

## SPACE

# U.S. Advances in Space

► A HIT ON THE MOON, the heaviest satellite, the largest man-made thing in outer space—these are recent U.S. space achievements.

Apparently hoping to save some face, the Russian news agency Tass gave out an unusual amount of information on its double-satellite launching (Jan. 30). Tass has been relatively mum on other launchings in the Soviets' Cosmos satellite series.

By orbiting two satellites from a single rocket, the Soviets did not score a first.

The U.S. Air Force sent up twin moonlets last summer and has plans to send up triplets and quadruplets.

America's 13-story-high Echo II balloon satellite, launched Jan. 25, remains the biggest man-made thing in outer space. It is said to be operating with "great success" despite earlier radar signals hinting it had run into trouble.

Echo II is the first phase of a cooperative space program between the Soviet Union and the United States which eventually will lead to a global weather satellite service "for the benefit of all countries," said James E. Webb, head of the National Aeronautics and Space Administration.

Scientists at the oft-forgotten pads at Wallops Island, Va., continued throughout the week of Jan. 26 to launch successfully rockets armed with grenades. The rockets are used to measure wind patterns in the upper atmosphere.

Scientists have been measuring the time it takes for the sound of the exploding grenades to reach sensitive monitoring equipment on the ground.

On Jan. 29 at Cape Kennedy, Fla., America sent its awesome Saturn SA-5 rocket into action to push into orbit the heaviest satellite ever launched—37,700 pounds. The heaviest Russian satellite up to then weighed about 15,000 pounds.

Later the same day at Vandenberg Air Force Base, Calif., the Air Force blasted a Minuteman intercontinental ballistic missile from its 85-foot-deep silo and sent it some 5,000 miles down range into its Pacific target. It was Minuteman's 29th successful launching.

At Cape Kennedy on Jan. 30 an Atlas-Agena rocket boosted the 804-pound Ranger into a "parking orbit" around earth. The probe part, fired into orbit, hit the moon on target in the Sea of Tranquility on Feb. 2.

Scientists began a study of why Ranger's television cameras failed to send back close-up pictures of the moon. The study was expected to delay the moon flight of Ranger VII, scheduled originally for a February launch.

• Science News Letter, 85:98 Feb. 15, 1964

## TECHNOLOGY

## Gauge Measures Very High Altitudes

► A NEW METHOD of measuring very high altitudes has been developed and has successfully passed balloon trials.

The pressure gauge, called a hypsometer, shows altitude by measuring the boiling temperature of a liquid, butyl-benzene, from which height can be determined. The liquid is electrically heated to its boiling point and kept at that point during the entire balloon flight.

The hypsometer was developed at the Air Force Cambridge Research Laboratories in Cambridge, Mass., under the direction of Dr. W. C. Wagner.

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U.S. Navy

*ECHOS CROSS—This photograph of Echo I and Echo II as they passed over Washington, D. C. during the early morning on Jan. 31 was taken from the roof of the U.S. Naval Oceanographic Office at Suitland, Md. The short breaks in the satellite trails and the background star trails were produced by opening and closing the camera shutter.*

## SPACE

## Saturn's Camera System Most Elaborate Ever

► THE MOST ELABORATE optical system ever carried by a U.S. launch vehicle was aboard the huge Saturn SA-5 rocket which was hurled into space Jan. 29.

The purpose of the eight movie cameras and one TV camera was to provide a visual record of events that occur within several critical sections of the rocket and to relay information to earth about what occurred outside the rocket after some of the cameras were ejected.

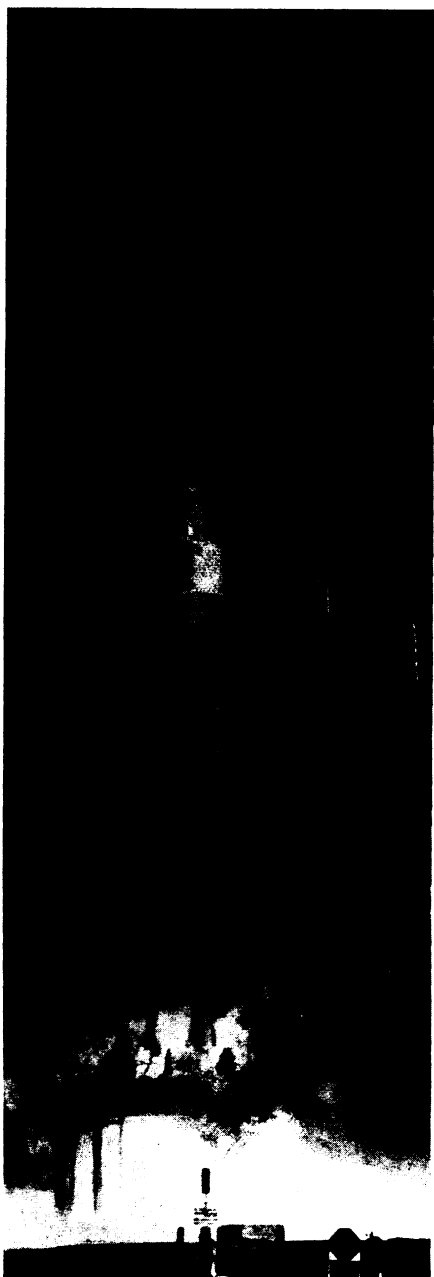
Inside the spacecraft, two cameras "watched" the two liquid oxygen tanks. Four others looked forward outside the vehicle to monitor the firings of the exterior rockets, and the coasting and firing of one of the stages.

The third interior camera viewed the stages as they separated and monitored the piping of engine number four. The fourth watched the effect of the solid oxygen-gaseous oxygen disposal system.

Cameras on the outside of the rocket and the piping took 64 pictures a second, those monitoring the outer liquid oxygen tank and the liquid oxygen-gaseous oxygen tanks, 24 a second, and the last camera, 12 a second.

These pictures will help in launching on an advanced Saturn the Apollo capsule that will put two men on the moon, perhaps ten years from now.

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NASA

*UP INTO SPACE—Saturn SA-5 lifts from Launch Complex 37, Pad B, Cape Kennedy, Jan. 29.*