Low-Cost Suite of COTS GNC Sensors for Precision Lunar Lander

Stellar Exploration, Inc.

Technical Abstract
We are proposing to exploit (in an innovative way) existing, readily available, GNC sensors for the purpose of precision lunar landing. Majority of previous lunar lander concepts with the precision/pinpoint landing capability required expensive and risky development of new GNC and landing sensors (scanning lidars, multi-beam mm-ww radar, etc.). Our proposed alternative consists solely of existing and low-cost sensors that synergistically leverage each capability and compensate for individual sensor weaknesses. For example, we can use a simple single-beam low-frequency radar altimeter (available at low-cost off-the-shelf, and proven on several Mars lander missions). The low-frequency radar can meet the maximum slant range requirements much easier than the mm-wave sensor but it does not have the adequate multiple narrow beam capability of the Apollo LM or Viking lander radar. However, the optical descent imaging measurement (using DSMAC-type sensor) can supplement the single beam radar measurement and obtain the same information about the complete state vector. There are several similar concepts implemented in this sensor suite of complementing strengths and weakness of individual sensors.

Company Contact
Tomas Svitek
(805) 549-8200
charles@stellar-exploration.com

2007 Phase II
Proposal S4.06-8307

Innovative Applications of DoD Propulsion Technology for Low-Cost Satellite Missions

Stellar Exploration, Inc.

Technical Abstract
We are proposing to leverage the Missile Defense Agency investments in high-performance propulsion systems for low-cost space missions with large Dv requirements, for example, a soft lunar lander. This design concept exploits a core set of hardware developed under past and current Department of Defense (DoD) investments. The propulsion system concepts under consideration are from the DoD's Missile Defense Kinetic Kill Vehicle programs such as EKV, THAAD, ASAT and LEAP. These are bipropellant, storable and hypergolic system that use high-performance propellants (MMH/NTO). This subtopic is seeking technologies with the superior performance for orbital control, for on-orbit applications including storage capability and propulsion. This propulsion system should allow transfers from LEO or GTO to lunar orbit or similar destinations. These missions have in common the substantial Dv propulsion requirements that cannot be met with the existing flown propulsion systems on current small spacecraft missions (for example, SNAP-1, Cubesats, Orbcomm or similar missions). Our proposed solutions offers that capability at an affordable but credible cost.

Company Contact
Tomas Svitek
(805) 549-8200
charles@stellar-exploration.com

2007 Phase II
Proposal S4.07-8340