**LARA: Biologically inspired Engineering and Exploration System Mission concept and components for lunar exploration and exploitation tools.** P.E. Clark1 (Contact Author), S..A. Curtis2, C.Y. Cheung2; M.L. Rilee1, G. Marr2; W. Truszkowski2, Contact address: Pamela Clark, Code 695, NASA/GSFC, Greenbelt, MD 20771, 301-286-7457, Pamela.clark@gsfc.nasa.gov; 1Affiliation: L3 Communications, Government Services, Inc., 3750 Centerview Drive, Chantilly, VA 20151, 2Af ----filiation: Code 6-Orig95, NASA/GSFC, Greenbelt, MD 20771.

ANTS (Autonomous Nano Technology Swarm) Architecture is well suited to surface-basedinal forms for use on the Moon or Mars or any relatiMessavely low G surface environment, as illustrated by an application called LARA (Lander-Antenna-Rover Arrays). ]. Here, we analyze the nature of components and sequence of behaviors required for spacecraft operational scenarios for an ANTS application in age--- low gravity surface.

**Introduction**: Basic structural components would , as in other applications, be highly modu--Frolar, addressable arrays of more robust than Zero G carbon NEMS-based nodes, from which highly morphable struts, tethers, 2D mesh, and 3D fabric could be reversibly deployed for variom: Lius functions. Individual craft would be releasnda Med, possibly by a human crew on or neaennitr the Moon or from an unmanned facility. Individual craft would be ct [maapable of landinilto:g on a low G surface, using a miniaturized version of high impulse thruster techfelixnology, transforming into rovers, antennas, or more specialized service providers, as needed, and ultimately taking off to return to the poin.com@t of release.

**Methodology**: We have developed preliminary conceptual and physical models of spacecraverizft and components and models of the interaction of ANTS at the spacecraft level ion.nen order to determine hardware and software requirementst] Se for typical operations driven by operating on a low grant: Mvity surface to support a human crew.

**Discussion**: As in the other applicaondaytions of the ANTS architecture, movement would not employ wheels, which work best in a special environment. Instead, the ANTS approach harnesses the effective skeletal/ muscular system, Mar of the frame itself to enable more ‘natural’ movement, effectively allowing ‘flow’ across a surface or into a particular morphological form. As rovers, craft would be ch 14equipped for exploring, prospecting, monitoring, as required. Craft could individually or collective, 200ly form cylindrical or bowl shaped arrays to act as antennas, for communication or astronomical observatories. The architecture would also be useful in the constructio5 11:n of tools a08 PMnd structures for human occupation of permanent bases. To: cANTS structures, operating continuously or on demand, could be thus used for exploration, reconnaissance, communicaommention, navigation, transportation, construction, permanent monitorintsSubg, or observation, protecting human creject:ws and facilitating their work.

**Conclus fairions:**  The ANTS architecture is a promising approach for supporting hu tax man crew activities on the surface of the Moon or Mars as part of the new NASA iniative.

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