



FOR USE: Immediate

WESTINGHOUSE BUILDS COLOR TV CAMERA AND 'MINI' MONITOR FOR APOLLO 10

BALTIMORE, May 16 -- A color television camera that weighs less than 15 pounds and a "mini" monitor -- a TV set with a screen smaller than a credit card -- have been built by Westinghouse Electric Corporation for Apollo 10 astronauts to take with them on their mission to the moon this month.

The camera is about 17 inches long including a variable focus "zoom" lens. It is designed to be carried aboard the three-man Apollo 10 command module and is the first color TV camera designed for use aboard a manned spacecraft. The use of a zoom lens and a TV monitor aboard a manned spacecraft are also space "firsts."

The lens has a variable focal length ranging from 12.5 millimeters to 75 millimeters and will provide a diagonal field of view variable from 54 degrees to nine degrees respectively. There is a range of aperture stops from f2.2 to f22 for operation in the expected mission light levels and a focus range of 20 inches to infinity.

The little television monitor -- which weighs less than four pounds -- has a black and white viewing screen that measures two by two

and three-quarter inches. It also is to be carried inside the command module so that the astronaut using the camera will be able to see the exact scene the camera is transmitting back to earth.

Stanley Lebar, manager of Apollo camera programs for the Westinghouse aerospace division, said the camera was built under the direction of Larkin L. Niemyer, Jr. Lloyd B. Gangaware directed work on the monitor. Both camera and monitor were built for National Aeronautics & Space Administration's Manned Spacecraft Center, Houston, Tex.

Mr. Lebar said the color telecasts from the Apollo spacecraft are expected to show the astronauts at work while enroute to the moon, the moon itself "close-up," and also the earth as seen from the vicinity of the moon.

Mr. Niemyer said the color camera is electronically very similar to a black and white camera developed over a two-year period by Westinghouse for other applications.

The color camera uses a special imaging tube which can produce an image even at very low light levels. The tube, called an SEC (secondary electron conduction) imaging tube, can literally see in the dark. The tube is the same type that was used in the Westinghouse lunar TV camera flown on Apollo 9 and scheduled to be used on the moon's surface during the Apollo 11 flight. The SEC tube was invented and developed by scientists at the Westinghouse Research Laboratories, Pittsburgh, Pa., and the company's electronic tube division, Elmira, N. Y.

Mr. Niemyer said, however, that a significant addition to the camera is a rotating color wheel with red, blue and green filters arranged so that the filters pass in front of the imaging tube. The wheel spins at 600 revolutions per minute and is divided into six sections so that the sequence of color filters as they pass in front of the tube during one revolution will be red, blue and green, red, blue and green.

In operation, he said, the camera will transmit separate red, blue and green images to earth receiving stations.

On earth, through the use of special conversion equipment, the various colored images are combined to produce a single "live" color picture. The conversion equipment will produce images at the rate of 30 frames per second compatible with the "standard" rate for commercial television.

Mr. Lebar said the rotating color wheel system, which engineers call the "field sequential" system, is similar to one pioneered by the CBS laboratories in the 1940s and early 1950s. One of its limitations at that time was that the color images it produced were not compatible with the black and white system. He said, however, that the conversion equipment which is located at the Manned Spacecraft Center, Houston, Tex., makes it possible to take the image from the color camera and convert it to one that can be viewed on both color and black and white home receivers.

Westinghouse Builds Color TV Camera
And 'Mini' Monitor For Apollo 10 - 4 -

Mr. Gangaware said that the "mini" monitor, when installed aboard the spacecraft, will receive its power and its video signal through a nine-foot cable connected directly to the camera. The monitor will require about three watts of power.

Just beneath its viewing screen, it will have four control knobs familiar to every home TV viewer -- "brightness," "contrast," "vertical," and "horizontal." Mr. Gangaware added that the astronaut will be able to "zoom" in on a target and focus the picture himself without having to rely on voice direction from the ground.

##81705-2-P##

APOLLO 10
BRIEFING SCHEDULE
KSC TRAINING AUDITORIUM

FRIDAY, MAY 16

- 10:00 a.m. - Onboard Television
Westinghouse: Stan Lebar, Manager, Apollo Camera Programs
Larkin Niemyer, Electro-optical Department
- 1:00 p.m. - Apollo 10 and 11 Launch Preparations
Paul Donnelly, Launch Operations Manager, KSC
- 3:00 p.m. - Lunar Geology
H. H. (Jack) Schmitt, Geologist Astronaut, MSC

SATURDAY, MAY 17

- 9:30 a.m. - Mission Planning and Descent Engine
Don Ross, Mission Planning Project Engineer, TRW
Joe Miller, Propulsion Systems Engineering Manager, TRW
- 11:00 a.m. - Prelaunch Briefing
At KSC: George H. Hage, Apollo Mission Director, Hq
George M. Low, Apollo Spacecraft Program Manager, MSC
Lee James, Saturn V Program Manager, MSFC
Rocco Petrone, Launch Director, KSC
Ozro Covington, Assistant Director for Manned Flight
Support, GSFC
Col. Royce Olson, USAF, Director, DOD Manned Space
Flight Support, Patrick AFB
Donald K. Slayton, Director, Flight Crew Operations, MSC
Dr. Charles Berry, Director, Medical Research & Operations,
MSC
- At MSC: Christopher Kraft, Director, Flight Operations, MSC
Glynn Lunney, Flight Director, MSC
- 1:30 p.m. - Apollo 10 Guidance and Navigation
Hugh Brady, Apollo Program Director, AC Electronics

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