ESMD Technology Needs for Altair and Ares V

Please contact:

Frank Peri
Exploration Technology Development Program, Manager

757.864.2003
frank.peri-1@nasa.gov
Ares V Technology Needs

**Key Technology Areas**
- Composites
- Cryo Fluid Management
- Solids
- Automation
- Liquid Propulsion
- Control/Separation

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**ETDP Technology Prioritization Process (TPP)**

### Ares V Technology Priorities

1. Large Composite Manufacturing
2. HTPB Propellant
3. Long Term CFM
4. Composite Damage Tolerance/Detection
5. EDS State Determination & Abort
6. Composite Joining Technology
7. Liquid Level Measurement
8. Multi Layer Insulation
9. Leak Detection
10. Non Autoclave Composites
11. SRM Composite Metal Technology
12. Composite Dry Structure Development
13. Composite Damage Failure Detection for Abort
14. Nozzle Sensitivity to Pocketing (High Heat Flux from HTPB)
15. LH2 Tank Micro Cracking

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**Ares Value Stream**

- Nose Cone/Forward Skirt
- Loaded Motor
- Core Stage Aft Skirt
- Point of Departure Shroud (Biconic)
# Altair Technology Needs

1. Highly Reliable LOX/LH2 Throttling Engine
2. Cryogenic Fluid Management
3. LO₂/LCH₄ Main Engine and RCS
4. Composite Primary Structure
5. Landing Hazard Avoidance and Detection
6. Radiation Effects Mitigation/Environmental Hardness
7. Cabin CO₂ and Moisture Removal System
8. Low Cycle Life Rechargeable Battery
9. Low Mass, High Reliable, PEM Fuel Cell
10. High Pressure Oxygen System
11. Dust Mitigation
12. Sublimator-driven coldplate
13. Crew Compartment Composite Pressure Vessel Design and Validation

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**Altair Technology Priorities**

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