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APOLLO 14 IN LUNAR ORBIT; Farouk El-Baz, Lunar Exploration Department, Bellcomm, Washington, D.C. 20024; and Stuart A. Roosa, Astronaut Office, Manned Spacecraft Center, Houston, Texas 77058.

Orbital photography and visual observations on Apollo 14 provided significant new results pertaining to numerous lunar surface features and processes. The data provided new clues to deciphering the role of volcanism in the formation and modification of the lunar highlands. Among these are the delineation of the following:

1. The smooth appearance of v-shaped fractures in the floors of two (unnamed) conjugate craters on the lunar farside. The larger of the two craters is 40 km across and portrays a concentric pattern of cracks; the smaller crater is 25 km in diameter and displays an alligator-hide pattern of fractures. The latter appear to have been cooling cracks in the lava fill in caldera-type floors.

2. The numerous elongate hills with summit vents in the area between Mare Smythii, on the eastern limb of the moon, and the crater Pasteur. The hills occur in clusters which are reminescent of furrowed terra units west of both Mare Nectaris and Mare Humorum. Individual occurrences may portray a crater chain, an elongate depression or irregular vents surrounded by smooth but distinct rim deposits. They are interpreted as being volcanic in origin.

3. The detailed morphology of furrowed terra units in the vicinity of the crater Descartes and implications relative to the probable stratigraphic sequence of the geologic units of the Apollo 16 landing site.

The Hycon camera provided us with the first high resolution stereo strip photography of the lunar surface. The photographs covered a strip about 350 km long and 4 km wide which included the crater Theophilus and the Kant Plateau. Study of the photographs reveals that craters on the floor of Theophilus, on its ejecta blanket and rim deposits, and on the Kant Plateau are distinctly different in shape, depth and appearance. This suggests, in addition to differences in origin of some of the craters, a difference in thickness and other characteristics of of the regolith in three units.

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Photogrammetric reduction of the photographic data obtained on Apollo 14 revealed that the Kant Plateau is elevated by about 6 km relative to the mare surface to the east. This topographic rise confirms earlier earth-based measurements of the relative height of this portion of the central highlands. The upward slope averages about 6° and leads to an elevation that is higher than the top of the Apennine Mountains relative to the center of mass of the moon.

Other new results of the photography include: 1) Depiction of what is probably the youngest crater in the 20-40 km size range on the moon. The farside crater is 35 km in diameter and displays a bright halo about 100-150 km in diameter. Flow units in its floor display what appear to be drag fractures and are interpreted as somewhat viscous lava flows; 2) Providing the first photographs of a flow channel with multiple levels in the mare materials southeast of the crater Lansberg; 3) Establishing the utility of near-terminator photography in photogeologic interpretations of small scale topographic variations on the lunar surface.

Visual observations were made from the Command Module to complement the photography: Color characteristics of lunar surface units were compared; Tracking surface features at zero-phase illumination conditions were attempted and variations were noted between targets in the highlands and similar objects in the maria; Other features such as ejecta blankets of large impact basins and bright-haloed craters and their characteristics were described to aid in photogeologic interpretations of the processes which were responsible for the modification of the lunar surface.