

ALSEPs/EASEP-Apollo Era Lunar Surface Science Stations

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As the Apollo Program developed in the early 1960's, it was decided to include lunar surface science stations (Apollo Lunar Surface Experiments Packages-ALSEPs) at each of the Apollo lunar landings sites except the first landing- Apollo 11. The science experiments were selected by NASA Headquarters, ALSEP management and development responsibility assigned to NASA JSC, and an industrial systems development contractor, Bendix Aerospace, was competitively selected. This paper describes the ALSEP system evolved to fly combinations of 14 experiments 5 to 8 at a time on the six Apollo lunar landed missions. The completely independent ALSEPs were deployed by the astronauts up to 100 to 200 meters from the lunar lander. Each system consisted of a central station providing the telemetry, data handling, and power distribution functions and the science experiment packages which were deployed from 5 to 30 meters from the central station. Power was provided by a radioisotope thermal generator (RTG) which was externally fueled by the astronauts. Astronaut deployment of the ALSEP typically required 2 or more hours. Some of the unique instrument/astronaut interfaces, spacesuit limitations, lunar surface environment, dust, RTG power system and their complications and subtleties, are discussed. A little over a year before the Apollo 11 launch, NASA asked if the ALSEP system could be simplified so the astronauts would be able to deploy the modified system in 20 minutes or less. This resulted in the solar powered Early Apollo Scientific Experiment Package (EASEP) having 3 experiments which flew on Apollo 11. A concluding table shows the system level performances of the 6 deployed ALSEP/EASEP systems exceeded preflight expectations by wide margins.