THE APOLLO 17 LUNAR SOUNDER EXPERIMENT: A PROGRESS REPORT,
R. J. Phillips[2], G. F. Adams[3], W. E. Brown, Jr.[2], R. E. Eggleton[4], P.L. Jackson[3], R. Jordan[2], W. J. Peeples[1], L.J. Porcello[3], G. G. Schaber[4], W. R. Sill[1], T. W. Thompson[2], S. H. Ward[1], and J.S. Zelenka[3], 1- Univ. of Utah, 2- Jet Propulsion Lab., 3- Environmental Res. Inst. of Mich., 4- U.S. Geo. Survey.

During the past year we have been engaged in radar profile data reduction, imagery interpretation, and computer software development for production processing of subsurface data.

The elevation profiles of the Moon taken by the HF1 (5 MHz) radar during revolutions 16, 17, and 18 have been extracted from the data. The sample points along track are spaced every 50 meters and have a footprint of about 2000 meters each. The data are plotted with respect to the center of mass, center of figure, and with respect to a great circle fitted to the major maria.

A comparison of the laser altimeter and the radar data show good agreement over the maria. The uncertainty of the elevation profiles is approximately 100 meters over the maria for the global profiles. A supplemental Doppler profiling technique has been developed that provides a relative uncertainty of less than 10 meters.

The along track variation of echo strength has also been recovered and the effective dielectric constant inferred.

The high resolution VHF (150 MHz) profile-imagery has been studied in detail in the Serenitatis and Crisium basins with an aim toward interpretation of both the subtle local patterns and the general regional patterns in terms of basin deformation.

The sounder data is undergoing production computer processing for subsurface features. We have an interactive capability to select the dip angle and integration length during the subsurface data processing. During digital-to-film playback we can interactively select black and white tonal distributions for the photographic displays. We have completed processing (zero dip, 10km integration) for the prime HF1 passes over Mare Serenitatis, Mare Crisium, and Oceanus Procellarum. There are numerous apparent or real subsurface reflections in the output data. The key issue is to distinguish real subsurface reflections from surface reflections arising from the linear surface features, principally mare scarps and ridges. For the first time we are able to look at our various data in a regional context; i.e., multiple complete passes across a mare. In particular, the availability of multiple passes aids in a geometrical separation of pervasive subsurface features from linear surface features.

During the first quarter of 1974 we have begun an intensive study correlating subsurface results with high resolution photography. The aim is to distinguish the signatures of surface and subsurface features and place the results in a geolgic framework.

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