**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 -----Origifiliation: Code 6nal Message95, NASA/GSFC, Greenbelt, MD 20771.

ANTS (Autonomous Nano Technology Swarm) Architecture is well suited to surface-based-----From: forms for use on the Moon or Mars or any relatiLinda Mennively 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 att [mailto: low gravity surface.

**Introduction**: Basic structural components would , as in other applications, be highly modufelix.com@vlar, 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 varioerizon.net]us functions. Individual craft would be releas Sent: Monded, possibly by a human crew on or neaay, March 1r the Moon or from an unmanned facility. Individual craft would be c4, 2005 11:apable of landin08 PMTo: cog on a low G surface, using a miniaturized version of high impulse thruster techmmentsSubjenology, transforming into rovers, antennas, or more specialized service providers, as needed, and ultimately taking off to return to the poinct: fair tat of release.

**Methodology**: We have developed preliminary conceptual and physical models of spacecrax for all Aft and components and models of the interaction of ANTS at the spacecraft level idverse Tax n order to determine hardware and software requirementsConsequence for typical operations driven by operating on a low gras for Same-vity surface to support a human crew.

**Discussion**: As in the other applicaSex Couplestions 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 1.Health I 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 nsurance foequipped for exploring, prospecting, monitoring, as required. Craft could individually or collectiver Partners ly form cylindrical or bowl shaped arrays to act as antennas, for communication or astronomical observatories. The architecture would also be useful in the constructio- A Taxing n of tools aPropositionnd structures for human occupation of permanent bases. : EmployeeANTS structures, operating continuously or on demand, could be thus used for exploration, reconnaissance, communicas payincometion, navigation, transportation, construction, permanent monitorin and payrolg, or observation, protecting human crel tax on thws and facilitating their work.

**Concluse health inions:**  The ANTS architecture is a promising approach for supporting husurance preman crew activities on the surface of the Moon or Mars as part of the new NASA iniative.

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