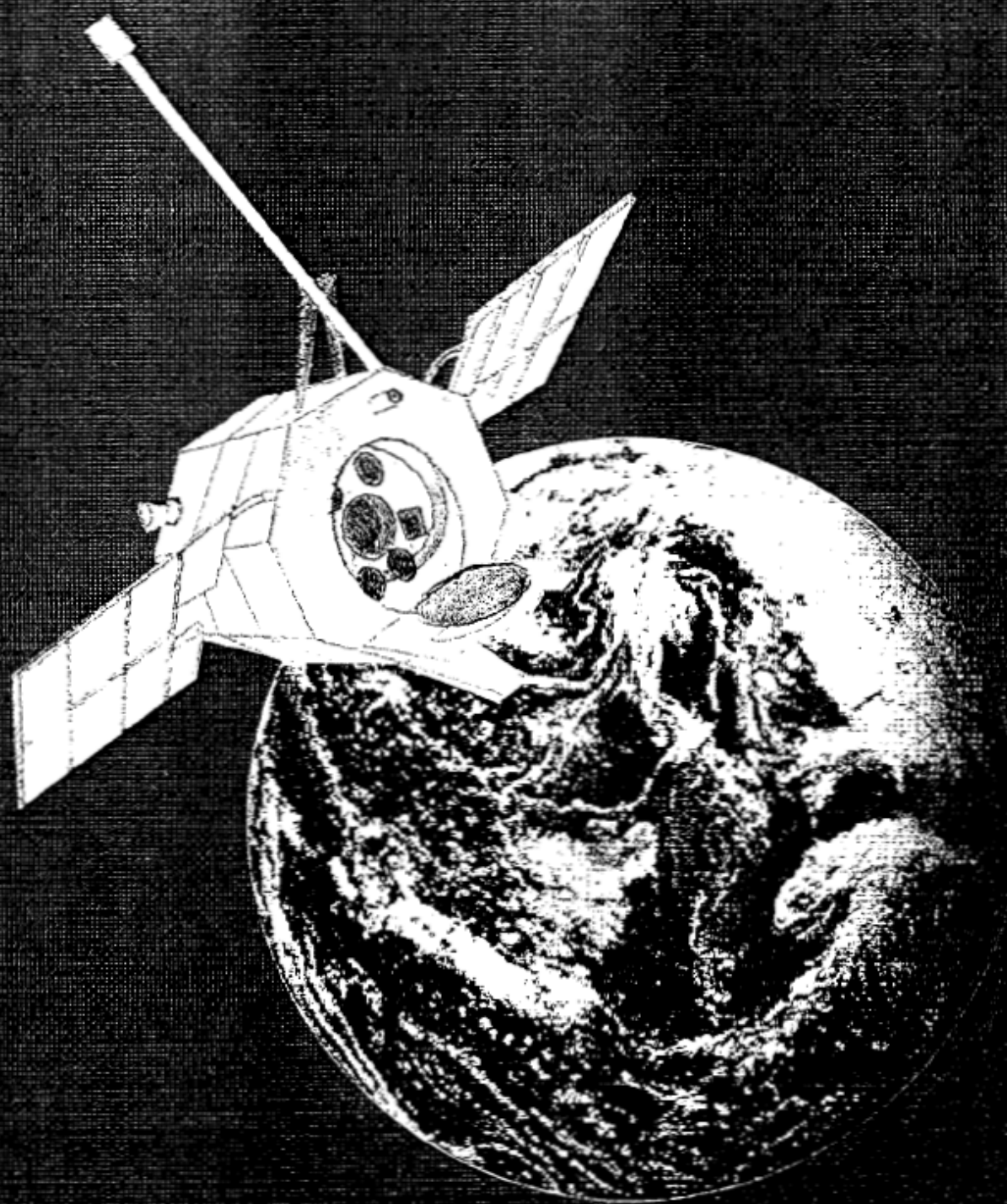


*TABLE  
OF ARTIFICIAL  
SATELLITES  
LAUNCHED IN 1990*



AFP-731	A	1990-19-B	Cosmos-2097	1990-76-A	J	1990-13-C	Raduga-1 (2)	R	1990-116-A
Asiasat-1		1990-30-A	Cosmos-2098	1990-78-A	JAS-1B		Raduga-25		1990-16-A
Atlantis		1990-19-A	Cosmos-2099	1990-80-A	JCSAT-2	1990-1-B	Raduga-26		1990-112-A
	B		Cosmos-2100	1990-83-A			Resurs-F6		1990-47-A
Badr-A		1990-59-A	Cosmos-2101	1990-87-A	Kristall	1990-48-A	Resurs-F7		1990-60-A
BS-3A		1990-77-A	Cosmos-2102	1990-92-A			Resurs-F8		1990-73-A
BSB-R2		1990-74-A	Cosmos-2103	1990-96-A	L		Resurs-F9		1990-82-A
	C		Cosmos-2104	1990-98-A	Leasat-5	1990-2-B	Rosat		1990-49-A
			Cosmos-2105	1990-99-A				S	
Cosmos-2055		1990-3-A	Cosmos-2106	1990-104-A	M-1	1990-43-A	Satcom-1		1990-100-A
Cosmos-2056		1990-4-A	Cosmos-2107	1990-108-A	M-2	1990-43-B	SBS-6		1990-91-A
Cosmos-2057		1990-9-A	Cosmos-2108	1990-109-A	Meteor-2 (19)	1990-57-A	Skynet-4A		1990-1-A
Cosmos-2058		1990-10-A	Cosmos-2109	1990-110-A	Meteor-2 (20)	1990-86-A	Skynet-4C		1990-79-A
Cosmos-2059		1990-12-A	Cosmos-2110	1990-110-B	Microsat-1	1990-5-D	Soyuz-TM 9		1990-14-A
Cosmos-2060		1990-22-A	Cosmos-2111	1990-110-C	Microsat-2	1990-5-E	Soyuz-TM 10		1990-67-A
Cosmos-2061		1990-23-A	Cosmos-2112	1990-111-A	Microsat-3	1990-5-F	Soyuz-TM 11		1990-107-A
Cosmos-2062		1990-24-A	Cosmos-2113	1990-113-A	Microsat-4	1990-5-G	Spot-2		1990-5-A
Cosmos-2063		1990-26-A	Cosmos-2114	1990-114-A	Molnya-1 (77)	1990-39-A	STS-31		1990-37-A
Cosmos-2064		1990-29-A	Cosmos-2115	1990-114-B	Molnya-1 (78)	1990-71-A	STS-32		1990-2-A
Cosmos-2065		1990-29-B	Cosmos-2116	1990-114-C	Molnya-1 (79)	1990-101-A	STS-35		1990-106-A
Cosmos-2066		1990-29-C	Cosmos-2117	1990-114-D	Molnya-3 (37)	1990-6-A	STS-36		1990-19-A
Cosmos-2067		1990-29-D	Cosmos-2118	1990-114-E	Molnya-3 (38)	1990-52-A	STS-38		1990-97-A
Cosmos-2068		1990-29-E	Cosmos-2119	1990-114-F	Molnya-3 (39)	1990-84-A	STS-41		1990-90-A
Cosmos-2069		1990-29-F	Cosmos-2120	1990-115-A	Momo-1B	1990-13-A	Syncom-4 (5)		1990-2-B
Cosmos-2070		1990-29-G	CRRES	1990-65-A	MOS-1B	1990-13-A		T	
Cosmos-2071		1990-29-H			Muses-A	1990-7-A	TDF-2		1990-63-A
Cosmos-2072		1990-33-A						U	
Cosmos-2073		1990-35-A	DEBUT	1990-13-B			Ulysses		1990-90-B
Cosmos-2074		1990-36-A	DFS-2	1990-63-B			UOSAT-D		1990-5-B
Cosmos-2075		1990-38-A			Nadezhda-2	1990-17-A	UOSAT-E		1990-5-C
Cosmos-2076		1990-40-A	Eutelsat-2 F1	1990-79-B			USA-50		1990-8-A
Cosmos-2077		1990-42-A					USA-51		1990-15-A
Cosmos-2078		1990-44-A	Fengyun-1 (2)	1990-81-A	Ofeq-2	1990-27-A	USA-52		1990-15-B
Cosmos-2079		1990-45-A	Foton-3	1990-32-A	Okean-2	1990-18-A	USA-53		1990-19-B
Cosmos-2080		1990-45-B	Fuji-2	1990-13-C	Orizuru	1990-13-B	USA-54		1990-25-A
Cosmos-2081		1990-45-C			Oscar-14	1990-5-B	USA-55		1990-28-B
Cosmos-2082		1990-46-A	Galaxy-6	1990-91-B	Oscar-15	1990-5-C	USA-56		1990-31-A
Cosmos-2083		1990-53-A	Gamma	1990-58-A	Oscar-16	1990-5-D	USA-57		1990-31-B
Cosmos-2084		1990-55-A	Gorizont-20	1990-54-A	Oscar-17	1990-5-E	USA-58		1990-31-C
Cosmos-2085		1990-61-A	Gorizont-21	1990-94-A	Oscar-18	1990-5-F	USA-59		1990-50-A
Cosmos-2086		1990-62-A	Gorizont-22	1990-102-A	Oscar-19	1990-5-G	USA-60		1990-50-B
Cosmos-2087		1990-64-A	GSTAR-4	1990-100-B			USA-61		1990-50-C
Cosmos-2088		1990-66-A			Palapa-B2 R	1990-34-A	USA-62		1990-50-D
Cosmos-2089		1990-69-A			PCR-31	1990-81-B	USA-63		1990-68-A
Cosmos-2090		1990-70-A	Hiten	1990-7-A	PCR-32	1990-81-C	USA-64		1990-88-A
Cosmos-2091		1990-70-B	HST	1990-37-B	Pegsat	1990-28-A	USA-65		1990-95-A
Cosmos-2092		1990-70-C			PRC-26	1990-11-A	USA-66		1990-103-A
Cosmos-2093		1990-70-D	Inmarsat-2 F1	1990-93-A	PRC-33	1990-89-A	USA-67		1990-97-B
Cosmos-2094		1990-70-E	Insat-1D	1990-51-A	Progress-42	1990-41-A	USA-68		1990-105-A
Cosmos-2095		1990-70-F	Intelsat-6	1990-21-A	Progress-M3	1990-20-A		Y	
Cosmos-2096		1990-75-A	Intelsat-6 F4	1990-56-A	Progress-M4	1990-72-A	Yuri-3A		1990-77-A
					Progress-M5	1990-85-A			

Code name Spacecraft description	International number	Country Organization Site of launching	Date	Initial orbital data		Frequencies Transmitter power	Observations
				Perigee (km) Apogee (km)	Period (min) Inclination (degree)		
Skynet-4A	1990-1-A	United Kingdom launched from the United States	1 Jan.	33 685 35 782	1382.5 3.4		Military telecommunications
JCSAT-2	1990-1-B	Japan launched from the United States	1 Jan.	821 7191	180.1 0.3		Telecommunications
STS-32 space shuttle <i>Columbia</i>	1990-2-A	United States NASA (Kennedy Space Center)	9 Jan.	316 342	90.8 28.4		Reusable spacecraft. Crew: D. Brandstein, J. Wetherbee, B. Dunbar, M. Ivins and D. Low. Landed at Edwards Air Force Base on 20 January 1990 after having recuperated from orbit the satellite <i>LDEF-1</i> (1984-34-B)
Syncom-4 (5) (Leasat-5) Hughes-type <i>HS 381</i> ; 6894 kg	1990-2-B	United States Department of Defense launched from <i>STS-32</i>	9 Jan.	34 858 36 363 in geostationary-satellite orbit	1427.1 1.4		Government telecommunications
Cosmos-2055	1990-3-A	USSR	17 Jan.	251 280	89.6 62.8		Decayed on 29 January 1990
Cosmos-2056	1990-4-A	USSR	18 Jan.	779 819	100.8 74		
Spot-2 1870 kg	1990-5-A	France CNES (Kourou)	22 Jan.	802 831 heliosynchronous orbit	100.9 98.7	2205.9; 5745.0; 8253.1; 8307.1 MHz	Earth observation
UOSAT-D (Oscar-14) 93 kg	1990-5-B	United Kingdom (Kourou)	22 Jan.	791 821	100.8 98.7		Amateur radio
UOSAT-E (Oscar-15) 93 kg	1990-5-C	United Kingdom (Kourou)	22 Jan.	791 821	100.8 98.7		Amateur radio
Microsat-1 (Oscar-16) to Microsat-4 (Oscar-19) 48 kg each	1990-5-D to 1990-5-G	United States (Kourou)	22 Jan.	791 821	100.8 98.7		Amateur radio
Molnya-3 (37) 3-axis stabilized; 1500 kg	1990-6-A	USSR (Plesetsk)	23 Jan.	642 38 892	701 63	5.9-6.2 GHz (reception) 3.6-3.9 GHz (emission)	Television and multichannel radiocommunications

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Muses-A (Hiten) 197.4 kg	1990-7-A	Japan Institute of Space and Aeronautical Science (Kagoshima)	24 Jan.				Use of swing-by technique to modify the course and speed of the probe by using the gravity of the Moon and to deploy a subsatellite into Moon orbit
USA-50	1990-8-A	United States	24 Jan.	19 978 20 189	713.5 54.6		
Cosmos-2057	1990-9-A	USSR	25 Jan.	195 349	89.7 62.8		Decayed on 19 March 1990
Cosmos-2058	1990-10-A	USSR	30 Jan.	650 678	97.8 82.5		
PRC-26	1990-11-A	China (Jiuquan)	4 Feb.			6/4 GHz band	Telecommunications
Cosmos-2059	1990-12-A	USSR	6 Feb.	191 2276	110 65.8		Decayed on 12 November 1990
MOS-1B (Momo-1B)	1990-13-A	Japan (Tanegashima)	7 Feb.	913 940	103.3 99	2220.0; 136.122; 1702.48; 8150/8305 MHz	Marine Observation Satellite
DEBUT (Orizuru) 50 kg	1990-13-B	Japan (Tanegashima)	7 Feb.	903 1614	110.5 99		DEployable Boom and Umbrella Test
JAS-1B (Fuji-2) 50 kg	1990-13-C	Japan (Tanegashima)	7 Feb.	920 1476	112.2 99	435.79; 435.91 MHz	Japan Amateur Satellite
Soyuz-TM 9 7 tonnes at launch	1990-14-A	USSR (Baikonur)	11 Feb.				Docked with <i>Mir-1</i> orbital complex on 13 February 1990. Returned to Earth on 9 August 1990
USA-51	1990-15-A	United States (Kennedy Space Center)	14 Feb.	532 549	95.3 43		
USA-52	1990-15-B	United States (Kennedy Space Center)	14 Feb.	464 470	93.8 43.1		
Raduga-25 3-axis stabilized; 5 tonnes; solar panels	1990-16-A	USSR (Baikonur)	15 Feb.	35 903 in geostationary-satellite orbit	1444 1.3	5.7-6.2 GHz (reception) 3.4-3.9 GHz (emission)	Television and multichannel radiocommunications
Nadezhda-2	1990-17-A	USSR	27 Feb.	975 1032	104.9 83		Navigation system for determining the position of maritime vessels and also apparatus of the international space system for search and rescue

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Code name Spacecraft description	International number	Country Organization Site of launching	Date	Initial orbital data		Frequencies Transmitter power	Observations
				Perigee (km) Apogee (km)	Period (min) Inclination (degree)		
Okean-2	1990-18-A	USSR (Plesetsk)	28 Feb.	655 679	97.8 82.5		Optical scanning and radio-physical equipment to obtain oceanographic information and data on ice conditions
STS-36 (Atlantis)	1990-19-A	United States NASA (Kennedy Space Center)	28 Feb.	248 264	89.4 61.9		Space Transportation System 36. Reusable spacecraft. Crew: J. O. Creighton, J. Casper, D. C. Hilmers, M. Mullane, and P. J. Thuot. Landed at Edwards Air Force Base on 4 March 1990
USA-35 (AFP-731) 16.8 tonnes	1990-19-B	United States launched from STS-36	28 Feb.				Advanced digital imaging cameras
Progress-M3	1990-20-A	USSR (Baikonur)	28 Feb.	188 245	88.6 51.6		Expendable supply craft. Docked with <i>Mir-1</i> orbital complex. Decayed on 28 April 1990
Intelsat-6 3-axis stabilized	1990-21-A	International INTELSAT (Cape Canaveral)	14 March	154 346		6/4 and 14/11 GHz bands	Telecommunications. Failed to reach correct orbit after a launch mishap
Cosmos-2060	1990-22-A	USSR	14 March	412 430	92.7 65		
Cosmos-2061	1990-23-A	USSR	20 March	994 1031	105.1 82.9		
Cosmos-2062	1990-24-A	USSR	22 March	194 250	88.6 82.3		Decayed on 5 April 1990
USA-54	1990-25-A	United States	26 March	169 20 284	354.9 37.6		
Cosmos-2063	1990-26-A	USSR	27 March	602 39 346	709 62.9		
Ofeq-2	1990-27-A	Israel	3 April	209 1577	102.5 143.2		Decayed on 9 July 1990
Pegsat USA-55	1990-28-A 1990-28-B	United States United States	5 April 5 April	500 682 498 673	96.4 94.1 96.3 94.1		Launched using the winged <i>Pegasus</i> rocket booster released from an airplane
Cosmos-2064 to Cosmos-2071	1990-29-A to 1990-29-H	USSR	6 April	1437 1495	115 74		Government telecommunications
Asiasat-1	1990-30-A	Asia Satellite Telecommunications Co. (Jiuquan)	7 April	35 786 35 789	1436.2 0.1 in geostationary-satellite orbit at 105.5° E	6/4 GHz band	Commercial telecommunications. Launched by the <i>Long March-3</i> rocket from China

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USA-56 to USA-58	1990-31-A to 1990-31-C	United States	11 April				
Foton-3	1990-32-A	USSR	11 April	225 389	90.5 62.8		Space material technology research. Experiments to obtain protein crystals and semiconductor materials under microgravity. Decayed on 27 April 1990
Cosmos-2072	1990-33-A	USSR	13 April	189 248	89 64.8		Decayed on 21 November 1990
Palapa-B2 R	1990-34-A	Indonesia	13 April	35 717 37 785	1485.7 0.4 in geostationary-satellite orbit at 113° E		National telecommunications
Cosmos-2073	1990-35-A	USSR	17 April	189 267	88.7 82.3		Decayed on 28 April 1990
Cosmos-2074	1990-36-A	USSR	20 April	982 1016	104.9 83		
STS-31 HST	1990-37-A 1990-37-B	United States United States	24 April 24 April	611 620	96.8 28.4		Landed in California on 29 April 1990 <i>Hubble Space Telescope</i> deployed from the orbiting <i>STS-31</i> on 25 April 1990
Cosmos-2075	1990-38-A	USSR	25 April	489 522	94.6 70.0		
Molnya-1 (77) hemetically sealed cylinder with conical ends; 1000 kg; 6 solar panels	1990-39-A	USSR (Plesetsk)	26 April	654 40 747	736 62.8	800 MHz band 40 W (emission) 1000 MHz band (reception) 3400-4100 MHz (retransmission of television)	Television and multichannel radiocommunications
Cosmos-2076	1990-40-A	USSR	28 April	613 39 342	709 62.8		Scientific instruments for continuing space research, a radio system for precise orbital measurement, and a radiotelemetry system
Progress-42	1990-41-A	USSR	5 May	194 261	88.7 51.6		Expendable supply craft. Various cargo for the manned orbital complex <i>Mir-1</i> . Decayed on 27 May 1990
Cosmos-2077	1990-42-A	USSR	7 May	195 346	89.6 62.9		Scientific instruments for continuing space research, a radio system for precise orbital measurement, and a radiotelemetry system. Decayed on 4 July 1990

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Code name Spacecraft description	International number	Country Organization Site of launching	Date	Initial orbital data		Frequencies Transmitter power	Observations
				Perigee (km) Apogee (km)	Period (min) Inclination (degree)		
M-1	1990-43-A	United States	9 May	641	98.6		
M-2	1990-43-B	United States	9 May	783	89.8		
Cosmos-2078	1990-44-A	USSR	15 May	640 782	98.6 89.8		Space research. Decayed on 28 June 1990
Cosmos-2079 to Cosmos-2081	1990-45-A to 1990-45-C	USSR	19 May	19 130	675 64.9		Equipment to determine the location of aircraft and ships
Cosmos-2082	1990-46-A	USSR	22 May	852 880	102 71.0		Instruments for continuing space research, systems for precise measurement, and a radio-telemetry system
Resurs-F6	1990-47-A	USSR	29 May	190 260	88.7 82.3		Multizonal and multispectral photography for Earth resources exploration. Equipment from the Fed. Rep. of Germany for biotechnological experiments in microgravity conditions. Decayed on 14 June 1990
Kristall	1990-48-A	USSR (Baikonur)	31 May	220 346	89.9 51.6		Research on semiconductor materials, purification of biological active substances, cultivation of crystals, hybridization of cells, and astrophysical, geophysical and technical experiments. Docked with <i>Mir-1</i> orbital complex on 10 June 1990
Rosat	1990-49-A	Fed. Rep. of Germany/United States	1 June	567 588	96.1 52.9		X-ray
USA-59 to USA-62	1990-50-A to 1990-50-D	United States	8 June				
Insat-1D	1990-51-A	India (Kennedy Space Center)	12 June	35 767 35 974 in geostationary-satellite orbit at 83° E	1440.0 0.2	6/4 and 5 GHz bands	National telecommunications
Molnya-3 (38) 3-axis stabilized; 1500 kg	1990-52-A	USSR (Plesetsk)	13 June	492 40 839	738 62.8	5.9-6.2 GHz (reception)  3.6-3.9 GHz (emission)	Television and multichannel radiocommunications

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Cosmos-2083	1990-53-A	USSR	19 June	192 262	88.7 82.6		Decayed on 3 July 1990
Gorizont-20 3-axis stabilized; solar panels	1990-54-A	USSR (Baikonur)	20 June	35 788 in geostationary-satellite orbit	1436 1.4	5.7-6.2 GHz (reception)  3.4-3.9 GHz (emission)	Television and multichannel radiocommunications. Carries a MAYAK transmitter developed jointly by Bulgaria, Hungary, the German Dem. Rep., USSR, and the Czech and Slovak Fed. Rep.
Cosmos-2084	1990-55-A	USSR	21 June	590 756	98.2 62.8		
Intelsat-6 F4	1990-56-A	International INTELSAT	23 June			6/4 and 14/11 GHz bands	Thirty-eight C-band and ten K-band transponders. Commercial telecommunications
Meteor-2 (19) cylinder; 2750 kg; 2 solar panels	1990-57-A	USSR (Plesetsk)	27 June	951 974	104.1 82.3		Placed in orbit by the <i>Tsiklon</i> launcher
Gamma	1990-58-A	USSR	11 July	190 233	88.45 51.6		Search for gamma radiation sources and measurement of X and soft-gamma radiation. Instruments developed and manufactured by the USSR, France and Poland
Badr-A	1990-59-A	Pakistan	16 July	201 984	96.3 28.4		Placed in orbit by the Chinese <i>Long March-3</i> launcher. Decayed on 8 December 1990
Resurs-F7	1990-60-A	USSR	17 July	194 278	88.9 82.3		Study of Earth resources. Decayed on 16 August 1990
Cosmos-2085	1990-61-A	USSR	18 July	35 889 in geostationary-satellite orbit	1441 1.4		Telecommunications. Placed in orbit by the <i>Proton</i> launcher
Cosmos-2086	1990-62-A	USSR	20 July	191 258	88.7 82.3		Space exploration. Placed in orbit by the <i>Soyuz</i> launcher. Decayed on 3 August 1990
TDF-2 1274 kg	1990-63-A	France CNES (Kourou)	24 July			14/12 and 17 GHz bands 2212.018 MHz	Telecommunications and direct broadcasting
DFS-2	1990-63-B	Fed. Rep. of Germany	24 July	35 786 35 853 in geostationary-satellite orbit at 28.5° E	1437.8 0.1		
Cosmos-2087	1990-64-A	USSR	25 July	613 39 342	709 62.8		Placed in orbit by the <i>Molnya</i> launcher
CRRES	1990-65-A	United States	25 July	335 33 612	591.9 18.2		Combined Release and Radiation Effects Satellite

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Code name Spacecraft description	International number	Country Organization Site of launching	Date	Initial orbital data		Frequencies Transmitter power	Observations
				Perigee (km) Apogee (km)	Period (min) Inclination (degree)		
Cosmos-2088	1990-66-A	USSR	30 July	1502 1537	116 73.6		Placed in orbit by the <i>Tsiklon</i> launcher
Soyuz-TM 10 7 tonnes at launch	1990-67-A	USSR (Baikonur)	1 August				Crew: G. M. Manakov and G. M. Strelakov. Docked with <i>Mir-1</i> orbital complex on 3 August 1990. Returned to Earth on 10 December 1990 with cosmonauts Manakov, Strelakov and Akiyama
USA-63	1990-68-A	United States	2 August	19 931 20 665	722.7 54.7		Navigation
Cosmos-2089	1990-69-A	USSR	3 August	186 357	89.9 62.8		Placed in orbit by the <i>Soyuz</i> launcher. Decayed on 1 October 1990
Cosmos-2090 to Cosmos-2095	1990-70-A to 1990-70-F	USSR	8 August	1390 1432	113.8 82.6		Six satellites placed in orbit simultaneously by the <i>Tsiklon</i> launcher
Molnya-1 (78) hermetically sealed cylinder with conical ends: 1000 kg; 6 solar panels	1990-71-A	USSR (Plesetsk)	10 August	646 40 634	736 62.7	800 MHz band 40 W (emission)  1000 MHz band (reception)  3400-4100 MHz (rettransmission of television)	Television and multichannel radiocommunications
Progress-M4	1990-72-A	USSR (Baikonur)	15 August	186 235	88.5 51.6		Expendable supply craft. Docked with <i>Mir-1</i> orbital complex on 17 August 1990. Decayed on 20 September 1990
Resurs-F8	1990-73-A	USSR	16 August	176 229	88.5 82.3		Study of Earth resources. Decayed on 1 September 1990
BSB-R2 Hughes-type HS 376	1990-74-A	United Kingdom British Satellite Broadcasting	18 August	35 565 35 859 in geostationary-satellite orbit	1432.2 0.3	14/12 GHz band	Direct broadcasting of television
Cosmos-2096	1990-75-A	USSR	23 August	412 427	92.7 65.0		
Cosmos-2097	1990-76-A	USSR	28 August	619 38 881	706.9 62.8		<i>Molnya</i> -type spacecraft

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BS-3A (Yuri-3A) 550 kg; solar cells (1.4 kW)	1990-77-A	Japan National Space Development Agency (Tanegashima)	28 August	177 37 905 in geostationary-satellite orbit at 110° E	672 28.8	2273.44 MHz 2.5 W 11.76585 GHz 120 W 11.84256 GHz 120 W 11.91928 GHz 120 W 12.6400 GHz 20 W	Three television channels for direct broadcasting
Cosmos-2098	1990-78-A	USSR	28 August	407 2001	109.2 82.9		
Skynet-4C 3-axis stabilized	1990-79-A	United Kingdom Ministry of Defence (Kourou)	30 August	34 719 35 869 in geostationary-satellite orbit at 53° E	1411.0 4.4	SHF and UHF bands	Military telecommunications
Eutelsat-2 F1 3-axis stabilized; 2 solar panels	1990-79-B	Europe (EUTELSAT) (Kourou)	30 August	6509 35 866 in geostationary-satellite orbit at 13° E	758.5 3.4	14/12 GHz band	Sixteen 50-W transponders with nine channels of 36 MHz and seven of 32 MHz
Cosmos-2099	1990-80-A	USSR	31 August	191 258	88.7 82.3		Decayed on 14 September 1990
Fengyun-1 (2)	1990-81-A	China (Jiuquan)	3 Sept.	879 894	102.7 98.9		
PCR-31	1990-81-B	China (Jiuquan)	3 Sept.	882 896	102.8 98.9		
PCR-32	1990-81-C	China (Jiuquan)	3 Sept.	875 894	102.7 98.9		
Resurs-F9	1990-82-A	USSR	7 Sept.	193 267	88.8 82.6		Study for Earth's natural resources. Equipment from the Fed. Rep. of Germany for biotechnological experiments in microgravitation conditions. Decayed on 21 September 1990
Cosmos-2100	1990-83-A	USSR	14 Sept.	978 1026	104.9 82.9		
Molnya-3 (39) 3-axis stabilized; 1500 kg	1990-84-A	USSR (Plesetsk)	20 Sept.	454 40 782	735 62.7	5.9-6.2 GHz (reception)  3.6-3.9 GHz (emission)	Television and multichannel radiocommunications
Progress-M5	1990-85-A	USSR (Baikonur)	27 Sept.				Expendable supply craft. Docked with <i>Mir-1</i> orbital complex on 29 September 1990. Decayed on 28 November 1990

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Code name Spacecraft description	International number	Country Organization Site of launching	Date	Initial orbital data		Frequencies Transmitter power	Observations
				Perigee (km) Apogee (km)	Period (min) Inclination (degree)		
Meteor-2 (20) cylinder; 2750 kg; 2 solar panels	1990-86-A	USSR (Plesetsk)	28 Sept.	953 975	104.2 82.5		Meteorology. Instruments for obtaining global images of cloud layers and the underlying surface in the visible and infrared bands. Constant observation of the flux of penetrating radiation in near-Earth space
Cosmos-2101	1990-87-A	USSR	1 Oct.	180 321	89.2 64.8		Decayed on 30 November 1990
USA-64	1990-88-A	United States	1 Oct.	165 20 413	356.9 37.6		
PRC-33	1990-89-A	China (Jiuquan)	5 Oct.	199 295	89.3 56.9		Biological research on animals and plants. Decayed on 23 October 1990
STS-41 space shuttle <i>Discovery</i>	1990-90-A	United States NASA (Kennedy Space Center)	6 Oct.	280 303	90.2 28.4		Reusable spacecraft. Deployed the <i>Ulysses</i> solar satellite. Landed at Edwards Air Force Base on 10 October 1990
<i>Ulysses</i>	1990-90-B	Europe ESA launched from 1990-90-A	6 Oct.	heliocentric orbit			To explore the heliosphere over the full range of solar latitudes, especially in the polar regions. Five-year mission
SBS-6	1990-91-A	United States SBS (Kourou)	12 Oct.	7675 36 450	795.5 3.1	14/12 and 6/4 GHz bands	Telecommunications
Galaxy-6	1990-91-B	United States Hughes Communi- cations Inc. (Kourou)	12 Oct.	201 36 419	641.6 6.9	6/4 GHz band	Telecommunications
Cosmos-2102	1990-92-A	USSR	16 Oct.	192 360	89.7 62.8		Decayed on 12 December 1990
Inmarsat-2 F1 3-axis stabilized; 690 kg; 2 solar panels (1200 W)	1990-93-A	International INMARSAT (Cape Canaveral Air Force Base)	30 Oct.	in geostationary-satellite orbit at 64.5° E		6/4 GHz band	Mobile satellite service
Gorizont-21 3-axis stabilized; solar panels	1990-94-A	USSR (Baikonur)	3 Nov.	35 688	1431 1.4	5.7-6.2 GHz (reception) 3.4-3.9 GHz (emission)	Television and multichannel radiocommunications

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USA-65	1990-95-A	United States	13 Nov.				
Cosmos-2103	1990-96-A	USSR	14 Nov.	410 430	92.8 65		
STS-38 space shuttle <i>Atlantis</i>	1990-97-A	United States (Kennedy Space Center)	15 Nov.	215 221	88.6 28.4		Reusable spacecraft. Reconnaissance payload. Landed at Kennedy Space Center on 20 November 1990
USA-67	1990-97-B	United States launched from STS-38	15 Nov.				
Cosmos-2104	1990-98-A	USSR	16 Nov.	247 387	90.6 62.8		Decayed on 4 December 1990
Cosmos-2105	1990-99-A	USSR	20 Nov.	606 39 339	709 63.2		
Satcom-1	1990-100-A	United States (Kourou)	20 Nov.	35 563 35 662	1427.2 0.1		
GSTAR-4	1990-100-B	United States (Kourou)	20 Nov.	35 268 35 722	1421.2 0.0		
Molnya-1 (79) hermetically-sealed cylinder with conical ends; 1000 kg; 6 solar panels	1990-101-A	USSR (Plesetsk)	23 Nov.	654 40 593	735 62.9	800 MHz band 40 W (emission)  1000 MHz band (reception)  3400-4100 MHz (retransmission of television)	Television and multichannel radiocommunications
Gorizont-22 3-axis stabilized; solar panels	1990-102-A	USSR (Baikonur)	23 Nov.	in geostationary-satellite orbit		5.7-6.2 GHz (reception) 3.4-3.9 GHz (emission)	Television and multichannel radiocommunications
USA-66	1990-103-A	United States	26 Nov.	19 935 20 279	714.8 54.8		Navigation
Cosmos-2106	1990-104-A	USSR	28 Nov.	526 550	95.2 82.5		
USA-68	1990-105-A	United States	2 Dec.	729 845	100.6 98.9		

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Code name Spacecraft description	International number	Country Organization Site of launching	Date	Initial orbital data		Frequencies Transmitter power	Observations
				Perigee (km) Apogee (km)	Period (min) Inclination (degree)		
STS-35 space shuttle <i>Columbia</i>	1990-106-A	United States NASA (Kennedy Space Center)	2 Dec.	350 363	91.7 28.5		Reusable spacecraft. Seven crew members. Carried <i>Astro-1</i> astro-physical laboratory. Landed in California on 11 December 1990
Soyuz-TM 11 7 tonnes at launch	1990-107-A	USSR (Baikonur)	2 Dec.				Docked with the <i>Mir-1</i> orbital complex on 4 December 1990
Cosmos-2107	1990-108-A	USSR	4 Dec.	414 442	92.9 65		
Cosmos-2108	1990-109-A	USSR	4 Dec.	196 339	89.6 62.8		
Cosmos-2109 to Cosmos-2111	1990-110-A to 1990-110-C	USSR (Baikonur)	10 Dec.	19 142	676 64.8		Space and navigational research. <i>Proton</i> launcher
Cosmos-2112	1990-111-A	USSR	10 Dec.	774 818	100.7 74.1		
Raduga-26 3-axis stabilized; 5 tonnes; solar panels	1990-112-A	USSR (Baikonur)	20 Dec.	35 937 in geostationary-satellite orbit	1443 1.3	5.7-6.2 GHz (reception)  3.4-3.9 GHz (omission)	Television and multichannel radiocommunications
Cosmos-2113	1990-113-A	USSR	21 Dec.	189 307	89.2 64.8		Placed in orbit by the <i>Soyuz</i> launcher
Cosmos-2114 to Cosmos-2119	1990-114-A to 1990-114-F	USSR (Plesetsk)	22 Dec.	1388 1442	114.1 82.6		Placed in orbit by the <i>Tsikon</i> launcher
Cosmos-2120	1990-115-A	USSR	26 Dec.	231 336	90.2 82.6		Decayed on 17 January 1991
Raduga-1 (2)	1990-116-A	USSR (Baikonur)	27 Dec.	36 535	1474 1.4		National telecommunications

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CNES = Centre national d'études spatiales  
 ESA = European Space Agency  
 EUTELSAT = European Telecommunications Satellite Organization  
 INMARSAT = International Maritime Satellite Organization

INTELSAT = International Telecommunications Satellite Organization  
 NASA = National Aeronautics and Space Administration (United States)  
 SBS = Satellite Business Systems (United States)

*The following satellites have decayed since the preparation of the  
 "Table of artificial satellites launched in 1989" published in May 1990*

satellite	international number	decay
Transit-5A3	1963-22-A	3 August 1990
Cosmos-58	1965-14-A	25 February 1990
Explorer-37	1968-17-A	16 November 1990
Cosmos-236	1968-70-A	4 March 1990
Cosmos-358	1970-64-A	26 June 1990
Meteor-1 (8)	1971-31-A	10 January 1991
Molnya-3 (9)	1978-9-A	24 April 1990
Ariel-6	1979-47-A	23 September 1990
Cosmos-1450	1983-27-A	30 May 1990
Rohini-3	1983-33-A	19 April 1990
Cosmos-1534	1984-7-A	20 September 1990

satellite	international number	decay
Cosmos-1615	1984-127-A	15 April 1990
Cosmos-1631	1985-18-A	8 December 1990
Cosmos-1788	1986-83-A	21 January 1991
Cosmos-1949	1988-45-A	23 April 1990
Cosmos-1960	1988-65-A	9 April 1990
Cosmos-2033	1989-58-A	6 January 1991
Soyuz-TM 8	1989-71-A	19 February 1990
Cosmos-2049	1989-88-A	19 June 1990
Cosmos-2051	1989-92-A	21 January 1991
Progress-M2	1989-99-A	9 February 1990





Orbital position	Space station	Frequency bands GHz																				
		0	1	2	3	4	5	6	7	8	11	12	13	14	15	17	18	19	20	>20	>30	>40
55.00 W A	G INM INMARSAT3 AOR-WEST	1	4	6																		
55.00 W A	USA USASAT-14B	4	6																			
54.50 W A	F ESA MARECS ATL4	1	4	6																		
53.00 W N	USAIT INTELSAT IBS 307E	1	4	6																		
53.00 W N	USAIT INTELSAT5A CONT1	C4	C6																			
53.00 W C	USAIT INTELSAT4 307E	4	5	6																		
53.00 W A	USAIT INTELSAT7 307E	4	5	6																		
52.50 W N	USA USGCS PH3 W ATL	C2					7	8														
50.00 W C	USA USASAT-13C																					
50.00 W C	USAIT INTELSAT IBS 310E	4	6																			
50.00 W N	USAIT INTELSAT5 CONT2	4	6																			
50.00 W C	USAIT INTELSAT5A CONT2	4	6																			
50.00 W C	USAIT INTELSAT6 310E	4	5	6																		
50.00 W A	USAIT INTELSAT7 310E	4	6																			
47.00 W C	USA USASAT-13B																					
47.00 W C	USA USASAT-13J																					
47.00 W A	USA USASAT-23E																					
47.00 W A	USA USASAT-26E																					
46.00 W A	USA ATRDS 46W	2																				
46.00 W A	USA TDRS 46W	2																				
45.00 W C	USA USASAT-13F	2																				
45.00 W A	USA USASAT-13I	C4	C6																			
45.00 W A	USA USASAT-25D	4	6																			
45.00 W A	USA USASAT-26D																					
44.00 W A	F ESA EDRSS-W	2																				
43.50 W C	F VIDEOSAT-3	2																				
43.00 W C	USA USASAT-13G																					
43.00 W A	USA USASAT-25C	4	6																			
43.00 W A	USA USASAT-26C																					
42.50 W A	USA USGCS PH3 MID-ATL	2																				
42.50 W A	USA USGCS PH4 ATL3	2																				
41.00 W A	USA ATRDS 41W	2																				
41.00 W N	USA TDRS EAST	2																				
41.00 W C	USA USASAT-14A	4	6																			
41.00 W A	USA USASAT-25B	4	5																			
41.00 W A	USA USASAT-26B																					
40.50 W C	USAIT INTELSAT IBS 319.5E	4	6																			
40.50 W A	USAIT INTELSAT K 319.5E																					
40.50 W C	USAIT INTELSAT5A 319.5E	4	6																			
40.50 W A	USAIT INTELSAT7 319.5E	4	6																			
39.00 W A	USA USGCS PH4 ATL2	2																				
37.50 W C	F VIDEOSAT-2	2																				
37.50 W C	URS STATIONAR-25	4	5	6																		
37.50 W C	USA USASAT-13A																					
37.50 W A	USA USASAT-25A	4	6																			
37.50 W A	USA USASAT-26A																					
35.00 W A	USA USGCS PH4 ATL1	2																				
34.50 W N	USAIT INTELSAT3 ATL4	4	6																			
34.50 W C	USAIT INTELSAT5A ATL3	4	6																			
34.50 W C	USAIT INTELSAT6 325.5E	4	5	6																		

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Orbital position	Space station	Frequency bands GHz																				
		0	1	2	3	4	5	6	7	8	11	12	13	14	15	17	18	19	20	>20	>30	>40
34.50 W A	USAIT INTELSAT7 325.5E																					
34.00 W C	G INM INMARSAT AOR-CENT 1A	1	4	6																		
34.00 W A	G INM INMARSAT3 AOR-CL-1A	1	4	6																		
33.00 W A	G SKYNET 4D	0																				
32.50 W A	F ESA MARECS ATL3	1	4	6																		
32.00 W A	F ESA EDRSS WC	1	2																			
32.00 W C	G INM INMARSAT AOR-CENT 2A	1	4	6																		
32.00 W A	G INM INMARSAT3 AOR-CL-2A	1	4	6																		
31.00 W A	E HISPASAT-1	2																				
31.00 W N	G BSB-1																					
31.00 W C	IRL EIRESAT-1																					
31.00 W C	USAIT INTELSAT5 ATL6	4	6																			
31.00 W C	USAIT INTELSAT5A ATL6	4	6																			
31.00 W A	USAIT INTELSAT7 329E	4	6																			
27.50 W N	USAIT INTELSAT5A ATL2	4	6																			
27.50 W N	USAIT INTELSAT6 332.5E	C4	C5	C6																		
27.50 W A	USAIT INTELSAT7 332.5E	4	6																			
26.50 W N	URS GALS-1																					
26.50 W C	URS STATIONAR-17	4	5	6																		
26.50 W C	URS STATIONAR-DI	4	6																			
26.50 W C	URS TOR-1																					
26.50 W C	URS VOLNA-13	0	1																			
26.00 W N	F ESA MARECS ATL1	0	1	4	6																	
26.00 W C	G INM INMARSAT AOR-CENT	1	4	6																		
26.00 W A	G INM INMARSAT3 AOR-CL-1	1	4	6																		
25.00 W N	URS GALS-9																					
25.00 W N	URS STATIONAR-8	4	5																			
25.00 W C	URS TOR-9																					
25.00 W C	URS VOLNA-1A	0	1																			
25.00 W C	URS VOLNA-1M	1																				
24.50 W N	USAIT INTELSAT5A ATL1																					
24.50 W N	USAIT INTELSAT6 335.5E	C4	C5	C6																		
24.50 W A	USAIT INTELSAT7 335.5E	4	6																			
24.40 W C	LUX GDL-5																					
24.00 W C	G INM INMARSAT AOR-CENT 2	1	4	6																		
24.00 W N	URS PROGNOZ-1	0	1	2																		
23.00 W N	USA FLTSATCOM ATL	0																				
23.00 W N	USA FLTSATCOM-B EAST ATL																					
21.50 W A	USAIT INTELSAT K 338.5E																					
21.50 W N	USAIT INTELSAT MCS ATL C	1	4	6																		
21.50 W N	USAIT INTELSAT5 ATL5	1	4	6																		
21.50 W C	USAIT INTELSAT5A 338.5E	4	6																			
21.50 W A	USAIT INTELSAT7 338.5E	4	6																			
20.00 W C	LUX GDL-4																					
20.00 W A	USA ACS-4	1																				
19.00 W A	D TV-SAT 2	C2																				
19.00 W N	F TDF-1	C2																				
19.00 W C	F TDF-2	C2																				
19.00 W N	F ESA L-SAT	C2																				
19.00 W A	I SARIT	C2																				

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Orbital position	Space station	Frequency bands GHz																			
		0	1	2	4	5	6	7	8	11	12	13	14	15	17	18	19	20	>20	>30	>40
152.00 E A	AUS AUSSAT A 152E											12	14								
152.00 E A	AUS AUSSAT A 152E PAC											12	14								
152.00 E A	USA MILSTAR-II	0	C2															C20		C*	
154.00 E A	J ETS-6-FS		2	4		6									17			*	*	*	
154.00 E C	J ETS-6-IS		2																*	*	*
154.00 E A	J ETS-6-MSS		2																		
154.00 E C	J ETS-6-T		2																		
154.00 E N	J JCSAT-2										C13	C14									
154.00 E C	TON TONGASAT AP-7			4		6															
155.00 E A	USA USGCCS PH4 W PAC-1		2															20		*	
156.00 E A	AUS AUSSAT B2											12	14								
156.00 E A	AUS AUSSAT B2 MC											12	14								
156.00 E A	AUS AUSSAT B2-MOB	1										12	14								
156.00 E A	AUS AUSSAT B2-NZ											12	14								
156.00 E A	AUS AUSSAT B2-R	1										12	14								
156.00 E A	AUS AUSSAT B2-S											12	14							*	
156.00 E A	AUS AUSSAT PACIFIC-2											12	14								
156.00 E N	AUS AUSSAT 2											12	13	14							
157.00 E C	TON TONGASAT AP-6			4		6															
158.00 E N	J SUPERBIRD-A						7	8				12	14		17	18	19	*			
160.00 E A	AUS ACSAT1						7	8													
160.00 E A	AUS AUSSAT B1											12	14								
160.00 E A	AUS AUSSAT B1 MC											12	14								
160.00 E A	AUS AUSSAT B1-MOB	1										12	14								
160.00 E A	AUS AUSSAT B1-NZ											12	14								
160.00 E A	AUS AUSSAT B1-R	1										12	14								
160.00 E A	AUS AUSSAT B1-S											12	14							*	
160.00 E A	AUS AUSSAT PACIFIC-1											12	14								
160.00 E N	AUS AUSSAT1											12	13	14							
160.00 E N	J GMS-100E	0	1	2																	
160.00 E C	TON TONGASAT C-3			4		6															
162.00 E N	J SUPERBIRD-B						7	8				12	14		17	18	19	*			
164.00 E A	AUS ACSAT-2	0					7	8													
164.00 E N	AUS AUSSAT PACIFIC-3											12	14								
164.00 E N	AUS AUSSAT-3											12	13	14							
164.00 E C	TON TONGASAT C-2			4		6															
166.00 E C	URS GOMS-2	0	1	2			7	8									20	*			
166.00 E C	URS GOMS-2M	0	1	2			7	8									20	*			
166.00 E C	URS PROGNOZ-6			2																	
167.00 E N	URS YSSRD-2									11	12	13	14								
167.45 E A	PNG PACSTAR A-1		C1		5	6															
167.45 E C	PNG PACSTAR-1			4		6						12	14								
170.00 E C	USA USASAT-13M											12	14								
170.75 E C	TON TONGASAT C-1			4		6															
171.00 E A	USA ACS-5	1																			
172.00 E N	USA FLTSATCOM W PAC	0					7	8													
172.00 E N	USA FLTSATCOM-B WEST PAC																				
174.00 E N	USAIT INTELSAT5 PAC1			4		6				11			14								
174.00 E C	USAIT INTELSAT5A PAC1			4		6				11			14								
174.00 E C	USAIT INTELSAT7 174E			4		6				11	12		14								

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Orbital position	Space station	Frequency bands GHz																			
		0	1	2	4	5	6	7	8	11	12	13	14	15	17	18	19	20	>20	>30	>40
175.00 E N	USA USGCCS PH2 W PAC																				
175.00 E N	USA USGCCS PH3 W PAC																				
176.00 E N	USA MARISAT-PAC	0	1		4		6														
176.00 E N	USAIT INTELSAT5 PAC2				4		6														
177.00 E C	USAIT INTELSAT5A PAC2				4		6														
177.00 E C	USAIT INTELSAT7 177E				4		6														
177.50 E C	G INM INMARSAT POR-11				1		4		6												
177.50 E A	USA MILSTAR-14	0		C2																	
178.00 E N	F ESA MARECS PAC1	0	1		4		6														
179.50 E C	G INM INMARSAT3 POR-1				1		4		6												
179.50 E A	G INM INMARSAT3 POR-1				1		4		6												
180.00 E A	USA USGCCS PH2 W PAC-2																				
180.00 E A	USA USGCCS PH3 W PAC-2				2																
180.00 E N	USAIT INTELSAT MCS PAC A	C1		C4		C6															
180.00 E N	USAIT INTELSAT5 PAC3				4		6						11								14
180.00 E C	USAIT INTELSAT5A PAC3				4		6							11							14
180.00 E C	USAIT INTELSAT7 180E				4		6							11	12						14

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