Science Objectives

WISE will provide an all-sky survey from 3 to 25 μm with 500,000 times the sensitivity of COBE/DIRBE and hundreds of times that of IRAS. The survey will help search for the origins of planets, stars, and galaxies and create an infrared atlas whose legacy will endure for decades.

WISE will:

■ Find the most luminous galaxies in the Universe.
■ Find the closest stars to the Sun.
■ Detect most Main Belt asteroids larger than 3 km.
■ Enable a wide variety of studies ranging from the evolution of planetary debris discs to the history of star formation in normal galaxies.
■ Provide an important source catalog for JWST.

Mission Overview

Launch: 2009 Dec. 14 at 6:09am PST

■ Direct injection launch on a Delta II rocket into a circular, 525-km, Sun-synchronous orbit.
■ 6-month survey of entire sky following a 1-month checkout, with estimated cryogen lifetime allowing 3 additional months of survey.
■ Sky-pointing instrument.
■ 11-second data-taking exposure cycle synchronized with orbit to provide total sky coverage with overlap between orbits.
■ 8 or more independent exposures at each position over more than 99% of the sky.
Science Payload

The WISE instrument is a four-channel imager which operates in a single mode, taking overlapping snapshots of the sky. It includes:

- A 40-cm telescope and reimaging optics.
- A scan mirror to stabilize the line-of-sight while the spacecraft scans the sky.
- A 47 arcminute field of view.
- HgCdTe and Si:As 1024² detector arrays at 3.4, 4.6, 12, and 22 µm with a plate scale of 2.75”/pixel.
- A resolution of 6” (12” at 22 µm).
- A two-stage solid-hydrogen cryostat with an expected 10-month lifetime, to cool focal planes and optics.

Mission Management

The Principal Investigator for WISE is Edward Wright of UCLA, data team head for COBE and WMAP, and interdisciplinary scientist for Spitzer. The WISE Science Team includes world leaders in ULIRGs (Ultra-Luminous Infrared Galaxies), Brown Dwarfs, IR Instrumentation, JWST, and all-sky survey design and data processing.

JPL is responsible for project management, system engineering, mission operations, and mission assurance.

Complementing the science team are industry and university team members selected for their expertise in each area:

- Space Dynamics Laboratory: Instrument Systems Engineering, Electronics, & Testing
  - DRS, Teledyne: Focal Planes
  - Lockheed Martin: Cryostat
  - SSG: Telescope, Optics, Scan Mirror
- Ball Aerospace: Spacecraft, System Testing, Operations Support
- IPAC/Caltech: Data Processing and Archiving
- UC Berkeley: Education & Public Outreach

Visit the WISE Website at: 
http://wise.astro.ucla.edu

Education & Public Outreach

A nationwide partnership led by UC Berkeley, the WISE E/PO program includes public and student asteroid searches, multi-media presentations for science museums and planetaria, classroom lesson plans for grades 6-12, professional development for teachers, and outreach kits for amateur astronomers.