

## Crew Survival

Johnson Space Center (JSC) is a world leader in design, test, verification, and implementation of launch and entry suit and crew protection systems. The launch and entry suit provides a survivable environment for the crewmember during launch and landing mission phases and emergency survival and escape hardware to aid emergency events from bailout to search and rescue anywhere on the planet.

### Services Provided

- Design, development, testing, analysis, certification and failure investigation for the following:
  - Launch and entry pressure suits
  - Vehicle seats
  - Occupant protection systems
  - Survival radios
  - Life rafts
  - Emergency breathing systems
  - Automatic-inflation life preservers
- Metabolic load physiological limitation studies to determine crewmember heat stress under multiple suit configurations
- Carbon Dioxide (CO<sub>2</sub>) buildup and washout testing to disperse helmet CO<sub>2</sub> and prevent hypercapnia
- Occupant protection impact testing
- Suit material outgas investigation at vacuum
- Oxygen flammability assessment for emergency breathing hardware
- Multiple crewmember life raft stability studies



## Atmospheric Reentry Materials and Structures Evaluation Facility

### Advanced Crew Escape Suit (ACES)

ACES provides a survivable environment for a crewmember during launch and reentry mission phases in nominal and emergency scenarios. The suit is a full-pressure suit that delivers oxygen to the crewmember for breathing, suit pressurization, and anti-g suit inflation, and it is certified up to 100,000 feet in altitude. The suit system provides liquid cooling, emergency breathing, and escape hardware to aid survivability through bailout and land or water egress events.

### Capabilities

- Full pressure suit (launch and reentry), gloves, boots, helmet
- Provides 3.46 psi nominal operating pressure
- Protection in low altitude bailout and ground egress scenarios
- Ability to operate as open or closed-loop demand breathing system
- Emergency breathing system
- Liquid cooling system
- Headset communication system
- Search and rescue identification and emergency communication hardware
- High-altitude, automatic-inflation parachutes
- Automatic-inflation life preserver
- Survival drinking water packets



*ACES in Crew Survival Laboratory*

## Testing and Analysis

### Crew Survival Laboratory

The Crew Survival Laboratory is utilized to process launch and entry suit components and assemblies under pressure and high altitude conditions. It is currently dedicated to the processing and development of crew survival systems for the International Space Station and future programs.

We have developed customer-friendly agreements to streamline business relationships and are eager to share our unique facilities and expertise with new customers. We invite your inquiries regarding application or adaptation of our capabilities to satisfy your special requirements. Briefings on general or specific subjects of mutual interest can be arranged at JSC or at your business site.



For the benefit of all

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