Project Orion Progress and Challenges

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Constellation Program Components

- Ares V - Heavy Lift Launch Vehicle
- Ares I - Crew Launch Vehicle
- Earth Departure Stage
- Orion - Crew Exploration Vehicle
- Altair - Lunar Lander
Orion-CEV Expanded View

Crew Module
crew and cargo transport

Spacecraft Adapter
structural transition to Ares launch vehicle

Launch Abort System
emergency escape during launch

Service Module
propulsion, electrical power, fluids storage
Orion Design and Operational Heritage

- 5 meter diameter capsule – Apollo shape
  - Significant increase in volume from Apollo (3.9 meter)
  - Proven safe technique to withstand extreme heating loads
  - Able to leverage Apollo performance data
  - Reduced development time and risk
- Larger Crew Accommodations
  - Lunar missions: 4 crew
  - Space Station missions: 6 crew
- Expanded Mission Capabilities
  - Long Duration (6 months)
  - State-of-the-Art Materials, Systems
Orion Earth Orbital Mission

- Capable of supporting ISS missions
- Transport up to 6 crew members on Orion for crew rotation
- 210 day stay time
- Emergency lifeboat for entire ISS crew
- Deliver limited pressurized cargo for ISS resupply
Orion Lunar Mission

- Orion and Lunar Lander boosted to lunar orbit
  - Up to 4 crew onboard
- Lander descends to lunar surface
- Orion is uninhabited during lunar surface operations
- Lander upper stage returns to Orion in lunar orbit
- Orion returns crew to Earth
Lunar Sortie Mission

Video
Orion Project Driving Challenges

• Expect to fly Orion for a generation
• Mission adaptability as exploration evolves
• Block upgrades to capability as experience gained
  – First major upgrade for lunar capability
• Invest in safety – “Liftoff to Landing”
• Design for low operations cost – Invest in life cycle efficiency and lowest total ownership cost as basis of sustainability
• Leverage experienced workforce and industrial capability
Recent Orion Accomplishments

Facility Renovation–GRC IET Facility

Wind Tunnel Testing

LAS Abort Motor Test Firing

Abort Test Launch Complex - WSMR

Pad Abort Test #1 – Crew Module

Boilerplate Test Article