

QuikSCAT

PROJECT HIGHLIGHTS

Announcement of Opportunity	TBD
NASA Headquarters Office	Earth Science
Enterprise	Earth Science
Project	Quick Scatterometer
Project Lead Center	JPL
Management Approach	Out-of-House
Mission Life (months)	24
Additional Data Analysis months	0
Launch Date	19 Jun 1999

MISSION OBJECTIVES

The Quick Scatterometer, or QuiKScat, will provide climatologists, meteorologists, and oceanographers with daily detailed snapshots of ocean winds as they swirl above the Earth's oceans. The mission will greatly improve weather forecasting. The mission will help Earth scientists determine the location, structure, and strength of severe marine storms - hurricanes in the Atlantic, typhoons near Asia, and mid-latitude cyclones worldwide - which are among the most destructive of all natural phenomena. The National Oceanic and Atmospheric Administration (NOAA), a chief partner in the QuikScat mission, will use mission data from improved weather forecasting and storm warning. As NASA's next "El Nino watcher", QuikScat will be used to better understand the global El Nino/La Nina phenomenon. QuikScat will be able to track changes in the trade winds along the equator.

FOREIGN PARTICIPATION

None

SPACECRAFT DESCRIPTION

The QuikScat satellite is based on a satellite design developed by Ball Aerospace, called the Ball Commercial Platform 2000. The satellite's main structure, or bus, is a 6.2 ft. by 4.9 ft. by 4 ft. box made of aluminum honeycomb panels tied together by corner posts made of extruded aluminum. Most of the electronics are mounted inside the box, as are the propulsion subsystem, torque rods, reaction wheels, and inertial reference units. Subsystems mounted outside include various antennae including the rotating radar antenna, star trackers, and magnetometers. Most subsystems on the satellite are redundant, so that if one fails a backup unit can take over. The satellite is designed for a five-year life.

PAYLOAD DESCRIPTION

The payload consists of one instrument, SeaWinds, which studies ocean winds. The instrument consists of a radio transmitter and receiver, rotating dish antenna, instrument controller and data handler, stable time reference, and power converters.

INSTRUMENT DESCRIPTIONS AND SCIENCE LEADERS

Data Point Number 943: The SeaWinds instrument (SeaWinds) [prototype] (QuikSCAT) is a specialized microwave radar that measures near-surface wind speed and direction under all weather and cloud conditions over Earth's oceans. SeaWinds uses a rotating disk antenna with two spot beams that sweep in a circular pattern. The antenna radiates microwave pulses at a frequency of 13.4 gigahertz across broad regions on Earth's surface. The instrument will collect data over ocean, land, and ice in a continuous, 1,800-kilometer-wide band, making approximately 400,000 measurements and covering 90 percent of Earth's surface in one day. Michael H. Freilich (Oregon State University) is the instrument Project Scientist.

GROUND SYSTEM DESCRIPTION

Spacecraft operations for QuikScat are handled by the Laboratory for Atmospheric and Space Physics at the University of Colorado, Boulder, under a subcontract to Ball Aerospace. Staff at the Colorado facility plan and schedule satellite operations; monitor and control the satellite; determine the satellite's orbit; and analyze engineering data on the health and status of the satellite. More than a score of students participate in QuikScat mission operations. A mission emergency center at JPL monitors the satellite and serves as an emergency backup for spacecraft operations.

NASA's Wallops Flight Facility manages the network of ground stations communicating with the satellite. Wallops operates tracking stations at Wallops Island; Poker Flats, AK; Svalbard, Norway; and McMurdo, Antarctica. QuikScat is the first space mission in which the ground stations are completely computer-controlled without human operators. The stations at Poker Flats, Svalbard, and Wallops Island use dish antennae 37 feet in diameter, while McMurdo is equipped with a dish antenna 33 feet in diameter.

Fifteen times a day, QuikScat sends science data to ground stations. For routine operations, the satellite communicates with a given ground station for 8 to 10 minutes at a time.

Science data from QuikScat is processed at two facilities. The National Oceanic and Atmospheric Administration (NOAA) processes data at a facility in Suitland, MD, forwarding them to meteorological agencies around the world and to the general public. In addition, the data are processed by NASA's Physical Oceanography Distributed Active Archive Center located at JPL. JPL archives science data and presents them at <http://winds/jpl.nasa.gov>.

CONTRACT AND SUBCONTRACT HISTORY

<u>Contractor/Subcontractor</u>	<u>Project Element</u>
Ball Aerospace	Spacecraft
UPL	Instrument, Ground Processing

LAUNCH AND MISSION ORBIT DATA

Launch Vehicle/Upper Stage	Titan II	Inclination (deg)	98.60
Launch Site	Space Launch Complex 4, Vandenberg AFB	Period (min)	101
Mission Orbit Type	Sun-synchronous circular	Perigee (km)	803
		Apogee (km)	803