

Fact Sheet

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Aqua **NASA's Earth Observing System Afternoon Spacecraft**

System Description:

NASA's Aqua spacecraft is a remote sensing spacecraft designed to gather climate-related information on hydrological processes throughout the Earth's atmosphere, oceans, and land surface and their relationship to earth system changes.

Designed and built by Northrop Grumman, Aqua is based on Northrop Grumman's modular, standardized T-330 spacecraft bus. The design features common subsystems scalable to the mission-specific needs of this and future remote-sensing missions. Instrument payloads can be attached on a "mix and match" basis without changes in the overall design or subsystem support requirements. Weighing 6,468 pounds and equipped with 4.6 kilowatts of electric power, Aqua is built of lightweight composite materials that allow for increased payload weight and reduced launch costs. Aqua will be launched from a Delta II launch vehicle into in a low-Earth, sun-synchronous polar orbit from Vandenberg Air Force Base, California.

Aqua hosts six types of science instruments (eight total) that will gather data on atmospheric temperature and humidity, clouds, precipitation and radiative balance; terrestrial snow and sea ice; sea surface temperature and ocean productivity; soil moisture; and help improve numerical weather prediction.

Customer:

NASA Goddard Space Flight Center, Greenbelt, Maryland

Contract Details and Requirements:

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- Design and build two remote sensing spacecraft, Aqua (formerly EOS PM) and Aura (formerly EOS CHEM)
- Integrate instruments furnished by NASA
- Launch spacecraft from Delta-class launch vehicle

Background Data:

EOS spacecraft are the centerpiece of NASA's Earth Science Enterprise, an ambitious, long-term program to monitor natural and human induced changes to Earth's climate and environment from land, airborne and space-based platforms. Making observations of the land surface, biosphere, solid Earth, atmosphere and oceans, EOS satellites will provide systematic, continuous observations from low-Earth, sun-synchronous orbit.

Aqua is the second in NASA's series of Earth Observing System (EOS) spacecraft. The spacecraft was named Aqua, the Latin word for water, because the study of hydrological processes is a major mission objective. NORTHROP GRUMMAN is also building Aura, the third in NASA's series of EOS spacecraft. Aura will provide data on the creation and destruction of various trace chemical compounds in the Earth's atmosphere. Both spacecraft have a six-year mission life.

The first spacecraft in NASA's EOS series is Terra. Terra was launched in December 1999.

Earth Science Enterprise data will help scientists understand how Earth's resources interact to create the planet's environment and its effects on humans, and will help people to make informed decisions about the environment.

Northrop Grumman has been involved with the development of remote sensing instruments and spacecraft for NASA and international customers for several decades. The spacecraft include the Total Ozone Mapping Spectrometer-Earth Probe, ROCSAT-1 and KOMPSAT. Northrop Grumman is also a prime contractor on the program definition and risk reduction phase of the National Polar-Orbiting Operational Environmental Satellite System.

Northrop Grumman has also developed the Earth Observing System Data Operations System (EDOS). The EDOS ground system disseminates environmental data to the science community. The data is being

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used for the development of models to help better predict and address the impact of human activities on global climatic changes.

Aqua's instruments include the Atmospheric Infrared Sounder, built by the former Lockheed Martin Infrared Imaging Systems, now BAE Systems, and provided by JPL; Advanced Microwave Sounding Unit, built by Aerojet and provided by Goddard Space Flight Center; Advanced Microwave Scanning Radiometer-EOS, built by Mitsubishi Electronics Corporation and provided by NASDA-Japan; Clouds and the Earth's Radiant Energy System, built by Northrop Grumman and provided by Langley Research Center; Humidity Sounder for Brazil, built by Matra-Marconi and provided by AEB-Brazil; Moderate Resolution Imaging Spectroradiometer, built by Raytheon Santa Barbara Remote Sensing and provided by Goddard Space Flight Center.

Spacecraft Specifications:

Size:

Stowed

8.8 ft (2.68m) x 8.2ft

(2.49 m) x 21.3 ft (6.49m)

Deployed

15.8 ft (4.81 m) x 54.8 ft

(16.70 m) x 26.4 ft (8.04m)

Weight:

At Launch

6,468 lb (2,934 kg)

Spacecraft

3,858 lb (1,750 kg)

Instruments

2,385 lb (1,082 kg)

Propellant

225 lb (102 kg)

Electrical Power:

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4,600 W

Telemetry:

S-band (TDRSS and Deep Space
Network/ Ground Network
compatible)

Data Links:

X-band

Propulsion:

Hydrazine blow-down system;
4 pairs of 1 lb. thrusters

Orbit:

438 mi (705 km) polar, sun
synchronous

Launch Vehicle:

Delta class 7920-10L

Launch Readiness:

No earlier than 2002

Design Life:

Six years

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