Active Seismic

NSSDCA ID: 1972-031C-02

Mission Name: Apollo 16 Lunar Module /ALSEP
Principal Investigator: Dr. Robert L. Kovach

Description

The purpose of the (S-033) active seismic experiment (ASE) was to acquire data to determine the physical properties of the lunar surface and subsurface materials. Both natural and artificially produced seismic waves were monitored. The artificial waves were produced by shotgun-like charges fired by an astronaut-operated 'thumper' device and by explosive grenade charges fired from a mortar box assembly. The equipment consisted of a thumper assembly, a geophone array, a mortar package assembly, interconnecting cables, and an electronics assembly housed in the central station. The ASE generated and monitored seismic waves in the range 3 to 250 Hz with a frequency response of plus or minus 3 dB in the frequency range of 3 to 100 Hz. Natural seismic waves were also monitored within this range while the ALSEP station was operating in the ASE mode. The data-gathering interval was small, because the central station operated in the ASE mode on the average of only 30 min/week. The thumper contained 21 standard initiators mounted perpendicular to its base plate. Each initiator in turn was selected and fired by an astronaut at selected locations. The thumper was cable-connected to the central station and was fired at distance intervals of 5 meters. Thumper firings beyond approximately 40 m produced weak signals. One P-wave velocity of 114 m/sec was measured. The geophones were electromagnetic listening devices that were cable-connected to the central station, where their signals were amplified, digitized, and transmitted to earth. They were placed at distances of 3, 43, and 93 m from the central station. The mortar box grenades were rocket-launched by earth command. They impacted at ranges of approximately 150, 300, and 900 m from the deployed mortar box assembly. The decision not to launch grenade no. 1 (1500 m) was made because the launch assembly pitch-angle sensor went off-scale high, making the pitch position of the assembly uncertain.

Alternate Names

- Apollo16ALSEP/ActiveSeismic
- S033

Facts in Brief

Mass: 11.2 kg

Funding Agency

- NASA-Office of Space Science United States

Discipline

- Planetary Science: Geology and Geophysics

Additional Information

- Apollo 16 Lunar Module /ALSEP
- Data collections from this experiment

Questions and comments about this experiment can be directed to: Dr. David R. Williams

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Selected References
