NASA Fact Sheet

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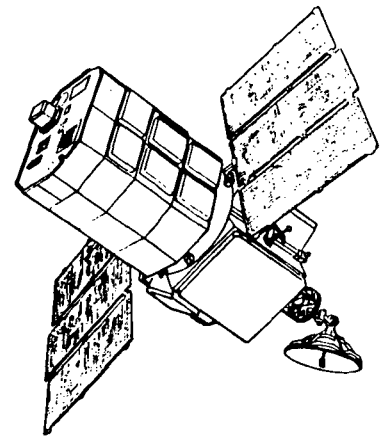

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SOLAR MAXIMUM MISSION

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SOLAR MAXIMUM MISSION

A major step toward understanding the violent nature of the Sun and its possible effects on Earth is the promise of NASA's Solar Maximum Mission.

Solar flares are expected to occur most frequently near the maximum of the Sun's 11-year cycle expected in 1980-81. The flares are a complex phenomenon and no two are exactly alike.

The Solar Maximum Mission will use a variety of observation methods, including satellites, sounding rockets and ground-based instruments, to study solar flares through their individual life histories.

The mission's satellite is designed to provide scientists with observations of solar flares (violent eruptions on the Sun's surface) over a wide band of wavelengths in the ultraviolet, X-ray and gamma ray regions of the electromagnetic spectrum. Through coordinated observations at many different wavelengths, scientists expect to obtain many clues about the causes of solar flares and how they might be predicted.

Although the spacecraft will concentrate on solar flare activity, instruments are expected to measure also the Sun's radiation to within one-tenth of one percent of the total output over a period of one year. According to computer model predictions of the response of Earth's atmosphere to solar radiation, such a precise measurement should be sufficient to definitely establish whether changes in total solar heat output are sufficient to affect climate and weather.

The satellite will operate in a 574 kilometer (310 mile)-high circular orbit after the early 1980 launch from Cape Canaveral, Fla., on a Delta rocket. The planned orbit is inclined 28.6 degrees to the equator with the satellite taking 96 minutes to complete one orbit. At the end of its mission, the satellite may be retrieved by the manned Space Shuttle.

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The Mission

Mission Spacecraft

The Solar Maximum Mission spacecraft is approximately 4 meters (13 feet) in length, 2.3 m (7 ft.) in diameter and is modular in design. The upper 2.3 m (7 ft.) is the instrument module which houses all solar observation instruments and the Fine Pointing Sun Sensor System for aiming control.

Below the instrument module is the Multimission Modular Spacecraft, a 1.5 m (5 ft.) triangular framework which houses the essential attitude control, power, communications and data handling systems.

Two fixed solar paddles are attached to a transition adaptor between the upper instrument module and the lower spacecraft bus. The paddles supply power to the spacecraft during the daylight portion of orbits while three rechargeable batteries supply power at night.

Scientific Instruments

The spacecraft will carry the following scientific instruments:

- Gamma Ray Spectrometer -- will measure the intensity, energy and Doppler shift of narrow gamma ray radiation lines and the intensity of extremely broadened lines. The goal is to study ways in which high-energy particles are produced in solar flares.

- Hard X-ray Spectrometer -- will help determine the role that energetic electrons play in the solar flare phenomenon.

- Hard X-ray Imaging Spectrometer -- will image the Sun in hard X-rays and will provide information about the position, extension and spectrum of the hard X-ray bursts in flares.

- Soft X-ray Polychromator -- will investigate solar activity that produces solar plasma temperatures in the 1.5 to 50 million degree range. Will study solar plasma density and temperature.

- Ultraviolet Spectrometer and Polarimeter -- will study the ultraviolet radiation from the solar atmosphere, particularly from active regions, flares, prominences and the active corona and will study the quiet Sun.

- High Altitude Observatory Coronagraph/Polarimeter -- will return imagery of the Sun's corona in parts of the visible spectrum as part of an investigation of coronal disturbances created by solar flares.

- Solar Constant Monitoring Package -- will monitor the output of the Sun over most of the spectrum and over the entire solar surface.

The satellite is the first solar satellite designed to study a specific solar phenomenon such as flares, using a coordinated set of instruments that measure many different flares in different wavelengths of light.

Management

The Solar Maximum Mission is managed for NASA's Office of Space Science, Washington, D.C., by the Goddard Space Flight Center, Greenbelt, Md. Michael E. McDonald is program manager and Dr. Eric Chipman is program scientist. At Goddard, project manager is Peter Burr and Kenneth J. Frost is project scientist.

An Experimenters Operations Facility to direct and coordinate the solar research activity will be established at Goddard once the spacecraft is operational. This round-the-clock facility will house the scientific investigators and necessary computing equipment. In addition, personnel from the National Oceanic and Atmospheric Administration's Solar Forecast Center, Boulder, Colo., will be located there to coordinate satellite observations with those from ground observatories.

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