



NASA SBIR 2011 Phase I Solicitation

X4.01 Space Suit Pressure Garment and Airlock Technologies

Lead Center: JSC

Participating Center(s): GRC

Advanced space suit pressure garment and airlock technologies are necessary for the successful support of the International Space Station (ISS) and future human space exploration missions for in-space microgravity EVA and planetary surface operations.

Research is needed in the following space suit pressure garment areas:

- The space suit pressure garment requires innovative technologies that increase the life, comfort, mobility, and durability of gloves, self sealing materials to minimize the effects of small punctures or tears, and materials that are resistant to abrasion.
- Innovative garments that provide direct thermal control to crew member that minimize consumables are needed as well as materials for helmets that are scratch resistant or prevent fogging
- Technologies for space suit flexible thermal insulation suitable for use in vacuum and low ambient pressure are also needed.
- Light Weight Bearings for use in mobility joints in the pressure garment are needed.
- Advanced cooling garments that are highly efficient in removing metabolic heat and are low power consuming are needed.
- Advanced suit materials that provide radiation protection and reduce risks associated with electrical charging and shock.

Due to the expected large number of space walks that will be performed on the ISS beyond 2020 and future human space exploration missions, innovative technologies and designs for both microgravity and surface airlocks will also be needed.

Research is needed in the following space suit airlock area:

Technology development is needed for minimum gas loss airlocks providing quick exit and entry that can accommodate an incapacitated crew member, suit port/suit lock systems for docking a space suit to a dust mitigating entry/hatch in order for the space suit to remain in the airlock and prevent dust from entering the habitable environment.