

NASA Advanced Space Suit Pressure Garment System Status and Development Priorities 2025

ICES-2025-385



DATE

CONTRIBUTORS

PREPARED BY

This document does not contain export controlled technical data. Trade names are used in this presentation for identification only. Their usage does not constitute an official endorsement, either expressed or implied, by the National Aeronautics and Space Administration.

July 2025

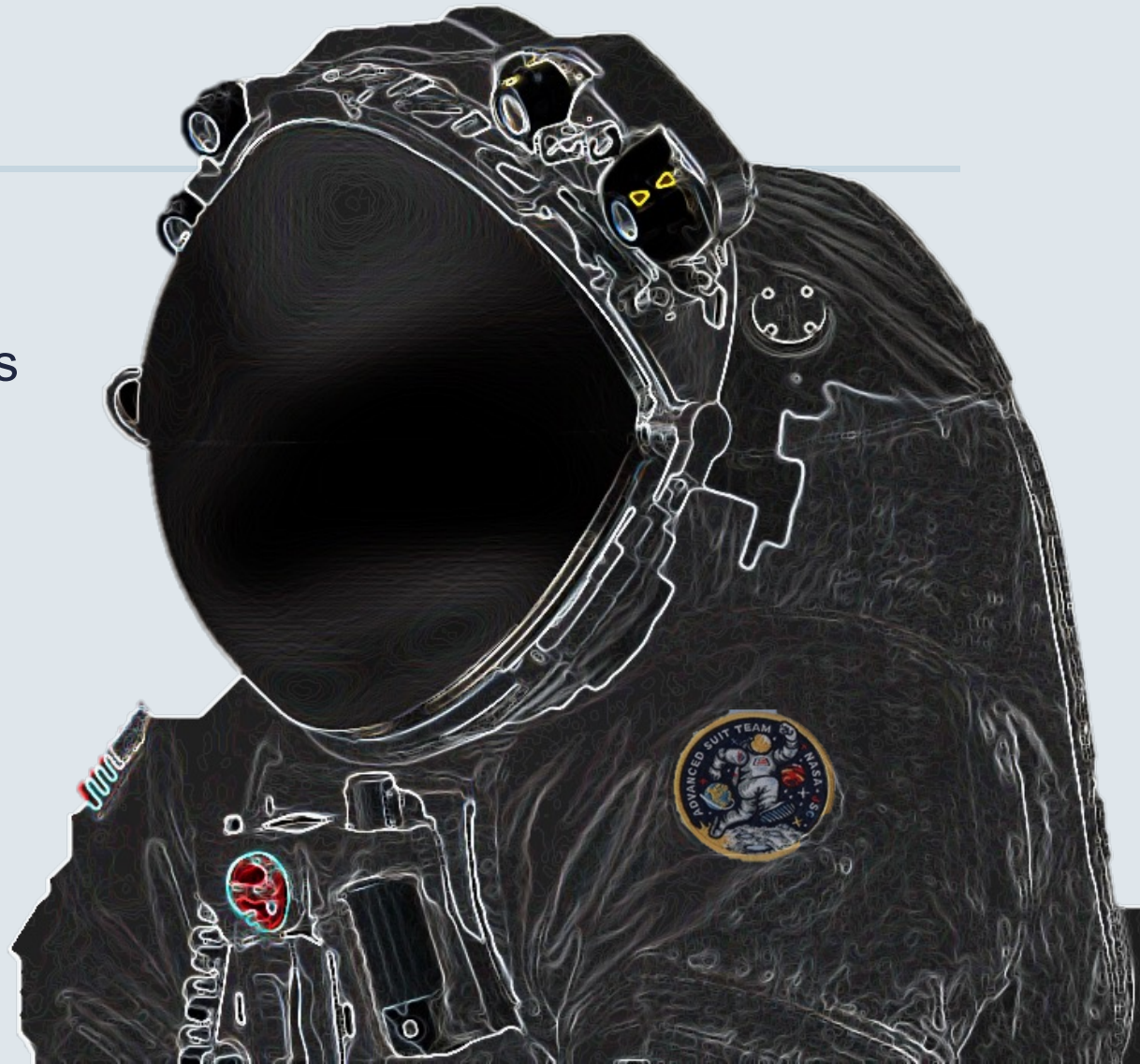
Richard Rhodes
NASA
Don Campbell
KBR/NASA

Shane McFarland
Aegis Aerospace/NASA



Agenda

- Introduction
- Commercial EVA Services
- Testing and Integration
- Hardware Maturation
- Technology Development
- Conclusion



Introduction



NASA

JSC

Engineering

Crew and
Thermal Systems

Space Suit and Crew
Survival Systems

Advanced Pressure
Garment (Suit) Team

Advanced Suit Team

- Vision statement: *To cultivate the development of spacesuit assemblies and technologies that will enable NASA to meet its human exploration goals*
- Organizational Structure:
 - Insight
 - Integrated Test Team
 - Technology Development
 - Hardware Team

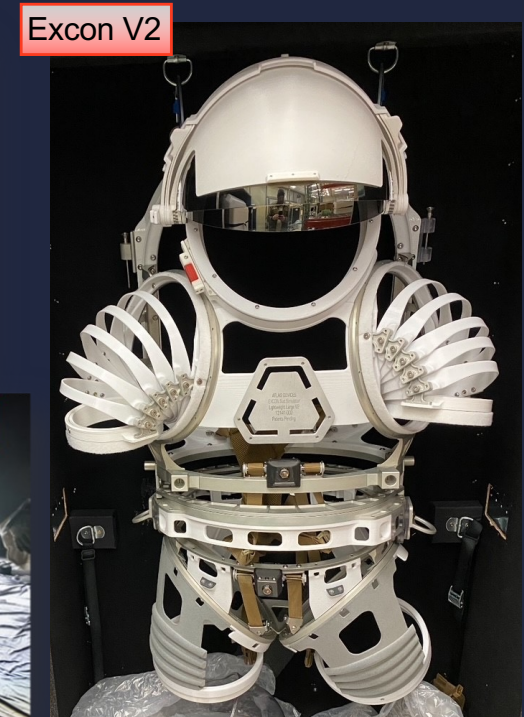
Commercial EVA Services



AXIOM
SPACE



Testing and Integration



Testing and Integration



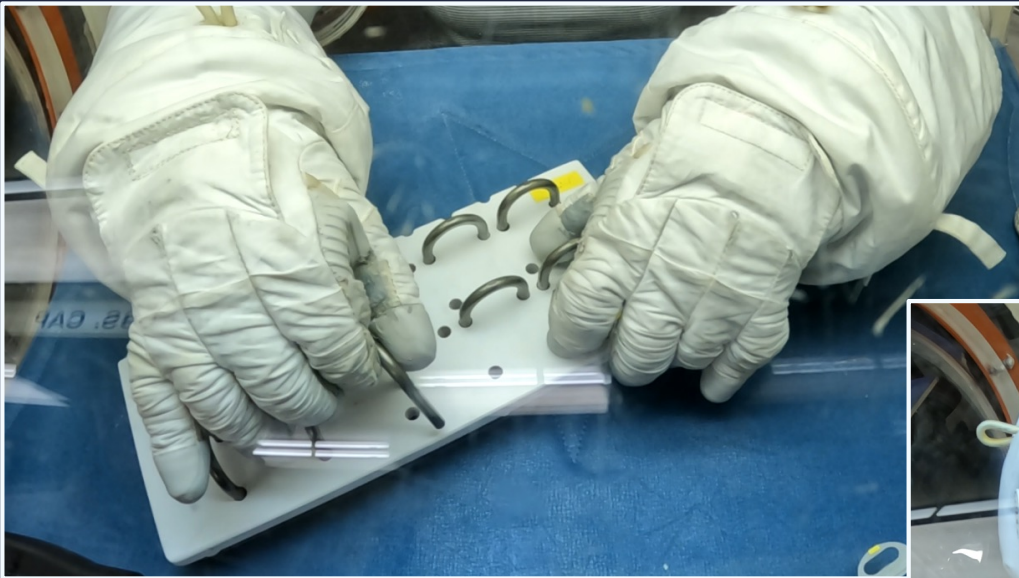
ARGOS xEMU Testing



Axiom/SpaceX HLS Testing



Testing and Integration



Elevated Suit
Pressure Testing



Hardware Maturation



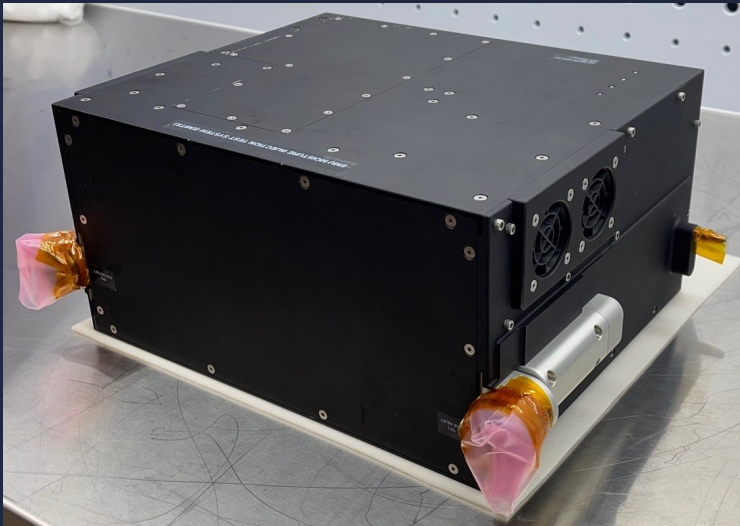
xPGS

EMU Moisture Injection Test System



EMITS/EMU Validation Test Setup

EMITS System

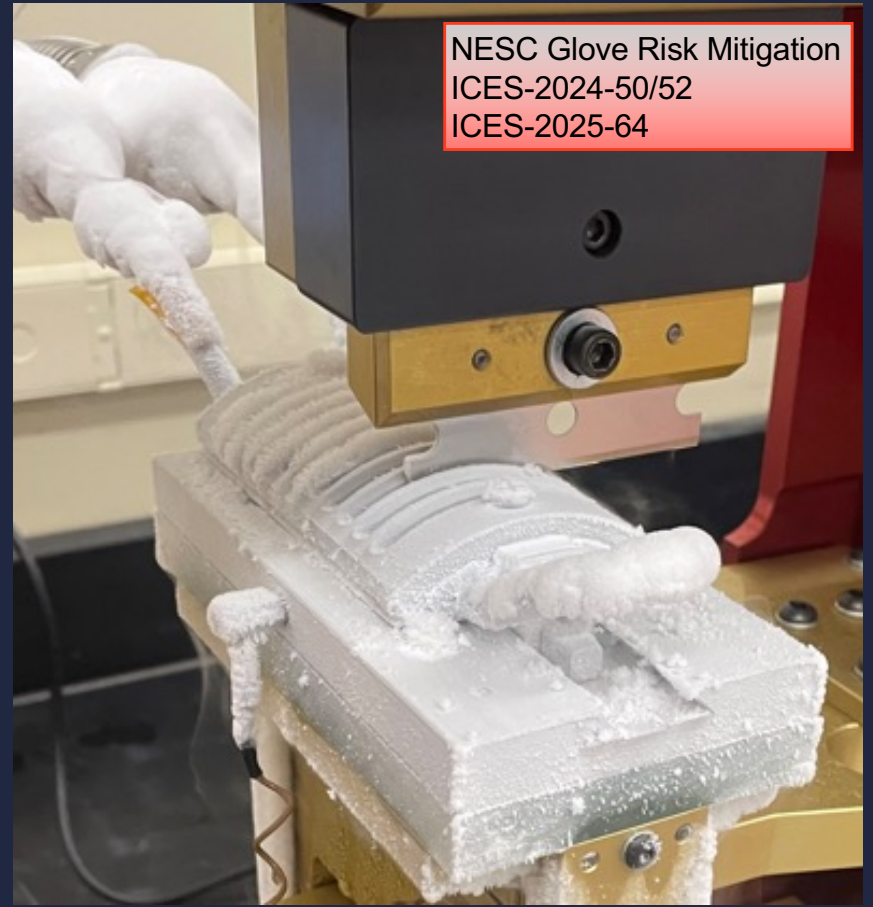


Technology Development



- NESC Glove
- xEMU Boot TVAC
- Artemis Suit Materials
- SBIR/STTR Portfolio
- Others

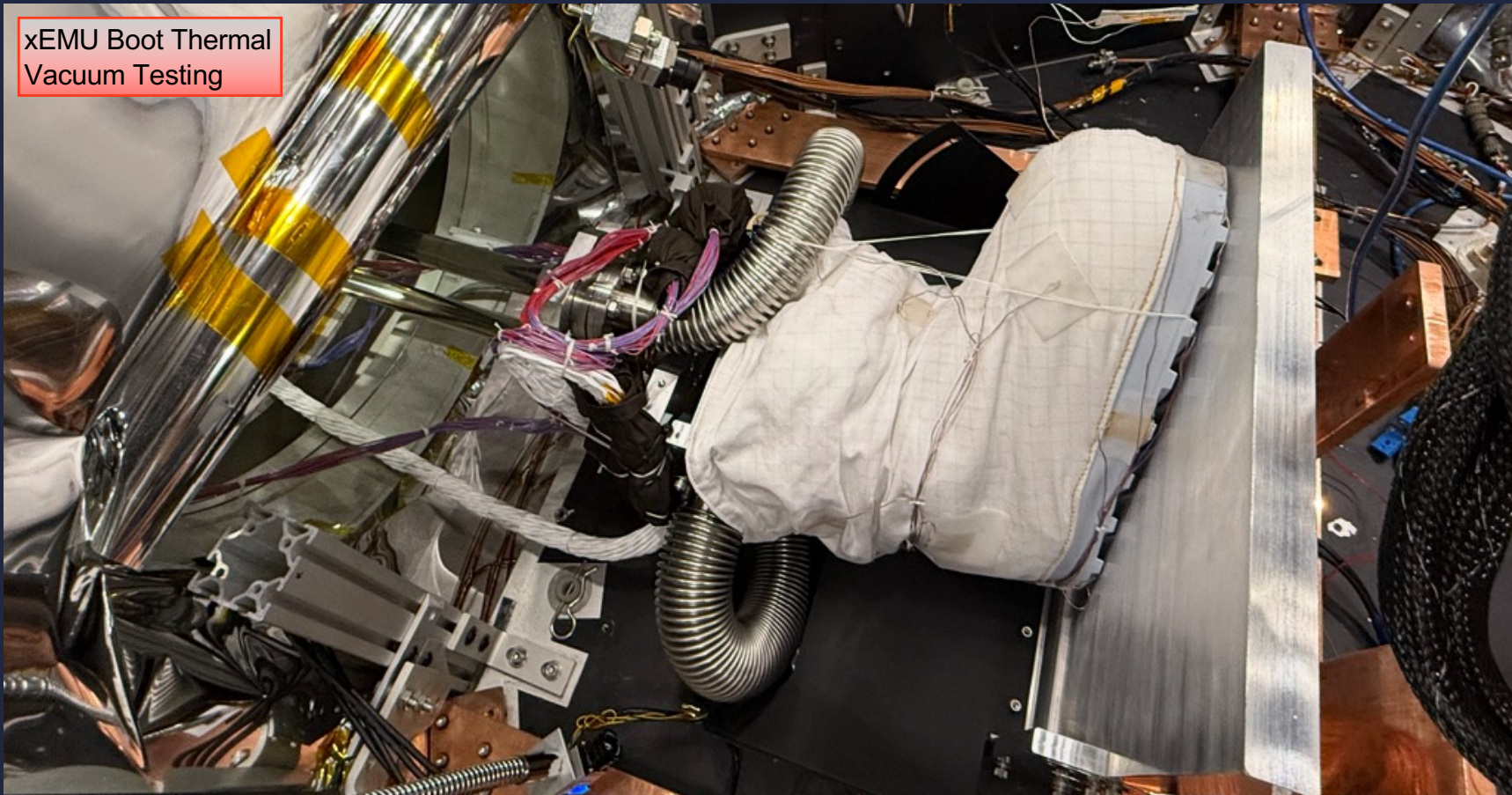
Technology Development



Technology Development



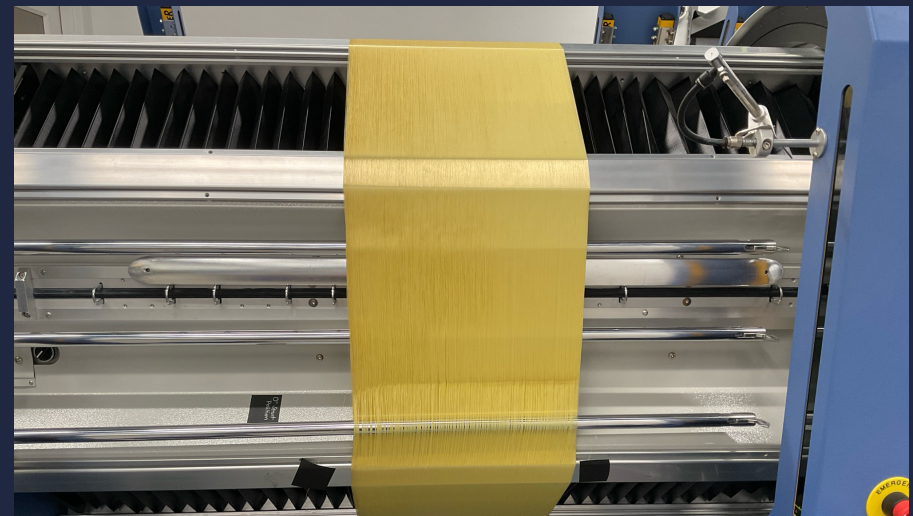
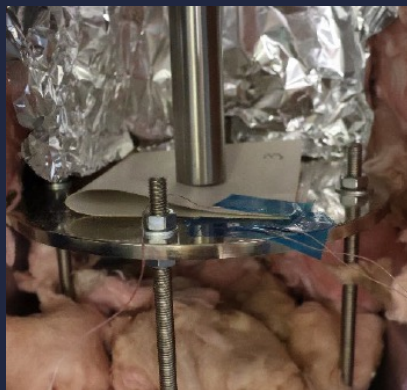
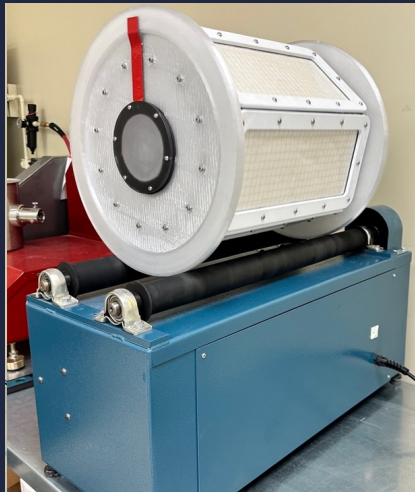
xEMU Boot Thermal
Vacuum Testing



Technology Development



Artemis Suit Materials
ICES-2025-56



Technology Development



SBIR/STTR Portfolio

- Advanced water connectors
 - Mainstream Engineering; Phase II
- EPG textile and material development
 - Paragon/NC-State and Force Engineering; Phase II
- Persistently antimicrobial suit bladder materials
 - TRI-Austin; Phase II
- Permanent helmet anti-fog coatings and technologies
 - Acree Technologies and SwiftCoat; Phase II
- Advanced flexible formulation aerogels for Mars
 - Optowares, Phase II
- Cryogenic compatible materials for Lunar south pole
 - Moonprint, Phase II
- Lightweight and dust-tolerant structures (Phase I – pending)

Technology Development



- Technology Development Roadmap
 - ICES-2025-61
- Lunar Electrostatic Discharge and Dust Mitigation (LEDMD) tool
- Nike Space Act Agreement
- Mars

