LUNAR CRATER OBSERVATION AND SENSING SATELLITE (LCROSS) MISSION: PRELIMINARY REPORT ON THE LCROSS OBSERVATION CAMPAIGN RESULTS. J.L. Heldmann[1], T. Colaprete[1], D. Wooden[1], and the LCROSS Astronomer Team, [1]NASA Ames Research Center, Moffett Field, CA, 94035

Introduction: The primary objective of the LCROSS (Lunar Crater Observation and Sensing Satellite) mission is to confirm the presence or absence of water ice on the Moon. The LCROSS mission, which launched with the Lunar Reconnaissance Orbiter in June 2009, will use the Atlas V Centaur Earth departure upper stage of the launch vehicle as a kinetic impactor. The impact creates an ejecta plume whose properties, including water ice and vapor content, will be observed by the LCROSS shepherding spacecraft (S-S/C) plus Earth- and space-based telescopes. Following a similar trajectory of the Centaur, the S-S/C will fly through the Centaur impact plume and then the S-S/C will also impact the Moon. The S-S/C impact will likely also be observable to ground-based and space-based telescopes.

Impact Observing Information: The LCROSS impacts are scheduled for ~11:30 UTC on October 9, 2009. We estimate that the Centaur impact debris plume should be in view several seconds after Centaur impact and will peak in brightness at 30 to 100 seconds after impact. If water is lofted above the lunar surface then the photodissociation process could also result in the presence of an OH atmosphere which could persist for several hours to days.

The LCROSS mission is currently targeting the Cabeus A crater. The selection of Cabeus A was based on a set of conditions that include proper debris plume illumination for visibility from Earth, a high concentration of hydrogen, and mature crater features such as a flat floor, gentle slopes and the absence of large boulders. All of these characteristics will help ensure a plume that can be observed from the variety of assets participating in the LCROSS Observation Campaign. In addition, Cabeus A is on the nearside of the Moon and thus this region is visible to telescopes on the ground to enable Earth-based observations. The LCROSS Team may retarget a different location on the Moon in the event of additional data and/or information suggesting a more optimal impact location.

Observational Support: This paper presents a preliminary report from the LCROSS Observation Campaign. Numerous ground and space-based observing assets plan to observe these impacts through a coordinated observation campaign effort. Professional astronomer teams have been integrated into the LCROSS Science Team in order to facilitate observation planning (e.g. time and location of impact, science expertise regarding mission objectives, identification of scientific synergies amongst observations, etc). The Observation Campaign members have worked together on pre-planning activities (including pointing methodology, generation of image mosaics and lighting models, etc.) as well as planning for the analysis of observations post-impact. The synthesis of observations from multiple observing platforms and a variety of wavelength regimes and instruments provides a unique perspective from which to maximize the amount of information learned from this unique lunar impactor mission.