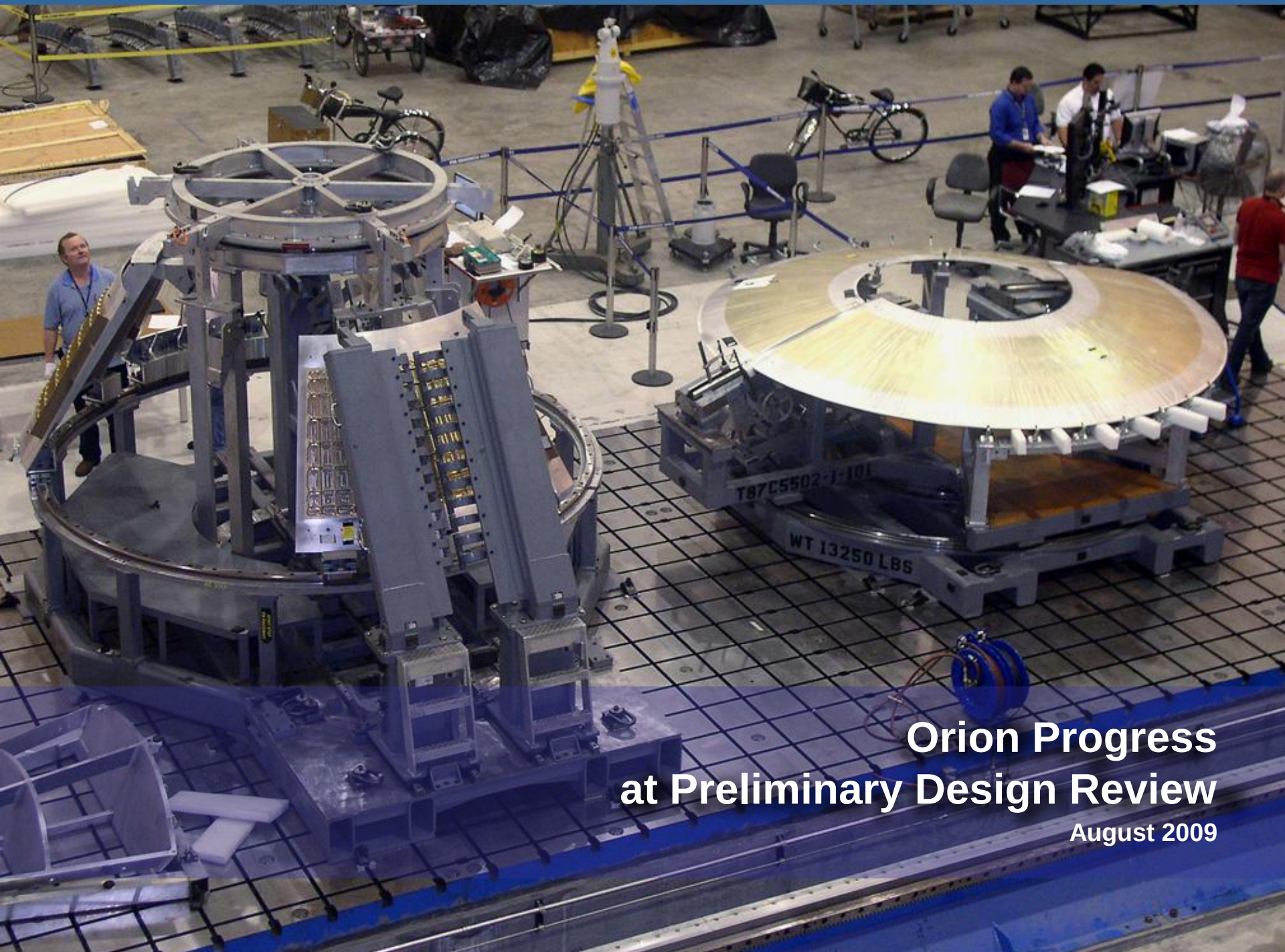
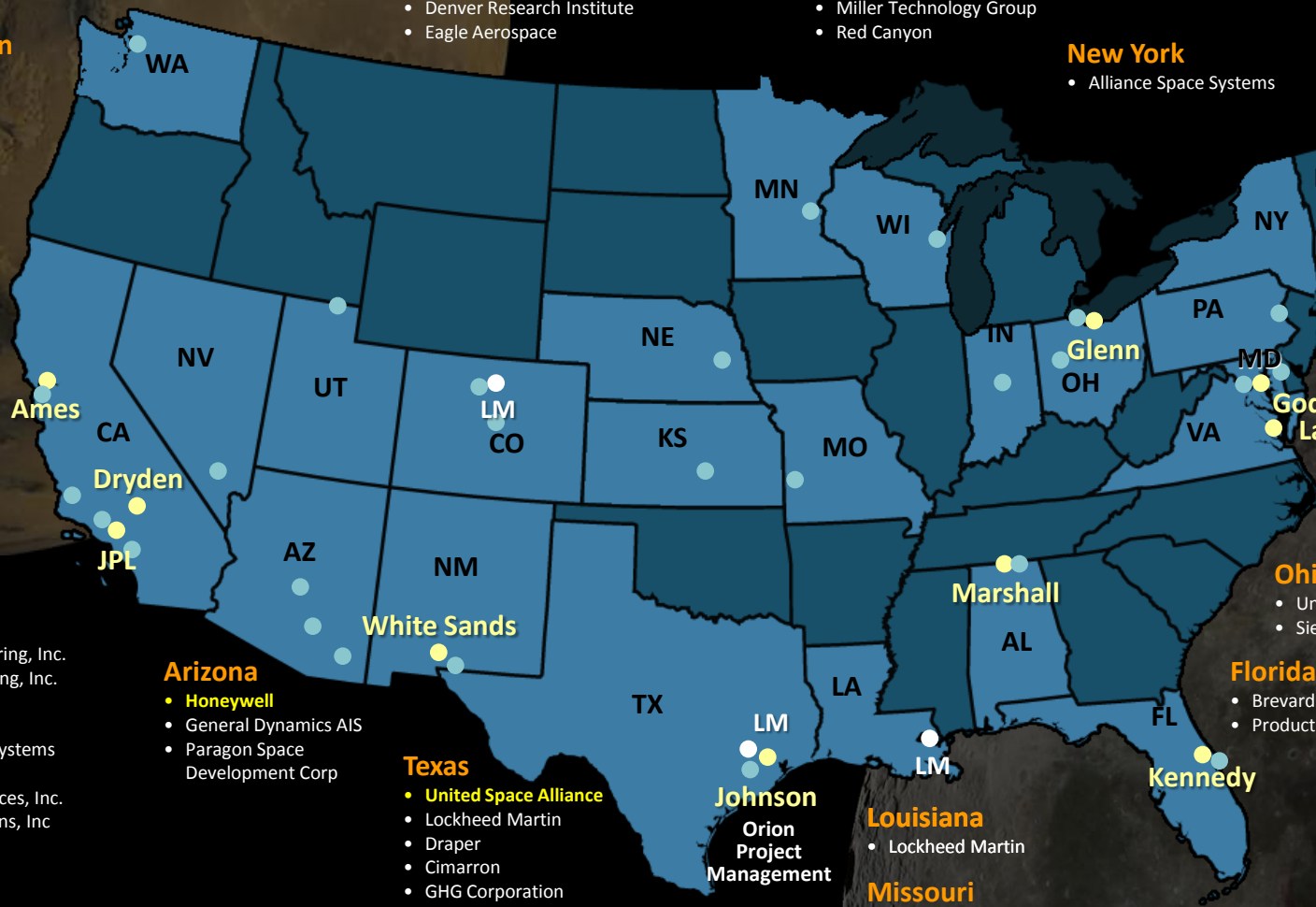


Orion Progress at Preliminary Design Review

August 2009

Orion Team



Nevada
- Arcata Associates

Utah
- Utah State University

Washington
- Corsair
- Safeware Engineering

Wisconsin
- Strohwig

Indiana
- Major Tool

Kansas
- Benecor, Inc.

Nebraska
- General Dynamics ATP

Minnesota
- Goodrich Sensor Systems

Colorado
- Lockheed Martin – Space Systems Company
- Advanced Solutions Inc.
- Cullimore & Ring Technologies, Inc.
- Deep Space Systems
- Denver Research Institute
- Eagle Aerospace
- EMA
- Glass Parametric
- ISYS Technologies
- Instar
- Miller Technology Group
- Red Canyon
- SEAKR Engineering
- Syzygyx
- TTJ&B Inc
- VTT

New York
- Alliance Space Systems

Connecticut
- **Hamilton Sunstrand Space Systems International**
- Ensign Bickford Aerospace & Defense
- Pioneer
- Yardney Technical Products

New Hampshire
- Haigh-Farr

Massachusetts
- Textron

Pennsylvania
- Teletronics Corp

Maryland
- **Lockheed Martin**
- Jackson & Tull
- Emergent Space

Virginia
- **Orbital Sciences Corporation**
- Alion

Ohio
- University of Dayton
- Sierra Lobo

Florida
- Brevard Canvas and Marine
- Productivity Apex

Alabama
- Infinity Technologies

California
- **Aerojet**
- Alejo Engineering, Inc.
- ATA Engineering, Inc.
- ATK
- Hi Shear
- JFA Avionics Systems
- Midcom
- Specialty Devices, Inc.
- Stellar Solutions, Inc

Arizona
- **Honeywell**
- General Dynamics AIS
- Paragon Space Development Corp

Texas
- **United Space Alliance**
- Lockheed Martin
- Draper
- Cimarron
- GHG Corporation
- MEI Technologies
- MRI Technologies
- Odyssey Research (UT El Paso)

Louisiana
- Lockheed Martin

Missouri
- Eagle Pichers

Human Factors EvaluationTests
Johnson Space Center
Houston, Texas

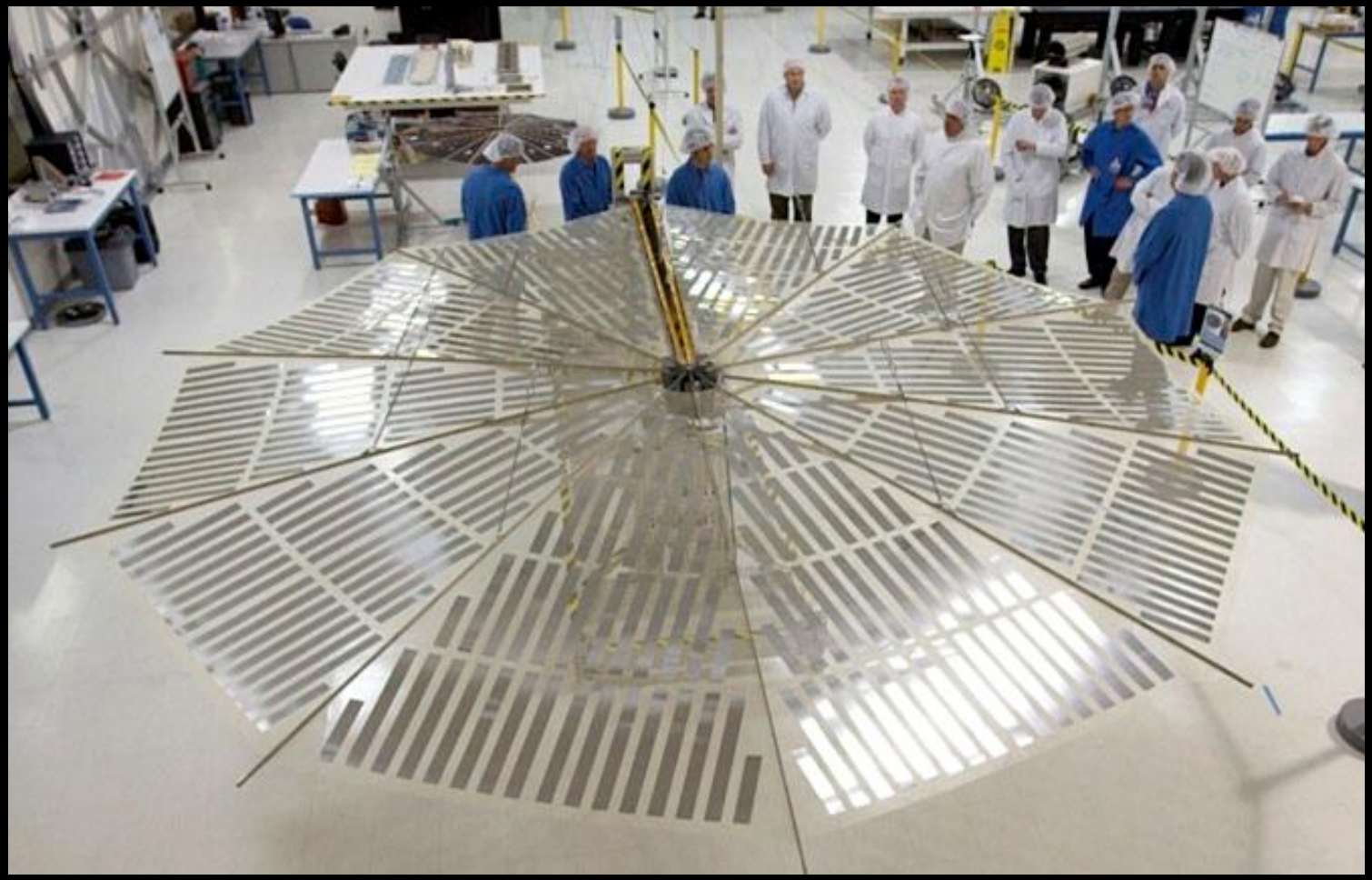
Human Factors EvaluationTests
Johnson Space Center
Houston, Texas

Post-Landing Orion Recovery Tests
Atlantic Ocean
Kennedy Space Center - Florida

Post-Landing Orion Recovery Tests
Atlantic Ocean
Kennedy Space Center - Florida

Landing System Development Tests
Crew Impact Attenuation System Test Article
Langley Research Center - Hampton, Virginia

Parachute Drop Tests
U.S. Army Proving Grounds
Yuma, Arizona



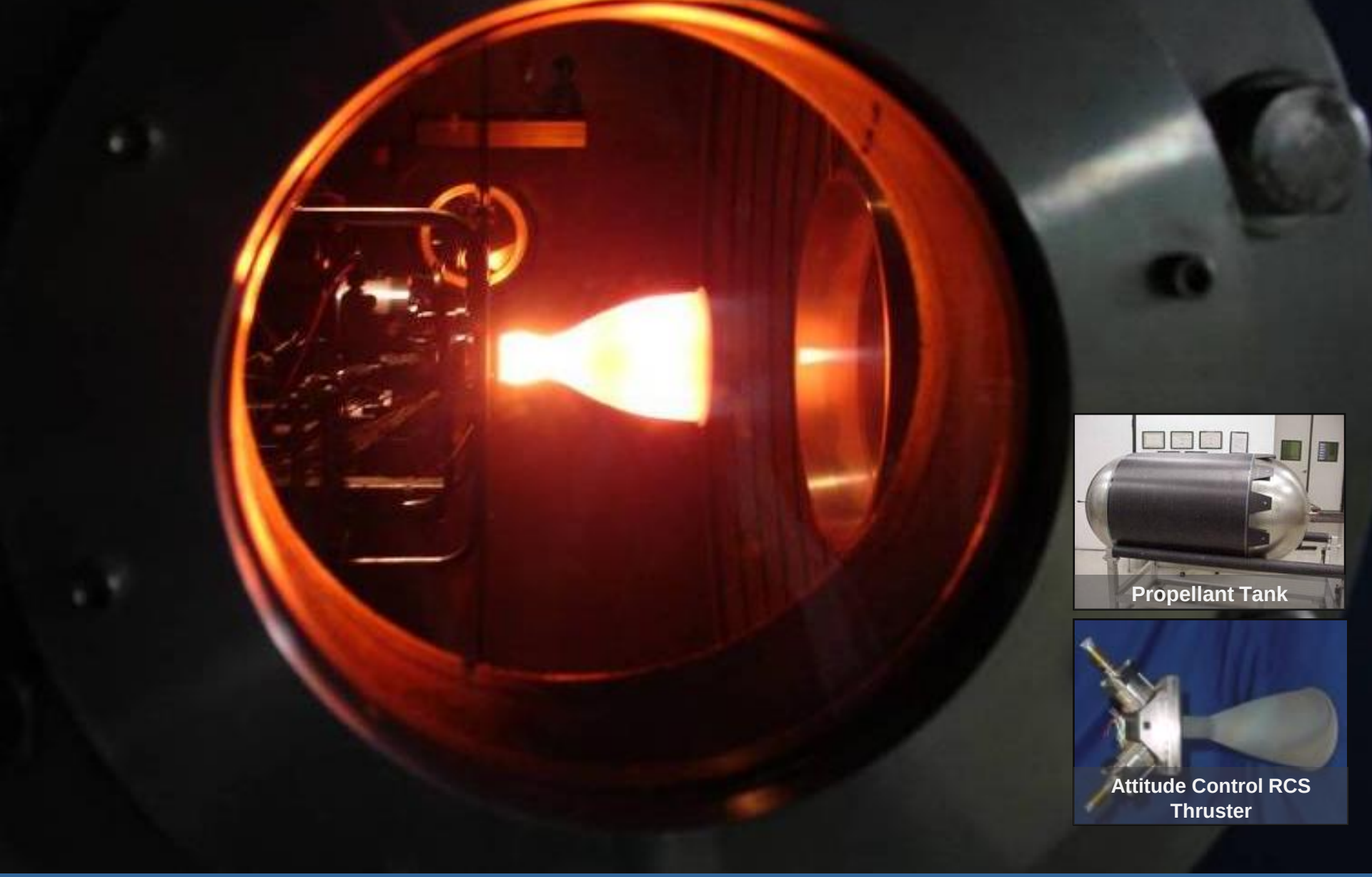
Solar Array Deployment Test

Testing and Deployment of 5.5m (18ft)-Diameter UltraFlex Solar Arrays

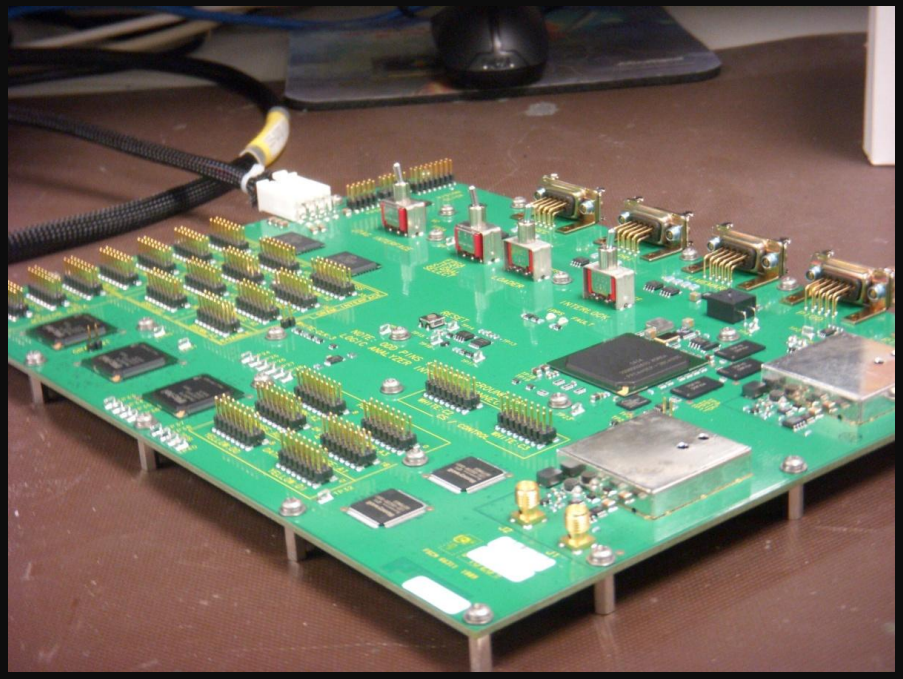
Goleta, California

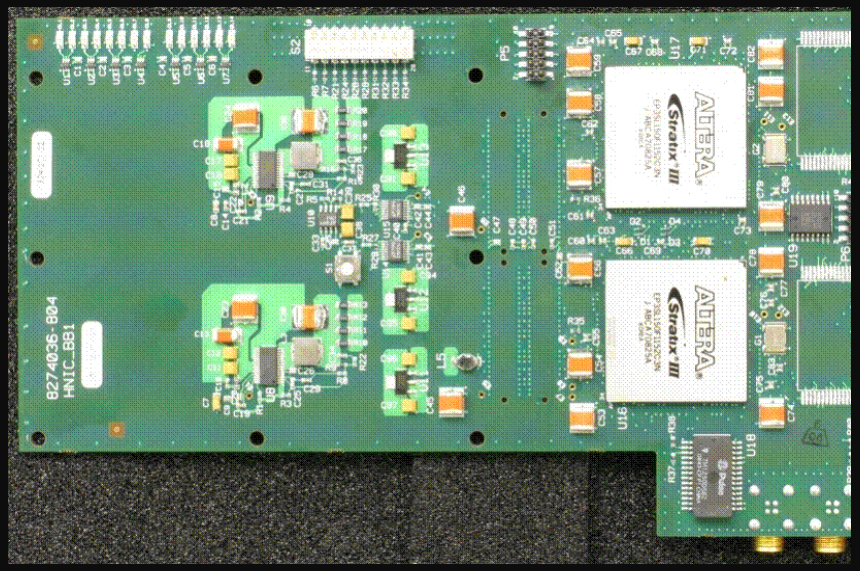
Integration and Test
Crew Module Flight Test Article
Dryden Flight Research Center
California

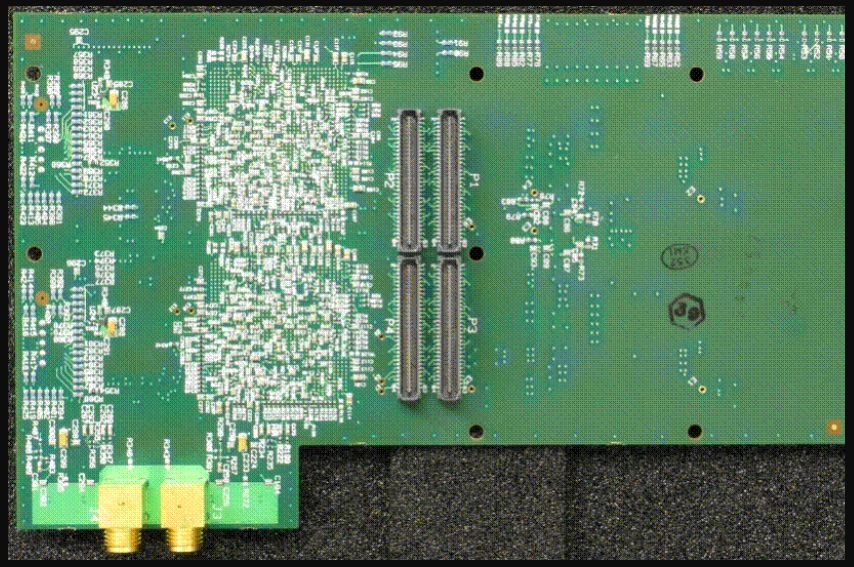
Weight and Balance Test
Crew Module Flight Test Article
Dryden Flight Research Center
California



Auxiliary Translational Thruster, Attitude Control RCS Thruster and Propellant Tank
Orion Service Module
Led by Glenn Research Center, Ohio

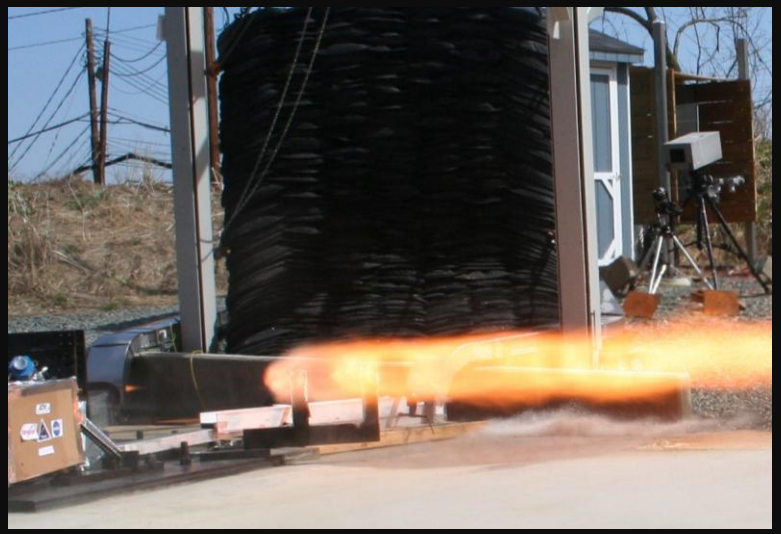






First Prototype High Integrity Network Interface Card
Honeywell Aerospace
Phoenix, Arizona

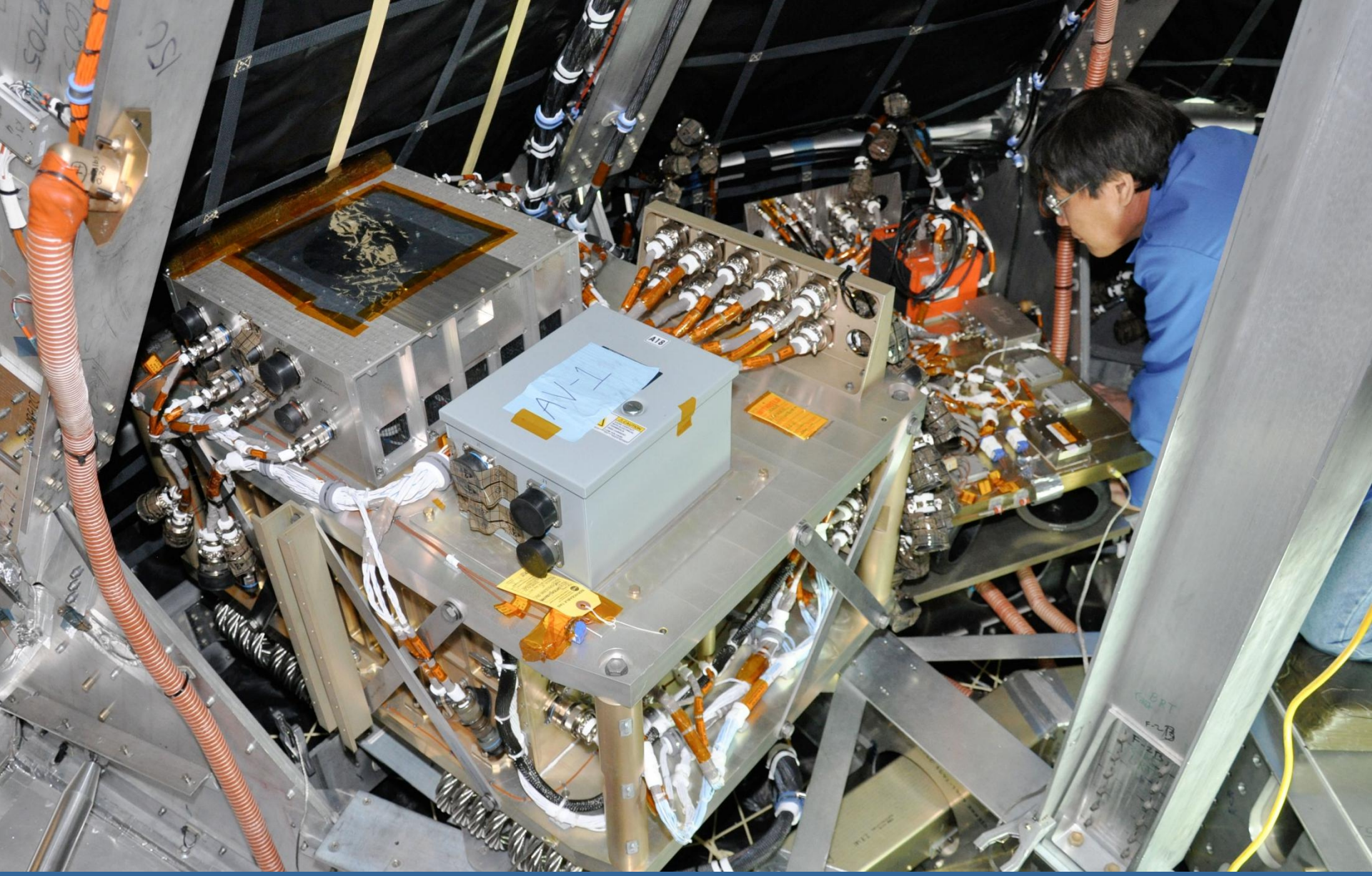
Launch Abort System Motor Deliveries
White Sands Missile Range
New Mexico



Launch Abort System Motor Tests
Attitude Control Motor, Jettison Motor and Abort Motor

Acoustic Test
Crew Module Flight Test Article
Dryden Flight Research Center
California

Center of Gravity Test
Crew Module Flight Test Article
Dryden Flight Research Center
California



Installation of Integrated Flight Pallet
Dryden Flight Research Center
California

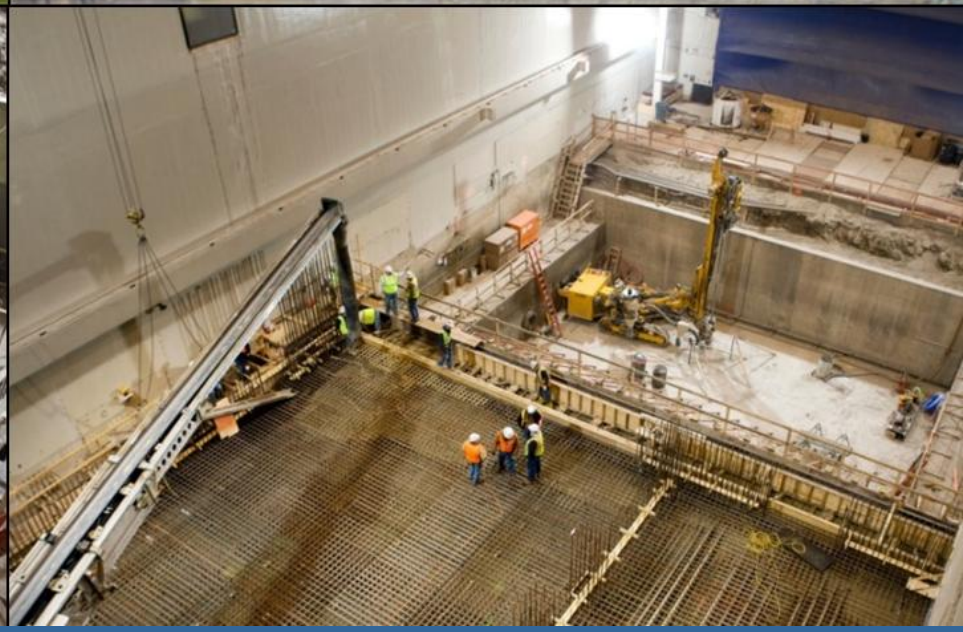
Installation of Integrated Avionics Pallet
Dryden Flight Research Center
California

Transport of Pad Abort 1 Crew Module
Dryden Flight Research Center
California

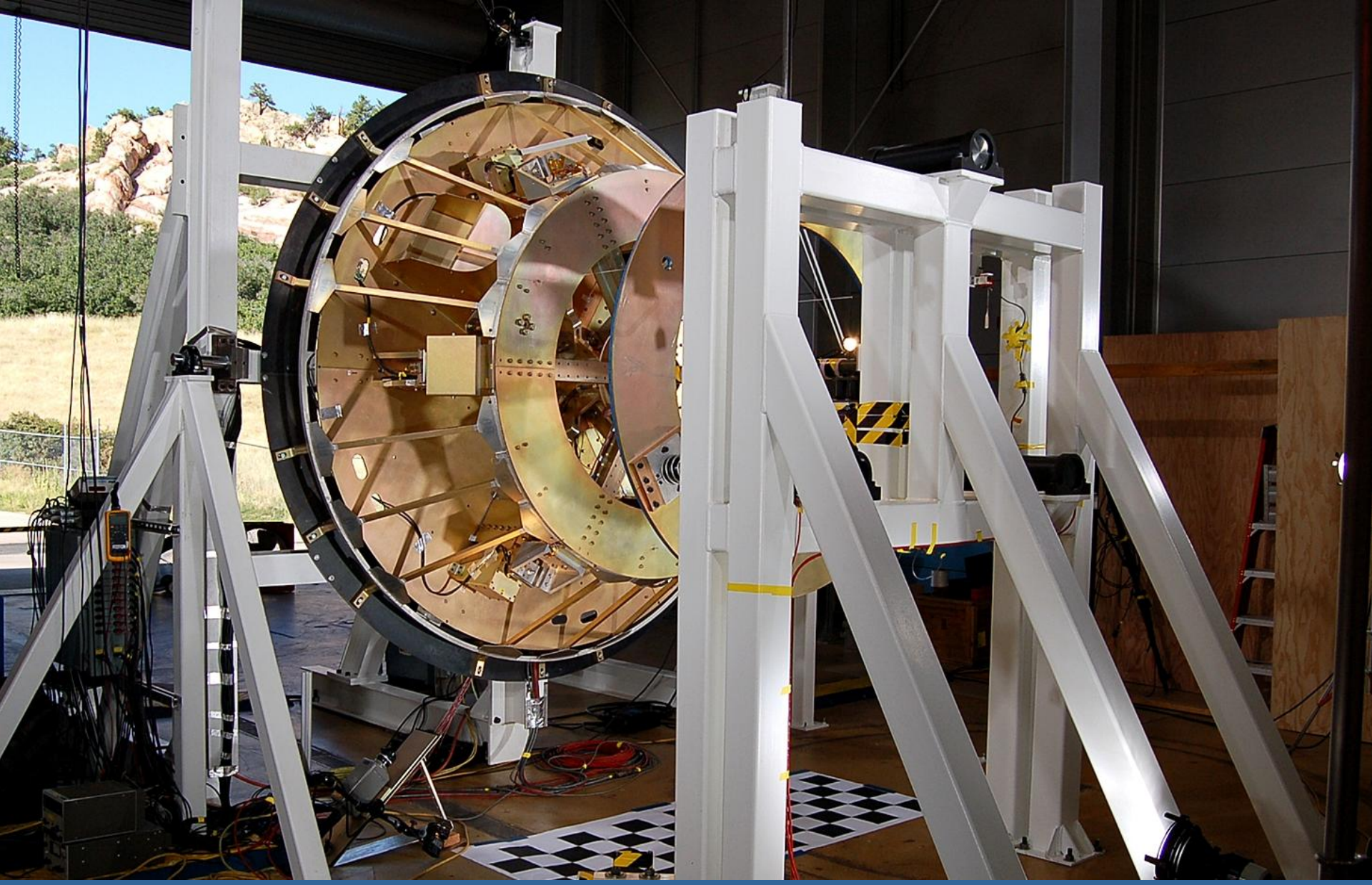
Delivery of Pad Abort 1 Crew Module
White Sands Missile Range
New Mexico

Orion Launch Complex and Completed Ascent Abort Gantry
White Sands Missile Range
New Mexico

Mobile Operations Facility Control Room
White Sands Missile Range
New Mexico

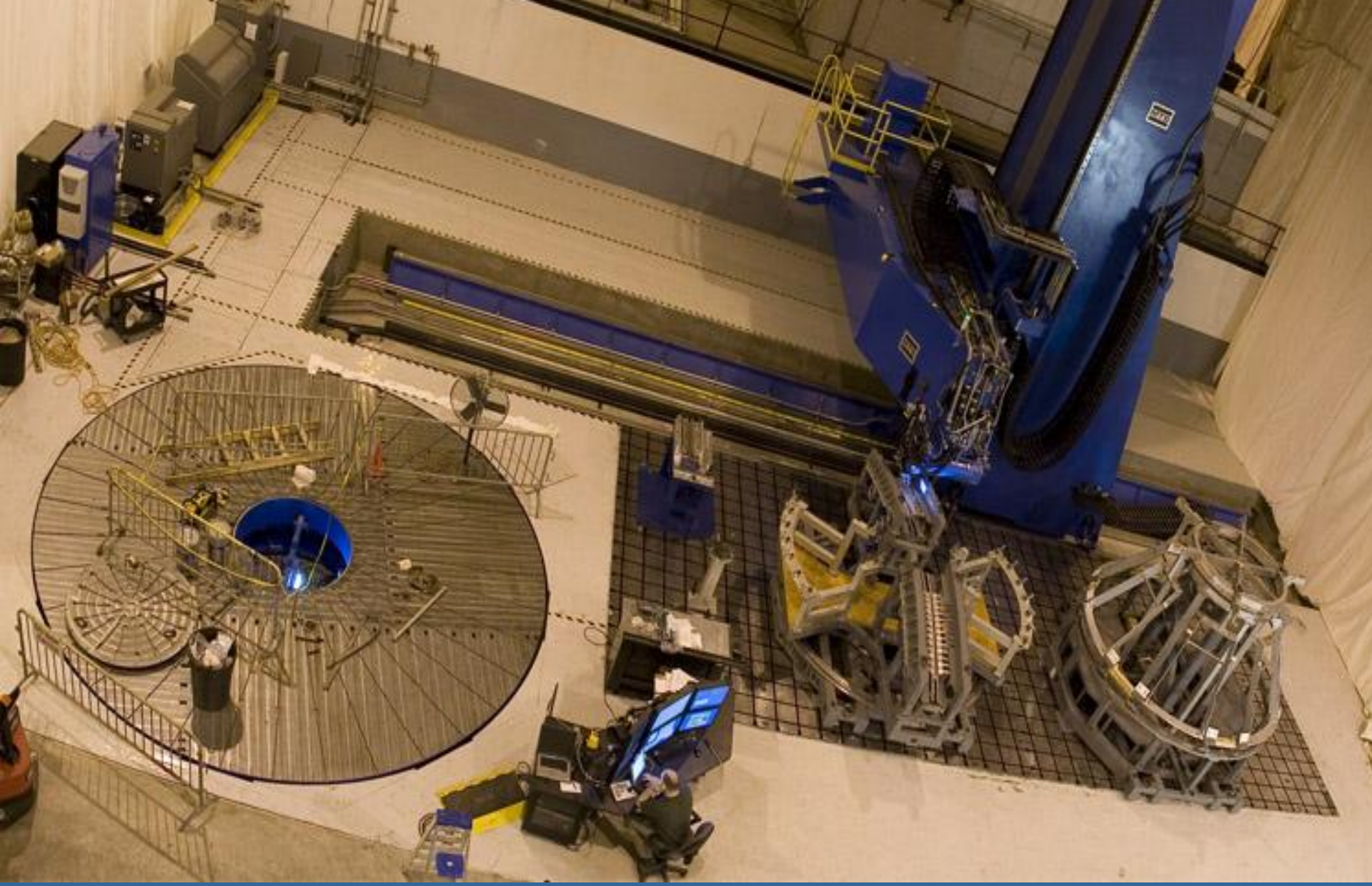


Renovations at the Spacecraft Environmental Test Facility
Plum Brook Station
Sandusky, Ohio



Pad Abort 1 Forward Bay Cover Test
Lockheed Martin Engineering Propulsion Lab
Waterton Campus
Denver, Colorado

Completed Orion Operations & Checkout Facility
Kennedy Space Center
Florida



Ground Test Article Tooling Complete, Operational
Michoud Assembly Facility
Louisiana

Ground Test Article Hardware
(crew cabin and backbone structures).
AMRO Fabricating Corporation - El Monte, California

Ground Test Article Fabrication
Michoud Assembly Facility
New Orleans, Louisiana