LCROSS IMPACT SITE CHARACTERIZATION. G. D. Bart[1] and A. Colaprete[1], [1]NASA Ames Research Center, Moffett Field, M/S 245-3, Mountain View,CA 94035, gbart@seti.org.

Introduction: LCROSS, the Lunar CRater Observation and Sensing Satellite, will be launched on the same rocket as the Lunar Reconnaissance Orbiter (LRO) later this year. The purpose of the LCROSS mission is to investigate the presence of water ice in permanently shadowed craters at the south pole. The presence of water ice is hypothesized based on evidence found by the Lunar Prospector neutron spectrometer for hydrogen in permanently shadowed regions at the poles [1].

The LCROSS spacecraft will set the rocket's Centaur Earth departure upper stage (EDUS) on an impact trajectory with the Moon. Once the trajectory is set, the spacecraft will release the EDUS, which will then impact the Moon in a permanently shadowed region characterized by high concentrations of hydrogen according to the Lunar Prospector neutron spectrometers. Following four minutes behind the EDUS, LCROSS will fly through the impact plume, using its 9 instruments (5 cameras (1 visible, 2 Near IR, 2 Mid IR), three spectrometers (1 visible, 2 NIR) and one photometer) to search for water ice.

Impact Site Candidates: Four regions are currently candidates for the LCROSS impact: Shoemaker crater (88.1° S, 44.9° E, 50.9 km diameter), Shackleton crater (89.9° S, 0.0° E, 19 km diameter), Faustini crater (87.3° S, 77.0° E, 39 km diameter), and Cabaeus (85° S, 35° E). These regions are labeled in Figure 1, a Goldstone radar image of the lunar south pole [2].

Impact Site Characterization: In order distinguish between the candidates, we will determine the topographic parameters of their crater floors. Characterizing the expected terrain within the crater will be difficult because the target impact site is required to be permanently shadowed,. One technique is to conduct comparison studies of craters of similar diameters elsewhere on the Moon. For example, lunar crater Agrippa (4.1°N, 10.5°E, 44 km diameter), shown in Figure 2, is located near the equator, allowing for full illumination of its floor. Obtaining high resolution images of such craters and studying their interior topographic profiles will help us better constrain the LCROSS impact site.

References: [1] Feldman, W. C.; Maurice, S.; Binder, A. B.; Barraclough, B. L.; Elphic, R. C.; Lawrence, D. J. (1998) Science, **281**, 5382, p. 1496. [2] Margot, J. L.; Campbell, D. B.; Jurgens, R. F.; Slade, M. A. (1999) Science, Volume 284, Issue 5420, pp. 1658-1660.

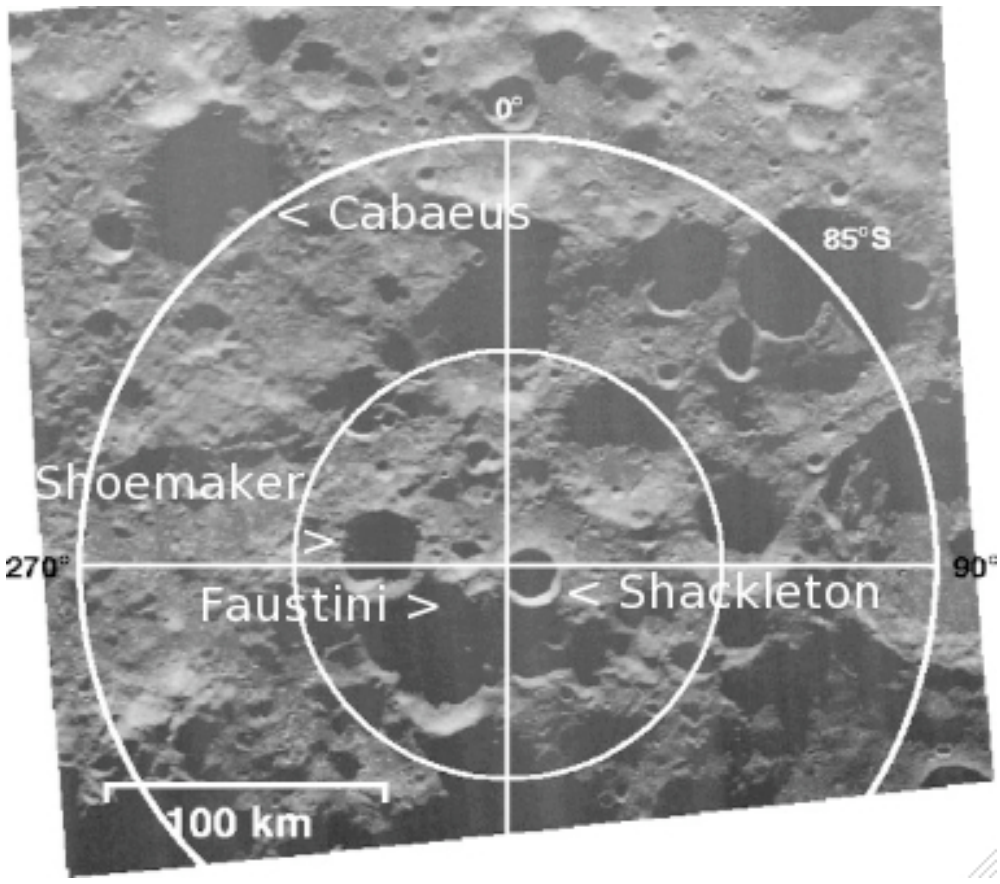

Figure 1: Illustration of the location of possible candidate impact locations for LCROSS, superimposed on a radar backscatter map of the lunar south pole from [2].

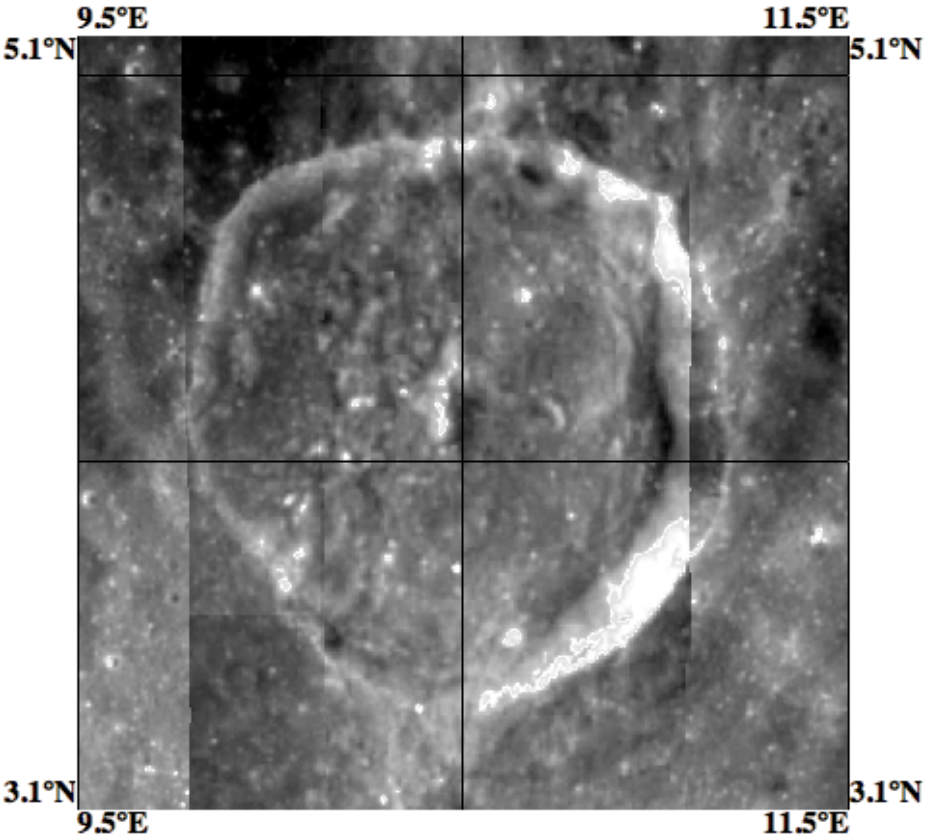

Figure 2: Lunar crater Agrippa (4.1°N, 10.5°E, 44 km diameter), shown here in Clementine 750nm basemap images (http://www. mapaplanet. org/). This crater is a possible analog for the south pole craters based on its similar diameter.