NASA SBIR 2008 Phase I Solicitation

X5.03 Extravehicular Activity (EVA)

Lead Center: JSC

Participating Center(s): GRC

Proposals are sought which address the following technology needs of the advanced extravehicular activity (EVA) system:

Space suit pressure garment radiation and puncture protection technologies, dust and abrasion protection materials, flexible thermal insulation suitable for use in vacuum and low ambient pressure, and space suit low profile bearings. Technology development is needed for minimum gas loss airlocks providing quick exit and entry, suit port/suit lock systems for docking a space suit to a dust mitigating entry/hatch, and active and passive space suit and equipment dust removal technologies.

Portable life support system (PLSS) technologies that are robust, lightweight, and maintainable. PLSS technologies require a minimum of 100 EVAs x 4 life cycles (3200 hrs). High-capacity chemical oxygen storage systems for an emergency supply of oxygen, low-venting or non-venting regenerable individual life support subsystem concepts for crew member cooling, heat rejection, and removal of expired water vapor and CO_2; lightweight convection and freezable radiators for thermal control with a mass usage of water not to exceed 1.9 kg; innovative garments that provide direct thermal control to crew member.

Space suit displays, cameras, controls, and integrated systems technologies for gathering, processing, and displaying various types of information to the suited crew member, using low mass, low volume, low power, radiation hardened or tolerant equipment. Technology development is needed in the area of suit health and crew health sensors; cameras; and displays, mounted both inside and outside the space suit. Research is also needed for lightweight, low power general purpose computing platforms, such as processors or FPGAs to allow the use of on-suit software applications such as biomedical advisory algorithms, procedure displays, navigation displays, and voice recognition applications. Low computational overhead voice recognition processing systems capable of performing on lightweight radiation tolerant embedded computing platforms are also desired.

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