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Press Kit

Project Marisat-B

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NASA TO LAUNCH SECOND MARISAT FOR COMSAT GENERAL CORP.

The second maritime satellite (Marisat) will be launched by NASA for COMSAT General Corp. from Cape Canaveral, Fla., about May 27.

The spacecraft will be the second in the new Marisat system designed to provide communications to the U.S. Navy, commercial shipping and offshore industries.

Marisat-B will be placed into synchronous orbit over the equator above the Pacific Ocean at 176.5 degrees W. longitude just west of Hawaii. A third Marisat has been built as a spare.

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The first spacecraft, Marisat-1, was launched successfully Feb. 19 on a Delta vehicle and is in orbit over the Atlantic at 15 degrees W. longitude, where it has been providing service on UHF frequencies to the Navy since March 25.

It is planned to inaugurate full-time commercial voice and data communications via both Marisat satellites on July 1.

A Delta rocket will place the 655-kilogram (1,445-pound) Marisat-B into a highly elliptical transfer orbit of about 36,790 kilometers (22,300 miles) with an inclination of 26 degrees to the Earth's equator. A 293-kg (646 lb.) apogee kick motor augmented by the onboard hydrazine system will later circularize the elliptical transfer orbit into an Earth-synchronous 35,788 km (22,300 mi.) 2.5 degree inclined orbit.

At this altitude the speed of the spacecraft in orbit matches the rotational speed of the Earth to hover over the Pacific. Small gas jets on board will keep Marisat-B on station and oriented properly toward Earth to receive and retransmit signals. From this vantage point the satellite can serve an area of about one-third of the Earth's surface.

COMSAT General will reimburse NASA for the cost of the launch vehicle, launch services and other administrative costs. COMSAT General has arranged for all ground station support required for the launch and control of the satellite. There are no requirements for NASA ground station tracking or command support.

The Delta project is managed for NASA's Office of Space Flight by NASA's Goddard Space Flight Center, Greenbelt, Md. Kennedy Space Center, Fla., is responsible for launch operations. Prime contractor for the Delta rocket is McDonnell Douglas Astronautics Co., Huntington Beach, Calif. Prime contractor for the Marisat spacecraft is Hughes Aircraft, Culver City, Calif.

(END OF GENERAL RELEASE. BACKGROUND INFORMATION FOLLOWS.)

DELTA LAUNCH VEHICLE

First Stage

The first stage is a McDonnell Douglas modified Thor booster incorporating nine strap-on Thiokol solid-fuel rocket motors. The booster is powered by a Rocketdyne engine using liquid oxygen and liquid hydrocarbon propellants. The main engine is gimbal-mounted to provide pitch and yaw control from liftoff to main engine cutoff (MECO).

Second Stage

The second stage is powered by a TRW liquid-fuel, pressure-fed engine that also is gimbal-mounted to provide pitch and yaw control through the two second stage burns. A nitrogen gas system uses eight fixed nozzles for roll control during powered and coast flight, as well as pitch and yaw control during coast and after second stage cutoffs. Two fixed nozzles, fed by the propellant tank, helium pressurization system, provide retrothrust after third stage separation. Twenty-two minutes after spacecraft separation the second stage will be reignited for one-second burn. Data on this burn will be collected for studies related to future Delta missions.

Third Stage

The third stage is the TE-364-4 spin-stabilized, solid propellant Thiokol motor. It is secured in the spin table mounted to the second stage. The firing of eight solid propellant rockets fixed to the spin table accomplishes spin-up of the third stage spacecraft assembly.

Injection Into Synchronous Orbit

The Delta vehicle will inject Marisat-B into a transfer orbit having an apogee of 36,762 km (22,827 mi.). At this point NASA/Delta responsibilities end. Command, control, tracking and data analysis become the responsibilities of the COMSAT and COMSAT General Control Center in Washington, D.C. The centers will, for example, command the apogee kick motor on the fourth apogee (43 sec. burn) two days after launch, placing the spacecraft into a geosynchronous orbit of 35,788 km (22,300 mi.).

STRAIGHT-EIGHT DELTA FACTS AND FIGURES

The Delta has the following general characteristics:

Height: 35.4 meters (116 feet) including shroud

Maximum Diameter: 2.4 m (8 ft.) without attached solids

Liftoff Weight: 133,180 kg (293,000 lb.)

Liftoff Thrust: 1,741,475 newtons (391,343 lb.) including strap-on solids

First Stage

(Liquid only) consists of an extended long tank Thor, produced by McDonnell Douglas. The RS-27 engines are produced by the Rocketdyne Division of Rockwell International. The stage has the following characteristics:

Diameter: 2.4 m (8 ft.)

Height: 21.3 m (70 ft.)

Propellants: RJ-1 kerosene as the fuel and liquid oxygen (LOX) as the oxidizer

Thrust: 912,000 N (205,000 lb.)

Burning Time: About 3.48 minutes

Weight: About 84,600 kg (186,000 lb.) excluding strap-on solids

Strap-on solids consist of nine solid propellant rockets produced by the Thiokol Chemical Corp., with the following features:

Diameter: 0.8 m (31 in.)

Height: 7 m (23.6 ft.)

Total Weight: 40,300 kg (88,650 lb.) for nine
4,475 kg (9,850 lb.) for each

Thrust: 2,083,000 N (468,000 lb.) for nine
231,400 N (52,000 lb.) each

Burning Time: 38 seconds

Second Stage

Produced by McDonnell Douglas Astronautics Co., using a TRW TR-201 rocket engine; major contractors for the vehicle inertial guidance system located on the second stage are Hamilton Standard and Teledyne.

Propellants: Liquid, consists of Aerozene 50 for the fuel and nitrogen tetroxide (N_2O_4) for the oxidizer.

Diameter: 1.5 m (5 ft.) plus 2.4 m (8 ft.) attached ring.

Height: 6.4 m (21 ft.)

Weight: 6,180 kg (13,596 lb.)

Thrust: About 42,923 N (9,650 lb.)

Total Burning Time: 335 seconds

Third Stage

Thiokol Chemical Co. TE-364-4 motor.

Propellants: Solid

Height: 1.4 m (4.5 ft.)

Diameter: 1 m (3 ft.)

Weight: 1,160 kg (2,560 lb.)

Thrust: 61,858 N (13,900 lb.)

Burning Time: 44 seconds

TYPICAL LAUNCH SEQUENCE FOR MARISAT-B

Event	Time	Altitude Kilometers	Altitude Miles	Velocity Km/ph	Velocity Mph
Liftoff	0 Sec.	0	0	2,434	1,512
Six Solid Motor Burnout	38 sec.	6	4	2,358	1,467
Three Solid Motor Ignition	39 sec.	6	4	2,358	1,467
Three Solid Motor Burnout	1 min. 18 sec.	23	14	3,960	2,460
Nine Solid Motor Jettison	1 min. 27 sec.	24	15	4,266	2,650
Main Engine Cutoff (MECO)	3 min. 48 sec.	106	65	18,702	11,620
First/Second Stage Separation	3 min. 56 sec.	113	70	18,720	11,632
Second Stage Ignition	4 min. 1 sec.	116	72	19,782	12,292
Fairing Jettison	4 min. 40 sec.	137	85	19,260	11,967
Second Stage Cutoff (SECO I)	9 min.	188	117	28,222	17,536
Second Stage Restart	21 min. 44 sec.	179	111	28,163	17,500
Second Stage Cutoff (SECO II)	21 min. 53 sec.	179	111	28,534	17,730

Event	Time	Altitude Kilometers/Miles		Velocity Km/ph	Mph
Third Stage Spinup	22 min. 52 sec.	181	113	28,525	17,725
Second/Third Stage Separation	22 min. 54 sec.	181	113	28,525	17,725
Third Stage Ignition	23 min. 36 sec.	183	114	28,517	17,719
Third Stage Burnout	24 min. 20 sec.	187	116	36,967	22,970
Third Stage/Spacecraft separation	25 min. 32 sec.	218	136	36,867	22,908
*Second Stage Ignition #3	78 min. 20 sec.				
Second Stage Cutoff (SECO-3)	78 min. 21 sec.				

*Experimental Burn for R&D Purposes. Not mission-related.

LAUNCH OPERATIONS

The Kennedy Space Center's Expendable Vehicles Directorate is responsible for the preparation for launch of the thrust-augmented Delta rocket carrying Marisat-B.

Delta 124 will be launched from Pad A at Complex 17, Cape Canaveral, Fla.

The Delta first stage and interstage were erected on Pad A April 15-16. The nine solid strap-on rocket motors were mounted in place around the base of the first stage April 19-23 and the second stage was erected April 25.

The Marisat-B spacecraft was received during February, checked out and mated with the Delta third stage. The third stage/spacecraft assembly is to be mated with Delta May 20 and the payload fairing which will protect the spacecraft during its flight through the atmosphere is to be erected atop the vehicle May 25.

NASA TEAM

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Peter T. Eaton	Manager, Delta Program

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*COMSAT General is a subsidiary of Communications Satellite Corp. (COMSAT).

May 7, 1976