The MISR

Currently, satellite instruments provide our best hope of making, at a reasonable cost, the routine global observations of aerosol, cloud, and surface properties needed to assess their climatic effects. But satellite instruments must rely on remote sensing — the study of light collected at a distance from the Earth's surface and lower atmosphere.

How will we know if we are interpreting the MISR measurements correctly? This is the goal of the MISR Validation Program.

One of the main tools in the Validation Program is an instrument called AirMISR, which was built largely of spare parts from the MISR instrument. AirMISR contains a single camera on a rotating mount so it can view Earth at multiple angles. It flies at a height of about 20 kilometers (over 65,000 feet), above the clouds that affect our weather, in the nose of a NASA high-altitude aircraft. To AirMISR, Earth looks much as it does from space. But unlike the satellite instrument, AirMISR can be cleaned and tested regularly in the laboratory. So, at times during the six-year MISR mission, AirMISR will fly under the path of its satellite sister, making measurements to check those from the satellite.

P48864A

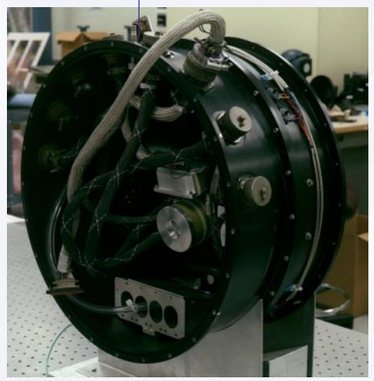
AirMISR was readied for flight in 1997. And since MISR is one of the first instruments designed to take multiangle images of Earth from space, AirMISR data are helping us develop methods to interpret multiangle observations even before the spacecraft version of MISR is launched.

Some of the most accurate measurements of atmospheric properties and surface characteristics can be made from the ground. Field measurements of sky brightness, aerosol properties, and ground reflectance are also part of the MISR Validation Program.

Validation Program

AirMISR Instrument and ER-2 Aircraft

AirMISR flies aboard the NASA high-altitude ER-2 aircraft. The photogaph above shows the instrument in its black cylindrical cover, mounted at the bottom of the aircraft just ahead of the cockpit, before an engineering test flight in April 1997. (P-48594)



The image below is a close-up of AirMISR with the rear cover off, revealing internal cabling and the back of the camera. The cylinder is about 45 centimeters (18 inches) in diameter. (JPL-28762Ac)

These members of the MISR team are preparing to make field measurements at Lunar Lake, Nevada, early on the morning of June 5, 1996. They are working with a portable instrument that can measure light reflected by the surface in many color bands and at multiple view angles. In the course of the day, they carried parts of this instrument around the test site in a backpack, taking hundreds of surface measurements. (P-48455Ac)

Sunset on a smoggy summer day in Los Angeles. You can see the tallest buildings in the downtown area poking up through the smog layer, and you may be able to just make out the Los Angeles River wending its way across East Los Angeles in the foreground. MISR will measure aerosol amounts globally, and will deduce some information about particle size, shape, and composition. (P48863A)

Views of Moffett Field, California, at Two Angles

These red/green/blue images of the area surrounding Moffett Field, California, were taken by the AirMISR instrument on August 25,1997. North is toward the top in the pictures, and the Sun is shining from approximately the south. For the image above, the camera was pointing 26.1 degrees forward of nadir, along the southward direction of flight. (P-49345Ac)

The image below was taken 26.1 degrees aft of nadir. Rivers and tidal areas are brighter in the image to the left, illustrating that these surfaces produce mirrorlike reflections. The images cover about 10 kilometers (6 miles) on a side, and show details as small as 8 meters (26 feet) in size. (P-49345Bc)