NLSI FOCUS GROUP ON RECOVERY OF MISSING ALSEP DATA: STATUS UPDATE FOR 2012 NLSI SCIENCE FORUM L. R. Lewis[1], Y. Nakamura[2], S. Nagihara[3], D. R. Williams[4], P. Chi[5], P. T. Taylor[6], G. K. Schmidt[7], H. K. Hill[4] [1]Retired, formerly ALSEP Systems Engineering Manager, San Gabriel, CA 91775 (LYACHLewis@aol.com), [2]Institute for Geophysics, University of Texas at Austin, Austin TX 78758-4445, [3]Department of Geosciences, Texas Tech University, Lubbock, TX 79409, [4]Goddard Space Flight Center, National Space Science Data Center, Greenbelt, MD 20711, [5]IGPP, University of California at Los Angeles, CA 90095, [6]Goddard Space Flight Center, Greenbelt, MD 20771, [7]NASA Lunar Science Institute, Ames Research Center, Moffett Field, CA 94035.

Introduction: On the six Apollo lunar landed missions, the Astronauts deployed the Apollo Lunar Surface Experiments Package (ALSEP) science stations which measured active and passive seismic events, magnetic fields, charged particles, solar wind, heat flow, the diffuse atmosphere, meteorites and their ejecta, lunar dust, etc. Today's investigators are able to extract new information and make new discoveries from the old ALSEP data utilizing recent advances in computer capabilities and new analysis techniques. However, current-day investigators are encountering problems in trying to use the ALSEP data. The data were in formats often not well described in the published reports and contained rerecording anomalies which required tape experts to resolve. To solve these problems the DPS Lunar Data Node was established at NASA Goddard Space Flight Center (GSFC) NASA Space Science Data Center (NSSDC) in 2008 and is currently in the process of making the existing archived ALSEP data available to current-day investigators in easily useable forms. However, current estimates by NSSDC archivists are that only about 60 percent of the PI processed ALSEP data and less than 30 percent of the raw experiment ALSEP data-of-interest to current lunar science investigators are currently in the NSSDC archives.

Formation of NLSI Missing ALSEP Data Recovery Focus Group: In July of 2010 the NASA Lunar Science Institute (NLSI) at NASA Ames Research Center established the Recovery of Missing ALSEP Data Focus Group in recognition of the importance of the current activities to find this ALSEP data missing from the NSSDC archives.

ALSEP Experiment Archival Data: The ALSEP archival raw data was collected in three forms over the duration of the mission:

7-69 to 2-73 Ground station analog "range " tapes
3-73 to 2-76 JSC generated digital ARCSAV tapes
3-76 to 9-77 UT-Galveston digital "work" tapes

The Focus Group Approaches: The Focus Group has two parallel approaches to recovering the missing ALSEP data:

*The **first effort*** is to reconstruct as much of the original ALSEP raw data as possible from recovered archival range, ARCSAV, and work tapes. Fortunately, the raw data from the time period the UT-Galveston performed the extraction and PI data distribution function, i.e. 1 March 1976 to end-of-mission on 30 September 1977, were retained by UT-Galveston and are available. These data are archived in IRIS (Incorporated Research Institution for Seismology) and NSSDC archives. Until recently the thousands of archival analog range and digital ARCSAV tapes for the period from July 1969 (Apollo 11) to February 1976 were "lost" and only over the last couple of years have records of their history been found by members of the Focus Group. Currently Focus Group members are attempting to locate these missing range and ARCSAV tapes containing the raw ALSEP data for this time period. Seiichi Nagihara has succeed in locating and gaining accesses to 450 ARCSAV tapes in National Record Center (NRC) which contain the raw experiment data from all five ALSEP systems operating in three month period 1 April to 30 June 1975. A LASER program effort has been approved to make these raw ALSEP data available to contemporary lunar investigators within the next year or two. Patrick Taylor is continuing his efforts to determine if ALSEP ARCSAV and/or "range" tapes are currently stored in the Iron Mountain Storage Facilities. Currently, a privacy issue is in the process of being resolved. However, there is a high probability many of these archival raw data tapes were destroyed or may be "permanently" lost.

Thus, a second effort by the Focus Group is to make direct contacts with the original PIs or PI team members to attempt to find (1) the missing experiment raw data and/or the original PI data tapes, (2) the experiment's processed data missing from the NSSDC archives, (3) the missing experiment metadata-data about the data (i.e., conversion programs to convert the raw data into science and engineering units, apply calibrations and other corrections needed, etc.), and (4) to obtain from the PIs or their institutions Focus Group/NSSDC access to any boxes of data and data tapes originally sent to NRC for storage. If as we think some of the original archival data may have been destroyed by two situations that occurred at GSFC one in 1980 and a second in the early 1990s, direct contact with PIs/PI teams may be our only way to recover the missing data. Peter Chi has been working with Palmer Dyal, the Lunar Surface Magnetometer PI and has recently succeeded in obtaining access to Dyal's

personal data boxes stored in NRC. Contacts with Otto Berg, PI on Lunar Ejecta and Meteoroid (LEAM) Experiment has provided avenues for search at GSFC for LEAM raw and pre-processed data. Yosio Nakamura has also been able to supply 4 to 5 months of raw LEAM data to Mihaly Horanyi, University of Colorado, PI on upcoming LADEE dust experiment.