



Astronaut Photography

On Discovery's aft flight deck, astronaut Dominic C. Gorie, pilot, uses a 70mm handheld camera to record images of Africa. Two overhead and two head-level windows, located on the aft flight deck, afford an easy means for astronauts-turned-photographers to take pictures of targets of opportunity on the home planet.

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EarthKAM Photography

Astronaut Bonnie Dunbar looks out the Shuttle window where the EarthKAM camera is mounted. Note the attached cables; these connect to a computer that triggers the camera shutter. (January, 1998)

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EarthKAM Photography

EarthKAM is a NASA-sponsored education program that enables students to take electronic photographs of Earth using a camera mounted in the Space Shuttle and, eventually, on the International Space Station. During an EarthKAM mission, 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 EarthKAM camera is a digital camera with a light-sensitive detector instead of film. This detector produces an image which can be transmitted directly to a computer. Like most cameras, the EarthKAM camera takes pictures using visible light. This means that it takes pictures of the Earth only during the 45 minutes of each orbit when the Earth is in sunlight.

Once the Shuttle is in orbit, an astronaut mounts the EarthKAM camera in the Shuttle's overhead window. During EarthKAM operations, the Shuttle flies "upside down" (with the overhead window facing Earth), so the camera points straight towards the ground. The astronauts also connect the EarthKAM camera to its own computer, which communicates with a computer in NASA's Mission Control.

EarthKAM middle school students study Earth science, geography, weather, current events, and more in order to determine what they want to photograph.

During the mission, they take the photographs by tracking the spacecraft and finding the time when it flies over a location of interest. They send 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 EarthKAM computer in orbit. At each listed time, the computer sends a command to the EarthKAM camera to take a picture. Within a few hours, the images are added to the EarthKAM Datasystem on the World Wide Web, where they can be accessed by the students and the general public for viewing and study.

EarthKAM
Camera



Astronaut Photography

All astronauts spend time looking at and photographing the Earth below. They are trained in both photography and the Earth Sciences, so that their photographs of Earth can be used by scientists in all of the Earth science disciplines: geology, ecology, oceanography, meteorology, and more.

Today's program for Shuttle and ISS astronauts includes intensive training before flight on the camera hardware and their photographic skills. They also receive Earth science training, including geography, so they recognize the major features on Earth's surface, and general information in the fields of geology, ecology and the environment, ocean systems, comparative planetology, and meteorology and climate. Additionally, the crews are introduced to hot topics in the Earth sciences, such as changes in deltas or river systems, biomass burning, or El Niño events, so they can obtain photos for current studies or experiments.

Just before the flight, the Office of Earth Sciences at the Johnson Space Center provides the crew with a last minute update of current events (tropical storms, floods, volcanic eruptions, large fires, etc.) that the crew is likely to see.

During a mission, the astronauts look out the windows and decide what they want to photograph, based on their training and their interest in what they see. In addition, NASA's Office of Earth Science communicates with the crew on a daily basis, providing a synopsis of significant photography opportunities.

Upon return to Earth, the film is processed within 2-3 days of landing, and the Earth Science staff at the Johnson Space Center reviews the film with the crew. The film is then cataloged and added to a database, where it can be accessed by scientists for research in all of the Earth science disciplines.

Additional information:

EarthKAM images and lessons: <http://www.earthkam.ucsd.edu>
JSC *Earth From Space* image database: <http://earth.jsc.nasa.gov>
NASA Spacelink: <http://spacelink.nasa.gov>