

Orbiter Has Own Darkroom

Orbiter's moon pictures are stored on film that can be retrieved for readout any time

By Barbara Culliton

► LUNAR ORBITER, the United States' first photographer to take pictures of the mysterious backside of the moon, processes film in its own onboard darkroom. It reels off 200 feet of film, snapping one picture after another until its entire roll is exposed. A television camera scanning the developed film relays the pictures back to space scientists on earth.

The picture taking system of the National Aeronautics and Space Administration's Lunar Orbiter is quite different from that of the Surveyor probe that sent back moon pictures last June.

A television camera onboard Surveyor scanned the lunar surface and NASA scientists saw the results almost instantly. Lunar Orbiter, however, is taking actual photographs of the surface of the moon, pictures which can be stored onboard the spacecraft and retrieved and studied at will. In fact, it will be the middle of September before all of the Orbiter's expected photographs are seen.

After a film exposure is made by Orbiter's camera, the film is reeled forward to a storage or buffer area in between the camera and film processor. Here it is wound around a series of loops designed to take up the slack

that may accumulate as the film moves through the photographic system.

The looper, a system of pulley blocks that can hold as many as 20 frames at one time, can be adjusted to accommodate the lengths of film awaiting processing.

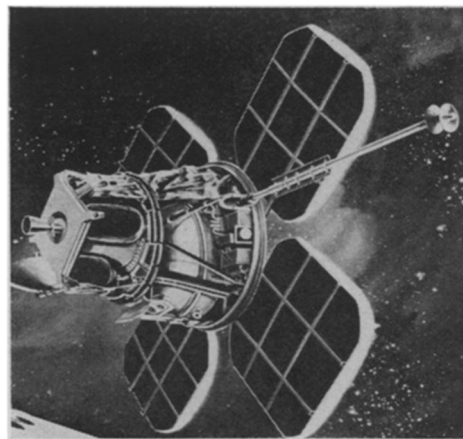
Exposed film is chemically developed by Eastman Kodak's "Bimat" process. Film passes onto a processor drum where it is mechanically pressed against a "Bimat" web or backing which is saturated with a solution of photographic developing chemicals.

Processed negative film, dried by a small electric heater, is stored on a take-up reel until the picture readout process is to begin.

Lunar Orbiter's readout instruments must capture as much as possible of the film's densely packed information and convert it into a stream of electronic signals for transmission to earth. The pictures are passed in front of a television camera that scans the film and relays images back to earth.

Officials can check on the operation of the photographic system by calling for partial readout before the entire roll of film is exposed.

Because the Orbiter is taking photographs instead of television pictures, scientists can stop the process at any



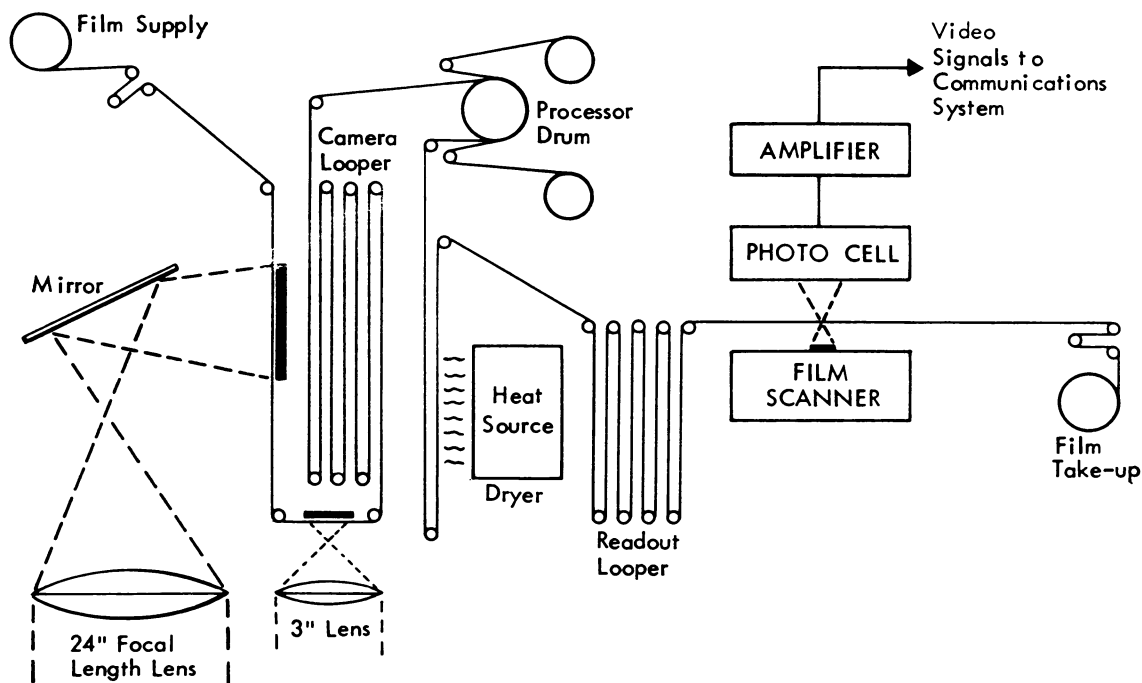
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LUNAR PHOTOGRAPHER—An artist's concept shows the National Aeronautics and Space Administration's Lunar Orbiter spacecraft only 28 miles from the lunar surface, circling the moon while taking pictures.

point and look at the developed photographs well before the roll of film is completely exposed. A series of movable loops can be adjusted to take up slack in the film as it is stopped in front of the television camera to be scanned and transmitted. When picture taking is over, the Bimat web will be cut from the film and wound out of the way so that the developed film can be turned forward or back any number of times.

Any picture can be studied, stored, called back and studied again.

Geologists hope to make maps of the moon from Orbiter's pictures—maps astronauts will use for selecting possible future landing sites.



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DIAGRAM OF LUNAR ORBITER'S PHOTOGRAPHIC SUBSYSTEM