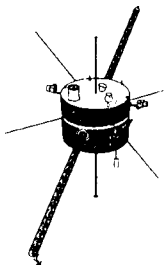
WIND

Global Geospace Science Program: Wind Mission

Spacecraft Sketch	Mission Objective
	The objectives of the Global Geoscience (GGS) Polar and Wind missions are to: 1) characterize the energy input to the ionosphere; 2) determine the role of the ionosphere in substorm phenomena and in the overall magnetosphere energy balance; 3) measure complete plasma, energetic particles, and fields in high latitude polar regions, and the energy input through the dayside cusp; 4) provide global multispectral aurora) images of the magnetospheric energy disposition into the ionosphere and upper atmosphere; and 5) determine characteristics of ionsopheric plasma outflow.

TYPE OF MISSION	PROGRAM OFFICE	PROJECT LEAD CENTER	MANAGEMENT APPROACH	S/C CONTRACTOR	I&T CONTRACTOR
SPACE PHYSICS	SPACE SCIENCE	GSFC	HYBRID	GE	GE

Payload Description
The Interplanetary Physics Laboratory (WIND) payload carries a total of eight instruments that provide measurements to aid in the study of magnetic fields; energetic particles; three-dimensional plasma; solar wind; gamma-rays; solar wind and suprathermal ion compositions; and radio and plasma waves. The WIND also accommodates the KOIYCIS Russian Gamma-Ray Spectrometer. The POLAR spacecraft utilizes, as much as possible, common off-the-shelf subsystems of proven design. The power subsystem consists of solar arrays, batteries and power distribution. The command equipment receives, processes and executes real-time commands - as well as commands from on-board command storage. The C&DH subsystems collects, formats, and records science and engineering data. The spacecraft is spin stabilized, utilizing an open-loop system consisting of Earth sensors, Sun sensors and Star sensors. Liquid-propellant propulsion is used for orbit and attitude maneuvers.

INSTRUMENT NAME	ACRONYM	PI AFFILIATION	PRINCIPAL INVESTIGATOR	I&T CONTRACTOR
ENERGETIC PARTICLES ACCELERATION-COMPOSITION-TRANSPOR	EPACT	GSFC	T. VON ROSENVINGE	GSFC
ENERGETIC PARTICLES AND 3-D PLASMA ANALYZER	3-D PLASMA	UCB	R. LIN	UCB
MAGNETIC FIELDS INVESTIGATION	MFI	GSFC	R. LEPPING	GSFC
RADIO & PLASMA WAVE EXPERIMENT	WAVES	MEUDON OBS	J. BOUGERT	PARIS OBS/UNIV MINNESOTA
RUSSIAN GAMMA-RAY SPECTROMETER	KONUS	RUSSIA/GSFC	E. MAZETS/T. CLINE	GSFC
SOLAR WIND EXPERIMENT	SWE	GSFC	K. OGILIVIE	GSFC
SWICS/MASS/STICS	SMS	UNIV MD	G. GLOECKLER	UNIV MD
TRANSIENT GAMMA-RAY SPECTROMETER	TGRS	GSFC	B. TEEGARDEN	GSFC

Instrument Descriptions
The WIND Energetic Particles Acceleration-Composition-Transport (EPACT), Data Point 686, is divided into three semiautonomous subsystems: 1) low-energy angular distribution telescopes (LEAD), 2) low-energy matrix telescopes (LEMT), and 3) electron/isotope telescope (ELITE). There are four individual LEAD sensors; two which view the hemisphere above the spin plane and two which are pointed below the spin plane. There are three LEMT sensors oriented above, below, and into the spin plane. The double-ended ELITE sensor completes the instrument.
The WIND Energetic Particles And 3-D Plasma Analyzer (3-D PLASMA), Data Point 688, consists of three detector systems, two of which contain state-of-the-art design analyzers. Microprocessors are employed to provide physically meaningful onboard data processing and compression, as well as flexibility of operation. n.
The WIND Magnetic Fields Investigation (MFI) consists of a triaxial fluxgate magnetometer mounted remote from the spacecraft on a boom, a multiple resolution analog-to-digital converter and a microprocessor-controlled range control logic and data processing system. Seven measurement ranges are included: plus or minus 16; 64; 256; 1024; 4096; 16,384 and 65,536 nT. The resolution ranges are 0.004 to 16 nT in normal mode and 2.5E-4 to 1 nT in high resolution mode.
The WIND Radio and Plasma Wave Experiment (WAVES), Data Point 689, contains five subsystems within a main electronics box, one spin-axis and two spin-plane electric antennas (all spacecraft supplied); and a triaxial search coil magnetometer. The five subsystems in the main electronics box are radio frequency receivers, comb filter receiver, fast envelope sampler, waveform analyzer, and power distribution subsystem.
The WIND Russian Gamma-Ray Spectrometer (KONUS) performs gamma ray burst studies similar to the Transient Gamma-Ray Spectrometer (TRGS). It also performs event detection and measure time history. While the collected data is not as high a resolution as TGRS, the KONUS complements TGRS by allowing full-sky coverage when combined with TGRS data. The KONUS includes a body-mounted sensor and an electronics package.
The WIND Solar Wind Experiment (SWE), Data Point 685, is designed to provide detailed comprehensive high-time resolution of the distribution functions of ions and electrons. The instrument consists of a six-axis ion-electron spectrometer and two Faraday cups.
The WIND SWICS/MASS/STICS (SMS), Data Point 687, is designed to provide the elemental and ionic-charge composition, temperature, mean speeds, spectra, and anisotropies of all major solar wind ions from hydrogen through iron. The instrument measures solar wind speeds of 100 to 1500 km/sec for elemental energies from 0.1 to 1000 KeV/charge. The instrument is comprised of two sensor subsystems, each with a time-of-flight analyzer, and a data processing unit which contains two redundant microprocessors.
The WIND Transient Gamma-Ray Spectrometer (TGRS) is designed to make high-resolution observations of transient gamma-ray events in the energy range from 10 KeV to 8 Mev. The investigation includes the first high-resolution spectroscopic survey of cosmic gamma-ray transients, and the first high-resolution spectroscopic measurements of solar flare gamma-ray lines. The basic physical parameters measured are counting rates and pulse heights of particles and photons in the germanium detectors. The derived products from the physical parameters are gamma-ray fluxes and energy spectra.

Launch
11/1/94(W) 11/21/95(P)