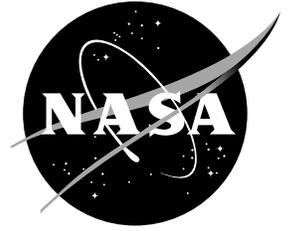


National Aeronautics and
Space Administration

Marshall Space Flight Center
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Crew Earth Observations (CEO)

Missions: All Expeditions (experiment began with Exp. 1)

Experiment Location on ISS: Destiny window

Principal Investigator: Kamlesh Lulla, NASA Johnson Space Center, Houston, Texas

Payload Developer: Sue Runco, NASA Johnson Space Center, Houston, Texas

Overview

By taking photographs from space, the Crew Earth Observations (CEO) experiment provides people on Earth with data needed to better understand our planet. The photographs—taken by crew members using handheld cameras—record observable Earth surface changes over a period of time, as well as more fleeting events, such as storms, floods, fires and volcanic eruptions.

Orbiting 240 miles above the Earth, the International Space Station offers an ideal vantage point for crew members to continue observational efforts that began in the early 1960s when space crews first photographed the Earth below. This experiment on the Space Station began during Expedition 1, and is planned to continue through the life of the Space Station. NASA fuels discoveries that make the world smarter, healthier and safer.

Experiment Operations

As part of the Crew Earth Observations experiment, crew members spend about 10 minutes a day taking photographs of specific regions of the Earth. System hardware includes 35 and 70 mm cameras. Film for the cameras is transported as needed with the Space Shuttle delivering a fresh supply of film and returning undeveloped film to Earth. For faster turnaround, crew members also use an electronic still, or digital, camera that allows for near real-time image downlink and quick analysis.



Hurricane Ivan, one of the strongest hurricanes on record, fills this image over the northern Gulf of Mexico photographed by CEO on September 15, 2004.

Areas to be photographed include subjects selected by the crew as well as pre-determined regions of Earth that have undergone change or are indicators of global change. This list of sites is determined weekly and uplinked to the Space Station.

Specific target sites include major deltas in south and east Asia; coral reefs; smog-prone urban regions; areas experiencing major floods or droughts triggered by El Niño cycles; high altitude glaciers, which reflect longer-term climate changes; faults associated with major tectonic plate boundaries; and unusual features on Earth, like impact craters comparable to structures on other planets.

Data gathered as part of the Crew Earth Observations experiment will be coupled with other types of data, such as images from satellites and aircraft, when available for public, research or commercial applications. These data will be added into a database of 30-plus years of human observations.

All of the imagery is cataloged and added to a database at the Johnson Space Center in Houston by the Earth Sciences and Image Analysis Laboratory. Through today's digital technologies and global networking, the catalog of imagery is available to scientists, educators and the public on the Internet.

The Crew Earth Observations experiment began Space Station operations during Expedition 1 in November 2000. It will continue independent operations as well as be eventually integrated with other experiments located in the Window Observational Research Facility (WORF) in the U.S. laboratory module. The Crew Earth Observations experiment will take place on all Space Station flights, with operation scheduled five days per week, approximately 10 to 20 minutes per day, depending on sites selected.

Flight History/Background

This experiment has flown on every crewed NASA space mission beginning with in 1961. Since that time, astronauts have photographed the Earth, observing the world's geography and documenting events such as hurricanes and other natural phenomena. Over the years, space crews also have documented human impacts on Earth—city growth, agricultural expansion and reservoir construction. The Crew Earth Observations Experiment aboard the International Space Station will build on that knowledge.

Benefits

Today, images of the world from 10, 20 or 30 years ago provide valuable insight into Earth processes and the effects of human developments. Photographic images taken by space crews serve as both primary data on the state of the Earth and as secondary data to be combined with images from other satellites in orbit. World wide more than one million users log on to the Astronaut Earth Photography database each year. Through their photography of the Earth, Space Station crew members will build on the time series of imagery started 35 years ago—ensuring this record of Earth remains unbroken.

More information on this and other Space Station experiments, as well as images taken as part of the Crew Earth Observation Experiment, can be found at:

<http://www.nasa.gov>

<http://eol.jsc.nasa.gov>

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