National Aeronautics and Space Administration

Thursday, 19 August 2010

Cronología de Lanzamientos Espaciales

Año 1990

Recopilación de datos Ing. Eladio Miranda Batlle.
Los textos, imágenes y tablas fueron obtenidos de la National Space Science. Data Center. NASA

National Aeronautics and Space Administration

Wednesday, 09 March 2011

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Spacecraft Query Results

There were 167 spacecraft returned.

Spacecraft Name	NSSDC ID	Launch Date
AFP-675	AFP-675	1990-07-19
AFP-888	AFP-888	1990-07-19
AsiaSat 1	1990-030A	1990-04-07
Astro 1	ASTRO-1	1990-12-02
BADR-A	1990-059A	1990-07-16
BS-3A	1990-077A	1990-08-28
BSB-R2	1990-074A	1990-08-18
Cosmos 2055	1990-003A	1990-01-17
Cosmos 2056	1990-004A	1990-01-18
Cosmos 2057	1990-009A	1990-01-25
Cosmos 2058	1990-010A	1990-01-30
Cosmos 2059	1990-012A	1990-02-06
Cosmos 2060	1990-022A	1990-03-14
Cosmos 2061	1990-023A	1990-03-20
Cosmos 2062	1990-024A	1990-03-22
Cosmos 2063	1990-026A	1990-03-27
Cosmos 2064	1990-029A	1990-04-06
Cosmos 2065	1990-029B	1990-04-06
Cosmos 2066	1990-029C	1990-04-06
Cosmos 2067	1990-029D	1990-04-06
Cosmos 2068	1990-029E	1990-04-06
Cosmos 2069	1990-029F	1990-04-06
Cosmos 2070	1990-029G	1990-04-06
Cosmos 2071	1990-029H	1990-04-06
Cosmos 2072	1990-033A	1990-04-13
Cosmos 2073	1990-035A	1990-04-17
Cosmos 2074	1990-036A	1990-04-20
Cosmos 2075	1990-038A	1990-04-25
Cosmos 2076	1990-040A	1990-04-28
Cosmos 2077	1990-042A	1990-05-07
Cosmos 2078	1990-044A	1990-05-15
Cosmos 2079	1990-045A	1990-05-19
Cosmos 2080	1990-045B	1990-05-19
Cosmos 2081	1990-045C	1990-05-19
Cosmos 2082	1990-046A	1990-05-22
Cosmos 2083	1990-053A	1990-06-19

Cosmos 2084	1990-055A	1990-06-21
Cosmos 2085	1990-061A	1990-07-18
Cosmos 2086	1990-062A	1990-07-20
Cosmos 2087	1990-064A	1990-07-25
Cosmos 2088	1990-066A	1990-07-30
Cosmos 2089	1990-069A	1990-08-03
Cosmos 2090	1990-070A	1990-08-08
Cosmos 2091	1990-070B	1990-08-08
Cosmos 2092	1990-070C	1990-08-08
Cosmos 2093	1990-070D	1990-08-08
Cosmos 2094	1990-070E	1990-08-08
Cosmos 2095	1990-070F	1990-08-08
Cosmos 2096	1990-075A	1990-08-23
Cosmos 2097	1990-076A	1990-08-28
Cosmos 2098	1990-078A	1990-08-28
Cosmos 2099	1990-080A	1990-08-31
Cosmos 2100	1990-083A	1990-09-14
Cosmos 2101	1990-087A	1990-10-01
Cosmos 2102	1990-092A	1990-10-16
Cosmos 2103	1990-096A	1990-11-14
Cosmos 2104	1990-098A	1990-11-16
Cosmos 2105	1990-099A	1990-11-20
Cosmos 2106	1990-104A	1990-11-28
Cosmos 2108	1990-109A	1990-12-04
Cosmos 2110	1990-110B	1990-12-10
Cosmos 2111	1990-110C	1990-12-08
Cosmos 2112	1990-111A	1990-12-10
Cosmos 2113	1990-113A	1990-12-21
Cosmos 2114	1990-114A	1990-12-22
Cosmos 2115	1990-114B	1990-12-22
Cosmos 2116	1990-114C	1990-12-22
Cosmos 2117	1990-114D	1990-12-22
Cosmos 2118	1990-114E	1990-12-22
Cosmos 2119	1990-114F	1990-12-22
Cosmos 2120	1990-115A	1990-12-26
CRRES	1990-065A	1990-07-25
DEBUT	1990-013B	1990-02-07
DFS Kopernikus 2	1990-063B	1990-07-24
DMSP 5D-2/F10	1990-105A	1990-12-01
EUTELSAT-II F1	1990-079B	1990-08-30
Fanhui Shi Weixing 1	1990-089A	1990-10-05
Fengyun 1B	1990-081A	1990-09-03
Foton 6	1990-032A	1990-04-11
Galaxy 6	1990-091B	1990-10-12
Gamma 1	1990-058A	1990-07-11
Gorizont 20	1990-054A	1990-06-20
Gorizont 21	1990-094A	1990-11-03
Gorizont 22	1990-102A	1990-11-20
GSTAR 4	1990-100B	1990-11-20

Hagoromo	1990-007B	1990-03-18
Hiten	1990-007A	1990-01-24
HST	1990-037B	1990-04-25
Inmarsat 2-F1	1990-093A	1990-10-30
INSAT 1D	1990-051A	1990-06-12
INTELSAT 6 F-3	1990-021A	1990-03-14
INTELSAT 6 F-4	1990-056A	1990-06-23
JAS-1B	1990-013C	1990-02-07
JCSAT 2	1990-001B	1990-01-01
KH 11-10	1990-019B	1990-02-28
KRISTALL	1990-048A	1990-05-31
LACE	1990-015A	1990-02-14
Leasat F5	1990-002B	1990-01-09
Lusat	1990-005G	1990-01-22
MACSAT 1	1990-043A	1990-05-09
MACSAT 2	1990-043B	1990-05-09
Meteor 2-19	1990-057A	1990-06-27
Meteor 2-20	1990-086A	1990-09-28
Molniya 1-77	1990-039A	1990-04-26
Molniya 1-78	1990-071A	1990-08-10
Molniya 1-79	1990-101A	1990-11-23
Molniya 3-37	1990-006A	1990-01-23
Molniya 3-38	1990-052A	1990-06-13
Molniya 3-39	1990-084A	1990-09-20
MOS-1B	1990-013A	1990-02-07
Nadezhda-2	1990-017A	1990-02-27
Navstar 2-06	1990-008A	1990-01-24
Navstar 2-07	1990-025A	1990-03-26
Navstar 2-08	1990-068A	1990-08-02
Navstar 2-09	1990-088A	1990-10-01
Navstar 2A-01	1990-103A	1990-11-26
Ofeq 2	1990-027A	1990-04-03
Okean 2	1990-018A	1990-02-28
OSCAR 14	1990-005B	1990-01-22
OSCAR 15	1990-005C	1990-01-22
OSCAR 17	1990-005E	1990-01-22
OSCAR 18	1990-005F	1990-01-22
PACSAT	1990-005D	1990-01-22
Palapa-B2R	1990-034A	1990-04-13
PEGSAT	1990-028A	1990-04-05
POGS	1990-031A	1990-04-11
PRC 26	1990-011A	1990-02-04
Progress 42	1990-041A	1990-05-05
Progress M- 3	1990-020A	1990-02-28
Progress M- 4	1990-072A	1990-08-15
Progress M- 5	1990-085A	1990-09-27
Qi Qiu Weixing 1	1990-081B	1990-09-03
Qi Qiu Weixing 2	1990-081C	1990-09-03
Raduga 1-2	1990-116A	1990-12-27

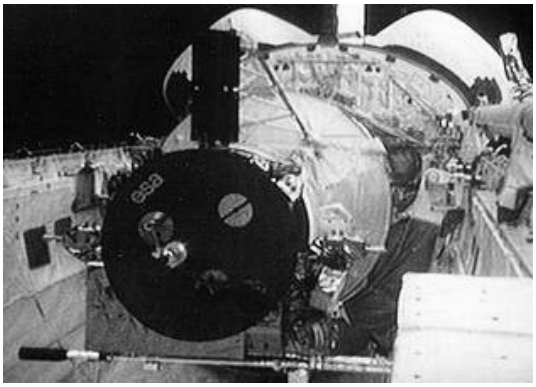
Raduga 25	1990-016A	1990-02-15
Raduga 26	1990-112A	1990-12-20
Resurs-F 6	1990-047A	1990-05-29
Resurs-F 7	1990-060A	1990-07-17
Resurs-F 8	1990-073A	1990-08-16
Resurs-F 9	1990-082A	1990-09-07
RME	1990-015B	1990-02-14
ROSAT	1990-049A	1990-06-01
SATCOM I	1990-100A	1990-11-20
SBS 6	1990-091A	1990-10-12
SCE	1990-031C	1990-04-11
SECS	1990-028B	1990-04-05
Skynet 4A	1990-001A	1990-01-01
Skynet 4C	1990-079A	1990-08-30
Soyuz TM- 9	1990-014A	1990-02-11
Soyuz TM-10	1990-067A	1990-08-01
Soyuz TM-11	1990-107A	1990-12-02
SPOT 2	1990-005A	1990-01-22
STS 31	1990-037A	1990-04-24
STS 32	1990-002A	1990-01-09
STS 35/Astro 1	1990-106A	1990-12-02
STS 36	1990-019A	1990-02-28
STS 38	1990-097A	1990-11-15
STS 41/SSBUV02	1990-090A	1990-10-06
TDF 2	1990-063A	1990-07-24
TEX	1990-031B	1990-04-11
Ulysses	1990-090B	1990-10-06
USA 59A	1990-050A	1990-06-08
USA 60	1990-050B	1990-06-08
USA 61	1990-050C	1990-06-08
USA 62	1990-050D	1990-06-08
USA 65	1990-095A	1990-11-13
USA 67	1990-097B	1990-11-15

Ulysses

Nacionalidad: Europa-EEUU
· Fecha de lanzamiento: 06.10.90
· Objetivo: Estudio del Sol desde los polos
· Objetivos:

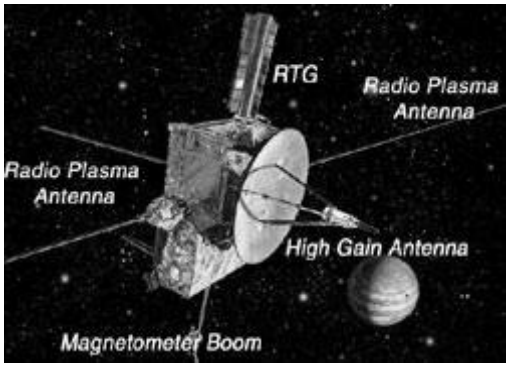
La sonda Ulysses es la primera misión cuyo objetivo principal es el estudio del ambiente alrededor del Sol, desde los polos al ecuador, en una gran variedad de condiciones de actividad solar. Entre los primeros resultados claves obtenidos por esta misión conjunta de la ESA y la NASA, se encuentra la observación y medición de los vientos solares en los polos en momentos de máxima y de mínima actividad solar, el descubrimiento de que el flujo magnético que abandona el Sol es el mismo en todas las latitudes, el descubrimiento de 'reservas' de partículas energéticas alrededor del Sol, el descubrimiento de polvo interestelar en el Sistema Solar y las primeras medidas directas de los átomos de helio interestelar.

· La misión:
La nave fue lanzada el 6 de octubre de 1.990 a las 11:47 GMT a bordo del transbordador espacial Discovery en su misión STS-41. El peso total de la nave rondaba en el momento del inicio de la misión los 367 kilogramos y actualmente (2.006) se encuentra en una fase operacional con una órbita elíptica de 80º de inclinación sobre la eclíptica. La última ampliación de la misión permite que la nave siga trabajando al menos hasta mediados de 2.008, enviando datos las 24 horas del día, todos los días de la semana.



Lanzamiento en el Discovery

La sonda está dotada de un amplio conjunto de instrumentos científicos que permiten detectar y medir los iones y electrones del viento solar, los campos magnéticos, las partículas energéticas, los rayos cósmicos, las ondas de plasma y radio naturales, el polvo cósmico, el gas interestelar neutral, los rayos-X solares y las explosiones cósmicas de rayos gamma. Todos estos experimentos permiten conocer el Sol y la Heliosfera. Como Ulysses viaja tan lejos del Sol, la energía solar no puede ser usada para proporcionar la electricidad, por lo que se usan generadores nucleares RTG.



Esquema general de la nave

Tras ser lanzada por el Discovery, la nave se dirigió hasta Júpiter, donde llegó en febrero de 1.992 para realizar una maniobra de asistencia gravitatoria, para situarse en una órbita polar del Sol. Tras esto Ulises sobrevoló el polo sur solar en 1.994 y su polo norte en 1.995. En los años 2.000 y 2.001 la nave visitó los polos solares por segunda vez tras realizar otro recorrido de seis años de duración.

Paso por las cercanías de Júpiter e Io

· La nave:

El diseño principal de Ulysses está pensado para poder surcar las grandes distancias a las que se encuentra la nave respecto al Sol y la Tierra, casi siempre superior a los 800 millones de kilómetros. La sonda pesaba originalmente 366,7 kilogramos y tiene unas dimensiones de 3.2 metros de largo, 3.3 de anchura y una altura de 2.1 metros.

La nave está estabilizada por giro en un eje y posee numerosas estructuras externas. La antena de alta ganancia (HGA) tiene un diámetro de 1,65 metros y opera en las frecuencias de la banda X y S. Porta dos brazos extensibles de 35 metros de longitud a los lados de la plataforma que conforman las antenas del instrumento URAP. Se trata de delgadas tiras de berilio y cobre que se encontraban plegadas en el lanzamiento y que más tarde fueron desplegadas. La superficie externa de la nave está cubierta de escudos de protección térmica, consistentes en 20 capas de kapton cubiertas con una capa de óxido de indio y color dorado.

Para su alimentación lleva generadores termoeléctricos de radioisótopos (RTG) que la abastecen de electricidad

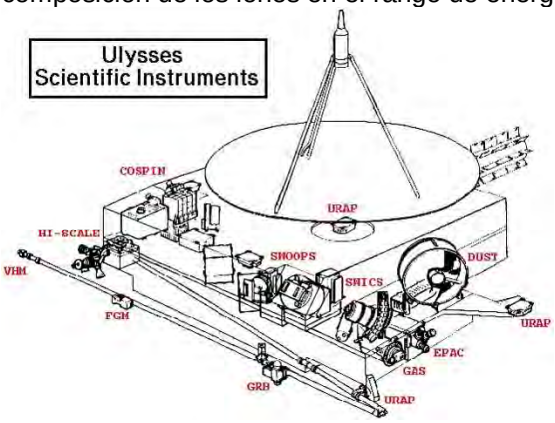
· Instrumentos:

La sonda lleva un total de 12 instrumentos:

• Magnetómetro - Magnetometer (VHM/FGM): Su función es determinar las estructuras y gradientes del campo magnético, así como la dependencia de los fenómenos interplanetarios observados de la latitud solar.

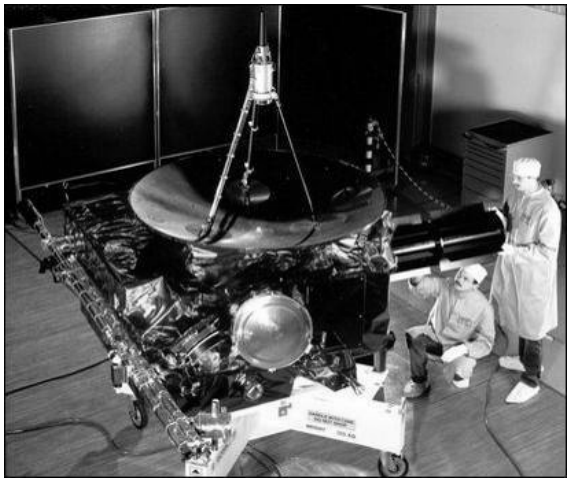
• Experimento de Plasma del Viento Solar - Solar Wind Plasma Experiment (SWOOPS): Experimento preparado para caracterizar el flujo de masa y las condiciones internas del plasma interplanetario en tres dimensiones en la dirección hacia Júpiter. Las observaciones tienen lugar a todas las distancias y latitudes alcanzadas por la sonda en la eclíptica y fuera de ella.

• Instrumento de Composición de los Iones del Viento Solar - Solar Wind Ion Composition Instrument (SWICS): Sirve para determinar la carga iónica y elemental, las temperaturas y la velocidad de la mayoría de los iones del viento solar, desde el H al Fe, entre los 175 Km./s (protones) y los 1.280 Km./s (Fe8+).
• Instrumento de Ondas de Plasma y Radio Unificado - Unified Radio and Plasma Wave Instrument (URAP): Para determinar la dirección, el tamaño angular y la polarización de las fuentes de radio de la Heliosfera y la magnetosfera joviana.
• Instrumento de Partículas Energéticas - Energetic Particle Instrument (EPAC): Su objetivo es la medición de los flujos, las distribuciones angulares, los espectros de energía y la composición de los iones en el rango de energía entre los 300 keV/núcleo y los 25 MeV/núcleo.



Esquema de instrumentos
• Experimento de Gas Neutral Interestelar - Interstellar Neutral-Gas Experiment (GAS): Mide las propiedades del gas interestelar local (densidad, velocidad flujo relativa al Sistema Solar y temperatura), representado por el helio neutral que penetra en la Heliosfera.
• Experimento de Iones y Electrones de Baja Energía - Low-Energy Ion and Electron Experiment (HISCALE): Realiza mediciones de los iones interplanetarios y de los electrones durante toda la misión.
• Instrumento de Partículas Solares y Rayos Cósmicos - Cosmic Ray and Solar Particle Instrument (COSPIN): Realiza la medición en tres dimensiones de las anisotropías de protones y del helio a bajas energías.

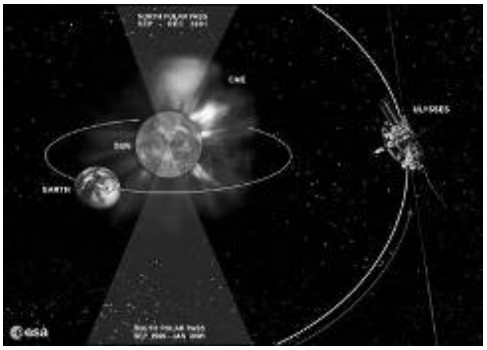
• Instrumento de Explosiones de Rayos Gamma Cósmicos y de Rayos X Solares - Solar X-ray and Cosmic Gamma-Ray Burst Instrument (GRB): Centrado en el estudio de los estallidos de rayos gamma, así como de las explosiones solares.
• Experimento de Polvo - Dust Experiment (DUST): Proporciona observaciones directas de los granos de polvo con masas entre los 10-16 g y los 10-6 g en el espacio interplanetario, para investigar sus propiedades físicas y dinámicas.
• Experimento de Sondeo Coronal - Coronal-Sounding Experiment (SCE): Sirve para la obtención de los parámetros del plasma de la atmósfera solar, usando técnicas establecidas de sondeo de la corona.
• Experimento de Ondas Gravitacionales - Gravitational Wave Experiment (GWE): Su misión es la detección de ondas gravitacionales en bandas de baja frecuencia.



· Cronología:

- 6 de octubre de 1990: Lanzamiento en el Discovery
  - 8 de febrero de 1992: Máxima aproximación a Júpiter (6,3 radios)
  - 15 de febrero de 1992: Primer afelio (5,4 UA)
  - 26 de junio de 1994: Comienzo del primer pase por el Polo Sur
  - 13 de septiembre de 1994: Máxima latitud sur solar (-80,2º)
  - 5 de noviembre de 1994. Fin del primer pase por el Polo Sur
  - 12 de marzo de 1995: primer perihelio (1,34 UA)
  - 13 de marzo de 1995: cruce de la eclíptica
  - 9 de junio de 1995: mínima distancia a la Tierra (2,01 UA)
  - 19 de junio de 1995: comienzo del primer pase por el Polo Norte
  - 31 de Julio de 1995: máxima latitud norte solar (+80,2º)
  - 29 de septiembre de 1995: fin del primer pase por el Polo Norte

  - 17 de abril de 1998: segundo afelio (5,41 UA)
  - 9 de mayo de 1998: cruce de la eclíptica
  - 28 de agosto de 1998: máxima distancia a la Tierra (6,36 UA)
  - 6 de septiembre de 2000: Comienzo del segundo pase por el Polo Sur
  - 27 de noviembre de 2000: Máxima latitud sur solar (-80,2º)
  - 16 de enero de 2001: Fin del segundo pase por el Polo Sur
  - 23 de mayo de 2001: Segundo perihelio (1,34 UA)
  - 25 de mayo de 2001: cruce de la eclíptica
  - 19 de julio de 2001: mínima distancia a la Tierra (1,34 UA)
  - 31 de agosto de 2001: comienzo del segundo pase por el Polo Norte
  - 13 de octubre de 2001: máxima latitud norte solar (+80,2º)
  - 10 de diciembre de 2001: fin del segundo pase por el Polo Norte
  - 4 de febrero de 2004: mayor aproximación a Júpiter (1684 Radios)
-



- 30 de junio de 2004: tercer afelio (5,41 UA)
- 14 de julio de 2004: cruce de la eclíptica
- 29 de agosto de 2004: mayor aproximación a la Tierra (6,4 UA)

- 17 de noviembre de 2006: comienzo del tercer pase por el Polo Sur
- 7 de febrero de 2007: máxima latitud sur solar (-79,7º)
- 3 de abril de 2007: final del tercer pase por el Polo Sur
- 18 de agosto de 2007: tercer perihelio (1,39 UA)
- 19 de agosto de 2007: cruce de la eclíptica
- 27 de agosto de 2007: mínima distancia a la Tierra (0,42 UA)
- 30 de noviembre de 2007: comienzo del tercer pase por el Polo Norte
- 14 de enero de 2008: máxima latitud norte solar (79,8º)
- 15 de marzo de 2008: final del tercer pase por el Polo Norte

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AFP-675

NSSDC ID: AFP-675

Description

This Shuttle payload contains six experiments mounted in an Experiment Support System (ESS). The ESS consists of a pallet plus a command panel. The objectives of AFP-675 are (1) to obtain data in several wavelength regions to support the development of DOD systems, (2) to validate technologies for DOD applications, (3) to validate the use of man as an autonomous experimenter in space, and (4) to demonstrate the cost effectiveness of performing DOD experiments on reusable systems. Payload specialists will conduct the six experiments that have been assigned to this flight. The experiments cover the infrared, ultraviolet, X-ray and gamma-ray portions of the spectrum, as well as particle measurements.

Alternate Names

- Air Force Project-675
- STP P-675
- CIRRIS 1A

Facts in Brief

Launch Date: 1990-07-19
Launch Vehicle: Shuttle
Launch Site: null
Mass: 5080.0 kg

Funding Agency

- Department of Defense-Department of the Air Force (United States)

Disciplines

- Astronomy
- Earth Science

Additional Information

- Launch/Orbital information for AFP-675

Experiments on AFP-675

Data collections from AFP-675

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

Personnel

Name	Role	Original Affiliation	E-mail
Mr. Herbert Shodiss	Project Manager	Lockheed Palo Alto	
Maj P. Sefchek	Project Manager	US Air Force Space Division	
Lcol J. Janzen	Mission Manager	US Air Force Space Division	

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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AFP-888

NSSDC ID: AFP-888

Description

Air Force Program-888 (APF-888) is a DOD satellite which has essentially a rectangular parallelepiped shape and approximate dimensions 2.4 x 2.4 x 0.7 m. The spacecraft is three-axis stabilized to maintain one 2.4- x 2.4-m surface vector pointing at the nadir. The spacecraft serves as a stable platform reference for three experiment telescopes. The spacecraft telemetry capability is PCM and it uses onboard tape recorders with up to 6 hours storage. This spacecraft was named STP P80-1 until December 1983 when it was renamed AFP-888 and its launch date became classified.

Alternate Names

- Air Force Project-888
- P80-1
- STP P80-1
- Teal Ruby Satellite(TRS)
- Space Test Program P80-1

Facts in Brief

Launch Date: 1990-07-19
Launch Vehicle: Shuttle
Launch Site: United States
Mass: 1940.0 kg

Funding Agency

- Department of Defense-Department of the Air Force (United States)

Disciplines

- Astronomy
- Engineering
- Surveillance and Other Military

Additional Information

- Launch/Orbital information for AFP-888

Experiments on AFP-888

Data collections from AFP-888

Questions or comments about this spacecraft can be directed to: Coordinated

Request and User Support Office.

Personnel

Name	Role	Original Affiliation	E-mail
Dr. W. A. Wisdom	Project Manager	US Air Force Space Division	
Dr. I. Rzepnick	Project Scientist	Aerospace Corporation	

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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AsiaSat 1

NSSDC ID: 1990-030A

Description

This spacecraft was originally deployed from the Shuttle flight STS-41B in February, 1984, as Westar 6. That spacecraft became stranded in the wrong orbit and was recovered by Shuttle flight STS-51A in November, 1984. The retrieved satellite was bought by the AsiaSat consortium, whose members are: Cable & Wireless; Hutchinson Whampoa; China International Trust and Investment Corporation (CITIC, which is a subsidiary of the Bank of China). It was the first time an American made spacecraft had been orbited by the Chinese. Stationed above 105 deg. e, Asiasat was the first of a series of privately operated commsats providing telephone, telex, facsimile, data and TV broadcast services to an area housing half the world's population. Two beams covered an area from Korea to the Middle East and Mongolia to Malaysia. Each of the payload's 24 C-band transponders could accomodate 2,400 one-way voice circuits or one TV channel. Asiasat was a standard Hughes HS 376 bus, 2.1 m diameter, 6.6 m high with solar drum extended and antenna reflector deployed. Beginning of life power was 1,060 W. It weighed 1,442 kg at launch.

Alternate Names

- 20558

Facts in Brief

Launch Date: 1990-04-07
Launch Vehicle: Long March 3
Launch Site: Xichang, Peoples Republic of China
Mass: 1442.0 kg

Funding Agency

- Asia Satellite Telecommunications Co. Ltd. (AsiaSat) (Peoples Republic of China)

Discipline

- Communications

Additional Information

- Launch/Orbital information for AsiaSat 1

Experiments on AsiaSat 1

Data collections from AsiaSat 1

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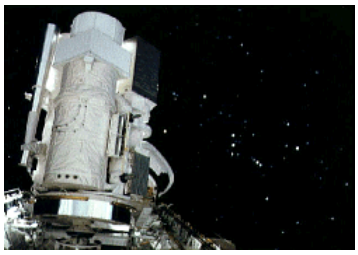

Astro 1

Astro 1

NSSDC ID: ASTRO-1

Description

The "Astro Observatory" was developed as a system of telescopes that could fly multiple times on the space shuttle. Astro-1 consisted of three ultraviolet telescopes and an X-ray telescope. The primary objectives of this observatory were to obtain (1) imagery in the spectral range 1200-3100 A (Ultraviolet Imaging Telescope, UIT); (2) spectrophotometry in the spectral region 425 to 1850 A (Hopkins Ultraviolet Telescope, HUT); (3)spectrapolarimetry from 1250 to 3200 A (Wisconsin Ultraviolet Photopolarimetry Experiment, WUPPE); and (4) X-ray data in the bandpass between 0.3 and 12 keV (Broad Band X-ray Telescope, BBXRT). Since many science objectives and selected astronomical targets of the three instrument teams were inter-related, simultaneous observations by all four instruments were planned.

The telescopes were mounted on a Spacelab pallet in the payload bay of the shuttle (flight STS-35). The Spacelab Instrument Pointing System (IPS), pallets, and avionics were utilized for attachment to the Shuttle and for control and data handling. Astro-1 required both mission specialists and payload specialists to control its operations from the Shuttle aft flight deck. Instrument monitoring and quick-look data analysis were performed for real-time ground operations. During the flight both on-board Digital Display Units malfunctioned, and the star guidance system calibration was not possible. The observing sequences were rescheduled during the flight, and instrument pointing was done by hand by the astronauts, and from the ground.

As a result of the numerous technical glitches, the returned data volume was less than half of that originally planned, and the scientific return was about 67% of the stated goals of the mission. Astro-1 was returned to earth 17:54 U.T., December 11, 1990. However, the mission was very successful in that 231 observations of 130 unique astronomical targetrs were made.

The follow-up flight, Astro-2, was dedicated to studies of many astronomical objects, and included increasing participation of guest investigators.

Alternate Names

- STS-35/Astro-1
- 20980

Facts in Brief

Launch Date: 1990-12-02
Launch Vehicle: Shuttle
Launch Site: Cape Canaveral, United States
Mass: 12453.0 kg
Nominal Power: 7.0 W

Funding Agency

- NASA-Office of Space Science (United States)

Disciplines

- Astronomy
- Earth Science
- Planetary Science

Additional Information

- Launch/Orbital information for Astro 1
- PDMP information for Astro 1
- Telecommunications information for Astro 1

Experiments on Astro 1

Data collections from Astro 1

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support

Office.

Personnel

Name	Role	Original Affiliation	E-mail
Dr. Theodore R. Gull	Mission Scientist	NASA Goddard Space Flight Center	gull@stars.gsfc.nasa.gov
Dr. Leon B. Allen	Project Manager	NASA Marshall Space Flight Center	
Mr. William Huddleston	Program Manager	NASA Headquarters	
Dr. Edward J. Weiler	Program Scientist	NASA Headquarters	edward.j.weiler@nasa.gov
Dr. Jack A. Jones	Mission Manager	NASA Marshall Space Flight Center	
Dr. Charles A. Meegan	Mission Scientist	NASA Marshall Space Flight Center	charles.meegan@msfc.nasa.gov

Related Information/Data at NSSDC

STS 35 (Astro 1 mission)
Astro 2

US Active Archive for Astro 1 Information/Data

The Astro Archive at MAST(STScI)

Other Sources of Astro 1 Information/Data

Broad Band X-Ray Telescope (BBXRT) page at HEASARC
Hopkins Ultraviolet Telescope (HUT) team page
Ultraviolet Imaging Telescope (UIT) team page
Wisconsin Ultraviolet Photopolarimeter Experiment (WUPPE) team page

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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BADR-A

NSSDC ID: 1990-059A

Description

BADR-A was launched by the People's Republic of China for Pakistan using the Long March 2 cluster launch vehicle. The launch from Xichang lifted the 52-kg satellite into a low-earth orbit where a digital communications experiment was demonstrated. It was expected to operate 15 to 20 minutes during 3 orbits a day. Built by SUPARCO, the Pakistan national space agency, the satellite was a 26-sided polyhedron, 483 mm in diameter. Signals ended after 35 days and the satellite decayed on December 8, 1990. BADR-A flew as a piggyback payload along with a mass model of AUSSAT, an Australian communications satellite.

Alternate Names

- BADR 1
- 20685

Facts in Brief

Launch Date: 1990-07-16
Launch Vehicle: Long March 2
Launch Site: Xichang, Peoples Republic of China
Mass: 52.0 kg

Funding Agency

- Pakistan National Space Agency (Pakistan)

Discipline

- Communications

Additional Information

- Launch/Orbital information for BADR-A

Experiments on BADR-A

Data collections from BADR-A

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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BS-3A

NSSDC ID: 1990-077A

Description

BS-3A (Broadcasting Satellite-3A) was launched by the H-I launch vehicle (H22F) from the Tanegashima Space Center in Japan. A follow-on to the BS-2 series providing direct boradcast service to all of Japan and the islands of Okinawa and Ogasawara, BS-3A featured more transponder output - from 100 to 120 W, an added channel - from 2 to 3, and longer life - from 5 to 7 years. An experimental 20-W wideband transponder tested high-definition TV transmission. The payload operated at 14/12 GHz. Built by GE Astro Space and Nippon Electric Company, the satellite was based on GE's SATCOM 3000 bus and incorporated Japanese transponders, antenna and apogee kick motor. The box-shaped satellite measured 1.3 by 1.6 by 1.6 m, spanning 15 m with solar panels deployed. The shaped beam parabolic antenna extended overall height to 3.2 m on orbit. The arrays provided 1,443 W at beginning of life. As is customary with Japanese launches, the satellite was renamed in flight. Yuri (lily) reached its assigned geosynchronous station at 110 deg. e. in October. Operations were turned over to the Telecommunications Satellite Company of Japan.

Alternate Names

- Yuri 3A
- 20771

Facts in Brief

Launch Date: 1990-08-28
Launch Vehicle: H-I
Launch Site: Tanegashima, Japan
Mass: 550.0 kg
Nominal Power: 1443.0 W

Funding Agency

- National Space Development Agency (NASDA) (Japan)

Discipline

- Communications

Additional Information

- Launch/Orbital information for BS-3A

Experiments on BS-3A

Data collections from BS-3A

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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BSB-R2

NSSDC ID: 1990-074A

Description

BSB-R 2, a UK TV broadcasting satellite known as Marco Polo 2, was launched using the Delta launch vehicle on August 18, 1990, from Cape Canaveral. It joined a sister craft at 31 deg. w, to provide high-power direct broadcast signals to UK users with antennas as small as 0.3 m. It housed 5 Ku-band transponder channels, but only 3 could be at full power at one time. With both satellite on station, 5 channels could be beamed at full power. The twins were maneuvered to stay in close proximity allowing signals from both to be beamed at the same spot. Built for British Satellite Broadcasting by Hughes Space and Communications Group, Marco Polo 2 was a 2.1-m diameter drum, 2.7 m tall. With solar drum deployed and antenna reflector raised, overall height was 7.2 m. Body mounted solar arrays provided 1,000 W at the beginning of its 10-year life.

Alternate Names

- British Sat Broadcast R2
- Marco Polo 2
- 20762

Facts in Brief

Launch Date: 1990-08-18
Launch Vehicle: Delta
Launch Site: Cape Canaveral, United States
Mass: 679.0 kg
Nominal Power: 1000.0 W

Funding Agency

- British Satellite Broadcasting (United Kingdom)

Discipline

- Communications

Additional Information

- Launch/Orbital information for BSB-R2

Experiments on BSB-R2

Data collections from BSB-R2

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2055

NSSDC ID: 1990-003A

Description

Cosmos 2055 was a Soviet military cartographic photo-surveillance satellite launched from the Plesetsk Cosmodrome aboard a Soyuz 11 rocket. It conducted an investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. Typical orbital profile: inclination 70 degrees with altitude of 350-420 km. Designed duration: 15 days. Transmission frequencies observed in West: 19.989 FSK; 39.978 FSK; 232.0 PPM-AM.

Alternate Names

- 20426

Facts in Brief

Launch Date: 1990-01-17
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2055

Experiments on Cosmos 2055

Data collections from Cosmos 2055

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2056

NSSDC ID: 1990-004A

Description

The lowest level of the three-tier communications satellite constellation was populated with two distinct systems devoted to military and government communications. Both systems were assessed to be simple store-dump repeaters which were particularly useful in relaying traffic between the Russian Federation and overseas stations or forces. These Strela (which means "Arrow" in Russian) satellites recorded radio messages transmitted by Russian intelligence agents worldwide and relayed them when flying over Moscow. Debuting in 1970 was a system of small (61 kg, 0.80 m by 0.75 m) relay satellites launched from Plesetsk by the Kosmos booster in groups of eight. Although the mean altitude of this constellation was near 1500 km, each set of eight Strela 1 satellites was normally dispersed into slightly elliptical orbits with mean altitudes between 1430 and 1490 km. The intentional orbital period differences of about 0.15 min ensured that the satellites would become randomly spaced about the orbital plane shortly after launch. Unlike the lower altitude constellation, this network relied on a single orbital plane with an inclination of 74 deg which was replenished on the average of once each year. The last mission in this network was in June 1992, and the network has now been superseded by the more modern and capable Strela 3 system.

Alternate Names

- 20432

Facts in Brief

Launch Date: 1990-01-18
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 900.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2056

Experiments on Cosmos 2056

Data collections from Cosmos 2056

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2057

NSSDC ID: 1990-009A

Description

Cosmos 2057 was a Soviet high resolution photo reconnaissance satellite launched from the Plesetsk cosmodrome aboard a Soyuz rocket. It returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission.

Alternate Names

- 20457

Facts in Brief

Launch Date: 1990-01-25
Launch Vehicle: Modified SS-6 (Sapwood) with 2nd Generation (Longer) Upper Stage
Launch Site: Plesetsk, U.S.S.R
Mass: 6500.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2057

Experiments on Cosmos 2057

Data collections from Cosmos 2057

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2058

NSSDC ID: 1990-010A

Description

Cosmos 2058 was a Soviet ELINT (Electronic and Signals Intelligence) satellite launched from the Plesetsk cosmodrome.

From 1965 to 1967 two dedicated ELINT systems were tested: the Tselina and the Navy's US. Both reached service, since the Ministry of Defence could not force a single system on the military services.

Tselina was developed by Yuzhnoye and consisted of two satellites: Tselina-O for general observations and Tselina-D for detailed observations. ELINT systems for Tselina were first tested under the Cosmos designation in 1962 to 1965. The first Tselina-O was launched in 1970. The Tselina-D took a long time to enter service due to delays in payload development and weight growth. The whole Tselina system was not operational until 1976. Constant improvement resulted in Tselina-O being abandoned in 1984 and all systems being put on Tselina-D.

Alternate Names

- 20465

Facts in Brief

Launch Date: 1990-01-30
Launch Vehicle: Tsiklon
Launch Site: Plesetsk, U.S.S.R
Mass: 2000.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2058

Experiments on Cosmos 2058

Data collections from Cosmos 2058

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2059

NSSDC ID: 1990-012A

Description

From 1969 KB Yuzhnoye built the Lira targets for exercise and test of PVO air defence and space tracking systems. The second generation consisted of Taifun-1 and Taifun-2 satellites, which differed in the type of equipment installed. Taifun-1 would release up to 25 Romb sub-satellites, while Taifun-2 did not. In 1972 KB-3 under B E Khimrov, with the co-operation of assisting organisations and the Ministry of Defence, completed the draft project. The first Taifun-1 was completed in 1974, and flight trials were conducted in the second half of the 1970's using Kosmos-3M launch vehicles from Plesetsk and Kapustin Yar. The heads of the State Trials Commission were B N Karpov, N N Zhukov, and B G Zudin. Taifun-1 normally released 25 Romb subsatellites into an orbit of 300 to 500 km altitude, at inclinations of 50.7 degrees (from Kapustin Yar) and 65.9 74, or 82.9 degrees (from Plesetsk). Two unique missions in 1989-1990 were put into 180 km x 1550 km orbits at 65.8 degrees. With this higher apogee the payload was reduced to 10 Romb subsatellites. Vektor satellites were spherical in shape, about 2 m in diameter, the surface covered with solar cells and equipped with four antennae.

Alternate Names

- 20476

Facts in Brief

Launch Date: 1990-02-06
Launch Vehicle: F-2
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 500.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2059

Experiments on Cosmos 2059

Data collections from Cosmos 2059

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2060

NSSDC ID: 1990-022A

Description

Cosmos 2060 was a Soviet naval reconnaisance satellite launched from the Baikonur cosmodrome aboard a Tsyklon 2 rocket. This naval forces monitoring spacecraft was used to determine the position of enemy naval forces through detection and triangulation of their electromagnetic emissions (radio, radar, etc).

Alternate Names

- 20525

Facts in Brief

Launch Date: 1990-03-14
Launch Vehicle: Tsiklon-2
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 3000.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2060

Experiments on Cosmos 2060

Data collections from Cosmos 2060

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2061

NSSDC ID: 1990-023A

Description

Cosmos 2061 was part of a 6-satellite Soviet military navigation system distributed in orbital planes spaced 30 degrees apart, and launched from the Plesetsk cosmodrome aboard a Cosmos rocket. Navigation information was derived from Doppler-shifted VHF transmissions (approximately 150 and 400 MHz) of the satellite position and orbital data. By acquiring fixes from several satellite, a user's location could be calculated with an accuracy of 100 m. The time needed to ascertain a position was dependent upon the user's latitude and the number of operational spacecraft in orbit. Normally, accurate location determination could be made within 1-2 hours.

Alternate Names

- 20527

Facts in Brief

Launch Date: 1990-03-20
Launch Vehicle: Modified SS-5 (SKean IRBM) plus Upper Stage
Launch Site: Plesetsk, U.S.S.R
Mass: 825.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Cosmos 2061

Experiments on Cosmos 2061

Data collections from Cosmos 2061

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2062

NSSDC ID: 1990-024A

Description

Cosmos 2062 was a Soviet military cartographic photo-surveillance satellite launched from the Plesetsk Cosmodrome aboard a Soyuz 11 rocket. It conducted an investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. Typical orbital profile: inclination 70 degrees with altitude of 350-420 km. Designed duration: 15 days. Transmission frequencies observed in West: 19.989 FSK; 39.978 FSK; 232.0 PPM-AM.

Alternate Names

- 20529

Facts in Brief

Launch Date: 1990-03-22
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2062

Experiments on Cosmos 2062

Data collections from Cosmos 2062

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2063

NSSDC ID: 1990-026A

Description

Cosmos 2063 was a Soviet missile early warning satellite launched from the Plesetsk cosmodrome aboard a Molniya rocket. It was part of the Oko constellation of satellites and covered the plane 2 - 317 degree longitude of ascending node.

Alternate Names

- 20536

Facts in Brief

Launch Date: 1990-03-27
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1900.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2063

Experiments on Cosmos 2063

Data collections from Cosmos 2063

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

National Aeronautics and Space Administration

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Cosmos 2064

NSSDC ID: 1990-029A

Description

The lowest level of the three-tier communications satellite constellation was populated with two distinct systems devoted to military and government communications. Both systems were assessed to be simple store-dump repeaters which were particularly useful in relaying traffic between the Russian Federation and overseas stations or forces. These Strela (which means "Arrow" in Russian) satellites recorded radio messages transmitted by Russian intelligence agents worldwide and relayed them when flying over Moscow. Debuting in 1970 was a system of small (61 kg, 0.80 m by 0.75 m) relay satellites launched from Plesetsk by the Kosmos booster in groups of eight. Although the mean altitude of this constellation was near 1500 km, each set of eight Strela 1 satellites was normally dispersed into slightly elliptical orbits with mean altitudes between 1430 and 1490 km. The intentional orbital period differences of about 0.15 min ensured that the satellites would become randomly spaced about the orbital plane shortly after launch. Unlike the lower altitude constellation, this network relied on a single orbital plane with an inclination of 74 deg which was replenished on the average of once each year. The last mission in this network was in June 1992, and the network has now been superseded by the more modern and capable Strela 3 system.

Alternate Names

- 20549

Facts in Brief

Launch Date: 1990-04-06
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 45.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2064

Experiments on Cosmos 2064

Data collections from Cosmos 2064

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2065

NSSDC ID: 1990-029B

Description

The lowest level of the three-tier communications satellite constellation was populated with two distinct systems devoted to military and government communications. Both systems were assessed to be simple store-dump repeaters which were particularly useful in relaying traffic between the Russian Federation and overseas stations or forces. These Strela (which means "Arrow" in Russian) satellites recorded radio messages transmitted by Russian intelligence agents worldwide and relayed them when flying over Moscow. Debuting in 1970 was a system of small (61 kg, 0.80 m by 0.75 m) relay satellites launched from Plesetsk by the Kosmos booster in groups of eight. Although the mean altitude of this constellation was near 1500 km, each set of eight Strela 1 satellites was normally dispersed into slightly elliptical orbits with mean altitudes between 1430 and 1490 km. The intentional orbital period differences of about 0.15 min ensured that the satellites would become randomly spaced about the orbital plane shortly after launch. Unlike the lower altitude constellation, this network relied on a single orbital plane with an inclination of 74 deg which was replenished on the average of once each year. The last mission in this network was in June 1992, and the network has now been superseded by the more modern and capable Strela 3 system.

Alternate Names

- 20550

Facts in Brief

Launch Date: 1990-04-06
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 45.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2065

Experiments on Cosmos 2065

Data collections from Cosmos 2065

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2066

NSSDC ID: 1990-029C

Description

The lowest level of the three-tier communications satellite constellation was populated with two distinct systems devoted to military and government communications. Both systems were assessed to be simple store-dump repeaters which were particularly useful in relaying traffic between the Russian Federation and overseas stations or forces. These Strela (which means "Arrow" in Russian) satellites recorded radio messages transmitted by Russian intelligence agents worldwide and relayed them when flying over Moscow. Debuting in 1970 was a system of small (61 kg, 0.80 m by 0.75 m) relay satellites launched from Plesetsk by the Kosmos booster in groups of eight. Although the mean altitude of this constellation was near 1500 km, each set of eight Strela 1 satellites was normally dispersed into slightly elliptical orbits with mean altitudes between 1430 and 1490 km. The intentional orbital period differences of about 0.15 min ensured that the satellites would become randomly spaced about the orbital plane shortly after launch. Unlike the lower altitude constellation, this network relied on a single orbital plane with an inclination of 74 deg which was replenished on the average of once each year. The last mission in this network was in June 1992, and the network has now been superseded by the more modern and capable Strela 3 system.

Alternate Names

- 20551

Facts in Brief

Launch Date: 1990-04-06
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 45.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2066

Experiments on Cosmos 2066

Data collections from Cosmos 2066

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2067

NSSDC ID: 1990-029D

Description

The lowest level of the three-tier communications satellite constellation was populated with two distinct systems devoted to military and government communications. Both systems were assessed to be simple store-dump repeaters which were particularly useful in relaying traffic between the Russian Federation and overseas stations or forces. These Strela (which means "Arrow" in Russian) satellites recorded radio messages transmitted by Russian intelligence agents worldwide and relayed them when flying over Moscow. Debuting in 1970 was a system of small (61 kg, 0.80 m by 0.75 m) relay satellites launched from Plesetsk by the Kosmos booster in groups of eight. Although the mean altitude of this constellation was near 1500 km, each set of eight Strela 1 satellites was normally dispersed into slightly elliptical orbits with mean altitudes between 1430 and 1490 km. The intentional orbital period differences of about 0.15 min ensured that the satellites would become randomly spaced about the orbital plane shortly after launch. Unlike the lower altitude constellation, this network relied on a single orbital plane with an inclination of 74 deg which was replenished on the average of once each year. The last mission in this network was in June 1992, and the network has now been superseded by the more modern and capable Strela 3 system.

Alternate Names

- 20552

Facts in Brief

Launch Date: 1990-04-06
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 45.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2067

Experiments on Cosmos 2067

Data collections from Cosmos 2067

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2068

NSSDC ID: 1990-029E

Description

The lowest level of the three-tier communications satellite constellation was populated with two distinct systems devoted to military and government communications. Both systems were assessed to be simple store-dump repeaters which were particularly useful in relaying traffic between the Russian Federation and overseas stations or forces. These Strela (which means "Arrow" in Russian) satellites recorded radio messages transmitted by Russian intelligence agents worldwide and relayed them when flying over Moscow. Debuting in 1970 was a system of small (61 kg, 0.80 m by 0.75 m) relay satellites launched from Plesetsk by the Kosmos booster in groups of eight. Although the mean altitude of this constellation was near 1500 km, each set of eight Strela 1 satellites was normally dispersed into slightly elliptical orbits with mean altitudes between 1430 and 1490 km. The intentional orbital period differences of about 0.15 min ensured that the satellites would become randomly spaced about the orbital plane shortly after launch. Unlike the lower altitude constellation, this network relied on a single orbital plane with an inclination of 74 deg which was replenished on the average of once each year. The last mission in this network was in June 1992, and the network has now been superseded by the more modern and capable Strela 3 system.

Alternate Names

- 20553

Facts in Brief

Launch Date: 1990-04-06
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 45.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2068

Experiments on Cosmos 2068

Data collections from Cosmos 2068

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2069

NSSDC ID: 1990-029F

Description

The lowest level of the three-tier communications satellite constellation was populated with two distinct systems devoted to military and government communications. Both systems were assessed to be simple store-dump repeaters which were particularly useful in relaying traffic between the Russian Federation and overseas stations or forces. These Strela (which means "Arrow" in Russian) satellites recorded radio messages transmitted by Russian intelligence agents worldwide and relayed them when flying over Moscow. Debuting in 1970 was a system of small (61 kg, 0.80 m by 0.75 m) relay satellites launched from Plesetsk by the Kosmos booster in groups of eight. Although the mean altitude of this constellation was near 1500 km, each set of eight Strela 1 satellites was normally dispersed into slightly elliptical orbits with mean altitudes between 1430 and 1490 km. The intentional orbital period differences of about 0.15 min ensured that the satellites would become randomly spaced about the orbital plane shortly after launch. Unlike the lower altitude constellation, this network relied on a single orbital plane with an inclination of 74 deg which was replenished on the average of once each year. The last mission in this network was in June 1992, and the network has now been superseded by the more modern and capable Strela 3 system.

Alternate Names

- 20554

Facts in Brief

Launch Date: 1990-04-06
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 45.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2069

Experiments on Cosmos 2069

Data collections from Cosmos 2069

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2070

NSSDC ID: 1990-029G

Description

The lowest level of the three-tier communications satellite constellation was populated with two distinct systems devoted to military and government communications. Both systems were assessed to be simple store-dump repeaters which were particularly useful in relaying traffic between the Russian Federation and overseas stations or forces. These Strela (which means "Arrow" in Russian) satellites recorded radio messages transmitted by Russian intelligence agents worldwide and relayed them when flying over Moscow. Debuting in 1970 was a system of small (61 kg, 0.80 m by 0.75 m) relay satellites launched from Plesetsk by the Kosmos booster in groups of eight. Although the mean altitude of this constellation was near 1500 km, each set of eight Strela 1 satellites was normally dispersed into slightly elliptical orbits with mean altitudes between 1430 and 1490 km. The intentional orbital period differences of about 0.15 min ensured that the satellites would become randomly spaced about the orbital plane shortly after launch. Unlike the lower altitude constellation, this network relied on a single orbital plane with an inclination of 74 deg which was replenished on the average of once each year. The last mission in this network was in June 1992, and the network has now been superseded by the more modern and capable Strela 3 system.

Alternate Names

- 20555

Facts in Brief

Launch Date: 1990-04-06
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 45.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2070

Experiments on Cosmos 2070

Data collections from Cosmos 2070

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2071

NSSDC ID: 1990-029H

Description

The lowest level of the three-tier communications satellite constellation was populated with two distinct systems devoted to military and government communications. Both systems were assessed to be simple store-dump repeaters which were particularly useful in relaying traffic between the Russian Federation and overseas stations or forces. These Strela (which means "Arrow" in Russian) satellites recorded radio messages transmitted by Russian intelligence agents worldwide and relayed them when flying over Moscow. Debuting in 1970 was a system of small (61 kg, 0.80 m by 0.75 m) relay satellites launched from Plesetsk by the Kosmos booster in groups of eight. Although the mean altitude of this constellation was near 1500 km, each set of eight Strela 1 satellites was normally dispersed into slightly elliptical orbits with mean altitudes between 1430 and 1490 km. The intentional orbital period differences of about 0.15 min ensured that the satellites would become randomly spaced about the orbital plane shortly after launch. Unlike the lower altitude constellation, this network relied on a single orbital plane with an inclination of 74 deg which was replenished on the average of once each year. The last mission in this network was in June 1992, and the network has now been superseded by the more modern and capable Strela 3 system.

Alternate Names

- 20556

Facts in Brief

Launch Date: 1990-04-06
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 45.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2071

Experiments on Cosmos 2071

Data collections from Cosmos 2071

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2072

NSSDC ID: 1990-033A

Description

Cosmos 2072 was a Soviet digital photography surveillance satellite launched from the Baikonur cosmodrome aboard a Soyuz rocket. It remained in orbit for 225 days.

Alternate Names

- 20568

Facts in Brief

Launch Date: 1990-04-13
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 6600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2072

Experiments on Cosmos 2072

Data collections from Cosmos 2072

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2073

NSSDC ID: 1990-035A

Description

Cosmos 2073 was a Soviet military cartographic photo-surveillance satellite launched from the Plesetsk Cosmodrome aboard a Soyuz 11 rocket. It conducted an investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. Typical orbital profile: inclination 70 degrees with altitude of 350-420 km. Designed duration: 15 days. Transmission frequencies observed in West: 19.989 FSK; 39.978 FSK; 232.0 PPM-AM.

Alternate Names

- 20573

Facts in Brief

Launch Date: 1990-04-17
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2073

Experiments on Cosmos 2073

Data collections from Cosmos 2073

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2074

NSSDC ID: 1990-036A

Description

Cosmos 2074 was part of a 6-satellite Soviet military navigation system distributed in orbital planes spaced 30 degrees apart, and launched from the Plesetsk cosmodrome aboard a Cosmos rocket. Navigation information was derived from Doppler-shifted VHF transmissions (approximately 150 and 400 MHz) of the satellite position and orbital data. By acquiring fixes from several satellite, a user's location could be calculated with an accuracy of 100 m. The time needed to ascertain a position was dependent upon the user's latitude and the number of operational spacecraft in orbit. Normally, accurate location determination could be made within 1-2 hours.

Alternate Names

- 20577

Facts in Brief

Launch Date: 1990-04-20
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 825.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2074

Experiments on Cosmos 2074

Data collections from Cosmos 2074

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2075

NSSDC ID: 1990-038A

Description

From 1969 KB Yuzhnoye built the Lira targets for exercise and test of PVO air defence and space tracking systems. The second generation consisted of Taifun-1 and Taifun-2 satellites, which differed in the type of equipment installed. Taifun-1 would release up to 25 Romb sub-satellites, while Taifun-2 did not. In 1972 KB-3 under B E Khimrov, with the co-operation of assisting organisations and the Ministry of Defence, completed the draft project. The first Taifun-1 was completed in 1974, and flight trials were conducted in the second half of the 1970's using Kosmos-3M launch vehicles from Plesetsk and Kapustin Yar. The heads of the State Trials Commission were B N Karpov, N N Zhukov, and B G Zudin. Taifun-1 normally released 25 Romb subsatellites into an orbit of 300 to 500 km altitude, at inclinations of 50.7 degrees (from Kapustin Yar) and 65.9 74, or 82.9 degrees (from Plesetsk). Two unique missions in 1989-1990 were put into 180 km x 1550 km orbits at 65.8 degrees. With this higher apogee the payload was reduced to 10 Romb subsatellites. Vektor satellites were spherical in shape, about 2 m in diameter, the surface covered with solar cells and equipped with four antennae.

Alternate Names

- 20581

Facts in Brief

Launch Date: 1990-04-25
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 1000.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2075

Experiments on Cosmos 2075

Data collections from Cosmos 2075

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2076

NSSDC ID: 1990-040A

Description

Cosmos 2076 was a Soviet missile early warning satellite launched from the Plesetsk cosmodrome aboard a Molniya rocket. It was part of the Oko constellation of satellites and covered the plane 1 - 277 degree longitude of ascending node.

Alternate Names

- 20596

Facts in Brief

Launch Date: 1990-04-28
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1900.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2076

Experiments on Cosmos 2076

Data collections from Cosmos 2076

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2077

NSSDC ID: 1990-042A

Description

Cosmos 2077 was a Soviet high resolution photo reconnaissance satellite launched from the Plesetsk cosmodrome aboard a Soyuz rocket. It returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission.

Alternate Names

- 20604

Facts in Brief

Launch Date: 1990-05-07
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2077

Experiments on Cosmos 2077

Data collections from Cosmos 2077

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2078

NSSDC ID: 1990-044A

Description

Cosmos 2078 was a Soviet military cartography satellite launched from the Baikonur cosmodrome aboard a Soyuz 11 rocket.

It was used for topographic mapping for the Army General Staff. The Yantar-1KFT was equipped with the TK-350 topographic camera, which has a focal length of 350 mm, with photo negative size of 300 x 450 mm, covering an area of 200 x 300 km with a resolution of 10 m and a scale of 1:660,000. The camera was designed for exceptional geometric precision for cartographic purposes and each image overlaps the next by 60% to 80% to allow stereoscopic pairs to be made. Closeup images were made by the KVR-1000 camera with a focal length of 1000 mm, a negative size of 180 x 180 mm covering an area of 40 km x 40 km at 1:50,000 scale and 2 m resolution.

Alternate Names

- 20615

Facts in Brief

Launch Date: 1990-05-15
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 6600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2078

Experiments on Cosmos 2078

Data collections from Cosmos 2078

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2079

NSSDC ID: 1990-045A

Description

Cosmos 2079 was a Soviet Global Navigation Satellite System (GLONASS) satellite launched from the Baikonur cosmodrome aboard a Proton rocket. Originally established in order to locate the Soviet Union's civil aircraft and its merchant and fishing vessels, the signals were used by many American GPS system receivers as a complement/backup to the GPS system itself. The operational system contained 21 satellites in 3 orbital planes, with 3 on-orbit backups. Each satellite was identified by its slot number, which defined the orbital plane (1-8, 9-16, 17-24) and the location within the plane. The 3 orbital planes were separated 120 degrees, and the satellites within the same orbit plane by 45 degrees. The orbits were roughly circular with an inclination of about 64.8 degrees, a semi-axis of 25,440 km, and a period of 11h 15m 44s.

The 3-axis stabilized spacecraft possessed a mass of about 1,400 kg, a slight increase over the 1,250 original model. The diameter and height of the satellite bus were approximately 2.4 m and 3.7 m, respectively, with a solar array span of 7.2 m for an electrical power generation capability of 1.6 kW at beginning of life. The aft payload structure housed 12 primary antennas for L-band transmissions. Laser corner-cube reflectors were also carried to aid in precise orbit determination and geodetic research.

Alternate Names

- 20619

Facts in Brief

Launch Date: 1990-05-19
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 1400.0 kg Nominal
Power: 1600.0 W

Funding Agency

- Scientific Production Association(Russia) (U.S.S.R)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Cosmos 2079

Experiments on Cosmos 2079

Data collections from Cosmos 2079

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2080

NSSDC ID: 1990-045B

Description

Cosmos 2080 was a Soviet Global Navigation Satellite System (GLONASS) satellite launched from the Baikonur cosmodrome aboard a Proton rocket. Originally established in order to locate the Soviet Union's civil aircraft and its merchant and fishing vessels, the signals were used by many American GPS system receivers as a complement/backup to the GPS system itself. The operational system contained 21 satellites in 3 orbital planes, with 3 on-orbit backups. Each satellite was identified by its slot number, which defined the orbital plane (1-8, 9-16, 17-24) and the location within the plane. The 3 orbital planes were separated 120 degrees, and the satellites within the same orbit plane by 45 degrees. The orbits were roughly circular with an inclination of about 64.8 degrees, a semi-axis of 25,440 km, and a period of 11h 15m 44s.

The 3-axis stabilized spacecraft possessed a mass of about 1,400 kg, a slight increase over the 1,250 original model. The diameter and height of the satellite bus were approximately 2.4 m and 3.7 m, respectively, with a solar array span of 7.2 m for an electrical power generation capability of 1.6 kW at beginning of life. The aft payload structure housed 12 primary antennas for L-band transmissions. Laser corner-cube reflectors were also carried to aid in precise orbit determination and geodetic research.

Alternate Names

- 20620

Facts in Brief

Launch Date: 1990-05-19
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 1400.0 kg
Nominal Power: 1600.0 W

Funding Agency

- Scientific Production Association(Russia) (U.S.S.R)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Cosmos 2080

Experiments on Cosmos 2080

Data collections from Cosmos 2080

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2081

NSSDC ID: 1990-045C

Description

Cosmos 2081 was a Soviet Global Navigation Satellite System (GLONASS) satellite launched from the Baikonur cosmodrome aboard a Proton rocket. Originally established in order to locate the Soviet Union's civil aircraft and its merchant and fishing vessels, the signals were used by many American GPS system receivers as a complement/backup to the GPS system itself. The operational system contained 21 satellites in 3 orbital planes, with 3 on-orbit backups. Each satellite was identified by its slot number, which defined the orbital plane (1-8, 9-16, 17-24) and the location within the plane. The 3 orbital planes were separated 120 degrees, and the satellites within the same orbit plane by 45 degrees. The orbits were roughly circular with an inclination of about 64.8 degrees, a semi-axis of 25,440 km, and a period of 11h 15m 44s.

The 3-axis stabilized spacecraft possessed a mass of about 1,400 kg, a slight increase over the 1,250 original model. The diameter and height of the satellite bus were approximately 2.4 m and 3.7 m, respectively, with a solar array span of 7.2 m for an electrical power generation capability of 1.6 kW at beginning of life. The aft payload structure housed 12 primary antennas for L-band transmissions. Laser corner-cube reflectors were also carried to aid in precise orbit determination and geodetic research.

Alternate Names

- 20621

Facts in Brief

Launch Date: 1990-05-19
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 1400.0 kg
Nominal Power: 1600.0 W

Funding Agency

- Scientific Production Association(Russia) (U.S.S.R)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Cosmos 2081

Experiments on Cosmos 2081

Data collections from Cosmos 2081

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2082

NSSDC ID: 1990-046A

Description

Cosmos 2082 was a Soviet ELINT (Electronic and Signals Intelligence) satellite launched from the Baikonur cosmodrome aboard a Zenit 2 rocket.

Based on the first generation Tselina ELINT, TSNII-KS at the beginning of the 1970's developed the specifications for an improved model with increased frequency range and on-board method of determining the position of fixed transmitters. The Tselina-2 was authorised in March 1973 and handled by prime contractor TsNIRTI Minradioprom (M E Zaslovskiy) for the ELINT equipment and KB Yuzhnoye (KB-3, B S Khimrov) for the spacecraft bus. The launch vehicle was by OKB MEI Minvuza (A F Bogomolov) and the encrypted communications system by 0-TsNII KS MO. The draft project was drawn up in the first quarter of 1974 and the MO approved the TTZ in May 1974. After a long review process the VPK issued the project plan for development of the system in December 1976. It would now use the new Zenit launch vehicle. The first flight trials system was completed in December 1980, but delays in the development of the Zenit launch vehicle meant that the first two trials flights had to be aboard Proton boosters in 1984 and 1985. Zenit-boosted flights began in 1985 and the system was accepted into service in 1987.

Alternate Names

- 20624

Facts in Brief

Launch Date: 1990-05-22
Launch Vehicle: Zenit
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 6000.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2082

Experiments on Cosmos 2082

Data collections from Cosmos 2082

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2083

NSSDC ID: 1990-053A

Description

Cosmos 2083 was a Soviet military cartographic photo-surveillance satellite launched from the Plesetsk Cosmodrome aboard a Soyuz 11 rocket. It conducted an investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. Typical orbital profile: inclination 70 degrees with altitude of 350-420 km. Designed duration: 15 days. Transmission frequencies observed in West: 19.989 FSK; 39.978 FSK; 232.0 PPM-AM.

Alternate Names

- 20657

Facts in Brief

Launch Date: 1990-06-19
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2083

Experiments on Cosmos 2083

Data collections from Cosmos 2083

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2084

NSSDC ID: 1990-055A

Description

Cosmos 2084 was a Soviet missile early warning satellite launched from the Plesetsk cosmodrome aboard a Molniya rocket. It was part of the Oko constellation of satellites but was launched into an erronous orbit. There was no communication with the satellite.

Alternate Names

- 20663

Facts in Brief

Launch Date: 1990-06-21
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1800.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2084

Experiments on Cosmos 2084

Data collections from Cosmos 2084

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2085

NSSDC ID: 1990-061A

Description

Cosmos 2085 was a Soviet military second generation global command and control system (GKKRS) satellite launched from the Baiknour cosmodrome aboard a Proton K rocket. These satellites were integrated with the Luch geostationary system and featured retransmission of high rate data retransmission in the centimetre wavelength range. While Luch handled communications between spacecraft and ground stations, Potok handled communications between fixed points and digital data from the Yantar-4KS1 electroptical reconnaissance satellite. Potok was the first communications spacecraft built by the Lavochkin design bureau and used the Splav-2 transponder by NPO Elas.

Potok is said by one account to have utilized the KAUR-4 spacecraft bus. This had an active 3-axis orientation system, with a single central body from which extended 40 square metres of solar panels. Its basic structure was that of the KAUR-3, but it was equipped with completely new systems: a digital computer, plasma station-keeping engines, hydrazine monopropellant orientation engines, and actively-scanned antennae arrays with 0.5 degrees antenna and 0.1 degree spacecraft pointing accuracy. Cosmos 2085 was stationed at 80 deg E.

Alternate Names

- 20693

Facts in Brief

Launch Date: 1990-07-18
Launch Vehicle: Proton-K
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 2150.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2085

Experiments on Cosmos 2085

Data collections from Cosmos 2085

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2086

NSSDC ID: 1990-062A

Description

Cosmos 2086 was a Soviet military cartographic photo-surveillance satellite launched from the Plesetsk Cosmodrome aboard a Soyuz 11 rocket. It conducted an investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. Typical orbital profile: inclination 70 degrees with altitude of 350-420 km. Designed duration: 15 days. Transmission frequencies observed in West: 19.989 FSK; 39.978 FSK; 232.0 PPM-AM.

Alternate Names

- 20702

Facts in Brief

Launch Date: 1990-07-20
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2086

Experiments on Cosmos 2086

Data collections from Cosmos 2086

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2087

NSSDC ID: 1990-064A

Description

Cosmos 2087 was a Soviet missile early warning satellite launched from the Plesetsk cosmodrome aboard a Molniya rocket. It was part of the Oko constellation and covered the plane 6 - 117 degree longitude of ascending node.

Alternate Names

- 20707

Facts in Brief

Launch Date: 1990-07-25
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1900.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2087

Experiments on Cosmos 2087

Data collections from Cosmos 2087

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2088

NSSDC ID: 1990-066A

Description

Cosmos 2088 was a Soviet geodetic satellite launched from the Plesetsk cosmodrome aboard a Tsyklon 3 rocket. It provided five ways for determining satellite position:

1. Doppler system working at 150 and 400 MHz and providing 3 cm accuracy 2. High intensity lights flashing 3 times per second, allowing precise location by ground observatories 3. Radio transponder working at 5.7/3.4 GHz and providing 5 m accuracy 4. Laser reflector providing 1.5 m accuracy 5. Radar reflector working at 9.4 GHz providing 5 m altitude accuracy.

Alternate Names

- 20720

Facts in Brief

Launch Date: 1990-07-30
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 1500.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Cosmos 2088

Experiments on Cosmos 2088

Data collections from Cosmos 2088

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2089

NSSDC ID: 1990-069A

Description

Cosmos 2089 was a Soviet photo surveillance satellite launched from the Plesetsk cosmodrome aboard a Soyuz rocket. Two small film capsules were recovered in flight and the main reentry capsule with remaining film, camera, and computer systems at end of flight.

Alternate Names

- 20732

Facts in Brief

Launch Date: 1990-08-03
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2089

Experiments on Cosmos 2089

Data collections from Cosmos 2089

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2090

NSSDC ID: 1990-070A

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 20735

Facts in Brief

Launch Date: 1990-08-08
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2090

Experiments on Cosmos 2090

Data collections from Cosmos 2090

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2091

NSSDC ID: 1990-070B

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 20736

Facts in Brief

Launch Date: 1990-08-08
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2091

Experiments on Cosmos 2091

Data collections from Cosmos 2091

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2092

NSSDC ID: 1990-070C

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 20737

Facts in Brief

Launch Date: 1990-08-08
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2092

Experiments on Cosmos 2092

Data collections from Cosmos 2092

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2093

NSSDC ID: 1990-070D

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 20738

Facts in Brief

Launch Date: 1990-08-08
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2093

Experiments on Cosmos 2093

Data collections from Cosmos 2093

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2094

NSSDC ID: 1990-070E

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 20739

Facts in Brief

Launch Date: 1990-08-08
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2094

Experiments on Cosmos 2094

Data collections from Cosmos 2094

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
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Cosmos 2095

NSSDC ID: 1990-070F

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 20740

Facts in Brief

Launch Date: 1990-08-08
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2095

Experiments on Cosmos 2095

Data collections from Cosmos 2095

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
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Cosmos 2096

NSSDC ID: 1990-075A

Description

Cosmos 2096 was a Soviet naval reconnaisance satellite launched from the Baiknour cosmodrome aboard a Tsyklon 2 rocket. This naval forces monitoring spacecraft was used to determine the position of enemy naval forces through detection and triangulation of their electromagnetic emissions (radio, radar, etc).

Alternate Names

- 20765

Facts in Brief

Launch Date: 1990-08-23
Launch Vehicle: Tsiklon-2
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 3000.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2096

Experiments on Cosmos 2096

Data collections from Cosmos 2096

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2097

NSSDC ID: 1990-076A

Description

Cosmos 2097 was a Soviet missile early warning satellite launched from the Plesetsk cosmodrome aboard a Molniya rocket. It was part of the Oko constellation of satellites and covered the plane 6 - 357 degree longitude of ascending node.

Alternate Names

- 20767

Facts in Brief

Launch Date: 1990-08-28
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1900.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2097

Experiments on Cosmos 2097

Data collections from Cosmos 2097

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
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Cosmos 2098

NSSDC ID: 1990-078A

Description

Cosmos 2098 was a Soviet atmospheric research satellite launched from the Plesetsk cosmodrome aboard a Kosmos 11 rocket. It was part of a series of Vektor spacecraft.

Alternate Names

- 20774

Facts in Brief

Launch Date: 1990-08-28
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 550.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Cosmos 2098

Experiments on Cosmos 2098

Data collections from Cosmos 2098

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2099

NSSDC ID: 1990-080A

Description

Cosmos 2099 was a Soviet military cartographic photo-surveillance satellite launched from the Plesetsk Cosmodrome aboard a Soyuz 11 rocket. It conducted an investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. Typical orbital profile: inclination 70 degrees with altitude of 350-420 km. Designed duration: 15 days. Transmission frequencies observed in West: 19.989 FSK; 39.978 FSK; 232.0 PPM-AM.

Alternate Names

- 20779

Facts in Brief

Launch Date: 1990-08-31
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2099

Experiments on Cosmos 2099

Data collections from Cosmos 2099

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2100

NSSDC ID: 1990-083A

Description

Cosmos 2100 was part of a 6-satellite Soviet military navigation system distributed in orbital planes spaced 30 degrees apart, and launched from the Plesetsk cosmodrome aboard a Cosmos rocket. Navigation information was derived from Doppler-shifted VHF transmissions (approximately 150 and 400 MHz) of the satellite position and orbital data. By acquiring fixes from several satellite, a user's location could be calculated with an accuracy of 100 m. The time needed to ascertain a position was dependent upon the user's latitude and the number of operational spacecraft in orbit. Normally, accurate location determination could be made within 1-2 hours.

Alternate Names

- 20804

Facts in Brief

Launch Date: 1990-09-14
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 810.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Cosmos 2100

Experiments on Cosmos 2100

Data collections from Cosmos 2100

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2101

NSSDC ID: 1990-087A

Description

Cosmos 2101 was the second of the sixth generation photo reconnaisance satellites launched from the Baikonur cosmodrome using the Soyuz-U2 launch vehicle, which had otherwise been restricted to supporting Soyuz-TM and Progress-M missions. The spacecraft was inserted into an orbital inclination of 64.8 degrees with mean operational altitudes normally between 240 and 260 km. The sixth generation spacecraft, believed to carry both film return capsules and digital transmission capabilities, have only flown six times; once each year during 1989-1993 and once in 1997.

Alternate Names

- 20828

Facts in Brief

Launch Date: 1990-10-01
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 6700.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2101

Experiments on Cosmos 2101

Data collections from Cosmos 2101

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2102

NSSDC ID: 1990-092A

Description

Cosmos 2102 was a Soviet photo surveillance satellite launched from the Plesetsk cosmodrome aboard a Soyuz rocket. Two small film capsules were recovered in flight and the main reentry capsule with remaining film, camera, and computer systems at end of flight

Alternate Names

- 20909

Facts in Brief

Launch Date: 1990-10-16
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6200.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2102

Experiments on Cosmos 2102

Data collections from Cosmos 2102

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2103

NSSDC ID: 1990-096A

Description

Cosmos 2103 was a Soviet naval reconnaisance satellite launched from the Baikonur cosmodrome aboard a Tsyklon 2 rocket. This naval forces monitoring spacecraft was used to determine the position of enemy naval forces through detection and triangulation of their electromagnetic emissions (radio, radar, etc).

Alternate Names

- 20933

Facts in Brief

Launch Date: 1990-11-14
Launch Vehicle: Tsiklon-2
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 3000.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2103

Experiments on Cosmos 2103

Data collections from Cosmos 2103

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2104

NSSDC ID: 1990-098A

Description

Cosmos 2104 was a Soviet military cartographic photo-surveillance satellite launched from the Plesetsk Cosmodrome aboard a Soyuz 11 rocket. It conducted an investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. Typical orbital profile: inclination 70 degrees with altitude of 350-420 km. Designed duration: 15 days. Transmission frequencies observed in West: 19.989 FSK; 39.978 FSK; 232.0 PPM-AM.

Alternate Names

- 20936

Facts in Brief

Launch Date: 1990-11-16
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2104

Experiments on Cosmos 2104

Data collections from Cosmos 2104

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
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Cosmos 2105

NSSDC ID: 1990-099A

Description

Cosmos 2105 was a Soviet missile early warning satellite launched from the Plesetsk cosmodrome aboard a Molniya rocket. It was part of the Oko constellation of satellites and covered the planes 3/4 - 12 degree longitude of ascending node.

Alternate Names

- 20941

Facts in Brief

Launch Date: 1990-11-20
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1900.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2105

Experiments on Cosmos 2105

Data collections from Cosmos 2105

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2106

NSSDC ID: 1990-104A

Description

Cosmos 2106 was a Soviet ELINT (Electronic and Signals Intelligence) satellite launched from the Plesetsk cosmodrome.

From 1965 to 1967 two dedicated ELINT systems were tested: the Tselina and the Navy's US. Both reached service, since the Ministry of Defence could not force a single system on the military services.

Tselina was developed by Yuzhnoye and consisted of two satellites: Tselina-O for general observations and Tselina-D for detailed observations. ELINT systems for Tselina were first tested under the Cosmos designation in 1962 to 1965. The first Tselina-O was launched in 1970. The Tselina-D took a long time to enter service due to delays in payload development and weight growth. The whole Tselina system was not operational until 1976. Constant improvement resulted in Tselina-O being abandoned in 1984 and all systems being put on Tselina-D.

Alternate Names

- 20966

Facts in Brief

Launch Date: 1990-11-28
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 3000.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2106

Experiments on Cosmos 2106

Data collections from Cosmos 2106

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2108

NSSDC ID: 1990-109A

Description

Cosmos 2108 was a Soviet photo surveillance satellite launched from the Plesetsk cosmodrome aboard a Soyuz rocket. Two small film capsules were recovered in flight and the main reentry capsule with remaining film, camera, and computer systems at end of flight

Alternate Names

- 21000

Facts in Brief

Launch Date: 1990-12-04
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2108

Experiments on Cosmos 2108

Data collections from Cosmos 2108

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2110

NSSDC ID: 1990-110B

Description

Cosmos 2110 was a Soviet Global Navigation Satellite System (GLONASS) satellite launched from the Baikonur cosmodrome aboard a Proton rocket. Originally established in order to locate the Soviet Union's civil aircraft and its merchant and fishing vessels, the signals were used by many American GPS system receivers as a complement/backup to the GPS system itself. The operational system contained 21 satellites in 3 orbital planes, with 3 on-orbit backups. Each satellite was identified by its slot number, which defined the orbital plane (1-8, 9-16, 17-24) and the location within the plane. The 3 orbital planes were separated 120 degrees, and the satellites within the same orbit plane by 45 degrees. The orbits were roughly circular with an inclination of about 64.8 degrees, a semi-axis of 25,440 km, and a period of 11h 15m 44s.

The 3-axis stabilized spacecraft possessed a mass of about 1,400 kg, a slight increase over the 1,250 original model. The diameter and height of the satellite bus were approximately 2.4 m and 3.7 m, respectively, with a solar array span of 7.2 m for an electrical power generation capability of 1.6 kW at beginning of life. The aft payload structure housed 12 primary antennas for L-band transmissions. Laser corner-cube reflectors were also carried to aid in precise orbit determination and gedetic research.

Alternate Names

- 21007

Facts in Brief

Launch Date: 1990-12-10
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 1400.0 kg Nominal
Power: 1600.0 W

Funding Agency

- Scientific Production Association(Russia) (U.S.S.R)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Cosmos 2110

Experiments on Cosmos 2110

Data collections from Cosmos 2110

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2111

NSSDC ID: 1990-110C

Description

Cosmos 2111 was a Soviet Global Navigation Satellite System (GLONASS) satellite launched from the Baikonur cosmodrome aboard a Proton rocket. Originally established in order to locate the Soviet Union's civil aircraft and its merchant and fishing vessels, the signals were used by many American GPS system receivers as a complement/backup to the GPS system itself. The operational system contained 21 satellites in 3 orbital planes, with 3 on-orbit backups. Each satellite was identified by its slot number, which defined the orbital plane (1-8, 9-16, 17-24) and the location within the plane. The 3 orbital planes were separated 120 degrees, and the satellites within the same orbit plane by 45 degrees. The orbits were roughly circular with an inclination of about 64.8 degrees, a semi-axis of 25,440 km, and a period of 11h 15m 44s.

The 3-axis stabilized spacecraft possessed a mass of about 1,400 kg, a slight increase over the 1,250 original model. The diameter and height of the satellite bus were approximately 2.4 m and 3.7 m, respectively, with a solar array span of 7.2 m for an electrical power generation capability of 1.6 kW at beginning of life. The aft payload structure housed 12 primary antennas for L-band transmissions. Laser corner-cube reflectors were also carried to aid in precise orbit determination and gedetic research.

Alternate Names

- 21008

Facts in Brief

Launch Date: 1990-12-08
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 1400.0 kg
Nominal Power: 1600.0 W

Funding Agency

- Scientific Production Association(Russia) (U.S.S.R)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Cosmos 2111

Experiments on Cosmos 2111

Data collections from Cosmos 2111

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2112

NSSDC ID: 1990-111A

Description

The lowest level of the three-tier communications satellite constellation is now populated with two distinct systems devoted to military and government communications. Both systems are assessed to be simple store-dump repeaters which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations of forces. The first Strela (which means "Arrow" in Russian) system debuted in 1970 and consisted of 750 - 1000 kg satellites deployed at mean altitudes of 800 km in three orbital planes inclined 74 degrees to the equator and spaced 120 degrees apart. These Strela 2 spacecraft were launched separately by the Kosmos launch vehicle from the Plesetsk cosmodrome into each orbital plane at intervals of 24-36 months. The activity of these satellites could be monitored via a characteristic CW beacon emitted on a frequency of 153.660 MHz.

Alternate Names

- 21014

Facts in Brief

Launch Date: 1990-12-10
Launch Vehicle: Cosmos
Launch Site: Plesetsk, U.S.S.R
Mass: 900.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2112

Experiments on Cosmos 2112

Data collections from Cosmos 2112

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2113

NSSDC ID: 1990-113A

Description

Cosmos 2113 was a Soviet digital photo surveillance satellite launched from the Baikonur cosmodrome aboard a Soyuz 11 rocket. It remained in orbit for 172 days.

Alternate Names

- 21026

Facts in Brief

Launch Date: 1990-12-21
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 6600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2113

Experiments on Cosmos 2113

Data collections from Cosmos 2113

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Cosmos 2114

NSSDC ID: 1990-114A

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 21028

Facts in Brief

Launch Date: 1990-12-22
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2114

Experiments on Cosmos 2114

Data collections from Cosmos 2114

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

National Aeronautics and Space Administration

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Cosmos 2115

NSSDC ID: 1990-114B

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 21029

Facts in Brief

Launch Date: 1990-12-22
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2115

Experiments on Cosmos 2115

Data collections from Cosmos 2115

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2116

NSSDC ID: 1990-114C

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 21030

Facts in Brief

Launch Date: 1990-12-22
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2116

Experiments on Cosmos 2116

Data collections from Cosmos 2116

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2117

NSSDC ID: 1990-114D

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 21031

Facts in Brief

Launch Date: 1990-12-22
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2117

Experiments on Cosmos 2117

Data collections from Cosmos 2117

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2118

NSSDC ID: 1990-114E

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 21032

Facts in Brief

Launch Date: 1990-12-22
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2118

Experiments on Cosmos 2118

Data collections from Cosmos 2118

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2119

NSSDC ID: 1990-114F

Description

The Strela 3 system was a communications satellite constellation devoted to military and government communications. It was a simple store-dump repeater system which were particularly useful in relaying non-essential traffic between the Russian Federation and overseas stations or forces. The Strela 3 system, which began in 1985, was launched by the Tsyklon-3 booster from the Plesetsk cosmodrome into orbits near 1400 km at inclinations of 82.6 degrees with six spacecraft stacked atop each launch vehicle. Two orbital planes were spaced 90 degrees apart, apparently each contained 10-12 operational spacecraft. Normally, two missions were conducted per year, suggesting an average spacecraft life-time of approximately 24 months. The 220 kg spacecraft had a diameter of 1.0 m and a main bus height of 1.5 m. A gravity-gradient beam was extended on-orbit to provide attitude stabilization.

Alternate Names

- 21033

Facts in Brief

Launch Date: 1990-12-22
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 220.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Cosmos 2119

Experiments on Cosmos 2119

Data collections from Cosmos 2119

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Cosmos 2120

NSSDC ID: 1990-115A

Description

Cosmos 2120 was a Soviet military cartographic photo-surveillance satellite launched from the Plesetsk Cosmodrome aboard a Soyuz 11 rocket. It conducted an investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. Typical orbital profile: inclination 70 degrees with altitude of 350-420 km. Designed duration: 15 days. Transmission frequencies observed in West: 19.989 FSK; 39.978 FSK; 232.0 PPM-AM.

Alternate Names

- 21035

Facts in Brief

Launch Date: 1990-12-26
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for Cosmos 2120

Experiments on Cosmos 2120

Data collections from Cosmos 2120

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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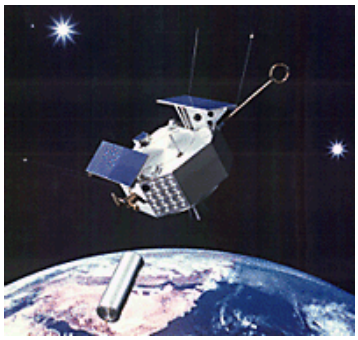

CRRES

CRRES

NSSDC ID: 1990-065A

Description

The Combined Release and Radiation Effects Satellite (CRRES) was launched into a geosynchronous transfer orbit (GTO) for a nominal three-year mission to investigate fields, plasmas, and energetic particles inside the Earth's magnetosphere. As part of the CRRES program the SPACERAD (Space Radiation Effects) project, managed by Air Force Geophysics Laboratory, investigated the radiation environment of the inner and outer radiation belts and measured radiation effects on state-of-the-art microelectronics devices. Other magnetospheric, ionospheric, and cosmic ray experiments were included onboard CRRES and supported by NASA or the Office of Naval Research. The chemical release project was managed by NASA/MSFC and utilized the release of chemicals from onboard canisters at low altitudes near dawn and dusk perigee times and at high altitudes near local midnight. The chemical releases were monitored with optical and radar instrumentation by ground-based observers to measure the bulk properties and movement of the expanding clouds of photo-ionized plasma along field lines after the releases occurred. In order to study the magnetosphere at different local times during the mission, the satellite orbit was designed to precess with respect to the earth-sun line such that the local time at apogee decreased by 2.5 minutes/day from 08:00 (LT) just after launch and returned to this position in nineteen-month cycles. The CRRES spacecraft had the shape of an octagonal prism with solar arrays on the top side. The prism is 1 m high and 3 m between opposite faces. Four of the eight compartments were for the chemical canisters and the other four housed SPACERAD and other experiments. The spacecraft body was spun at 2.2 rpm about a spin axis in the ecliptic plane and kept pointed about 12 degrees ahead of the Sun's apparent motion in celestial coordinates. Pre-launch and in-flight operations were supported by the Space Test and Transportation Program Office of the U.S. Air Force Space Division. Contact with the CRRES spacecraft was lost on October 12, 1991 and was presumed to be due to onboard battery failure.

Alternate Names

- Combined Release and Radiation Effects Satellite
- 20712

Facts in Brief

Launch Date: 1990-07-25
Launch Vehicle: Atlas-Centaur
Launch Site: Cape Canaveral, United States
Mass: 4383.0 kg

Funding Agencies

- NASA-Office of Space Science Applications (United States)
- Department of Defense-Department of the Air Force (United States)

Discipline

- Space Physics

Additional Information

- Launch/Orbital information for CRRES

Experiments on CRRES

Data collections from CRRES

Questions or comments about this spacecraft can be directed to: Dr. Timothy E. Eastman.

Personnel

Name	Role	Original Affiliation	E-mail
Mr. R. Gracen Joiner	Project Manager	US Navy Office of Naval Research	
Dr. E. Gary Mullen	Project Manager	Phillips Laboratory (nee USAF Geophysics Lab, nee Cambridge Labs)	
Dr. Susan Gussenhoven-Shea	Project Scientist	Phillips Laboratory (nee USAF Geophysics Lab, nee Cambridge Labs)	
Dr. Charles P. Holmes	Program Scientist	NASA Headquarters	cholmes@mail.hq.nasa.gov
Dr. David L. Reasoner	Project Scientist	NASA Marshall Space Flight Center	
Dr. John F. Stone	Project Manager	NASA Marshall Space Flight Center	

Other CRRES Data/Information at NSSDC

Retrieve magnetospheric data from NSSDC's anonymous FTP site
Newsletter Article about CRRES Radiation Belt Data On-Line at NSSDC
MEA Energetic Electron Data (CDAWeb)

Other Sources of CRRES Data/Information

CRRES Users Guide

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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DEBUT

NSSDC ID: 1990-013B

Description

DEBUT (Deployable Boom and Umbrella Test) was a Japanese technology satellite launched by the same 2-stage H-1 rocket that launched MOS-1B. It carried a retractible 1.46-m boom and 24-panel aerodynamic umbrella to verify deployment operations in space. Such umbrellas may one day be used to lower orbits of geostationary satellite or as aerodynamic braking mechanisms for lunar/planetary missions. Developed by the National Aerospace Laboratory, DEBUT was separated from the second stage 60 m, 21 sec after liftoff. The national name for this satellite was Orizuru meaning "folded paper crane" in Japanese.

Alternate Names

- Orizuru
- Deploy Boom Umbrlla Test
- 20479

Facts in Brief

Launch Date: 1990-02-07
Launch Vehicle: H-1
Launch Site: Tanegashima, Japan
Mass: 50.0 kg

Funding Agency

- Unknown (Japan)

Discipline

- Engineering

Additional Information

- Launch/Orbital information for DEBUT

Experiments on DEBUT

Data collections from DEBUT

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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DFS Kopernikus 2

NSSDC ID: 1990-063B

Description

The German telecommunications satellite, DFS Kopernikus 2, was lofted with TDF-2 aboard an Ariane 44L booster from Kourou, French Guiana. The satellite was the second in a two-satellite system providing telephone service, television and radio broadcasts to Germany and neighboring East and West European countries. It carried 11 transponders, 3 operating at 14/11 GHz, 7 at 14/12 GHz, and 1 at 30/20 GHz. Maximum EIRP was 54 dbW. The satellite was built by a German consortium, RDSF, for Deutsche Bundespost Telekom. It was a 3.4 by 1.7 by 2.9 m box, spanning 15.4 m with solar arrays deployed. DFS Kopernikus 2, stationed above 28.5 deg. e long., supplements the coverage area of the Flight 1 satellite in orbit since June 1989. It has a 10-year design life.

Alternate Names

- 20706

Facts in Brief

Launch Date: 1990-07-24
Launch Vehicle: Ariane 44L
Launch Site: Kourou, French Guiana
Mass: 850.0 kg
Nominal Power: 1550.0 W

Funding Agency

- Deutsche Bundespost (Federal Republic of Germany)

Discipline

- Communications

Additional Information

- Launch/Orbital information for DFS Kopernikus 2

Experiments on DFS Kopernikus 2

Data collections from DFS Kopernikus 2

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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DMSP 5D-2/F10

NSSDC ID: 1990-105A

Description

DMSP 5D-2/F10 is one of a series of meteorological satellites developed and operated by the Air Force under the Defense Meteorological Satellite Program (DMSP). This program, previously known as DAPP (Data Acquisition and Processing Program), was classified until March 1973. The objective of this program is to provide global visual and infrared cloudcover data and specialized environmental data to support Department of Defense operational weather analysis and forecasting requirements. Operationally, the program consists of two satellites in sun-synchronous polar orbits, with the ascending node of one satellite in early morning and the other at local noon. The 6.4-m-long spacecraft is separated into four sections: (1) a precision mounting platform for sensors and equipment requiring precise alignment; (2) an equipment support module containing the electronics, reaction wheels, and some meteorological sensors; (3) a reaction control equipment support structure containing the third-stage rocket motor and supporting the ascent phase reaction control equipment; and (4) a 9.29-sq-m solar cell panel. The spacecraft stabilization is controlled by a combination flywheel and magnetic control coil system so that sensors are maintained in the desired earth-looking mode. One feature is the precision-pointing accuracy of the primary imager to 0.01 deg provided by a star sensor and an updated ephemeris navigation system. This allows automatic geographical mapping of the digital imagery to the nearest picture element. The operational linescan system is the primary data acquisition system that provides real-time or stored, multi-orbit, day-and-night, visual and infrared imagery of clouds. A supplementary sensor package contains five special sensors: (1) a microwave temperature sounder, (2) an advanced X-ray detector, (3) an ionospheric/scintillation monitor, (4) a precipitating electron/ion spectrometer, and (5) a microwave imager. Either recorded or real-time data are transmitted to ground-receiving sites by two redundant S-band transmitters. Recorded data are read out to tracking sites located at Fairchild AFB, Washington, and at Loring AFB, Maine, and relayed by SATCOM to Air Force Global Weather Central, Offutt AFB, Nebraska. Real-time data are read out at mobile tactical sites located around the world. Additional information concerning this satellite can be found in the report by D. A. Nichols, "The Defense Meteorological Satellite Program," Optical Engineering, v. 14, n. 4, p. 273, July-August 1975.

Alternate Names

- DMSP-F10
- USA 68
- 20978

Facts in Brief

Launch Date: 1990-12-01
Launch Vehicle: Atlas E
Launch Site: Vandenberg AFB, United States
Mass: 468.0 kg

Funding Agency

- Department of Defense-Department of the Air Force (United States)

Disciplines

- Astronomy
- Earth Science
- Space Physics

Additional Information

- Launch/Orbital information for DMSP 5D-2/F10

Experiments on DMSP 5D-2/F10

Data collections from DMSP 5D-2/F10

Questions or comments about this spacecraft can be directed to: Dr. Dieter K. Bilitza.

Personnel

Name	Role	Original Affiliation	E-mail
Col J. Rivers	Program Manager	US Air Force Space Division	

Other Sources of DMSP Data/Information

SSIES ion data (U. Texas - Dallas)
DMSP data (National Geophysical Data Center)
DMSP F10 summary (NASA MSFC)

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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EUTELSAT-II F1

NSSDC ID: 1990-079B

Description

EUTELSAT-II F1 was launched by the same Ariane launch vehicle that launched Skynet 4C. It was part of a constellation of 5 EUTELSAT II satellites that were basically identical except for EUTELSAT II-F6 which was modified for colocation at 13 degrees E and renamed Hot Bird 1.

With the arrival of the W series of satellites at the orbital positions until now used by EUTELSAT II-F1, F2, F3, and F4, these satellites were gradually relocated to new positions where they could continue to be used for a full range of telecommunications and television services.

Alternate Names

- 20777

Facts in Brief

Launch Date: 1990-08-30
Launch Vehicle: Ariane 44LP
Launch Site: Kourou, French Guiana
Mass: 1874.7 kg

Funding Agency

- European Telecommunications Satellite Consortium (International)

Discipline

- Communications

Additional Information

- Launch/Orbital information for EUTELSAT-II F1

Experiments on EUTELSAT-II F1

Data collections from EUTELSAT-II F1

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Fanhui Shi Weixing 1

NSSDC ID: 1990-089A

Description

Fanhui Shi Weixing 1, F12 (PRC 33) was a Chinese recoverable satellite launched from the Jaiquan launch facility aboard a Long March 2C booster. It was the 13th flight in the series, the 12th to succeed. Fanhui Shi Weixing, for Recoverable Test Satellite, was dome shaped, 3.14m long with a 2.2 m base. The descent craft was beehive-shaped, 1.5 m long with a 1.6 m base. Overall mass was 2.6 metric tons; descent capsule mass was 2,080 kg. The capsule, carrying plants and animals for zero-gravity studies, was recovered after 8 days in orbit on October 13 at 3:59.

Alternate Names

- PRC 33
- FSW-1 3
- 20838

Facts in Brief

Launch Date: 1990-10-05
Launch Vehicle: Long March 2
Launch Site: Jiuquan, Peoples Republic of China
Mass: 2080.0 kg

Funding Agency

- Unknown (Peoples Republic of China)

Discipline

- Life Science

Additional Information

- Launch/Orbital information for Fanhui Shi Weixing 1

Experiments on Fanhui Shi Weixing 1

Data collections from Fanhui Shi Weixing 1

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Fengyun 1B

NSSDC ID: 1990-081A

Description

In 1988 and again in 1990 the People's Republic of China launched FY-1 (Feng Yun - Wind and Cloud) meterological satellites into approximately 900 km, 99 degree inclination orbits by CZ-4 boosters from the Taiyuan space center. The spacecraft were designed to be comparable to existing international LEO meteorological and remote sensing systems, including APT transmissions in the 137 MHz band. The satellite structure and support systems were created by the Shanghai Satellite Engineering and Research Center of the China Space Technology Institute, whereas the payload was developed by the Shanghai Technical Physics Institute of the Chinese Academy of Sciences.

Both satellites were experimental to test systems prior to the launch of operational Feng Yun 1 spacecraft and were similar in design, although technical characteristics differed. The height of the cubical spacecraft bus (1.4 m by 1.4 m base) of Feng Yun 1A was apparently increased from 1.2 m to nearly 1.8 m for Feng Yun 1B. Likewise, total spacecraft mass increased from 750 kg to about 880 kg. Both satellites were powered by two solar arrays (about 3.5 m long each) with a combined rating of more than 800 W. Nickel- cadmium batteries were used for electrical power storage. Attitude control was maintained by a combination of nitrogen cold gas thrusters and reaction wheels, although both spacecraft suffered serious malfunctions in this system. Feng Yun 1A was lost after only 38 days, but Feng Yun 1B operated for more than a year.

The Feng Yun 1 primary payload consisted of two Very High Resolution Scanning Radiometers (VHRSR) with a combined mass of 95 kg. These optical-mechanical scanners operated at 360 rpm with a 20-cm diameter primary mirror. The five spectral bands used were 0.58-0.68 um, 0.725-1.1 um, 0.48-0.53 um, 053-0.58 um, and 10.5-12.5 um. The system swath was 2,860 km with a 1.08-km resolution in the High Resolution Picture Transmission (HRPT) mode and 4-km resolution in the Automatic Picture Transmission (APT) mode.

Alternate Names

- FY-1B
- PRC 30
- Fengyuan 1B
- China 30
- 20788

Facts in Brief

Launch Date: 1990-09-03
Launch Vehicle: Long March 4
Launch Site: Taiyuan, Peoples Republic of China
Mass: 881.0 kg

Funding Agency

- Chinese Meteorological Administration (Peoples Republic of China)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Fengyun 1B
- Telecommunications information for Fengyun 1B

Experiments on Fengyun 1B

Data collections from Fengyun 1B

Questions or comments about this spacecraft can

be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

National Aeronautics and Space Administration

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Foton 6

NSSDC ID: 1990-032A

Description

Foton 6 was launched from the Plesetsk Cosmodrome via a Soyuz booster. It was a dedicated materials processing satellite that carried a French microgravity research payload. The Centre National d'Etudes Spatiales (CNES) experiment, called Crocodile, contained materials to produce high-quality organic crystals for new generation electronics. It was the second French payload to fly on a Soviet Foton. The Foton housed a 2.3-m spherical descent module for return to earth. A double-cone retrorocket extended from the base of the sphere, a small cylindrical unit atop the module housed chemical batteries to power the experiments. Overall satellite length was 5 m; mass was 6,200 kg. Foton, with Crocodile aboard, returned to earth April 27, 1990 at 6:15.

Alternate Names

- Photon 6
- 20566

Facts in Brief

Launch Date: 1990-04-11
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6200.0 kg

Funding Agencies

- Unknown (U.S.S.R)
- Centre National d'Etudes Spatiales (France)

Discipline

- Microgravity

Additional Information

- Launch/Orbital information for Foton 6

Experiments on Foton 6

Data collections from Foton 6

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Galaxy 6

NSSDC ID: 1990-091B

Description

Galaxy 6 was a US telecommunications satellite launched by the same Ariane launch vehicle the launched SBS-6 (90-091A). The telecommunications satellite, owned and operated by Hughes Communications Inc (HCI), increased system capacity and served as an on-orbit spare for 5 other Galaxy/Westar satellites. It provided video and broadcast transmissions to occasional users, including local cable and TV stations. Built by Hughes Space and Communications Group, Galaxy 6 carried 24 C-band transponders, each able to accommodate one analog video signal or a combination of compressed video, voice and data signals. The satellite was one of the Hughes HS 376 series, a 2.1 m drum standing 6.6 m high with solar panels and antenna reflector deployed. It was positioned above 91 deg. w, covering the continental US. It began commercial operations on October 29, 1990 and has an expected 13-year serivce life.

Alternate Names

- 20873

Facts in Brief

Launch Date: 1990-10-12
Launch Vehicle: Ariane 44L
Launch Site: Kourou, French Guiana
Mass: 708.0 kg

Funding Agency

- Pan American Satellite (United States)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Galaxy 6

Experiments on Galaxy 6

Data collections from Galaxy 6

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Gamma 1

NSSDC ID: 1990-058A

Description

The Gamma USSR/France gamma/x-ray astronomical telescope spacecraft was derived from the Soyuz manned spacecraft and had an unusually long gestation. The basic design was first conceived in 1965 as part of a 'Cloud Space Station' - a primary space station from which a number of man-tended, free-flying spacecraft would operated. This evolved by the early 1970's into the MKBS/MOK space station complex. Various spacecraft with specialised laboratories or instrument sets would fly autonomously away from the huge N1-launched main station. Gamma was originally to be a free-flyer of this complex. The Soyuz propulsion system was used, but the descent and orbital modules were replaced by a large pressurised cylinder containing the scientific instruments.

Work on the instrument payload for Gamma began in 1972, and French participation began in 1974. However that same year the N1 launch vehicle, and the MKBS space station, were cancelled.

The Soviet space program was completely reformulated in a resolution of February 1976, which included authorisation to develop the free flyer in conjunction with the DOS-7/DOS-8 space station (which would eventually evolve into Mir). The draft project for Gamma was completed in 1978, and production was authorised together with Mir on 16 February 1979. At this point Gamma included a passive docking port so that the spacecraft could be serviced by Soyuz manned spacecraft. It was planned that at six and twelve months into its one year mission Gamma would be visited by a two-crew Soyuz, who would replace film cassettes and repair or replace instruments. This approach was dropped in 1982 when it became apparent that the spacecraft was overweight and that all planned Soyuz would be needed for support of the Mir station itself. All film systems were removed and replaced with purely electronic data return methods.

By that time Gamma was scheduled originally for launch in 1984, but further severe technical delays resulted in a 1990 launch, 35 years after it was first conceived. In the end the satellite's research in the field of high-energy astrophysics, conducted jointly with France and Poland, did not produce many noteworthy results.

Alternate Names

- 20683

Facts in Brief

Launch Date: 1990-07-11
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 7000.0 kg

Funding Agencies

- CNRS Centre d'Etudes Spatiales des Rayonnements (France)
- Centre National d'Etudes Spatiales (France)
- Institut Kosmicheskich Issledovaniy(Inst. of Cosmophysical Research) (U.S.S.R)

Discipline

- Astronomy

Additional Information

- Launch/Orbital information for Gamma 1

Experiments on Gamma 1

Data collections from Gamma 1

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

Other Sources of Gamma 1 Information/Data

The Gamma Satellite
Gamma 1 Data Archive at IKI

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

National Aeronautics and Space Administration

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Gorizont 20

NSSDC ID: 1990-054A

Description

Gorizont 20 was a Soviet geosynchronous communications satellite. It was launched to provide telephone, telegraph and fax communications services, in addition to relaying TV and radio broadcasts. Stationed at 90 deg E, it also provided continuation of work in the context of the "Intercosmos" program for the development of new frequency ranges and the creation of long-range systems of space communications jointly with the Byelorussian SSR, GDR, Hungary, and Czechoslovakia. It was stationed at 90 deg E.

The Gorizont spacecraft possessed an initial mass in excess of 2.1 metric tons and have demonstrated a lifetime of nearly 10 years, although a 5-year service life was more common. The 3-axis stabilized satellite was approximately 2 m in diameter and 5 m long with two large solar arrays capable of generating 1.3 kW of electrical power for the first 3 years. Seven separate transmission antennas allowed a variety of reception patterns for both broad and localized terrestrial regions.

A typical Gorizont communications payload included six general purpose (TV, audio, facsimile) 6/4 GHz transponders (five 12.5 W and one 60 W), one Luch 14/11 GHz transponder (15 W), and one Volna 1.6/1.5 GHz transponder (20 W). The Volna transponders were INMARSAT-compatible and were extensively used by the Russian merchant marine fleet via the primary GEO television rebroadcasting system, supporting all five Federation time zones: Zone 1 from 140 deg E, Zone 2 from 90 deg E, Zone 3 from 80 deg E, Zone 4 from 53 deg E, and Zone 5 from 14 deg W. These transmissions were handled by Orbita (12-m receiving antenna) and Moskva (2.5-m receiving antenna) ground stations in the 6/4 GHz band. The Moskva Globalnaya system was inaugurated in 1989 using 4-m receiving antennas and serviced by Gorizonts at 96.5 deg E and 11 deg W.

Alternate Names

- 20659

Facts in Brief

Launch Date: 1990-06-20
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 2125.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Gorizont 20

Experiments on Gorizont 20

Data collections from Gorizont 20

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Gorizont 21

NSSDC ID: 1990-094A

Description

Gorizont 21 was a Soviet geosynchronous communications satellite. It was launched to provide telephone, telegraph and fax communications services, in addition to relaying TV and radio broadcasts. It was stationed at 90 deg E.

The Gorizont spacecraft possessed an initial mass in excess of 2.1 metric tons and have demonstrated a lifetime of nearly 10 years, although a 5-year service life was more common. The 3-axis stabilized satellite was approximately 2 m in diameter and 5 m long with two large solar arrays capable of generating 1.3 kW of electrical power for the first 3 years. Seven separate transmission antennas allowed a variety of reception patterns for both broad and localized terrestrial regions.

A typical Gorizont communications payload included six general purpose (TV, audio, facsimile) 6/4 GHz transponders (five 12.5 W and one 60 W), one Luch 14/11 GHz transponder (15 W), and one Volna 1.6/1.5 GHz transponder (20 W). The Volna transponders were INMARSAT-compatible and were extensively used by the Russian merchant marine fleet via the primary GEO television rebroadcasting system, supporting all five Federation time zones: Zone 1 from 140 deg E, Zone 2 from 90 deg E, Zone 3 from 80 deg E, Zone 4 from 53 deg E, and Zone 5 from 14 deg W. These transmissions were handled by Orbita (12-m receiving antenna) and Moskva (2.5-m receiving antenna) ground stations in the 6/4 GHz band. The Moskva Globalnaya system was inaugurated in 1989 using 4-m receiving antennas and serviced by Gorizonts at 96.5 deg E and 11 deg W.

Alternate Names

- 20923

Facts in Brief

Launch Date: 1990-11-03
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 2125.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Gorizont 21

Experiments on Gorizont 21

Data collections from Gorizont 21

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Gorizont 22

NSSDC ID: 1990-102A

Description

Gorizont 22 was a Soviet geosynchronous communications satellite. It was launched to provide telephone, telegraph and fax communications services, in addition to relaying TV and radio broadcasts. It was stationed at 40 deg E.

The Gorizont spacecraft possessed an initial mass in excess of 2.1 metric tons and have demonstrated a lifetime of nearly 10 years, although a 5-year service life was more common. The 3-axis stabilized satellite was approximately 2 m in diameter and 5 m long with two large solar arrays capable of generating 1.3 kW of electrical power for the first 3 years. Seven separate transmission antennas allowed a variety of reception patterns for both broad and localized terrestrial regions.

A typical Gorizont communications payload included six general purpose (TV, audio, facsimile) 6/4 GHz transponders (five 12.5 W and one 60 W), one Luch 14/11 GHz transponder (15 W), and one Volna 1.6/1.5 GHz transponder (20 W). The Volna transponders were INMARSAT-compatible and were extensively used by the Russian merchant marine fleet via the primary GEO television rebroadcasting system, supporting all five Federation time zones: Zone 1 from 140 deg E, Zone 2 from 90 deg E, Zone 3 from 80 deg E, Zone 4 from 53 deg E, and Zone 5 from 14 deg W. These transmissions were handled by Orbita (12-m receiving antenna) and Moskva (2.5-m receiving antenna) ground stations in the 6/4 GHz band. The Moskva Globalnaya system was inaugurated in 1989 using 4-m receiving antennas and serviced by Gorizonts at 96.5 deg E and 11 deg W.

Alternate Names

- 20953

Facts in Brief

Launch Date: 1990-11-20
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 2125.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Gorizont 22

Experiments on Gorizont 22

Data collections from Gorizont 22

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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GSTAR 4

NSSDC ID: 1990-100B

Description

Completing the GTE Spacenet communications satellite network, GStar 4 was tandem-launched aboard an Ariane 42P booster rocket. The fourth all Ku-band satellite in the network, GStar 4, stationed above 125 deg. w long., joined 3 GStars and 3 Spacenet satellites in geosynchronous orbit. Built by GE Astro Space, the satellite measured 2.75 m by 1.3 m by 1.6 m. Solar arrays spanning 14.3 m supplied 1,352 W at end of life. The communications payload consisted of 16 KU-band transponders providing telephone, video and data service to commercial users in the continential US, Alaska and Hawaii. A full frequency reuse capability allowed uplink and downlink frequencies to be used twice. Beam switching enabled users to fine-tune geographical service areas. GStar 4 has a 10-year life expectancy.

Alternate Names

- 20946

Facts in Brief

Launch Date: 1990-11-20
Launch Vehicle: Ariane 42P
Launch Site: Kourou, French Guiana
Mass: 741.0 kg
Nominal Power: 1352.0 W

Funding Agency

- GE American Communications, Inc. (United States)

Discipline

- Communications

Additional Information

- Launch/Orbital information for GSTAR 4

Experiments on GSTAR 4

Data collections from GSTAR 4

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Hagoromo

NSSDC ID: 1990-007B

Description

Hagoromo, named for the veil worn by the legendary Buddhist angel Hiten, was deployed in the vicinity of the Moon by the Hiten (1990-007A, formerly Muses A) engineering satellite and intended to go into lunar orbit. Hagoromo was a 12 kg, 26-faced polyhedron, 36 cm between opposite faces. A solid propellant (KM-L) retrorocket with a mass of 4 kg was mounted inside the spacecraft for orbit insertion. Sixteen surfaces were covered with 1000 sheets of indium-phosphorus solar cells which could generate about 10 W of power. Two-way communications with a ground station were provided by an S-band transponder and an omni-directional cross-dipole antenna mounted on top of the orbiter. No scientific instrumentation was included, only housekeeping data such as temperature were transmitted.

Hagoromo was mounted on the Hiten spacecraft and the two were launched on 24 January 1990. The S-band transmitter on Hagoromo failed on 21 February 1990 making contact impossible. Hagoromo was released from Hiten as they approached their first lunar encounter at 19:37 UT on 18 March 1990 (4:37 19 March JST). The ignition of the Hagoromo deceleration rocket was confirmed by ground observation at 20:04:03 UT and an orbit of 7400 x 20000 km orbit with a period of 2.01 days was estimated, but never confirmed, so it is not known if Hagoromo actually entered lunar orbit. No data were returned because of the transmitter failure. (Hagoromo is referred to as Hagomoro in some sources).

Alternate Names

- Hagomoro
- 20618

Facts in Brief

Launch Date: 1990-03-18
Launch Vehicle: M-3SII
Launch Site: Uchinoura Space Center, Japan
Mass: 12.0 kg
Nominal Power: 10.0 W

Funding Agency

- Institute of Space and Aeronautical Science, U of Tokyo (Japan)

Disciplines

- Engineering
- Planetary Science

Additional Information

- Launch/Orbital information for Hagoromo

Experiments on Hagoromo

Data collections from Hagoromo

Questions or comments about this spacecraft can be directed to: Dr. David R. Williams.

Selected References

Uesugi, K., Results of the MUSES-A "HITEN" mission, *Adv. Space Res.*, 18, No. 11, (11)69-(11)72, 1996.

Uesugi, K., *et al.*, Japanese first double Lunar swingby mission "HITEN", Acta Astronautica, 25, No. 7, 347-355, 1991.

Hiten - Information on Hagoromo's carrier spacecraft
Hiten Page - Japanese Aerospace Exploration Agency

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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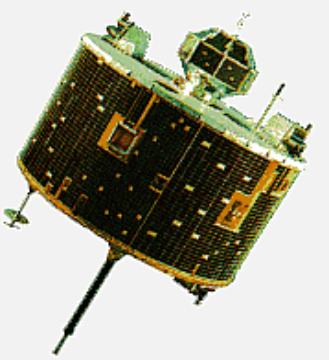


Hiten

National Space Science Data Center

Hiten

NSSDC ID: 1990-007A

Description

Hiten (originally called Muses-A) was an ISAS (Japanese Space Agency) Earth orbiting satellite designed primarily to test and verify technologies for future lunar and planetary missions. The spacecraft carried a small satellite named Hagoromo which was released in the vicinity of the Moon. Hiten itself was put into a highly elliptical Earth orbit which passed by the Moon ten times during the mission, which ended when Hiten was intentionally crashed into the Moon on 10 April 1993. The primary objectives of the mission were to: 1) test trajectory control utilizing gravity assist double lunar swingbys; 2) insert a sub-satellite into lunar orbit; 3) conduct optical navigation experiments on a spin-stabilized spacecraft; 4) test fault tolerant onboard computer and packet telemetry; 5) conduct cis-lunar aerobraking experiments; and 6) detect and measure mass and velocity of micro-meteorite particles. Three follow-on objectives were also added later in the mission: excursion to the L4 and L5 Lagrangian points of the Earth-Moon system, orbit of the Hiten spacecraft around the Moon, and hard landing on the lunar surface. Hiten was named after a flying, music-playing Buddhist angel. Hagoromo was named for the veil worn by Hiten. This mission included Japan's first-ever lunar flyby, lunar orbiter, and lunar surface impact, making Japan only the third nation to achieve each of these goals.

Spacecraft and Subsystems

Hiten was a cylindrically shaped spacecraft, 1.4 m in diameter and 0.8 m high. The small polyhedral-shaped Hagoromo lunar orbiter was mounted on top of the spacecraft. The fully fueled mass of Hiten was 197 kg, this included 42 kg of hydrazine fuel and the 12 kg Hagoromo orbiter. Solar cells on the cylindrical surface of the spacecraft supplied the power requirement of 110 W, backed up by a small onboard battery. The spacecraft was spin-stabilized at 10 - 20.5 rpm.

Spacecraft propulsion and attitude control was provided by eight 23-N and four 3-N hydrazine thrusters, two spin-type Sun aspect sensors, a star scanner, a steerable horizon crossing indicator, three accelerometers, a nutation damper, and control electronics including an onboard processor. An optical navigation subsystem, consisting of two CCD image detectors to detect the Moon and bright stars was also tested.

Communications were accomplished through a medium gain collinear array antenna in both X-band and S-band protruding from the bottom surface of the spacecraft and two cross dipole omni-directional low gain antennas in S-band only, one mounted on the top and one on the bottom. Downlink is via onboard X-band and S-band transmitters, each with two power levels. Two receivers are used for S-band uplink, one

Alternate Names

- Muses-A
- 20448

Facts in Brief

Launch Date: 1990-01-24
Launch Vehicle: M-3SII
Launch Site: Uchinoura Space Center, Japan
Mass: 143.0 kg
Nominal Power: 110.0 W

Funding Agency

- Institute of Space and Aeronautical Science, U of Tokyo (Japan)

Disciplines

- Engineering
- Planetary Science

Additional Information

- Launch/Orbital information for Hiten
- PDMP information for Hiten
- Telecommunications information for Hiten

Experiments on Hiten

Data collections from Hiten

Questions or comments about this spacecraft can be directed to: Dr. David R. Williams.

connected to the low-gain antennas and the other to the medium gain antenna. Commands were sent from ground stations at 1 kbps. The onboard command computer consists of three independent processor cells with a total of 2 Mbits ROM and 512 Kbits RAM.

Mission Profile

Hiten was launched into highly elliptical Earth orbit on a Mu-3SII-5 rocket from Kagoshima Space Center in Japan at 11:46:00 UT (20:46:00 JST) on 24 January 1990. Injection velocity was 50 m/s less than the nominal value, resulting in an apogee of only 290,000 km compared to the expected 476,000 km. A number of trajectory correction maneuvers were performed and Hiten was put back in a nominal orbit. At 19:37 UT on 18 March 1990 (04:37 19 March JST) as Hiten approached its first lunar flyby, the small Hagoromo spacecraft was released. Although the S-band transmitter aboard Hagoromo had failed on 21 February 1990, the ignition of the Hagoromo deceleration rocket was confirmed by ground observation at 20:04:03 UT, a lunar orbit of 7,400 x 20,000 km with a period of 2.01 days was estimated but never confirmed, so it is unknown if Hagoromo ever went into lunar orbit. Six seconds later, at 20:04:09 UT (05:04:09 19 March JST) Hiten reached its closest flyby distance to the Moon of 16,472.4 km.

Further manuevers were made to have Hiten simulate the planned trajectory of the future Geotail spacecraft. Hiten completed seven more lunar swingbys by 4 March 1991 and then started the aerobraking portion of its mission. On 19 March at 00:43 UT Hiten flew into the Earth's upper atmosphere at an altitude of 125.5 km over the Pacific at 11.0 km/s. Atmospheric drag lowered the velocity by 1.712 m/s and the apogee altitude by 8665 km. This was the first time aerobraking was used to modify a spacecraft orbit at close to escape velocity. Another aerobraking maneuver was done at 11:36 UT on 30 March at 120 km altitude, reducing velocity by 2.8 m/s and apogee by 14,000 km. This concludied the primary mission and a follow-on mission was started. A ninth lunar swingby was used to increase the apogee to 1,532,000 km. This marked the first use of a low-energy (weak stability boundary) transfer to modify an orbit and the first use of a transfer to the Moon requiring no deltaV for capture. On 2 October 1991 Hiten was temporarily captured by the Moon and then put into a looping orbit which passed through the L4 and L5 stable libration points to look for trapped dust particles. No obvious increase was found. On 15 February 1993 at 13:33 UT (22:33 JST) at a closest approach of 422 km most of Hiten's remaining fuel was used to put it into lunar orbit. The very last fuel was used to have the spacecraft, whose orbit was decaying after almost two months in lunar orbit, crash into the lunar surface on 10 April 1993 at 18:03:25.7 UT (11 April 03:03:25.7 JST) at 55.6 E, 34.3 S.

Hagoromo Orbiter

The Hagoromo orbiter was a 12 kg, 26-faced polyhedron, 36 cm between opposite faces. A solid propellant (KM-L) retrorocket with a mass of 4 kg was mounted inside the spacecraft for lunar orbit insertion. Sixteen of the surfaces were covered with 1000 sheets of indium-phosphorus solar cells which could generate about 10 W. Two way communications with a ground station were provided by an S-band transponder and an omni-directional cross-dipole antenna mounted on top of the orbiter. No scientific instrumentation was included, only housekeeping data such as temperature was transmitted. The transmitter malfunctioned on 21 February 1990, before the lunar orbit insertion attempt, and no data were transmitted after this time.

Selected References

Hardware for the coming age, *Science* and Technology in Japan, 8, No. 30, 19-44, April 1989.

Uesugi, K., Results of the MUSES-A "HITEN" mission, *Adv. Space Res.*, 18, No. 11, (11)69-(11)72, 1996.

Uesugi, K., *et al.*, Japanese first double Lunar swingby mission "HITEN", Acta Astronautica, 25, No. 7, 347-355, 1991.

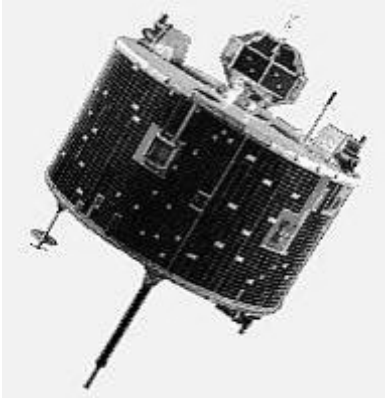
Hagoromo - Information on the small lunar orbiter
Hiten Page - Japanese Aerospace Exploration Agency

Hiten / Harogomo

Hiten - Hagoromo. Otros nombres: 1990-007A, Muses-A, 20448
· Lanzamiento: 24 de enero de 1.990 a las 11:46:00 GMT
· Masa seca en órbita: 143 kgs

Introducción.
La sonda Hiten fue una sonda de la Agencia Espacial Japonesa ISAS realizada para orbitar la Tierra y realizar pruebas y comprobaciones de nuevas tecnologías para futuras misiones lunares y planetarias. La nave portaba un pequeño satélite llamado Hagoromo que fue soltado en las cercanías de la Luna. La sonda Hiten fue colocada en una órbita altamente elíptica que pasaba cerca de la Luna 10 veces durante la misión que finalizó con el impacto intencionado de la nave contra la Luna el 10 de abril de 1.993.

Entre los objetivos primarios se encontraba probar el control de la trayectoria utilizando la asistencia gravitatoria lunar con dobles sobrevuelos, insertar un subsatélite en órbita lunar, realizar experimentos de navegación optica de una nave estabilizada por giro, comprobar la tolerancia a los fallos de los ordenadores y los datos telemétricos, realizar experimentos de aerofrenado y detectar y medir la masa y velocidad de las partículas de micro-meteoritos. Finalmente se añadieron tres objetivos mas: una excursión a los puntos lagrangianos L4 y L5, orbitar la Luna con Hiten e impactar contra su superficie. Esta misión supuso el primer sobrevuelo de la Luna realizado por Japón, el primer orbitador lunar japonés y el primer impacto contra la superficie de una sonda de este pais, siendo de esta manera el tercer pais del mundo en lograr estos tres objetivos.



La nave

La nave tenía forma cilíndrica de 1,4 metros de diámetro y 80 centímetros de altura. la pequeña sonda poliédrica Hagoromo fue colocada en la parte superior de la nave. La masa del conjunto al completo era de 197 kgs, incluyendo los 42 kgs de hidracina y los 12 kgs de Hagoromo. Las células solares expuestas en la superficie del cilindro daban unos 110 W de energía que eran almacenados en una batería. La nave estaba estabilizada por giro (10 a 20,5 rpm).

La propulsión y la orientación estaban controlados por 8 toberas de 23 N y 4 de 3 N de hidracina, dos sensores del Sol, un escaner de estrellas, un indicador de horizonte, tres acelerómetros y un ordenador. Un sistema de navegación optica (Optical Navigation System - ONS) que estaba formado por dos CCDs (384 por 490 píxeles) para detectar la Luna y las estrellas brillantes. Las comunicacioens se llevaban a cabo por una antena colinear de media ganancia en las bandas X y S, que se encontraba en la parte inferior del cilindro. Tambien contaba con dos antenas de baja ganancia omni-direccionales en banda S, una en cada lado de la nave. Las transmisiones a la Tierra se realizaban por dos transmisores de banda X y S con dos potencias diferentes. Para la recepción se usaba la banda-S, con un receptor conectado a la antena de baja ganancia y otro en la de media ganancia. Los comandos se enviaba a un ritmo de 1 kbps. Los ordenadores de la sonda consistían en 3 procesadores independientes con un total de 2 Mbits de ROM y 512 Kbits de RAM.

La misión
Hiten fue lanzada en una órbita altamente elíptica alrededor de la Tierra por un cohete Mu-3SII-5 desde el Kagoshima Space Center de Japón a las 11:46:00 GMT del 24 de enero de 1.990. La velocidad de inyección fue 50 m/s menor que la prevista, resultando en un apogeo de tan sólo 290.000 kms, en lugar de los 476.000 previstos. Tras una serie de maniobras de corrección se alcanzó la órbita deseada. El 18 de marzo de 1.990 a las 19:37 GMT, cuando Hiten se acercaba a su primer sobrevuelo lunar, la pequeña subsonda Haragomo fue soltada. Sin embargo el transmisor de banda S a bordo de la pequeña nave había fallado el 21 de febrero de 1.990, por lo que la ignición del cohete de desaceleración de Harogomo tuvo que ser confirmado a través de observaciones desde la Tierra a las 20:04:03 GMT. La nave adquirió una órbita lunar de 7.400 x 20.000 kms con un periodo de 2,01 días aunque este extremo nunca pudo ser confirmado, e incluso se desconoce si aun se mantiene en órbita lunar. Seis segundos más tarde, a las 20:04:09 Hiten realizó su sobrevuelo más cercano a la Luna a unos 16.472,4 kms.

Más adelante se realizaron nuevas maniobras para simular la trayectoria prevista para la futura nave Geotail. Hiten completó 7 sobrevuelos más de la Luna para el 4 de marzo de 1.991 y comenzó la parte de aerofrenado de su misión. El 19 de marzo a las 00:43 GMT la nave sobrevoló las capas altas de la atmósfera de la Tierra a una altura de 125,5 kms sobre el Pacífico a 11 kms/s. El rozamiento atmosférico bajó la velocidad en 1,712 metros por segundo y la altura del apogep bajó 8.665 kms. Esta fue la primera vez que el aerofrenado fue usado para modificar la velocidad de una sonda que tenía una velocidad casi de escape. Otra maniobra de aerofrenado se realizó el 30 de marzo a las 11:36 GMT a 120 kms de altura, reduciendo de nuevo la velocidad en 2,8 m/s y el apogeo en 14.000 kms. De esta manera finalizó la misión primaria y se decidió realizar una ampliación.

Con esto concluyó la misión primaria y se comenzó con la misión extendida. Una novena asistencia gravitatoria con la Luna fue utilizada para aumentar el apogeo de la órbita hasta los 1,532,000 km. Esto constituyó el primer uso de una órbita de transferencia de baja energía (trayectorias en la región de estabilidad débil) para modificar una órbita, y la primera transferencia hacia la Luna sin la necesidad de ser utlizado un impulso extra.

El 2 de octubre de 1.991 la sonda fue capturada temporalmente por la Luna y puesta en una órbita que pasó por los puntos L4 y L5 de libración para buscar partículas de polvo allí atrapadas con el Munich Dust Counter (MDC). Los análisis demostraron que no se encontró nada diferente. El 15 de febrero de 1.993 a las 13:33 GMT, en el momento de mayor aproximación (442 kms), se gastó el combustible restante para poner la nave en órbita lunar. Tras dos meses, las gotas de combustible finales fueron utilizadas para modificar ligeramente la órbita decayente y hacer que Hiten se estrellara contra la superficie lunar el 10 de abril de 1.993 a las 18:03:25 GMT en las coordenadas 55,6ºE y 34,3ºS.

Harogomo

Este orbitador pesaba 12 kgs y era un poliedro de 26 caras, con un tamaño de 36 centímetros entre caras opuestas. Para su propulsión contaba con un retrocohete de propelente sólido (KM-L) con una masa de 4 kgs que fue montado en el interior de la nave para conseguir la inserción

en la órbita lunar. Dieciseis de su caras fueron cubiertas por 1000 células solares de indio y fósforo que generaban 10 W. Un sistema de comunicaciones en las dos direcciones estaba formado por un transpondedor de banda S y una antena de dipolo cruzado omni-direccional. No lleva ninguna clase de instrumentación científica y tan sólo portaba sensores de temperatura. El transmisor dejó de funcionar el 21 de febrero de 1.990 antes de la inserción en órbita por lo que no se transmitieron datos de ningún tipo.

El impacto

El 11 de abril de 1.993 la sonda Hiten fue estrellada a propósito en la superficie lunar tras 3 años de misión. Usando el combustible final se dirigió el impacto hacia la cara visible desde la Tierra para poder realizar el seguimiento. Tres equipos: JPL-MMNAV, ISAS-GOOD y ISAS-ONS predijeron con mucha exactitud el lugar del impacto. El Dr. David Allen del Observatorio Anglo Australiano de Epping (Australia) tomó una serie de fotografías que mostraban una nube de polvo causada por el impacto, con un diámetro de unos 5 kms.

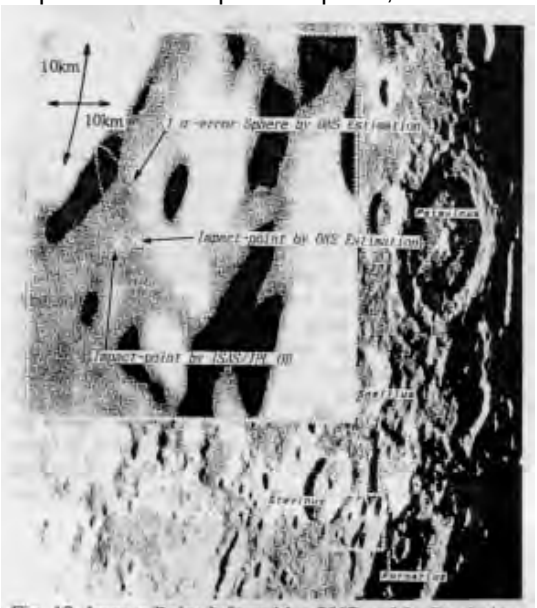


Fig. 12 Impact Point Inferred by ONS and Its Deviation
(Photograph : by Mr. S. Satoh, Hiroshima, Japan)

Zona del impacto en un mapa lunar

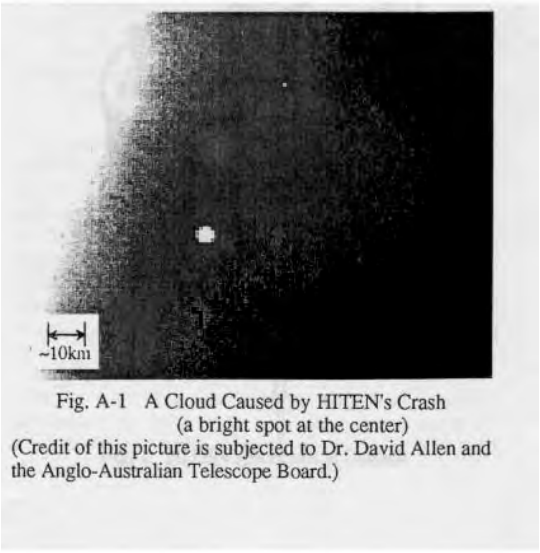
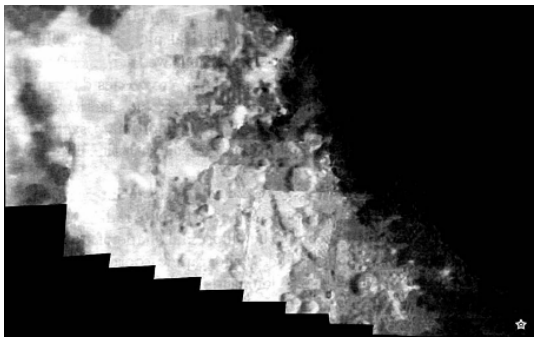


Fig. A-1 A Cloud Caused by HITEN's Crash
(a bright spot at the center)
(Credit of this picture is subjected to Dr. David Allen and the Anglo-Australian Telescope Board.)

Imagen del impacto de Hiten



Secuencia final del impacto tomada por la propia nave, de pobre calidad. La estrella marca el lugar de impacto en el terminador.

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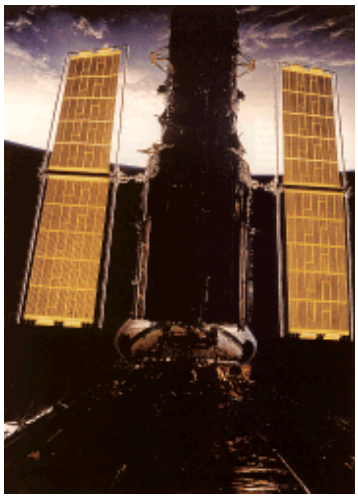

HST

National Space Science Data Center

HST

NSSDC ID: 1990-037B

Description

The Hubble Space Telescope (HST) was the first and flagship mission of NASA's Great Observatories program. Designed to complement the wavelength capabilities of the other spacecraft in the program (CGRO, AXAF, and SIRTF), HST was a 2.4 m, f/24 Ritchey-Chretien telescope capable of performing observations in the visible, near-ultraviolet, and near-infrared (1150 A to 1 mm).

Placed into a low-earth orbit by the space shuttle, HST was designed to be modular so that on subsequent shuttle missions it could be recovered, have faulty or obsolete parts replaced with new and/or improved instruments, and be re-released. HST was roughly cylindrical in shape, 13.1 m end-to-end and 4.3 m in diameter at its widest point.

HST used an elaborate scheme for attitude control to improve the stability of the spacecraft during observations. Maneuvering was performed by four of six gyros, or reaction wheels. Pointing could be maintained in this mode (coarse track) or the Fine Guidance Sensors (FGSs) could be used to lock onto guide stars (fine lock) to reduce the spacecraft drift and increase the pointing accuracy.

Power to the two on-board computers and the scientific instruments was provided by two 2.4 x 12.1 m solar panels. The power generated by the arrays was also used to charge six nickel-hydrogen batteries which provided power to the spacecraft during the roughly 25 minutes per orbit in which HST was within the Earth's shadow.

Communications with the satellite were maintained with the TDRS satellites. Observations taken during the time when neither TDRS was visible from the spacecraft were recorded on tape recorder and dumped during periods of visibility. The spacecraft also supported real-time interactions with the ground system during times of TDRS visibility, enabling observers to make small offsets in the spacecraft pointing to perform their observations. HST was the first scientific spacecraft designed to utilize the full capabilities of TDRSS, communicating over either multiple-access or single-access channels at any of the supported transmission rates.

HST was operated in three distinct phases. During the first phase of the mission (Orbital Verification or OV), responsibility for the spacecraft was given to Marshall Space Center. OV consisted of an extended, eight-month checkout of the spacecraft, including test of the on-board computers, pointing control system, solar arrays, etc. This phase was followed by the Science Verification (SV) phase, lasting nearly another

Alternate Names

- Space Telescope
- Hubble Space Telescope
- 20580

Facts in Brief

Launch Date: 1990-04-25
Launch Vehicle: Shuttle
Launch Site: Cape Canaveral, United States
Mass: 11600.0 kg
Nominal Power: 2400.0 W

Funding Agencies

- European Space Agency (International)
- NASA-Office of Space Science Applications (United States)

Disciplines

- Astronomy
- Planetary Science

Additional Information

- Launch/Orbital information for HST
- PDMP information for HST
- Telecommunications information for HST

Experiments on HST

Data collections from HST

Questions or comments

year, during which each of the six science instruments was tested to verify their capabilities and set limits on their safe operations during the remainder of the mission. Responsibility for the spacecraft during SV was given to Goddard Space Flight Center. The last phase of the mission, known as the General Observer (GO) phase, was planned to last from the end of SV through the end of the mission and was the responsibility of the Space Telescope Science Institute. General observations were phased in gradually, however, during the SV phase because the OV and SV portions of the mission were considerably longer than expected prior to deployment.

The mission was troubled soon after launch by the discovery that the primary mirror was spherically aberrated. In addition, problems with the solar panels flexing as the spacecraft passed from the Earth's shadow into sunlight caused problems with the pointing stability. Steps were taken to correct these problems, including replacement of the solar panels, replacement of the Wide Field and Planetary Camera with a second-generation version with built-in corrective optics, and replacement of the High-Speed Photometer with COSTAR (Corrective Optics Space Telescope Axial Replacement) to correct the aberration for the remaining instruments.

about this spacecraft can be directed to: Coordinated Request and User Support Office.

Personnel

Name	Role	Original Affiliation	E-mail
Dr. David S. Leckrone	Deputy Project Scientist	NASA Goddard Space Flight Center	dleckrone@hst.nasa.gov
Mr. Fred S. Wojtalik	Project Manager	NASA Goddard Space Flight Center	
Mr. David J. Pine	Program Manager	NASA Headquarters	
Dr. Marc Bensimon	Program Manager	NASA Headquarters	
Mr. James B. Odom	Project Manager	NASA Marshall Space Flight Center	
Dr. Edward J. Weiler	Program Scientist	NASA Headquarters	edward.j.weiler@nasa.gov
Mr. James V. Moore	Project Manager	NASA Goddard Space Flight Center	
Mr. Frank A. Carr	Project Manager	NASA Goddard Space Flight Center	
Mr. Douglas R. Broome	Program Manager	NASA Headquarters	
Dr. Robert W. Hobbs	General Contact	NASA Goddard Space Flight Center	
Mr. Gerald D. Repass	Mission Operations Manager	NASA Goddard Space Flight Center	grepass@hst.nasa.gov

Related Information/Data at NSSDC

HST images of Comet P/Shoemaker-Levy 9
View some of the images taken by (and of) HST in the NSSDC Photo Gallery

STS 31 (HST Deployment mission)
STS 61 (First HST Refurbishment mission)
STS 82 (Second HST Refurbishment mission)

US Active Archive for HST Information/Data

The HST Archive at MAST(STScI)

Other Sources of HST Information/Data

The Space Telescope Science Institute
The Space Telescope European Coordinating Facility

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Inmarsat 2-F1

NSSDC ID: 1990-093A

Description

Inmarsat 2-F1 was a maritime satellite launched using the Delta launch vehicle from Cape Canaveral Air Force Base for the International Maritime Satellite Organization. It was a new-generation mobile communications satellite and was box-shaped, 2.5 m high by 1.5 m long by 1.4 m wide. Solar arrays spanning 15.2 m provided 1,200 W. The communications payload, supplied by Hughes Aircraft Company, provided 250 ship-to-shore, shore-to-ship, aeronautical and land mobile voice circuits. The mobile link was via L-band; fixed-ground links via C-band. The payload used 4 separate cup-dipole phased-array antennas for both frequencies. Stationed above 64.5 deg e, it increased transmission capacity over the Indian Ocean area by a factor of six.

Alternate Names

- Inter. Maritime Sat-2 F1
- 20918

Facts in Brief

Launch Date: 1990-10-30
Launch Vehicle: Delta
Launch Site: Cape Canaveral, United States
Mass: 690.0 kg
Nominal Power: 1200.0 W

Funding Agency

- Inmarsat (International)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Inmarsat 2-F1

Experiments on Inmarsat 2-F1

Data collections from Inmarsat 2-F1

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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INSAT 1D

NSSDC ID: 1990-051A

Description

The last in a series of multipurpose satellites providing communications and weather forecasting service for India was Delta-launched from Cape Canaveral. INSAT 1D, built by Ford Aerospace (now Loral Inc) for the Indian Space Research Organization (ISRO) housed 12 C-band transponders for telephone and data communications and two S-band transponders for direct broadcast service. A radiometer returned meteorological imagery for long-term weather forecasting, storm warning and resource management. Positioned above 83.1 deg. e, INSAT 1D replaced INSAT 1B, launched in 1983 and near the end of its life expectancy. The 1D launch was delayed almost a year when a launch pad hoist cable broke and damaged its C-band reflector; this mishap followed solar panel damage suffered during the 1989 San Francisco earthquake. The fourth in the INSAT 1 series, the satellite was box-shaped, measuring 1.55 x 1.42 x 2.18 m. A solar sail and 11.5 sq. m solar panel extended overall length to 19.4 m when deployed. It has a 7-year life expectancy.

Alternate Names

- Indian National Satellite 1D
- 20643

Facts in Brief

Launch Date: 1990-06-12
Launch Vehicle: Delta
Launch Site: Cape Canaveral, United States
Mass: 700.0 kg
Nominal Power: 1200.0 W

Funding Agencies

- National Aeronautics and Space Administration (United States)
- Indian Space Research Organization (India)

Disciplines

- Communications
- Earth Science

Additional Information

- Launch/Orbital information for INSAT 1D

Experiments on INSAT 1D

Data collections from INSAT 1D

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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INTELSAT 6 F-3

NSSDC ID: 1990-021A

Description

INTELSAT 6 F-3 was launched from Cape Canaveral, Florida using a Titan 3 booster rocket. A booster separation failure cast INTELSAT 6 F-3, the second in the series, into a non-operational substationary orbit. The satellite carried 38 C-band and 10 K-band transponders, to provide telephone, TV and data services to large ground stations and small terminals. It could have accommodated 120,000 phone calls and 3 TV channels simultaneously. Built by Hughes Space and Communications Group for INTELSAT, the new series satellite were the largest commsats flown to date. It was drum-shaped, 3.6 m in diameter and 11.7 m tall, weighing 4,215 kg at launch; 2,560 kg on orbit. Body mounted solar arrays provided 2,250 W at end of life.

Alternate Names

- 20523

Facts in Brief

Launch Date: 1990-03-14
Launch Vehicle: Titan III
Launch Site: Cape Canaveral, United States
Mass: 2560.0 kg

Funding Agency

- International Telecommunications Satellite Corporation (International)

Discipline

- Communications

Additional Information

- Launch/Orbital information for INTELSAT 6 F-3

Experiments on INTELSAT 6 F-3

Data collections from INTELSAT 6 F-3

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INTELSAT 6 F-4

NSSDC ID: 1990-056A

Description

INTELSAT 6 F-4, a communications satellite, was launched using a Titan launch vehicle for the International Telecommunications Satellite Organization. It carried 38 C-band and 10 K-band transponders to provide telephone, TV and data service to large ground stations and small terminals. It could accommodate 120,000 phone calls and 3 TV channels simultaneously. Built by Hughes Space and Communications Group, the new series satellite were the largest commsats flown to date. Located above 27.5 deg w, it absorbed the transmission demand over the north and south Atlantic area.

Alternate Names

- 20667

Facts in Brief

Launch Date: 1990-06-23
Launch Vehicle: Titan
Launch Site: Cape Canaveral, United States
Mass: 2560.0 kg

Funding Agency

- International Telecommunications Satellite Corporation (International)

Discipline

- Communications

Additional Information

- Launch/Orbital information for INTELSAT 6 F-4

Experiments on INTELSAT 6 F-4

Data collections from INTELSAT 6 F-4

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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JAS-1B

NSSDC ID: 1990-013C

Description

JAS-1B (Japanese Amateur Radio Satellite) was launched by the same 2-stage H-1 rocket that launched MOS-1B. It succeeded JAS 1 (Oscar 12), Japan's first communications satellite linking amateur radio operators. JAS-1B operated as a store and forward message service. Uplink frequency was 144 MHz; downlink was 435 MHz. The satellite, deployed by the Japan Amateur Radio League, was 0.44 m in diameter, and 0.47 m long. A turnstile antenna ring at its base received signals and 4 transmitting antennas extended from the top. Body mounted solar cells supplied 10 W. The national name of this satellite is Fuji-2 meaning "wisteria" in Japanese.

Alternate Names

- FUJI-2
- Japan Amateur Sat-1B
- Oscar 20
- 20480

Facts in Brief

Launch Date: 1990-02-07
Launch Vehicle: H-1
Launch Site: Tanegashima, Japan
Mass: 50.0 kg

Funding Agency

- Unknown (Japan)

Discipline

- Communications

Additional Information

- Launch/Orbital information for JAS-1B

Experiments on JAS-1B

Data collections from JAS-1B

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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JCSAT 2

NSSDC ID: 1990-001B

Description

JCSAT 2, a Japanese communications satellite, was launched by the US using the Titan 3 launch vehicle along with the UK's Skynet 4A satellite. It was the second in a two-satellite series of privately owned high-power Japanese communications satellites. A solid-fuel kick motor boosted the satellite into a geosynchronous transfer orbit. After 4 weeks of tests, the satellite was delivered to its owner/operator, Japan Communications Satellite Company (JCSAT) in February 1990. JCSAT is jointly owned by Hughes Communications, Inc, C. Itoh & Co, and Mitsui and Co, Ltd. The satellite provided telephone, TV, facsimile and data services to Japanese businesses. High quality video and message data were received on user antennas as small as 1.2 m. The Ku-band communications payload provided 32 channels, each able to handle one TV broadcast, 250 telephone circuits or 45 million bits of data per second. It measured 3.7 m by 10 m fully extended and with its 2.3 m antenna deployed. Body mounted solar cells provided 2200 W of power over its 10-yeart design life. Stationed above 154 deg e, it joined JCSAT 1, launched in March 1989.

Alternate Names

- Japanese Communications Satellite 2
- 20402

Facts in Brief

Launch Date: 1990-01-01
Launch Vehicle: Titan III
Launch Site: Cape Canaveral, United States
Mass: 1364.0 kg

Funding Agency

- Japan Satellite Systems, Inc. (Japan)

Discipline

- Communications

Additional Information

- Launch/Orbital information for JCSAT 2

Experiments on JCSAT 2

Data collections from JCSAT 2

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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KH 11-10

NSSDC ID: 1990-019B

Description

KH 11-10 was deployed from the orbiting STS-36 for the US Department of Defense. It was an electro-optical reconnaisance satellite that was heavier than other KH-11 satellites and believed to include a signals intelligence payload. It had wider spectral band sensitivity, perhaps "real time" television capability, and other improvements compared to the other KH-11 satellites. The satellite was reported to have malfunctioned after being placed in orbit.

Alternate Names

- AFP-731
- USA 53
- 20516

Facts in Brief

Launch Date: 1990-02-28
Launch Vehicle: Shuttle
Launch Site: Cape Canaveral, United States
Mass: 19600.0 kg

Funding Agency

- Department of Defense-Department of the Air Force (United States)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for KH 11-10

Experiments on KH 11-10

Data collections from KH 11-10

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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KRISTALL

NSSDC ID: 1990-048A

Description

Mir's third expansion module, dedicated to materials processing, Kristall was launched by the USSR and carried equipment for research on semiconductors and the purification of biologically active substances to the space station Mir. It also carried astrophysical, geophysical and technical experiments. Kristall was 11.9 m long, 4.35 m in diameter. Solar arrays spanned 36 m. Its main body was similar to Kvant 2, with a multiple docking port instead of an EVA airlock module. The docking system will host a future Buran visit. It increased Mir's mass to 83 metric tons and restabilized the station, thrown off kilter with the addition of Kvant 2.

Alternate Names

- 20635

Facts in Brief

Launch Date: 1990-05-31
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 19640.0 kg

Funding Agency

- Unknown (U.S.S.R)

Disciplines

- Astronomy
- Earth Science
- Microgravity

Additional Information

- Launch/Orbital information for KRISTALL

Experiments on KRISTALL

Data collections from KRISTALL

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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LACE

NSSDC ID: 1990-015A

Description

USA 51 was launched from Cape Canaveral, Florida, using a Delta rocket for the US Department of Defense. Also known as the Low-power Atmospheric Compensation Experiment (LACE), this spacecraft carried visible, infrared and phased sensors to measure distortions in laser beams targeting it from earth. The satellite, built by the Naval Research Laboratory, also carried an ultraviolet plume instrument to determine the best wavelengths to track rocket plumes, and an Army Background Experiment to measure neutron activity in space. Results from experiments aboard this satellite will aid in the design of laser defenses against missile threats. LACE was a gravity gradient stabilized spacecraft with attitude measurement accuracy better than 1 degree. The spacecraft was designed to operate the primary experiment for a 30-month lifetime. It was decommissioned on February 14, 1993.

Alternate Names

- USA 51
- Low-power Atmospheric Compensation Experiment
- 20496

Facts in Brief

Launch Date: 1990-02-14
Launch Vehicle: Delta
Launch Site: Cape Canaveral, United States
Mass: 1430.0 kg

Funding Agency

- Department of Defense (United States)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for LACE

Experiments on LACE

Data collections from LACE

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Leasat F5

NSSDC ID: 1990-002B

Description

LEASAT-5, also known as SYNCOM-IV-5, was deployed from the orbiting STS 32 on January 10, 1990. Forty-five minutes after ejecting frisbee-style from the cargo bay, LEASAT's solid perigee kick motor fired to boost it into orbit. Subsequent solid and liquid fuel engine firings inserted the satellite into geosynchronous orbit. It reached its assigned station at 177 deg w on January 14. LEASAT was built by Hughes Space and Communications Group for Hughes Communications, Inc (HCI). The US Navy leased communications service from HCI for DoD users, including air, sea, surface and subsurface units. Twelve UHF repeaters provided the main communications capability; signals were received and transmitted via 2 helical antennas. LEASAT 5 was a 4.26-m-diameter drum, standing 6.17 m high with antenna mast deployed. Body mounted solar arrays provided 1,238 W at the end of its 10-year design life.

Alternate Names

- Leased Satellite F5
- Syncom IV-5
- 20410

Facts in Brief

Launch Date: 1990-01-09
Launch Vehicle: Shuttle
Launch Site: Cape Canaveral, United States
Mass: 1388.0 kg

Funding Agency

- Department of Defense-Department of the Navy (United States)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Leasat F5

Experiments on Leasat F5

Data collections from Leasat F5

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Lusat

NSSDC ID: 1990-005G

Description

Lusat was launched by the same Ariane vehicle that launched SPOT-2 from the Kourou Space Center in French Guiana. It was an AMSAT amateur radio satellite. It carried a CCD camera for earth photography.

Alternate Names

- Microsat 4
- OSCAR 19
- 20442

Facts in Brief

Launch Date: 1990-01-22
Launch Vehicle: Ariane 40
Launch Site: Kourou, French Guiana
Mass: 13.76 kg

Funding Agency

- Radio Amateur Satellite Corporation (United States)

Disciplines

- Communications
- Earth Science

Additional Information

- Launch/Orbital information for Lusat

Experiments on Lusat

Data collections from Lusat

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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MACSAT 1

NSSDC ID: 1990-043A

Description

The two MACSAT spacecraft were third generation DSI digital communications satellites designed to demonstrate tactical UHF voice, data, fax, and video store and forward capabilities for the US military. The gravity gradient boom on one spacecraft appears to have failed to deploy. The other spacecraft was used during Operation Desert Storm for message relay to and from military troops in the Gulf region. The satellites were launched together by a single Scout booster into 613 x 739 km, 90 deg inclination orbits. Manufactured by Defense Systems Inc for DARPA, each was 61 cm in diameter and 35.6 cm high, with two digitally tunable 10 watt transmitters, a 65 watt high power auxiliary receiver for spacecraft command and hardware configuration, and two antenna systems.

Alternate Names

- Multiple Access Comm Sat
- M-1
- 20607

Facts in Brief

Launch Date: 1990-05-09
Launch Vehicle: Scout
Launch Site: Edwards Air Force Base, United States
Mass: 68.0 kg
Nominal Power: 150.0 W

Funding Agency

- Defense Advanced Research Projects Agency (United States)

Discipline

- Communications

Additional Information

- Launch/Orbital information for MACSAT 1

Experiments on MACSAT 1

Data collections from MACSAT 1

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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MACSAT 2

NSSDC ID: 1990-043B

Description

The two MACSAT spacecraft were third generation DSI digital communications satellites designed to demonstrate tactical UHF voice, data, fax, and video store and forward capabilities for the US military. The gravity gradient boom on one spacecraft appears to have failed to deploy. The other spacecraft was used during Operation Desert Storm for message relay to and from military troops in the Gulf region. The satellites were launched together by a single Scout booster into 613 x 739 km, 90 deg inclination orbits. Manufactured by Defense Systems Inc for DARPA, each was 61 cm in diameter and 35.6 cm high, with two digitally tunable 10 watt transmitters, a 65 watt high power auxiliary receiver for spacecraft command and hardware configuration, and two antenna systems.

Alternate Names

- M-2
- Multiple Access Comm Sat
- 20608

Facts in Brief

Launch Date: 1990-05-09
Launch Vehicle: Scout
Launch Site: Edwards Air Force Base, United States
Mass: 68.0 kg
Nominal Power: 150.0 W

Funding Agency

- Defense Advanced Research Projects Agency (United States)

Discipline

- Communications

Additional Information

- Launch/Orbital information for MACSAT 2

Experiments on MACSAT 2

Data collections from MACSAT 2

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Meteor 2-19

NSSDC ID: 1990-057A

Description

Meteor 2-19 obtained global images of cloud layers and the underlying surfaces in the visible and infrared wavelengths; it observed the streams of penetrating radiation in near earth cosmic space; and it carried systems for precise orbital measurement.

Alternate Names

- 20670

Facts in Brief

Launch Date: 1990-06-27
Launch Vehicle: Tsiklon
Launch Site: Plesetsk, U.S.S.R
Mass: 2750.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Meteor 2-19

Experiments on Meteor 2-19

Data collections from Meteor 2-19

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Meteor 2-20

NSSDC ID: 1990-086A

Description

Meteor 2-20 was launched by the USSR and carried scientific instruments for obtaining global images of cloud layers and the underlying surfaces in the visable and infrared wavelengths; observed the flows of penetrating radiation in near earth space; and carried systems for precise orbital measurement.

Alternate Names

- 20826

Facts in Brief

Launch Date: 1990-09-28
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 2750.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Meteor 2-20

Experiments on Meteor 2-20

Data collections from Meteor 2-20

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Molniya 1-77

NSSDC ID: 1990-039A

Description

Molniya 1/77 was a first-generation Russian communications satellite orbited to test and perfect a system of radio communications and television broadcasting using earth satellites as active transponders and to experiment with the system in practical use. The basic function of the satellite was to relay television programs and long-distance two-way multichannel telephone, phototelephone, and telegraph links from Moscow to the various standard ground receiving stations in the 'Orbita' system. The satellite was in the form of a hermetically sealed cylinder with conical ends -- one end contained the orbital correcting engine and a system of microjets, and the other end contained externally mounted solar and earth sensors. Inside the cylinder were (1) a high-sensitivity receiver and three 800-MHz 40-w transmitters (one operational and two in reserve), (2) telemetering devices that monitored equipment operation, (3) chemical batteries that were constantly recharged by solar cells, and (4) an electronic computer that controlled all equipment on board. Mounted around the central cylinder were six large solar battery panels and two directional, high-gain parabolic aerials, 180 deg apart. One of the aerials was directed continually toward the earth by the highly sensitive earth sensors. The second aerial was held in reserve. Signals were transmitted in a fairly narrow beam ensuring a strong reception at the earth's surface. The satellite received telemetry at 1000 MHz. Television service was provided in a frequency range of 3.4 to 4.1 GHz at 40 w. Molniya 1/77, whose cylindrical body was 3.4 m long and 1.6 m in diameter, was much heavier than corresponding U.S. COMSATs, and it had about 10 times the power output of the Early Bird COMSAT. In addition, it did not employ a geosynchronous equatorial orbit as have most U.S. COMSATs because such an orbit would not provide coverage for areas north of 70 deg n latitude. Instead, the satellite was boosted from a low-altitude parking orbit into a highly elliptical orbit with two high apogees daily over the northern hemisphere -- one over Russia and one over North America -- and relatively low perigees over the southern hemisphere. During its apogee, Molniya 1/77 remained relatively stationary with respect to the earth below for nearly 8 of every 12 hr. By placing three or more Molniya 1 satellites in this type of orbit, spacing them suitably, and shifting their orbital planes relative to each other by 120 deg, a 24-hr/day communication system could be obtained.

Alternate Names

- 20583

Facts in Brief

Launch Date: 1990-04-26
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Molniya 1-77

Experiments on Molniya 1-77

Data collections from Molniya 1-77

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Molniya 1-78

NSSDC ID: 1990-071A

Description

Molniya 1/78 was a first-generation Russian communications satellite orbited to test and perfect a system of radio communications and television broadcasting using earth satellites as active transponders and to experiment with the system in practical use. The basic function of the satellite was to relay television programs and long-distance two-way multichannel telephone, phototelephone, and telegraph links from Moscow to the various standard ground receiving stations in the 'Orbita' system. The satellite was in the form of a hermetically sealed cylinder with conical ends -- one end contained the orbital correcting engine and a system of microjets, and the other end contained externally mounted solar and earth sensors. Inside the cylinder were (1) a high-sensitivity receiver and three 800-MHz 40-w transmitters (one operational and two in reserve), (2) telemetering devices that monitored equipment operation, (3) chemical batteries that were constantly recharged by solar cells, and (4) an electronic computer that controlled all equipment on board. Mounted around the central cylinder were six large solar battery panels and two directional, high-gain parabolic aerials, 180 deg apart. One of the aerials was directed continually toward the earth by the highly sensitive earth sensors. The second aerial was held in reserve. Signals were transmitted in a fairly narrow beam ensuring a strong reception at the earth's surface. The satellite received telemetry at 1000 MHz. Television service was provided in a frequency range of 3.4 to 4.1 GHz at 40 w. Molniya 1/78, whose cylindrical body was 3.4 m long and 1.6 m in diameter, was much heavier than corresponding U.S. COMSATs, and it had about 10 times the power output of the Early Bird COMSAT. In addition, it did not employ a geosynchronous equatorial orbit as have most U.S. COMSATs because such an orbit would not provide coverage for areas north of 70 deg n latitude. Instead, the satellite was boosted from a low-altitude parking orbit into a highly elliptical orbit with two high apogees daily over the northern hemisphere -- one over Russia and one over North America -- and relatively low perigees over the southern hemisphere. During its apogee, Molniya 1/78 remained relatively stationary with respect to the earth below for nearly 8 of every 12 hr. By placing three or more Molniya 1 satellites in this type of orbit, spacing them suitably, and shifting their orbital planes relative to each other by 120 deg, a 24-hr/day communication system could be obtained.

Alternate Names

- 20742

Facts in Brief

Launch Date: 1990-08-10
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Molniya 1-78

Experiments on Molniya 1-78

Data collections from Molniya 1-78

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Molniya 1-79

NSSDC ID: 1990-101A

Description

Molniya 1/79 was a first-generation Russian communication satellite orbited to test and perfect a system of radio communications and television broadcasting using earth satellites as active transponders and to experiment with the system in practical use. The basic function of the satellite was to relay television programs and long-distance two-way multichannel telephone, phototelephone, and telegraph links from Moscow to the various standard ground receiving stations in the 'Orbita' system. The satellite was in the form of a hermetically sealed cylinder with conical ends -- one end contained the orbtial correcting engine and a system of microjets, and the other end contained externally mounted solar and earth sensors. Inside the cylinder were (1) a high-sensitivity receiver and three 800-MHz 40-w transmitters (one operational and two in reserve), (2) telemetering devices that monitored equipment operation, (3) chemical batteries that were constantly recharged by solar cells, and (4) an electronic computer that controlled all equipment on board. Mounted around the central cylinder were six large solar battery panels and two directional, high-gain parabolic aerials, 180 deg apart. One of the aerials was directed continually toward the earth by the highly sensitive earth sensors. The second aerial was held in reserve. Signals were transmitted in a fairly narrow beam ensuring a strong reception at the earth's surface. The satellite received at 1000 MHz. Television service was provided in a frequency range of 3.4 to 4.1 GHz at 40 w. Molniya 1/79, whose cylindrical body was 3.4 m long and 1.6 m in diameter, was much heavier than corresponding U.S. COMSATs, and it had about 10 times the power output of the Early Bird COMSAT. In addition, it did not employ a synchronous equatorial orbit as do most U.S. COMSATs because such an orbit would not provide coverage for areas north of 70 deg n latitude. Instead, the satellite was boosted from a low-altitude parking orbit into a highly elliptical orbit with two high apogees daily over the northern hemisphere -- one over Russia and one over North America -- and relatively low perigees over the southern hemisphere. During its apogee, Molniya 1/79 remained relatively stationary with respect to the earth below for nearly 8 of every 12 hr. By placing three or more Molniya 1 satellites in this type of orbit, spacing them suitably, and shifting their orbital planes relative to each other by 120 deg, a 24-hr/day communication system could be obtained.

Alternate Names

- 20949

Facts in Brief

Launch Date: 1990-11-23
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Molniya 1-79

Experiments on Molniya 1-79

Data collections from Molniya 1-79

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Molniya 3-37

NSSDC ID: 1990-006A

Description

The Molniya-3 Soviet communications satellites were used to create the 'Orbita' communications system for northern regions, with groups of four satellites. The first Molniya 3 spacecraft appeared in 1974, primarily to support civil communications (domestic and international), with a slightly enhanced electrical power system and a communications payload of three 6/4 GHz transponders with power outputs of 40 W or 80 W. The land segment used a 12 m diameter parabolic antenna, which was pointed automatically at the satellite using autonomous electromechanical equipment. Later versions were to be part of the YeSSS Unified Satellite Communications System. Trials of this version began in the 1980's, with the system being accepted by the Russian military in 1983-1985.

Alternate Names

- 20444

Facts in Brief

Launch Date: 1990-01-23
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Molniya 3-37

Experiments on Molniya 3-37

Data collections from Molniya 3-37

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Molniya 3-38

NSSDC ID: 1990-052A

Description

The Molniya-3 Soviet communications satellites were used to create the 'Orbita' communications system for northern regions, with groups of four satellites. The first Molniya 3 spacecraft appeared in 1974, primarily to support civil communications (domestic and international), with a slightly enhanced electrical power system and a communications payload of three 6/4 GHz transponders with power outputs of 40 W or 80 W. The land segment used a 12 m diameter parabolic antenna, which was pointed automatically at the satellite using autonomous electromechanical equipment. Later versions were to be part of the YeSSS Unified Satellite Communications System. Trials of this version began in the 1980's, with the system being accepted by the Russian military in 1983-1985.

Alternate Names

- 20646

Facts in Brief

Launch Date: 1990-06-13
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Molniya 3-38

Experiments on Molniya 3-38

Data collections from Molniya 3-38

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Molniya 3-39

NSSDC ID: 1990-084A

Description

The Molniya-3 Soviet communications satellites were used to create the 'Orbita' communications system for northern regions, with groups of four satellites. The first Molniya 3 spacecraft appeared in 1974, primarily to support civil communications (domestic and international), with a slightly enhanced electrical power system and a communications payload of three 6/4 GHz transponders with power outputs of 40 W or 80 W. The land segment used a 12 m diameter parabolic antenna, which was pointed automatically at the satellite using autonomous electromechanical equipment. Later versions were to be part of the YeSSS Unified Satellite Communications System. Trials of this version began in the 1980's, with the system being accepted by the Russian military in 1983-1985.

Alternate Names

- 20813

Facts in Brief

Launch Date: 1990-09-20
Launch Vehicle: Molniya
Launch Site: Plesetsk, U.S.S.R
Mass: 1600.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Molniya 3-39

Experiments on Molniya 3-39

Data collections from Molniya 3-39

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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MOS-1B

NSSDC ID: 1990-013A

Description

The Japanese Marine Observation Satellite-1B (MOS-1B) was the second Earth resources satellite in the MOS series to be launched by NASDA to monitor atmospheric water vapor, ocean currents, sea surface temperature, ice floe dynamics, chlorophyll concentration in the oceans, and vegetation and agricultural land applications. The MOS-1B carried the same three sensors as the MOS-1A: a Multi-spectrum Electronic Self-Scanning Radiometer (MESSR), a Visible and Thermal Infrared Radiometer (VTIR), and a Microwave Scanning Radiometer (MSR). Data was transmitted real-time to the Hatoyama Earth Observation Center for processing and is available through the Data Service Department, Remote Sensing Technology Center of Japan (RESTEC). The satellite also included a Data Collection System (DCS) Transponder designed to be a forerunner of the Japanese TDRSS, used to collect and relay information from surface Data Collection Platforms (DCPs) and locate DCPs based on the Doppler frequency of received signals. The satellite is a 1.26 x 1.48 x 2.4 meter high box-shape of aluminium honeycomb construction with a single solar array of three 1.51 meter wide panels. The satellite is controlled in three axes by momentum wheels and four IN hydrazine thrusters. Other MOS satellites are planned throughout the 1990's.

Alternate Names

- MOMO-1B
- Marine Observ. Sat. 1B
- 20478

Facts in Brief

Launch Date: 1990-02-07
Launch Vehicle: H-2
Launch Site: Tanegashima, Japan
Mass: 740.0 kg

Funding Agency

- National Space Development Agency (NASDA) (Japan)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for MOS-1B

Experiments on MOS-1B

Data collections from MOS-1B

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

Personnel

Name	Role	Original Affiliation	E-

			mail
Mr. K. Yoneyama	Project Manager	National Space Development Agency of Japan	
Mr. T. Tanaka	Program Manager	National Space Development Agency of Japan	

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Nadezhda-2

NSSDC ID: 1990-017A

Description

Nadezda-2 was launched by the Cosmos rocket carrier. It carried a navigation system for determining the position of maritime vessels. It also carried apparatus for the international space system for the search and rescue of vessels and aircraft in difficulty.

Alternate Names

- 20508

Facts in Brief

Launch Date: 1990-02-27
Launch Vehicle: Modified SS-5 (SKean IRBM) plus Upper Stage
Launch Site: Plesetsk, U.S.S.R
Mass: 825.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Nadezhda-2

Experiments on Nadezhda-2

Data collections from Nadezhda-2

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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- NASA Official: Dr. Ed Grayzeck
- Curator: E. Bell, II
- Version 4.0.14, 08 October 2010

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Navstar 2-06

NSSDC ID: 1990-008A

Description

Global Positioning System (GPS) was developed by the US Department of Defense to provide all-weather round-the-clock navigation capabilities for military ground, sea, and air forces. Since its implementation, GPS has also become an integral asset in numerous civilian applications and industries around the globe, including recreational used (e.g., boating, aircraft, hiking), corporate vehicle fleet tracking, and surveying. GPS employs 24 spacecraft in 20,200 km circular orbits inclined at 55 degrees. These vehicles are placed in 6 orbit planes with four operational satellites in each plane.

GPS Block 2 was the operational system, following the demonstration system comprised of Block 1 (Navstar 1 - 11) spacecraft. These spacecraft were 3-axis stabilized, nadir pointing using reaction wheels. Dual solar arrays supplied 710 watts of power. They used S-band (SGLS) communications for control and telemetry and UHF cross-link between spacecraft. The payload consisted of two L-band navigation signals at 1575.42 MHz (L1) and 1227.60 MHz (L2). Each spacecraft carried 2 rubidium and 2 cesium clocks and nuclear detonation detection sensors. Built by Rockwell Space Systems for the US Air force, the spacecraft measured 5.3 m across with solar panels deployed and had a design life of 7.5 years.

Alternate Names

- USA 50
- GPS 2-6
- 20452

Facts in Brief

Launch Date: 1990-01-24
Launch Vehicle: Delta II
Launch Site: Cape Canaveral, United States
Mass: 840.0 kg
Nominal Power: 710.0 W

Funding Agency

- Department of Defense-Department of the Air Force (United States)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Navstar 2-06

Experiments on Navstar 2-06

Data collections from Navstar 2-06

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Navstar 2-07

NSSDC ID: 1990-025A

Description

Global Positioning System (GPS) was developed by the US Department of Defense to provide all-weather round-the-clock navigation capabilities for military ground, sea, and air forces. Since its implementation, GPS has also become an integral asset in numerous civilian applications and industries around the globe, including recreational used (e.g., boating, aircraft, hiking), corporate vehicle fleet tracking, and surveying. GPS employs 24 spacecraft in 20,200 km circular orbits inclined at 55 degrees. These vehicles are placed in 6 orbit planes with four operational satellites in each plane.

GPS Block 2 was the operational system, following the demonstration system comprised of Block 1 (Navstar 1 - 11) spacecraft. These spacecraft were 3-axis stabilized, nadir pointing using reaction wheels. Dual solar arrays supplied 710 watts of power. They used S-band (SGLS) communications for control and telemetry and UHF cross-link between spacecraft. The payload consisted of two L-band navigation signals at 1575.42 MHz (L1) and 1227.60 MHz (L2). Each spacecraft carried 2 rubidium and 2 cesium clocks and nuclear detonation detection sensors. Built by Rockwell Space Systems for the US Air Force, the spacecraft measured 5.3 m across with solar panels deployed and had a design life of 7.5 years.

Alternate Names

- USA 54
- GPS 2-7
- 20533

Facts in Brief

Launch Date: 1990-03-26
Launch Vehicle: Delta II
Launch Site: Cape Canaveral, United States
Mass: 840.0 kg
Nominal Power: 710.0 W

Funding Agency

- Department of Defense-Department of the Air Force (United States)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Navstar 2-07

Experiments on Navstar 2-07

Data collections from Navstar 2-07

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Navstar 2-08

NSSDC ID: 1990-068A

Description

Global Positioning System (GPS) was developed by the US Department of Defense to provide all-weather round-the-clock navigation capabilities for military ground, sea, and air forces. Since its implementation, GPS has also become an integral asset in numerous civilian applications and industries around the globe, including recreational used (e.g., boating, aircraft, hiking), corporate vehicle fleet tracking, and surveying. GPS employs 24 spacecraft in 20,200 km circular orbits inclined at 55 degrees. These vehicles are placed in 6 orbit planes with four operational satellites in each plane.

GPS Block 2 was the operational system, following the demonstration system comprised of Block 1 (Navstar 1 - 11) spacecraft. These spacecraft were 3-axis stabilized, nadir pointing using reaction wheels. Dual solar arrays supplied 710 watts of power. They used S-band (SGLS) communications for control and telemetry and UHF cross-link between spacecraft. The payload consisted of two L-band navigation signals at 1575.42 MHz (L1) and 1227.60 MHz (L2). Each spacecraft carried 2 rubidium and 2 cesium clocks and nuclear detonation detection sensors. Built by Rockwell Space Systems for the US Air force, the spacecraft measured 5.3 m across with solar panels deployed and had a design life of 7.5 years.

Alternate Names

- GPS 2-8
- USA 63
- 20724

Facts in Brief

Launch Date: 1990-08-02
Launch Vehicle: Delta
Launch Site: Cape Canaveral, United States
Mass: 840.0 kg
Nominal Power: 710.0 W

Funding Agency

- Department of Defense-Department of the Air Force (United States)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Navstar 2-08

Experiments on Navstar 2-08

Data collections from Navstar 2-08

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Navstar 2-09

NSSDC ID: 1990-088A

Description

Global Positioning System (GPS) was developed by the US Department of Defense to provide all-weather round-the-clock navigation capabilities for military ground, sea, and air forces. Since its implementation, GPS has also become an integral asset in numerous civilian applications and industries around the globe, including recreational used (e.g., boating, aircraft, hiking), corporate vehicle fleet tracking, and surveying. GPS employs 24 spacecraft in 20,200 km circular orbits inclined at 55 degrees. These vehicles are placed in 6 orbit planes with four operational satellites in each plane.

GPS Block 2 was the operational system, following the demonstration system comprised of Block 1 (Navstar 1 - 11) spacecraft. These spacecraft were 3-axis stabilized, nadir pointing using reaction wheels. Dual solar arrays supplied 710 watts of power. They used S-band (SGLS) communications for control and telemetry and UHF cross-link between spacecraft. The payload consisted of two L-band navigation signals at 1575.42 MHz (L1) and 1227.60 MHz (L2). Each spacecraft carried 2 rubidium and 2 cesium clocks and nuclear detonation detection sensors. Built by Rockwell Space Systems for the US Air Force, the spacecraft measured 5.3 m across with solar panels deployed and had a design life of 7.5 years.

Alternate Names

- USA 64
- GPS 2-9
- 20830

Facts in Brief

Launch Date: 1990-10-01
Launch Vehicle: Delta
Launch Site: Cape Canaveral, United States
Mass: 840.0 kg
Nominal Power: 710.0 W

Funding Agency

- Department of Defense-Department of the Air Force (United States)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Navstar 2-09

Experiments on Navstar 2-09

Data collections from Navstar 2-09

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Navstar 2A-01

NSSDC ID: 1990-103A

Description

Global Positioning System (GPS) was developed by the US Department of Defense to provide all-weather round-the-clock navigation capabilities for military ground, sea, and air forces. Since its implementation, GPS has also become an integral asset in numerous civilian applications and industries around the globe, including recreational used (e.g., boating, aircraft, hiking), corporate vehicle fleet tracking, and surveying. GPS employs 24 spacecraft in 20,200 km circular orbits inclined at 55 degrees. These vehicles are placed in 6 orbit planes with four operational satellites in each plane.

GPS Block 2 was the operational system, following the demonstration system comprised of Block 1 (Navstar 1 - 11) spacecraft. These spacecraft were 3-axis stabilized, nadir pointing using reaction wheels. Dual solar arrays supplied 710 watts of power. They used S-band (SGLS) communications for control and telemetry and UHF cross-link between spacecraft. The payload consisted of two L-band navigation signals at 1575.42 MHz (L1) and 1227.60 MHz (L2). Each spacecraft carried 2 rubidium and 2 cesium clocks and nuclear detonation detection sensors. Built by Rockwell Space Systems for the US Air Force, the spacecraft measured 5.3 m across with solar panels deployed and had a design life of 7.5 years.

Alternate Names

- USA 66
- GPS 2-10
- 20959

Facts in Brief

Launch Date: 1990-11-26
Launch Vehicle: Delta II 7925
Launch Site: Cape Canaveral, United States
Mass: 840.0 kg
Nominal Power: 710.0 W

Funding Agency

- Department of Defense-Department of the Air Force (United States)

Discipline

- Navigation & Global Positioning

Additional Information

- Launch/Orbital information for Navstar 2A-01

Experiments on Navstar 2A-01

Data collections from Navstar 2A-01

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Ofeq 2

NSSDC ID: 1990-027A

Description

Israel's second satellite, Ofeq 2, was launched via a Shavit booster from Yavne launch facility in the Negev desert. The experimental scientific satellite tested two-way communications, remote control, and onboard system performance in a space environment. Built by Israel Aircraft Industires for the Israeli Space Agnecy, Ofeq 2 was an octagonal prism, measuring 2.3 m tall, 1.2 m wide at the bottom, 0.7 m wide at the top. Body mounted solar cells supplied 246 W of power. Telemetry was transmitted via an S-band communications system. It reentered earth's atmosphere on July 9, 1990.

Alternate Names

- Horizon 2
- 20540

Facts in Brief

Launch Date: 1990-04-03
Launch Vehicle: Shavit
Launch Site: Yavne, Israel
Mass: 160.0 kg

Funding Agency

- Israeli Space Agency (Israel)

Disciplines

- Communications
- Engineering

Additional Information

- Launch/Orbital information for Ofeq 2

Experiments on Ofeq 2

Data collections from Ofeq 2

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Okean 2

NSSDC ID: 1990-018A

Description

The Okean series of satellites were all-weather radar oceanographic systems primarily designed to monitor sea-ice conditions in the Arctic seas. The payload included a side-looking radar, a scanning microwave radiometer, a nadir-viewing microwave spectrometer, optical scanners and a data collection platform. The spacecraft was a stepped cylindrical pressurized bus 3 m high and 1.4 m diameter. It was 3-axis stabilized (nadir pointing, aided by a gravity gradient boom), had a twin solar array spanning 4.82 m and an 11.8 m radar antenna mounted on the Earth-facing base. A primary feature of the Okean-series was direct Automatic Picture Transmission (APT) on 137.4 MHz of imagery to CIS APT stations as well as to foreign users. The on-board recorder had 6.5 minute capacity and permitted coverage and transmission of a 470 x 2750 km image by side-looking radar (SRL) and 1930 x 2750 km image by the multispectral scanner during a pass over an APT station. The SRL operated at 3.2 cm with a swath width of 450 km and ground resolution of 1200 x 1500 meters. The MSU-M visible/near-IR multispectral scanner operated at 0.5 - 0.6, 0.6 - 0.7, 0.7 - 0.8, and 0.8 - 1.1 microns with a swath width of 1900 km and ground resolution of 1900 meters. The MSU-S visible/near-IR scanner operated at 0.6 - 0.7 and 0.8 - 1.1 microns with a swath width of 1100 km and a ground resolution of 370 m. The MSU-SK operates at 0.8 - 1.1 microns with a swath width of 1150 km and ground resolution of 500 m. The non-scanning microwave instrument operated at a frequency of 3 cm with a ground resolution of 12 m along orbit and 6 m perpendicular to the orbit track. The Okean payload was flown on Cosmos 1500, Cosmos 1602, Cosmos 1766, and Cosmos 1869 (radar failed), as well as Okean-1 and Okean-2. See Karpov, A., "Hydrometeorological, Oceanographic and Earth-Resources Satellite Systems Operated by the U.S.S.R.", Adv. Space Res., Vol. 11, No. 3, pp. 183-190, 1991.

Alternate Names

- 20510

Facts in Brief

Launch Date: 1990-02-28
Launch Vehicle: Tsiklon-3
Launch Site: Plesetsk, U.S.S.R
Mass: 1950.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Okean 2

Experiments on Okean 2

Data collections from Okean 2

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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OSCAR 14

NSSDC ID: 1990-005B

Description

UOSAT-D was launched by the same Ariane vehicle that launched SPOT-2 from the Kourou Space Center in French Guiana. It's name was later changed to Oscar 14. It carried a communications package.

Alternate Names

- UOSAT 3
- UOSAT-D
- 20437

Facts in Brief

Launch Date: 1990-01-22
Launch Vehicle: Ariane 40
Launch Site: Kourou, French Guiana
Mass: 46.0 kg

Funding Agency

- University of Surrey (United Kingdom)

Discipline

- Communications

Additional Information

- Launch/Orbital information for OSCAR 14

Experiments on OSCAR 14

Data collections from OSCAR 14

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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OSCAR 15

NSSDC ID: 1990-005C

Description

UOSAT-E was launched by the same Ariane vehicle that launched SPOT-2 from the Kourou Space Center in French Guiana. It's name was later changed to OSCAR 15. It carried technology experiments and a CCD camera for earth imaging. Although expected to operate for 5 years, OSCAR 15 ceased transmitting after 30 hours.

Alternate Names

- UOSAT-E
- UOSAT 4
- 20438

Facts in Brief

Launch Date: 1990-01-22
Launch Vehicle: Ariane 40
Launch Site: Kourou, French Guiana
Mass: 47.0 kg

Funding Agency

- University of Surrey (United Kingdom)

Disciplines

- Communications
- Earth Science

Additional Information

- Launch/Orbital information for OSCAR 15

Experiments on OSCAR 15

Data collections from OSCAR 15

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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OSCAR 17

NSSDC ID: 1990-005E

Description

Microsat 2 was launched by the same Ariane vehicle that launched SPOT-2 from the Kourou Space Center in French Guiana. It was an AMSAT amateur radio satellite carrying a Digital Orbiting Voice Encoder (DOVE) that synthesized voice messages received by students with portable receivers.

Alternate Names

- Microsat 2
- 20440

Facts in Brief

Launch Date: 1990-01-22
Launch Vehicle: Ariane 40
Launch Site: Kourou, French Guiana
Mass: 12.92 kg

Funding Agency

- Radio Amateur Satellite Corporation (United States)

Discipline

- Communications

Additional Information

- Launch/Orbital information for OSCAR 17

Experiments on OSCAR 17

Data collections from OSCAR 17

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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OSCAR 18

NSSDC ID: 1990-005F

Description

Microsat 3 was launched by the same Ariane vehicle that launched SPOT-2 from the Kourou Space Center in French Guiana. It was an AMSAT amateur radio satellite. It also took photographs and transmitted earth images. Microsat 3 was also known as Webersat for Weber State College, the satellite developer.

Alternate Names

- Microsat 3
- Webersat
- 20441

Facts in Brief

Launch Date: 1990-01-22
Launch Vehicle: Ariane 40
Launch Site: Kourou, French Guiana
Mass: 16.03 kg

Funding Agency

- Radio Amateur Satellite Corporation (United States)

Disciplines

- Communications
- Earth Science

Additional Information

- Launch/Orbital information for OSCAR 18

Experiments on OSCAR 18

Data collections from OSCAR 18

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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PACSAT

NSSDC ID: 1990-005D

Description

Pacsat was launched by the same Ariane vehicle that launched SPOT-2 from the Kourou Space Center in French Guiana. It was called Microsat 1 prior to launch and was an AMSAT amateur radio satellite. It carried digital message communications.

Alternate Names

- Microsat 1
- OSCAR 16
- 20439

Facts in Brief

Launch Date: 1990-01-22
Launch Vehicle: Ariane 40
Launch Site: Kourou, French Guiana
Mass: 13.34 kg

Funding Agency

- Radio Amateur Satellite Corporation (United States)

Discipline

- Communications

Additional Information

- Launch/Orbital information for PACSAT

Experiments on PACSAT

Data collections from PACSAT

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Palapa-B2R

NSSDC ID: 1990-034A

Description

Five and a half years after the shuttle rescued it from an unusable orbit, Palapa B-2R was relaunched by a Delta rocket from Cape Canaveral. The Indonesian communications satellite's origical flight was cut short in February 1984, when an upper stage malfunction left it in low-earth orbit, far from its geosynchronous destination. Nine months later, Palapa B-2 and another stranded craft, Westar 6, were retrieved by STS-51A and returned to earth. The refurbished satellite, built for Permutel by Hughes Space and Communications Group, provided voice, video, and data services to the 13,677 Indonesian islands. Palapa B2R's 24 C-band transponders handled 12,000 simultaneous telephone calls or 24 TV broadcasts. One of the Hughes HS 376 series, Palapa was a 2.1-m drum, 2.8 m high. With solar drum and antenna reflector deployed, height was 6.6 m. Solar panels provided 1,062 W at beginning of life, expected to be 10 years. Stationed above 1.7.7 deg. e, it joined Palapa B1 and Palapa B-2P.

Alternate Names

- 20570

Facts in Brief

Launch Date: 1990-04-13
Launch Vehicle: Delta
Launch Site: Cape Canaveral, United States
Mass: 650.0 kg

Funding Agency

- Unknown (Indonesia)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Palapa-B2R

Experiments on Palapa-B2R

Data collections from Palapa-B2R

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

National Aeronautics and Space Administration

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PEGSAT

NSSDC ID: 1990-028A

Description

This spacecraft was the first to be launched using the privately-developed winged Pegasus rocket booster released from an aircraft in flight. The project involved DARPA, DoD, and NASA. The three-function payload included instrumentation to help establish the launch vehicle payload environment measuring variations in launch vehicle and spacecraft attitude, temperature, pressure, structural loading and vibrations. It also ejected a small Navy experimental communications relay satellite (90-028B). The third function was a pair of barium chemical release experiments. These experiments were part of a NASA plan to recover some science objectives lost when the CRRES spacecraft was reconfigured from a Shuttle launch to an Atlas-Centaur launch. Interactions of photoionized barium with magnetic and electric fields in the Earth's magnetosphere and ionosphere were observed from a network of ground sites in central Canada and the United States. Both releases, on April 16 and April 25, 1990, were successfully observed by the western stations. In addition, this mission marked the first coordinated use of the Canadian ground-based system of magnetometers and photometers, Canopus, with a satellite or rocket campaign.

Alternate Names

- CRRES-B
- 20546

Facts in Brief

Launch Date: 1990-04-05
Launch Vehicle: Pegasus
Launch Site: Edwards Air Force Base, United States
Mass: 178.0 kg

Funding Agencies

- Department of Defense-Department of the Navy (United States)
- NASA-Office of Space Science Applications (United States)

Discipline

- Space Physics

Additional Information

- Launch/Orbital information for PEGSAT

Experiments on PEGSAT

Data collections from PEGSAT

Questions or comments about this spacecraft can be directed to: Dr. Timothy E. Eastman.

Personnel

Name	Role	Original Affiliation	E-mail
Dr. E. Gary Mullen	Project Manager	Phillips Laboratory (nee USAF Geophysics Lab, nee Cambridge Labs)	
Dr. Charles P. Holmes	Program Scientist	Raytheon ITSS	cholmes@mail.hq.nasa.gov

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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POGS

NSSDC ID: 1990-031A

Description

The US Military's STACKSAT mission involved the launch of three similar spacecraft (POGS, TEX, and SCE) on the same booster. Manufactured by Defense Systems Inc (DSI), the spacecraft were gravity gradient stabilized with body mounted solar arrays providing ~15 W orbit average power. POGS carried a magnetometer to accurately map the Earth's magnetic field for the Defense Mapping Agency. TEX and SCE each carried specially designed transmitters to study ionospheric effects on radio signals.

This spacecraft, POGS (Polar Orbiting Geomagnetic Survey), was designed to measure the Earth's magnetic field vector as a function of position. Data from the experiment were used to improve Earth navigation systems, and were stored in an experimental solid state recorder.

Alternate Names

- USA 56
- SSR
- P87-2
- STACKSAT
- 20560

Facts in Brief

Launch Date: 1990-04-11
Launch Vehicle: Atlas E
Launch Site: Vandenberg AFB, United States
Nominal Power: 15.0 W

Funding Agency

- Department of Defense-Department of the Navy (United States)

Disciplines

- Engineering
- Earth Science
- Surveillance and Other Military
- Space Physics

Additional Information

- Launch/Orbital information for POGS
- PDMP information for POGS

Experiments on POGS

Data collections from POGS

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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PRC 26

NSSDC ID: 1990-011A

Description

PRC-26, a communications satellite, was launched from Xichang into a near geosynchronous orbit using a Long March 3 carrier rocket by the People's Republic of China. It was the fifth geosynchronous communications satellite orbited by the Chinese. PRC 26, a NORAD designation, is also known as Shiyang Tongbu Tonxin Weixing 4, Chinese for Operational Geostationary Communications Satellite. This satellite series is known collectively as Dong Fang Hong 2.

Alternate Names

- STTW-4
- 20473

Facts in Brief

Launch Date: 1990-02-04
Launch Vehicle: Long March 3
Launch Site: Xichang, Peoples Republic of China
Mass: 441.0 kg

Funding Agency

- Unknown (Peoples Republic of China)

Discipline

- Communications

Additional Information

- Launch/Orbital information for PRC 26

Experiments on PRC 26

Data collections from PRC 26

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Progress 42

NSSDC ID: 1990-041A

Description

Progress-42 was launched by the USSR and delivered various cargo to the manned space station Mir. The spacecraft docked with the space station on May 7, 1990.

Alternate Names

- 20602

Facts in Brief

Launch Date: 1990-05-05
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 7150.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Resupply/Refurbishment/Re

Additional Information

- Launch/Orbital information for Progress 42

Experiments on Progress 42

Data collections from Progress 42

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Progress M- 3

NSSDC ID: 1990-020A

Description

An improved version of cargo freighters used to supply the Mir space station, the Progress M series had greater cargo capacity, a modernized approach/docking system and carried 2 solar panels to generate electrical power. Progress M can fly for 30 days independently and 108 days docked with Mir. Spare propellent in Progress M's tanks can be transferred to Mir before it is consigned to burn up in reentry. In the past, extra fuel was abandoned with the craft. Future Progress vehicles will carry a recoverable reentry capsule for the speedy return of up to 150 kg of material from Mir to earth.

Progress M-3 docked with Mir on March 3, 1990.

Alternate Names

- 20513

Facts in Brief

Launch Date: 1990-02-28
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 7250.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Resupply/Refurbishment/Re

Additional Information

- Launch/Orbital information for Progress M- 3

Experiments on Progress M- 3

Data collections from Progress M- 3

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Progress M- 4

NSSDC ID: 1990-072A

Description

An improved version of cargo freighters used to supply the Mir space station, the Progress M series had greater cargo capacity, a modernized approach/docking system and carried 2 solar panels to generate electrical power. Progress M can fly for 30 days independently and 108 days docked with Mir. Spare propellent in Progress M's tanks can be transferred to Mir before it is consigned to burn up in reentry. In the past, extra fuel was abandoned with the craft. Future Progress vehicles will carry a recoverable reentry capsule for the speedy return of up to 150 kg of material from Mir to earth.

Progress M-4 docked with Mir on August 17, 1990.

Alternate Names

- 20752

Facts in Brief

Launch Date: 1990-08-15
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 7250.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Resupply/Refurbishment/Re

Additional Information

- Launch/Orbital information for Progress M- 4

Experiments on Progress M- 4

Data collections from Progress M- 4

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Progress M- 5

NSSDC ID: 1990-085A

Description

An improved version of cargo freighters used to supply the Mir space station, the Progress M series had greater cargo capacity, a modernized approach/docking system and carried 2 solar panels to generate electrical power. Progress M can fly for 30 days independently and 108 days docked with Mir. Spare propellent in Progress M's tanks can be transferred to Mir before it is consigned to burn up in reentry. In the past, extra fuel was abandoned with the craft. Future Progress vehicles will carry a recoverable reentry capsule for the speedy return of up to 150 kg of material from Mir to earth.

Progress M-5 also carried a recoverable capsule for returning scientific results back to Earth.

Alternate Names

- 20824

Facts in Brief

Launch Date: 1990-09-27
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 7250.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Resupply/Refurbishment/Re

Additional Information

- Launch/Orbital information for Progress M- 5

Experiments on Progress M- 5

Data collections from Progress M- 5

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Qi Qiu Weixing 1

NSSDC ID: 1990-081B

Description

Atmospheric research balloon Qi Qui Weixing 1 (PRC 31) was launched along with Fengyun 1-2 aboard a Long March 4 booster from Taiyuan. It was inflated on orbit to 3 m and performed atmospheric density observations.

Alternate Names

- PRC 31
- Da Qi 1
- Air Balloon Satellite 1
- Da Qi 1A
- Atmosphere 1
- 20789

Facts in Brief

Launch Date: 1990-09-03
Launch Vehicle: Long March 4
Launch Site: Taiyuan, Peoples Republic of China
Mass: 4.0 kg

Funding Agency

- Unknown (Peoples Republic of China)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Qi Qiu Weixing 1
- Telecommunications information for Qi Qiu Weixing 1

Experiments on Qi Qiu Weixing 1

Data collections from Qi Qiu Weixing 1

Questions or comments about this spacecraft can

be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Qi Qiu Weixing 2

NSSDC ID: 1990-081C

Description

Atmospheric research balloon Qi Qui Weixing 2 (PRC 32) was launched by the People's Republic of China from Taiyuan along with Fengyun 2-1 and Qi Qui Weixing 1. It was inflated on orbit to 2.5 m and performed atmospheric density observations.

Alternate Names

- Da Qi 1B
- Atmosphere 2
- PRC 32
- Da Qi 2
- Air Balloon Satellite 2
- 20790

Facts in Brief

Launch Date: 1990-09-03
Launch Vehicle: Long March 4
Launch Site: Taiyuan, Peoples Republic of China
Mass: 4.0 kg

Funding Agency

- Unknown (Peoples Republic of China)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Qi Qiu Weixing 2
- Telecommunications information for Qi Qiu Weixing 2

Experiments on Qi Qiu Weixing 2

Data collections from Qi Qiu Weixing 2

Questions or comments about this spacecraft can

be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Raduga 1-2

NSSDC ID: 1990-116A

Description

Raduga 1-2 was a Soviet communications satellite launched from the Baikonur cosmodrome aboard a Proton 8K82K/Block DM rocket. It provided uninterrupted round the clock telephone and telegraph radio communications in the USSR and simultaneous transmission of color and black and white USSR central television programs to stations in the Orbita network. It was placed in a geostationary orbit at 49 deg E and was the second launch of an alternate Raduga design.

Alternate Names

- 21038

Facts in Brief

Launch Date: 1990-12-27
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 2000.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Raduga 1-2

Experiments on Raduga 1-2

Data collections from Raduga 1-2

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Raduga 25

NSSDC ID: 1990-016A

Description

Raduga 25 was a Soviet communications satellite launched from the Baikonur cosmodrome aboard a Proton 8K82K/Block DM rocket. It provided uninterrupted round the clock telephone and telegraph radio communications in the USSR and simultaneous transmission of color and black and white USSR central television programs to stations in the Orbita network. It was placed in a geostationary orbit at 70 deg E.

Alternate Names

- 20499

Facts in Brief

Launch Date: 1990-02-15
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 1965.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Raduga 25

Experiments on Raduga 25

Data collections from Raduga 25

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Raduga 26

NSSDC ID: 1990-112A

Description

Raduga 26 was a Soviet communications satellite launched from the Baikonur cosmodrome aboard a Proton 8K82K/Block DM rocket. It provided uninterupted round the clock telephone and telegraph radio communications in the USSR and simultaneous transmission of color and black and white USSR central television programs to stations in the Orbita network. It was placed in a geostationary orbit at 85 deg E.

Alternate Names

- 21016

Facts in Brief

Launch Date: 1990-12-20
Launch Vehicle: Proton
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 1965.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Raduga 26

Experiments on Raduga 26

Data collections from Raduga 26

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Resurs-F 6

NSSDC ID: 1990-047A

Description

Resurs-F6 was a Soviet satellite that took multizonal and multispectral photographs for exploration of the earth's natural resources. Also on board was equipment of the Federal Republic of Germany for biotechnological experiments on microgravitation conditions.

Alternate Names

- 20632

Facts in Brief

Launch Date: 1990-05-29
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Resurs-F 6

Experiments on Resurs-F 6

Data collections from Resurs-F 6

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Resurs-F 7

NSSDC ID: 1990-060A

Description

Resurs-F7 was launched by the USSR and carried equipment to study the earth's natural resources.

Alternate Names

- 20687

Facts in Brief

Launch Date: 1990-07-17
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Resurs-F 7

Experiments on Resurs-F 7

Data collections from Resurs-F 7

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
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Resurs-F 8

NSSDC ID: 1990-073A

Description

Resurs-F was launched by the USSR and carried equipment to study the earth's natural resources.

Alternate Names

- 20754

Facts in Brief

Launch Date: 1990-08-16
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Resurs-F 8

Experiments on Resurs-F 8

Data collections from Resurs-F 8

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Resurs-F 9

NSSDC ID: 1990-082A

Description

Resurs-F9 was launched by the USSR and carried equipment for the study of the earth's natural resources. It also carried scientific equipment from the Federal Republic of Germany which conducted biotechnological experiments under microgravity conditions.

Alternate Names

- 20794

Facts in Brief

Launch Date: 1990-09-07
Launch Vehicle: Soyuz
Launch Site: Plesetsk, U.S.S.R
Mass: 6300.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for Resurs-F 9

Experiments on Resurs-F 9

Data collections from Resurs-F 9

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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RME

NSSDC ID: 1990-015B

Description

USA 52 was launched from Cape Canaveral, Florida, on the same Delta rocket used to launch USA 51. The Relay Mirror Experiment (RME) satellite hosted a 24-inch mirror to test pointing technology by deflecting ground-based beams back to earth. Results from experiments aboard this satellite will aid in the design of laser defenses against missile threats. RME was built by Ball Space Systems Division and weighed 1,040 kg at launch.

Alternate Names

- Relay Mirror Experiment
- USA 52
- 20497

Facts in Brief

Launch Date: 1990-02-14
Launch Vehicle: Delta
Launch Site: Cape Canaveral, United States
Mass: 1040.0 kg

Funding Agency

- Department of Defense (United States)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for RME

Experiments on RME

Data collections from RME

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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ROSAT

NSSDC ID: 1990-049A

Description

The Roentgensatellit (ROSAT) was a joint German, US and British X-ray astrophysics project. ROSAT carried a German-built imaging X-ray Telescope (XRT) with three focal plane instruments: two German Position Sensitive Proportional Counters (PSPC) and the US-supplied High Resolution Imager (HRI). The X-ray mirror assembly was a grazing incidence four-fold nested Wolter I telescope with an 84-cm diameter aperture and 240-cm focal length. The angular resolution was <5 arcsec at half energy width. The XRT assembly was sensitive to X-rays between 0.1 to 2 keV. In addition, a British-supplied extreme ultraviolet (XUV) telescope, the Wide Field Camera (WFC), was coaligned with the XRT and covers the wave band between and 6 angstroms (0.042 to 0.21 keV). ROSAT's unique strengths were high spatial resolution, low-background, soft X-ray imaging for the study of the structure of low surface brightness features, and for low-resolution spectroscopy. The ROSAT spacecraft was a three-axis stablized satellite which can be used for pointed observations, for slewing between targets, and for performing scanning observations on great circles perpendicular to the plane of the ecliptic. ROSAT was capable of fast slews (180 deg. in ~15 min.) which makes it possible to observe two targets on opposite hemispheres during each orbit. The pointing accuracy was 1 arcminute with stability <5 arcsec per sec and jitter radius of ~10 arcsec. Two CCD star sensors were used for optical position sensing of guide stars and attitude determination of the spacecraft. The post facto attitude determination accuracy was 6 arcsec. The ROSAT mission was divided into two phases: (1) After a two-month on-orbit calibration and verification period, an all-sky survey was performed for six months using the PSPC in the focus of XRT, and in two XUV bands using the WFC. The survey was carried out in the scan mode. (2) The second phase consists of the remainder of the mission and was devoted to pointed observations of selected astrophysical sources. In ROSAT's pointed phase, observing time was allocated to Guest Investigators from all three participating countries through peer review of submitted proposals. ROSAT had a design life of 18 months, but was expected to operate beyond its nominal lifetime.

Alternate Names

- Roentgen Satellite
- 20638

Facts in Brief

Launch Date: 1990-06-01
Launch Vehicle: Delta II
Launch Site: Cape Canaveral, United States
Mass: 2421.1 kg
Nominal Power: 905.0 W

Funding Agencies

- NASA-Office of Space Science Applications (United States)
- Bundesministerium fuer Forschung und Tecnnologie (Federal Republic of Germany)

Discipline

- Astronomy

Additional Information

- Launch/Orbital information for ROSAT
- PDMP information for ROSAT
- Telecommunications information for ROSAT

Experiments on ROSAT

Data collections from ROSAT

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

Personnel

Name	Role	Original Affiliation	E-mail
Dr. Alan N. Bunner	Program Scientist	NASA Headquarters	
Dr. M. Otterbein	Program Manager	Bundesministerium fuer Forschung und Technologie	
Dr. Stephen S. Holt	Project Scientist	NASA Goddard Space Flight Center	holt@lheavx.gsfc.nasa.gov
Mr. Jerre B. Hartman	Project Manager	NASA Goddard Space Flight Center	jerre.hartman@omitron.com
Prof. Joachim Truemper	Project Scientist	Max-Planck-Institut fur Extraterrestrische Physik	jtrumper@mpe.mpg.de
Dr. Robert Petre	Project Scientist	NASA Goddard Space Flight Center	rob@hatrack.gsfc.nasa.gov
Dr. Guenter R. Reigler	Program Manager	NASA Headquarters	griegler@mail.hq.nasa.gov
Mr. Karl H. Pfeiffer	Project Manager	Deutsche Forschungs-und Versuchsenstalt fuer Luft-und Raumfahrt	

Selected References

Ayres, T. S., *et al.*, Digging in the coronal graveyard: A ROSAT observation of the red giant Arcturus, *Astrophys. J.*, 376, No. 2, L45-L48, Aug. 1991.

ROSAT mission description, ROSAT Scientific Data Center and Max-Plank-Institut fur Extraterrestriche Physik, NRA 91-OSSA-3, Appendix F, Jan. 1991.

US Active Archive for ROSAT Information/Data

The ROSAT Archive at HEASARC

Other Sources of ROSAT Information/Data

SAO ROSAT Science Data Center
ROSAT Home Page at MPE
The UK ROSAT Public Data Archive at Leicester

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
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SATCOM I

NSSDC ID: 1990-100A

Description

SATCOM I was a telecommunications satellite launched using the Ariane launch vehicle from the Kourou Space Center in French Guiana. Built for GE American Communications by GE Astro Space, it provided C-band video, voice and data service to commercial and government users in the continental US, Alaska and Hawaii. Twenty-four transponders operated at 6/4 GHz. The new commsat, the first in a series of scheduled replacements for the GE network, featured command encryption and both vertical and horizontal polarization. Onboard polarization switching allowed the satellite to operate at other orbital postitions to restore interruptions in multipoint distribution services. The box-shaped bus measured 2.5 m by 1.3 m by 1.6 m. Solar arrays, supplying 1,030 W at end of life, span 15.7 m when deployed. SATCOM I was stationed above 137 deg. w long., and has a 12-year design life.

Alternate Names

- SATCOM C1
- 20945

Facts in Brief

Launch Date: 1990-11-20
Launch Vehicle: Ariane 42P
Launch Site: Kourou, French Guiana
Mass: 670.0 kg
Nominal Power: 1030.0 W

Funding Agency

- GE American Communications, Inc. (United States)

Discipline

- Communications

Additional Information

- Launch/Orbital information for SATCOM I

Experiments on SATCOM I

Data collections from SATCOM I

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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SBS 6

NSSDC ID: 1990-091A

Description

SBS-6 (Satellite Business Systems-6) was a telecommunications satellite launched using the Ariane 441 launch vehicle from the Kourou Space Center in French Guiana. Built for Hughes Communications Inc (HCI) by Hughes Space and Communications Group, SBS 6 carried 19 41-W Ku-band transponders and 11 spares. The powerful channels allowed small, portable ground antennas to receive transmissions. Stationed above 99 deg. w, SBS 6 covered the continental US. The satellite was slated to backup other older craft in the HCI network. In the short term, however, new customers could lease transmission capacity. A Hughes HS 393 series bus, SBS 6 was drum-shaped, measuring 3.6 m in diameter, 3.6 m high. Deployed height on oribt was 9.4 m. Declared operational on November 17, 1990, it has a 15-year life expectancy.

Alternate Names

- Satellite Business Systems 6
- 20872

Facts in Brief

Launch Date: 1990-10-12
Launch Vehicle: Ariane 44L
Launch Site: Kourou, French Guiana
Mass: 1514.0 kg

Funding Agency

- Pan American Satellite (United States)

Discipline

- Communications

Additional Information

- Launch/Orbital information for SBS 6

Experiments on SBS 6

Data collections from SBS 6

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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SCE

NSSDC ID: 1990-031C

Description

The US Military's STACKSAT mission involved the launch of three similar spacecraft (POGS, TEX, and SCE) on the same booster. Manufactured by Defense Systems Inc (DSI), the spacecraft were gravity gradient stabilized with body mounted solar arrays providing ~15 W orbit average power. POGS carried a magnetometer to accurately map the Earth's magnetic field for the Defense Mapping Agency. TEX and SCE each carried specially designed transmitters to study ionospheric effects on radio signals.

This spacecraft, SCE (Selective Communications Experiment) carried a variable frequency transmitter to study ionospheric effects at various RF frequencies, and was also designed to demonstrate message store and forward techniques.

Alternate Names

- USA 58
- P87-2
- STACKSAT
- 20562

Facts in Brief

Launch Date: 1990-04-11
Launch Vehicle: Atlas E
Launch Site: Vandenberg AFB, United States
Nominal Power: 15.0 W

Funding Agency

- Department of Defense-Department of the Navy (United States)

Disciplines

- Communications
- Engineering
- Surveillance and Other Military
- Space Physics

Additional Information

- Launch/Orbital information for SCE
- PDMP information for SCE

Experiments on SCE

Data collections from SCE

Questions or comments

about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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SECS

NSSDC ID: 1990-028B

Description

SECS (Special Experimental Communications System) was a digital store and forward communications spacecraft for a classified US Navy mission. The design was similar to GLOMR with more data storage, greater redundancy, more space qualified hardware content. SECS was the first spacecraft launched on the air-launched Pegasus launch vehicle. It was built by Defense Systems Inc (DSI), was spherically shaped and approximately 0.6 m in diameter. It operated for 3.5 years.

Alternate Names

- Special Exp Comm System
- USA 55
- 20547

Facts in Brief

Launch Date: 1990-04-05
Launch Vehicle: Pegasus
Launch Site: Edwards Air Force Base, United States
Mass: 25.0 kg

Funding Agency

- Department of Defense-Department of the Navy (United States)

Disciplines

- Communications
- Engineering
- Surveillance and Other Military

Additional Information

- Launch/Orbital information for SECS

Experiments on SECS

Data collections from SECS

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support

Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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Skynet 4A

NSSDC ID: 1990-001A

Description

Skynet 4A, a United Kingdom communications satellite, was launched by the US using the Titan 3 launch vehicle. It was the second in a series of UK Ministry of Defense communications satellites dual-launched with JCSat 2 aboard the first commercial Titan III. It provided jam-proof communications service between fixed and mobile land and sea-based ground stations. The payload housed one four-channel SHF transponder and one two-channel UHF transponder. An EHF transponder was available for propagation experiments. Built by British Aerospace, the satellite measured 2.1m by 1.4m and weighed 1,463 kg at launch. Solar arrays spanning 16m provided 1,200 W of power.

Alternate Names

- 20401

Facts in Brief

Launch Date: 1990-01-01
Launch Vehicle: Titan III
Launch Site: Cape Canaveral, United States
Mass: 1463.0 kg
Nominal Power: 1200.0 W

Funding Agency

- Ministry of Defence, UK (United Kingdom)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Skynet 4A

Experiments on Skynet 4A

Data collections from Skynet 4A

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Skynet 4C

NSSDC ID: 1990-079A

Description

Skynet 4C was launched by the Ariane launch vehicle from the Kourou Space Center in French Guiana.

Alternate Names

- 20776

Facts in Brief

Launch Date: 1990-08-30
Launch Vehicle: Ariane 44LP
Launch Site: Kourou, French Guiana
Mass: 1430.5 kg

Funding Agency

- Ministry of Defence, UK (United Kingdom)

Discipline

- Communications

Additional Information

- Launch/Orbital information for Skynet 4C

Experiments on Skynet 4C

Data collections from Skynet 4C

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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Soyuz TM- 9

NSSDC ID: 1990-014A

Description

Soyuz TM-9 was launched by the USSR and docked with the orbital station Mir on February 13, 1990. The departing TM-8 crew reported that 3 of the TM-9 transport's 8 thermal blankets were damaged, a situation leading to 2 unscheduled spacewalks. Ground controllers feared that the torn insulation was blocking sensors used to align the spacecraft at reentry, and that as exposures to the space vacuum degraded TM-9's temperature controls, condensation would cause an electrical short. The temperature was stabilized by maneuvering Mir to keep TM-9 facing the sun, but the blanket damage could not be mitigated without special tools and an EVA ladder to reach the impaired area. The materials arrived with the Kristall module (90-048A) on June 10. Kristall docked at the front longitudinal port of the Mir complex, and was moved to a radial port opposite Kvant 2 the next day. The cosmonauts began the repair mission July 17, exiting through the Kvant 2 hatch. The thermal problem was solved by stowing the torn blankets out of the sensor's line of sight, a laborious task that took 6 hours -- near the limits of their space suits. Back in the Kvant 2 airlock, they discovered the outer door wouldn't close. Apparently, the chamber had not fully depressurized when they opened to hatch and its hinges were damaged. Cosmonauts Solovyov and Balandin had to depressurize an adjoining compartment, move into it, then repressurize it to enter the station proper. By then almost 7 hours had elapsed. On July 26, they reentered the open airlock to repair the buckled hinge. A short-term fix was accomplished during the 3-hr 31-mn spacewalk. The cosmonauts' 179-day, 1-hr, 18-mn mission ended August 9th when Soyuz TM-9 touched down at a pre-set area 72 km northeast of the city of Arkalyk.

Alternate Names

- 20494

Facts in Brief

Launch Date: 1990-02-11
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 7150.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Human Crew

Additional Information

- Launch/Orbital information for Soyuz TM-9

Experiments on Soyuz TM-9

Data collections from Soyuz TM- 9

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

Launch, orbit and landing data

Launch date:	11.02.1990
Launch time:	06:16 UT
Launch site:	Baikonur
Launch pad:	1
Altitude:	350 km
Inclination:	51,6°
Landing date:	09.08.1990
Landing time:	07:33 UT
Landing site:	50° 51' N, 67° 17' E

Flight

Launch from Baikonur; landing 72 km northeast of Arkalyk.

Docking on Soyuz TM-8-MIR-Quant-Quant2 complex; sixth resident crew take turning the fifth resident crew; supplies with several cargo spaceships of type Progress; module Kristall docked on the station at 10.06.1990; EVA on 17.07.1990 (7h 16m) in which spacecraft Soyuz TM-9 was repaired; problems because of damage of Quant2-module hatch; another EVA on 26.07.1990 (3h 31m) to repair the hatch (failed).

Photos / Drawings

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Soyuz TM-10

NSSDC ID: 1990-067A

Description

Soyuz TM-10, with two cosmonauts aboard, was launched by the USSR and docked with the orbiting station Mir on August 3, 1990. This egg-shaped orbital module weighs approximately one metric tone, houses life support equipment and consumables and provides some crew space in addition to the descent module. The forward end of the orbital module could be configured for a variety of different missions and the end is connected to the descent/command module.

The bell-shaped descent module could be configured for a crew of one, two or three members. The reentry capsule was designed with aerodynamic capabilities for precision landings at preselected locations. Deorbit and recovery were usually conducted at a force of three to four G's, but emergency ballistic reentries up to 10 G's were possible.

The cylindric-shaped instrument module provided maneuver, attitude and thermal control. Electric power on all but two Soyuz variants was generated by two sets of rectangular solar panels attached to, and deployed at right angles from the instrument module. This component also contained the retrorocket engines (two 400-kilogram-thrust liquid fuel system) that deorbit the craft or change its orbital parameters

Alternate Names

- 20722

Facts in Brief

Launch Date: 1990-08-01
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 7150.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Human Crew

Additional Information

- Launch/Orbital information for Soyuz TM-10

Experiments on Soyuz TM-10

Data collections from Soyuz TM-10

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

Soyuz TM-10

Launch, orbit and landing data

Launch date:	01.08.1990
Launch time:	09:32 UT
Launch site:	Baikonur
Launch pad:	1
Altitude:	350 km
Inclination:	51,6°
Landing date:	10.12.1990
Landing time:	06:08 UT
Landing site:	69 km NE of Arkalyk

Crew

No.		Surname	Given name	Job
1		Manakov	Gennadi Mikhailovich	Commander
2		Strekalov	Gennadi Mikhailovich	Flight Engineer

Flight

Launch from Baikonur; landing 69 km northeast of Arkalyk.

Seventh resident crew of MIR spacestation; scientific work (astrophysical, geophysical, space materials science, biological and biotechnological research and experiments) performed in the Soyuz TM-10-Quant-MIR-Quant2-Kristall complex; supplies with cargo space ships Progress M-4 and M-5; EVA on 29.10.1990 (3h 45m) repairing work on damaged hatch of Quant-2-module; when returning to Earth, Japanese cosmonaut Akiyama (launched with Soyuz TM-11-spacecraft) onboard.

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Soyuz TM-11

NSSDC ID: 1990-107A

Description

Soyuz TM-11, a Soviet research spacecraft, docked with the Mir complex on December 4, 1990. Designed and manufactured by RKK Energiya, the Soyuz TM was capable of carrying three cosmonauts and has a gross weight of just over seven metric tons, a length of seven meters, and a maximum diameter of 2.7 m. The spacecraft consisted of three main sections: the orbital module, the command and reentry module, and the service module. Two solar arrays (10.6 m span) provided electrical power for the typical 50-hour journey to Mir and could be interconnected with the space station's electrical system to furnish additional 1.3 kW. The nominal flight time for Soyuz TM spaceship is 5-6 months.

Alternate Names

- 20981

Facts in Brief

Launch Date: 1990-12-02
Launch Vehicle: Soyuz
Launch Site: Tyuratam (Baikonur Cosmodrome), U.S.S.R
Mass: 7150.0 kg

Funding Agency

- Unknown (U.S.S.R)

Discipline

- Human Crew

Additional Information

- Launch/Orbital information for Soyuz TM-11

Experiments on Soyuz TM-11

Data collections from Soyuz TM-11

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

Soyuz TM-11

Launch, orbit and landing data

Launch date:	02.12.1990
Launch time:	08:13 UT
Launch site:	Baikonur
Launch pad:	1
Altitude:	350 km
Inclination:	51,6°
Landing date:	26.05.1991
Landing time:	10:04 UT
Landing site:	68 km SE of Dzheskasgan

Crew

No.		Surname	Given name	Job
1		Afanasiyev	Viktor Mikhailovich	Commander
2		Manarov	Musa Khiromanovich	Flight Engineer
3		Akiyama	Toyohiro	Research Cosmonaut

Flight

Launch from Baikonur; landing 68 km southeast of Dzheskasgan.

First commercial flight with a paying passenger; the private Japanese television company paid 28 million dollar; docking on Soyuz TM-10-Quant1-MIR-Kristall-Quant2 complex; Akiyama made

daily TV-broadcast; scientific work with seventh resident crew of the station; then Afanasiyev and Manarov became the eighth resident crew; both cosmonauts performed four EVA`s on 07.01. (5h 18m), 23.01. (5h 33m), 26.01. (6h 20m) and 25.04.1991 (3h 34m); during the EVA's they completed the repair of the Quant-hatch, installed the Strela boom and solar array supports on Mir, and finally inspected the Kurs docking system antenna.

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SPOT 2

NSSDC ID: 1990-005A

Description

The SPOT-B (Systeme Probatoire d'Observation de la Terre) spacecraft is an earth observation satellite with a ground resolution better than that of the Landsat series satellites. The main applications for the images returned by the second SPOT mission are land-use studies, agriculture and forestry resources, mineral and oil resources, and cartography. The three-axis stabilized satellite operates in a circular sun-synchronous near-polar orbit for a design lifetime of 2 years. The spacecraft dimensions are 2 x 2 x 3.5 m and 15.60 m for the overall length of the deployed solar panel. SPOT-B consists of two parts: (1) the bus, a standard multipurpose platform, and (2) the payload. The bus provides housekeeping information and an onboard computer. The payload is mounted on one of the side panels of the bus. It consists of two identical high-resolution visible (HRV) imaging instruments and a package comprising two magnetic-tape data recorders and a telemetry transmitter. The HRV imaging instrument observes in three spectral bands (in the visible and near infrared regions) with a ground resolution of 20 m, and/or in a broader spectral band (panchromatic black and white) with a ground resolution of 10 m. The pattern of successive ground tracks is repeated exactly at 26-day intervals. The SPOT-B instrument package has the provision for off-nadir viewing which should be particularly useful for monitoring localized phenomena evolving on a relatively short timescale. It also provides the capability for recording stereoscopic pairs of images of a given area during successive satellite passes.

Alternate Names

- SPOT-B
- 20436

Facts in Brief

Launch Date: 1990-01-22
Launch Vehicle: Ariane 40
Launch Site: Kourou, French Guiana
Mass: 1870.0 kg

Funding Agency

- Centre National d'Etudes Spatiales (France)

Discipline

- Earth Science

Additional Information

- Launch/Orbital information for SPOT 2

Experiments on SPOT 2

Data collections from SPOT 2

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

Personnel

Name	Role	Original Affiliation	E-mail
Dr. Michel Courtois	Project Manager	Centre National d'Etudes Spatiales	

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STS 31

National Space Science Data Center

STS 31

NSSDC ID: 1990-037A

Description

STS-31 was the tenth launch of the shuttle Discovery. On board were Loren Shriver, Charles Bolden, Bruce McCandless, Steven Hawley, and Kathryn Sullivan. The main purpose of this mission was to deploy the Hubble Space Telescope (HST) astronomical observatory. It was designed to operate above the earth's turbulent and obscuring atmosphere to observe celestial objects at ultraviolet, visible and near-infrared wavelengths. This was a joint NASA-ESA effort. The rest of the mission was devoted to photography and onboard experiments. To launch HST into an orbit that guaranteed longevity, Discovery soared to 600 km - the highest shuttle altitude to date. The record height permitted the crew to photograph earth's large scale geographic features not apparent from lower orbits. Motion pictures were recorded by two IMAX cameras. Experiment activity included a biomedical technology study, advanced materials research; particle contamination and ionizing radiation measurements; and student science project studying zero gravity effects on electronic arcs. Discovery's reentry from its higher than usual orbit call for a 4-mn, 58-sec deorbit burn, the longest in shuttle history. It touched down on Edwards AFB runway 22 at 13:49, April 29, after 5 days, 1 hr, 16 mn.

Alternate Names

- 20579

Facts in Brief

Launch Date: 1990-04-24
Launch Vehicle: Shuttle
Launch Site: Cape Canaveral, United States
Mass: 10863.0 kg

Funding Agency

- NASA-Office of Space Flight (United States)

Discipline

- Human Crew

Additional Information

- Launch/Orbital information for STS 31

Experiments on STS 31

Data collections from STS 31

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

Related Information/Data at NSSDC

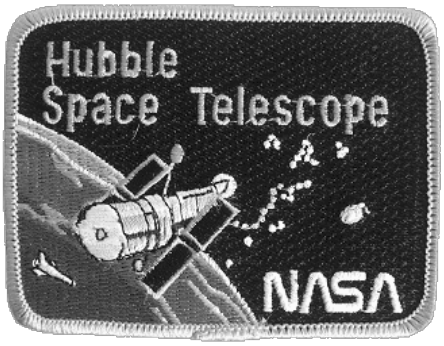
The Hubble Space Telescope

Other Sources of STS 31 Information/Data

STS 31 information (NASA KSC)

STS 31 Press Release images (NASA JSC)

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010



Launch, orbit and landing data

Launch date:	24.04.1990
Launch time:	12:33 UT
Launch site:	Cape Canaveral (KSC)
Launch pad:	39-B
Altitude:	611 km
Inclination:	28,45°
Landing date:	29.04.1990
Landing time:	13:49 UT
Landing site:	Edwards AFB

Crew

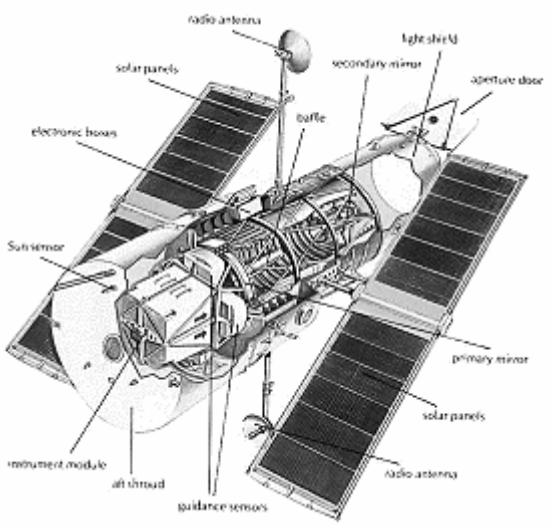
No.		Surname	Given name	Job
1		Shriver	Loren James	CDR
2		Bolden	Charles Frank, Jr. "Charlie"	PLT
3		Hawley	Steven Alan	MSP
4		Sullivan	Kathryn Dwyer	MSP
5		McCandless	Bruce II	MSP

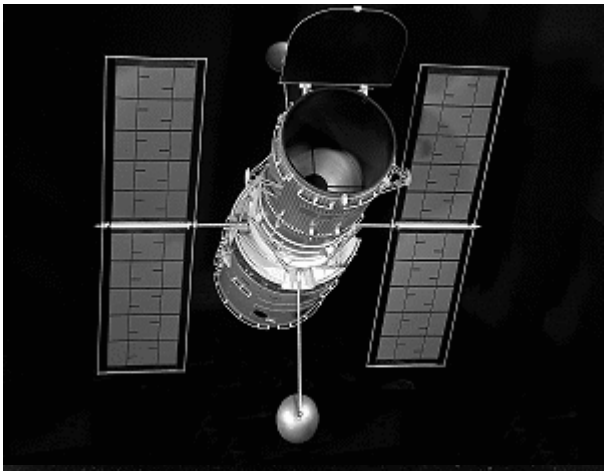
Flight

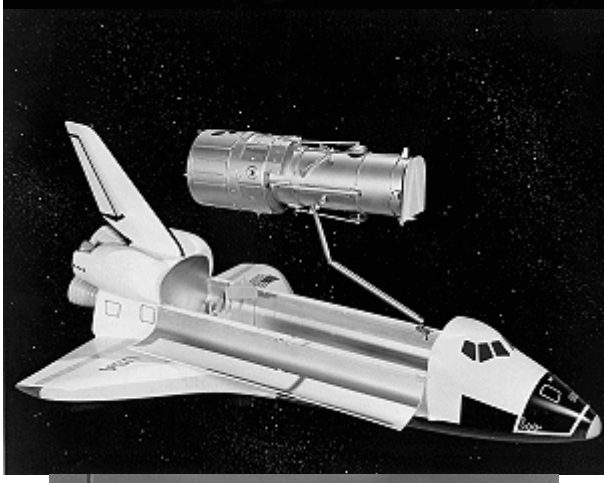
Launch from Cape Canaveral (KSC); landing on Edwards AFB.

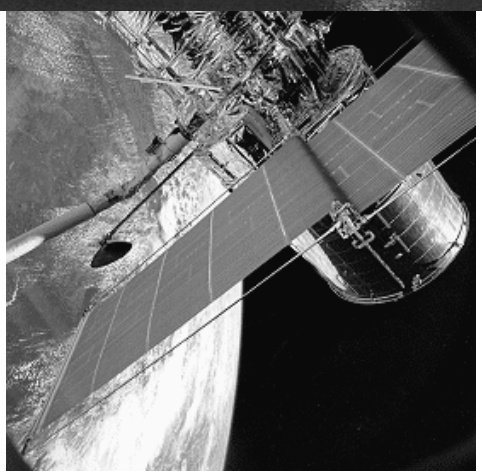
Primary payload Hubble Space Telescope, deployed in a 380-statute-mile orbit; several secondary payloads: (ICBC, APM, AMOS and more); the later very successful Hubble Telescope does not work well, because of mirror-problems; therefore a repair-mission was planned (STS-61).

Photos / Drawings









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STS 32

STS 32

NSSDC ID: 1990-002A

Description

Objectives were deployment of SYNCOM IV-F5 defense communications satellite and retrieval of NASA's Long Duration Exposure Facility (LDEF). SYNCOM IV-F5 (also known as LEASAT 5) deployed first, and third stage Minuteman solid perigee kick motor propelled satellite to geosynchronous orbit. LDEF retrieved on flight day four using remote manipulator system. Middeck payloads: Characterization of Neurospora Circadian Rhythms (CNCR); Protein Crystal Growth (PCG); Fluid Experiment Apparatus (FEA); American Flight Echocardiograph (AFE); Latitude /Longitude Locator (L3); Mesoscale Lightning Experiment(MLE); IMAX camera; and Air Force Maui Optical Site (AMOS) experiment.

Alternate Names

- 20409

Facts in Brief

Launch Date: 1990-01-09
Launch Vehicle: Shuttle
Launch Site: Cape Canaveral, United States
Mass: 12014.0 kg

Funding Agency

- NASA-Office of Space Flight (United States)

Discipline

- Human Crew

Additional Information

- Launch/Orbital information for STS 32

Experiments on STS 32

Data collections from STS 32

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

Related Information/Data at NSSDC

LDEF
Leasat 5

Other Sources of STS 32 Information/Data

STS 32 information (NASA KSC)
STS 32 Press Release images (NASA JSC)

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

Launch, orbit and landing data

Launch date:	09.01.1990
Launch time:	12:35 UT
Launch site:	Cape Canaveral (KSC)
Launch pad:	39-A
Altitude:	329 km
Inclination:	28,5°
Landing date:	20.01.1990
Landing time:	09:35 UT
Landing site:	Edwards AFB

Crew

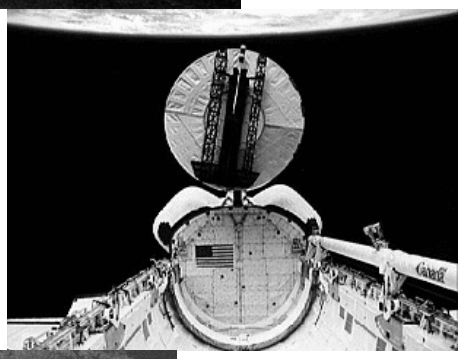
No.		Surname	Given name	Job
1		Brandenstein	Daniel Charles	CDR
2		Wetherbee	James Donald "Wexbee"	PLT
3		Dunbar	Bonnie Jeanne	MSP
4		Ivins	Marsha Sue	MSP
5		Low	David George	MSP

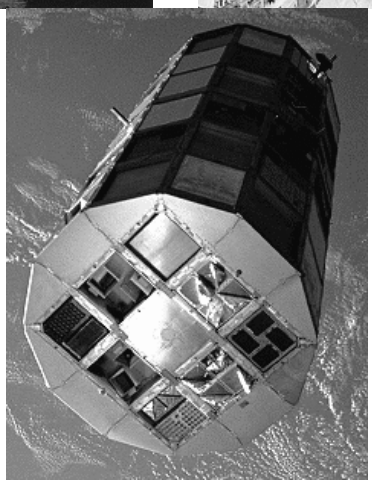
Flight

Launch from Cape Canaveral (KSC); landing on Edwards AFB.

Deploying of defense communications satellite Syncom-IV-F5; retrieval of 1984 stranded "Long Duration Exposure Facility" (LDEF), with 57 long duration experiments and bringing it back to Earth.

Photos / Drawings





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STS 35/Astro 1

National Space Science Data Center

STS 35/Astro 1

NSSDC ID: 1990-106A

Description

STS 35 was the 38th shuttle mission and the tenth flight of the Columbia orbiter. The commander was Vance Brand and the pilot was Guy Gardner. Mission specialists were Jeffrey Hoffman, John Lounge, and Robert Parker. Payload specialists were Samuel Durrance and Ronald Parise. The shuttle landed after completing 144 orbits with a total mission duration of 8 days, 23 hours, 5 minutes, and 8 seconds.

Primary objectives were round-the-clock observations of celestial sphere in ultraviolet and X-ray astronomy with ASTRO-1 observatory consisting of four telescopes: Hopkins Ultraviolet Telescope (HUT); Wisconsin Ultraviolet Photo-Polarimeter Experiment (WUPPE); Ultraviolet Imaging Telescope (UIT); and Broad Band X-Ray Telescope (BBXRT). Ultraviolet telescopes mounted on Spacelab elements in cargo bay were to be operated in shifts by flight crew. Loss of both data display units (used for pointing telescopes and operating experiments) during mission impacted crew-aiming procedures and forced ground teams at Marshall Space Flight Center to aim ultraviolet telescopes with fine-tuning by flight crew. BBXRT, also mounted in cargo bay, was directed from outset by ground-based operators at Goddard Space Flight Center and not affected. Other experiments: Shuttle Amateur Radio Experiment-2 (SAREX-2); ground-based experiment to calibrate electro-optical sensors at Air Force Maui Optical Site (AMOS) in Hawaii; and crew conducted Space Classroom Program: Assignment: The Stars, to spark student interest in science, math and technology. Crew experienced trouble dumping waste water due to clogged drain, but managed using spare containers. The mission was cut short one day due to impending bad weather at primary landing site, Edwards Air Force Base, CA. Science teams at Marshall and Goddard Space Flight Centers estimated 70 percent of planned science data achieved.

Alternate Names

- 20980

Facts in Brief

Launch Date: 1990-12-02
Launch Vehicle: Shuttle
Launch Site: Cape Canaveral, United States
Mass: 102420.0 kg

Funding Agency

- NASA-Office of Space Flight (United States)

Disciplines

- Astronomy
- Human Crew

Additional Information

- Launch/Orbital information for STS 35/Astro 1
- Telecommunications information for STS 35/Astro 1

Experiments on STS 35/Astro 1

Data collections from STS 35/Astro 1

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

Related Information/Data at NSSDC

Astro 1

Other Sources of STS 35 Information/Data

STS 35 information (NASA KSC)
STS 35 Press Release images (NASA JSC)

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

STS-35

Launch, orbit and landing data

Launch date:	02.12.1990
Launch time:	06:49 UT
Launch site:	Cape Canaveral (KSC)
Launch pad:	39-B
Altitude:	352 km
Inclination:	28,45°
Landing date:	11.12.1990
Landing time:	05:54 UT
Landing site:	Edwards AFB

Crew

No.		Surname	Given name	Job
1		Brand	Vance DeVoe	CDR
2		Gardner	Guy Spence	PLT
3		Hoffman	Jeffrey Alan	MSP
4		Lounge	John Michael	MSP
5		Parker	Robert Alan Ridley	MSP

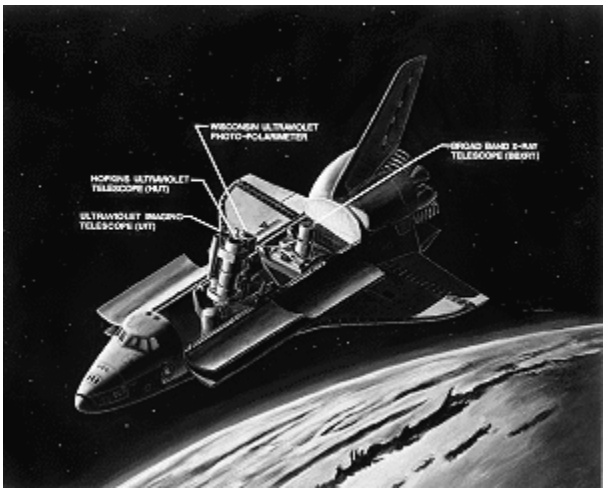
6		Parise	Ronald Anthony	PSP
7		Durrance	Samuel Thornton	PSP

Flight

Launch from Cape Canaveral (KSC); landing on Edwards AFB.

Primary payload ASTRO-1 observatory with four telescopes (HUT, WUPPE, UIT and BBXRT); some problems during the mission (loss of both data display units), so only 70% of planned science data achieved; mission cut short one day due to impending bad weather at primary landing site.

Photos / Drawings



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STS 36

NSSDC ID: 1990-019A

Description

STS-36 was the sixth flight of the shuttle Atlantis. On board were John Creighton, John Casper, David Hilmers, Richard Mullane and Pierre Thout. The primary purpose for this mission was to launch a spacecraft for the US Department of Defense. Mission duration was 106 hours 18 minutes 22 seconds.

Alternate Names

- 20512

Facts in Brief

Launch Date: 1990-02-28
Launch Vehicle: Shuttle
Launch Site: Cape Canaveral, United States

Funding Agency

- NASA-Office of Space Flight (United States)

Discipline

- Human Crew

Additional Information

- Launch/Orbital information for STS 36

Experiments on STS 36

Data collections from STS 36

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

Launch, orbit and landing data

Lauch date:	28.02.1990
Launch time:	07:50 UT
Launch site:	Cape Canaveral (KSC)
Launch pad:	39-A
Altitude:	244 km
Inclination:	62,0°
Landing date:	04.03.1990
Landing time:	18:08 UT
Landing site:	Edwards AFB

Crew

No.		Surname	Given name	Job
1		Creighton	John Oliver	CDR
2		Casper	John Howard	PLT

3		Mullane	Richard Michael	MSP
4		Hilmers	David Carl	MSP
5		Thuot	Pierre Joseph	MSP

Flight

Launch from Cape Canaveral (KSC); landing on Edwards AFB.

Sixth mission dedicated to Department of Defense; deploying of reconnaissance satellite AFP-731 (KH-12; USA-53); later on, the satellite failed and crashed down to Earth.

Photos / Drawings

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STS 38

NSSDC ID: 1990-097A

Description

STS-38 was the 7th Atlantis flight with Richard Covey, Robert Springer, Carl Meade, Frank Culbertson, and Charles Gemer on board. This was a US Department of Defense mission. Scheduled to land at Edwards AFB after a four-day flight, Atlantis was rerouted to Kennedy Space Center due to high winds and rain at the California site. The landing was delayed one day in the hopes that conditions at Edwards would improve. The shuttle touched down at 21:42, November 20, after 80 orbits and 4 days, 21 hrs, 54 mns in space.

Alternate Names

- 20935

Facts in Brief

Launch Date: 1990-11-15
Launch Vehicle: Shuttle
Launch Site: Cape Canaveral, United States

Funding Agency

- NASA-Office of Space Flight (United States)

Discipline

- Human Crew

Additional Information

- Launch/Orbital information for STS 38

Experiments on STS 38

Data collections from STS 38

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

Launch, orbit and landing data

Launch date:	15.11.1990
Launch time:	23:48 UT
Launch site:	Cape Canaveral (KSC)
Launch pad:	39-A
Altitude:	263 km
Inclination:	28,5°
Landing date:	20.11.1990
Landing time:	21:42 UT
Landing site:	Cape Canaveral (KSC)

Crew

No.		Surname	Given name	Job
1		Covey	Richard Oswalt	CDR
2		Culbertson	Frank Lee, Jr.	PLT
3		Meade	Carl Joseph	MSP
4		Springer	Robert Clyde	MSP
5		Gemar	Charles Donald "Sam"	MSP

Flight

Launch from Cape Canaveral (KSC); landing on Cape Canaveral (KSC).

Seventh mission dedicated to Department of Defense; deploying of reconnaissance satellite AFP-658 (Magnum-3; USA-66) to view the area Persian Gulf/Iraq; mission extended one day, because of to high crosswinds at the original planned landing site Edwards AFB.

Photos / Drawings

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STS 41/SSBUV02

STS 41/SSBUV02

NSSDC ID: 1990-090A

Description

STS-41 was the 11th Discovery flight with Richard Richards, Robert Cabana, Bruce Melnick, William Shepherd, and Thomas Akers on board.

This mission deployed the Ulysses spacecraft, a joint, NASA/ESA mission to study the poles of the sun and the interplanetary space above and below the poles. Two upper stages, Inertial Upper Stage (IUS) and a mission-specific Payload Assist Module-S (PAM-S), combined together for first time to send Ulysses toward out-of- ecliptic trajectory. Other payloads and experiments: Shuttle Solar Backscatter Ultraviolet (SSBUV) experiment; INTELSAT Solar Array Coupon (ISAC); Chromosome and Plant Cell Division Experiment (CHROMEX); Voice Command System (VCS); Solid Surface Combustion Experiment (SSCE), Investigations into Polymer Membrane Processing (IPMP); Physiological Systems Experiment (PSE); Radiation Monitoring Experiment III (RME III); Shuttle Student involvement Program (SSIP) and Air Force Maui Optical Site (AMOS) experiment. The mission duration was 96 hours 10 minutes 2 seconds.

Alternate Names

- SSBUV02
- 20841

Facts in Brief

Launch Date: 1990-10-06
Launch Vehicle: Shuttle
Launch Site: Cape Canaveral, United States
Mass: 22140.0 kg

Funding Agency

- NASA-Office of Space Flight (United States)

Disciplines

- Earth Science
- Human Crew
- Solar Physics

Additional Information

- Launch/Orbital information for STS 41/SSBUV02

Experiments on STS 41/SSBUV02

Data collections from STS 41/SSBUV02

Questions or comments about this spacecraft can be directed to: Dr. John F. Cooper.

Related Information/Data at NSSDC

Ulysses

Other Sources of STS 41 Information/Data

STS 41 information (NASA KSC)
STS 41 Press Release images (NASA JSC)

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

Launch, orbit and landing data

Launch date:	06.10.1990
Launch time:	11:47 UT
Launch site:	Cape Canaveral (KSC)
Launch pad:	39-B
Altitude:	296 km
Inclination:	28,45°
Landing date:	10.10.1990
Landing time:	13:57 UT
Landing site:	Edwards AFB

hi res version (868 KB)

alternate crew photo

Crew

No.		Surname	Given name	Job
1		Richards	Richard Noel "Dick"	CDR
2		Cabana	Robert Donald	PLT

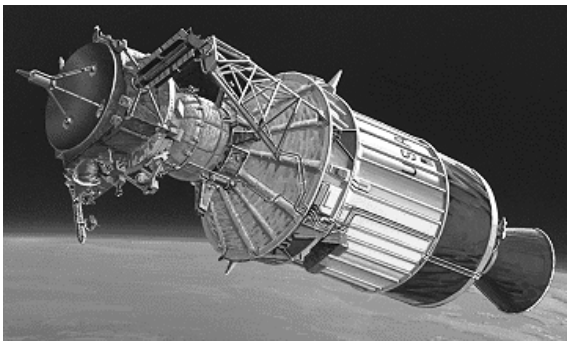
3		Melnick	Bruce Edward "Mel"	MSP
4		Shepherd	William McMichael	MSP
5		Akers	Thomas Dale	MSP

Flight

Launch from Cape Canaveral (KSC); landing on Edwards AFB.

Deploying ESA-built Ulysses spacecraft to explore polar regions of the sun; several secondary payloads and experiments.

Photos / Drawings



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TDF 2

NSSDC ID: 1990-063A

Description

TDF-2 was a French telecommunications satellite launched using the Ariane launch vehicle by the European Space Agency. It was the second 5-channel direct broadcast satellite built for Telediffusion de France by the European Eurosatellite consortium. It provided TV and radio programming to France, surrounding European countries, and a sliver of North Africa using the D2 MAC Packet standard. DTF-2 operated at 11/12 GHz, with a maximum EIRP of 64 dbW per channel. Box-shaped, the satellite measured 6.2 by 2.4 by 2.2 m, and spanned 19.3 m with solar arrays deployed. It joined TDF-1, Ariane-launched in 1988, at 19 deg. w long. The satellite had a 9-year life expectancy, but suffered two transponder failures two months after achieving operational status. The losses have not affected service, but do limit backup options. The French government announced in November, 1990 that the TDF program would be discontinued in favor of more current technology.

Alternate Names

- Telediffusion de France2
- 20705

Facts in Brief

Launch Date: 1990-07-24
Launch Vehicle: Ariane 44L
Launch Site: Kourou, French Guiana
Mass: 1255.0 kg
Nominal Power: 3300.0 W

Funding Agency

- Telediffusion de France (France)

Discipline

- Communications

Additional Information

- Launch/Orbital information for TDF 2

Experiments on TDF 2

Data collections from TDF 2

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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TEX

NSSDC ID: 1990-031B

Description

The US Military's STACKSAT mission involved the launch of three similar spacecraft (POGS, TEX, and SCE) on the same booster. Manufactured by Defense Systems Inc (DSI), the spacecraft were gravity gradient stabilized with body mounted solar arrays providing ~15 W orbit average power. POGS carried a magnetometer to accurately map the Earth's magnetic field for the Defense Mapping Agency. TEX and SCE each carried specially designed transmitters to study ionospheric effects on radio signals.

This spacecraft, TEX (Transceiver EXperiment), carried a variable power transmitter used to study ionospheric effects on RF transmissions. Data from the experiment were used to determine minimum spacecraft transmitter power levels for transmission to ground receivers.

Alternate Names

- STACKSAT
- USA 57
- P87-2
- 20561

Facts in Brief

Launch Date: 1990-04-11
Launch Vehicle: Atlas E
Launch Site: Vandenberg AFB, United States
Nominal Power: 15.0 W

Funding Agency

- Department of Defense-Department of the Air Force (United States)

Disciplines

- Engineering
- Surveillance and Other Military
- Space Physics

Additional Information

- Launch/Orbital information for TEX
- PDMP information for TEX

Experiments on TEX

Data collections from TEX

Questions or comments about this spacecraft can be directed to: Coordinated

Request and User Support Office.

+ Privacy Policy and Important Notices

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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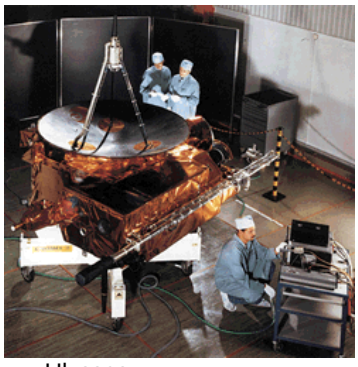

Ulysses

Ulysses

NSSDC ID: 1990-090B

Description

The primary objectives of Ulysses, formerly the International Solar Polar Mission (ISPM), are to investigate, as a function of solar latitude, the properties of the solar wind and the interplanetary magnetic field, of galactic cosmic rays and neutral interstellar gas, and to study energetic particle composition and acceleration. The 55 kg payload includes two magnetometers, two solar wind plasma instruments, a unified radio/plasma wave instrument, three energetic charged particle instruments, an interstellar neutral gas sensor, a solar X-ray/cosmic gamma-ray burst detector, and a cosmic dust sensor. The communications systems is also used to study the solar corona and to search for gravitational waves. Secondary objectives included interplanetary and planetary physics investigations during the initial Earth-Jupiter phase and investigations in the Jovian magnetosphere. The spacecraft used a Jupiter swingby in Feb. 1992 to transfer to a heliospheric orbit with high heliocentric inclination, and will pass over the rotational south pole of the sun in mid-1994 at 2 AU, and over the north pole in mid-1995. A second solar orbit will take Ulysses again over the south and north poles in years 2000 and 2001, respectively. The spacecraft is powered by a single radio-isotope generator. It is spin stabilized at a rate of 5 rpm and its high-gain antenna points continuously to the earth. A nutation anomaly after launch was controlled by CONSCAN. The original mission planned for two spacecraft, one built by ESA and the other by NASA. NASA cancelled its spacecraft in 1981.

Alternate Names

- Solar Polar
- International Solar Polar Mission
- 20842

Facts in Brief

Launch Date: 1990-10-06
Launch Vehicle: Shuttle-Centaur G-Prime
Launch Site: Cape Canaveral, United States
Mass: 370.0 kg
Nominal Power: 285.0 W

Funding Agencies

- European Space Agency (International)
- NASA-Office of Space Science Applications (United States)

Disciplines

- Astronomy
- Planetary Science
- Solar Physics
- Space Physics

Additional Information

- Launch/Orbital information for Ulysses
- PDMP information for Ulysses
- Telecommunications information for Ulysses

Experiments on Ulysses

Data collections from Ulysses

Questions or comments about this spacecraft can be directed to: Dr. John F. Cooper.

Personnel

Name	Role	Original Affiliation	E-mail
Mr. Ed B. Massey	Project Manager	NASA Jet Propulsion Laboratory	ed.b.massey@jpl.nasa.gov
Dr. Klaus Peter Wenzel	Project Manager	ESA-European Space Research and Technology Centre	kwenzel@estec.esa.nl
Dr. Edward J. Smith	Project Scientist	NASA Jet Propulsion Laboratory	edward.j.smith@jpl.nasa.gov
Dr. Richard G. Marsden	Project Scientist	ESA-European Space Research and Technology Centre	richard.marsden@esa.int

Selected References

Wenzel, K.-P., *et al.*, The International Solar Polar mission--its scientific investigations, ESA SP-1050, Paris, France, July 1983.

Hawkyard, A., and P. Buia, The Ulysses spacecraft, *ESA Bull.*, No. 63, 40-50, Aug. 1990.

Caseley, P. J., and R. G. Marsden, The Ulysses scientific payload, *ESA Bull.*, No. 63, 29-39, Aug. 1990.

Wenzel, K.-P., *et al.*, The Ulysses mission, Astron. Astrophys. Suppl. Ser., 92, No. 2, 207-219, Jan. 1992.

Other Ulysses Data/Information at NSSDC

COHOWeb (Browse and retrieve Ulysses and other mission data)
CDAWeb (Energetic particle data)
NSSDC anonymous FTP site
Heliocentric Trajectories

NSSDC News article on Ulysses data archiving and access(Dec. 1996)

Ulysses press release on dark matter (05/16/96)

Date Coverage Chart for Ulysses Data Sets at NSSDC

Related Information/Data at NSSDC

Jupiter page

Information about STS 41

Other Sources of Ulysses Data/Information

Ulysses Project page(JPL)
Ulysses Project page(ESTEC)

COSPIN home page (U. Chicago)
COSPIN/LET home page (ESTEC)
COSPIN/HET home page (U. Chicago) Access to data
COSPIN/KET home page (IFC/CNR, Milan, Italy)

COSPIN Anisotropy Telescope (Imperial College, UK)

Dust Detector page (MPI-Heidelberg) Access to data
EPAC home page (MPI-Lindau)
GAS home page (MPI-Lindau) Access to data

Gamma Ray Burst home page (UC-Berkeley)

Hi-Scale home page (JHU/APL) Access to data
Hi-Scale home page (Fundamental Tech.) Access to data

SCE home page (U. Bonn) Access to data
SWICS home page (U. Maryland) Access to data
SWOOPS home page (Los Alamos)
URAP home page (NASA Goddard) Access to data
VHM/FGM home page (Imperial College)

Ulysses Mission Status Report (JPL)

NASA Official: Dr. Ed Grayzeck
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USA 59A

NSSDC ID: 1990-050A

Description

USA-59A was launched from Cape Canaveral. It was the first launch by Titan 4 of new generation of NOSS naval reconnaissance satellites.

Alternate Names

- 20641

Facts in Brief

Launch Date: 1990-06-08
Launch Vehicle: Titan IV
Launch Site: Cape Canaveral, United States

Funding Agency

- Unknown (United States)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for USA 59A

Experiments on USA 59A

Data collections from USA 59A

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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USA 60

NSSDC ID: 1990-050B

Description

USA-60 was launched by the US Department of Defense from Cape Canaveral. This Naval reconnaisance NOSS subsatellite detected the location of naval vessels using radio inferometry, and consisted of a main spacecraft and several subsatellites, linked by fine wires, several 100's of meters apart.

Alternate Names

- 20682

Facts in Brief

Launch Date: 1990-06-08
Launch Vehicle: Titan IV
Launch Site: Cape Canaveral, United States

Funding Agency

- Unknown (United States)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for USA 60

Experiments on USA 60

Data collections from USA 60

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

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USA 61

NSSDC ID: 1990-050C

Description

USA-61 was launched by the US Department of Defense from Cape Canaveral. This Naval reconnaisance NOSS subsatellite detected the location of naval vessels using radio inferometry, and consisted of a main spacecraft and several subsatellites, linked by fine wires, several 100's of meters apart.

Alternate Names

- 20691

Facts in Brief

Launch Date: 1990-06-08
Launch Vehicle: Titan IV
Launch Site: Cape Canaveral, United States

Funding Agency

- Unknown (United States)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for USA 61

Experiments on USA 61

Data collections from USA 61

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
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USA 62

NSSDC ID: 1990-050D

Description

USA-62 was launched by the US Department of Defense from Cape Canaveral. This Naval reconnaisance NOSS subsatellite detected the location of naval vessels using radio inferometry, and consisted of a main spacecraft and several subsatellites, linked by fine wires, several 100's of meters apart.

Alternate Names

- 20692

Facts in Brief

Launch Date: 1990-06-08
Launch Vehicle: Titan IV
Launch Site: Cape Canaveral, United States

Funding Agency

- Unknown (United States)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for USA 62

Experiments on USA 62

Data collections from USA 62

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

NASA Official: Dr. Ed Grayzeck
Curator: E. Bell, II
Version 4.0.14, 08 October 2010

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USA 65

USA 65

NSSDC ID: 1990-095A

Description

This spacecraft is part of a continuing series of classified spacecraft. The three spacecraft USA 39 (1989-046A), USA 65 (1990-095A), and USA 75 (1991-080B) replace an earlier constellation of geosynchronous orbit spacecraft. These three were positioned at longitudes of approximately 195, 8, and 72 degrees, respectively, as of February 20, 1992. Each spacecraft carries two instruments whose data are available for magnetospheric research: the Magnetospheric Plasma Analyzer (MPA) and the Synchronous Orbit Particle Analyzer (SOPA). The article by McComas et al., "Magnetospheric plasma analyzer: Initial three-spacecraft observations from geosynchronous orbit," (J. Geophys. Res., 98, No. A8, p. 13453, 1993) gives more information. It also declares: "Recently, the MPA and SOPA data sets have become part of the International Solar Terrestrial Physics (ISTP) program with the inclusion of key parameter data in the ISTP Central Data Handling Facility (CDHF). These data should provide a valuable adjunct to ISTP science, particularly in light of the lack of a dedicated `Equator' spacecraft, in addition to providing new information about the geosynchronous environment in their own right."

Alternate Names

- DSP F15
- 20929

Facts in Brief

Launch Date: 1990-11-13
Launch Vehicle: Titan IV
Launch Site: Cape Canaveral, United States
Mass: 2360.0 kg

Funding Agency

- Department of Defense (United States)

Disciplines

- Surveillance and Other Military
- Space Physics

Additional Information

- Launch/Orbital information for USA 65

Experiments on USA 65

Data collections from USA 65

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.

Selected References

McComas, D. J., *et al.*, Magnetospheric plasma analyzer: Initial three-spacecraft observations

from geosynchronous orbit, *J. Geophys. Res.*, 98, No. A8, 13453-13465, Aug. 1993.

Image courtesy of the USAF Defense Support Program.

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USA 67

NSSDC ID: 1990-097B

Description

USA-67 was a US Department of Defense electronics intelligence (ELINT) satellite deployed from the STS-38 mission.

Alternate Names

- 20963

Facts in Brief

Launch Date: 1990-11-15
Launch Vehicle: Shuttle
Launch Site: Cape Canaveral, United States

Funding Agency

- Unknown (United States)

Discipline

- Surveillance and Other Military

Additional Information

- Launch/Orbital information for USA 67

Experiments on USA 67

Data collections from USA 67

Questions or comments about this spacecraft can be directed to: Coordinated Request and User Support Office.