**PHOBOS-LIFE: PRELIMINARY EXPERIMENT DESIGN.** Raymond Fraze[1)], Tomas Svitek[1)], Bruce Betts[2)], and Louis D. Friedman[2)] [1)]Stellar Exploration, Inc., San Luis Obispo CA [2)]The Planetary Society, Pasadena CA

**LIFE** (Living Interplanetary Flight Experiment) is an experiment under consideration for the Russian Phobos-Soil mission. Its goal is to test one aspect of transpermia by testing the survivability of microbes during a 34 month journey though interplanetary space.

The science objectives of this experiment are described in more detail in another abstract for this conference (Warmflash *et al.*: *Phobos-LIFE: An Experiment on the Survivability of Microorganisms During Interplanetary Transfer).* Proposed as a collaboration with the Space Research Institute and the Institute of Microbiology of the Russian Academy of Sciences, this experiment is under formal consideration by NPO Lavochkin for inclusion on the Russian Phobos-Soil sample return mission.

The Planetary Society team is designing the experiment and addressing planetary protection issues. The Planetary Society has flown hardware on many prior planetary missions. In order to minimize impact upon the Phobos sample return mission, the entire bio-module mass cannot exceed 100 grams. The current design is a short cylinder, 56 mm in diameter and 18 mm thick.

The current design provides 30 small cavities for individual microbe samples (each sample volume is several $mm^3$) and single larger cavity (26 mm diameter) for a larger sample, perhaps a native bacteria sample derived from a terrestrial permafrost region. The experiment is sealed to meet requirements of planetary protection and experimental validation. It is designed to withstand a 4,000 G Earth return landing impact shock with intact seals.

Our design is simple, compact and rugged. It relies on multiple sealing techniques. The outer titanium housing is machined with "pockets" which reduce weight but do not diminish its strength. The inner ceramic carrier is easily sterilized. Thirty polymer containers (3 mm diameter) hold the microbiological samples. A central single polymer container contains the permafrost sample.

The ceramic carrier consists of two halves, with matching cavities. A silicone O-ring is sandwiched between the two halves, as a secondary containment seal. Three titanium clips provide pressure to seal the carrier. The clips are retained by circumferential tape. The carrier is enveloped in a layer of Poron foam to mitigate launch and landing shock.

This sealed assembly is further contained inside the titanium housing. Indium wire in a groove between the top and bottom outer housings is crushed for sealing. Three integral locking lugs are engaged and safety wired in place to prevent the top from backing out.

Thus, the triple-redundant seal integrity is provided. Two dosimeter strips monitor the radiation dose. Temperature extremes are detected by thermal paint.

We are strictly following COSPAR planetary protection guidelines to responsibly reduce any possibility that this experiment could contaminate Mars with its life signature.

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