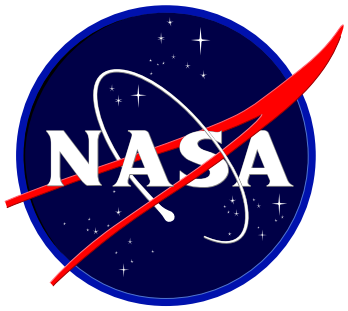
National Aeronautics and Space Administration
Press Kit



TDRS-I Mission

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For Release:
March 5, 2002

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RELEASE: #02-40

ADVANCED NASA COMMUNICATIONS SATELLITE GIVES BROADBAND ACCESS NEW MEANING

NASA is ready to launch the second in a series of three advanced Tracking and Data Relay Satellites, known as TDRS-I. This latest addition to the fleet of seven on-orbit Tracking and Data Relay Satellites will provide high data-rate communication links with the Space Shuttle, International Space Station, Hubble Space Telescope and a host of other spacecraft, as well as tracking services for expendable launch vehicles.

TDRS-I is scheduled to launch Friday, March 8, at 5:39 p.m. EST, the beginning of a 40-minute launch window, which extends until 6:19 p.m. EST.

"We're very excited about the new capabilities the advanced TDRS will provide the international space program," said Robert Jenkens Jr., TDRS Project Manager at NASA's Goddard Space Flight Center in Greenbelt, Md.

Together, the new trio of satellites will help replenish and maintain the specialized space communications capabilities of the current TDRS constellation, which has served numerous national and international space missions since 1983.

TDRS-I features the following capabilities:

* S-band Single Access: Two 15-foot diameter steerable antennas, used at the 2.0 to 2.3 GHz (Giga Hertz) band, supply robust communications to user satellites with smaller antennas and receive telemetry from expendable launch vehicles during launch.

* Ku-band Single Access: The same two antennas, operating from 13.7 to 15.0 GHz, provide higher bandwidth for user satellites, provide high-resolution digital television for Space Shuttle video communications and can quickly transfer large volumes of data from tape or solid-state data recorders aboard NASA scientific spacecraft.

TDRS-I also features these new capabilities:

* Ka-band Single Access: This new higher-frequency service, operating from 22.5 to 27.5 GHz, increases data rate capabilities to 800 Megabits per second to provide communications with future missions requiring high bandwidths, such as multi-spectral instruments for Earth science applications.

* Multiple Access: Using a phased-array antenna, operating in the 2.0 to 2.3 GHz range, the system can receive and relay data simultaneously from five lower data-rate users, while transmitting commands to a single user.

Transfer orbit operations, which will boost the 7,033-pound spacecraft into a geosynchronous orbit 22,300 miles above the Earth, are scheduled to occur during the two-week period following the launch. Upon completion of on-orbit testing and acceptance, TDRS-I will be renamed TDRS-9. Goddard's Operations Services Project will oversee operations of TDRS-9, using controllers at the White Sands Complex in New Mexico.

The TDRS replenishment program costs approximately $840 million, which includes the three satellites, launch vehicles, White Sands Complex modifications and NASA program costs. Boeing Satellite Systems of El Segundo, Calif., designed, built and tested the three satellites under a fixed-price contract with NASA.

Additional information about TDRS-I, as well as NASA's complete Tracking and Data Relay Satellite System, is available on the following Websites:

http://tdrs.gsfc.nasa.gov/Tdrsproject/
http://nmsp.gsfc.nasa.gov/tdrss/tdrsshome.html

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Media Services Information

NASA TV and Audio Coverage

NASA TV will provide live commentary and coverage of the TDRS-I launch on March 8 beginning at 4 p.m. EST. NASA TV coordinates are GE-2, transponder 9C at 85 degrees West longitude. The press conference and launch coverage also will be carried on the NASA "V" circuits, which can be accessed by dialing 321-867-1220/1240/1260 or 7135.

For a Web cast of the launch, go to the NASA/KSC web site at: http://www.ksc.nasa.gov/

Pre-launch Press Briefing

A pre-launch press briefing is scheduled for March 7 (L-1) at 1 p.m. EST at the KSC Press Site (Launch Complex 39) for media attending the launch. Participants will address spacecraft and launch readiness, spacecraft payload, the timeline from spacecraft separation through acceptance, and a weather forecast for launch day. The press conference will be carried live on NASA TV.

News Center/Status Reports

NASA Public Affairs will staff the News Center at KSC (321-867-2468) beginning on L-2 and continuing through launch and receipt of the initial signal from the spacecraft. Recorded launch status can be obtained beginning on L-2 by dialing **321-867-2525** or **301-286-NEWS**.

Launch Media Credentials

News media seeking launch accreditation should fax requests at least **three days** prior to launch to:

Bruce Buckingham, KSC/PAO
Kennedy News Center
KSC, FL
Fax: 321-867-2692

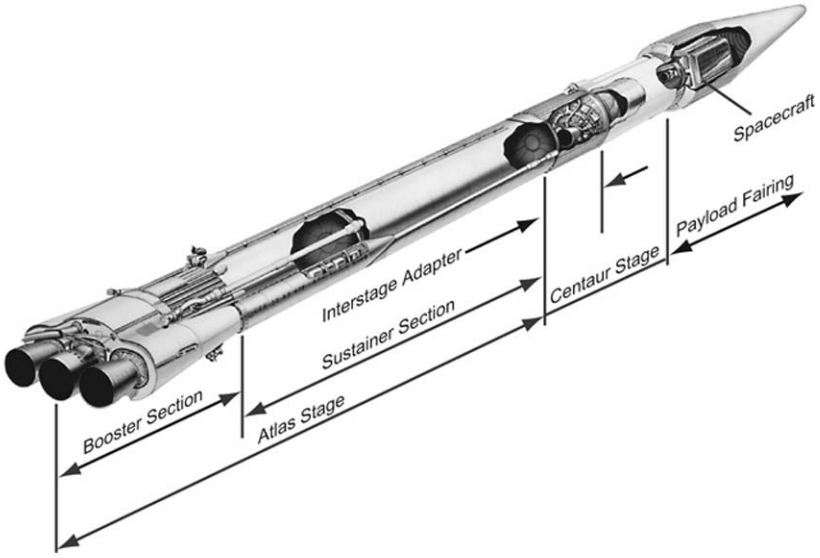
*****Requests must be on the letterhead of the news organization and specify the name of the editor making the assignment to cover the launch*****

Internet Information

Information about the launch and mission, as well as NASA's Tracking and Data Relay Satellite System is available on the Internet at:

http://www.gsfc.nasa.gov/
http://nmsp.gsfc.nasa.gov/tdrss/tdrsshome.html

Atlas IIA Launch Vehicle Diagram



Cutaway of the Atlas IIA expendable launch vehicle with TDRS-I stowed inside the payload fairing.

(Line drawing courtesy of Lockheed Martin)

TDRS-I Quick Facts

The first replenishment satellite, TDRS-H, launched June 30, 2000 from Cape Canaveral Air Force Station, Fla. aboard an Atlas II rocket. NASA acceptance occurred October 17, 2001.

TDRS-I is the second of three satellites built for NASA by Boeing Satellite Systems, Inc. (formally Hughes Space and Communications) of El Segundo, Calif.

TDRS-I will augment the TDRS' existing S-band and Ku-band frequencies by adding Ka-band capability, adding flexibility and providing higher data rates at a more favorable and less heavily used frequency band that is less susceptible to interference from an increasingly busy radio environment.

Two 15-foot steerable antennas will support the Space Shuttle with high-resolution digital television, and transfer enormous volumes of data at rates up to 300 megabits/second, which is 5,000 times faster than the average 56K home computer modem.

TDRS-I features a new, Multiple-Access (MA) system*, which can support up to five user spacecraft simultaneously and at higher data rates than the original TDRS fleet.

(*BSS recently modified the Multiple Access (MA) antenna aboard TDRS-I and –J to prevent a performance shortfall, which occurred on TDRS-H. Testing of the modified MA antenna aboard TDRS-I is complete and confirms that it meets specification.)

Spacecraft Details:

Dimensions: 69 feet (21 meters) long with solar arrays deployed, 43 feet (13 meters) wide with antennas deployed.

Weight: 7,033 pounds at lift-off (3,190 kilograms); 3,918 pounds (1,777 kilograms) estimated beginning of life on-orbit.

Power: Silicon solar cell arrays that generate 2,300 watts; nickel-hydrogen batteries supply payload power during eclipses.

Payload Services:

The TDRS-H, -I and –J payload consists of two large antennas, which track user satellites orbiting below, providing high data rate communications. These single access antennas are complemented by a MA phased array antenna system. Services provided by the new TDRS trio are as follows:

S-band single access (SSA) –

- Tunable over a range of frequencies, including MA frequency;
- Can provide high gain support of an MA user satellite with degraded communications, or temporarily provide an increased data rate;
- Provides forward and return services to users at a particular location;

- Provides two-way communication during user satellite data recorder playbacks, or full-time high-rate service to high-priority users such as the International Space Station and Space Shuttle;
- Transmits at speeds up to 6 megabits per second (Mbps) return; 300 kilobits per second (Kbps) forward data rates.

S-band multiple access (MA) –
- Provides five MA return channels (user satellite to ground), one MA forward channel (ground to users) per spacecraft;
- Features return services that use the same frequency (2287.5 MHz) and code division multiple access to avoid interfering with each other;
- Has been upgraded to 3 Mbps return (nearly equivalent to SSA capability) for TDRS H,I,J (versus 100 Kbps for previous TDRS), and up to 300 Kbps forward.

Ku-band single access (KuSA) –
- Operates at frequencies between 13.7 to 15.0 GHz, providing higher bandwidth for user satellites with data rates to 300 Mbps return, 25 Mbps forward;
- Rates support high-resolution digital television for all Space Shuttle video communications;
- Also used to swiftly transfer large volumes of data from tape or solid-state data recorders aboard NASA scientific spacecraft.

Ka-band single access (KaSA) –
- Features a new, high-frequency service that increases data rate capabilities to 300/800* Mbps for future missions requiring higher bandwidth communications such as multi-spectral instruments for Earth science applications (*data rates above 300 Mbps require ground station modifications);
- Establishes international compatibility with Japanese and European space relay programs, allowing mutual support in case of emergencies;
- High frequency provides high bandwidth, less interference with terrestrial communications, and lower user satellite equipment burden.

Satellite Navigation – In addition to telemetry and command data communications services, the system will continue to provide user navigational data needed to locate the orbit and position of NASA user satellites.

Mission Lifetime – TDRS-H, -I and -J each have an intended mission lifetime of 11 years, with expendables (fuel) for up to 15 years.

Pre/Post-Acceptance Testing – Boeing Satellite Systems is responsible for pre-acceptance testing, which will be performed from NASA's White Sands Complex in N.M. while the satellite is in a geosynchronous orbit at 150 degrees West longitude. After NASA acceptance, TDRS-I will undergo post-acceptance testing, performed from the White Sands Complex and under the guidance of Goddard's Mission Services Program Office.

Relocation of the Spacecraft – NASA will relocate TDRS-9 to an operational slot, after completion of NASA's post-acceptance testing.

Launch Vehicle – Lockheed Martin Atlas IIA rocket.

Launch Site – Launch Complex 36, Cape Canaveral Air Force Station, Fla.

Launch Date and Time – 5:39 p.m. EST at the beginning of a 40-minute launch window, which extends to 6:19 p.m. EST.

Spacecraft Separation – Launch+30 minutes.

Acquisition of Signal – Launch+65 minutes, via a ground station in Canberra, Australia.

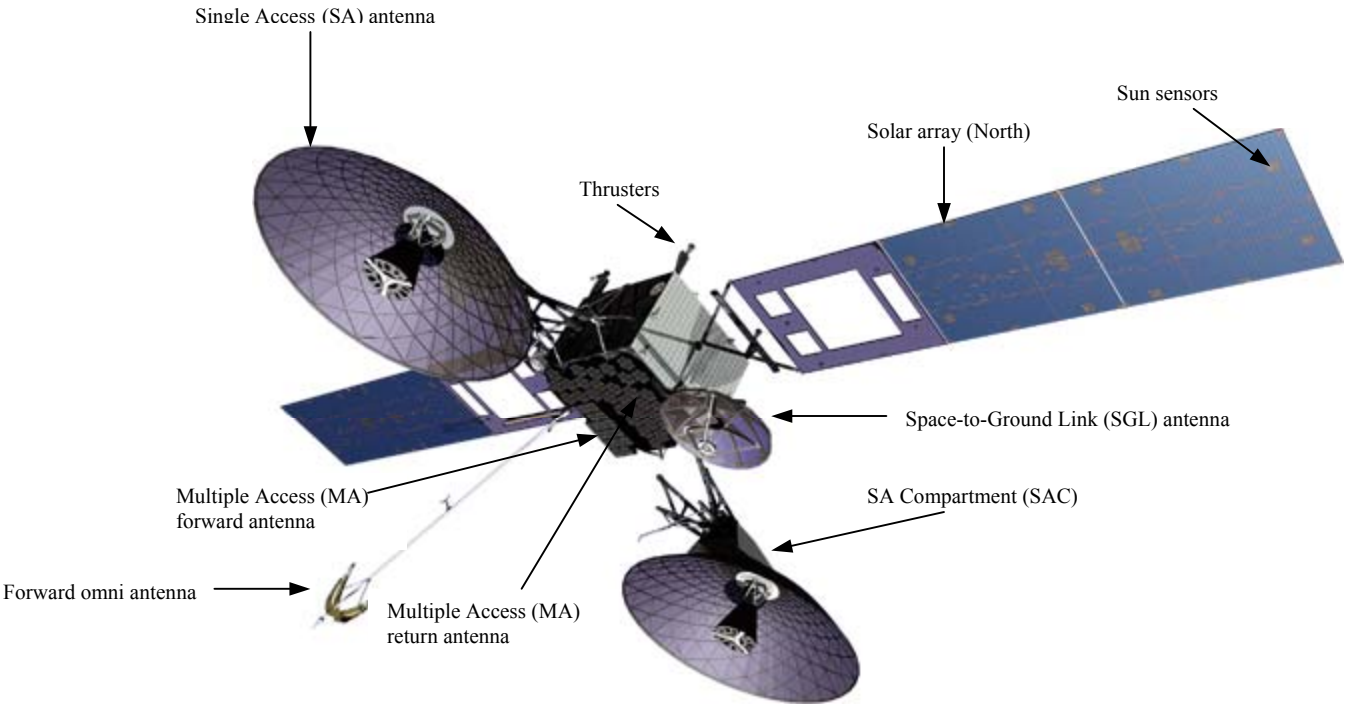
Cost – Total cost for the TDRS-H, -I and –J spacecraft and White Sands Complex modifications is approximately $485 million; or about $840 million for the entire program (e.g., three satellites, expendable launch vehicles, White Sands Complex renovations and NASA program costs).

Mission Oversight – The Operations Services Project at NASA Goddard Space Flight Center will manage the day-to-day operations of TDRS-9.

TDRSS Milestones

Jul 1981	White Sands Ground Terminal (WSGT) completed.
Apr 1983	TDRS-1 launched aboard the Space Shuttle Challenger.
Aug 1983	First TDRS customer support occurs with Landsat-4 mission. First Space Shuttle (STS-8) test communications support occurs through TDRS-1.
Jan 1986	TDRS-2 destroyed during Space Shuttle Challenger launch.
Sep 1988	TDRS-3 launched aboard Space Shuttle Discovery.
Nov 1988	Dual TDRS-1 and TDRS-3 support begins.
Mar 1989	TDRS-4 launched aboard Space Shuttle Discovery.
Aug 1991	TDRS-5 launched aboard Space Shuttle Atlantis.
Jan 1993	TDRS-6 launched aboard Space Shuttle Endeavour.
Dec 1993	Compton Gamma Ray Observatory on-board tape recorder failure (3/92) prompts closure of TDRS zone of exclusion to minimize science data loss. Temporary TDRSS capability implemented in Canberra, Australia.
Apr 1994	Second Ground Terminal completed.
Mar 1995	White Sands Ground Terminal decommissioned; upgrades begin.
Jul 1995	TDRS-7 (last TDRS built by TRW) launched aboard Space Shuttle Discovery.
Feb 1996	White Sands Ground Terminal upgrades complete.
Sep 1996	Guam Remote Ground Terminal implementation Phase II efforts begin.
Jun 1998	Guam Remote Ground Terminal completed.
Jul 1998	Guam Remote Ground Terminal declared operational; closes TDRS “zone of exclusion.”
Jan 1999	South Pole TDRSS relay implemented, allowing National Science Foundation to receive/transmit data from South Pole. TDRSS service also assists in resolving a medical emergency at the Pole.
Jun 2000	TDRS-H launched aboard an Atlas IIA rocket.
Oct 2001	NASA accepts TDRS-H; renaming it TDRS-8.

Illustration of TDRS-I



(Courtesy of Boeing Satellite Systems)

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