The Future of U.S. Space Suits

Presented by

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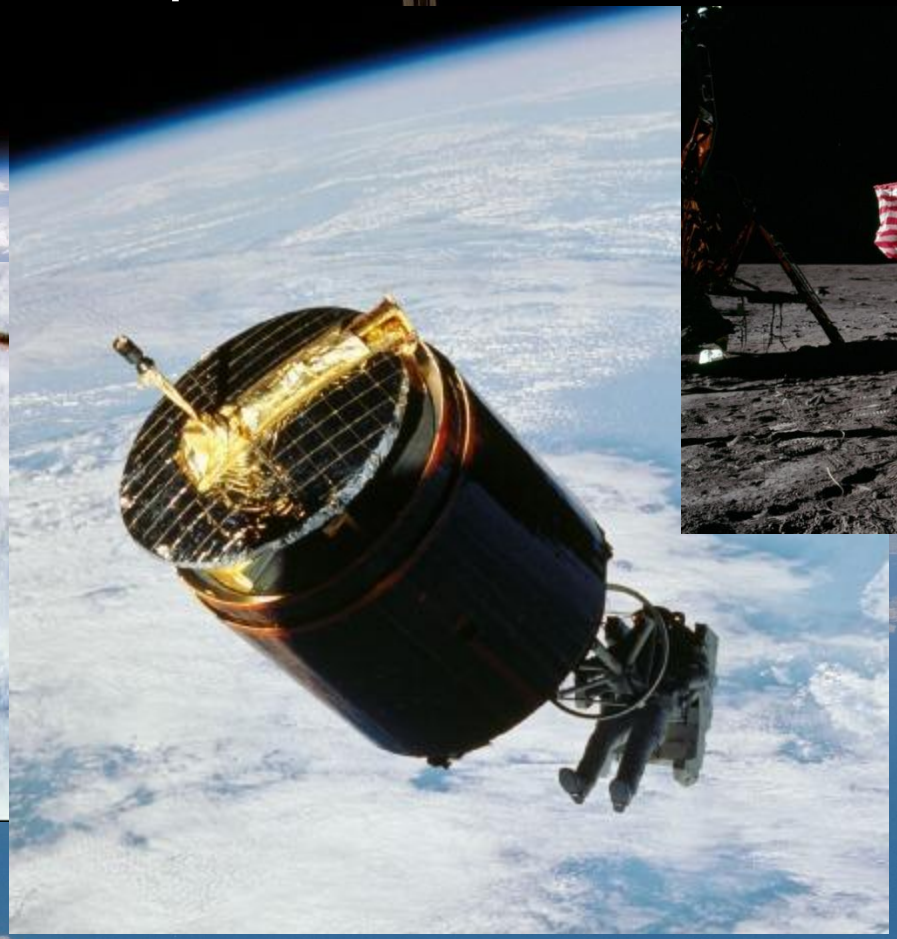
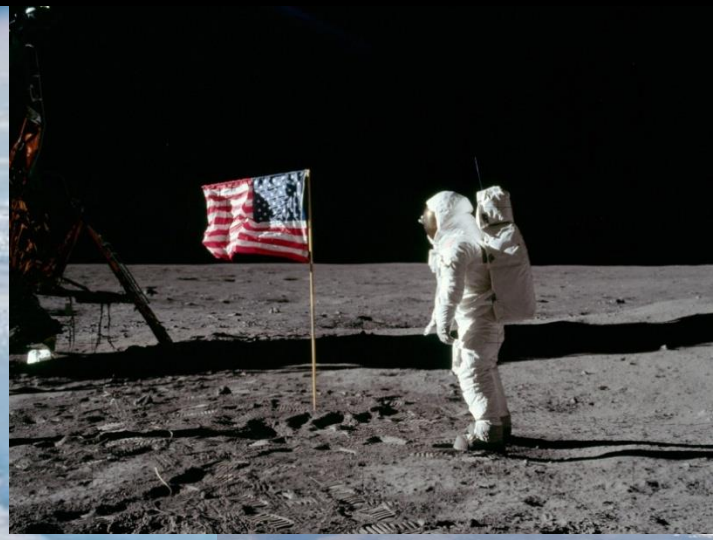
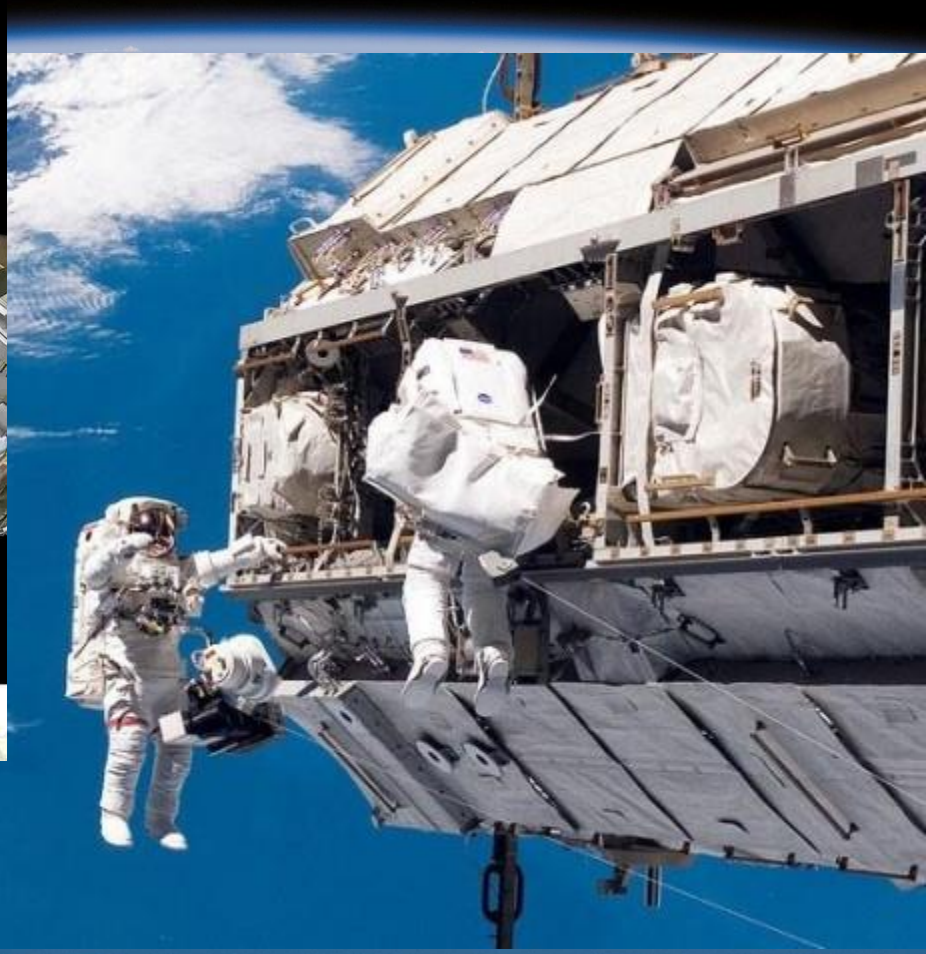
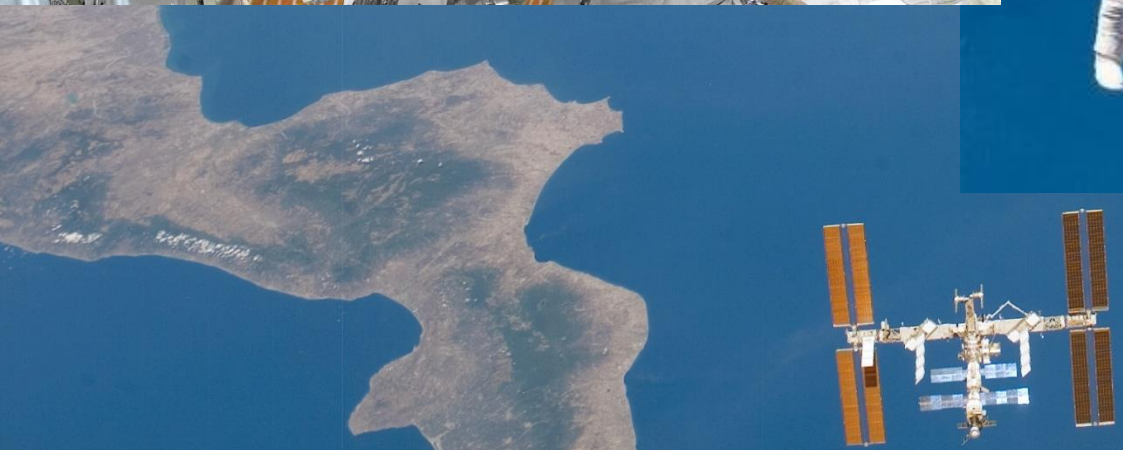
U.S. Space Suits – The Past



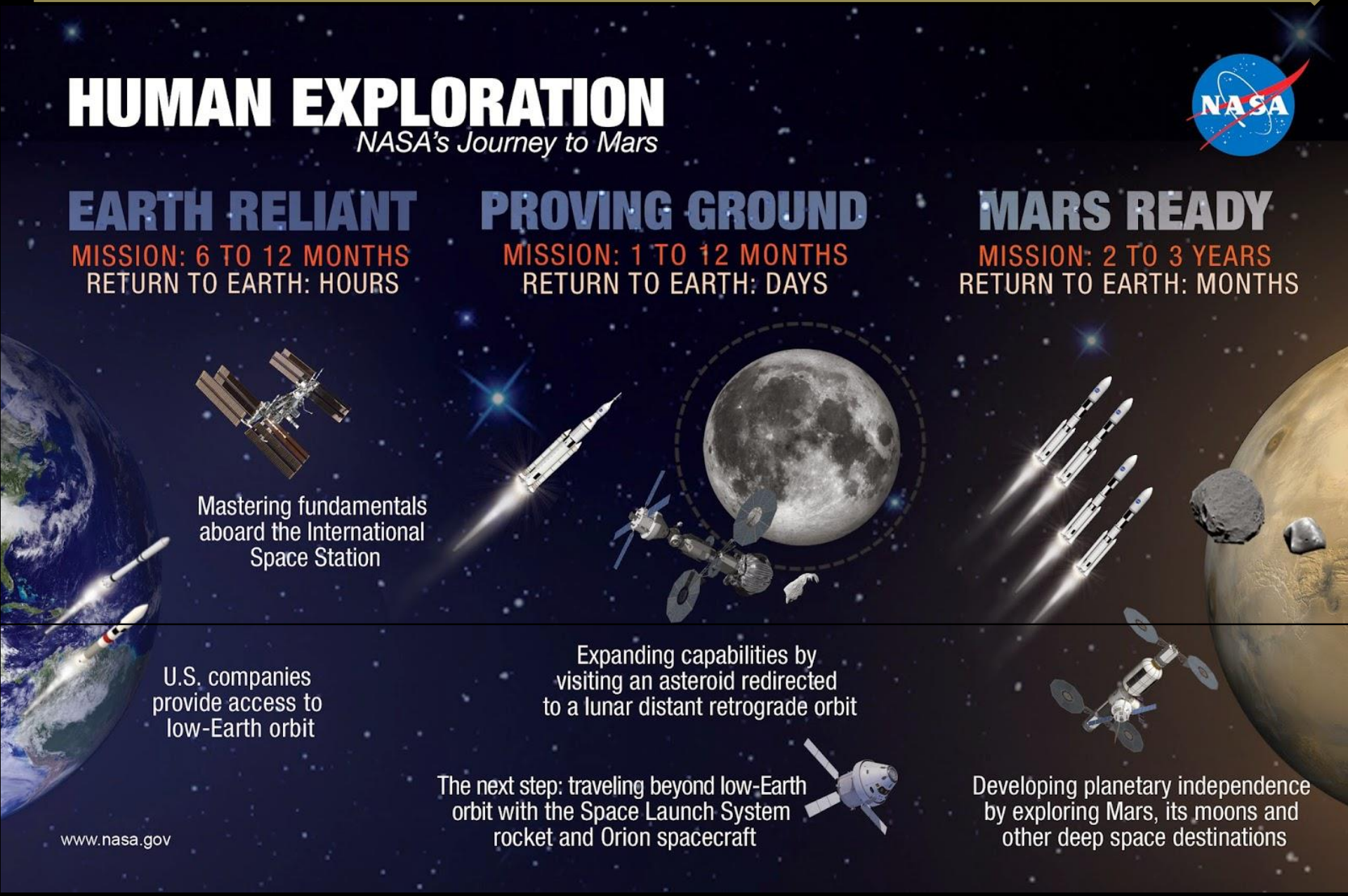


U.S. Space Suits – The Present





Future Human Exploration



New Space Suit Development Defining Questions

- What Is The Destination And The Destination Environment
- What Will Be The Host Spacecraft
  - What Is The Life Support Interface
  - What Is The Mechanical Interface
- What Are The Mobility Requirements
  - Walking, Riding, or Both
- What Size Suits Are Required
  - Suit Should Support A Larger Anthropometric Range
- What Is The Logistical Plan
  - Suit Must Be Logistically Supportable For Long Periods of Time
- What Is The Maintenance Plan
  - Suit Must Be Field Maintainable

NASA EVA Technology Development

NASA Performed Yearly Test Campaigns In The Western U.S. To Develop Requirements For Planetary Surface EVAs

EVA Pressure Garments At Field Testing, Flagstaff AZ 2006

NASA EVA Technology Development

- **Mark 3 Planetary Garment Designed For Surface EVAs**
  - **Hard Upper Torso And Hard Brief**
  - **Rear Entry**
  - **Walking Boots**
  - **Tested During Desert Rats Planetary Exploration Activities**

NASA EVA Technology Development

- ILC Dover I-Suit Pressure Garment
  - Soft Upper Torso And Soft Brief
  - Waist Or Rear Entry
  - Soft Lower Torso And Walking Boots
  - Tested At ILC And During Desert Rats Planetary Exploration Activities
  - Excellent Surface Mobility

NASA EVA Technology Development

- The Z-1Pressure Garment Was Developed By NASA Under The Advanced Exploration Systems Program
- Z-1 Suit Represents A Follow-On To The Mark 3
  - Rear Entry
  - Hard Upper Torso And Waist Brief
  - Elliptical Helmet
  - Improved Shoulder Fit
- A Follow-On Z-2 Pressure Garment Is In Development By NASA For Future Risk Reduction Testing
- Portable Life Support System Technology Is Being Tested In Parallel

Constellation Space Suit System Technology Risk Reduction

- Oceaneering Leads An Industry Team To Perform EVA Technology Risk Reduction Testing
- The Prototype Pressure Garment Has Been Developed
  - Improves Fit, Comfort, Mobility And Safety For Small And Large Crewmembers
  - Supports Multiple Pressures
  - Rear Entry
  - Reduces Mass To Orbit Of The Spacesuit And Supporting Systems
- Prototype Pressure Garment Testing Is Ongoing At The Oceaneering Space Systems Facility
- A Liquid Thermal Garment Has Been Developed That Improves Astronaut Cooling