NASA SBIR 2008 Phase I Solicitation

X2.03 Spacecraft Habitation and Waste Management Systems

Lead Center: ARC

Participating Center(s): GRC, JSC, KSC, MSFC

Waste management and habitation systems supporting critical needs for lunar mission architectures are requested. Improved technologies for recovery of water and other resources as well as safe long term stabilization and storage of residuals inside and outside the habitat are needed. Waste processes collect, process, recover resources, stabilize, and store residuals. Proposals should explicitly describe the weight, power, and volume advantages of the proposed technology.

Clothing/Laundry Systems

Clothing is a major consumable and trash source. Low mass reusable or long usage clothing options that meet flammability, out gassing, and crew comfort requirements are desired. Techniques, equipment, and clothing material that extend clothing life, facilitate clothing washing/drying, low consumable mass/volumes, low acoustic generation, and low water usage are desirable. Technologies must minimize crew time, be compatible with lunar gravity, atmospheric pressures from 8 to 15 psia, minimize electrical power, minimize acoustic noise generation, be flame resistant in 32% oxygen environments, have low outgassing, and have non-toxic cleaning agents waste products compatible with biological water processing and atmospheric trace contaminant control.

Waste Management

Wastes (trash, food packaging, feces, paper, tape, filters, water brines, clothing, hygiene wipes, etc.) must be managed to protect crew health, safety, and quality of life, to avoid harmful contamination of planetary surfaces, and to recover useful resources. Areas of emphasis include:

- Solid waste stabilization including water removal and recovery of water from wet wastes (including human fecal wastes, food packaging, brines, etc.);
- Solid waste storage and odor control (e.g., catalytic and adsorptive systems);
- Energy efficient/internal heat recycling waste pyrolysis systems for mineralization of wastes and recovery of resources.