Wallops Set To Launch Latest Langley Satellite

A Langley Research Center satellite designed to gather information on the hazards to spacecraft from tiny flying particles in space will be launched Thursday or later from Wallops Island.

The National Aeronautics and Space Administration has labeled the new satellite S-55C. It closely resembles Explorer XVI, formerly called S-55B, which telemetered to earth the first statistically significant data on the ability of the particles -- or micrometeoroids -- to penetrate spacecraft skins.

Explorer XVI was launched Dec. 16, 1962 and radioed information successfully for seven months. S-55C is designed to transmit data for one year, and its radios will be shut off at that time although the satellite may stay in orbit for three years.

The S-55C was built around the fourth stage of a Scout rocket, another Langley-directed project. A cylinder 24 inches across and 92 inches long, it will be launched toward the southwest in a 99.6-minute orbit taking it as little as 238 miles and as much as 637 miles from the earth.

Three experiments will be carried aboard the S-55C. The main one will be meteoroid penetration sensors covered by two different thicknesses of thin stainless steel. A capacitor -- type penetration detector will make the trip to see whether it will stay reliable under high-energy space radiation. The third experiment will measure air loads on the Scout vehicle as it climbs from 25,000 to 40,000 feet altitude after launch.

Meteoroids are bits of iron, sand and other rocky materials traveling in space like rain sometimes sporadically and sometimes in heavy showers. Some come from asteroids orbiting the sun between the planets Mars and Jupiter, and others are believed to come from comets in the distant regions of our solar system.

Air friction burns meteoroids entering earth's atmosphere, and most are reduced to dust, but so many cross the earth's path that scientists estimate several thousand tons of meteorites -- burned-out meteoroids -- settle to the ground each day.

Meteoroid speeds in space have been estimated from as low as 7 to as much as 45 miles per second, or even faster.

The S-55C, carrying meteoroid sensors over its entire usable surface, should record a larger number of meteoroid penetrations than Explorer XVI.

Its primary experiment, like Explorer XVI's, will use three kinds of meteoroid detectors. They are pressurized cells and sounding-board impact detectors, both developed by Langley, and cadmium sulphide cells developed by Goddard Space Flight Center, Greenbelt, Md.

There will be 216 pressurized cells of type S-55B stainless steel, arranged in 7 rows with their round sides out. Six will be inactive, but were included to balance the spacecraft. The walls of 70 cells will be one thousandth of an inch thick; steel twice as thick will be used for 160 cells. About 22 1/3 square feet of area will be exposed by the pressurized cells.

Designed, developed and fabricated by Langley, these contain helium under pressure and a meteoroid puncture will let the gas leak out, causing a pressure-sensitive switch to open and signal a penetration.

On Explorer XVI, the pressurized cells were made of beryllium copper rather than stainless steel.

Langley also devised the impact detectors. 24 triangular aluminum sounding boards .051 inch thick which will detect three levels of meteoroid momentum in impacts on a 223-square-inch area of the satellite. Signals of impacts will be sent by piezoelectric elements on the undersides of the sounding boards, where they will be picked up and transmitted back to earth.

A meteoroid puncture will vaporize and ionize a bit of the material as it goes through, and signal a penetration when it strikes their surfaces. Each will be covered with mylar coated with vapor-deposited aluminum to keep out light and a micrometeoroid punctures the mylar. The amount of light that reaches the cell will give scientists a clue to the size of impacting micrometeoroids.

Two different mylar thicknesses will be used, and the exposed surface area will be about 3.3 square feet per cell.

The S-55C will give an extended proving in space radiation to a capacitor detector, also Langley-developed, which shows promise for deep space exploration because of its light weight, large surface area and reusability.

Capacitor detectors consist of a sandwich of mylar film between one-thousandth-inch stainless steel outside and copper inside, and will be charged to about 14 volts by the satellite batteries in flight.

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