



Launch Services Program presents...

WISE

WISE (Wide-field Infrared Survey Explorer) will be launched on a Delta II 7320-10 into a circular, Sun-synchronous orbit. The satellite will survey the entire sky in a portion of the electromagnetic spectrum called the mid-infrared with far greater sensitivity than any previous mission or program ever has. The WISE survey will consist of millions of images from which hundreds of millions of astronomical objects will be catalogued, providing a vast storehouse of knowledge about the Solar System, the Milky Way, and the Universe. Among the objects WISE will find are dark and potentially hazardous asteroids, the nearest stars (too cool to shine in visible light), and the most luminous galaxies undergoing dusty, cataclysmic formation 10 billion years ago. The solar panels on the satellite will provide WISE with the electricity it needs to operate, and will always point toward the Sun. As WISE orbits from the North Pole to the equator to the South Pole and then back up to the North Pole, the telescope will sweep out a circle in the sky. After 6 months WISE will have observed the whole sky taking pictures every 11 seconds. Each picture will have one mega pixel at each of four different wavelengths that range from 5 to 35 times longer than the longest waves the human eye can see. Data taken by WISE will be downloaded by radio transmission 4 times per day to computers on the ground. These computers will combine the many images taken by WISE into an atlas covering the entire celestial sphere and a catalog of all the detected objects.

Spacecraft image credit to Ball Aerospace & Technologies Corporation (BATC)

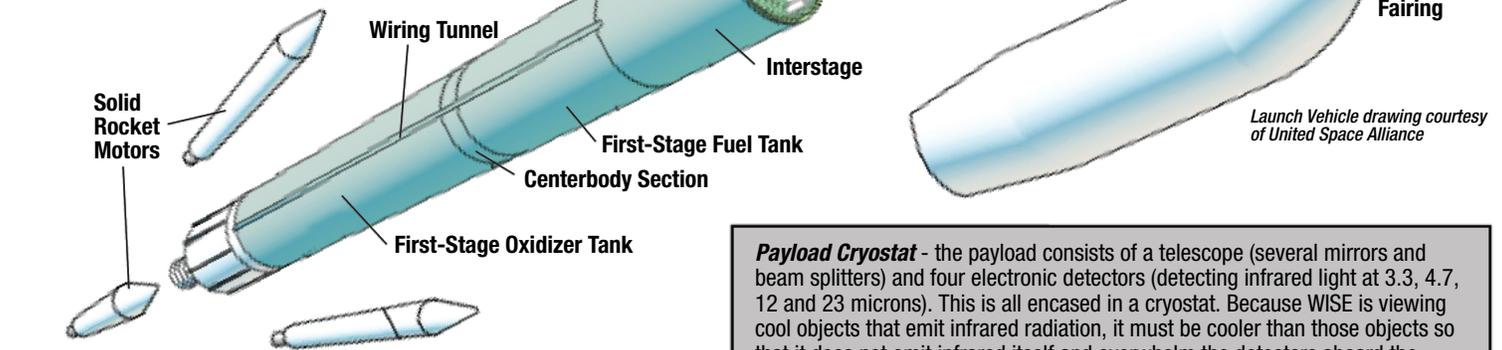
Launch Vehicle: Delta II 7320-10

Launch Location: Vandenberg Air Force Base, CA

Launch Date: 2009

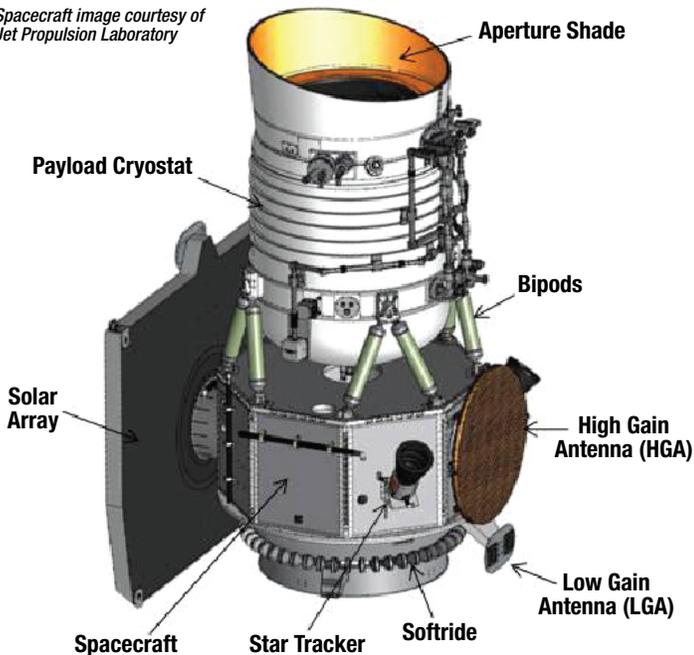
WISE

WISE (Wide-field Infrared Survey Explorer) will be launched from Vandenberg Air Force Base, California, in the fall using a two-stage Delta II 7320-10 rocket with three graphite epoxy strap-on-solid rocket motors. From Lift off at the launch pad to the spacecraft separation is approximately 55 minutes. The Vandenberg launch facilities are best suited for launches into polar orbit (orbits that goes over Earth's poles). The type of orbit WISE will be in is Sun-synchronous, because it flies over the dividing line between day and night on Earth, called terminator. The 525 kilometer (283.47 nautical miles) circular orbit, inclined by 97.4 degrees, shifts as the Earth moves around the Sun so that it can stay over the line. This allows the spacecraft to constantly be in the sunlight, so the solar panels will always be pointed at the Sun, providing power to the spacecraft.



Launch Vehicle drawing courtesy of United Space Alliance

Spacecraft image courtesy of Jet Propulsion Laboratory



Payload Cryostat - the payload consists of a telescope (several mirrors and beam splitters) and four electronic detectors (detecting infrared light at 3.3, 4.7, 12 and 23 microns). This is all encased in a cryostat. Because WISE is viewing cool objects that emit infrared radiation, it must be cooler than those objects so that it does not emit infrared itself and overwhelm the detectors aboard the spacecraft. The cryostat is like a thermos that cools and keeps the telescope and detectors cold. It is filled with solid hydrogen that cools the telescope down to 17 Kelvin (-429 degrees Fahrenheit), cools the 3.3 micron and 4.7 micron detectors down to 34 Kelvin (-399 degrees Fahrenheit), and cools the 12 and 23 micron detectors down to 8 Kelvin (-446 degrees Fahrenheit).

Solar Array - along with the back up batteries inside the spacecraft bus provides electric power for the Flight System.

Spacecraft - (or spacecraft bus) is the housing that contains the electronic boxes (and back up battery) for controlling everything aboard the Flight System.

Star Tracker - (one on each side of the HGA) are mini-telescopes that have a wide view of the sky. The stars seen in the star tracker are compared to existing star charts. The information from the star trackers and reaction wheels (spinning electric motors) aboard the spacecraft allows the spacecraft to know the exact position and orientation of the Flight System at all times.

Aperture Shade - Protects telescope from solar/Earth heating. Inner shade <110 Kelvin (261 degrees Fahrenheit).

Bipods - connect the payload to the spacecraft bus.

High Gain Antenna (HGA) - sends and receives radio signals from Operations at JPL via a communications network of ground based antennae and communications satellites in Earth orbit. It sends and receives relatively high powered signals directed in a narrow beam.

Low Gain Antenna (LGA) - (WISE has two: one below the HGA and one atop of the solar array) sends and receives radio signals from Operations at JPL via a communications network of ground based antennae and communications satellites in Earth orbit. It sends and receives relatively low powered signals directed in a wide beam, and serves as backup to the HGA.

Softride - is to reduce the lateral load on the Instrument from the launch vibration environment.

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