SELF-HEALING SENSORS FOR INFLATABLE SPACE STRUCTURES

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OVERVIEW

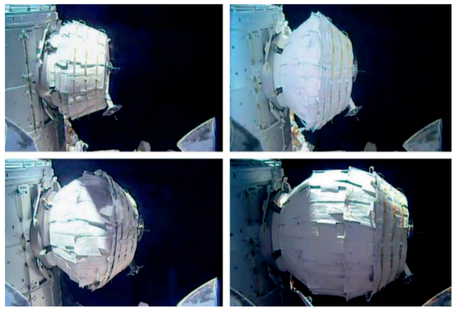
Over 100 Million Untrackable Pieces of Micrometeoroids and Orbital Debris (MMOD) in Low Earth Orbit

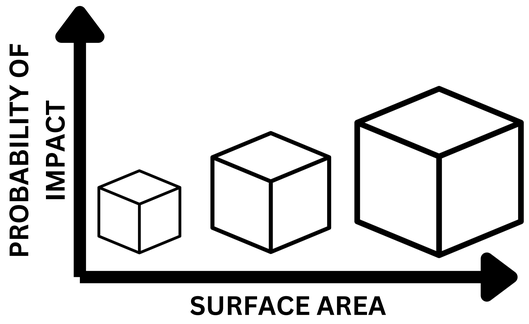
Long duration spaceflight is becoming a reality as the industry looks to return to the moon, this time to stay.

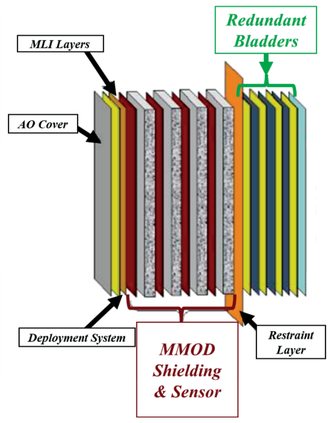
Engineers are tasked with developing habitats where astronauts can live & work safely for months or years while avoiding the many hazards of space (MMOD)

INFLATABLE SPACE STRUCTURES

NASA BEAM MODULE INFLATION PROGRESSION

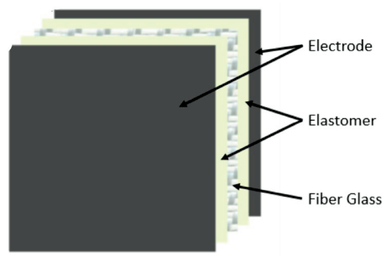




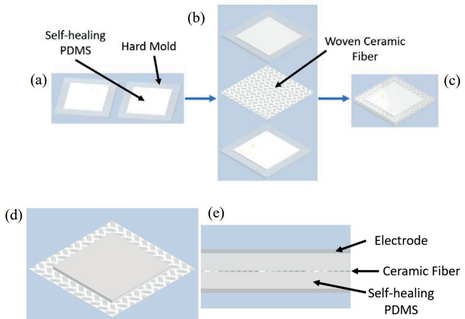


DIELECTRIC ELASTOMER SENSOR

DE SENSOR



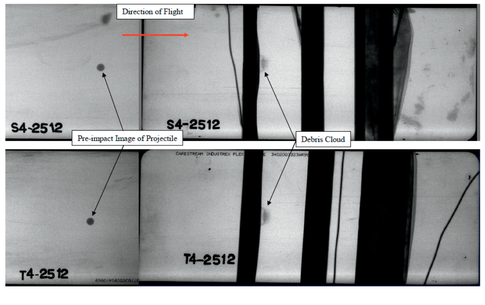
MOLDING PROCESS FOR DE SENSOR



HYPERVELOCITY IMPACT TESTING

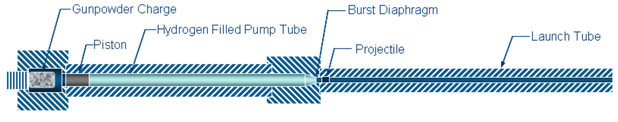
HVIT TWO STAGE LIGHT-GAS GUN

X-RAY IMAGE OF PROJECTILE INTACT PRIOR TO IMPACT

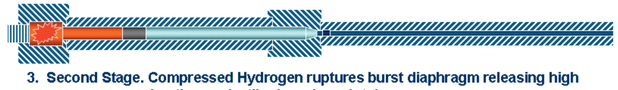


HVIT TWO-STAGE LIGHT-GAS GUN FIRING PROCESS

1. Gun loaded and ready to fire.

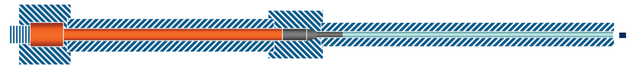


2. First Stage. Gunpowder ignited, launching piston which compresses Hydrogen.



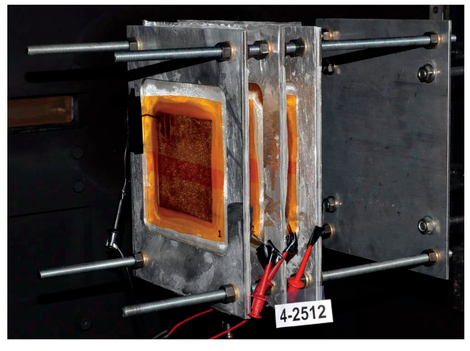
3. Second Stage. Compressed Hydrogen ruptures burst diaphragm releasing high pressure gas accelerating projectile down launch tube.

4. Projectile exits launch tube. Piston lodges in the high-pressure section.

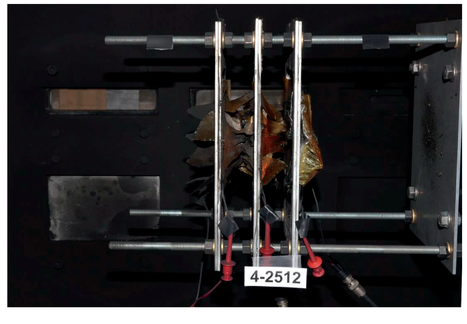


RESULTS

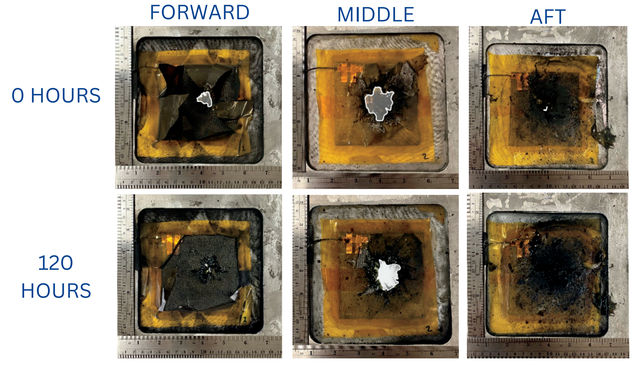
BEFORE IMPACT



AFTER IMPACT



SELF-HEALABILITY



VOLTAGE GENERATED DURING HVIT