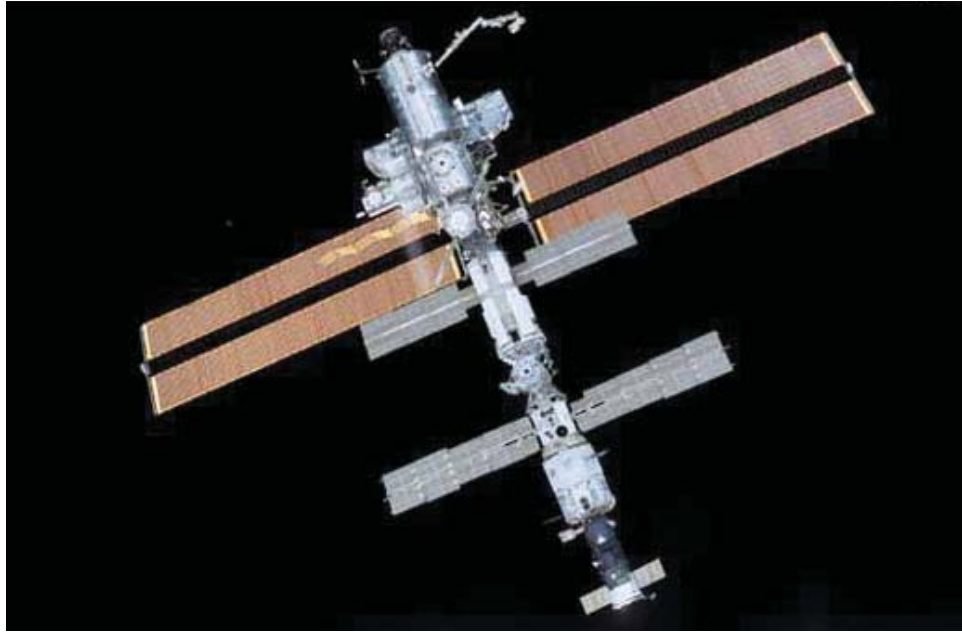
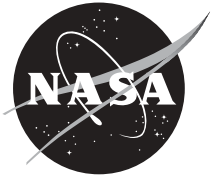


National Aeronautics and
Space Administration

ISS EarthKAM Photography





International Space Station

The International Spaces Station (ISS) is the result of an unprecedented international collaboration. Fifteen countries are partners in the design, development, operation, and use of the Station. Today, ISS is the largest laboratory ever built in space. The Station and its crew draw from the resources and scientific knowledge of multiple countries to perform state-of-the art research in a space environment.

On May 6, 2001, the ISS EarthKAM Electronic Still Camera (ESC) was set up on the ISS. The next few weeks were used for intensive testing of the camera and flight software's interaction with its new home on the ISS. During the first year of operation, ISS EarthKAM captured over 2,000 images.

Within the ISS, EarthKAM is housed in the U.S. Destiny Laboratory. The aluminum lab, 28 feet long by 14 feet wide, is composed of three cylindrical sections and two end-cones used to connect the lab to the other station components. The ISS EarthKAM camera points out the nadir window, a 50.9-centimeter-diameter optical-quality glass window that points directly toward Earth's surface. After its installation, ISS EarthKAM will be one of the first payloads mounted on the Window Observational Research Facility (WORF), a special rack for mounting sensors to the nadir window.

ISS EarthKAM's permanent home on the Space Station has innumerable

effects on the study of Earth science. Images taken by ISS EarthKAM on the more recent flights show drastic changes when compared to those taken just a few years earlier. With ISS EarthKAM permanently on the Station, students will be better equipped to track the changes on Earth. Since Earth is constantly changing, there will never be two identical images.

ISS EarthKAM Photography

ISS EarthKAM is a NASA-sponsored education program that enables students to take electronic photographs of Earth using a camera mounted on the International Space Station. During an ISS EarthKAM operational period, students use interactive Web pages to target and request images of Earth. They then use the images to study Earth from the unique perspective of space.



The ISS EarthKAM camera is a digital camera with a light-sensitive detector instead of film. This detector produces an image that can be transmitted directly to a computer. Like most cameras, the ISS EarthKAM camera takes pictures using visible light. As a result, students can only photograph Earth during the 45 minutes of each orbit when the Station flies over Earth's sunlit side.

For the program's first five years, the ISS EarthKAM camera operated from the Space Shuttle. In May 2001, operations switched to the ISS.

Operations on the Space Shuttle are very similar to operations on ISS. During a Shuttle mission, an astronaut mounts the camera in the Shuttle's overhead window as soon as the Shuttle reaches orbit. While in orbit, the Shuttle flies "upside down" (with the overhead window facing Earth), so the camera points straight toward the ground. For ISS operations, the ISS EarthKAM camera is mounted in the Destiny Lab.

After mounting the camera, astronauts connect it to the ISS EarthKAM computer, which communicates with a computer in NASA's Mission Control.

Middle school students study Earth science, geography, weather, current events, and more in order to determine photographic targets. Students track the spacecraft to find the time it flies over a location of interest.

Using the Internet, middle school students transmit the time and target

information to the University of California, San Diego, where the requests are compiled into a list and sent to NASA's Mission Control Center. From there, the list is sent to the ISS EarthKAM computer in orbit. At each listed time, the computer commands the camera to take a picture. Within a few hours, the images are added to the ISS EarthKAM Datasystem on the World Wide Web, where students and the general public can access them for viewing and study.

About the Images on the Front of the Lithograph

International Space Station

The entire International Space Station as photographed by the STS-110 crew in April 2002. The Destiny module is at the very bottom of the image. Look closely to spot the nadir window.

ISS EarthKAM Photography

Astronaut Carl Walz confirms that the ISS EarthKAM camera is set up properly during February 2002 operations. Problems with a power cable forced the camera to be set up in the service module instead of the U.S. lab.

Nadir Window

Astronaut Steven Frick admires the view from the nadir window of the U.S. lab during his visit to the ISS on Shuttle mission STS-110.

Additional information:

ISS EarthKAM images and lessons:

<http://www.earthkam.ucsd.edu>

NASA Spacelink:

<http://spacelink.nasa.gov>