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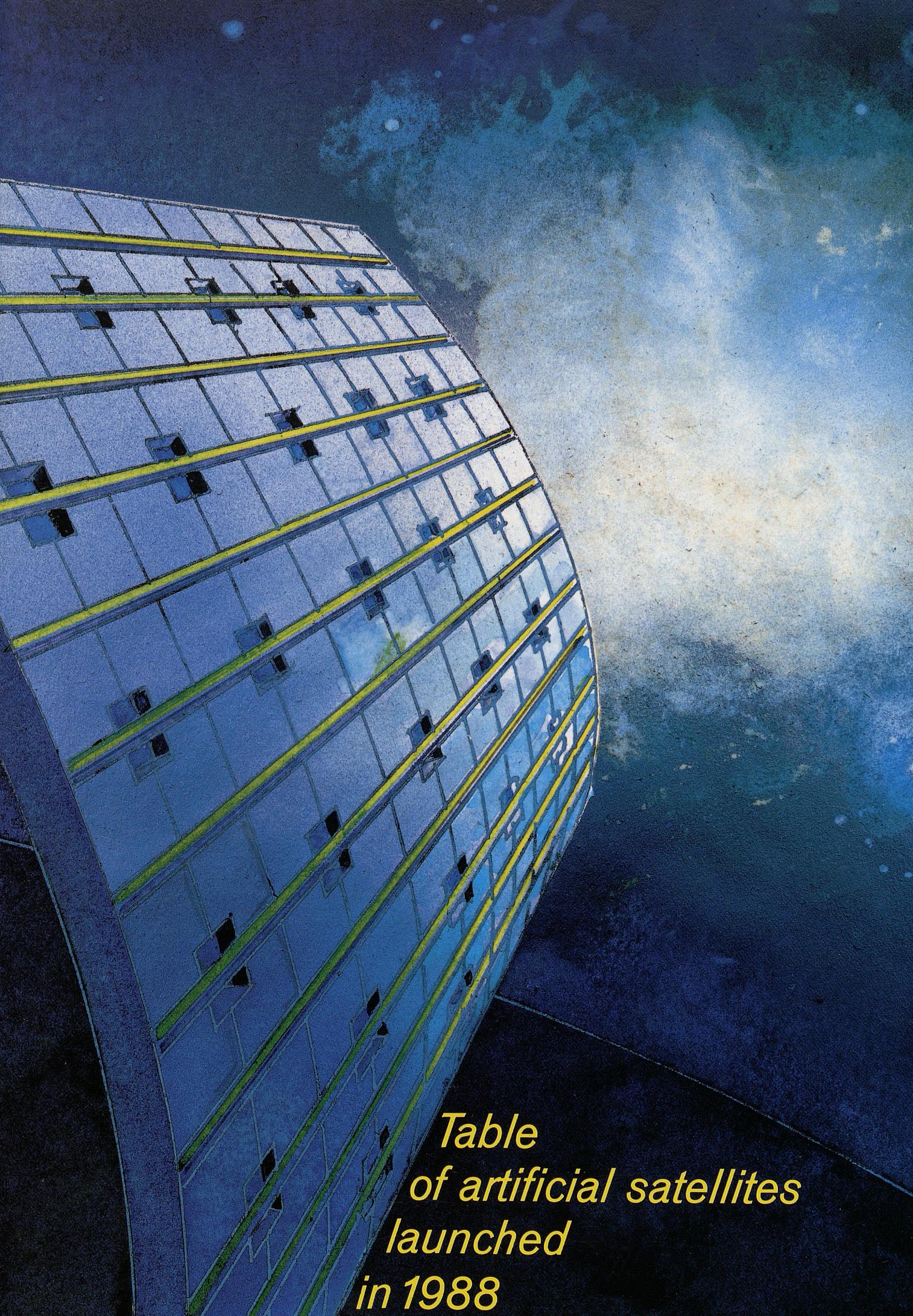
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(ITU) للاتصالات الدولي الاتحاد في والمحفوظات المكتبة قسم أجزاء الضوئي بالمسح تصوير نتاج (PDF) الإلكترونية النسخة هذه والمحفوظات المكتبة قسم في المتوفرة الوثائق ضمن أصلية ورقية وثيقة من نقلأً.

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*Table
of artificial satellites
launched
in 1988*

EuroStar

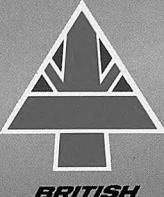
Class

INMARSAT-2, TELECOM-2 and ORION:
satellite programs using the British
Aerospace-Matra EUROSTAR bus, also
proposed for HISPASAT and
BRAZILSAT-2. With modular design
and state-of-the-art technology,
EUROSTAR is a versatile bus
more able to meet
customer
specifications at
lower launch mass
than any other
spacecraft in its class – an
advantage which provides
longer in-orbit life or lower
launch costs.

**BRITISH
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**BRITISH
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MATRA

This list includes all artificial satellites launched in 1988. It was prepared from information provided by telecommunication administrations of ITU Member countries, the Committee on Space Research (COSPAR), national space research organizations, the International Frequency Registration Board (IFRB) of the ITU, and from details published in the specialized press. The data concerning the orbit parameters are the initial orbital data. Fragments or stages of rockets left over from launching operations and placed in orbit with the various spacecraft have not been included.

CS-3A (Satsop-3A)	1988-12-A	Japan	10	17 Dec	108	3155	30° S	60° E	12.8-19.5 GHz band	Communication missions on 4 March 1988
Cosmos-101	1988-11-V	D22KUSDA	10	19 Dec	312	3155	60° S	28.2		
Cosmos-102	1988-12-V	Japan	10	20 Dec	398	3155	30° S	60° E		
Cosmos-103	1988-13-V	Japan	10	21 Dec	183	3155	30° S	60° E		
Astra-1	1988-109-B									
A		Cosmos-1944			1988-41-A					
		Cosmos-1945			1988-42-A					
Buran	1988-100-A	Cosmos-1946			1988-43-A	ECS-5			1988-63-B	O
B		Cosmos-1947			1988-43-B	Ekran-18			1988-36-A	1988-56-A
		Cosmos-1948			1988-43-C	Ekran-19			1988-108-A	1988-51-B
		Cosmos-1949			1988-45-A	Eutelsat-1 F5			1988-63-B	1988-33-A
CS-3A	1988-12-A	Cosmos-1950			1988-46-A					1988-74-A
CS-3B	1988-86-A	Cosmos-1951			1988-47-A					1988-74-B
China-23	1988-67-A	Cosmos-1952			1988-49-A	Fengyun-1			Okean-1	1988-33-B
Cosmos-1908	1988-1-A	Cosmos-1953			1988-50-A	Fobos-1			Oscar-13	
Cosmos-1909	1988-2-A	Cosmos-1954			1988-53-A	Fobos-2			Oscar-23	
Cosmos-1910	1988-2-B	Cosmos-1955			1988-54-A	Foton-1			Oscar-25	
Cosmos-1911	1988-2-C	Cosmos-1956			1988-55-A				Oscar-31	
Cosmos-1912	1988-2-D	Cosmos-1957			1988-57-A				Oscar-32	
Cosmos-1913	1988-2-E	Cosmos-1958			1988-60-A	GDL-6				
Cosmos-1914	1988-2-F	Cosmos-1959			1988-62-A	GSTAR-3			P	
Cosmos-1915	1988-4-A	Cosmos-1960			1988-65-A	Gorizont-15			PAS-1	1988-51-C
Cosmos-1916	1988-7-A	Cosmos-1961			1988-66-A	Gorizont-16			PRC-22	1988-14-A
Cosmos-1917	1988-9-A	Cosmos-1962			1988-68-A				PRC-25	1988-111-A
Cosmos-1918	1988-9-B	Cosmos-1963			1988-70-A	Horizon-1			Progress-34	1988-3-A
Cosmos-1919	1988-9-C	Cosmos-1964			1988-72-A				Progress-35	1988-24-A
Cosmos-1920	1988-10-A	Cosmos-1965			1988-73-A	I			Progress-36	1988-38-A
Cosmos-1921	1988-11-A	Cosmos-1966			1988-76-A	IRS-1A			Progress-37	1988-61-A
Cosmos-1922	1988-13-A	Cosmos-1967			1988-79-A	Insat-1C			Progress-38	1988-83-A
Cosmos-1923	1988-15-A	Cosmos-1968			1988-82-A	Intelsat-5A F13			Progress-39	1988-114-A
Cosmos-1924	1988-16-A	Cosmos-1969			1988-84-A				R	1988-95-A
Cosmos-1925	1988-16-B	Cosmos-1970			1988-85-A				S	
Cosmos-1926	1988-16-C	Cosmos-1971			1988-85-B	L			SBS-5	1988-81-B
Cosmos-1927	1988-16-D	Cosmos-1972			1988-85-C	Horizon-1			STS-26	1988-91-A
Cosmos-1928	1988-16-E	Cosmos-1973			1988-88-A	I			STS-27	1988-106-A
Cosmos-1929	1988-16-F	Cosmos-1974			1988-92-A	IRS-1A			Sakura-3A	1988-12-A
Cosmos-1930	1988-16-G	Cosmos-1975			1988-93-A	Insat-1C			Sakura-3B	1988-86-A
Cosmos-1931	1988-16-H	Cosmos-1976			1988-94-A	Intelsat-5A F13			San Marco-D	1988-26-A
Cosmos-1932	1988-19-A	Cosmos-1977			1988-96-A				Skynet-4B	1988-109-A
Cosmos-1933	1988-20-A	Cosmos-1978			1988-97-A	Lacrosse			Soyuz-TM 5	1988-48-A
Cosmos-1934	1988-23-A	Cosmos-1979			1988-101-A	Meteosat-P2			Soyuz-TM 6	1988-75-A
Cosmos-1935	1988-25-A	Cosmos-1980			1988-102-A	Molnya-1 (71)			Soyuz-TM 7	1988-104-A
Cosmos-1936	1988-27-A	Cosmos-1981			1988-103-A	Molnya-1 (72)			Spacenet-3R	1988-18-A
Cosmos-1937	1988-29-A	Cosmos-1982			1988-105-A	Molnya-1 (73)			T	
Cosmos-1938	1988-30-A	Cosmos-1983			1988-107-A	Molnya-1 (74)			TDF-1	1988-98-A
Cosmos-1939	1988-32-A	Cosmos-1984			1988-110-A	Molnya-3 (32)			TDRS-C	1988-91-B
Cosmos-1940	1988-34-A	Cosmos-1985			1988-113-A	Molnya-3 (33)			Télécom-1C	1988-18-B
Cosmos-1941	1988-35-A	Cosmos-1986			1988-116-A	Molnya-3 (34)			U	
Cosmos-1942	1988-37-A								USA-29	1988-6-A
Cosmos-1943	1988-39-A	Discovery							USA-30	1988-8-A
					1988-91-A	NOAA-11			USA-31	1988-77-A
						Nova-2			USA-32	1988-78-A
									USA-33	1988-99-A
									USA-34	1988-106-B

Code name Spacecraft description	International number	Country Organization Site of launching	Date	Initial orbital data			Frequencies Transmitter power	Observations
				Perigee (km)	Apogee (km)	Inclination (degree)		
Cosmos-1908	1988-1-A	USSR	6 Jan.	650 678	97.7 82.5			
Cosmos-1909 to Cosmos-1914	1988-2-A to 1988-2-F	USSR (Plesetsk)	15 Jan.	1386 1433	113.8 82.6			
Progress-34 <i>modified Soyuz without the descent section; 7 tonnes at launch; diameter: 2.3 m; length: 7.9 m</i>	1988-3-A	USSR	20 Jan.	191 277	88.8 51.6			Expendable supply craft. Docked with <i>Mir-1</i> on 22 January 1988. After undocking, it disintegrated on re-entry on 4 March 1988
Cosmos-1915	1988-4-A	USSR	26 Jan.	207 402	90.3 72.9			Recovered on 9 February 1988
Meteor-2 (17) <i>cylinder; 2750 kg; 2 solar panels</i>	1988-5-A	USSR (Plesetsk)	30 Jan.	947 973	104.1 82.5			Meteorology
USA-29	1988-6-A	United States Department of Defense	3 Feb.	824 832	101.5 98.8			
Cosmos-1916	1988-7-A	USSR	3 Feb.	179 384	89.9 64.9			Recovered on 29 February 1988
USA-30	1988-8-A	United States Department of Defense	8 Feb.	223 333	90.1 28.6			Decayed on 1 March 1988
Cosmos-1917 to Cosmos-1919	1988-9-A to 1988-9-C	USSR	18 Feb.					Satellites designed to test the elements and equipment of a space navigation system. The separation unit containing the satellites failed to reach the required orbit, entered dense layers of the atmosphere, and ceased existence on 19 February 1988
Cosmos-1920	1988-10-A	USSR	18 Feb.	193 268	88.8 82.6			Exploration of Earth's natural resources. Recovered on 9 March 1988
Cosmos-1921	1988-11-A	USSR	19 Feb.	215 408	90.4 70.2			Recovered on 4 March 1988

CS-3A (Sakura-3A) 550 kg	1988-12-A 1988-12-Y	Japan NSDA (Tanegashima)	19 Feb. 14 April	36 755 in geostationary-satellite orbit at 132°E	650 28.3	17.8-19.5 GHz band (emission)	Communications April 1988 Used instruments to obtain semiconductor recordings and measured properties and extra mass biologically
Cosmos-1922	1988-13-A 1988-13-Y	USSR	26 Feb.	612 39 344	709 62.8	(emission)	Recovered on 21-23 March 1988 Telecommunications
PRC-22	1988-14-A 1988-14-Y	China (Jiuquan)	7 March	35 716 36 613	1455.5 0.6	(emission)	Telecommunications Recovered on 18-19 March 1988 Used instruments to obtain semiconductor recordings and measured properties and extra mass biologically
Cosmos-1923	1988-15-A 1988-15-Y	USSR	10 March	205 332	89.5 72.8	(emission)	Recovered on 22 March 1988 Telecommunications
Cosmos-1924 to Cosmos-1931	1988-16-A 1988-16-H 1988-16-Y	USSR (Plesetsk)	11 March	1445 1508	115 74	(emission)	Recovered on 8 April 1988 Telecommunications
Molnya-1 (71) hermetically sealed cylinder with conical ends; 1000 kg; 6 solar panels	1988-17-A 1988-17-Y	USSR (Plesetsk)	11 March	491 38 967	699 62.5	800 MHz band 40 W (emission) 1000 MHz band (reception) 3400-4100 MHz (retransmission of television)	Television and multichannel radiocommunications Recovered on 16 April 1988 Used instruments to obtain semiconductor recordings and measured properties and extra mass biologically
Spacenet-3R 3-axis stabilized; 1195 kg at launch; 705 kg in orbit	1988-18-A 1988-18-Y	United States GTE (Kourou)	11 March 13 May	35 548 35 775	1429.7 0.1	6/4 and 14/12 GHz bands (emission) 1000 MHz band (reception) 14/12, 6/4, 8/7 and 4/2 GHz bands 800 MHz band	Commercial communications Recovered on 16 May 1988 Expendable supply craft. Docked with Mir orbital complex on 15 May 1988 and delivered supplies. After undocking, it re-entered Earth's atmosphere and landed on 5 June 1988
Télécom-1C 3-axis stabilized; 718 kg; 2 solar panels	1988-18-B 1988-18-Y	France FRANCE TELECOM (Kourou)	11 March	35 083 35 799	1418.4 0.4	(emission)	Telecommunications
Cosmos-1932	1988-19-A 1988-19-Y	USSR	14 March	256 279	89.7 65	(emission)	Communications
Cosmos-1933	1988-20-A 1988-20-Y	USSR	15 March	650 675	97.7 82.5	(emission)	Communications

Code name Spacecraft description	International number	Country Organization Site of launching	Date	Initial orbital data			Frequencies Transmitter power	Observations
				Perigee (km)	Apogee (km)	Inclination (degree)		
IRS-1A	1988-21-A	India	17 March	863 917		102.7 99.01		Remote sensing
Molnya-1 (72) hermetically sealed cylinder with conical ends; 1000 kg; 6 solar panels	1988-22-A	USSR (Plesetsk)	17 March	655 40 584		735 62.9	800 MHz band 40 W (emission) 1000 MHz band (reception) 3400-4100 MHz (retransmission of television)	Television and multichannel radiocommunications
Cosmos-1934	1988-23-A	USSR	22 March	967 1021		104.7 83		
Progress-35 modified Soyuz spacecraft without the descent section; 7 tonnes at launch; diameter: 2.3 m; length: 7.9 m	1988-24-A	USSR (Baikonur)	23 March	190 281		88.9 51.6		Expendable supply craft. Docked with the <i>Mir</i> orbital complex and delivered supplies. After undocking, it disintegrated on re-entry on 5 May 1988
Cosmos-1935	1988-25-A	USSR	24 March	179 356		89.5 67		Recovered on 8 April 1988
San Marco-D	1988-26-A	Italy (San Marco launch platform in Indian Ocean)	25 March	263 615		93.4 3.0		Carries experiments to measure drag forces on the satellite in orbit and for research on the upper atmosphere
Cosmos-1936	1988-27-A	USSR	30 March	189 290		89 64.8		Recovered on 18 May 1988
Gorizont-15 3-axis stabilized; solar panels	1988-28-A	USSR (Baikonur)	31 March	36 560 in geostationary-satellite orbit	1476 1.3		5.7-6.2 GHz (reception) 3.4-3.9 GHz (emission)	Television and multichannel radiocommunications
Cosmos-1937	1988-29-A	USSR	5 April	774 813		100.6 74		Recovered on 4 June 1988 Communications

Cosmos-1938	1988-30-A	USSR	11 April	209 316	89.4 72.8		Recovered on 25 April 1988
Foton-1	1988-31-A	USSR	14 April	225 397	90.5 62.8		Carries instruments to obtain semiconductor materials with improved properties and extra pure biologically active preparation under microgravitation
Cosmos-1939	1988-32-A	USSR	20 April	620 678	97.6 98		Flight to test materials composition and physical properties of biological material under microgravity conditions
Oscar-23	1988-33-A	United States (Western Test Range)	26 April	1017 1302	108.6 90.4		Part of navigation transit system for orientation of submarines
Oscar-32	1988-33-B	United States (Western Test Range)	26 April	1018 1316	108.7 90.4		Part of navigation transit system for orientation of submarines
Cosmos-1940	1988-34-A	USSR	26 April	35 849	1441 1.2		Recovered on 31 August 1988
					in geostationary-satellite orbit		
Cosmos-1941	1988-35-A	USSR	27 April	217 293	89.3 70.3		Recovered on 11 May 1988
Ekran-18	1988-36-A	USSR (Baikonur)	6 May	35 620	1427 0.4	5.7-6.2 GHz (reception) 3.4-3.9 GHz (emission)	Television relay
3-axis stabilized; 5 tonnes; solar cells					in geostationary-satellite orbit		
Cosmos-1942	1988-37-A	USSR	12 May	178 385	89.8 67		Recovered on 4 July 1988
Progress-36	1988-38-A	USSR (Baikonur)	13 May	193 262	88.6 51.6		Expendable supply craft. Docked with <i>Mir</i> orbital complex on 15 May 1988 and delivered supplies. After undocking, it re-entered Earth's atmosphere and disintegrated on 5 June 1988
modified <i>Soyuz</i> spacecraft without the descent section; 7 tonnes at launch; diameter: 2.3 m; length: 7.9 m							
Cosmos-1943	1988-39-A	USSR	15 May	851 876	101.2 71.2		
Intelsat-5A F13	1988-40-A	International INTELSAT (Kourou)	17 May	33 364 35 734	1373.3 0.9	6/4 and 14/11 GHz bands (communications)	Commercial telecommunications
3-axis stabilized; height: 6.6 m; 2 solar arrays					in geostationary-satellite orbit at 307°E		

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-1944	1988-41-A	USSR	18 May	205 311	89.4 64.8			Recovered on 23 June 1988
Cosmos-1945	1988-42-A	USSR	19 May	217 391	90.3 70.4			Recovered on 31 May 1988
Cosmos-1946	1988-43-A	USSR	21 May	19 137	675 64.2			Testing elements and equipment of a space navigation system to determine the location of aircraft and ships
Cosmos-1947	1988-43-B	USSR	21 May	19 137	675 64.2			Testing elements and equipment of a space navigation system to determine the location of aircraft and ships
Cosmos-1948	1988-43-C	USSR	21 May	19 137	675 64.2			Testing elements and equipment of a space navigation system to determine the location of aircraft and ships
Molyna-3 (32) 3-axis stabilized; 1500 kg	1988-44-A	USSR (Plesetsk)	26 May	636 40 716	737 62.5	5.9-6.2 GHz (reception) 3.6-3.9 GHz (emission)		Television and multichannel radiocommunications
Cosmos-1949	1988-45-A	USSR	28 May	412 431	93 65			
Cosmos-1950	1988-46-A	USSR	30 May	1503 1534	116 73.6			
Cosmos-1951	1988-47-A	USSR	31 May	187 272	88.8 82.3			Earth resources studies. Recovered on 14 June 1988
Soyuz-TM 5	1988-48-A	USSR (Baikonur)	7 June					Crew: A. Solovev, V. Savinikh, A. Aleksandrov. Forty-six projects involving astrophysics experiments, remote probing of the Earth's surface and studies in space biology and medicine. Docked with the <i>Mir</i> orbital complex on 9 June 1988. Undocked from Mir on 5 September with cosmonauts Lyakhov and Mohmand on board. Landed in USSR on 7 September 1988
Cosmos-1952	1988-49-A	USSR	11 June	215 300.2	89.4 70			Recovered on 25 June 1988
Cosmos-1953	1988-50-A	USSR	14 June	647 680	97.8 82.5			

Meteosat-P2	1988-51-A	Europe ESA (Kourou)	15 June	35 796 35 889	1439.0 0.5		Meteorology	2 October 1988
Oscar-13	1988-51-B	United States (Kourou)	15 June	242 36 094	637.9 10.0		Navigation and military and civil telecommunications	
PAS-1	1988-51-C	United States PanAmSat (Kourou)	15 June	35 612 36 162	1441.3 0.1	14/11 GHz band	Commercial telecommunications	
				in geostationary-satellite orbit				
Nova-2	1988-52-A	United States	16 June	773 1105	103.8 90.1			
Cosmos-1954	1988-53-A	USSR	21 June	783 819	100.8 74			
Cosmos-1955	1988-54-A	USSR	22 June	181 382	89.8 64.8		Decayed on 20 August 1988	
Cosmos-1956	1988-55-A	USSR	23 June	196 265	88.8 82.3		Recovered on 7 July 1988	
Okean-1	1988-56-A	USSR	5 July	651 680	97.8 82.5		Optical scanning and radio-physical equipment to obtain oceanographic information and data on ice conditions	
Cosmos-1957	1988-57-A	USSR	7 July	194 256	88.7 82.6		Recovered on 21 July 1988	
Fobos-1	1988-58-A	USSR	7 July	trans-Mars trajectory heliocentric orbit			First of two spacecraft to probe Mars and its moon Phobos, the Sun and interplanetary space. The on-board equipment has been developed in 13 countries and by the European Space Agency. Main tasks are to chart martian surface temperature, study daily and seasonal dynamics of its thermal regime, measure thermal inertia of martian soil, seek areas of heat emission and permafrost zones and investigate the mineral composition of the martian surface	
Fobos-2	1988-59-A	USSR	12 July	trans-Mars trajectory heliocentric orbit			Second of two spacecraft to probe Mars and its moon, the Sun and interplanetary space	
Cosmos-1958	1988-60-A	USSR	14 July	375 417	92.4 65.8			

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)		
Progress-37 modified Soyuz spacecraft without the descent section; 7 tonnes at launch; diameter: 2.3 m; length: 7.9 m	1988-61-A	USSR (Baikonur)	18 July	194 273	88.8 51.6			Expendable supply craft. Docked with Mir orbital complex on 20 July 1988 and delivered fuel and supplies for the crew. After undocking, it disintegrated on re-entry on 12 August 1988
Cosmos-1959	1988-62-A	USSR	18 July	975 1019	104.8 83			
Insat-1C	1988-63-A	India (Kourou)	21 July	35 959 35 989	1445.7 0.2	in geostationary-satellite orbit at 93.50° E	6/4 GHz band	National telecommunications
Eutelsat-1 F5 (ECS-5) 3-axis stabilized; 700 kg; 2 solar panels (1000 W)	1988-63-B	Europe EUTELSAT (Kourou)	21 July	35 418 35 883	1429.1 0.1	in geostationary-satellite orbit at 13° E	14/11-12 GHz band	European telecommunications
Meteor-3 (2)	1988-64-A	USSR	26 July	1198 1221	109.4 82.5			Meteorology and geophysical exploration
Cosmos-1960	1988-65-A	USSR	28 July	475 518	94.5 65.9			
Cosmos-1961	1988-66-A	USSR	1 August	36 312	1463 1.4	SHF band		Experimental telecommunications
China-23	1988-67-A	China (Jiuquan)	5 August	204 296	63.0			Reusable satellite carrying experimental devices from the Federal Republic of Germany. The capsule landed by parachute in China on 13 August 1988
Cosmos-1962	1988-68-A	USSR	8 August	215 297	89.4 70			Recovered on 22 August 1988
Molnya-1 (73) hermetically sealed cylinder with conical ends; 1000 kg; 6 solar panels	1988-69-A	USSR (Plesetsk)	12 August	617 40 754	738 62.9	800 MHz band 40 W (emission) 1000 MHz band (reception) 3400-4100 MHz (retransmission of television)		Television and multichannel radiocommunications

Cosmos-1963 Cosmos-1963	1988-70-A 1988-70-V	USSR Russia Test	16 August 1988-08-16	181 376	89.8 64.8		Recovered on 2 October 1988 RECOVERED ON 02 OCTOBER 1988
Gorizont-16 3-axis stabilized; solar panels	1988-71-A 1988-71-V	USSR (Baikonur)	18 August 1988-08-18	35 772 13 261	1435 1.3	5.7-6.2 GHz (reception) 3.4-3.9 GHz (emission)	Television and multichannel radiocommunications TELEVISION AND MULTICHANNEL RADIocommunications
Cosmos-1964 Cosmos-1964	1988-72-A 1988-72-V	USSR Russia	23 August 1988-08-23	216 297	89.4 70		Recovered on 9 September 1988 RECOVERED ON 09 SEPTEMBER 1988
Cosmos-1965 Cosmos-1965	1988-73-A 1988-73-V	USSR Russia	23 August 1988-08-23	195 265	88.7 82.3		Earth resources exploration. Recovered on 22 September 1988 EARTH RESOURCES EXPLORATION. RECOVERED ON 22 SEPTEMBER 1988
Oscar-25 Oscar-25	1988-74-A 1988-74-B	United States USA	25 August 1988-08-25	1032 1176	107.4 90.0		Part of navigation transit system for orientation of submarines PART OF NAVIGATION TRANSIT SYSTEM FOR ORIENTATION OF SUBMARINES
Oscar-31 Oscar-31	1988-74-B 1988-74-V	United States USA	25 August 1988-08-25	1032 1178	107.4 90.0		Part of navigation transit system for orientation of submarines PART OF NAVIGATION TRANSIT SYSTEM FOR ORIENTATION OF SUBMARINES
Soyuz-TM 6 7 tonnes at launch	1988-75-A 1988-75-V	USSR (Baikonur)	29 August 1988-08-29	333 138	84 88.3		Crew: V. Lyakhov, V. Polyakov and A. A. Mohmand (Afghanistan). Docked with the <i>Mir</i> orbital complex on 31 August 1988. Undocked on 21 December. The descent module landed the same day 180 km south-east of Dzhezkazgan
Cosmos-1966 Cosmos-1966	1988-76-A 1988-76-V	USSR Russia	30 August 1988-08-30	617 39 299	708 62.6		RECOVERY OF RE-ENTRY IN DOKKUM, NETHERLANDS ON 30 AUGUST 1988
USA-31 USA-31	1988-77-A 1988-77-V	United States Department of Defense (Western Test Range)	2 Sept. 1988-09-02	393 103	82.2		EXHIBITION OF BURNED-OUT RE-ENTRY
USA-32 USA-32	1988-78-A 1988-78-V	United States Department of Defense (Western Test Range)	5 Sept. 1988-09-05	10 800 12 380	0.7 13.3		EXHIBITION OF BURNED-OUT RE-ENTRY
Cosmos-1967 Cosmos-1967	1988-79-A 1988-79-V	USSR Russia	6 Sept. 1988-09-06	206 409	90.3 72.9		Recovered on 15 September 1988 RECOVERED ON 15 SEPTEMBER 1988
Fengyun-1 Fengyun-1	1988-80-A 1988-80-V	China	6 Sept. 1988-09-06	881 904	102.8 99.1		Two very high resolution scanning radiometers with five detecting channels for day and night monitoring

Code name Spacecraft description	International number	Country Organization Site of launching	Date	Initial orbital data			Frequencies Transmitter power	Observations
				Perigee (km)	Apogee (km)	Inclination (degree)		
GSTAR-3	1988-81-A	United States GTE Spacenet (Kourou)	8 Sept.	16 587 36 161	983.1 1.5		14/12 GHz band	Commercial telecommunications
SBS-5 550 kg	1988-81-B	United States (Kourou)	8 Sept.	35 289 35 786	1423.4 0.1	in geostationary-satellite orbit	14/12 GHz band	Telecommunications
Cosmos-1968	1988-82-A	USSR	9 Sept.	192 262	88.7 82.3			Exploration of Earth resources. Recovered on 23 September 1988
Progress-28 modified Soyuz spacecraft without the descent section; 7 tonnes at launch; diameter: 2.3 m; length: 7.9 m	1988-83-A	USSR (Baikonur)	9 Sept.	193 267	88.8 51.6			Expendable supply craft. Docked with the <i>Mir</i> orbital complex on 12 September 1988. After undocking, it disintegrated on re-entry on 23 November 1988
Cosmos-1969	1988-84-A	USSR	15 Sept.	178 373	89.7 67			
Cosmos-1970	1988-85-A	USSR	16 Sept.	19 102	674 64.8			Instruments to develop components for a space navigation system for aircraft and ships
Cosmos-1971	1988-85-B	USSR	16 Sept.	19 102	674 64.8			Instruments to develop components for a space navigation system for aircraft and ships
Cosmos-1972	1988-85-C	USSR	16 Sept.	19 102	674 64.8			Instruments to develop components for a space navigation system for aircraft and ships
CS-3B (Sakura-3B) 550 kg	1988-86-A	Japan NSDA (Tanegashima)	16 Sept.	199 37 405	663 28.3	in geostationary-satellite orbit at 136° E	17.8-19.2 GHz band 10 W 3820 and 4080 MHz 7 W	Communications
Horizon-1	1988-87-A	Israel	19 Sept.	250 1150	98.8 142.9			
Cosmos-1973	1988-88-A	USSR	22 Sept.	206 395	90.2 72.9			Recovered on 10 October 1988 Recovered on 5 October 1988

NOAA-11	1988-89-A	United States NOAA (Western Test Range)	24 Sept. in Dec.	849 865	102.1 98.8	(reception) 2.4-2.6 GHz 1.4-1.6 GHz 0.8-1.0 GHz 0.4-0.6 GHz	Meteorology
Molnya-3 (33) 3-axis stabilized; 1500 kg	1988-90-A	USSR (Plesetsk)	29 Sept. in Dec.	646 38 937	702.8 62.9	5.9-6.2 GHz (reception) 3.6-3.9 GHz (emission)	Television and multichannel radiocommunications
STS-26 (Discovery)	1988-91-A	United States NASA (Eastern Test Range)	29 Sept. in Dec.	306 336	91 28.5		Space transportation System-26. Reusable spacecraft. Crew: F. Hauck, R. Covey, D. Hilmers, J. Lounge and G. Nelson. Returned Earth on 3 October 1988
TDRS-C	1988-91-B	United States launched from STS-26	29 Sept. in Dec.	35 719 35 803	1434.8 0.1		Tracking and data relay satellite. Deployed from the orbiting STS-26
Cosmos-1974	1988-92-A	USSR	3 Oct.	613 39 342	709 62.8		
Cosmos-1975	1988-93-A	USSR (Plesetsk)	11 Oct.	649 679	97.8 82.5		Recovered on 14 December 1988
Cosmos-1976	1988-94-A	USSR (Plesetsk)	13 Oct.	206 396	90.2 72.9		
Raduga-22 3-axis stabilized; 5 tonnes; solar panels	1988-95-A	USSR (Baikonur)	20 Oct. in Dec.	36 522	1473 1.5 in geostationary-satellite orbit	5.7-6.2 GHz (reception) 3.4-3.9 GHz (emission)	Television and multichannel radiocommunications
Cosmos-1977	1988-96-A	USSR	25 Oct.	613 39 432	709 62.8		
Cosmos-1978	1988-97-A	USSR	27 Oct.	206 394	90.2 72.9		Recovered on 10 November 1988
TDF-1 1272.7 kg	1988-98-A	France CNES (Kourou)	28 Oct. in Dec.	35 562 35 983	1435.1 0.1 in geostationary-satellite orbit at 19°W	11.72; 11.80; 11.88; 11.95; 12.03 GHz 230 W	Direct broadcasting satellite
USA-33	1988-99-A	United States Department of Defense	6 Nov.				

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)			
Buran	1988-100-A	USSR	15 Nov.					Reusable orbital spacecraft. After two orbits, it re-entered the atmosphere and landed successfully the same day as launched
Cosmos-1979	1988-101-A	USSR	18 Nov.	408 432	92.8 65			Following as in previous entry
Cosmos-1980	1988-102-A	USSR	23 Nov.	852 880	101.9 71			
Cosmos-1981	1988-103-A	USSR	24 Nov.	245 364	90.4 62.8			Recovered on 8 December 1988
Soyuz-TM 7 7 tonnes at launch	1988-104-A	USSR (Baikonur)	26 Nov.					Crew: A. Volkov, S. Krikalev and J.-L. Chrétien (France). Docked with <i>Mir-I/Soyuz-6</i> orbital complex on 28 November 1988
Cosmos-1982	1988-105-A	USSR	30 Nov.	215 403	90.4 70			Recovered on 14 December 1988
STS-27 space shuttle <i>Atlantis</i>	1988-106-A	United States Department of Defense (Eastern Test Range)	2 Dec.		57	S band UHF		Reusable spacecraft. Landed at Edwards Air Force Base on 6 December 1988
USA-34 (Lacrosse) span: 45 m; solar arrays	1988-106-B	United States Department of Defense launched from STS-27	2 Dec.					Imaging radar satellite
Cosmos-1983	1988-107-A	USSR	8 Dec.	197 251	89 62.8			Recovered on 22 December 1988
Ekran-19 3-axis stabilized; 5 tonnes; solar cells	1988-108-A	USSR (Baikonur)	10 Dec.	35 455	1419 1.4 in geostationary-satellite orbit	5.7-6.2 GHz (reception) 3.4-3.9 GHz (emission)		Television relay

LIST OF GEOSTATIONARY SPACE STATIONS
BY ORBITAL POSITIONS

Skynet-4B	1988-109-A	United Kingdom Ministry of Defence (Kourou)	11 Dec.	34 424 35 860	1403.3 3.1				Military telecommunication satellite
Astra-1 (GDL-6) 3-axis stabilized; 1820 kg at launch; 1045 kg in orbit	1988-109-B	Luxembourg SES (Kourou)	11 Dec.	35 518 35 573	1428.8 0.2	in geostationary-satellite orbit at 19.2° E	14.25-14.50 GHz (uplink) 11.20-11.45 GHz (downlink)		Sixteen television broadcasting channels of 45 W each plus six spares; alternate channels are horizontally and vertically polarized. Intended for direct reception although using FSS frequencies
Cosmos-1984	1988-110-A	USSR	16 Dec.	195 345	89.6 62.8				
PRC-25	1988-111-A	China (Jiuquan)	22 Dec.	35 785 36 365	1450.8 0.6				Telecommunications
Molnya-3 (34) 3-axis stabilized; 1500 kg	1988-112-A	USSR (Plesetsk)	22 Dec.	437 39 832	716 62.8		5.9-6.2 GHz (reception) 3.6-3.9 GHz (emission)		Television and multichannel radiocommunications
Cosmos-1985	1988-113-A	USSR	23 Dec.	529 549	95.2 73.6				
Progress-39 modified <i>Soyuz</i> spacecraft without the descent section; 7 tonnes at launch; diameter: 2.3 m; length: 7.9 m	1988-114-A	USSR (Baikonur)	25 Dec.	193 255	88.7 51.6				Expendable supply craft. Docked with <i>Mir-1</i>
Molnya-1 (74) hermetically sealed cylinder with conical ends; 1000 kg; 6 solar panels	1988-115-A	USSR (Plesetsk)	28 Dec.	623 38 874	700.5 62.8		800 MHz band 40 W (emission) 1000 MHz band (reception) 3400-4100 MHz (retransmission of television)		Television and multichannel radiocommunications
Cosmos-1986	1988-116-A	USSR	29 Dec.	204 316	89.4 64.8				

CNES = Centre national d'études spatiales

ESA = European Space Agency

EUTELSAT = European Telecommunications Satellite Organization

INTELSAT = International Telecommunications Satellite Organization

NASA = National Aeronautics and Space Administration (United States)

NOAA = National Oceanic and Atmospheric Administration (United States)

NSDA = National Space Development Agency (Japan)

PanAmSat = Pan-American Satellite Corporation

SES = Société européenne des satellites

The following satellites have decayed since the preparation of the "Table of artificial satellites launched in 1987" published in May 1988

satellite	international number	decay
Cosmos-118	1966-38-A	23 November 1988
Intelsat-3 F5	1969-64-A	14 October 1988
Molnya-2 (11)	1974-102-A	7 July 1988
Molnya-3 (2)	1975-29-A	29 November 1988
Astro-B	1983-11-A	17 December 1988
Ohzora	1984-15-A	20 April 1988
Cosmos-1567	1984-53-A	3 April 1988
Cosmos-1588	1984-83-A	17 February 1988
Cosmos-1646	1985-30-A	12 May 1988
Cosmos-1682	1985-82-A	17 May 1988
Cosmos-1686	1985-89-A	2 July 1988

satellite	international number	decay
Cosmos-1735	1986-21-A	17 November 1988
Cosmos-1769	1986-59-A	18 February 1988
Cosmos-1786	1986-80-A	6 March 1988
Cosmos-1815	1987-7-A	15 November 1988
Cosmos-1834	1987-31-A	14 October 1988
Cosmos-1881	1987-76-A	30 March 1988
Cosmos-1890	1987-86-A	26 December 1988
Cosmos-1901	1987-102-A	3 February 1988
Cosmos-1902	1987-103-A	30 December 1988
Soyuz-TM 4	1987-104-A	17 June 1988
Cosmos-1906	1987-108-A	13 March 1988

Galaxy-1A	1982-109-A	10 Dec.	1988	10.7 GHz	17.0-17.5 GHz	17.0-17.5 GHz	17.0-17.5 GHz
Galaxy-1B	1982-109-B	11 Dec.	1988	10.7 GHz	17.0-17.5 GHz	17.0-17.5 GHz	17.0-17.5 GHz
Galaxy-1C	1982-109-C	10 Dec.	1988	10.7 GHz	17.0-17.5 GHz	17.0-17.5 GHz	17.0-17.5 GHz
Galaxy-1D	1982-109-D	11 Dec.	1988	10.7 GHz	17.0-17.5 GHz	17.0-17.5 GHz	17.0-17.5 GHz

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				
164.00 E N	AUS AUSSAT PAC3									12		14											
164.00 E N	AUS AUSSAT-3									12	13	14											
164.00 E A	TON TONGASAT C-2	0	1	2	4	6	7	8															
166.00 E C	URS GOMS-2	0	1	2			7	8										20	29				
166.00 E A	URS GOMS-2M	0	1	2			7	8										20	29				
166.00 E C	URS PROGNOZ-6			2																			
167.00 E N	URS VSSRD-2									11	12	13	14										
167.45 E A	PNG PACSTAR A-1	1			5	6				11	12	13	14										
167.45 E C	PNG PACSTAR-1				4	6				12		14											
170.00 E A	USA USASAT-13M								11	12		14											
170.75 E A	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											20	44				
172.00 E N	USA FLTSATCOM-B WEST PAC																						
174.00 E N	USAIT INTELSAT5 PAC1				4	6			11		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					
174.00 E C	USAIT INTELSAT5A PAC1									4	6							11		14				
175.00 E N	USA USGCCS PH2 W PAC											7	8											
175.00 E C	USA USGCCS PH3 W PAC											7	8											
176.50 E N	USA MARISAT-PAC	0	1							4	6													
177.00 E N	USAIT INTELSAT4A PAC2									4	6						11			14				
177.00 E C	USAIT INTELSAT5 PAC2									4	6						11			14				
177.50 E A	USA MILSTAR 14	0		2																			20	45
178.00 E N	F ESA MARECS PAC1	0	1			4	6																	
179.50 E A	G INM INMARSAT POR-1		1			4	6																	
180.00 E A	USA USGCCS PH2 W PAC-2											7	8											
180.00 E A	USA USGCCS PH3 W PAC-2										7	8												
180.00 E N	USAIT INTELSAT MCS PAC A	C1			C4	C6											11			14				
180.00 E C	USAIT INTELSAT5 PAC3									4	6						11			14				

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QHF spectrum

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