DEEP SPACE

DEEP OCEAN

Aramco Technology and Operational Excellence Forum

Robotics Technology Development To Enable Manned, Planetary Exploration
NASA Robotic Research Pointed Toward Deep Space Missions

• NASA is planning for manned deep space missions utilizing the Space Launch System and the Orion manned capsule
  – Asteroid retrieval
  – Moon
  – Mars
• Robots will play an integral role in the deep space mission architectures
  – In-transit mission phases
    • EVA spacecraft maintenance and inspection
    • IVA maintenance and inspection
    • IVA crew assistant
    • Countermeasures exercise equipment
  – Surface operations in advance of manned crews
    • Habitat assembly, checkout and operational verification
    • Habitat maintenance
  – Surface operations during manned visits
    • Assistant
    • Explorer
    • Rovers
Robots Will Play a Key Role In Transit Spacecraft Operations

- In-transit Phase Developments
  - Robonaut 2 and 3
  - Autonomous EVA Robotic Camera
  - Robotically assisted space suit
  - Miniature Exercise Device
Planetary Surface Operations Will Be Supported By Robots

- Surface operations will be performed prior to manned operations
- Robots will support crews during manned operations
- Chariot rovers designed for planetary traversal
- Valkyrie will perform assembly, maintenance, and science on the planet surface