NASA to upgrade vital communications link

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TDRS-K is in the Boeing satellite factory undergoing a fit check. Credit: Boeing Corp.

Technicians and engineers are completing final system checks and spacecraft inspections on the first of NASA's third-generation Tracking and Data Relay Satellites (TDRS). Boeing Space Systems will ship TDRS-K from its satellite assembly facility in El Segundo, Calif., to Cape Canaveral, Fla., in November. The December launch of TDRS-K will be aboard a United Launch Alliance Atlas V rocket.

NASA's Goddard Space Flight Center in Greenbelt, Md., is home to the team responsible for building and launching these satellites. Once in orbit, the new satellite will become part of NASA's Space Network,

which incorporates a fleet of TDRS spacecraft. Currently, seven first- and second-generation satellites are connected in real-time to a series of ground stations and data facilities. This network provides the critical communications lifeline for NASA missions such as the Hubble Space Telescope and International Space Station.

NASA established the TDRS project in 1973 to provide around-the-clock communications to the agency's most critical missions in low Earth orbit. The TDRS design also increases the data rate of the space-to-ground communication service. The resulting system is a set of geosynchronous relay satellites distributed around the globe. Ground terminals complete the system, connecting scientists and engineers on Earth with satellites in orbit.

The first TDRS launched in April 1983. It was designed to handle an exponential increase in data volume and provide a major increase in coverage for low Earth orbit spacecraft. When TDRS-1 was launched from space shuttle Challenger, TDRS spacecraft were the largest, most sophisticated communication satellites ever built. After on-orbit checkout, TDRS-1 began providing communication support to space shuttle missions in late 1983. On that first mission, TDRS transmissions enabled more shuttle data flow to the ground than had been accomplished in the previous seven shuttle missions combined.

NASA continued adding first generation TDRS spacecraft until 1995. TRW, later to become Northrop Grumman built seven satellites. TDRS-2 was lost aboard Challenger in 1986. From 2000-2002, NASA added three second-generation spacecraft to the fleet. Hughes, now the Boeing Co., built the TDRS-H, I and J satellites, which continue operating along with four members of the first generation.

It has been almost thirty years, and the TDRS constellation continues to play a major role in maintaining a reliable communications network for

NASA with critical, non-interrupted connections. Of the nine TDRS satellites launched, seven are still operational. Two have been retired. NASA engineers recognize the fleet is aging and are working to replenish the fleet with a new generation of TDRS satellites.

TDRS-K will be the first of three, next generation satellites designed to ensure vital operational continuity for NASA. TDRS-L is scheduled to launch in 2013, and TDRS-M is planned to launch in 2015.

The TDRS network provides critical support to NASA's human spaceflight endeavors that began during the shuttle era and continues with ongoing International Space Station support. It also provides communications support to an array of science missions, as well as various types of launch vehicles.

As a vital information pipeline for space-based research and exploration ambitions, TDRS fulfills NASA's broadest communication demands. Now in its third operational decade, the TDRS legacy of communications excellence has become key to enabling many of NASA's scientific discoveries. TDRS-K continues a legacy while increasing bandwidth of a network that has become the vital communications link for the missions of NASA.

NASA's Space Communications and Navigation Program, a part of the Human Exploration and Operations Mission Directorate, is responsible for the TDRS network.

More information: tdrs.gsfc.nasa.gov/

Provided by NASA's Goddard Space Flight Center