IMPROVED NOAA WEATHER SATELLITE SCHEDULED FOR NASA LAUNCH

National Aeronautics and Space Administration
Washington, D. C.

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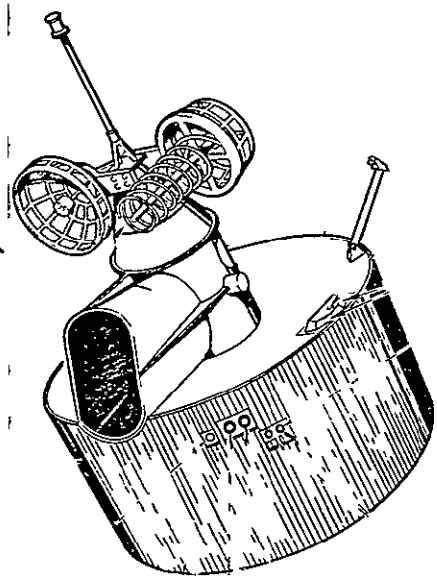

FOR RELEASE

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IMPROVED NOAA WEATHER SATELLITE SCHEDULED FOR NASA LAUNCH

The second in a series of three improved Geostationary Operational Environmental Satellites will be launched by NASA no earlier than Thursday, May 14, for the National Oceanic and Atmospheric Administration (NOAA).

GOES-E, to be designated GOES-5 once in geostationary orbit at about 35,792 kilometers (22,240 miles) altitude, will be positioned at 85 degrees west longitude, ultimately to replace an older GOES-type satellite at 75 degrees west, monitoring the eastern half of the United States and Canada, all of Central and South America and much of the Atlantic Ocean.

April 27, 1981

-more-

As NOAA's "GOES East" satellite, the new spacecraft when operational will watch hurricane development and movement in the Caribbean Sea, locate Gulf Stream System currents for marine interests, warn Florida citrus growers of approaching crop-killing frosts, and provide government and private weathercasters with a variety of information crucial to the accurate forecasting of the weather.

A twin satellite, GOES-4, is performing similar services for the western half of the United States and Canada and much of the eastern Pacific Ocean from its position at 135 degrees west above the equator.

NOAA has maintained operational geostationary spacecraft at these locations for the past six years as part of its responsibility to observe and monitor the Earth's weather and some of its resources, as well as some solar activity. The Commerce Department agency also operates a two-spacecraft polar-orbiting satellite system which provides imagery and data of the entire Earth's surface.

Aboard GOES-E at liftoff from NASA's launch complex 17-A at Cape Canaveral Air Force Station will be a promising new instrument, the Visible Infrared Spin-Scan Radiometric Atmospheric Sounder (VAS).

This instrument, first carried into space on GOES-4 last September, not only provides the traditional visual imagery of the Earth's surface and cloud cover familiar to most television weather program viewers -- as well as infrared sea surface temperature data -- it also records atmospheric temperatures and the amount, distribution and movement of water vapor at various levels. These latter functions, atmospheric soundings, are being researched by NASA.

The VAS instrument detects and measures reflected sunlight and can sense infrared energy in 12 spectral bands, 11 more than the radiometer carried on earlier GOES satellites. This expanded capability gives the VAS its sounding ability. At its present stage of development, however, the new instrument cannot obtain sounding data and provide imagery simultaneously.

Hughes Aircraft Co. built both the spacecraft and the VAS instrument, as well as the satellite's Data Collection System instrumentation and its Telemetry, Tracking and Command Subsystem. The Data Collection System collects and relays environmental data back to Earth from more than 1,500 existing remote platforms on land, at sea and carried aloft by balloons and aircraft, while the telemetry subsystem performs a variety of communications functions.

Also included in the spacecraft's instrumentation package is a Space Environmental Monitor which obtains measurements of solar activity, detects solar flares and measures solar wind intensity and the strength and direction of the Earth's magnetic field.

Elements of this subsystem were built by Ball Aerospace, Panametrics, Inc., and Ford Aerospace and Communications Corp.

GOES-E cost about $20 million, and its launch by a Delta 3914 launch vehicle will cost an additional $16 million. NASA funded the development of the VAS instrument, while NOAA is paying for the VAS on GOES-E, plus satellite construction and launch costs.

Once checked out by NASA, the new spacecraft will be under the control of NOAA's National Earth Satellite Service, which will make the imagery and digital data available to users worldwide through its existing distribution network.

The sounding data from the VAS instrument is not yet available operationally. NOAA is working with NASA to determine how the atmospheric temperature and moisture profiles could be provided to operational users such as the National Weather Service in the late 1980s.

(END OF GENERAL RELEASE; BACKGROUND INFORMATION FOLLOWS.)

GOES-E MISSION

GOES-E is the seventh spacecraft in the SMS/GOES series -- Geostationary Operational Environmental Satellites placed into Earth synchronous orbits to provide near continual, high resolution visual and infrared imaging over large areas of North and South America and surrounding oceans at least every 30 minutes; to collect environmental data from up to 10,000 remote observing platforms on land, in the ocean and in the air; to measure energetic solar particle flux, X-rays and the strength of the Earth's magnetic field; and, to broadcast centrally prepared weather and satellite information.

GOES-E, like its predecessor GOES-4, contains an experimental, advanced type of meteorological sensor which not only observes the traditional visible light and infrared images of cloud formations and motion, but also, on command, temperature variations with light in the atmosphere and will map the distribution of water vapor in the air. This instrument is called the Visible Infrared Spin-Scan Radiometric Atmospheric Sounder (VAS) and was shown to have significant meteorological use as a geosynchronous temperature sounder during its initial experimental runs with the GOES-4 VAS between October 1980 and January 1981.

Two GOES satellites presently are operational: one at 135 degrees west longitude, observing North America and the Pacific Ocean to west of Hawaii; and a second at 75 degrees west, observing both North and South America and the Atlantic Ocean. They are at altitudes of approximately 35,800 kilometers (22,200 miles) and are in circular orbit traveling at about 11,000 kilometers per hour (6,830 miles per hour).

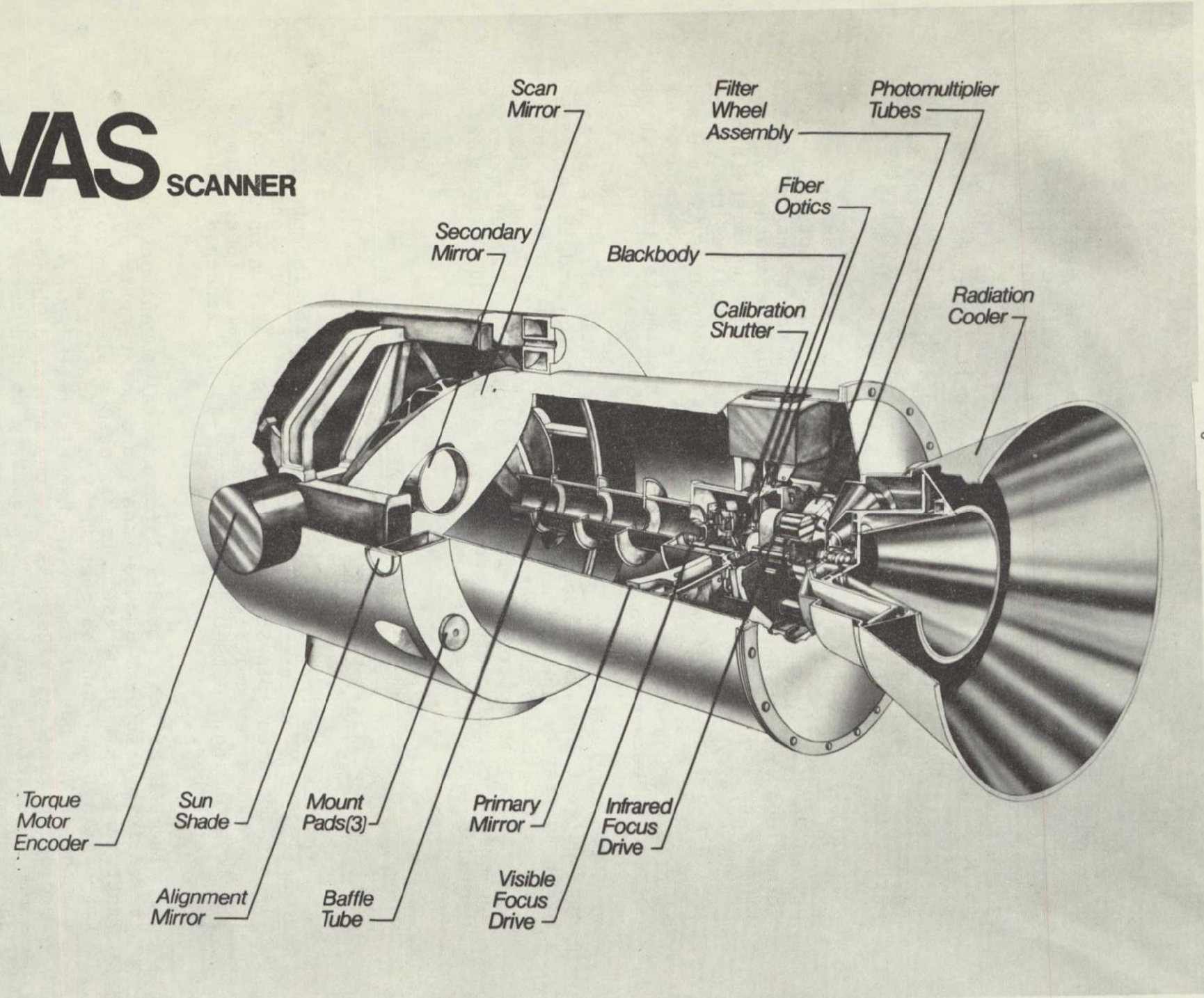
INSTRUMENTATION

The spacecraft on-board subsystems include:

The Visible Infrared Spin-Scan Radiometric Atmospheric Sounder (VAS), an instrument incorporating the functions of the Visible Infrared Spin-Scan Radiometer (VISSR) flown on GOES-1, 2 and 3, with a new ability for geostationary satellites: atmospheric sounding. GOES-D, renamed GOES-4, was launched with a VAS last September.

The VAS has the potential for several advantages over the presently operational geostationary and polar-orbiting satellite instruments as regards their use in meso-scale meteorology and forecasting. Advantages over the VISSR are (1) multispectral imaging -- VAS has 12 infrared channels (with 10-bit radiometric resolution) whereas VISSR has but one infrared channel (with an 8-bit resolution); and, (2) the ability to use these channels to derive temperature and moisture profiles and fields. Additionally, the VAS is programmable.

VAS SCANNER


Scan Mirror
Filter Wheel Assembly
Photomultiplier Tubes
Fiber Optics
Secondary Mirror
Blackbody
Calibration Shutter
Radiation Cooler
Torque Motor Encoder
Sun Shade
Mount Pads(3)
Primary Mirror
Infrared Focus Drive
Alignment Mirror
Baffle Tube
Visible Focus Drive

DATA ACQUISITION AND DISTRIBUTION

Unprocessed VAS data is transmitted via the S-band system to the 18.3-meter (60-foot) dish antenna at the Wallops, Va., CDA. These data are received during the 18 degrees of spacecraft rotation when the instrument views the Earth. The CDA processes the incoming data in a synchronizer/data buffer, which reduces the data rate about 16 to 1 for simplification of data transmission. The CDA processes and retransmits this "stretched" data back to the satellite during the remaining 342 degrees of rotation of the spacecraft. The lower resolution infrared data are formatted in special computers for analog transmission via 3 kHz telephone lines directly to the Satellite Field Services Stations and to the Central Data Distribution Facility.

The stretched data is received at the National Earth Satellite Service facility, which relays it via a dedicated microwave link to the Central Data Distribution Facility nearby. There the data are formatted and "sectorized" into a form suitable for transmission via 3 kHz telephone lines to the Satellite Field Services Station.

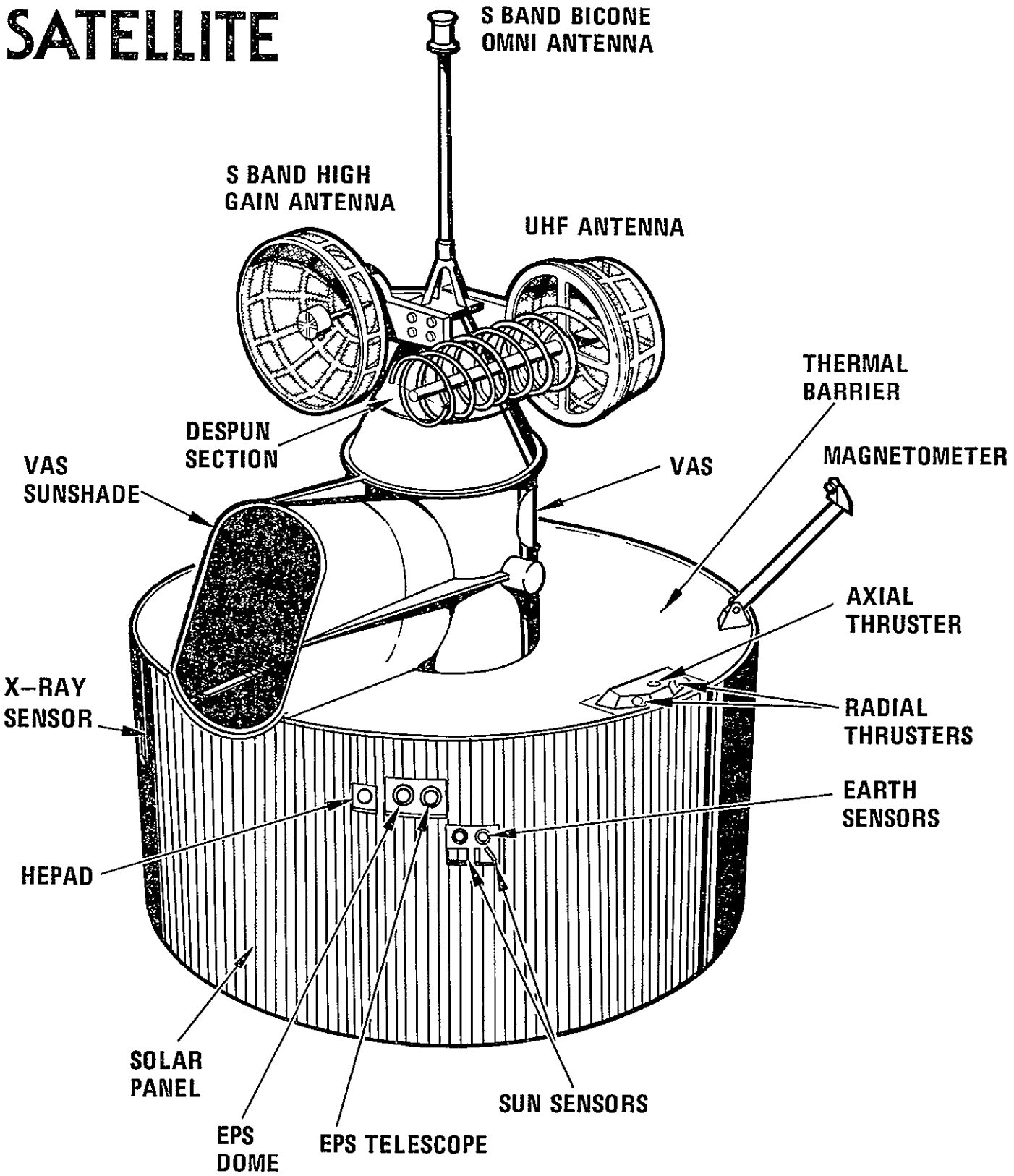
Sectorizers at the CDDF extract from the total high-resolution "full disk" data sections of specified geographical areas and resolution of 0.9, 1.9 or 3.7 km (1/2, 1 or 2 mi.). Seven 1/2-mile resolution sectors and/or four 1-mile resolution sectors cover the contiguous 48 states. Also, a standard 2-mile resolution covers the western United States (including Alaska) and the eastern Pacific to about 170 degrees east. These sectors are available for each picture every 30 minutes, or more frequently when the satellite is operating in a limited scan mode during severe weather events.

Infrared data also can be sectorized at the CDDF to provide equivalent infrared imagery with the same geographical coverage as the visible sectors. The CDDF and Wallops have the capability of surface and cloud temperature (infrared) enhancement for emphasis of specified features in the imagery.

The sectors are produced by a digital device called a sectorizer. It selects smaller sectors from the "full disk" image and subsequently makes an analog transmission to the Satellite Field Services Stations and other users.

Satellite Field Services Stations are near Washington, D.C., at Camp Springs, Md.; Miami, Fla.; Kansas City, Mo.; San Francisco, Calif.; Honolulu, Hawaii; and Anchorage, Alaska. They receive a standard "menu" of imagery on a half hour or more frequent basis, day and night, for analysis and retransmission to National Weather Service offices and other users via dedicated telephone lines.

GOES SATELLITE



SPACECRAFT DESCRIPTION

The spacecraft is 215 centimeters (85 inches) in diameter, and its overall height is 312 cm (123 in.). The weight of GOES-E will be 836 kilograms (1,841 pounds) when launched by the Delta 3914 booster, and 397 kg (875 lb.) at beginning of mission life in orbit after firing and ejecting its self-contained solid motor.

The spinning, drum-shaped base of the spacecraft houses the Earth, Sun and X-ray sensors, the energetic particle monitor, and axial and radial thrusters for attitude control. Solar panels are bonded on the entire exterior surface of the drum sides, and a magnetometer is mounted on a boom situated at the edge of the drum. Contained within, but protruding from, the base at the center is the primary instrument, the VAS, and its sunshade.

The S-band high gain antenna, the UHF antenna and the S-band omni-directional antenna are mounted atop the VAS housing and are mechanically despun by an electric motor so as to point at the Earth while the base is spinning for stability.

THE DELTA LAUNCH VEHICLE

The GOES-E mission will be the 154th for Delta which was introduced into NASA service in 1960. Since that time, Delta, built by the McDonnell Douglas Astronautics Co., Huntington Beach, Calif., has placed into orbit the majority of U.S. non-military communications, weather and scientific satellites, including those of foreign governments and international organizations. The three-stage Delta 3914 configuration, which will be used to launch GOES-E mission, has the following characteristics:

Height: 35.36 m (116 ft.)

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

Liftoff Weight: 190,631 kg (420,270 lb.)

First Stage Thrust (average with five solids burning): 2,947,245 newtons (662,600 lb.)

First Stage

The Delta first stage is the extended long-tank Thor, produced by McDonnell Douglas Astronautics Co. The RS-27 liquid fuel engine is built by Rocketdyne Division of Rockwell International.

Height: 21.3 m (70 ft.)

Diameter: 2.4 m (8 ft.)

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

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

The first stage also includes nine TX-526-2 Castor IV strap-on solid-propellant rocket motors produced by Thiokol Chemical Corp. Five of the solids ignite at liftoff. The other four are ignited after the first five burn out. The motors have the following features:

Height: 11.3 m (37 ft.)

Diameter: 101.6 cm (40 in.)

Liftoff Thrust: 377,145 N (84,790 lb.)

Second Stage

The second stage also is provided by McDonnell Douglas, utilizing liquid-fueled TR-201 pressure fed engines provided by TRW, which can be restarted in space. The second stage includes the Delta Inertial Guidance System (DIGS) which controls the flight of the first and second stages, and has the following characteristics:

Height: 7 m (23 ft.)

Diameter: 140 cm (55 in.)

Propellants: Liquid, consisting of Aerozine-50 fuel and nitrogen tetroxide oxidizer

Thrust: 43,590 N (9,800 lb.)

Third Stage

The Delta third stage includes the spin-stabilized TE-364-4 solid fuel motor built by Thiokol Chemical Corp., with the following characteristics:

Height: 1.8 m (6 ft.)

Diameter: 94 cm (37 in.)

Thrust: 66,987 N (15,060 lb.)

LAUNCH OPERATIONS

NASA's Kennedy Space Center, Fla., Deployable Payloads Operations Directorate is responsible to the Goddard Space Flight Center, Greenbelt, Md., Delta Projects Office, for the assembly, checkout and launch of Delta 154. The Delta Project Office, in turn, is responsible to the Office of Space Transportation Operations at NASA Headquarters for the technical management of the Delta Program.

The Delta first stage and interstage adapter were erected on Pad A at Launch Complex 17 at Cape Canaveral Air Force Station on Jan. 29. The nine Castor IV solid strap-on rocket motors were attached to the base of the first stage between Jan. 30 and Feb. 2. The second stage was erected and mated on Feb. 3.

The GOES-E spacecraft arrived Feb. 4 and was checked out and tested in Hangar AE at Cape Canaveral Air Force Station. It was moved to the Delta Spin Test Facility on Feb. 25. There the apogee motor was installed, the reaction control system was fueled with hydrazine and the satellite was mated with the Delta third stage. The mated spacecraft assembly is scheduled to be moved to Complex 17 on March 11. The payload shroud which will protect the spacecraft on its flight through the atmosphere will be mated several days before launch to complete assembly of the flight vehicle.

MAJOR LAUNCH EVENTS FOR DELTA/GOES-E MISSION

Event	Time	Altitude Miles/Kilometers		Downrange Miles/Kilometers		Velocity mph	Velocity km/hr
Ignition	0 sec.	0	0	0	0	0	0
Five Solids Burnout	57 sec.	6.2	10	2.6	4.2	1,017	1,636
Four Solid Ignition	1:4 min.	7.7	12.4	3.9	6.3	977	1,572
Four Solids Burnout	2:1 min.	26	42	36	58	4,400	7,081
Jettison Four Solids	2:7 min.	29	47	43	69	4,604	7,409
Main Engine Cutoff (MECO)	3:44 min.	67	108	240	386	12,176	19,627
First/Second Stage Separation	3:52 min.	70	113	266	428	12,197	19,629
Fairing Jettison	4:23 min.	80	129	370	595	12,458	20,049
Second Stage Cutoff (SECO-1)	8:12 min.	100	161	1,257	2,023	16,570	26,667
Restart Second Stage	20:14 min.	103	166	4,499	7,240	16,560	26,651
Final Cutoff, Stage II (SECO-2)	21:5 min.	102	164	4,737	7,623	17,845	28,719
Second/Third Stage Separation	22:7 min.	101	163	5,037	8,106	17,857	28,738
Third Stage Ignition	22:49 min.	103	166	5,238	8,430	17,850	28,727
Third Stage Burnout	23:33 min.	107	172	5,478	8,816	22,398	36,046
Spacecraft Separation	24:42 min.	130	209	5,890	9,479	22,321	35,922

POST LAUNCH EVENTS

The achieved velocity of 36,046 km/hr (22,398 mph) places the spacecraft in a transfer orbit, with an apogee of 49,343 km (30,667 mi.) and a perigee of 167 km (104 mi.). An on-board motor will be fired on a later apogee to circularize the orbit near its highest point. Its final velocity will be about 11,066 km/hr (6,876 mph), completing one orbit every 24 hours and thus remaining above the same spot on the equator at 35,811 km (22,252 mi.) altitude.

DELTA/GOES-E TEAM

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David S. Johnson	Assistant Administrator for Satellites, NOAA
Harold W. Yates	Acting Technical Director
E. Larry Heacock	Director of Systems Integration
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Thomas J. Karras	Manager, Satellite Operational Control Center and Acting Chief, Satellite Operations Division
Gary K. Davis	GOES-E Operations Readiness Team Leader
Everitt W. Kendall	Manager, Command and Data Acquisition Station (Wallops Island)
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Donald C. Winner	Chief, Satellite Services Division

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T. Perry	Program Manager, Geostationary Operational Environmental Satellites
S. G. Tilford	Chief, Atmospheric Processes Branch
J. C. Dodge	Manager, Severe Storms and Local Weather Research Program
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Joseph B. Mahon	Director, Expendable Launch Vehicles Program
Peter Eaton	Program Manager, Delta Launch Vehicle
Robert E. Smylie	Associate Administrator for Tracking and Data Acquisition

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John H. McElroy	Deputy Director
William C. Keithley	Director of Projects
Paul A. Mowatt	Associate Director for GOES and Delta

Goddard Space Flight Center (cont'd.)

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Richard Wirth	Deputy Project Manager, Technical
August Wessels	Deputy Project Manager, Resources
W. H. Farthing	Science Manager
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Ralph Bannin	Network Operations Manager
Kermit Blaney	Network Support Manager
Michael Prokopchak	Mission Support Manager
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McDonnell Douglas Astronautics Co. Huntington Beach, Calif.	Delta launch vehicle
Hughes Aircraft Co. Space and Communications Group El Segundo, Calif.	GOES-E spacecraft
Hughes Aircraft Co. Santa Barbara Research Center Santa Barbara, Calif.	VAS instrument
Ball Aerospace Boulder, Colo.	SEM instrument
Panametrics, Inc. Boston, Mass.	SEM instrument
Ford Aerospace and Communications Corp. Palo Alto, Calif.	SEM instrument
Hughes Aircraft Co. Hughes Technology Division Space and Communications Group El Segundo, Calif.	TCC subsystem and DCS system

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