ARTEMIS: A two-satellite mission to study Moon in 2010-2012 and beyond. V. Angelopoulos[1], D. G. Sibeck[2], W. M. Farrell[2], G.T. Delory[3], J. Halekas[3], R. Lillis[3], D. Brain[3], K. K. Khurana[1], C. T. Russell[1], M. G. Kivelson[1], N. Murphy[4], D. Shriver[1], P. Travnicek[1], J. Bonnell[3], D. Larson[3], J. McFadden[3], and K.-H. Glassmeier[5], [1]IGPP/UCLA (Box 951567, Los Angeles, CA 90095, vassilis@ucla.edu); [2]NASA/GSFC (Code 696, Greenbelt, MD 20771); [3]SSL/UCB (7 Gauss Way, Berkeley, CA 94720-7450); [4]NASA/JPL (4800 Oak Grove Dr., M/S 169-525, Pasadena, CA 91109); [5]Technical University Braunschweig (W-38106 Mendelssonhnstr. 3, Germany)

Abstract: The five satellite MIDEX mission "Time History of Events and Macroscale Interactions during Substorms" (THEMIS) mission [1] will complete its prime mission in 2009. The science team has proposed an extended phase that includes moving the two most distant satellites (probes), P1 and P2, into orbits around the Moon, thereby establishing effectively a new mission to study the solar wind, magnetotail and lunar wake. ARTEMIS (Acceleration, Reconnection, Turbulence and Electrodynamics of Moon's Interaction with the Sun) is a dual-satellite mission to the Moon, that will provide comprehensive particles and fields instrumentation [Fig. 1] to study the lunar space environment. While designed to target Heliophysics objectives, ARTEMIS's low periselene [Fig. 2], and its stable equatorial orbits permit multi-year studies of the lunar exosphere from a few hundred to thousands of km over a wide range of inter-spacecraft separations. We discuss the potential of ARTEMIS for planetary exploration through its unique instrumentation, orbit design capability and data relay options. The lunar exosphere can be investigated by measurements of heavy pickup and sputtered ions; the lunar surface and interior can be sounded with dual magnetometer measurements at different distances from the surface; and lunar electrostatic electric fields and their possible effect on dust particle acceleration can be studied by in-situ measurements of the 3D electric fields and of the reflected or accelerated electron/ion distributions.

Figure 1: An ARTEMIS probe with deployed booms, showing instruments and their fields of view. FGM=FluxGate Magnetometer; EFIs/a=Electric Field Instrument: on spin plane and axial booms; ESA= ElectroStatic Analyzer; SST=Solid State Telescope.

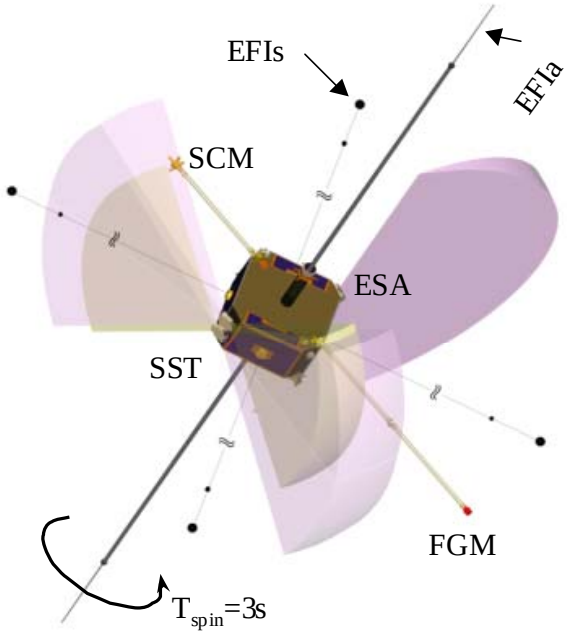
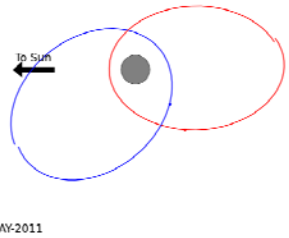


Figure 2: ARTEMIS Orbits: Following lunar swingbys, translunar injections, and Lissajous orbit residence for 6 months, probes P1 and P2 will be placed into near-equatorial lunar orbits in May 2010. The line of apsides precess 360deg relative to each other in 18 months and are stable for years.



References:

[1] Angelopoulos V. (2008) *Space Sci. Rev.*, doi: 10.1007/s11214-008-9336-1, in press.