

APOLLO ALSEP RESULTS – 40 YEARS LATER. Patricia H. Reiff¹, John W. Freeman², and Richard Vondrak³, ¹Rice University, Rice Space Institute MS 108, Houston TX 77005-1892 (reiff@rice.edu) for first author, ²Rice University, (jwf@rice.edu), ³NASA Goddard Space Flight Center, (richard.vondrak@nasa.gov).

Introduction: Forty years ago, the first ALSEP experiments were placed on the Moon. Rice University was key in two major instrument packages: SIDE (Apollo 12, 14, and 15) and CPLEE (Apollo 14). Their groundbreaking results were confirmed by other spacecraft, often many years later. This paper will present some of these historic results.



Rice University started its space research activity as a result of the historic JFK speech at Rice on September 12, 1962. The Department of Space Science was formed in 1963, one of the first in the country. The Department subsequently changed its name to the Department of Space Physics and Astronomy, and is now part of the Department of Physics and Astronomy. The space focus is housed in the Rice Space Institute.

SIDE: The Suprathermal Ion Detection Experiment measured ions near the lunar surface. SIDE's major discoveries included the following results (among others): 1. First detection of the plasma mantle at lunar distance. 2. First detection of water vapor ions. 3. IMF-dependent asymmetry of the magnetotail. 4. First measurement of Oxygen in the magnetotail. 5. First measurement of ions in the lunar exosphere. 6. Detection of impact-generated gas clouds at the lunar surface. 7. First measurement of lunar atmosphere loss rate. 8. First measurement of the electric potential of the lunar surface.



CPLEE: The Charged Particle Lunar Environment Experiment measured electrons and total ions. It was also part of the Apollo 13 package which of course never landed. Its major results included: 1. First measurement of lunar photoelectrons. 2. First measurements of the translunar plasma sheet. 3. Detection of deadly fluxes from the August 1972 flare. 4. Detection of electron cloud from SIVB impact. 5. First measurement of the solar wind strahl in the magnetosheath. 6. Discovery that the plasma sheet is hotter and denser during geomagnetic storms. 7. Discovery that the magnetosheath electron temperature is anisotropic. 8. Discovery of electron shadowing by the Moon.



Educational results: Seven students received their MS and/or PhD's at Rice University analyzing data from Apollo, as well as postdoctoral researchers including William Burke, Richard Vondrak and Kent Hills. Virtually all students have remained active in space research.

Additional Information: Additional information may be found at the Rice Space Institute website <http://rsi.rice.edu>.