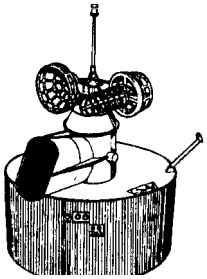
GOES 4

Geostationary Operational Environmental Satellite 4

Spacecraft Sketch	Mission Objective
	The primary objective of the Geostationary Operational Environmental Satellite (GOES 4, 5&6) mission is to replace and upgrade the operational geostationary satellite system of the SMS 162/GOES 1,2&3. The GOES 4,5&6 system will provide near-continuous, timely, high quality observations of the Earth and its environment. The goals of the system are to: 1) Extend knowledge of the atmosphere and its processes in order to improve both short and long term weather forecasts: 2) contribute to development of a domestic and international environmental data collection network; 3) improve capability for forecasting and providing real-time warnings of solar disturbances; and 4) provide for growth in the kind, quantity, and quality of environmental parameters measured.

TYPE OF MISSION	PROGRAM OFFICE	PROJECT LEAD CENTER	MANAGEMENT APPROACH	S/C CONTRACTOR	I&T CONTRACTOR
METEORO-LOGICAL	SPACE & TERRESTRIAL APPLICATIONS	GSFC	OUT-OF-HOUSE	HUGHES	HUGHES

Payload Description

The Geostationary Operational Environmental Satellite (GOES 4,566) includes improved technology and expanded capability into the Synchronous Meteorological Satellite (SMS/GOES) payload. The GOES 4,566 payload consists of a Visible and Infrared Spin-Scan Radiometer (VISSR) with Atmospheric Sounder (VAS) Capability for infrared (IR) and high-resolution visible photography, a Space Environment Monitor (SEM) System that includes various scientific sensors designed to continuously measure the solar emission activities, and a data collection system (DCS). The GOES 4,5&6 spacecraft also incorporates improved technology and expanded capability, particularly in a number of spacecraft components that are uniquely designed such as the despin control electronics, the S-band telemetry and command system, and the light-weight mechanically despun antenna array which is more efficient than the electronically despun antennas on the previous SMS/GOES missions. Other subsystem features include a fully channelized communications system that provides improved intermodulation performance; and use of more weight-efficient materials, higher performance solar cells, and hybrid micro-circuit chip technology. This results in a substantially longer design life due to increased fuel, solar cell array panel and battery capacities.

INSTRUMENT NAME	ACRONYM	PI AFFILIATION	PRINCIPAL INVESTIGATOR	I&T CONTRACTOR
SPACE ENVIRONMENT MONITOR	SEM	NOAA-ERL	H. LEINBACH	HUGHES
VISSR ATMOSPHERIC SOUNDER	VAS	NOAA-NESS	NESS STAFF	SBRC

Instrument Descriptions
The GOES 4 Space Environment Monitor (SEM) consists of three sensors which monitor the energy level and quantity of energetic particles, the intensity of solar X-ray radiation, and the magnitude and direction of the magnetic field. The system consists of a solar energetic particle sensor, an X-ray sensor and a magnetometer sensor. The solar energetic particle sensor consists of one omnidirectional spectrometer and one directional spectrometer solid-state detector used in a multiple arrangement to monitor protons, alpha (flux) particles and electrons during both solor illumination and solar eclipse. The Xray sensor is a simple type using ion chamber detectors which operate only during solar illumination to monitor solar X-ray emission. The magnetometer sensor consists of flux gate sensors that measure the direction and magnitudes of the three orthogonal magnetic field components external to the spacecraft. A calibration mode is provided to verify the basic operation of all three SEM sensors.
The GOES 4 Visible/Infrared Spin-Scan Radiometer (VISSR) Atmospheric Sounder (VAS), Data Point 424, produces twodimensional images of cloud systems and provides information on their speed and direction. It also develops temperature and humidity profiles of clear air from ocean and ground surfaces to altitudes of 50,000 feet-data useful for predicting shortterm weather patterns. The major parts of the VISSR system include a telescope, a radiometer, an optical line step scanner, and an electronics module. The telescope is a Ritchey-Chretien version of the classical cassegruinian telescope which contains eight identical channels for visible scan operation to provide daytime images of the Earth's disc and two (redundant to each other) channels for infrared scan to provide night-time images. The telescope mirror system consists of relay optics for the infrared channel, fiber optics light guides and collimating optics for the visible channels, optical filters for all channels, and a window optical prism for each visible channel. A two-stage radiation cooler is used to cool the long-wavelength detector used in the radiometer thermal channel.

Launch
9/9/80 (4) 5/22/81(5) 4/28/83(6)