

Apollo 17 Surface Electrical Properties (SEP) Experiment

Instrument Description

The purpose of the Apollo 17 Surface Electrical Properties (SEP) Experiment was to obtain data about the electromagnetic energy transmission, absorption, and reflection characteristics of the lunar surface and subsurface for use in the development of a geological model of the upper layers of the moon. This experiment determined layering, searched for pressure of water below the surface, and measured electrical properties in situ, determining these as a function of depth.

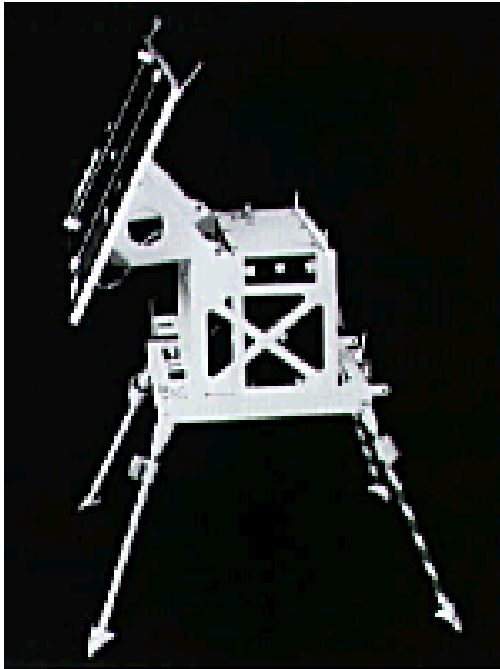


Figure 1: Surface Electrical Properties Experiment

The selected frequency range was chosen to measure these properties in a range from a few meters to a few kilometers depth. The transmitter produced continuous waves at 1, 2.4, 4, 8.1, 16, and 32.1 MHz, successively. These waves permitted measurement of the size and number of scattered bodies in the subsurface. Any moisture present was easily detected because minute amounts of water in rocks or subsoil change the electrical conductivity by several orders of magnitude.

The equipment for this experiment consisted of a deployable self-contained transmitter, a multiple frequency transmitter antenna, a portable receiver/recorder on the Lunar Roving Vehicle (LRV), a wide-bandwidth mutually orthogonal receiver antenna, and a retrievable data recording device. The crew transported and set up the transmitter approximately 100 m from the Lunar Module (LM) and then deployed the antennas. The receiver/recorder was placed on the LM. The crew established the location of the LRV in relation to the transmitter for each data stop during the traverse. Wheel turns were counted for distance, and azimuth was recorded using the navigation system. The recorder was then returned to earth.

References

Simmons, G., et al., Surface Electrical Properties Experiment, Chapter 15, Apollo 17 Preliminary Science Report, NASA SP-330, NASA, Washington, D.C., 1973.

Apollo Scientific Experiments Data Handbook, NASA Technical Memorandum X-58131, JSC-09166, published by NASA Johnson Space Center, Houston, Texas, Aug. 1974, revised Apr. 1976.

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