landing site was targeted to be on a mare region at the northern end of the Hadley Rille near the Apennine Mountains. The major goals were to assess the origin of the rille as well as the nature of the mountains and the thick section of lunar crustal material they might represent, and to determine the age of the lava plains and of the basin-forming event itself. Exploration of the region by Apollo 15 astronauts David Scott and James Irwin (Scott et al., 1972) identified several unusual and highly significant lunar samples and provided evidence for crater ejecta from Aristillus and Autolycus, two large craters further to the north in Imbrium Basin (Swann et al., 1972; Spudis and Ryder, 1986).

Samples from the site included two distinct types of mare basalts, as well as a suite of highland rocks, including anorthosites, Mg-suite plutonic rocks, impact melts, granulites, and breccias. Taken together with the results from other sites, the Apollo 15 data indicated that the Imbrium basin formed about 3.85 billion years ago and was resurfaced with maria at about 3.3 billion years ago. Also discovered at the Apollo 15 site was an aluminous non-mare basalt rich in KREEP and the pyroclastic green glass of ultramafic composition. Altogether, the Apollo 15 site is an exceptionally geologically complex and interesting region and new remote sensing data provides the opportunity to assess the provenance of many diverse materials as well as their modes of occurrence and abundance in the lunar crust.

Among questions of continued interest for the Hadley Rille area are: Is there evidence for stratigraphy and layering of basalts in the sinuous rille? To where did the lava that formed the rille eventually go in Mare Imbrium? Where are the Imbrium impact melt deposits? What is the distribution and source of the pyroclastic green glass?

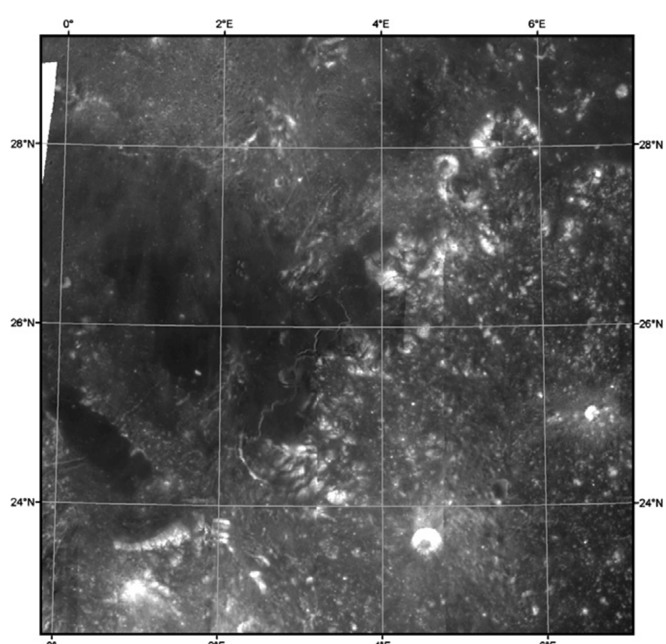

Fig. 6. Clementine 750 nm albedo image for the Apollo 15 region.

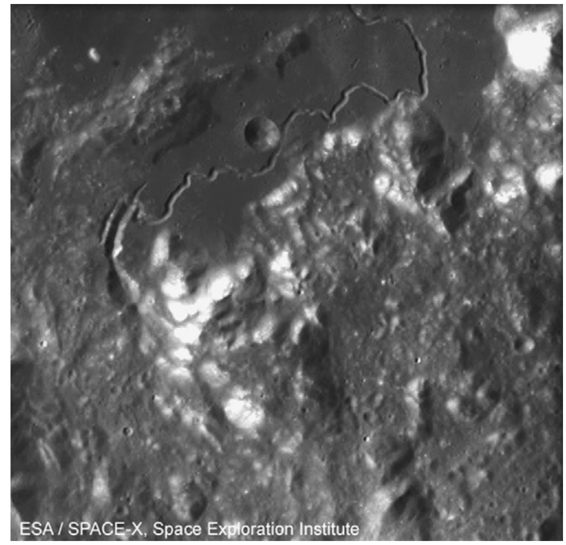

Fig. 7. SMART-1 image of the Apollo 15 area obtained by the AMIE camera.

Is there evidence for stratigraphy or sub-units in the basin ejecta deposits and can they be related to materials in the sample collection?

3.4. L-ISCT #4 South Pole-Aitken Basin Th-anomalies

Target center: 30.5°S, 175.5°E [northern target]; and 41°S, 165°E [southern target]

Principal rationale: A concentration of radiogenic elements observed in the NW region of South Pole-Aitken Basin may result from an asymmetry of excavated SPA lower crust/mantle or may be linked to antipode deposits from nearside basins. Several large-scale issues regarding the evolution of the lunar surface and interior are interwoven in this region.

Shown in Fig. 8 is an overview of key features of the 2500 km South Pole-Aitken Basin extracted from data collected by Clementine and Lunar Prospector. The basin's current designated "name" is derived from the fact that this enormous feature on the lunar farside extends from the South Pole to the crater Aitken, ~17° from the equator.

The South Pole-Aitken Basin is the largest, deepest, and oldest documented impact basin on the Moon (Wilhelms, 1987; Zuber et al., 1994). Clementine altimetry data indicate that the SPA Basin has a complex structure and a depth of more than 8 km. In spite of its tremendous size and depth (and in strong contrast to the smaller basins on the nearside), the SPA Basin has not been filled with mare basalt. Its interior thus likely contains materials derived from the impact event itself, which is expected to have excavated lower crust and/or possibly mantle materials. Lunar Prospector gamma-ray data (Lawrence et al., 2000, 2002, 2003) confirmed that the interior is geochemically distinct, with elevated iron and slightly elevated thorium content relative to the surrounding feldspathic highlands. Clementine albedo and color data independently reinforced the