LUNAR DATA PROJECT: APOLLO DATA RESTORATION AND UPDATE

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Long-term surface data were collected by autonomous stations placed on the surface of the Moon by the Apollo astronauts. The ALSEP (Apollo Lunar Surface Experiments Package) stations were placed by the crews of the Apollo 12, 14, 16, and 17 missions. The stations and collected data directly on the surface during their stays on the Moon, and instruments collected data from lunar orbit on the Command and Service Module. Mechanically, most of these data were never archived and do not need to be digitized or analyzed.

The Lunar Data Project (LDP) and Lunar Data Node (LDN) were formed at the National Space Science Data Center (NSSDC) to restore existing, scientifically important Apollo data into accessible digital form. The LDP operates under the auspices of the Oceans Sciences Node of the Planetary Data System (PDS). The LDN data in particular represent the only long-term information on the lunar surface environment, and as such are critical for planning the lunar domain and planning future lunar exploration.

These data cover time periods from the lunar landings (1969-1972) until ALSEP turn-off on September 30, 1977. The data are generally archived at NSSDC although some have been uncovered and re-archived at PDS. The microfilm data were re-scanned and converted into easily usable and manipulable digital form. Metadata, ancillary data to aid in the use and understanding of the data, are also being collected from various sources (science reports, instrument manuals, archived microfilm and microfiche records, personal communications with instrument scientists), and incorporated into the individual data sets. This will include complete descriptions of the data, formats, processing history, instructions, and revisions, and contact information and relevant references. These data sets will be made available online and archived with PDS and the Planetary Data System to assist wide-spread distribution to the scientific and engineering communities.

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The Charged Particle Lunar Environment Experiment on Apollo 14 measured the energy spectra of low energy particles striking the lunar surface. A set of two electrostatic analyzers and operated for over 6 years. The data were archived at NSSDC on magnetic tape in SDS 92 binary format. These have been read and translated to Common Data Format (CDF) to be put on the online CDRs system and will then be packaged and archived through PDS.

The Transeverse Gravimeter was carried on the Apollo 17 Lunar Rover. Gravity readings were taken by the astronaut at various points during the EVA traverses over 3 days. The data were stored on microfilm and hard-copy. The data were scanned to back out the raw and calibrated DTREM data for Apollo 14 and 15 held at NSSDC, we have re-scanned the microfilm and created a digital set of the raw scans which has undergone PDS review and is now in final resolution. The raw data have been read from the microfilm and the data formatted and reformatted in a digital calibrated data set can be produced from the raw data. We will also archive all raw data from Apollo 11 and 12.

LEAM

The Lunar Ejecta and Meteorites Experiment, part of the Apollo 17 ALSEP, measured the frequency, direction, and energy of small particle impacts at the lunar surface. The data were stored on magnetic tapes archived at NSSDC. The microfilm records have been scanned and a set of microfilm holding raw and calibrated DTREM data for Apollo 14 and 15 held at NSSDC, we have re-scanned the microfilm and created a digital set of the raw scans which has undergone PDS review and is now in final resolution. The raw data have been read from the microfilm and the data formatted and reformatted in a digital calibrated data set can be produced from the raw data. We will also archive all raw data from Apollo 11 and 12.

DTREM

The Dual, Themis, and Radiation Engineering Measurement experiment, also known as the dust detector experiment, was carried out on Apollo 14, 15, and 16. The objective was to measure the frequency, direction, and energy of small particle impacts at the lunar surface. The data were stored on magnetic tapes archived at NSSDC. The microfilm records have been scanned and a set of microfilm holding raw and calibrated DTREM data for Apollo 14 and 15 held at NSSDC, we have re-scanned the microfilm and created a digital set of the raw scans which has undergone PDS review and is now in final resolution. The raw data have been read from the microfilm and the data formatted and reformatted in a digital calibrated data set can be produced from the raw data. We will also archive all raw data from Apollo 11 and 12.

LASER

The Lunar Atmospheric Composition Experiment measured the tenuous lunar atmosphere as part of the Apollo 17 ALSEP. The original data, stored in SDS 92 binary format, were read from microfilm, tapes, and have been coverted to ASCII. These tables will be archived and made available. Appropriate metadata and ancillary information are being compiled and will be added to the data sets as we continue the archiving at PDS.