	34.11	119.10
7	PHAZ	PHOENIX AZ	33.30	112.03
7	PUCO	PUEBLO CO	38.17	104.38
7	RICA	RIVERSIDE-SAN BERNADINO-ONTAR CA	33.59	117.22
7	SACA	SACRAMENTO CA	38.32	121.30
7	SLCA	SALINAS-SEASIDE-MONTEREY CA	36.39	121.40
7	SNCA	SAN DIEGO CA	32.45	117.10
7	SFCA	SAN FRANCISCO - OAKLAND CA	37.45	122.27
7	SJCA	SAN JOSE CA	37.20	121.55
7	STCA	SANTA BARBARA-SANTA MARIA-LOMP CA	34.25	119.41
7	SCCA	SANTA CRUZ CA	36.58	122.03
7	SRCA	SANTA ROSA CA	38.26	122.43
7	SOCA	STOCKTON CA	37.59	121.20
7	TUAZ	TUCSON AZ	32.15	110.57
7	VACA	VALLEJO-FAIRFIELD-NAPA CA	38.05	122.14
7	VICA	VISALIA-TULARE-PORTERVILLE CA	36.20	119.18

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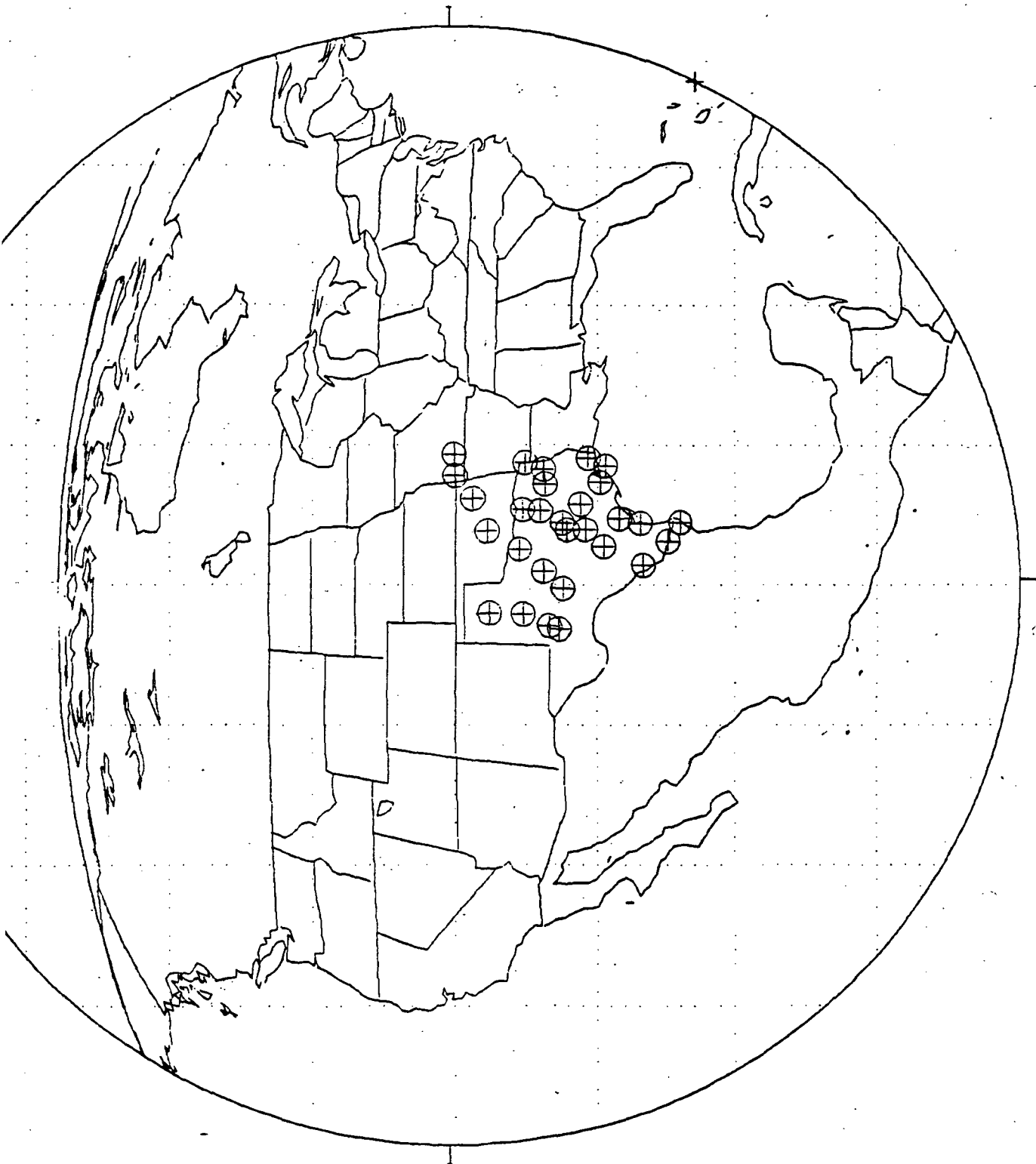
CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 7 OF KU BAND
03/26/85 14.344

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Ku-Band Beam Coverages
Page 8

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
8	ABTX	ABILENE TX	32.27	99.45
8	AMTX	AMARILLO TX	35.14	101.50
8	AUTX	AUSTIN TX	30.18	97.47
8	BETX	BEAUMONT-PORT ARTHUR-ORANGE TX	30.04	94.06
8	BRTX	BROWNSVILLE-HARLINGEN-SAN BENI TX	25.54	97.30
8	BYTX	BRYAN-COLLEGE STATION TX	30.41	96.24
8	COTX	CORPUS CHRISTIX	27.47	97.26
8	DATX	DALLAS-FORT WORTH TX	32.47	96.48
8	GATX	GALVESTON-TEXAS CITY TX	29.17	94.48
8	HOTX	HOUSTON TX	29.45	95.25
8	JOMO	JOPLIN MO	37.04	94.31
8	KITX	KILLEEN-TEMPLE TX	31.08	97.44
8	LATX	LAREDO TX	27.32	99.22
8	LOTX	LONGVIEW TX	32.30	94.45
8	LUTX	LUBBOCK TX	33.35	101.53
8	MCTX	MCALLEN-PHARR-EDINBURG TX	26.13	98.15
8	MITX	MIDLAND TX	32.00	102.09
8	ODTX	ODESSA TX	31.50	102.23
8	OKOK	OKLAHOMA CITY OK	35.28	97.33
8	SATX	SAN ANGELO TX	31.28	100.28
8	SNTX	SAN ANTONIO TX	29.25	98.30
8	SHTX	SHERMON-DENISON TX	33.39	96.35
8	SPMO	SPRINGFIELD MO	37.11	93.19
8	TETX	TEXARKANA TX-AR	33.28	94.02
8	TUOK	TULSA OK	36.07	95.58
8	TYTX	TYLER TX	32.22	95.18
8	VITX	VICTORIA TX	28.49	97.01
8	WATX	WACO TX	31.33	97.10
8	WITX	WICHITA FALLS TX	33.55	98.30

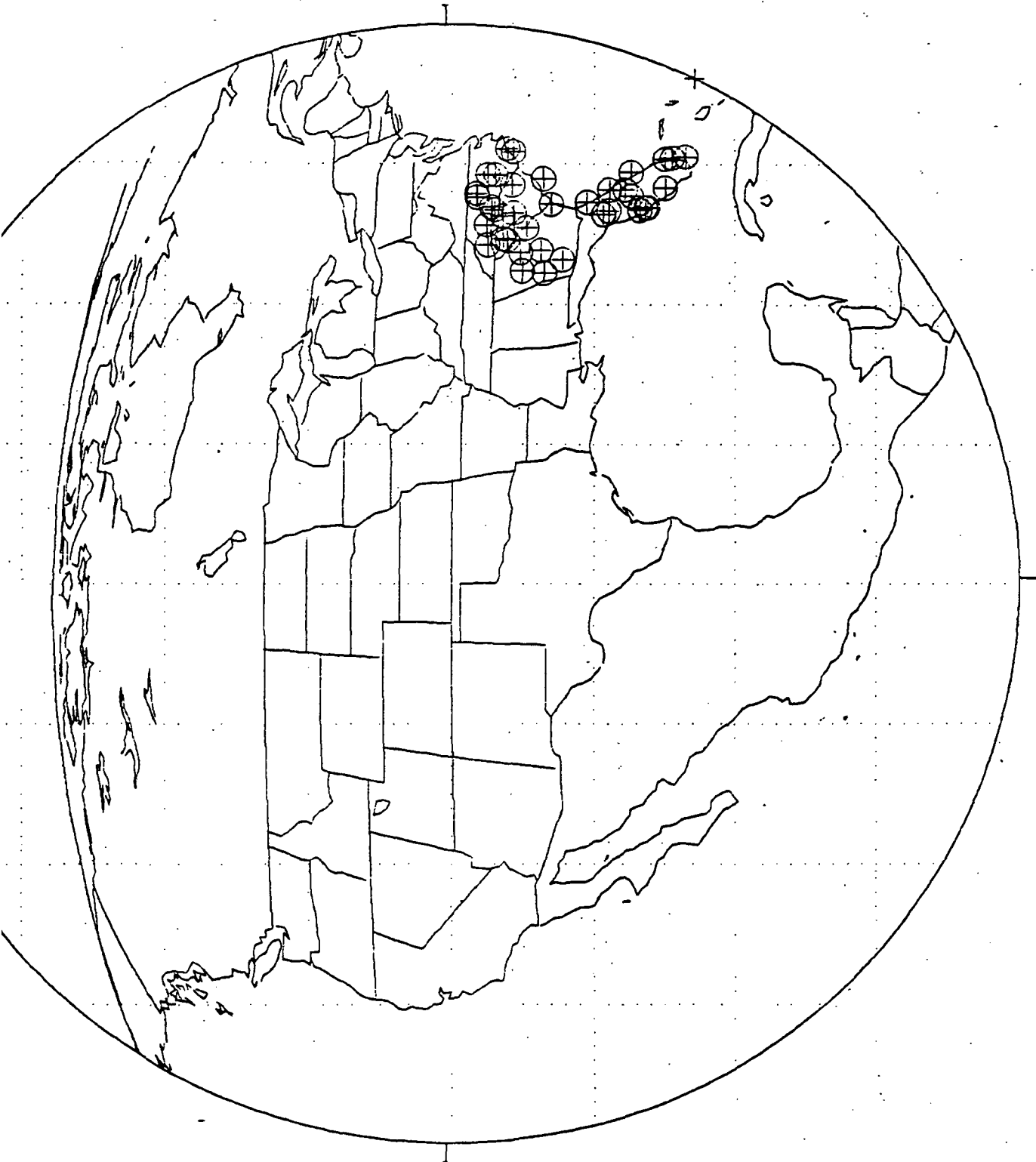


CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 8 OF KU BAND
03/26/85 14.350



Ku-Band Beam Coverages
Page 9

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
9	ALGA	ALBANY GA	31.37	84.10
9	ANSC	ANDERSON SC	34.30	82.39
9	ASNC	ASHEVILLE NC	35.35	82.35
9	ATGE	ATHENS GE	33.57	83.24
9	ATGA	ATLANTA GA	33.45	84.23
9	AUGA	AUGUSTA GA-SC	33.29	82.00
9	BRFL	BRADENTON FL	27.29	82.33
9	BUNC	BURLINGTON NC	36.05	79.27
9	CHSC	CHARLESTON -NORTH CHARLESTON SC	32.48	79.58
9	CHNC	CHARLOTTE-GASTONIA NC	35.03	80.50
9	COSC	COLUMBIA SC	34.00	81.00
9	COGA	COLUMBUS GA-AL	32.28	84.59
9	DAFL	DAYTONA BEACH FL	29.11	81.01
9	FANC	FAYETTEVILLE NC	35.05	78.53
9	FOSC	FORENCE SC	34.12	79.44
9	FOFL	FORT LAUDERDALE-HOLLYWOOD FL	26.08	80.08
9	FRFL	FORT MYERS FL	26.39	81.51
9	GAFL	GAINESVILLE FL	29.37	82.21
9	GRNC	GREENSBORO-WINSTON -SALEM-HIGH NC	36.03	79.50
9	GRSC	GREENVILLE-SPARTANBURG SC	34.52	82.25
9	HINC	HICKORY NC	35.44	81.23
9	JAFL	JACKSONVILLE FL	30.20	81.40
9	JANC	JACKSONVILLE NC	34.45	77.26
9	LAFL	LAKELAND-WINTER HAVEN FL	28.02	81.59
9	MAGA	MACON GA	32.49	83.37
9	MEFL	MELBOURNE-TITUSVILLE-COCOA FL	28.04	80.38
9	MIFL	MIAMI FL	25.45	80.15
9	OCFL	OCALA FL	29.11	82.09
9	ORFL	ORLANDO FL	28.33	81.21
9	RANC	RALEIGH-DURHAM NC	35.46	78.39
9	ROSC	ROCK HILL SC	34.55	81.01
9	SANC	SALISBURY-CONCORD NC	35.20	80.30
9	SAFL	SARASOTA FL	27.20	82.32
9	SAGA	SAVANNAH GA	32.04	81.07
9	TMFL	TAMPA-ST PETERSBURG FL	27.58	82.38
9	WEFL	WEST PALM BEACH-BOCA RATON FL	26.42	80.05
9	WINC	WILMINGTON NC	34.14	77.55



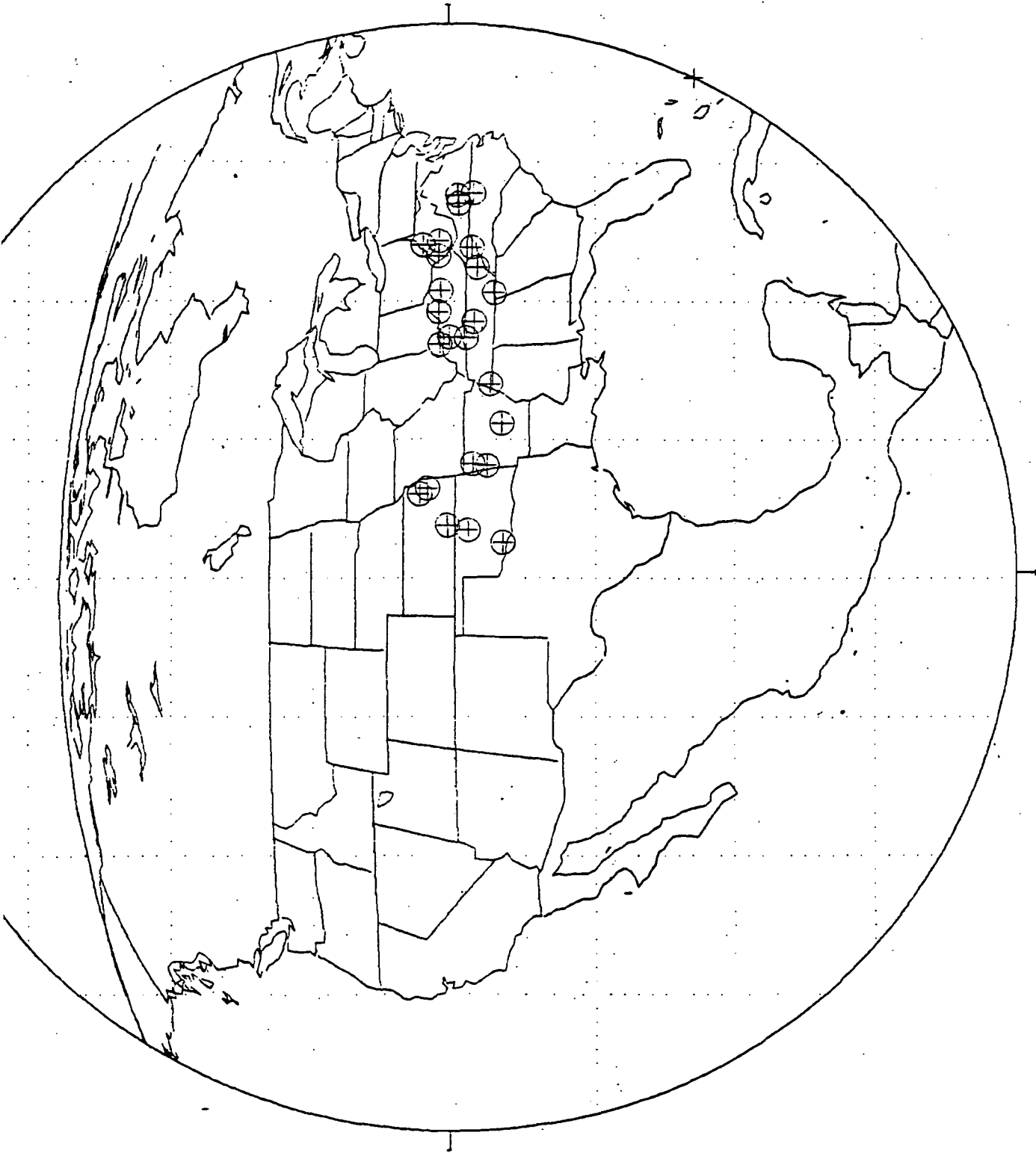
CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 9 OF KU BAND
03/26/85 14.357



Ku-Band Beam Coverages
Page 10

(UNCOVERED SMSA's)

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
0	CHWV	CHARLESTON WV	38.23	81.40
0	CHTN	CHATTANOOGA TN-GA	35.02	85.18
0	CLTN	CLARKSVILLE-HOPKINSVILLE TN-KY	36.50	87.30
0	DAVA	DANVILLE V	36.34	79.25
0	ENOK	ENID OK	36.24	97.54
0	EVIN	EVANSVILLE IN-KY	38.00	87.33
0	FAAR	FAYETTEVILLE-SPRINGDALE AR	36.03	94.10
0	FOAR	FORT SMITH AR-OK	35.22	94.27
0	HUWV	HUNTINGTON-ASHLAND WV-KY	38.24	82.26
0	JOTN	JOHNSON CITY-KINGSPORT-BRISTOL TN-VA	36.33	82.34
0	KNTN	KNOXVILLE TN	36.00	83.57
0	LAKS	LAWRENCE KS	38.58	95.15
0	LAOK	LAWTON OK	34.36	98.25
0	LEKY	LEXINGTON-FAYETTE KY	38.02	84.30
0	LIAR	LITTLE ROCK-NORTH LITTLE ROCK AR	34.42	92.17
0	LOKY	LOUISVILLE KY-IN	38.13	85.48
0	LYVA	LYNCHBURG VA	37.24	79.09
0	METN	MEMPHIS TN-AR	35.10	90.00
0	NATN	NASHVILLE-DAVIDSON TN	36.10	86.50
0	OWKY	OWENSBORO KY	37.45	87.05
0	PAWV	PARKERSBURG-MARIETTA WV-OH	39.17	81.33
0	ROVA	ROANOKE VA	37.15	79.58
0	TOKS	TOPEKA KS	39.02	95.41
0	WIKS	WICHITA KS	37.43	97.20



CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 0 OF KU BAND
03/26/85 14.365 (UNCOVERED AREA)



I-1.3 Ku-Band Beam To Beam (No Broadcast Video)



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Beam to Beam Matrix
Analog Voice and Data -- Scenario V
(HVC or KB/S)

Class = ANVK

From:

To:

NE-AC	NE-AC	3142	W-MW	11962	SE-OC	6909	NE-NYC	1807
	E-MW1	8177	NW-PC	7249	SW-PC	8359	SW-OC	7646
	SE-AC	12811	B2-NE	3460	B3-MW	3517	B4-W	368
	E-MW2	4126						
W-MW	NE-AC	11962	W-MW	916	SE-OC	5148	NE-NYC	9934
	E-MW1	3668	NW-PC	4888	SW-PC	7559	SW-OC	6676
	SE-AC	9153	B2-NE	2580	B3-MW	2098	B4-W	316
	E-MW2	411						
SE-OC	NE-AC	6909	W-MW	5148	SE-OC	416	NE-NYC	5856
	E-MW1	5399	NW-PC	3318	SW-PC	5017	SW-OC	4216
	SE-AC	5824	B2-NE	1745	B3-MW	1099	B4-W	188
	E-MW2	1676						
NE-NYC	NE-AC	1807	W-MW	9934	SE-OC	5856	E-MW1	12558
	NW-PC	6395	SW-PC	7220	SW-OC	6589	SE-AC	13694
	B2-NE	4473	B3-MW	2904	B4-W	329	E-MW2	3940
E-MW1	NE-AC	8177	W-MW	3668	SE-OC	5399	NE-NYC	12558
	NW-PC	6107	SW-PC	6545	SW-OC	6282	SE-AC	9799
	B2-NE	1047	B3-MW	2643	B4-W	312		
NW-PC	NE-AC	7249	W-MW	4888	SE-OC	3318	NE-NYC	6395
	E-MW1	6107	NW-PC	4694	SW-PC	10466	SW-OC	5395
	SE-AC	5690	B2-NE	2046	B3-MW	1915	B4-W	238
	E-MW2	2001						
SW-PC	NE-AC	8359	W-MW	7559	SE-OC	5017	NE-NYC	7220
	E-MW1	6545	NW-PC	10466	SW-PC	7346	SW-OC	8720
	SE-AC	7583	B2-NE	2541	B3-MW	2690	B4-W	490
	E-MW2	2382						
SW-OC	NE-AC	7646	W-MW	6676	SE-OC	4216	NE-NYC	6589
	E-MW1	6282	NW-PC	5395	SW-PC	8720	SW-OC	2708
	SE-AC	7802	B2-NE	2529	B3-MW	2009	B4-W	126
	E-MW2	2184						
SE-AC								



Ford Aerospace &
Communications Corporation

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	NE-AC	12811	W-MW	9153	SE-GC	5824	NE-NYC	13694
	E-MW1	9799	NW-PC	5690	SW-PC	7583	SW-GC	7802
	SE-AC	6146	B2-NE	2261	B3-MW	2852	B4-W	325
	E-MW2	3459						
B1-NE								
B2-NE								
	NE-AC	3460	W-MW	2580	SE-GC	1745	NE-NYC	4473
	E-MW1	1047	NW-PC	2046	SW-PC	2541	SW-GC	2529
	SE-AC	2261	B2-NE	36	B3-MW	697	B4-W	111
	E-MW2	312						
B3-MW								
	NE-AC	3517	W-MW	2098	SE-GC	1099	NE-NYC	2904
	E-MW1	2643	NW-PC	1915	SW-PC	2690	SW-GC	2009
	SE-AC	2852	B2-NE	697	B3-MW	348	B4-W	66
	E-MW2	665						
B4-W								
	NE-AC	368	W-MW	316	SE-GC	188	NE-NYC	329
	E-MW1	312	NW-PC	238	SW-PC	490	SW-GC	126
	SE-AC	325	B2-NE	111	B3-MW	66	E-MW2	93
E-MW2								
	NE-AC	4126	W-MW	411	SE-GC	1676	NE-NYC	3940
	NW-PC	2001	SW-PC	2382	SW-GC	2184	SE-AC	3459
	B2-NE	312	B3-MW	665	B4-W	93		

Class = DATA

From:

To:

NE-AC								
	NE-AC	2774	W-MW	10538	SE-GC	6093	NE-NYC	1592
	E-MW1	7202	NW-PC	6398	SW-PC	7364	SW-GC	6735
	SE-AC	11283	B2-NE	3047	B3-MW	3095	B4-W	322
	E-MW2	3634						
W-MW								
	NE-AC	10538	W-MW	806	SE-GC	4536	NE-NYC	8752
	E-MW1	3230	NW-PC	4305	SW-PC	6654	SW-GC	5882
	SE-AC	8057	B2-NE	2274	B3-MW	1851	B4-W	277
	E-MW2	363						
SE-GC								
	NE-AC	6093	W-MW	4536	SE-GC	366	NE-NYC	5160
	E-MW1	4756	NW-PC	2924	SW-PC	4418	SW-GC	3716
	SE-AC	5130	B2-NE	1536	B3-MW	972	B4-W	167
	E-MW2	1479						
NE-NYC								
	NE-AC	1592	W-MW	8752	SE-GC	5160	E-MW1	11057
	NW-PC	5628	SW-PC	6356	SW-GC	5805	SE-AC	12058



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Communications Corporation**

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E-MW1	B2-NE	3936	B3-MW	2558	B4-W	290	E-MW2	3469
	NE-AC	7202	W-MW	3230	SE-OC	4756	NE-NYC	11057
	NW-PC	5388	SW-PC	5768	SW-OC	5532	SE-AC	8631
	B2-NE	922	B3-MW	2328	B4-W	275		
NW-PC	NE-AC	6398	W-MW	4305	SE-OC	2924	NE-NYC	5628
	E-MW1	5388	NW-PC	4134	SW-PC	9216	SW-OC	4761
	SE-AC	5020	B2-NE	1803	B3-MW	1688	B4-W	212
	E-MW2	1760						
SW-PC	NE-AC	7364	W-MW	6654	SE-OC	4418	NE-NYC	6356
	E-MW1	5768	NW-PC	9216	SW-PC	6472	SW-OC	7686
	SE-AC	6682	B2-NE	2236	B3-MW	2371	B4-W	431
	E-MW2	2099						
SW-OC	NE-AC	6735	W-MW	5882	SE-OC	3716	NE-NYC	5805
	E-MW1	5532	NW-PC	4761	SW-PC	7686	SW-OC	2382
	SE-AC	6873	B2-NE	2228	B3-MW	1768	B4-W	111
	E-MW2	1922						
SE-AC	NE-AC	11283	W-MW	8057	SE-OC	5130	NE-NYC	12058
	E-MW1	8631	NW-PC	5020	SW-PC	6682	SW-OC	6873
	SE-AC	5414	B2-NE	1990	B3-MW	2511	B4-W	284
	E-MW2	3046						
B1-NE								
B2-NE	NE-AC	3047	W-MW	2274	SE-OC	1536	NE-NYC	3936
	E-MW1	922	NW-PC	1803	SW-PC	2236	SW-OC	2228
	SE-AC	1990	B2-NE	32	B3-MW	612	B4-W	97
	E-MW2	276						
B3-MW	NE-AC	3095	W-MW	1851	SE-OC	972	NE-NYC	2558
	E-MW1	2328	NW-PC	1688	SW-PC	2371	SW-OC	1768
	SE-AC	2511	B2-NE	612	B3-MW	306	B4-W	58
	E-MW2	586						
B4-W	NE-AC	322	W-MW	277	SE-OC	167	NE-NYC	290
	E-MW1	275	NW-PC	212	SW-PC	431	SW-OC	111
	SE-AC	284	B2-NE	97	B3-MW	58	E-MW2	82
E-MW2	NE-AC	3634	W-MW	363	SE-OC	1479	NE-NYC	3469
	NW-PC	1760	SW-PC	2099	SW-OC	1922	SE-AC	3046
	B2-NE	276	B3-MW	586	B4-W	82		

SUMMARY



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	ANVK	DATA
NE-AC	79533	70077
W-MW	65309	57525
SE-CC	46811	41253
NE-NYC	75699	66661
E-MW1	62537	55089
NW-PC	60402	53237
SW-PC	76918	67753
SW-CC	62882	55401
SE-AC	87399	76979
B1-NE	0	0
B2-NE	23838	20989
B3-MW	23503	20704
B4-W	2962	2606
E-MW2	21249	18716
Totals	689042	606990



Ford Aerospace &
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I-1.4 Transponder Loading (No Broadcast Video)



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Ku Transponder Loading
Analog Voice and Data -- Scenario V
(No Broadcast Video)

<u>From</u>	<u>To</u>	<u>Channel</u>	<u>Class</u>	<u>Circuits</u>
NE-AC	SE-CC	V-1	ANVK	6000
NE-AC	SW-PC	V-2	ANVK	6000
NE-AC	W-MW	V-3	ANVK	6000
NE-AC	SW-CC	V-4	ANVK	6000
NE-AC	W-MW	V-5	ANVK	5962
NE-AC	SE-AC	V-6	ANVK	6000
NE-AC	NW-PC	V-7	ANVK	6000
NE-AC	SW-PC	V-8A	ANVK	2000
NE-AC	NW-PC	V-8B	ANVK	1644
NE-AC	NE-NYC	V-8C	ANVK	1807
NE-AC	NE-AC	V-9A	ANVK	3000
NE-AC	SE-AC	V-9B	ANVK	3000
NE-AC	SS	V-10	DATA	63613
NE-AC	E-MW1	V-11	ANVK	6000
NE-AC	E-MW1	V-12	ANVK	6000
W-MW	SE-AC	V-1	ANVK	6000
W-MW	SW-CC	V-2	ANVK	6000
W-MW	NE-AC	V-3	ANVK	6000
W-MW	SE-CC	V-4	ANVK	5148
W-MW	NE-AC	V-5	ANVK	5962
W-MW	NE-NYC	V-6	ANVK	6000
W-MW	SW-PC	V-7	ANVK	6000
W-MW	W-MW	V-8A	ANVK	916
W-MW	NE-NYC	V-8B	ANVK	2000
W-MW	SE-AC	V-8C	ANVK	2000
W-MW	NE-NYC	V-9A	ANVK	1934
W-MW	E-MW1	V-9B	ANVK	3000
W-MW	SS	V-10	DATA	53123
W-MW	NW-PC	V-11	ANVK	4888
W-MW	SW-PC	V-12	ANVK	1559
SE-CC	NE-AC	V-1	ANVK	6000
SE-CC	SE-AC	V-2	ANVK	5824
SE-CC	NE-NYC	V-3	ANVK	5856
SE-CC	W-MW	V-4	ANVK	5148
SE-CC	E-MW1	V-5	ANVK	6000
SE-CC	SW-PC	V-6	ANVK	5017
SE-CC		V-7		
SE-CC	NW-PC	V-8A	ANVK	2000
SE-CC	SE-CC	V-8B	ANVK	416
SE-CC		V-8C		
SE-CC	NW-PC	V-9A	ANVK	1318



ORIGINAL PAGE IS
OF POOR QUALITY

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SE-CC		V-9B		
SE-CC	SS	V-10	DATA	38578
SE-CC	SW-CC	V-11	ANVK	4216
SE-CC		V-12		
NE-NYC	E-MW1	H-1	ANVK	6000
NE-NYC	E-MW1	H-2	ANVK	6000
NE-NYC	SE-CC	H-3	ANVK	5856
NE-NYC	NW-PC	H-4	ANVK	6000
NE-NYC	SW-PC	H-5	ANVK	6000
NE-NYC	W-MW	H-6	ANVK	6000
NE-NYC	SW-CC	H-7	ANVK	6000
NE-NYC	E-MW1	H-8A	ANVK	2000
NE-NYC	W-MW	H-8B	ANVK	2000
NE-NYC	NE-AC	H-8C	ANVK	1807
NE-NYC	W-MW	H-9A	ANVK	1934
NE-NYC	SW-CC	H-9B	ANVK	589
NE-NYC	SS	H-10	DATA	59683
NE-NYC	SE-AC	H-11	ANVK	6000
NE-NYC	SE-AC	H-12	ANVK	6000
E-MW1	NE-NYC	H-1	ANVK	6000
E-MW1	NE-NYC	H-2	ANVK	6000
E-MW1	NW-PC	H-3	ANVK	6000
E-MW1	SW-PC	H-4	ANVK	6000
E-MW1	SE-CC	H-5	ANVK	6000
E-MW1	SW-CC	H-6	ANVK	6000
E-MW1	SE-AC	H-7	ANVK	6000
E-MW1	NE-NYC	H-8A	ANVK	2000
E-MW1	SE-AC	H-8B	ANVK	2000
E-MW1	NW-PC	H-8C	ANVK	2000
E-MW1	SE-AC	H-9A	ANVK	3000
E-MW1	W-MW	H-9B	ANVK	3000
E-MW1	SS	H-10	DATA	69336
E-MW1	NE-AC	H-11	ANVK	6000
E-MW1	NE-AC	H-12	ANVK	6000
NW-PC	SW-PC	H-1	ANVK	6000
NW-PC	NW-PC	H-2	ANVK	4694
NW-PC	E-MW1	H-3	ANVK	6000
NW-PC	NE-NYC	H-4	ANVK	6000
NW-PC	SE-AC	H-5	ANVK	5690
NW-PC		H-6		
NW-PC	NE-AC	H-7	ANVK	6000
NW-PC	SE-CC	H-8A	ANVK	2000
NW-PC	NE-AC	H-8B	ANVK	1644
NW-PC	E-MW1	H-8C	ANVK	2000
NW-PC	SE-CC	H-9A	ANVK	1318
NW-PC	SW-PC	H-9B	ANVK	3000
NW-PC	SS	H-10	DATA	49534
NW-PC	W-MW	H-11	ANVK	4888
NW-PC	SW-CC	H-12	ANVK	5395
SW-PC	NW-PC	V-1	ANVK	6000



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SW-PC	NE-AC	V-2	ANVK	6000
SW-PC	SE-AC	V-3	ANVK	6000
SW-PC	E-MW1	V-4	ANVK	6000
SW-PC	NE-NYC	V-5	ANVK	6000
SW-PC	SE-OC	V-6	ANVK	5017
SW-PC	W-MW	V-7	ANVK	6000
SW-PC	NE-AC	V-8A	ANVK	2000
SW-PC	SW-OC	V-8B	ANVK	2000
SW-PC	SW-OC	V-8C	ANVK	2000
SW-PC	SW-OC	V-9A	ANVK	3000
SW-PC	NW-PC	V-9B	ANVK	3000
SW-PC	SS	V-10	DATA	62715
SW-PC	SW-PC	V-11	ANVK	6000
SW-PC	W-MW	V-12	ANVK	1559
SW-OC	SW-OC	H-1	ANVK	2708
SW-OC	W-MW	H-2	ANVK	6000
SW-OC		H-3		
SW-OC	NE-AC	H-4	ANVK	6000
SW-OC		H-5		
SW-OC	E-MW1	H-6	ANVK	6000
SW-OC	NE-NYC	H-7	ANVK	6000
SW-OC	SE-AC	H-8A	ANVK	2000
SW-OC	SW-PC	H-8B	ANVK	2000
SW-OC	SW-PC	H-8C	ANVK	2000
SW-OC	SW-PC	H-9A	ANVK	3000
SW-OC	NE-NYC	H-9B	ANVK	589
SW-OC	SS	H-10	DATA	51294
SW-OC	SE-OC	H-11	ANVK	4216
SW-OC	NW-PC	H-12	ANVK	5395
SE-AC	W-MW	H-1	ANVK	6000
SE-AC	SE-OC	H-2	ANVK	5824
SE-AC	SW-PC	H-3	ANVK	6000
SE-AC	SE-AC	H-4	ANVK	6000
SE-AC	NW-PC	H-5	ANVK	5690
SE-AC	NE-AC	H-6	ANVK	6000
SE-AC	E-MW1	H-7	ANVK	6000
SE-AC	SW-OC	H-8A	ANVK	2000
SE-AC	E-MW1	H-8B	ANVK	2000
SE-AC	W-MW	H-8C	ANVK	2000
SE-AC	E-MW1	H-9A	ANVK	3000
SE-AC	NE-AC	H-9B	ANVK	3000
SE-AC	SS	H-10	DATA	72000
SE-AC	NE-NYC	H-11	ANVK	6000
SE-AC	NE-NYC	H-12	ANVK	6000

Totals

ANVK : 519428
DATA : 519876



I-1.5 Ku-Band Beam To Beam Overflow To C-Band



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Beam to Beam Matrix
Overflow from Ku Beams
Scenario V

Class = ANVK

From:

To:

NE-AC	NE-AC	142	SE-OC	909	E-MW1	303	SW-PC	1579
	SW-OC	1646	SE-AC	3811	B2-NE	3460	B3-MW	3517
	B4-W	368						
W-MW	E-MW1	1079	SW-OC	676	SE-AC	1153	B2-NE	2580
	B3-MW	2098	B4-W	316				
SE-OC	NE-AC	909	E-MW1	1075	B2-NE	1745	B3-MW	1099
	B4-W	188						
NE-NYC	E-MW1	2498	SE-AC	1694	B2-NE	4473	B3-MW	2904
	B4-W	329						
E-MW1	NE-AC	303	W-MW	1079	SE-OC	1075	NE-NYC	2498
	NW-PC	108	SW-PC	2927	SW-OC	2466	SE-AC	2258
	B2-NE	1047	B3-MW	2643	B4-W	312		
NW-PC	E-MW1	108	SW-PC	1466	B2-NE	2046	B3-MW	1915
	B4-W	238						
SW-PC	NE-AC	1579	E-MW1	2927	NW-PC	1466	SW-PC	1346
	SW-OC	1720	SE-AC	1583	B2-NE	2541	B3-MW	2690
	B4-W	490						
SW-OC	NE-AC	1646	W-MW	676	E-MW1	2466	SW-PC	1720
	SE-AC	5802	B2-NE	2529	B3-MW	2009	B4-W	126
SE-AC	NE-AC	3811	W-MW	1153	NE-NYC	1694	E-MW1	2258
	SW-PC	1583	SW-OC	5802	SE-AC	146	B2-NE	2261
	B3-MW	2852	B4-W	325				
B1-NE								
	B2-NE							
B2-NE	NE-AC	3460	W-MW	2580	SE-OC	1745	NE-NYC	4473
	E-MW1	1047	NW-PC	2046	SW-PC	2541	SW-OC	2529
	SE-AC	2261	B2-NE	36	B3-MW	697	B4-W	111
	E-MW2	312						
B3-MW	NE-AC	3517	W-MW	2098	SE-OC	1099	NE-NYC	2904



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	E-MW1	2643	NW-PC	1915	SW-PC	2690	SW-GC	2009
	SE-AC	2852	B2-NE	697	B3-MW	348	B4-W	66
	E-MW2	665						
B4-W								
	NE-AC	368	W-MW	316	SE-GC	188	NE-NYC	329
	E-MW1	312	NW-PC	238	SW-PC	490	SW-GC	126
	SE-AC	325	B2-NE	111	B3-MW	66	E-MW2	93
E-MW2								
	B2-NE	312	B3-MW	665	B4-W	93		

Class = DATA

From:

To:

NE-AC	B2-NE	3047	B3-MW	3095	B4-W	322		
W-MW	B2-NE	2274	B3-MW	1851	B4-W	277		
SE-GC	B2-NE	1536	B3-MW	972	B4-W	167		
NE-NYC	SE-AC	194	B2-NE	3936	B3-MW	2558	B4-W	290
E-MW1	B2-NE	922	B3-MW	2328	B4-W	275		
NW-PC	B2-NE	1803	B3-MW	1688	B4-W	212		
SW-PC	B2-NE	2236	B3-MW	2371	B4-W	431		
SW-GC	B2-NE	2228	B3-MW	1768	B4-W	111		
SE-AC	NE-NYC	194	B2-NE	1990	B3-MW	2511	B4-W	284
B1-NE								
B2-NE								
	NE-AC	3047	W-MW	2274	SE-GC	1536	NE-NYC	3936
	E-MW1	922	NW-PC	1803	SW-PC	2236	SW-GC	2228
	SE-AC	1990	B2-NE	32	B3-MW	612	B4-W	97
	E-MW2	276						
B3-MW								
	NE-AC	3095	W-MW	1851	SE-GC	972	NE-NYC	2558
	E-MW1	2328	NW-PC	1688	SW-PC	2371	SW-GC	1768
	SE-AC	2511	B2-NE	612	B3-MW	306	B4-W	58
	E-MW2	586						
B4-W								
	NE-AC	322	W-MW	277	SE-GC	167	NE-NYC	290
	E-MW1	275	NW-PC	212	SW-PC	431	SW-GC	111



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E-MW2	SE-AC	284	B2-NE	97	B3-MW	58	E-MW2	82
	B2-NE	276	B3-MW	586	B4-W	82		

SUMMARY

	ANVK	DATA
NE-AC	15735	6464
W-MW	7902	4402
SE-GC	5016	2675
NE-NYC	11898	6978
E-MW1	16716	3525
NW-PC	5773	3703
SW-PC	16342	5038
SW-GC	16974	4107
SE-AC	21885	4979
B1-NE	0	0
B2-NE	23838	20989
B3-MW	23503	20704
B4-W	2962	2606
E-MW2	1070	944
Totals	169614	87114



I-1.6 Ku-Band Beam To Beam (With Broadcast Video)



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Beam to Beam Matrix
Overflow from Ku Beams
Scenario V
(Broadcast Video)

Class = ANVK

From:

To:

NE-AC								
W-MW	SE-AC	849	B2-NE	2659	B3-MW	2703	B4-W	283
SE-OC	E-MW1	137	B2-NE	1985	B3-MW	1614	B4-W	243
NE-NYC	B2-NE	1339	B3-MW	846	B4-W	145		
E-MW1	B2-NE	3438	B3-MW	2233	B4-W	252		
NW-PC	W-MW	137	SW-PC	870	SW-OC	513	B2-NE	805
SW-PC	B3-MW	2033	B4-W	240				
SW-OC	B2-NE	1574	B3-MW	1469	B4-W	183		
	E-MW1	870	B2-NE	1952	B3-MW	2071	B4-W	377
	E-MW1	513	SE-AC	4001	B2-NE	1948	B3-MW	1544
	B4-W	97						
SE-AC	NE-AC	849	SW-OC	4001	B2-NE	1735	B3-MW	2194
	B4-W	249						
B1-NE								
B2-NE	NE-AC	2659	W-MW	1985	SE-OC	1339	NE-NYC	3438
	E-MW1	805	NW-PC	1574	SW-PC	1952	SW-OC	1948
	SE-AC	1735	B2-NE	28	B3-MW	535	B4-W	85
	E-MW2	241						
B3-MW	NE-AC	2703	W-MW	1614	SE-OC	846	NE-NYC	2233
	E-MW1	2033	NW-PC	1469	SW-PC	2071	SW-OC	1544
	SE-AC	2194	B2-NE	535	B3-MW	268	B4-W	51
	E-MW2	512						
B4-W	NE-AC	283	W-MW	243	SE-OC	145	NE-NYC	252
	E-MW1	240	NW-PC	183	SW-PC	377	SW-OC	97
	SE-AC	249	B2-NE	85	B3-MW	51	E-MW2	71
E-MW2	B2-NE	241	B3-MW	512	B4-W	71		



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Class = DATA

From:

To:

NE-AC	B2-NE	2344	B3-MW	2382	B4-W	249		
W-MW	B2-NE	1748	B3-MW	1421	B4-W	213		
SE-GC	B2-NE	1183	B3-MW	744	B4-W	128		
NE-NYC	B2-NE	3030	B3-MW	1971	B4-W	222		
E-MW1	B2-NE	709	B3-MW	1791	B4-W	212		
NW-PC	B2-NE	1390	B3-MW	1299	B4-W	162		
SW-PC	B2-NE	1722	B3-MW	1821	B4-W	332		
SW-GC	B2-NE	1715	B3-MW	1361	B4-W	86		
SE-AC	B2-NE	1531	B3-MW	1934	B4-W	218		
B1-NE								
B2-NE	NE-AC	2344	W-MW	1748	SE-GC	1183	NE-NYC	3030
	E-MW1	709	NW-PC	1390	SW-PC	1722	SW-GC	1715
	SE-AC	1531	B2-NE	24	B3-MW	472	B4-W	74
	E-MW2	212						
B3-MW	NE-AC	2382	W-MW	1421	SE-GC	744	NE-NYC	1971
	E-MW1	1791	NW-PC	1299	SW-PC	1821	SW-GC	1361
	SE-AC	1934	B2-NE	472	B3-MW	234	B4-W	45
	E-MW2	450						
B4-W	NE-AC	249	W-MW	213	SE-GC	128	NE-NYC	222
	E-MW1	212	NW-PC	162	SW-PC	332	SW-GC	86
	SE-AC	218	B2-NE	74	B3-MW	45	E-MW2	63
E-MW2	B2-NE	212	B3-MW	450	B4-W	63		

SUMMARY



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	ANVK	DATA
NE-AC	6494	4975
W-MW	3979	3382
SE-GC	2330	2055
NE-NYC	5923	5223
E-MW1	4598	2712
NW-PC	3226	2851
SW-PC	5270	3875
SW-GC	8103	3162
SE-AC	9028	3683
B1-NE	0	0
B2-NE	18324	16154
B3-MW	18073	15925
B4-W	2276	2004
E-MW2	824	725
Totals	88448	66726



I-1.7 Transponder Loading (Including Broadcast Video)



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Ku Transponder Loading
Analog Voice and Data -- Scenario V
(Broadcast Video)

From	To	Channel	Class	Circuits
NE-AC	SE-GC	V-1	ANVK	5317
NE-AC	SW-PC	V-2	ANVK	6000
NE-AC	W-MW	V-3	ANVK	6000
NE-AC	SW-GC	V-4	ANVK	5876
NE-AC	W-MW	V-5	ANVK	3198
NE-AC	SE-AC	V-6	ANVK	6000
NE-AC	NW-PC	V-7	ANVK	5579
NE-AC	SW-PC	V-8A	ANVK	434
NE-AC	NW-PC	V-8B	ANVK	0
NE-AC	NE-NYC	V-8C	ANVK	1391
NE-AC	NE-AC	V-9A	ANVK	2422
NE-AC	SE-AC	V-9B	ANVK	3000
NE-AC	SS	V-10	DATA	48923
NE-AC	E-MW1	V-11	ANVK	6000
NE-AC	E-MW1	V-12	ANVK	3461
W-MW	SE-AC	V-1	ANVK	6000
W-MW	SW-GC	V-2	ANVK	5138
W-MW	NE-AC	V-3	ANVK	6000
W-MW	SE-GC	V-4	ANVK	3963
W-MW	NE-AC	V-5	ANVK	3198
W-MW	NE-NYC	V-6	ANVK	6000
W-MW	SW-PC	V-7	ANVK	5811
W-MW	W-MW	V-8A	ANVK	704
W-MW	NE-NYC	V-8B	ANVK	1643
W-MW	SE-AC	V-8C	ANVK	1042
W-MW	NE-NYC	V-9A	ANVK	0
W-MW	E-MW1	V-9B	ANVK	3000
W-MW	SS	V-10	DATA	40865
W-MW	NW-PC	V-11	ANVK	3753
W-MW	SW-PC	V-12	ANVK	0
SE-GC	NE-AC	V-1	ANVK	5317
SE-GC	SE-AC	V-2	ANVK	4480
SE-GC	NE-NYC	V-3	ANVK	4507
SE-GC	W-MW	V-4	ANVK	3963
SE-GC	E-MW1	V-5	ANVK	5443
SE-GC	SW-PC	V-6	ANVK	3856
SE-GC		V-7		
SE-GC	NW-PC	V-8A	ANVK	2000
SE-GC	SE-GC	V-8B	ANVK	318
SE-GC		V-8C		
SE-GC	NW-PC	V-9A	ANVK	548



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SE-GC		V-9B		
SE-GC	SS	V-10	DATA	29664
SE-GC	SW-GC	V-11	ANVK	3240
SE-GC		V-12		
NE-NYC	E-MW1	H-1	ANVK	6000
NE-NYC	E-MW1	H-2	ANVK	6000
NE-NYC	SE-GC	H-3	ANVK	4507
NE-NYC	NW-PC	H-4	ANVK	4913
NE-NYC	SW-PC	H-5	ANVK	5548
NE-NYC	W-MW	H-6	ANVK	6000
NE-NYC	SW-GC	H-7	ANVK	5069
NE-NYC	E-MW1	H-8A	ANVK	688
NE-NYC	W-MW	H-8B	ANVK	1643
NE-NYC	NE-AC	H-8C	ANVK	1391
NE-NYC	W-MW	H-9A	ANVK	0
NE-NYC	SW-GC	H-9B	ANVK	0
NE-NYC	SS	H-10	DATA	46054
NE-NYC	SE-AC	H-11	ANVK	6000
NE-NYC	SE-AC	H-12	ANVK	4532
E-MW1	NE-NYC	H-1	ANVK	6000
E-MW1	NE-NYC	H-2	ANVK	6000
E-MW1	NW-PC	H-3	ANVK	6000
E-MW1	SW-PC	H-4	ANVK	6000
E-MW1	SE-GC	H-5	ANVK	5443
E-MW1	SW-GC	H-6	ANVK	6000
E-MW1	SE-AC	H-7	ANVK	6000
E-MW1	NE-NYC	H-8A	ANVK	688
E-MW1	SE-AC	H-8B	ANVK	2000
E-MW1	NW-PC	H-8C	ANVK	239
E-MW1	SE-AC	H-9A	ANVK	2202
E-MW1	W-MW	H-9B	ANVK	3000
E-MW1	SS	H-10	DATA	53326
E-MW1	NE-AC	H-11	ANVK	6000
E-MW1	NE-AC	H-12	ANVK	3461
NW-PC	SW-PC	H-1	ANVK	6000
NW-PC	NW-PC	H-2	ANVK	3600
NW-PC	E-MW1	H-3	ANVK	6000
NW-PC	NE-NYC	H-4	ANVK	4913
NW-PC	SE-AC	H-5	ANVK	4373
NW-PC		H-6		
NW-PC	NE-AC	H-7	ANVK	5579
NW-PC	SE-GC	H-8A	ANVK	2000
NW-PC	NE-AC	H-8B	ANVK	0
NW-PC	E-MW1	H-8C	ANVK	239
NW-PC	SE-GC	H-9A	ANVK	548
NW-PC	SW-PC	H-9B	ANVK	2046
NW-PC	SS	H-10	DATA	38096
NW-PC	W-MW	H-11	ANVK	3753
NW-PC	SW-GC	H-12	ANVK	4156
SW-PC	NW-PC	V-1	ANVK	6000



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SW-PC	NE-AC	V-2	ANVK	6000
SW-PC	SE-AC	V-3	ANVK	5829
SW-PC	E-MW1	V-4	ANVK	6000
SW-PC	NE-NYC	V-5	ANVK	5548
SW-PC	SE-CC	V-6	ANVK	3856
SW-PC	W-MW	V-7	ANVK	5811
SW-PC	NE-AC	V-8A	ANVK	434
SW-PC	SW-CC	V-8B	ANVK	2000
SW-PC	SW-CC	V-8C	ANVK	2000
SW-PC	SW-CC	V-9A	ANVK	2712
SW-PC	NW-PC	V-9B	ANVK	2046
SW-PC	SS	V-10	DATA	48242
SW-PC	SW-PC	V-11	ANVK	5652
SW-PC	W-MW	V-12	ANVK	0
SW-CC	SW-CC	H-1	ANVK	2080
SW-CC	W-MW	H-2	ANVK	5138
SW-CC		H-3		
SW-CC	NE-AC	H-4	ANVK	5876
SW-CC		H-5		
SW-CC	E-MW1	H-6	ANVK	6000
SW-CC	NE-NYC	H-7	ANVK	5069
SW-CC	SE-AC	H-8A	ANVK	2000
SW-CC	SW-PC	H-8B	ANVK	2000
SW-CC	SW-PC	H-8C	ANVK	2000
SW-CC	SW-PC	H-9A	ANVK	2712
SW-CC	NE-NYC	H-9B	ANVK	0
SW-CC	SS	H-10	DATA	39456
SW-CC	SE-CC	H-11	ANVK	3240
SW-CC	NW-PC	H-12	ANVK	4156
SE-AC	W-MW	H-1	ANVK	6000
SE-AC	SE-CC	H-2	ANVK	4480
SE-AC	SW-PC	H-3	ANVK	5829
SE-AC	SE-AC	H-4	ANVK	4724
SE-AC	NW-PC	H-5	ANVK	4373
SE-AC	NE-AC	H-6	ANVK	6000
SE-AC	E-MW1	H-7	ANVK	6000
SE-AC	SW-CC	H-8A	ANVK	2000
SE-AC	E-MW1	H-8B	ANVK	2000
SE-AC	W-MW	H-8C	ANVK	1042
SE-AC	E-MW1	H-9A	ANVK	2202
SE-AC	NE-AC	H-9B	ANVK	3000
SE-AC	SS	H-10	DATA	55526
SE-AC	NE-NYC	H-11	ANVK	6000
SE-AC	NE-NYC	H-12	ANVK	4532

Totals

ANVK : 441474
DATA : 400152



I-2 - C-BAND PAYLOAD

As pointed out in Appendix I-1.1, the C-Band loadings were separate computer runs, using overflows from Ku-Band. The C-Band matrices were derived from the Ku Overflow Matrices presented in Appendix I.1.1. Relative traffic between C/Ku overlaps were used, and overflow data was assumed to be low rate data at 9.6 kb/s for a HVC.



I-2.1 C-Band Beam Coverage

The C-Band beam definitions for Scenario V are as follows:

<u>BEAM NO.</u>	<u>BEAM ACRONYM</u>	<u>BEAM DESCRIPTION</u>
1	B1-NE	Northeastern-most part of U.S., including New York
2	B2-NE	Larger northeastern section, encircling B1-NE
3	B3-MW	Central CONUS cut, including midwest/southeast
4	B4-W	Western half of continental U.S. (CONUS)



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BEAM COVERAGES

Beam: B1-NE				
CON	NJ	MAS	ME1	ME2
NH	NY2	NY3	RI	VT
Beam: B2-NE				
DEL	IN1	IN2	KY2	MD
MI3	NC1	NC2	NY1	OH1
OH2	PA1	PA2	SC1	SC2
VA1	VA2	WV1	WV2	
Beam: B3-MW				
AK1	AK2	AL1	AL2	FL1
FL2	FL3	GA1	GA2	IL1
IL2	IO1	IO2	KS2	KY1
LA1	LA2	MN1	MN2	MO1
MO2	MS2	ND2	NE2	OK2
SD2	TN1	TN2	WI1	WI2
Beam: B4-W				
AZ2	CA1	CA2	CA3	CO2
ID2	MT1	MT2	ND1	NM1
NM2	NV1	NV2	OK1	OR1
TX1	TX2	TX3	TX4	TX5
TX6	UT1	WA1	WA2	WY2



I-2.2 C-Band Coverage To SMSA's



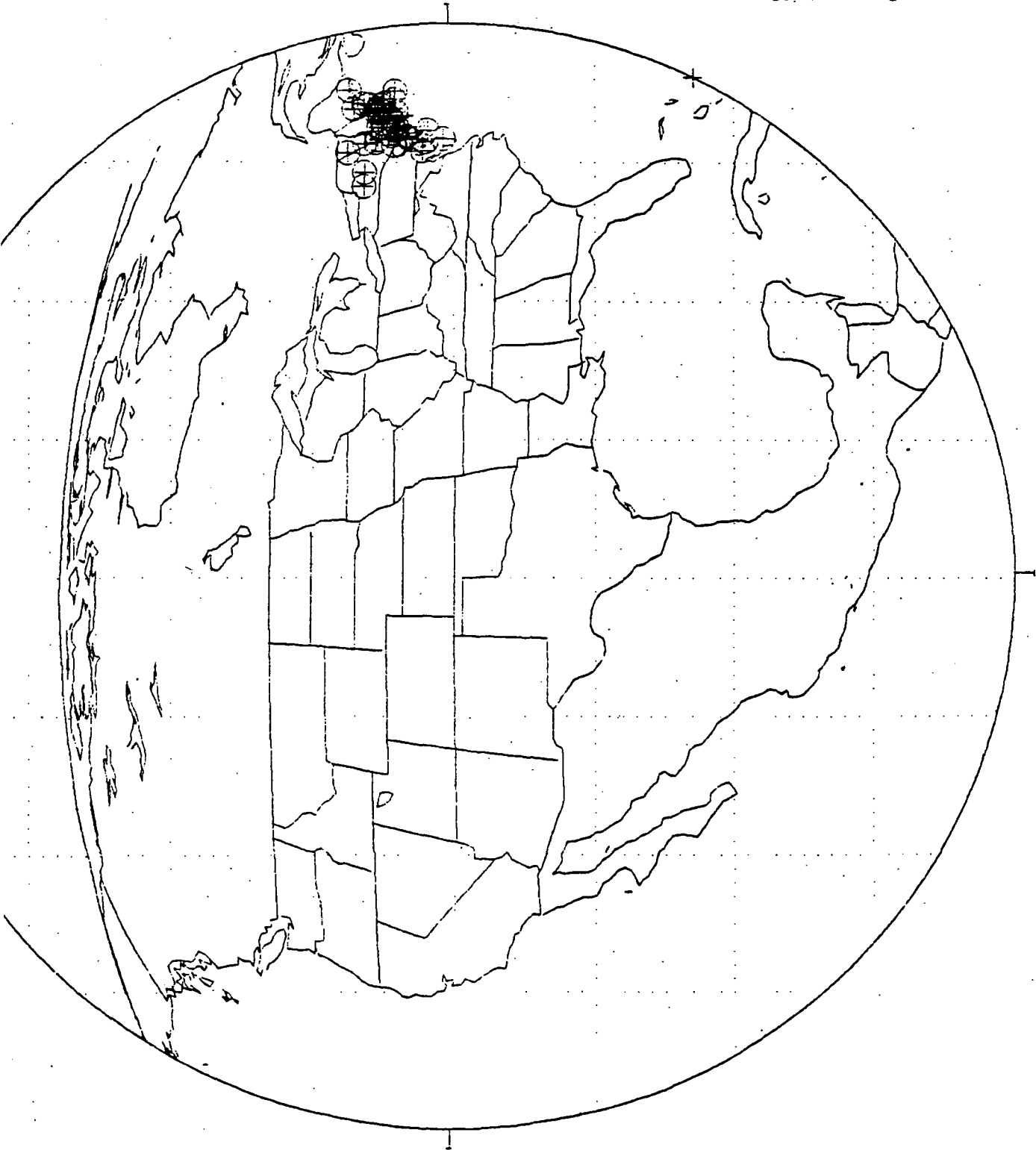
C-Band Beam Coverages

Page 1

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
1	ALNY	ALBANY-SCHENECTADY-TROY NY	42.40	73.49
1	ATNJ	ATLANTIC CITY NJ	39.23	74.27
1	BAME	BANGOR ME	44.49	68.47
1	BOMA	BOSTON MA	42.20	71.05
1	BRCT	BRIDGEPORT CT	41.12	73.12
1	BICT	BRISTOL CT	41.41	72.57
1	BRMA	BROCKTON MA	42.06	71.01
1	BUVT	BURLINGTON VT	44.28	73.14
1	DACT	DANBURY CT	41.24	73.26
1	FAMA	FALL RIVER MA-RI	41.42	71.08
1	FIMA	FITCHBURG-LEOMISTER MA	42.35	71.50
1	GLNY	GLENS FALLS NY	43.17	73.14
1	HACT	HARTFORD CT	41.45	72.42
1	JENJ	JERSEY CITY NJ	40.44	74.04
1	LAMA	LAWRENCE-HAVERHILL MA-NH	42.41	71.12
1	LEME	LEWISTON-AUBURN ME	44.06	70.14
1	LONJ	LONG BRANCH-ASBURY PARK NJ	42.38	71.19
1	LOMA	LOWELL MA-NH	42.38	71.19
1	MANH	MANCHESTER NH	42.59	71.28
1	MECT	MERIDEN CT	42.32	72.48
1	NANH	NASHUA NH	42.44	71.28
1	NANY	NASSAU-SUFFOLK NY	42.31	73.36
1	NEMA	NEW BEDFORD MA	41.38	70.55
1	NECT	NEW BRITAIN CT	41.40	72.47
1	NENJ	NEW BRUNSWICK-PERTH AMBOY-SAYR NJ	40.29	74.27
1	NWCT	NEW HAVEN-WEST HAVEN CT	41.18	72.55
1	NLCT	NEW LONDON-NORWICH CT-RI	41.21	72.06
1	NENY	NEW YORK NY-NJ	40.40	73.50
1	NWNJ	NEWARK NJ	40.44	74.11
1	NWNY	NEWBRGH-MIDDLETOWN NY	41.26	74.26
1	NOCT	NORWALK CT	41.07	73.25
1	PANJ	PATERSON-CLIFTON-PASSAIC NJ	40.52	74.08
1	PIMA	PITTSFIELD MA	38.23	75.26
1	POME	PORTLAND ME	43.41	70.18
1	PONH	PORTSMOUTH-DOVER-ROCHESTER NH-ME	43.03	70.47
1	PONY	POUGHKEEPSIE NY	41.43	73.56
1	PRRI	PROVIDENCE-WAWICK-PAWTUCKET RI-MA	39.42	75.53
1	SPCT	SPRINGFIELD-CHICOPEE-HOLYOKE CT-MA	42.07	72.35
1	STCT	STAMFORD CT	41.03	73.32
1	SYNY	SYRACUSE NY	43.03	76.10
1	TRNJ	TRENTON NJ	40.15	74.43
1	UTNY	UTICA-ROME NY	43.06	75.15
1	VINJ	VINELAND-MILLVILLE-RIDGETON NJ	39.29	75.02
1	WACT	WATERBURY CT	41.33	73.03
1	WOMA	WORCESTER MA	42.17	71.48



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CASE 03/18/85 16.123
SATellite POSITION 101.0 WEST (100W, 37N) ZONE 1 OF C BAND



C-Band Beam Coverages
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	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
2	AKOH	AKRON OH	41.04	81.31
2	ALPA	ALLENTOWN-BETHLEHEM-EASTON PA-NJ	40.11	74.36
2	ATPA	ALTOONA PA	40.32	78.23
2	ANIN	ANDERSON IN	40.05	85.14
2	ANSC	ANDERSON SC	34.30	82.39
2	ANMI	ANN ARBOR MI	42.18	83.43
2	ASNC	ASHEVILLE NC	35.35	82.35
2	BAMD	BALTIMORE MD	39.18	76.38
2	BAMI	BATTLE CREEK MI	42.20	85.01
2	BYMI	BAY CITY MI	43.35	83.52
2	BEMI	BENTON HARBOR MI	42.07	86.27
2	BINY	BINGHAMTON NY-PA	42.06	75.55
2	BLIN	BLOOMINGTON IN	39.10	86.31
2	BUNY	BUFFALO NY	42.52	78.55
2	BUNC	BURLINGTON NC	36.05	79.27
2	CAOH	CANTON OH	40.48	81.23
2	CHSC	CHARLESTON -NORTH CHARLESTON SC	32.48	79.58
2	CHWV	CHARLESTON WV	38.23	81.40
2	CHNC	CHARLOTTE-GASTONIA NC	35.03	80.50
2	CHVA	CHARLOTTESVILLE VA	38.02	78.29
2	CIOH	CINCINNATI OH-KY	39.10	84.30
2	CLOH	CLEVELAND OH	41.30	81.41
2	COSC	COLUMBIA SC	34.00	81.00
2	COOH	COLUMBUS OH	39.59	83.03
2	CUMD	CUMBERLAND MD-WV	39.40	78.47
2	DAVA	DANVILLE V	36.34	79.25
2	DAOH	DAYTON OH	39.45	84.10
2	DEMI	DETROIT MI	42.23	83.05
2	ELIN	ELKHART IN	41.52	85.56
2	ELNY	ELMIRA NY	42.06	76.50
2	ERPA	ERIE PA	42.07	80.05
2	EVIN	EVANSVILLE IN-KY	38.00	87.33
2	FANC	FAYETTEVILLE NC	35.05	78.53
2	FLMI	FLINT MI	43.03	83.04
2	FOSC	FORENCE SC	34.12	79.44
2	FOIN	FORT WAYNE IN	41.05	85.08
2	GAIN	GARY-HAMMOND-EAST CHICAGO IN	41.34	87.20
2	GRMI	GRAND RAPIDS MI	42.57	86.40
2	GRNC	GREENSBORO-WINSTON -SALEM-HIGH NC	36.03	79.50
2	GRSC	GREENVILLE-SPARTANBURG SC	34.52	82.25
2	HAMD	HAGERSTOWN MD	39.39	77.44
2	HAOH	HAMILTON-MIDDLETOWN OH	39.23	84.33
2	HAPA	HARRISBURG PA	40.17	76.54
2	HINC	HICKORY NC	35.44	81.23
2	HUWV	HUNTINGTON-ASHLAND WV-KY	38.24	82.26
2	ININ	INDIANAPOLIS IN	39.45	86.10
2	JAMI	JACKSON MI	42.15	84.24
2	JANC	JACKSONVILLE NC	34.45	77.26
2	JOTN	JOHNSON CITY-KINGSPORT-BRISTOL TN-VA	36.33	82.34
2	JOPA	JOHNSONTOWN PA	40.20	78.56

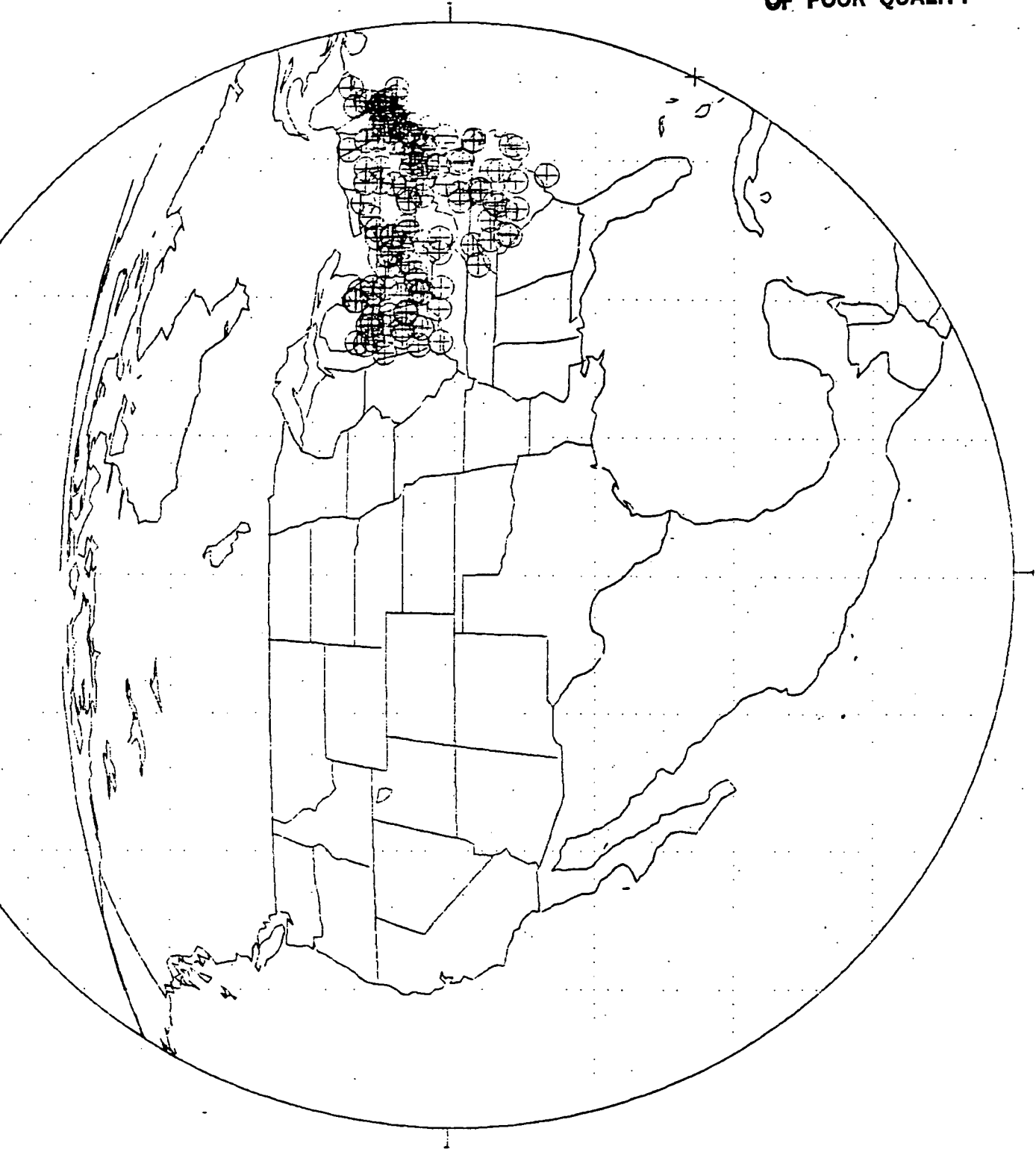


C-Band Beam Coverages

Page 3

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
2	KAMI	KALAMAZOO-PORTAGE MI	42.17	85.36
2	KNTN	KNOXVILLE TN	36.00	83.57
2	KOIN	KOKOMO IN	40.30	86.09
2	LAIN	LAFAYETTE-WEST LAFAYETTE IN	40.25	86.54
2	LAPA	LANCASTER PA	40.01	76.19
2	LAMI	LANSING-EAST LANSING MI	42.44	85.34
2	LEKY	LEXINGTON-FAYETTE KY	38.02	84.30
2	LIOH	LIMA OH	40.43	84.06
2	LOOH	LORAIN-ELYRIA OH	41.28	82.11
2	LOKY	LOUISVILLE KY-IN	38.13	85.48
2	LYVA	LYNCHBURG VA	37.24	79.09
2	MAOH	MANSFIELD OH	40.46	82.31
2	MUIN	MUNCIE IN	40.11	85.22
2	MUMI	MUSKEGON-NORTON SHORES-MUSKEGO MI	43.13	86.15
2	NEOH	NEWARK OH	40.03	82.25
2	NEVA	NEWPORT NEWS-HAMPTON VA	36.59	76.26
2	NOVA	NORFOLK-VIRGINIA BEACH-PORTSMO VA-NC	36.54	76.18
2	NOPA	NORTHEAST PENNSYLVANIA PA	41.20	75.45
2	PAWV	PARKERSBURG-MARIETTA WV-OH	39.17	81.33
2	PEVA	PETERSBURG-COLONIAL HEIGHTS-HO VA	37.14	77.24
2	PHPA	PHILADELPHIA PA-NJ	40.00	75.10
2	PIPA	PITTSBURGH PA	40.26	80.00
2	RANC	RALEIGH-DURHAM NC	35.46	78.39
2	REPA	READING PA	40.20	75.55
2	RIVA	RICHMOND VA	37.34	77.27
2	ROVA	ROANOKE VA	37.15	79.58
2	RONY	ROCHETER NY	43.12	77.37
2	ROSC	ROCK HILL SC	34.55	81.01
2	SAMI	SAGINAW MI	43.25	83.54
2	SANC	SALISBURY-CONCORD NC	35.20	80.30
2	SHPA	SHARON PA	41.16	80.30
2	SOIN	SOUTH BEND IN	41.40	86.15
2	SPOH	SPRINGFIELD OH	39.55	83.48
2	STPA	STATE COLLEGE PA	40.48	77.52
2	STOH	STEUBENVILLE-WEIRTON OH-WV	40.22	80.39
2	TEIN	TERRE HAUTE IN	39.27	87.24
2	TOOH	TOLEDO OH-MI	41.40	83.35
2	WADC	WASHINGTON DC-MD	38.55	77.00
2	WHWV	WHEELING WV-OH	40.05	80.43
2	WIPA	WILLIAMSPORT PA	41.16	77.03
2	WIDE	WILMINGTON DE-NJ	39.46	75.31
2	WINC	WILMINGTON NC	34.14	77.55
2	YOPA	YORK PA	39.57	76.44
2	YOOH	YOUNGSTOWN-WARREN OH	41.05	80.40

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CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 2 OF C BAND
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C-Band Beam Coverages

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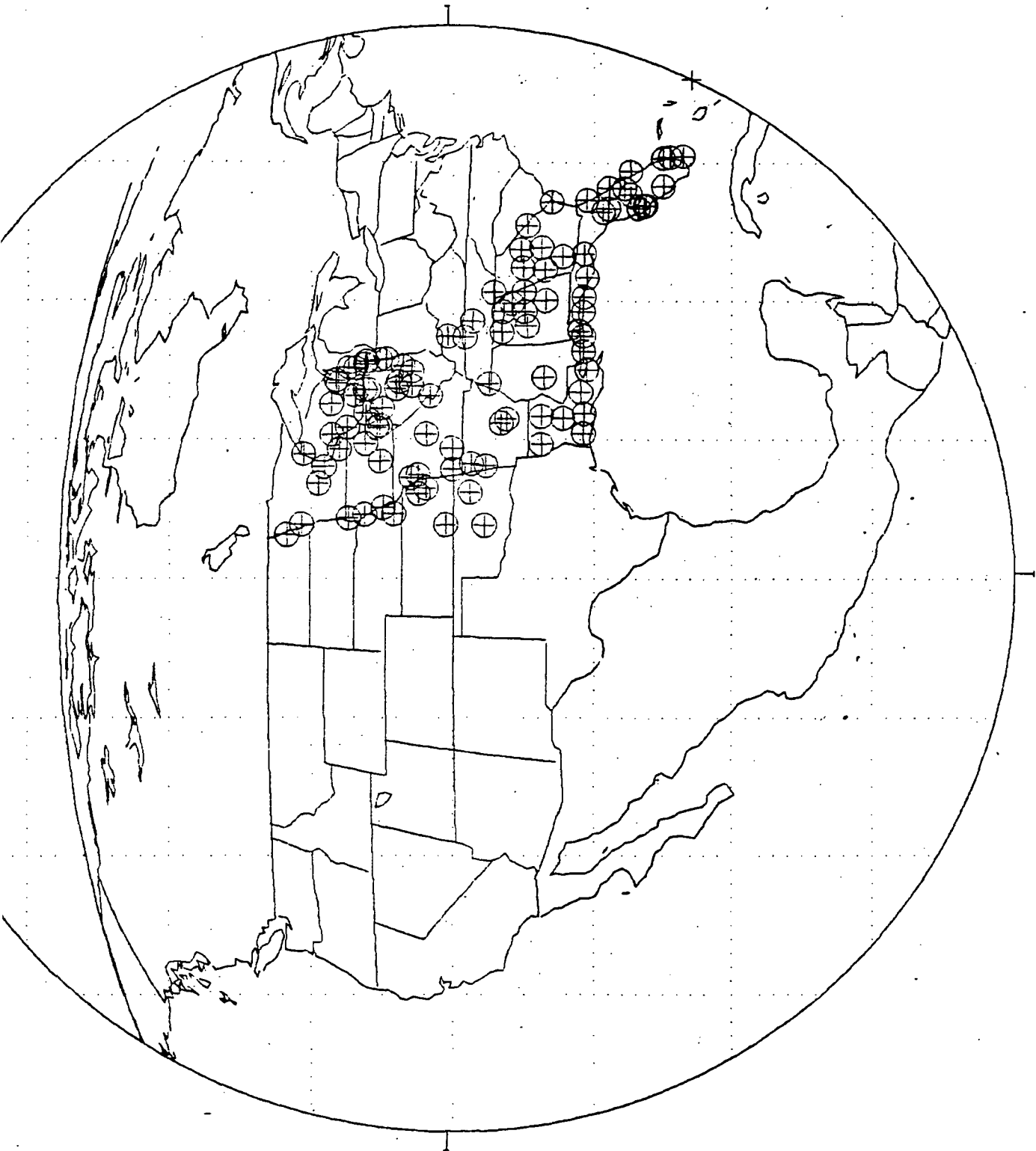
	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
3	ALGA	ALBANY GA	31.37	84.10
3	ALLA	ALEXANDRIA LA	31.19	92.29
3	ANAL	ANNISTON AL	33.38	85.50
3	APWI	APPLETON-OSHKOSH WI	44.17	88.24
3	ATGE	ATHENS GE	33.57	83.24
3	ATGA	ATLANTA GA	33.45	84.23
3	AUGA	AUGUSTA GA-SC	33.29	82.00
3	BALA	BATON ROUGE LA	30.30	91.10
3	BIMS	BILOXI-GULFPORT MS	30.21	89.08
3	BIAL	BIRMINGHAM AL	33.30	86.55
3	BLIL	BLOOMINGTON-NORMAL IL	40.29	89.00
3	BRFL	BRADENTON FL	27.29	82.33
3	CEIA	CEDAR RAPIDS IA	41.59	91.39
3	CHIL	CHAMPAIGN-URBANA-RANTOUL IL	40.07	88.14
3	CHTN	CHATTANOOGA TN-GA	35.02	85.18
3	CIIL	CHICAGO IL	41.50	87.45
3	CLTN	CLARKSVILLE-HOPKINSVILLE TN-KY	36.50	87.30
3	COMO	COLUMBIA MO	38.58	92.20
3	COGA	COLUMBUS GA-AL	32.28	84.59
3	DAIA	DAVENPORT-ROCK ISLAND-MOLINE IA-IL	41.30	90.34
3	DAFL	DAYTONA BEACH FL	29.11	81.01
3	DEIL	DECATUR IL	39.51	88.57
3	DEIA	DES MOINES IA	41.35	93.35
3	DUIA	DUBUQUE IA	42.31	90.41
3	DUMN	DULUTH-SUPERIOR MN-WI	46.45	92.10
3	EAWI	EAU CLAIRE WI	44.50	91.30
3	FAND	FARGO-MOORHEAD ND-MN	46.52	96.49
3	FAAR	FAYETTEVILLE-SPRINGDALE AR	36.03	94.10
3	FLAL	FLORENCE AL	34.48	87.40
3	FOFL	FORT LAUDERDALE-HOLLYWOOD FL	26.08	80.08
3	FRFL	FORT MYERS FL	26.39	81.51
3	FOAR	FORT SMITH AR-OK	35.22	94.27
3	FTFL	FORT WALTON BEACH FL	30.25	86.38
3	GAAL	GADSDEN AL	34.00	86.00
3	GAFI	GAINESVILLE FL	29.37	82.21
3	GRND	GRAND FORKS ND-MN	47.57	97.05
3	GRWI	GREEN BAY WI	44.32	88.00
3	HUAL	HUNTSVILLE AL	34.44	86.35
3	IOIW	IOWA CITY IW	41.39	91.31
3	JAMS	JACKSON MS	32.20	90.11
3	JAFL	JACKSONVILLE FL	30.20	81.40
3	JAWI	JANESVILLE-BELIOT WI	42.42	89.02
3	JOMO	JOPLIN MO	37.04	94.31
3	KAIL	KANKAKEE IL	41.08	87.52
3	KAMO	KANSAS CITY MO-KS	39.05	94.37
3	KEWI	KENOSHA WI	42.34	87.34
3	LAWI	LA CROSSE WI	43.48	91.04
3	LALA	LAFAYETTE LA	30.12	92.18
3	LKLA	LAKE CHARLES LA	30.13	93.13
3	LAFL	LAKELAND-WINTER HAVEN FL	28.02	81.59



C-Band Beam Coverages

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	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
3	LAKS	LAWRENCE KS	38.58	95.15
3	LINE	LINCOLN NE	40.49	96.41
3	LIAR	LITTLE ROCK-NORTH LITTLE ROCK AR	34.42	92.17
3	MAGA	MACON GA	32.49	83.37
3	MAWI	MADISON WI	43.04	89.22
3	MEFL	MELBOURNE-TITUSVILLE-COCOA FL	28.04	80.38
3	METN	MEMPHIS TN-AR	35.10	90.00
3	MIFL	MIAMI FL	25.45	80.15
3	MIWI	MILWAUKEE WI	43.03	87.56
3	MIMN	MINNEAPOLIS-ST PAUL MN-WI	45.00	93.15
3	MOAL	MOBILE AL	30.40	88.05
3	MOLA	MONROE LA	32.31	92.06
3	MNAL	MONTGOMERY AL	32.22	86.20
3	NATN	NASHVILLE-DAVIDSON TN	36.10	86.50
3	NELA	NEW ORLEANS LA	30.00	90.03
3	OCFL	OCALA FL	29.11	82.09
3	OKOK	OKLAHOMA CITY OK	35.28	97.33
3	OMNE	OMAHA NE-IA	41.15	96.00
3	ORFL	ORLANDO FL	28.33	81.21
3	OWKY	OWENSBORO KY	37.45	87.05
3	PAFL	PANAMA CITY FL	30.10	85.41
3	PAMS	PASCAGOULA-MOSS POINT PATERSON MS	30.21	88.32
3	PEFL	PENSACOLA FL	30.26	87.12
3	PEIL	PEORIA IL	40.43	89.38
3	PIAR	PINE BLUFF AR	34.13	92.00
3	RAWI	RACINE WI	42.42	87.50
3	ROMN	ROCHESTER MN	44.01	92.27
3	ROIL	ROCKFORD IL	42.16	89.06
3	STMN	ST CLOUD MN	45.34	94.10
3	STMO	ST JOSEPH MO	39.45	94.51
3	SLMO	ST LOUIS MO-IL	38.40	90.15
3	SAFL	SARASOTA FL	27.20	82.32
3	SAGA	SAVANNAH GA	32.04	81.07
3	SHWI	SHEBOYGAN WI	43.46	87.44
3	SHLA	SHREVEPORT LA	32.30	93.46
3	SINE	SIOUX CITY NE-IA	42.30	96.28
3	SISD	SIOUX FALLS SD	43.34	96.42
3	SPIL	SPRINGFIELD IL	39.49	89.39
3	SPMO	SPRINGFIELD MO	37.11	93.19
3	TAFL	TALLAHASSEE FL	30.26	84.19
3	TMFL	TAMPA-ST PETERSBURG FL	27.58	82.38
3	TOKS	TOPEKA KS	39.02	95.41
3	TUOK	TULSA OK	36.07	95.58
3	TUAL	TUSCALOOSA AL	33.12	87.33
3	WAIA	WATERLOO-CEDAR FALLS IA	42.30	92.20
3	WAWI	WAUSAU WI	44.58	89.40
3	WEFL	WEST PALM BEACH-BOCA RATON FL	26.42	80.05
3	WIKS	WICHITA KS	37.43	97.20



CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 3 OF C BAND
03/26/85 8.598

C-Band Beam Coverages

Page 6

	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
4	ABTX	ABILENE TX	32.27	99.45
4	ALNM	ALBUQUERQUE NM	35.05	106.38
4	AMTX	AMARILLO TX	35.14	101.50
4	ANCA	ANAHEIM-SANTA ANA-GARDEN GROVE CA	33.50	117.56
4	AUTX	AUSTIN TX	30.18	97.47
4	BACA	BAKERSFIELD CA	35.25	119.00
4	BETX	BEAUMONT-PORT ARTHUR-ORANGE TX	30.04	94.06
4	BEWA	BELLINGHAM WA	48.45	122.29
4	BIMT	BILLINGS MT	45.47	108.30
4	BIND	BISMARCK ND	46.50	100.48
4	BOID	BOISE CITY ID	43.38	115.30
4	BRWA	BREMERTON WA	47.34	122.40
4	BRTX	BROWNSVILLE-HARLINGEN-SAN BENI TX	25.54	97.30
4	BYTX	BRYAN-COLLEGE STATION TX	30.41	96.24
4	CAWY	CASPER WY	42.50	106.20
4	CHCA	CHICO CA	39.46	121.50
4	COCO	COLORADO SPRINGS CO	38.50	104.50
4	COTX	CORPUS CHRISTITX	27.47	97.26
4	DATX	DALLAS-FORT WORTH TX	32.47	96.48
4	DECO	DENVER-BOULDER CO	39.45	105.00
4	ELTX	EL PASO TX	31.45	106.30
4	ENOK	ENID OK	36.24	97.54
4	EUOR	EUGENE-SPRINGFIELD OR	44.03	123.04
4	FOCO	FORT COLLINS CO	40.35	105.05
4	FRCA	FRESNO CA	36.41	119.47
4	GATX	GALVESTON-TEXAS CITY TX	29.17	94.48
4	GRMT	GREATFALLS MT	47.30	111.6
4	GRCO	GREELEY CO	40.26	104.43
4	HOTX	HOUSTON TX	29.45	95.25
4	KITX	KILLEEN-TEMPLE TX	31.08	97.44
4	LATX	LAREDO TX	27.32	99.22
4	LANM	LAS CRUCES NM	32.18	106.47
4	LANV	LAS VEGAS NV	36.10	115.10
4	LAOK	LAWTON OK	34.36	98.25
4	LOTX	LONGVIEW TX	32.30	94.45
4	LOCA	LOS ANGELES-LONG BEACH CA	34.00	118.15
4	LUTX	LUBBOCK TX	33.35	101.53
4	MCTX	MCALLEN-PHARR-EDINBURG TX	26.13	98.15
4	MEOR	MEDFORD OR	42.20	122.52
4	MITX	MIDLAND TX	32.00	102.09
4	MOCA	MODESTO CA	37.37	121.00
4	ODTX	ODESSA TX	31.50	102.23
4	OLWA	OLYMPIA WA	47.03	122.53
4	OXCA	OXNARD-SIMI VALLEY-VENTURA CA	34.11	119.10
4	PHAZ	PHOENIX AZ	33.30	112.03
4	POOR	PORTLAND OR-WA	45.32	122.40
4	PRUT	PROVO=OREM UT	40.15	111.40
4	PUCO	PUEBLO CO	38.17	104.38
4	RECA	REDDING CA	40.35	122.24
4	RENV	RENO NV	39.32	119.49
4	RIWA	RICHLAND-KENNEWICK WA	46.17	119.17



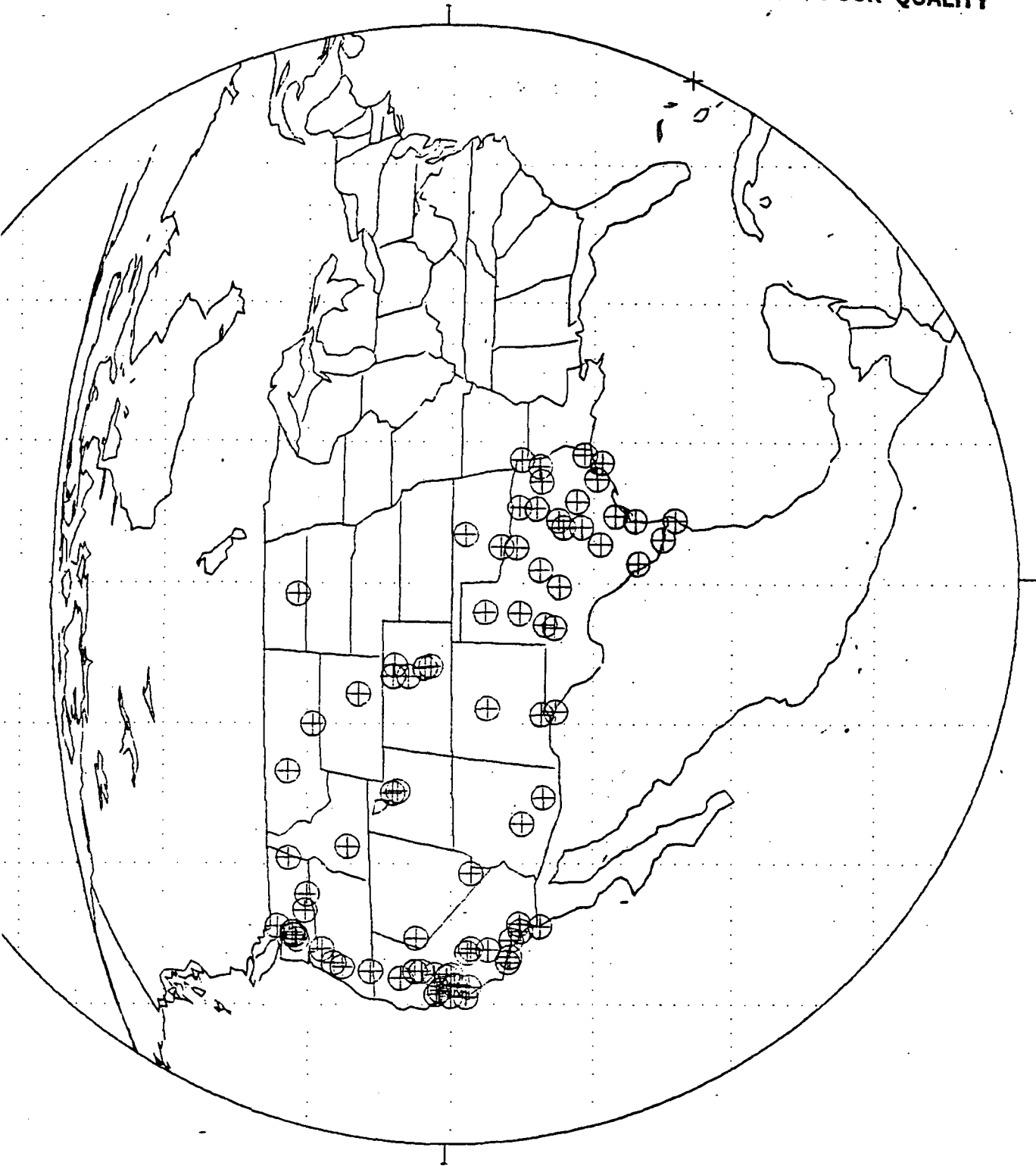
C-Band Beam Coverages

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	<u>CODE</u>	<u>DESCRIPTION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
4	RICA	RIVERSIDE-SAN BERNADINO-ONTAR CA	33.59	117.22
4	SACA	SACRAMENTO CA	38.32	121.30
4	SAOR	SALEM OR	44.57	123.01
4	SLCA	SALINAS-SEASIDE-MONTEREY CA	36.39	121.40
4	SAUT	SALT LAKE CITY-OGDEN UT	40.45	111.55
4	SATX	SAN ANGELO TX	31.28	100.28
4	SNTX	SAN ANTONIO TX	29.25	98.30
4	SNCA	SAN DIEGO CA	32.45	117.10
4	SFCA	SAN FRANCISCO - OAKLAND CA	37.45	122.27
4	SJCA	SAN JOSE CA	37.20	121.55
4	STCA	SANTA BARBARA-SANTA MARIA-LOMP CA	34.25	119.41
4	SCCA	SANTA CRUZ CA	36.58	122.03
4	SRCA	SANTA ROSA CA	38.26	122.43
4	SEWA	SEATTLE-EVERETT WA	47.35	122.20
4	SHTX	SHERMON-DENISON TX	33.39	96.35
4	SPWA	SPOKANE WA	47.40	117.25
4	SOCA	STOCKTON CA	37.59	121.20
4	TAWA	TACOMA WA	47.16	122.30
4	TETX	TEXARKANA TX-AR	33.28	94.02
4	TUAZ	TUCSON AZ	32.15	110.57
4	TYTX	TYLER TX	32.22	95.18
4	VACA	VALLEJO-FAIRFIELD-NAPA CA	38.05	122.14
4	VITX	VICTORIA TX	28.49	97.01
4	VICA	VISALIA-TULARE-PORTERVILLE CA	36.20	119.18
4	WATX	WACO TX	31.33	97.10
4	WITX	WICHITA FALLS TX	33.55	98.30
4	YAWA	YAKIMA WA	46.37	120.30
4	YUCA	YUBA CITY CA	39.09	121.36



ORIGINAL PAGE IS
OF POOR QUALITY



CASE SATELLITE POSITION 101.0 WEST (100W, 37N) ZONE 4 OF C BAND

03/26/85 8.606



I-2.3 Beam To Beam Matrix - C-Band (No Broadcast Video)



May 30 13:32 1985 5c.ov Page 1

Beam to Beam Matrix
Overflow to C Beams
Scenario V

Class = ANVC

From:

To:

B1-NE								
B2-NE	B2-NE	10491	B3-MW	5017	B4-W	1118		
B3-MW	B1-NE	10491	B2-NE	15961	B3-MW	24676	B4-W	18212
B4-W	B1-NE	5017	B2-NE	24676	B3-MW	14080	B4-W	10817
	B1-NE	1118	B2-NE	18212	B3-MW	10817	B4-W	7984

SUMMARY

ANVC

B1-NE 16626
B2-NE 69340
B3-MW 54590
B4-W 38131

Totals 178687



I-2.4 C-Band Transponder Loading (No Broadcast Video)



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C Transponder Loading
Scenario V
(No Broadcast Video)

From	To	Channel	Class	Circuits
B1-NE	B2-NE	H-1	ANVC	6000
B1-NE	B3-MW	H-2	ANVC	5017
B1-NE	B4-W	H-3	ANVC	1118
B1-NE		H-4		
B1-NE		H-5		
B1-NE		H-6		
B1-NE		H-7		
B1-NE		H-8		
B1-NE		H-9		
B1-NE		H-10		
B1-NE	B2-NE	H-11A	ANVC	3000
B1-NE		H-11B		
B1-NE	B2-NE	H-12A	ANVC	1491
B1-NE		H-12B		
B1-NE		H-12C		
B2-NE	B1-NE	V-1	ANVC	6000
B2-NE	B2-NE	V-2	ANVC	6000
B2-NE	B2-NE	V-3	ANVC	6000
B2-NE	B4-W	V-4	ANVC	6000
B2-NE	B3-MW	V-5	ANVC	6000
B2-NE	B3-MW	V-6	ANVC	6000
B2-NE	B3-MW	V-7	ANVC	6000
B2-NE	B3-MW	V-8	ANVC	6000
B2-NE	B4-W	V-9	ANVC	6000
B2-NE	B4-W	V-10	ANVC	6000
B2-NE	B1-NE	V-11A	ANVC	3000
B2-NE	B2-NE	V-11B	ANVC	3000
B2-NE	B1-NE	V-12A	ANVC	1491
B2-NE	B2-NE	V-12B	ANVC	961
B2-NE	B3-MW	V-12C	ANVC	676
B3-MW	B4-W	H-1	ANVC	6000
B3-MW	B1-NE	H-2	ANVC	5017
B3-MW	B3-MW	H-3	ANVC	6000
B3-MW		H-4		
B3-MW	B2-NE	H-5	ANVC	6000
B3-MW	B2-NE	H-6	ANVC	6000
B3-MW	B2-NE	H-7	ANVC	6000
B3-MW	B2-NE	H-8	ANVC	6000
B3-MW	B3-MW	H-9	ANVC	6000
B3-MW		H-10		
B3-MW	B3-MW	H-11A	ANVC	80



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B3-MW	B4-W	H-11B	ANVC	3000
B3-MW	B3-MW	H-12A	ANVC	2000
B3-MW	B4-W	H-12B	ANVC	1817
B3-MW	B2-NE	H-12C	ANVC	676
B4-W	B3-MW	V-1	ANVC	6000
B4-W	B4-W	V-2	ANVC	6000
B4-W	B1-NE	V-3	ANVC	1118
B4-W	B2-NE	V-4	ANVC	6000
B4-W	B4-W	V-5	ANVC	1984
B4-W		V-6		
B4-W		V-7		
B4-W		V-8		
B4-W	B2-NE	V-9	ANVC	6000
B4-W	B2-NE	V-10	ANVC	6000
B4-W		V-11A		
B4-W	B3-MW	V-11B	ANVC	3000
B4-W		V-12A		
B4-W	B3-MW	V-12B	ANVC	1817
B4-W		V-12C		

Totals

ANVC : 178263



I-2.5 C-Band Beam To Beam Overflow From Ku-Band
(Including Broadcast Video)



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Beam to Beam Matrix
Overflow to C Beams
Scenario V
(Broadcast Video)

Class = ANVC

From:

To:

B1-NE	B2-NE	4823	B3-MW	3051	B4-W	328		
B2-NE	B1-NE	4823	B2-NE	7935	B3-MW	14387	B4-W	8795
B3-MW	B1-NE	3051	B2-NE	14387	B3-MW	9980	B4-W	6731
B4-W	B1-NE	328	B2-NE	8795	B3-MW	6731	B4-W	1256

SUMMARY

ANVC

B1-NE 8202
B2-NE 35940
B3-MW 34149
B4-W 17110
Totals 95401



**I-2.6 C-Band Beam To Beam Matrix
(Including Broadcast Video)**



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Beam to Beam Matrix
Analog Voice and Data -- Scenario V
(Broadcast Video)
(HVC or KB/S)

Class = ANVK

From:

To:

NE-AC	NE-AC	2422	W-MW	9198	SE-GC	5317	NE-NYC	1391
	E-MW1	6287	NW-PC	5579	SW-PC	6434	SW-GC	5876
	SE-AC	9849	B2-NE	2659	B3-MW	2703	B4-W	283
	E-MW2	3174						
W-MW	NE-AC	9198	W-MW	704	SE-GC	3963	NE-NYC	7643
	E-MW1	2820	NW-PC	3753	SW-PC	5811	SW-GC	5138
	SE-AC	7042	B2-NE	1985	B3-MW	1614	B4-W	243
	E-MW2	317						
SE-GC	NE-AC	5317	W-MW	3963	SE-GC	318	NE-NYC	4507
	E-MW1	4152	NW-PC	2548	SW-PC	3856	SW-GC	3240
	SE-AC	4480	B2-NE	1339	B3-MW	846	B4-W	145
	E-MW2	1291						
NE-NYC	NE-AC	1391	W-MW	7643	SE-GC	4507	E-MW1	9658
	NW-PC	4913	SW-PC	5548	SW-GC	5069	SE-AC	10532
	B2-NE	3438	B3-MW	2233	B4-W	252	E-MW2	3030
E-MW1	NE-AC	6287	W-MW	2820	SE-GC	4152	NE-NYC	9658
	NW-PC	4702	SW-PC	5038	SW-GC	4833	SE-AC	7540
	B2-NE	805	B3-MW	2033	B4-W	240		
NW-PC	NE-AC	5579	W-MW	3753	SE-GC	2548	NE-NYC	4913
	E-MW1	4702	NW-PC	3600	SW-PC	8046	SW-GC	4156
	SE-AC	4373	B2-NE	1574	B3-MW	1469	B4-W	183
	E-MW2	1537						
SW-PC	NE-AC	6434	W-MW	5811	SE-GC	3856	NE-NYC	5548
	E-MW1	5038	NW-PC	8046	SW-PC	5652	SW-GC	6712
	SE-AC	5829	B2-NE	1952	B3-MW	2071	B4-W	377
	E-MW2	1832						
SW-GC	NE-AC	5876	W-MW	5138	SE-GC	3240	NE-NYC	5069
	E-MW1	4833	NW-PC	4156	SW-PC	6712	SW-GC	2080
	SE-AC	6001	B2-NE	1948	B3-MW	1544	B4-W	97
	E-MW2	1680						



Ford Aerospace &
Communications Corporation

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SE-AC	NE-AC	9849	W-MW	7042	SE-CC	4480	NE-NYC	10532
	E-MW1	7540	NW-PC	4373	SW-PC	5829	SW-CC	6001
	SE-AC	4724	B2-NE	1735	B3-MW	2194	B4-W	249
	E-MW2	2662						
B1-NE								
B2-NE	NE-AC	2659	W-MW	1985	SE-CC	1339	NE-NYC	3438
	E-MW1	805	NW-PC	1574	SW-PC	1952	SW-CC	1948
	SE-AC	1735	B2-NE	28	B3-MW	535	B4-W	85
	E-MW2	241						
B3-MW	NE-AC	2703	W-MW	1614	SE-CC	846	NE-NYC	2233
	E-MW1	2033	NW-PC	1469	SW-PC	2071	SW-CC	1544
	SE-AC	2194	B2-NE	535	B3-MW	268	B4-W	51
	E-MW2	512						
B4-W	NE-AC	283	W-MW	243	SE-CC	145	NE-NYC	252
	E-MW1	240	NW-PC	183	SW-PC	377	SW-CC	97
	SE-AC	249	B2-NE	85	B3-MW	51	E-MW2	71
E-MW2	NE-AC	3174	W-MW	317	SE-CC	1291	NE-NYC	3030
	NW-PC	1537	SW-PC	1832	SW-CC	1680	SE-AC	2662
	B2-NE	241	B3-MW	512	B4-W	71		

Class = DATA

From:

To:

NE-AC	NE-AC	2128	W-MW	8105	SE-CC	4681	NE-NYC	1226
	E-MW1	5541	NW-PC	4919	SW-PC	5668	SW-CC	5182
	SE-AC	8678	B2-NE	2344	B3-MW	2382	B4-W	249
	E-MW2	2795						
W-MW	NE-AC	8105	W-MW	620	SE-CC	3489	NE-NYC	6732
	E-MW1	2484	NW-PC	3311	SW-PC	5122	SW-CC	4524
	SE-AC	6199	B2-NE	1748	B3-MW	1421	B4-W	213
	E-MW2	279						
SE-CC	NE-AC	4681	W-MW	3489	SE-CC	282	NE-NYC	3966
	E-MW1	3656	NW-PC	2250	SW-PC	3399	SW-CC	2854
	SE-AC	3951	B2-NE	1183	B3-MW	744	B4-W	128
	E-MW2	1136						
NE-NYC	NE-AC	1226	W-MW	6732	SE-CC	3966	E-MW1	8505



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	NW-PC	4330	SW-PC	4887	SW-OC	4467	SE-AC	9272
E-MW1	B2-NE	3030	B3-MW	1971	B4-W	222	E-MW2	2669
	NE-AC	5541	W-MW	2484	SE-OC	3656	NE-NYC	8505
	NW-PC	4142	SW-PC	4435	SW-OC	4256	SE-AC	6639
	B2-NE	709	B3-MW	1791	B4-W	212		
NW-PC	NE-AC	4919	W-MW	3311	SE-OC	2250	NE-NYC	4330
	E-MW1	4142	NW-PC	3178	SW-PC	7093	SW-OC	3661
	SE-AC	3857	B2-NE	1390	B3-MW	1299	B4-W	162
	E-MW2	1355						
SW-PC	NE-AC	5668	W-MW	5122	SE-OC	3399	NE-NYC	4887
	E-MW1	4435	NW-PC	7093	SW-PC	4978	SW-OC	5911
	SE-AC	5136	B2-NE	1722	B3-MW	1821	B4-W	332
	E-MW2	1613						
SW-OC	NE-AC	5182	W-MW	4524	SE-OC	2854	NE-NYC	4467
	E-MW1	4256	NW-PC	3661	SW-PC	5911	SW-OC	1832
	SE-AC	5291	B2-NE	1715	B3-MW	1361	B4-W	86
	E-MW2	1478						
SE-AC	NE-AC	8678	W-MW	6199	SE-OC	3951	NE-NYC	9272
	E-MW1	6639	NW-PC	3857	SW-PC	5136	SW-OC	5291
	SE-AC	4160	B2-NE	1531	B3-MW	1934	B4-W	218
	E-MW2	2343						
B1-NE								
B2-NE	NE-AC	2344	W-MW	1748	SE-OC	1183	NE-NYC	3030
	E-MW1	709	NW-PC	1390	SW-PC	1722	SW-OC	1715
	SE-AC	1531	B2-NE	24	B3-MW	472	B4-W	74
	E-MW2	212						
B3-MW	NE-AC	2382	W-MW	1421	SE-OC	744	NE-NYC	1971
	E-MW1	1791	NW-PC	1299	SW-PC	1821	SW-OC	1361
	SE-AC	1934	B2-NE	472	B3-MW	234	B4-W	45
	E-MW2	450						
B4-W	NE-AC	249	W-MW	213	SE-OC	128	NE-NYC	222
	E-MW1	212	NW-PC	162	SW-PC	332	SW-OC	86
	SE-AC	218	B2-NE	74	B3-MW	45	E-MW2	63
E-MW2	NE-AC	2795	W-MW	279	SE-OC	1136	NE-NYC	2669
	NW-PC	1355	SW-PC	1613	SW-OC	1478	SE-AC	2343
	B2-NE	212	B3-MW	450	B4-W	63		



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SUMMARY

	ANVK	DATA
NE-AC	61172	53898
W-MW	50231	44247
SE-GC	36002	31719
NE-NYC	58214	51277
E-MW1	48108	42370
NW-PC	46433	40947
SW-PC	59158	52117
SW-GC	48374	42618
SE-AC	67210	59209
B1-NE	0	0
B2-NE	18324	16154
B3-MW	18073	15925
B4-W	2276	2004
E-MW2	16347	14393
Totals	529922	466878



**I-2.7 C-Band Transponder Loading
(Including Broadcast Video)**



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C Transponder Loading
Scenario V
(Broadcast Video)

From	To	Channel	Class	Circuits
B1-NE		H-1		
B1-NE		H-2		
B1-NE		H-3		
B1-NE		H-4		
B1-NE		H-5		
B1-NE		H-6		
B1-NE		H-7		
B1-NE		H-8		
B1-NE		H-9		
B1-NE		H-10		
B1-NE	B3-MW	H-11A	ANVC	3000
B1-NE	B2-NE	H-11B	ANVC	3000
B1-NE	B4-W	H-12A	ANVC	328
B1-NE	B2-NE	H-12B	ANVC	1823
B1-NE		H-12C		
B2-NE		V-1	BDCST	
B2-NE		V-2	BDCST	
B2-NE		V-3	BDCST	
B2-NE		V-4	BDCST	
B2-NE		V-5	BDCST	
B2-NE		V-6	BDCST	
B2-NE	B2-NE	V-7	ANVC	6000
B2-NE	B3-MW	V-8	ANVC	6000
B2-NE	B3-MW	V-9	ANVC	6000
B2-NE	B4-W	V-10	ANVC	6000
B2-NE	B4-W	V-11A	ANVC	2795
B2-NE	B1-NE	V-11B	ANVC	3000
B2-NE	B3-MW	V-12A	ANVC	2000
B2-NE	B1-NE	V-12B	ANVC	1823
B2-NE	B2-NE	V-12C	ANVC	1935
B3-MW		H-1	BDCST	
B3-MW		H-2	BDCST	
B3-MW		H-3	BDCST	
B3-MW		H-4	BDCST	
B3-MW		H-5	BDCST	
B3-MW		H-6	BDCST	
B3-MW	B4-W	H-7	ANVC	6000
B3-MW	B2-NE	H-8	ANVC	6000
B3-MW	B2-NE	H-9	ANVC	6000
B3-MW	B3-MW	H-10	ANVC	6000
B3-MW	B1-NE	H-11A	ANVC	3000



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B3-MW	B3-MW	H-11B	ANVC	3000
B3-MW	B2-NE	H-12A	ANVC	2000
B3-MW	B3-MW	H-12B	ANVC	980
B3-MW	B4-W	H-12C	ANVC	731
B4-W		V-1	BDCST	
B4-W		V-2	BDCST	
B4-W		V-3	BDCST	
B4-W		V-4	BDCST	
B4-W		V-5	BDCST	
B4-W		V-6	BDCST	
B4-W	B3-MW	V-7	ANVC	6000
B4-W		V-8		
B4-W	B4-W	V-9	ANVC	1256
B4-W	B2-NE	V-10	ANVC	6000
B4-W	B2-NE	V-11A	ANVC	2795
B4-W		V-11B		
B4-W	B1-NE	V-12A	ANVC	328
B4-W		V-12B		
B4-W	B3-MW	V-12C	ANVC	731

Totals

ANVC : 94525



I-3 - LINK BUDGETS FOR SCENARIO V



TABLE 1 - SCENARIO V - C-BAND (FSS) - LINK BUDGET

MODULATION: CSSB, Suppressed Carrier (6000 HVC/36 MHz)

Mid-band Downlink Freq. =	3.95 GHz	Saturated EIRP = 36.0 dBW
Mid-band Uplink Freq. =	6.15 GHz	SFD = -84.0 dBW/m ²
Uplink Free Space Loss =	200.0 dB	Satellite Gain = 161.1 dB
No. of Channels, N =	6000	Satellite G/T = 1.8 dB/K
<hr/>		
Transmitter Power	0.7 dBW	1.18 Watts
Transmit Line Loss	1.3 dB	Allocation
Transmitting Antenna Gain	36.8 dBi	Gridded Reflector
Output Backoff	5.0 dB	
Net EIRP	<u>31.2 dBW</u>	
Total Load	22.6 dBm0	-15.2 + 10 Log N
Reference Power EIRP, Pr	<u>8.6 dBW</u>	Net EIRP - Total Load
Free Space Loss	196.1 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
Net Path Loss	<u>196.6 dB</u>	
Power Flux Density	-131.5 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	50.1 dBi	10 m dish, 60% eff.
Receive Line Loss	0.1 dB	Allocation
System Noise Temperature	19.4 dB-K	
Receive G/T	<u>30.7 dB/K</u>	(Clear Sky)
Boltzmann's Constant	-228.6 dBW/Hz-K	
Downlink Pr/No	<u>71.3 dB-Hz</u>	
Uplink Pr/No	78.0 dB-Hz	Beam 4V, Worst-case
Downlink Interference Pr/Io	71.3 dB-Hz	
Uplink Interference Pr/Io	71.4 dB-Hz	
Intermodulation Pr/IMo	68.9 dB-Hz	14.7 dB = P1/P3
Terrestrial Pr/Io	89.2 dB-Hz	
Cross-polarization Pr/Io	82.1 dB-Hz	
Overall Pr/No	<u>64.3 dB-Hz</u>	
Required Pr/No	61.9 dB-Hz	
Pr/No Margin	<u>2.4 dB-Hz</u>	



TABLE 2 - SCENARIO V - C-BAND (FSS) - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 6.15 GHz

Transmitter Power	29.0 dBW	800.00 Watts
Transmit Line Loss	0.1 dB	Allocation
Transmitting Antenna Gain	54.0 dBi	10 m dish, 60% eff.
Input Back-Off	3.0 dB	
Net EIRP	<u>79.9 dBW</u>	
Free Space Loss	200.0 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
Net Path Loss	<u>200.5 dB</u>	
Power Flux Density	-82.8 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	28.9 dBi	Gridded Reflector
Receive Line Loss	1.3 dB	Allocation
System Noise Temperature	27.1 dB-K	
Receive G/T	<u>1.8 dB/K</u>	(Clear Sky)
Received Carrier Level	-91.7 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	109.8 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
Received C/N	<u>37.3 dB</u>	Beam 4V, Worst-case



TABLE 3 - SCENARIO V - C-BAND (FSS) - DOWNLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 3.95 GHz

Transmitter Power	0.7 dBW	1.18 Watts
Transmit Line Loss	1.3 dB	Allocation
Transmitting Antenna Gain	36.8 dBi	Gridded Reflector
Output Back-Off	3.0 dB	
	<u>EIRP</u>	
	33.2 dBW	
Free Space Loss	196.1 dB	38700 km; 30° Elev. Ang.
Polarization Loss	0.0 dB	Allocation
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
	<u>Net Path Loss</u>	
	196.6 dB	
Power Flux Density	-129.5 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	50.1 dBi	10 m dish, 60% eff.
Receive Line Loss	0.1 dB	Allocation
System Noise Temperature	19.5 dB-K	
	<u>Receive G/T</u>	
	30.6 dB/K	(Clear Sky)
Received Carrier Level	-113.3 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	95.8 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
	<u>Received C/N</u>	
	23.3 dB	
Required C/N	18.0 dB	Studio Reception
	=====	
Link Margin	5.3 dB	
Overall C/N	23.1 dB	37.3 dB Uplink C/N
Weighted (S/N) _w Ratio	54.1 dB	CCIR Type M
Minimum (S/N) _w	48.0 dB	Quality: Excellent (TASO)
	=====	
(S/N) _w Margin	6.1 dB	



TABLE 4 - SCENARIO V - Ku-BAND (FSS) - LINK BUDGET

MODULATION: CSSB, Suppressed Carrier (6000 HVC/36 MHz)

Mid-band Downlink Freq. =	11.95 GHz	Saturated EIRP =	39.0 dBW
Mid-band Uplink Freq. =	14.25 GHz	SFD =	-84.0 dBW/m ²
Uplink Free Space Loss =	207.3 dB	Satellite Gain =	171.4 dB
No. of Channels, N =	6000	Satellite G/T =	5.7 dB/K
<hr/>			
Transmitter Power	0.6 dBW	1.15 Watts	
Transmit Line Loss	1.1 dB	Allocation	
Transmitting Antenna Gain	39.9 dBi	Gridded Reflector	
Output Backoff	5.0 dB		
Net EIRP	<u>34.4 dBW</u>		
Total Load	22.6 dBm0	-15.2 + 10 Log N	
Reference Power EIRP, Pr	<u>11.8 dBW</u>	Net EIRP - Total Load	
Free Space Loss	205.8 dB	38700 km; 30° Elev. Ang.	
Pointing Loss	0.5 dB	Allocation	
Atmospheric Degradation	0.1 dB		
Rain Margin	3.0 dB		
Net Path Loss	<u>209.4 dB</u>		
Power Flux Density	-128.3 dBW/m ²	(Clear Sky)	
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% eff.	
Receive Line Loss	0.2 dB	Allocation	
System Noise Temperature	22.3 dB-K		
Receive G/T	<u>34.4 dB/K</u>	(Clear Sky)	
Boltzmann's Constant	-228.6 dBW/Hz-K		
Downlink Pr/No	<u>65.5 dB-Hz</u>		
Uplink Pr/No	74.8 dB-Hz	Beam 6, Worst-case	
Downlink Interference Pr/Io	78.1 dB-Hz		
Uplink Interference Pr/Io	75.8 dB-Hz		
Intermodulation Pr/IMo	68.9 dB-Hz	14.7 dB = P1/P3	
Terrestrial Pr/Io	86.5 dB-Hz		
Cross-polarization Pr/Io	85.3 dB-Hz		
Overall Pr/No	<u>63.1 dB-Hz</u>		
Required Pr/No	61.9 dB-Hz		
Pr/No Margin	<u>=====</u> 1.2 dB-Hz		



TABLE 5 - SCENARIO V - Ku (FSS) - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 14.25 GHz

Transmitter Power	29.0 dBW	800.00 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7 m dish, 60% eff.
Input Back-Off	3.0 dB	
	<hr/>	
Net EIRP	84.0 dBW	
Free Space Loss	207.3 dB	38700 km; 30° Elev. Ang.
Pointing Loss	1.0 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
	<hr/>	
Net Path Loss	211.4 dB	
Power Flux Density	-78.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	33.4 dBi	Gridded Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	
	<hr/>	
Receive G/T	5.7 dB/K	(Clear Sky)
Received Carrier Level	-93.9 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	106.9 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
	<hr/>	
Received C/N	34.4 dB	Beam 6, Worst-case



TABLE 6 - SCENARIO V - Ku (FSS) - DOWNLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 11.95 GHz

Transmitter Power	0.6 dBW	1.15 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	39.9 dBi	Gridded Reflector
Output Back-Off	3.0 dB	
Net EIRP	<u>36.4 dBW</u>	
Free Space Loss	205.8 dB	38700 km; 30° Elev. Ang.
Pointing Loss	1.0 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>206.9 dB</u>	
Power Flux Density	-126.3 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% eff.
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-113.7 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	92.4 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
Received C/N	<u>19.8 dB</u>	
Required C/N	18.0 dB	Studio Reception
Link Margin	<u>1.8 dB</u>	
Overall C/N	19.7 dB	34.4 dB Uplink C/N
Weighted (S/N) _w Ratio	50.7 dB	CCIR Type M
Minimum (S/N) _w	48.0 dB	Quality: Excellent (TASO)
(S/N) _w Margin	<u>2.7 dB</u>	



TABLE 7 - SCENARIO V - Ka-BAND (FSS) - UPLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Mid-band Frequency = 28.75 GHz

	Uncoded	Remarks
Transmitter Power	23.0 dBW	200.0 Watts
Transmit Line Loss	1.0 dB	Allocation
Transmitting Antenna Gain	64.3 dBi	7 m dish, 60% efficiency
EIRP	<u>86.3 dBW</u>	
Free Space Loss	213.4 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	1.0 dB	
Rain Margin	10.0 dB	
Net Path Loss	<u>224.9 dB</u>	
Power Flux Density	-76.4 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	53.0 dBi	Solid Reflector
Receive Line Loss	1.0 dB	Allocation
System Noise Temperature	28.8 dB-K	
Receive G/T	<u>24.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-85.6 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>114.2 dB-Hz</u>	



TABLE 8 - SCENARIO V - Ka-BAND (FSS) - DOWNLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Mid-band Frequency = 18.95 GHz

	Uncoded	Remarks
Transmitter Power	14.8 dBW	30.0 Watts
Transmit Line Loss	1.0 dB	Allocation
Transmitting Antenna Gain	53.0 dBi	Solid Reflector
EIRP	<u>66.8 dBW</u>	
Free Space Loss	209.8 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	1.0 dB	
Rain Margin	10.0 dB	
Net Path Loss	<u>221.3 dB</u>	
Power Flux Density	-96.0 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	60.7 dBi	7 m dish, 60% efficiency
Receive Line Loss	1.0 dB	Allocation
System Noise Temperature	26.0 dB-K	
Receive G/T	<u>34.7 dB/K</u>	(Clear Sky)
Received Carrier Level	-93.8 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>108.9 dB-Hz</u>	
Information Bit Rate	89.8 dB-Hz	960 Mb/s
Implementation Loss	2.0 dB	Allocation
Required Eb/No	14.0 dB	BER=10 ⁻⁶
Required C/kT	<u>105.8 dB</u>	
=====		
C/kT Margin	3.0 dB	



TABLE 9 - SCENARIO V - Ka-BAND (Scan) - UPLINK BUDGET

MODULATION: SS/TDMA/QPSK

CODING: Convolutional, $r=1/2$, $k=7$; Viterbi Decoding Algorithm, $Q=8$

Mid-band Frequency = 28.75 GHz

	Uncoded	Coded	Remarks
Transmitter Power	23.0	23.0 dBW	200.0 W uncoded; 200.0 W coded
Transmit Line Loss	1.0	1.0 dB	Allocation
Transmitting Antenna Gain	61.4	61.4 dBi	5 m dish, 60% efficiency
EIRP	83.4	83.4 dBW	
Free Space Loss	213.4	213.4 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5	0.5 dB	Allocation
Atmospheric Degradation	1.0	1.0 dB	
Rain Margin	0.0	10.0 dB	
Net Path Loss	214.9	224.9 dB	
Power Flux Density	-79.3	-79.3 dBW/m ²	
Receiving Antenna Gain	50.8	50.8 dBi	Solid Reflector
Receive Line Loss	1.0	1.0 dB	Allocation
System Noise Temperature	28.8	28.8 dB-K	
Receive G/T	22.0	22.0 dB/K	(Clear Sky)
Received Carrier Level	-80.7	-90.7 dBW	
Boltzmann's Constant	-228.6	-228.6 dBW/Hz-K	
Received C/kT	119.1	109.1 dB-Hz	
Information Bit Rate	86.8	83.8 dB-Hz	480 Mb/s; 240 Mb/s
Implementation Loss	2.0	2.0 dB	Allocation
Required Eb/No	10.5	6.5 dB	Coding Gain=4.0 dB; BER=10 ⁻⁶
Required C/kT	99.3	92.3 dB	
C/kT Margin	19.8	16.8 dB	



TABLE 10 - SCENARIO V - Ka-BAND (Scan) - DOWNLINK BUDGET

MODULATION: SS/TDMA/QPSK

CODING: Convolutional, r=1/2, k=7; Viterbi Decoding Algorithm, Q=8

Mid-band Frequency = 18.95 GHz

	Uncoded	Coded	Remarks
Transmitter Power	8.8	18.8 dBW	7.5 W uncoded; 75.0 W coded
Transmit Line Loss	1.0	1.0 dB	Allocation
Transmitting Antenna Gain	50.8	50.8 dBi	Solid Reflector
EIRP	58.6	68.6 dBW	
Free Space Loss	209.8	209.8 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5	0.5 dB	Allocation
Atmospheric Degradation	1.0	1.0 dB	
Rain Margin	0.0	10.0 dB	
Net Path Loss	211.3	221.3 dB	
Power Flux Density	-104.2	-94.2 dBW/m ²	
Receiving Antenna Gain	61.4	61.4 dBi	5 m dish, 60% efficiency
Receive Line Loss	1.0	1.0 dB	Allocation
System Noise Temperature	26.0	26.0 dB-K	
Receive G/T	35.4	35.4 dB/K	(Clear Sky)
Received Carrier Level	-91.3	-91.3 dBW	
Boltzmann's Constant	-228.6	-228.6 dBW/Hz-K	
Received C/kT	111.3	111.3 dB-Hz	
Information Bit Rate	86.8	83.8 dB-Hz	480 Mb/s; 240 Mb/s
Implementation Loss	2.0	2.0 dB	Allocation
Required Eb/No	10.5	6.5 dB	Coding Gain=4.0 dB; BER=10 ⁻⁶
Required C/kT	99.3	92.3 dB	
C/kT Margin	12.0	19.0 dB	



APPENDIX J

PAYLOAD DETAILS FOR SCENARIO VI-A

J-1 - C-BAND INTERNATIONAL PAYLOAD

Beam coverages and acronymn definitives for this payload are given as the first part of this appendix. Three of the beams (CONUS, AOREUR, PORLAN) are "pseudo beams"; ISLs, of course, do not really cover Europe or Africa. The use of pseudo beams simplifies the payload data base. Conus is a single pseudo-beam representing all of the U.S. The NASA total forecasts included circuits routed to gateway stations, so this pseudo-beam represents a portion of the VI-A traffic loaded to U.S. transponders. A scale factor of 1.0 was used, i.e., all requirements can be carried on a single satellite. Traffic loading is provided for year 2008.



J-1.1 Beam Definition And Coverage

The beam definition and associated coverage areas for Scenario VI-A are as follows:

<u>BEAM NO.</u>	<u>BEAM ACRONYM</u>	<u>BEAM DESCRIPTION</u>
1	CAM-N	Northern portion of Central America
2	CARIB	Caribbean Islands (Haiti, Dominican Republic, etc.)
3	SAM-CI	Caribbean coastland/islands of South America
4	VENEZ	Single country -- Venezuela
5	COLUMB	Single country -- Colombia
6	CAM-S	Southern portion of Central America
7	SAM-MP	Mid-Pacific coastland/inland of South America
8	BRAZIL	Single country -- Brazil
9	SAM-S	Southern portion of South America
10	CONUS	Continental United States (psuedo-beam)
11	AOREUR	ISL to Europe/Africa (psuedo-beam)
12	PORCAN	ISL to Canada/Pacific (pseudo-beam)



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BEAM COVERAGES

Beam: CAM-N EL SALVADOR	GUATEMALA	HONDURAS	MEXICO	
Beam: CARIB DOM. REP.	HAITI	JAMAICA	U.S. (PR)	
Beam: SAM-CI BARBADOS	FRANCE (EG)	FRANCE (MA)	SURINAM	TRIN&TOBAGO
Beam: VENEZ VENEZUELA				
Beam: COLUMB COLUMBIA				
Beam: CAM-S COSTA RICA	EQUADOR	NICARAGUA	PANAMA	
Beam: SAM-MP BOLIVIA	PARAGUAY	PERU		
Beam: BRAZIL BRAZIL				
Beam: SAM-S ARGENTINA	CHILE	URUGUAY		
Beam: CONUS U.S.				
Beam: AOREUR	ANGOLA	AUSTRIA	BAHAMAS	BAHRAIN
ALGERIA	BENIN	CAMEROON	CHAD	CONGO
BELGIUM	EGYPT	ETHIOPIA	FRANCE	GABON
CYPRUS	GHANA	GREECE	ICELAND	IRAN
GERMANY, FR	IRELAND	ISRAEL	ITALY	IVORY COAST
IRAQ	KENYA	KUWAIT	LEBANON	LIBERIA
JORDAN	MALAWI	MALI	MAURITANIA	MOROCCO
LIBYA	NETHERLANDS	NIGER	NIGERIA	NORDIC GRP
MOZAMBIQUE	PORTUGAL	QATAR	ROMANIA	SAUDI AR.
POLAND	SIERRA LEONE	SOUTH AF.	SPAIN	SUDAN
SENEGAL	TANZANIA	TOGO	TUNISIA	TURKEY
SWITZERLAND	U.A.E.	U.K. (ASC)	U.K. (BER)	U.K.
UGANDA	U.S.S.R.	YEMEN, A.R.	YUGOSLAVIA	ZAIRE
UPPER VOLTA				
ZIMBAWE				
Beam: PORCAN	CANADA	CHINA (PEK)	CHINA (TAI)	FIJI
AUSTRALIA	HONG KONG	INDIA	INDONESIA	JAPAN
FRANCE (NC)	MALAYSIA	NEW ZEALAND	PHILIPPINES	SINGAPORE
KOREA	THAILAND	U.S. -GUAM	U.S. -HAW	
SRI LANKA				

J-1.2 International C-Band Beam To Beam Matrix



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Beam to Beam Matrix
Voice -- Scenario VI-A

Class = ANVC

From:

To:

CAM-N	CARIB	156	VENEZ	274	COLUMB	302	CAM-S	161
	SAM-MP	90	BRAZIL	137	SAM-S	358	CONUS	2362
	AOREUR	2810	PORCAN	448				
CARIB	CAM-N	156	SAM-CI	357	VENEZ	44	COLUMB	107
	CAM-S	19	SAM-MP	19	SAM-S	41	CONUS	3979
	AOREUR	1160	PORCAN	648				
SAM-CI	CARIB	357	BRAZIL	30	CONUS	1380	AOREUR	1570
	PORCAN	325						
VENEZ	CAM-N	274	CARIB	44	CAM-S	360	SAM-MP	184
	BRAZIL	214	SAM-S	398	CONUS	3267	AOREUR	2220
	PORCAN	162						
COLUMB	CAM-N	302	CARIB	107	CAM-S	411	SAM-MP	112
	BRAZIL	137	SAM-S	205	CONUS	4734	AOREUR	1355
	PORCAN	129						
CAM-S	CAM-N	161	CARIB	19	VENEZ	360	COLUMB	411
	CAM-S	148	SAM-MP	110	BRAZIL	222	SAM-S	332
	CONUS	3527	AOREUR	1876	PORCAN	205		
SAM-MP	CAM-N	90	CARIB	19	VENEZ	184	COLUMB	112
	CAM-S	110	BRAZIL	348	SAM-S	403	CONUS	2671
	AOREUR	1654	PORCAN	117				
BRAZIL	CAM-N	137	SAM-CI	30	VENEZ	214	COLUMB	137
	CAM-S	222	SAM-MP	348	SAM-S	508	CONUS	2003
	AOREUR	2203	PORCAN	145				
SAM-S	CAM-N	358	CARIB	41	VENEZ	398	COLUMB	205
	CAM-S	332	SAM-MP	403	BRAZIL	508	SAM-S	302
	CONUS	2427	AOREUR	3897	PORCAN	436		
CONUS	CAM-N	2362	CARIB	3979	SAM-CI	1380	VENEZ	3267
	COLUMB	4734	CAM-S	3527	SAM-MP	2671	BRAZIL	2003
	SAM-S	2427	AOREUR	84319	PORCAN	36331		



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AOREUR	CAM-N	2810	CARIB	1160	SAM-CI	1570	VENEZ	2220
	COLUMB	1355	CAM-S	1876	SAM-MP	1654	BRAZIL	2203
	SAM-S	3897	CONUS	84193	PORCAN	7989		
PORCAN	CAM-N	448	CARIB	648	SAM-CI	325	VENEZ	162
	COLUMB	129	CAM-S	205	SAM-MP	117	BRAZIL	145
	SAM-S	436	CONUS	36334	AOREUR	7989		

SUMMARY

ANVC

CAM-N	7098
CARIB	6530
SAM-CI	3662
VENEZ	7123
COLUMB	7492
CAM-S	7371
SAM-MP	5708
BRAZIL	5947
SAM-S	9307
CONUS	147000
AOREUR	110927
PORCAN	46938

Totals 365103



J-1.3 International C-Band Transponder Loading



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Transponder Loading
Voice -- Scenario VI-A

From	To	Channel	Class	Circuits
CAM-N	SS	H-1	ANVC	2800
CAM-N	SS	H-2	ANVC	2800
CAM-N	SS	H-3	ANVC	1498
CAM-N		H-4	VIDEO	
CAM-N		H-5	VIDEO	
CAM-N		H-6	VIDEO	
CAM-N		H-7	VIDEO	
CAM-N		H-8	VIDEO	
CAM-N		H-9		
CAM-N		H-10		
CAM-N		H-11		
CAM-N		H-12		
CARIB	SS	V-1	ANVC	2800
CARIB	SS	V-2	ANVC	2800
CARIB	SS	V-3	ANVC	930
CARIB		V-4	VIDEO	
CARIB		V-5	VIDEO	
CARIB		V-6	VIDEO	
CARIB		V-7	VIDEO	
CARIB		V-8	VIDEO	
CARIB		V-9		
CARIB		V-10		
CARIB		V-11		
CARIB		V-12		
SAM-CI	SS	H-1	ANVC	2800
SAM-CI	SS	H-2	ANVC	862
SAM-CI		H-3	VIDEO	
SAM-CI		H-4	VIDEO	
SAM-CI		H-5	VIDEO	
SAM-CI		H-6	VIDEO	
SAM-CI		H-7	VIDEO	
SAM-CI		H-8		
SAM-CI		H-9		
SAM-CI		H-10		
SAM-CI		H-11		
SAM-CI		H-12		
VENEZ	SS	V-1	ANVC	2800
VENEZ	SS	V-2	ANVC	2800
VENEZ	SS	V-3	ANVC	1523
VENEZ		V-4	VIDEO	



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VENEZ		V-5	VIDEO	
VENEZ		V-6	VIDEO	
VENEZ		V-7	VIDEO	
VENEZ		V-8		
VENEZ		V-9		
VENEZ		V-10		
VENEZ		V-11		
VENEZ		V-12		
COLUMB	SS	H-1	ANVC	2800
COLUMB	SS	H-2	ANVC	2800
COLUMB	SS	H-3	ANVC	1892
COLUMB		H-4	VIDEO	
COLUMB		H-5	VIDEO	
COLUMB		H-6	VIDEO	
COLUMB		H-7	VIDEO	
COLUMB		H-8		
COLUMB		H-9		
COLUMB		H-10		
COLUMB		H-11		
COLUMB		H-12		
CAM-S	SS	V-1	ANVC	2800
CAM-S	SS	V-2	ANVC	2800
CAM-S	SS	V-3	ANVC	1771
CAM-S		V-4	VIDEO	
CAM-S		V-5	VIDEO	
CAM-S		V-6	VIDEO	
CAM-S		V-7	VIDEO	
CAM-S		V-8	VIDEO	
CAM-S		V-9		
CAM-S		V-10		
CAM-S		V-11		
CAM-S		V-12		
SAM-MP	SS	V-1	ANVC	2800
SAM-MP	SS	V-2	ANVC	2800
SAM-MP	SS	V-3	ANVC	108
SAM-MP		V-4	VIDEO	
SAM-MP		V-5	VIDEO	
SAM-MP		V-6	VIDEO	
SAM-MP		V-7	VIDEO	
SAM-MP		V-8		
SAM-MP		V-9		
SAM-MP		V-10		
SAM-MP		V-11		
SAM-MP		V-12		
BRAZIL	SS	V-1	ANVC	2800
BRAZIL	SS	V-2	ANVC	2800
BRAZIL	SS	V-3	ANVC	347
BRAZIL		V-4	VIDEO	
BRAZIL		V-5	VIDEO	
BRAZIL		V-6	VIDEO	



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BRAZIL		V-7	VIDEO	
BRAZIL		V-8		
BRAZIL		V-9		
BRAZIL		V-10		
BRAZIL		V-11		
BRAZIL		V-12		
SAM-S	SS	H-1	ANVC	2800
SAM-S	SS	H-2	ANVC	2800
SAM-S	SS	H-3	ANVC	2800
SAM-S	SS	H-4	ANVC	907
SAM-S		H-5	VIDEO	
SAM-S		H-6	VIDEO	
SAM-S		H-7	VIDEO	
SAM-S		H-8	VIDEO	
SAM-S		H-9	VIDEO	
SAM-S		H-10		
SAM-S		H-11		
SAM-S		H-12		
CONUS	SS	P1-1	ANVC	147000
AOREUR	SS	P2-1	ANVC	110927
PORCAN	SS	P3-1	ANVC	46938

Totals

.ANVC : 365103



J-2 - LINK BUDGETS FOR SCENARIO VI-A



TABLE 1-A - SCENARIO VI-A - C-BAND (FSS) INTERNATIONAL - UPLINK BUDGET

MODULATION: FDM-FM-FDMA

Mid-band Frequency = 6.15 GHz

No. of Voice Channels, N = 2,800

Transmitter Power	29.0 dBW	800.00 watts
Transmit Line Losses	0.1 dB	Allocation
Transmitting Antenna Gain	54.0 dBi	10-m dish, 60% eff.
Output Back-Off	5.0 dB	
Net EIRP	<u>77.9 dBW</u>	
Free Space Loss	200.0 dB	38,700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>200.5 dB</u>	
Power Flux Density	-84.8 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	24.7 dBi	Gridded Reflector
Receive Line Losses	1.3 dB	Allocation
System Noise Temperature	27.1 dB-K	Referred to antenna output
Receive G/T	<u>-2.4 dB/K</u>	(Clear Sky)
Received Carrier Level	-97.9 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Uplink C/kT	103.6 dB-Hz	
Occupied IF Bandwidth	75.6 dB-Hz	36.0 MHz IF Bandwidth
Received C/N	<u>28.1 dB</u>	



TABLE 1-B - SCENARIO VI-A - C-BAND (FSS) INTERNATIONAL - DOWNLINK BUDGET

MODULATION: FDM-FM-FDMA

Mid-band Frequency = 3.95 GHz

No. of Voice Channels, N = 2,800

Transmitter Power	4.0 dBW	2.50 watts
Transmit Line Losses	1.3 dB	Allocation
Transmitting Antenna Gain	33.6 dBi	Gridded Reflector
Output Back-Off	5.0 dB	
Net EIRP	<u>31.3 dBW</u>	
Free Space Loss	196.1 dB	38,700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>196.6 dB</u>	
Power Flux Density	-131.5 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	50.1 dBi	10-m dish, 60% efficiency
Receive Line Losses	0.1 dB	Allocation
System Noise Temperature	19.5 dB-K	Referred to antenna output
Receive G/T	<u>30.6 dB/K</u>	(Clear Sky)
Received Carrier Level	-115.3 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Downlink C/kT	93.9 dB-Hz	
Occupied IF Bandwidth	75.6 dB-Hz	36.0 MHz IF Bandwidth
Downlink C/N	<u>18.3 dB</u>	
Uplink C/N	28.1 dB	
Overall C/N	<u>17.9 dB</u>	
Required Minimum C/N	10.0 dB	Threshold Extension Detector
C/N Margin	===== 8.3 dB	



TABLE 2 - SCENARIO VI-A - C-BAND (FSS) INTERNATIONAL - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 6.15 GHz

Transmitter Power	29.0 dBW	800.00 Watts
Transmit Line Loss	0.1 dB	Allocation
Transmitting Antenna Gain	54.0 dBi	10 m dish, 60% eff.
Input Back-Off	3.0 dB	
Net EIRP	<u>79.9 dBW</u>	
Free Space Loss	200.0 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
Net Path Loss	<u>200.5 dB</u>	
Power Flux Density	-82.8 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	33.6 dBi	Gridded Reflector
Receive Line Loss	1.3 dB	Allocation
System Noise Temperature	27.1 dB-K	
Receive G/T	<u>6.5 dB/K</u>	(Clear Sky)
Received Carrier Level	-87.0 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	114.5 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
Received C/N	<u>42.0 dB</u>	Worst-case



TABLE 3 - SCENARIO VI-A - C-BAND (FSS) INTERNATIONAL - DOWNLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 3.95 GHz

Transmitter Power	4.0 dBW	2.50 Watts
Transmit Line Loss	1.3 dB	Allocation
Transmitting Antenna Gain	33.6 dBi	Gridded Reflector
Output Back-Off	3.0 dB	
EIRP	<u>33.3</u> dBW	
Free Space Loss	196.1 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
Net Path Loss	<u>196.6</u> dB	
Power Flux Density	-129.5 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	50.1 dBi	10 m dish, 60% eff.
Receive Line Loss	0.1 dB	Allocation
System Noise Temperature	19.5 dB-K	
Receive G/T	<u>30.6</u> dB/K	(Clear Sky)
Received Carrier Level	-113.3 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	95.9 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
Received C/N	<u>23.3</u> dB	
Required C/N	18.0 dB	Studio Reception
Link Margin	===== 5.3 dB	
Overall C/N	23.3 dB	42.0 dB Uplink C/N
Weighted (S/N) _w Ratio	54.3 dB	CCIR Type M
Minimum (S/N) _w	48.0 dB	Quality: Excellent (TASO)
(S/N) _w Margin	===== 6.3 dB	



TABLE 4 - SCENARIO VI-A - C-BAND (MARITIME) - UPLINK BUDGET

FORWARD LINK: Shore-to-Satellite

MODULATION: SCPC/FM (Voice Channel)

Mid-band Frequency = 6.433 GHz

Transmitter Power	19.0 dBW	80.00 Watts/Channel
Transmit Line Loss	0.1 dB	Allocation
Transmitting Antenna Gain	54.4 dBi	10-m dish, 60% eff.
Input Back-Off	3.0 dB	
Net EIRP/Channel	<u>70.3 dBW</u>	
Free Space Loss	200.8 dB	40775 km; 10° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.4 dB	
Net Path Loss	<u>201.7 dB</u>	
Power Flux Density	-92.9 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	18.2 dBi	Solid Reflector
Receive Line Loss	0.4 dB	Allocation
System Noise Temperature	29.7 dB-K	
Receive G/T	<u>-11.5 dB/K</u>	(Clear Sky)
Received Carrier Level	-113.2 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>85.7 dB-Hz</u>	



TABLE 5 - SCENARIO VI-A - L-BAND (MARITIME) - DOWNLINK BUDGET

FORWARD LINK: Satellite-To-Ship

MODULATION: SCPC/FM - Standard A (Voice Channel)

Mid-band Frequency = 1.538 GHz

Transmitter Power	1.0 dBW	1.25 Watts/Channel
Transmit Line Loss	1.5 dB	Allocation
Transmitting Antenna Gain	18.2 dBi	Solid Reflector
Output Back-Off	3.0 dB	
Net EIRP/Channel	<u>14.6 dBW</u>	
Free Space Loss	188.4 dB	40775 km; 10° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.2 dB	
Net Path Loss	<u>189.1 dB</u>	
Power Flux Density	-148.5 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	22.0 dBi	1 m dish, 60% eff.
Receive Line Loss	0.6 dB	Allocation
System Noise Temperature	26.0 dB-K	
Receive G/T	<u>-4.0 dB/K</u>	(Clear Sky)
Received Carrier Level	-152.4 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>50.1 dB-Hz</u>	
Overall C/kT	50.1 dB-Hz	85.7 dB Uplink C/kT



TABLE 6 - SCENARIO VI-A - L-BAND (MARITIME) - UPLINK BUDGET

RETURN LINK: Ship-to-Satellite

MODULATION: SCPC/FM - Standard A (Voice Channel)

Mid-band Frequency = 1.637 GHz

Transmitter Power	13.6 dBW	23.00 Watts/Channel
Transmit Line Loss	0.1 dB	Allocation
Transmitting Antenna Gain	22.5 dBi	1-m dish, 60% eff.
Net EIRP/Channel	<u>36.0</u> dBW	
Free Space Loss	188.9 dB	40775 km; 10° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.2 dB	
Net Path Loss	<u>189.6</u> dB	
Power Flux Density	-127.2 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	18.2 dBi	Solid Reflector
Receive Line Loss	0.6 dB	Allocation
System Noise Temperature	27.8 dB-K	
Receive G/T	<u>-9.6</u> dB/K	(Clear Sky)
Received Carrier Level	-135.4 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>65.4</u> dB-Hz	



TABLE 7 - SCENARIO VI-A - C-BAND (MARITIME) - DOWNLINK BUDGET

RETURN LINK: Satellite-to-Shore

MODULATION: SCPC/FM - (Voice Channel)

Mid-band Frequency = 3.6105 GHz

Transmitter Power	-18.2 dBW	0.015 Watts/Channel
Transmit Line Loss	1.2 dB	Allocation
Transmitting Antenna Gain	18.2 dBi	Solid Reflector
Net EIRP/Channel	<u>-1.2 dBW</u>	
Free Space Loss	195.8 dB	40775 km; 10° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.4 dB	
Net Path Loss	<u>196.7 dB</u>	
Power Flux Density	-164.4 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	49.4 dBi	10-m dish, 60% eff.
Receive Line Loss	0.1 dB	Allocation
System Noise Temperature	20.5 dB-K	
Receive G/T	<u>28.9 dB/K</u>	(Clear Sky)
Received Carrier Level	-148.5 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>59.5 dB-Hz</u>	
Overall C/kT	58.5 dB-Hz	65.4 dB Uplink C/kT



TABLE 8 - SCENARIO VI-A - TRANSATLANTIC CROSSLINK BUDGET

MODULATION: QPSK

Frequency = 60.0 GHz

	Uncoded	

Transmitter Power	7.0 dBW	5.0 Watts
Transmit Line Loss	1.5 dB	Allocation
Transmitting Antenna Gain	64.0 dBi	3 m Dish, 70% Eff.
EIRP	----- 69.5 dBW	
Free Space Loss	226.4 dB	83330 km, 160° apart
Polarization Loss	0.1 dB	Allocation
Total Path Loss	----- 226.5 dB	
Power Flux Density	-99.9 dBW/m ²	
Receiving Antenna Gain	64.0 dBi	3 m Dish, 70% Eff.
Receive Line Loss	1.5 dB	Allocation
System Noise Temperature	29.1 dB-K	
Receive G/T	----- 34.9 dB/K	
Received Carrier Level	-93.0 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	----- 106.5 dB-Hz	
Information Bit Rate	91.8 dB-Hz	1.5 Gb/s
Implementation Loss	2.0 dB	Allocation
Required Eb/No	10.5 dB	BER = 10 ⁻⁶
Required C/kT	----- 104.3 dB-Hz	
	=====	
Link Margin	2.2 dB	



APPENDIX K

PAYLOAD DETAILS FOR SCENARIO VI-B

K-1 - C-BAND NON-CONUS PAYLOAD

Non-U.S. domestic requirement loadings are contained in this appendix. Canada, Mexico, and Latin America are each treated separately, so there are three sets of Beams coverage, Beam to Beam Matrices, and Transponder Loadings. The scale factor used was 1.0 in all three cases. Traffic loading is provided for year 2008.



K-1.1 C-Band Beam Coverage

The C-Band beam definitions for Scenario VI-6 are as follows:

<u>BEAM NO.</u>	<u>BEAM ACRONYMN</u>	<u>BEAM DESCRIPTION</u>
1	CAN-W	Western Canada
2	CAN-C	Central Canada
3	CAN-E	Eastern Canada
4	MEX-N	Northern Mexico (split)
5	MEX-S	Southern Mexico (split)
6	--	Central America/Caribbean
7	SAM-N	Northern South America (split)
8	SAM-S	Southern South America (split)
9	BRAZC	Brazil (Rio/Sao Paulo)



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BEAM COVERAGES

Beam: CAN-W ALBERTA	BRITISH COL.	N.W. TERR.	SASKWAN	YUKON
Beam: CAN-C MANITOBA	ONTARIO 2			
Beam: CAN-E NEW BRUN.	NEWENLND	NOVA SCOTIA	PR. ED. IS.	QUEBEC 2
Beam: SPOT1 ONTARIO 1				
Beam: SPOT2 QUEBEC 1				
Beam: ISL ISL				



K-1.2 C-Band Beam To Beam Matrix



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Beam to Beam Matrix
Scenario VI-B -- Canada
(HVC)

Class = DVCC

From:

To:

CAN-W								
	CAN-W	3890	CAN-C	2907	CAN-E	3934	SPOT1	10693
	SPOT2	5807	ISL	2653				
CAN-C								
	CAN-W	2907	CAN-C	1352	CAN-E	2075	SPOT1	5300
	SPOT2	3065	ISL	1400				
CAN-E								
	CAN-W	3934	CAN-C	2075	CAN-E	1995	SPOT1	7286
	SPOT2	3133	ISL	1808				
SPOT1								
	CAN-W	10693	CAN-C	5300	CAN-E	7286	ISL	4918
SPOT2								
	CAN-W	5807	CAN-C	3065	CAN-E	3133	ISL	2671
ISL								
	CAN-W	2653	CAN-C	1400	CAN-E	1808	SPOT1	4918
	SPOT2	2671						

SUMMARY

DVCC

CAN-W 29884
CAN-C 16099
CAN-E 20231
SPOT1 28197
SPOT2 14676
ISL 13450

Totals 122537



K-1.3 C-Band Transponder Loading



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Transponder Loading
Scenario VI-B -- Canada

From	To	Channel	Class	Circuits
CAN-W	CAN-C	V-1	DVCC	3000
CAN-W	SPOT1	V-2	DVCC	3000
CAN-W	SPOT1	V-3	DVCC	3000
CAN-W	SPOT1	V-4	DVCC	3000
CAN-W	SPOT1	V-5	DVCC	3000
CAN-W	SPOT1	V-6	DVCC	2653
CAN-W	CAN-W	V-7	DVCC	3000
CAN-W	CAN-E	V-8	DVCC	3000
CAN-W		V-9		
CAN-W	SS	V-10	DVCC	3000
CAN-W	SS	V-11	DVCC	3000
CAN-W	SS	V-12	DVCC	231
CAN-C	CAN-W	H-1	DVCC	3000
CAN-C	CAN-E	H-2	DVCC	3000
CAN-C	CAN-E	H-3	DVCC	3000
CAN-C	CAN-C	H-4	DVCC	3000
CAN-C		H-5		
CAN-C		H-6		
CAN-C	CAN-C	H-7	DVCC	3000
CAN-C	CAN-C	H-8	DVCC	3000
CAN-C	CAN-C	H-9	DVCC	2952
CAN-C	SS	H-10	DVCC	3000
CAN-C	SS	H-11	DVCC	3000
CAN-C	SS	H-12	DVCC	3000
CAN-E	SPOT1	V-1	DVCC	3000
CAN-E	CAN-C	V-2	DVCC	3000
CAN-E	CAN-C	V-3	DVCC	2208
CAN-E	CAN-E	V-4	DVCC	2049
CAN-E		V-5		
CAN-E		V-6		
CAN-E	SPOT1	V-7	DVCC	3000
CAN-E	CAN-W	V-8	DVCC	3000
CAN-E	SPOT1	V-9	DVCC	1286
CAN-E	SS	V-10	DVCC	3000
CAN-E	SS	V-11	DVCC	3000
CAN-E	SS	V-12	DVCC	1697
SPOT1	CAN-E	V-1	DVCC	3000
SPOT1	CAN-W	V-2	DVCC	3000
SPOT1	CAN-W	V-3	DVCC	3000
SPOT1	CAN-W	V-4	DVCC	3000
SPOT1	CAN-W	V-5	DVCC	1725
SPOT1		V-6		
SPOT1	CAN-E	V-7	DVCC	3000
SPOT1		V-8		
SPOT1	CAN-E	V-9	DVCC	1286
SPOT1	SS	V-10	DVCC	3000
SPOT1	SS	V-11	DVCC	3000
SPOT1		V-12		
ISL	SS	---	DVCC	13450

Totals

DVCC : 122537



K-2 - KU-BAND NON-CONUS PAYLOAD

K-2.1 Ku-Band Beam Description

The Ku-Band beam description for Scenario VI-B is as follows:

<u>BEAM NO.</u>	<u>BEAM ACRONYM</u>	<u>BEAM DESCRIPTION</u>
1	SPOT	Canada (Toronto/Montreal -- split)
2	--	Mexico (2 channels)
3	BRAZK1	Brazil (vertical)
4	BRAZK2	Brazil (horizontal)



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BEAM COVERAGES

Beam: MEX-N1
MEXICO N.

Beam: MEX-N2
MEXICO C.

Beam: MEX-S
MEXICO S.

Beam: MEX-KU

C-5



K-2.2 Ku-Band Mexican Beam To Beam Matrix



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Beam to Beam Matrix
Scenario VI-B -- Mexico
(HVC)

Class = SCPC

From:

To:

MEX-N1	MEX-N1	1540	MEX-N2	3850	MEX-S	2310
MEX-N2	MEX-N1	3850	MEX-N2	9625	MEX-S	5775
MEX-S	MEX-N1	2310	MEX-N2	5775	MEX-S	3465
MEX-KU						

SUMMARY

SCPC

MEX-N1 7700
MEX-N2 19250
MEX-S 11550
MEX-KU 0

Totals 38500



Ford Aerospace &
Communications Corporation

K-2.3 Ku-Band Mexican Transponder Loading



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Transponder Loading
Scenario VI-B -- Mexico

<u>From</u>	<u>To</u>	<u>Channel</u>	<u>Class</u>	<u>Circuits</u>
MEX-N1	MEX-N1	H-1	SCPC	1800
MEX-N1	MEX-S	H-2	SCPC	1800
MEX-N1	MEX-N1	H-3	SCPC	1800
MEX-N1	MEX-S	H-4	SCPC	1800
MEX-N1	MEX-N1	H-5	SCPC	1800
MEX-N1	MEX-S	H-6	SCPC	1800
MEX-N1	MEX-N1	H-7	SCPC	1800
MEX-N1	MEX-S	H-8	SCPC	1800
MEX-N1	MEX-N1	H-9	SCPC	1800
MEX-N1	MEX-S	H-10	SCPC	1800
MEX-N1		H-11		
MEX-N1	MEX-S	H-12	SCPC	1800
MEX-S	MEX-S	V-1	SCPC	1800
MEX-S	MEX-N1	V-2	SCPC	1800
MEX-S	MEX-S	V-3	SCPC	1800
MEX-S	MEX-N1	V-4	SCPC	1800
MEX-S	MEX-S	V-5	SCPC	1800
MEX-S	MEX-N1	V-6	SCPC	1800
MEX-S	MEX-S	V-7	SCPC	1800
MEX-S	MEX-N1	V-8	SCPC	1800
MEX-S	MEX-S	V-9	SCPC	700
MEX-S	MEX-N1	V-10	SCPC	1800
MEX-S		V-11		
MEX-S	MEX-N1	V-12	SCPC	1800
MEX-KU		V-11		
MEX-KU		V-12		

Totals

SCPC : 38500



K-2.4 Ku-Band Brazilian Beam Coverage



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BEAM COVERAGES

Beam: SAM-N1				
COLUMBIA	ECUADOR	PERU	VENEZUELA	
Beam: SAM-N2				
ACRE	AMAPA	AMAZONAS	PARA	RORAUMA
Beam: SAM-S1				
ARGENTINA	BOLIVIA	CHILE		
Beam: SAM-S2				
ALAGOAS	CEARA	GOLIAS	MARANHAO	MATO GR.
PARAIBA	PERNAMBUCO	PIAUI	RIO GR. N.	RONDONIA
SERGIPE				
Beam: BRAZC				
BAHIA	DIST. FED.	ESP. SANTO	GUANABARA	MINAS GER.
PARANA	RIO DE JAN.	RIO GR. S.	SANTA CAT.	SAO PAULO
Beam: BRAZK1				
Beam: BRAZK2				



K-2.5 Brazilian Ku-Band Beam To Beam Matrix



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Beam to Beam Matrix
Scenario VI-B -- South America
(HVC)

Class = SCPC

From:

To:

SAM-N1						
	SAM-N1	11360				
SAM-N2						
	SAM-N2	95	SAM-S2	763	BRAZC	1790
SAM-S1						
	SAM-S1	8680				
SAM-S2						
	SAM-N2	763	SAM-S2	6245	BRAZC	14651
BRAZC						
	SAM-N2	1790	SAM-S2	14651	BRAZC	34357
BRAZK1						
BRAZK2						

SUMMARY

SCPC

SAM-N1	11360
SAM-N2	2648
SAM-S1	8680
SAM-S2	21659
BRAZC	50798
BRAZK1	0
BRAZK2	0

Totals 95145



K-2.6 Brazilian Ku-Band Transponder Loading

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Transponder Loading
Scenario VI-B -- South America

From	To	Channel	Class	Circuits
SAM-N1	SAM-N1	V-1	SCPC	1800
SAM-N2	BRAZC	V-2	SCPC	1217
SAM-N1	SAM-N1	V-3	SCPC	1800
SAM-N2	BRAZK1	V-4	SCPC	1431
SAM-N1	SAM-N1	V-5	SCPC	1800
SAM-N2		V-6		
SAM-N1	SAM-N1	V-7	SCPC	1800
SAM-N2		V-8		
SAM-N1	SAM-N1	V-9	SCPC	1800
SAM-N2		V-10		
SAM-N1	SAM-N1	V-11	SCPC	1800
SAM-N1	SAM-N1	V-12	SCPC	560
SAM-S1	SAM-S1	H-1	SCPC	1800
SAM-S2	SAM-S2	H-2	SCPC	1800
SAM-S1	SAM-S1	H-3	SCPC	1800
SAM-S2	SAM-S2	H-4	SCPC	1800
SAM-S1	SAM-S1	H-5	SCPC	1800
SAM-S2	SAM-S2	H-6	SCPC	1800
SAM-S1	SAM-S1	H-7	SCPC	1800
SAM-S2	BRAZC	H-8	SCPC	1800
SAM-S1	SAM-S1	H-9	SCPC	1480
SAM-S2	BRAZC	H-10	SCPC	1800
SAM-S1		H-11		
SAM-S2	BRAZC	H-12	SCPC	1800
BRAZC	BRAZC	V-1	SCPC	1800
BRAZC	SAM-N2	V-2	SCPC	1695
BRAZC	BRAZC	V-3	SCPC	1800
BRAZC	BRAZK2	V-4	SCPC	1800
BRAZC	BRAZC	V-5	SCPC	1800
BRAZC	BRAZK1	V-6	SCPC	1800
BRAZC	BRAZC	V-7	SCPC	1800
BRAZC	SAM-S2	V-8	SCPC	1800
BRAZC	BRAZC	V-9	SCPC	1800
BRAZC	SAM-S2	V-10	SCPC	1800
BRAZC	BRAZC	V-11	SCPC	1504
BRAZC	SAM-S2	V-12	SCPC	1800
BRAZK1	BRAZK1	V-1	SCPC	1800
BRAZK1	BRAZK1	V-2	SCPC	1800
BRAZK1	BRAZK1	V-3	SCPC	1800
BRAZK1	SAM-N2	V-4	SCPC	858
BRAZK1	BRAZK1	V-5	SCPC	1800
BRAZK1	BRAZC	V-6	SCPC	1800
BRAZK1	BRAZK1	V-7	SCPC	1800
BRAZK1	BRAZK1	V-8	SCPC	1800
BRAZK1	BRAZK1	V-9	SCPC	1800
BRAZK1	BRAZK1	V-10	SCPC	1800
BRAZK1	BRAZK1	V-11	SCPC	1800
BRAZK1	BRAZK1	V-12	SCPC	1800
BRAZK2	BRAZK2	H-1	SCPC	1800
BRAZK2	BRAZK2	H-2	SCPC	1800
BRAZK2	BRAZK2	H-3	SCPC	1800
BRAZK2	BRAZC	H-4	SCPC	1800
BRAZK2	BRAZK2	H-5	SCPC	1800
BRAZK2	BRAZK2	H-6	SCPC	1800
BRAZK2	BRAZK2	H-7	SCPC	1800
BRAZK2	BRAZK2	H-8	SCPC	1800
BRAZK2	BRAZK2	H-9	SCPC	1800
BRAZK2	BRAZK2	H-10	SCPC	1800
BRAZK2	BRAZK2	H-11	SCPC	1800
BRAZK2		H-12		

Totals

SCPC : 95145



K-3 - LINK BUDGETS FOR SCENARIO VI-B



TABLE 1-A - SCENARIO VI-B - C-BAND (FSS) - UPLINK BUDGET
MEXICO, CARIBBEAN ISLANDS, AND SOUTH AMERICA

MODULATION: SCPC/FM - 1,800 HVC/36 MHz

Mid-band Frequency = 6.15 GHz
No. of Channels, N = 1,800

E/S Transmitter Power	29.0 dBW	800.0 Watts
Transmit Line Losses	0.1 dB	Allocation
Transmitting Antenna Gain	54.0 dBi	10-m Dish, 60% efficiency
Earth Station EIRP	<u>82.9 dBW</u>	
Output Back-Off	3.0 dB	
Loading Factor	32.6 dB	10 log N
Net EIRP/SCPC Channel	<u>47.4 dBW</u>	
Free Space Loss	200.0 dB	38,700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>200.5 dB</u>	
Power Flux Density	-79.8 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	24.7 dBi	Gridded Reflector
Receive Line Losses	1.3 dB	Allocation
System Noise Temperature	27.1 dB-K	Referred to antenna output
Receive G/T	<u>-2.4 dB/K</u>	(Clear Sky)
Received Carrier Level	-128.4 dBW	per SCPC Channel
Boltzmann's Constant	-228.6 dBW/Hz-K	
Uplink C/kT	<u>73.1 dB-Hz</u>	per SCPC Channel
IF BW/ Channel	43.0 dB-Hz	20.0 kHz
Uplink C/N per Channel	<u>30.1 dB</u>	



TABLE 1-B - SCENARIO VI-B -C-BAND (FSS) - DOWNLINK BUDGET
MEXICO, CARIBBEAN ISLANDS, AND SOUTH AMERICA

MODULATION: SCPC/FM - 1,800 HVC/36 MHz

Mid-band Frequency = 3.95 GHz
No. of Channels, N = 1,800

Satellite Transmitter Power	11.1 dBW	13.0 watts
Transmit Line Losses	1.3 dB	Allocation
Transmitting Antenna Gain	26.3 dBi	Solid Reflector
Satellite EIRP	<u>36.1 dBW</u>	
Output Back-Off	3.0 dB	
Loading Factor	32.6 dB	10 log N
VOX Advantage	4.0 dB	40% Activity Factor
Net EIRP/SCPC Channel	<u>4.6 dBW</u>	
Free Space Loss	196.1 dB	38,700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>196.6 dB</u>	
Power Flux Density	-126.6 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	50.1 dBi	10-m dish, 60% efficiency
Receive Line Losses	0.1 dB	Allocation
System Noise Temperature	19.5 dB-K	Referred to antenna output
Receive G/T	<u>30.6 dB/K</u>	(Clear Sky)
Received Carrier Level	-141.9 dBW	per SCPC Channel
Boltzmann's Constant	-228.6 dBW/Hz-K	
Downlink C/kT	<u>67.2 dB-Hz</u>	per SCPC Channel
Uplink C/kT	73.1 dB-Hz	per SCPC Channel
Total Channel C/kT	<u>66.2 dB-Hz</u>	
Required Total Channel C/kT	55.0 dB-Hz	51-56 dB-Hz Acceptable
C/kT Margin	<u>11.2 dB</u>	
IF Bandwidth/Channel	43.0 dB-Hz	20.0 kHz
Total C/N per Channel	<u>23.2 dB</u>	



TABLE 2 - SCENARIO VI-B - C-BAND (FSS) - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 6.15 GHz

Transmitter Power	29.0 dBW	800.00 Watts
Transmit Line Loss	0.1 dB	Allocation
Transmitting Antenna Gain	54.0 dBi	10 m dish, 60% eff.
Input Back-Off	3.0 dB	
	<hr/>	
Net EIRP	79.9 dBW	
Free Space Loss	200.0 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
	<hr/>	
Net Path Loss	200.5 dB	
Power Flux Density	-82.8 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	24.7 dBi	Gridded Reflector
Receive Line Loss	1.3 dB	Allocation
System Noise Temperature	27.1 dB-K	
	<hr/>	
Receive G/T	-2.4 dB/K	(Clear Sky)
Received Carrier Level	-95.9 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	105.6 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
	<hr/>	
Received C/N	33.1 dB	Beam 8V, Worst-case



TABLE 3 - SCENARIO VI-B - C-BAND (FSS) - DOWNLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 3.95 GHz

Transmitter Power	11.1 dBW	13.00 Watts
Transmit Line Loss	1.3 dB	Allocation
Transmitting Antenna Gain	26.3 dBi	Gridded Reflector
Output Back-Off	3.0 dB	
	<u>EIRP</u>	
	33.1 dBW	
Free Space Loss	196.1 dB	38700 km; 30° Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.0 dB	
	<u>Net Path Loss</u>	
	196.6 dB	
Power Flux Density	-129.6 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	50.1 dBi	10 m dish, 60% eff.
Receive Line Loss	0.1 dB	Allocation
System Noise Temperature	19.5 dB-K	
	<u>Receive G/T</u>	
	30.6 dB/K	(Clear Sky)
Received Carrier Level	-113.4 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	95.7 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
	<u>Received C/N</u>	
	23.2 dB	
Required C/N	18.0 dB	Studio Reception
	=====	
Link Margin	5.2 dB	
Overall C/N	22.8 dB	33.1 dB Uplink C/N
Weighted (S/N) _w Ratio	53.8 dB	CCIR Type M
Minimum (S/N) _w	48.0 dB	Quality: Excellent (TASO)
	=====	
(S/N) _w Margin	5.8 dB	



TABLE 4 - SCENARIO VI-B - C-BAND (FSS) - UPLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Information Data Rate = 72 Mb/s

Mid-band Frequency = 6.15 GHz

	Uncoded	Remarks
Transmitter Power	29.0 dBW	800.0 Watts
Transmit Line Loss	0.1 dB	Allocation
Transmitting Antenna Gain	54.0 dBi	10-m dish, 60% efficiency
EIRP	<u>82.9 dBW</u>	
Free Space Loss	200.0 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>200.6 dB</u>	
Power Flux Density	-79.8 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	24.7 dBi	Gridded Reflector
Receive Line Loss	1.3 dB	Allocation
System Noise Temperature	27.1 dB-K	
Receive G/T	<u>-2.4 dB/K</u>	(Clear Sky)
Received Carrier Level	-93.0 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>108.5 dB-Hz</u>	



TABLE 5 - SCENARIO VI-B - C-BAND (FSS) - DOWNLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Mid-band Frequency = 3.95 GHz

	Uncoded	Remarks
Transmitter Power	11.1 dBW	13.0 Watts
Transmit Line Loss	1.3 dB	Allocation
Transmitting Antenna Gain	26.3 dBi	Gridded Reflector
EIRP	<u>36.1 dBW</u>	
Free Space Loss	196.1 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>196.7 dB</u>	
Power Flux Density	-126.6 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	50.1 dBi	10-m dish, 60% efficiency
Receive Line Loss	0.1 dB	Allocation
System Noise Temperature	19.5 dB-K	
Receive G/T	<u>30.6 dB/K</u>	(Clear Sky)
Received Carrier Level	-110.5 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>98.6 dB-Hz</u>	
Information Bit Rate	78.6 dB-Hz	72 Mb/s
Implementation Loss	2.0 dB	Allocation
Required Eb/No	14.0 dB	BER=10 ⁻⁶
Required C/kT	<u>94.6 dB-Hz</u>	
=====		
C/kT Margin	4.1 dB	



**Ford Aerospace &
Communications Corporation**

TABLE 6 - SCENARIO VI-B - Ku-BAND (FSS) CANADA - LINK BUDGET

MODULATION: CSSB, Suppressed Carrier (3000 HVC/36 MHz)

Mid-band Downlink Freq. =	11.95 GHz	Saturated EIRP =	39.0 dBW
Mid-band Uplink Freq. =	14.25 GHz	SFD =	-84.0 dBW/m ²
Uplink Free Space Loss =	207.3 dB	Satellite Gain =	171.4 dB
No. of Channels, N =	3000	Satellite G/T =	21.1 dB/K
<hr/>			
Transmitter Power	-8.2 dBW	0.15 Watts	
Transmit Line Loss	1.1 dB	Allocation	
Transmitting Antenna Gain	48.8 dBi	Gridded Reflector	
Output Backoff	5.0 dB		
Net EIRP	<u>34.5 dBW</u>		
Total Load	19.6 dBm0	-15.2 + 10 Log N	
Reference Power EIRP, Pr	<u>14.9 dBW</u>	Net EIRP - Total Load	
Free Space Loss	205.8 dB	38700 km; 30° Elev. Ang.	
Pointing Loss	0.5 dB	Allocation	
Atmospheric Degradation	0.1 dB		
Rain Margin	3.0 dB		
Net Path Loss	<u>209.4 dB</u>		
Power Flux Density	-128.3 dBW/m ²	(Clear Sky)	
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% eff.	
Receive Line Loss	0.2 dB	Allocation	
System Noise Temperature	22.3 dB-K		
Receive G/T	<u>34.4 dB/K</u>	(Clear Sky)	
Boltzmann's Constant	-228.6 dBW/Hz-K		
Downlink Pr/No	<u>68.6 dB-Hz</u>		
Uplink Pr/No	93.2 dB-Hz		
Downlink Interference Pr/Io	81.2 dB-Hz		
Uplink Interference Pr/Io	78.9 dB-Hz		
Intermodulation Pr/IMO	71.9 dB-Hz	14.7 dB = P1/P3	
Terrestrial Pr/Io	89.6 dB-Hz		
Cross-polarization Pr/Io	88.4 dB-Hz		
Overall Pr/No	<u>66.4 dB-Hz</u>		
Required Pr/No	61.9 dB-Hz		
Pr/No Margin	<u>4.5 dB-Hz</u>		



TABLE 7 - SCENARIO VI-B - Ku (FSS) CANADA - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 14.25 GHz

Transmitter Power	29.0 dBW	800.00 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7 m dish, 60% eff.
Input Back-Off	3.0 dB	
Net EIRP	<u>84.0 dBW</u>	
Free Space Loss	207.3 dB	38700 km; 30 ⁰ Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>210.9 dB</u>	
Power Flux Density	-78.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	48.8 dBi	Gridded Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	
Receive G/T	<u>21.1 dB/K</u>	(Clear Sky)
Received Carrier Level	-78.0 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	122.8 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
Received C/N	<u>50.3 dB</u>	



TABLE 8 - SCENARIO VI-B - Ku (FSS) CANADA - DOWNLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 11.95 GHz

Transmitter Power	-8.2 dBW	0.15 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	48.8 dBi	Gridded Reflector
Output Back-Off	3.0 dB	
Net EIRP	<u>36.5 dBW</u>	
Free Space Loss	205.8 dB	38700 km; 30° Elev. A
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>206.4 dB</u>	
Power Flux Density	-126.3 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% eff.
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-113.2 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	92.9 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
Received C/N	<u>20.4 dB</u>	
Required C/N	18.0 dB	Studio Reception
Link Margin	===== 2.4 dB	
Overall C/N	20.4 dB	50.3 dB Uplink C/N
Weighted (S/N) _w Ratio	51.4 dB	CCIR Type M
Minimum (S/N) _w	48.0 dB	Quality: Excellent (TASO)
(S/N) _w Margin	===== 3.4 dB	



TABLE 9 - SCENARIO VI-B - Ku-BAND (FSS) CANADA - UPLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Information Data Rate = 72 Mb/s

Mid-band Frequency = 14.25 GHz

	Uncoded	Remarks
Transmitter Power	29.0 dBW	800.0 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7 m dish, 60% efficiency
EIRP	<u>87.0 dBW</u>	
Free Space Loss	207.3 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>210.9 dB</u>	
Power Flux Density	-75.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	48.8 dBi	Gridded Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	
Receive G/T	<u>21.1 dB/K</u>	(Clear Sky)
Received Carrier Level	-75.0 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>125.8 dB-Hz</u>	



TABLE 10 - SCENARIO VI-B - Ku-BAND (FSS) CANADA - DOWNLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Mid-band Frequency = 11.95 GHz

	Uncoded	Remarks
Transmitter Power	-8.2 dBW	0.15 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	48.8 dBi	Gridded Reflector
EIRP	<u>39.5 dBW</u>	
Free Space Loss	205.8 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>206.4 dB</u>	
Power Flux Density	-123.3 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% efficiency
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-110.2 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>95.9 dB-Hz</u>	
Information Bit Rate	78.6 dB-Hz	72 Mb/s
Implementation Loss	1.5 dB	Allocation
Required Eb/No	14.0 dB	BER=10 ⁻⁶
Required C/kT	<u>94.1 dB-Hz</u>	
=====		
C/kT Margin	1.9 dB	



TABLE 11-A - SCENARIO VI-B -Ku-BAND (FSS) MEXICO - UPLINK BUDGET

MODULATION: SCPC/FM - 1,800 HVC/36 MHz

Mid-band Frequency = 14.25 GHz

No. of Channels, N = 1,800

E/S Transmitter Power	29.0 dBW	800.0 Watts
Transmit Line Losses	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7-m Dish, 60% efficiency
Earth Station EIRP	<u>87.0 dBW</u>	
Output Back-Off	3.0 dB	
Loading Factor	32.6 dB	10 log N
Net EIRP/SCPC Channel	<u>51.5 dBW</u>	
Free Space Loss	207.3 dB	38,700 km; 30 ⁰ Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>210.9 dB</u>	
Power Flux Density	-75.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	29.8 dBi	Gridded Reflector
Receive Line Losses	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	Referred to antenna output
Receive G/T	<u>2.1 dB/K</u>	(Clear Sky)
Received Carrier Level	-129.6 dBW	per SCPC Channel
Boltzmann's Constant	-228.6 dBW/Hz-K	
Uplink C/kT	<u>71.3 dB-Hz</u>	per SCPC Channel
IF BW/ Channel	43.0 dB-Hz	20.0 kHz
Uplink C/N per Channel	<u>28.3 dB</u>	



TABLE 11-B - SCENARIO VI-B - Ku-BAND (FSS) MEXICO - DOWNLINK BUDGET

MODULATION: SCPC/FM - 1,800 HVC/36 MHz

Mid-band Frequency = 11.95 GHz
No. of Channels, N = 1,800

Satellite Transmitter Power	10.4 dBW	11.0 watts
Transmit Line Losses	1.1 dB	Allocation
Transmitting Antenna Gain	29.8 dBi	Gridded Reflector
Satellite EIRP	<u>39.1 dBW</u>	
Output Back-Off	3.0 dB	
Loading Factor	32.6 dB	10 log N
VOX Advantage	4.0 dB	40% Activity Factor
Net EIRP/SCPC Channel	<u>7.6 dBW</u>	
Free Space Loss	205.8 dB	38,700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>209.4 dB</u>	
Power Flux Density	-123.6 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7-m dish, 60% efficiency
Receive Line Losses	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	Referred to antenna output
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-145.1 dBW	per SCPC Channel
Boltzmann's Constant	-228.6 dBW/Hz-K	
Downlink C/kT	<u>61.0 dB-Hz</u>	per SCPC Channel
Uplink C/kT	71.3 dB-Hz	per SCPC Channel
Total Channel C/kT	<u>60.6 dB-Hz</u>	
Required Total Channel C/kT	55.0 dB-Hz	51-56 dB-Hz Acceptable
C/kT Margin	<u>5.6 dB</u>	
IF Bandwidth/Channel	43.0 dB-Hz	20.0 kHz
Total C/N per Channel	<u>17.6 dB</u>	



TABLE 12- SCENARIO VI-B - Ku (FSS) MEXICO - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 14.25 GHz

Transmitter Power	29.0 dBW	800.00 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7 m dish, 60% eff.
Input Back-Off	3.0 dB	
Net EIRP	<u>84.0 dBW</u>	
Free Space Loss	207.3 dB	38700 km; 30 ⁰ Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>210.9 dB</u>	
Power Flux Density	-78.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	29.8 dBi	Gridded Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	
Receive G/T	<u>2.1 dB/K</u>	(Clear Sky)
Received Carrier Level	-97.0 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	103.8 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
Received C/N	<u>31.3 dB</u>	



TABLE 13 - SCENARIO VI-B - Ku (FSS) MEXICO - DOWNLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 11.95 GHz

Transmitter Power	10.8 dBW	12.0 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	29.8 dBi	Gridded Reflector
Output Back-Off	3.0 dB	
Net EIRP	<u>36.5 dBW</u>	
Free Space Loss	205.8 dB	38700 km; 30° Elev. A
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>206.4 dB</u>	
Power Flux Density	-126.3 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% eff.
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-113.2 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	93.0 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
Received C/N	<u>20.4 dB</u>	
Required C/N	18.0 dB	Studio Reception
Link Margin	<u>2.4 dB</u>	
Overall C/N	20.1 dB	31.3 dB Uplink C/N
Weighted (S/N) _w Ratio	51.1 dB	CCIR Type M
Minimum (S/N) _w	48.0 dB	Quality: Excellent (TASO)
(S/N) _w Margin	<u>3.1 dB</u>	



TABLE 14 - SCENARIO VI-B - Ku-BAND (FSS) MEXICO - UPLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Information Data Rate = 72 Mb/s

Mid-band Frequency = 14.25 GHz

	Uncoded	Remarks
Transmitter Power	29.0 dBW	800.0 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7 m dish, 60% efficiency
EIRP	<u>87.0 dBW</u>	
Free Space Loss	207.3 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>210.9 dB</u>	
Power Flux Density	-75.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	29.8 dBi	Gridded Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	
Receive G/T	<u>2.1 dB/K</u>	(Clear Sky)
Received Carrier Level	-94.0 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>106.8 dB-Hz</u>	



TABLE 15 - SCENARIO VI-B - Ku-BAND (FSS) MEXICO - DOWNLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Mid-band Frequency = 11.95 GHz

	Uncoded	Remarks
Transmitter Power	10.8 dBW	12.00 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	29.8 dBi	Gridded Reflector
EIRP	<u>39.5 dBW</u>	
Free Space Loss	205.8 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>206.4 dB</u>	
Power Flux Density	-123.3 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% efficiency
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-110.2 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>96.0 dB-Hz</u>	
Information Bit Rate	78.6 dB-Hz	72 Mb/s
Implementation Loss	1.5 dB	Allocation
Required Eb/No	14.0 dB	BER=10 ⁻⁶
Required C/kT	<u>94.1 dB-Hz</u>	
=====		
C/kT Margin	1.9 dB	



TABLE 16-A - SCENARIO VI-B -Ku-BAND (FSS) BRAZIL - UPLINK BUDGET

MODULATION: SCPC/FM - 1,800 HVC/36 MHz

Mid-band Frequency = 14.25 GHz
No. of Channels, N = 1,800

E/S Transmitter Power	29.0 dBW	800.0 Watts
Transmit Line Losses	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7-m Dish, 60% efficiency
Earth Station EIRP	<u>87.0 dBW</u>	
Output Back-Off	3.0 dB	
Loading Factor	32.6 dB	10 log N
Net EIRP/SCPC Channel	<u>51.5 dBW</u>	
Free Space Loss	207.3 dB	38,700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>210.9 dB</u>	
Power Flux Density	-75.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	27.3 dBi	Gridded Reflector
Receive Line Losses	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	Referred to antenna output
Receive G/T	<u>-0.4 dB/K</u>	(Clear Sky)
Received Carrier Level	-132.1 dBW	per SCPC Channel
Boltzmann's Constant	-228.6 dBW/Hz-K	
Uplink C/kT	<u>68.8 dB-Hz</u>	per SCPC Channel
IF BW/ Channel	43.0 dB-Hz	20.0 kHz
Uplink C/N per Channel	<u>25.8 dB</u>	



TABLE 16-B - SCENARIO VI-B - Ku-BAND (FSS) BRAZIL - DOWNLINK BUDGET

MODULATION: SCPC/FM - 1,800 HVC/36 MHz

Mid-band Frequency = 11.95 GHz

No. of Channels, N = 1,800

Satellite Transmitter Power	13.0 dBW	20.0 watts
Transmit Line Losses	1.1 dB	Allocation
Transmitting Antenna Gain	27.3 dBi	Gridded Reflector
Satellite EIRP	<u>39.2 dBW</u>	
Output Back-Off	3.0 dB	
Loading Factor	32.6 dB	10 log N
VOX Advantage	4.0 dB	40% Activity Factor
Net EIRP/SCPC Channel	<u>7.7 dBW</u>	
Free Space Loss	205.8 dB	38,700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>209.4 dB</u>	
Power Flux Density	-123.5 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7-m dish, 60% efficiency
Receive Line Losses	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	Referred to antenna output
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-145.0 dBW	per SCPC Channel
Boltzmann's Constant	-228.6 dBW/Hz-K	
Downlink C/kT	<u>61.1 dB-Hz</u>	per SCPC Channel
Uplink C/kT	68.8 dB-Hz	per SCPC Channel
Total Channel C/kT	<u>60.4 dB-Hz</u>	
Required Total Channel C/kT	55.0 dB-Hz	51-56 dB-Hz Acceptable
C/kT Margin	===== 5.4 dB	
IF Bandwidth/Channel	43.0 dB-Hz	20.0 kHz
Total C/N per Channel	<u>17.4 dB</u>	



TABLE 17 - SCENARIO VI-B - Ku (FSS) BRAZIL - UPLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 14.25 GHz

Transmitter Power	29.0 dBW	800.00 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7 m dish, 60% eff.
Input Back-Off	3.0 dB	
Net EIRP	<u>84.0 dBW</u>	
Free Space Loss	207.3 dB	38700 km; 30 ⁰ Elev. Ang.
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>210.9 dB</u>	
Power Flux Density	-78.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	27.3 dBi	Gridded Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	
Receive G/T	<u>-0.4 dB/K</u>	(Clear Sky)
Received Carrier Level	-99.5 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	101.3 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
Received C/N	<u>28.8 dB</u>	



TABLE 18 - SCENARIO VI-B - Ku (FSS) BRAZIL - DOWNLINK BUDGET

MODULATION: FM-FDMA Video channel (2 video/36 MHz)

Mid-band Frequency = 11.95 GHz

Transmitter Power	13.0 dBW	20.0 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	27.3 dBi	Gridded Reflector
Output Back-Off	3.0 dB	
Net EIRP	<u>36.2 dBW</u>	
Free Space Loss	205.8 dB	38700 km; 30° Elev. A
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>206.4 dB</u>	
Power Flux Density	-126.5 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% eff.
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-113.4 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	92.7 dB-Hz	
Receiver IF Bandwidth	72.6 dB-Hz	18 MHz IF Bandwidth
Received C/N	<u>20.1 dB</u>	
Required C/N	18.0 dB	Studio Reception
Link Margin	<u>2.1 dB</u>	
Overall C/N	19.6 dB	28.8 dB Uplink C/N
Weighted (S/N) _w Ratio	50.6 dB	CCIR Type M
Minimum (S/N) _w	48.0 dB	Quality: Excellent (TASO)
(S/N) _w Margin	<u>2.6 dB</u>	



TABLE 19 - SCENARIO VI-B - Ku-BAND (FSS) BRAZIL - UPLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Information Data Rate = 72 Mb/s

Mid-band Frequency = 14.25 GHz

	Uncoded	Remarks
Transmitter Power	29.0 dBW	800.0 Watts
Transmit Line Loss	0.2 dB	Allocation
Transmitting Antenna Gain	58.2 dBi	7 m dish, 60% efficiency
EIRP	<u>87.0 dBW</u>	
Free Space Loss	207.3 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	3.0 dB	
Net Path Loss	<u>210.9 dB</u>	
Power Flux Density	-75.7 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	27.3 dBi	Gridded Reflector
Receive Line Loss	1.1 dB	Allocation
System Noise Temperature	27.7 dB-K	
Receive G/T	<u>-0.4 dB/K</u>	(Clear Sky)
Received Carrier Level	-96.5 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>104.3 dB-Hz</u>	



TABLE 20 - SCENARIO VI-B - Ku-BAND (FSS) BRAZIL - DOWNLINK BUDGET

MODULATION: SS/TDMA/8-ary PSK

Mid-band Frequency = 11.95 GHz

	Uncoded	Remarks
Transmitter Power	13.0 dBW	20.00 Watts
Transmit Line Loss	1.1 dB	Allocation
Transmitting Antenna Gain	27.3 dBi	Gridded Reflector
EIRP	<u>39.2 dBW</u>	
Free Space Loss	205.8 dB	38700 km; 30° Elev. Angle
Pointing Loss	0.5 dB	Allocation
Atmospheric Degradation	0.1 dB	
Rain Margin	0.0 dB	
Net Path Loss	<u>206.4 dB</u>	
Power Flux Density	-123.5 dBW/m ²	(Clear Sky)
Receiving Antenna Gain	56.7 dBi	7 m dish, 60% efficiency
Receive Line Loss	0.2 dB	Allocation
System Noise Temperature	22.5 dB-K	
Receive G/T	<u>34.2 dB/K</u>	(Clear Sky)
Received Carrier Level	-110.4 dBW	
Boltzmann's Constant	-228.6 dBW/Hz-K	
Received C/kT	<u>95.7 dB-Hz</u>	
Information Bit Rate	78.6 dB-Hz	72 Mb/s
Implementation Loss	1.5 dB	Allocation
Required Eb/No	14.0 dB	BER=10 ⁻⁶
Required C/kT	<u>94.1 dB-Hz</u>	
=====		
C/kT Margin	1.6 dB	