



# **3<sup>RD</sup> SPACE EXPLORATION CONFERENCE & EXHIBIT**

## **Space Exploration Transition- Ares Launch Vehicles**

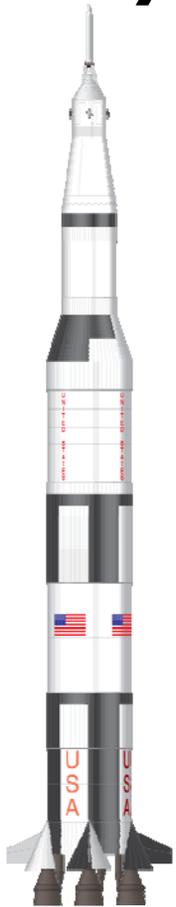
**Presenter: James Chilton  
Vice President- Boeing Exploration Launch Systems,  
Program Manager- Ares 1 Upper Stage Production**

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# Launch Vehicle Challenges- Now Beyond Technical



## *Apollo*



- **Computational Capabilities**
- **Technology**
- **Unknown Environments**
- **Physics**

## *Ares*



- **Minimizing Life-cycle cost**
- **Lean +**
- **Environmentally Friendly Manufacturing**
- **Designing for sustainability**

# Sharing Commercial, Space and Military Experience With Our Customer Helps Ensure Successful Transition



737, 777, 787...



- Production Expertise
- Supplier Base
- Buying Power
- Enterprise Tools, IP
- Safety & Operability



Ares I

Delta II/Delta IV, STS, ISS,  
C-17, F-18, Chinook,  
Satellites, Missile Defense...



- Human Space Flight Experience
- Production Lessons Learned
- Supplier Base
- State of the Art Cryo-Rocket Lessons-lived
- Experience Beyond Design

***Challenge of Blending Disparate Cultures:  
Human Space-Flight, Commercial, Military***

# NASA & Industry Partnership- *Working Together is Critical*



## **Program Requirements:**

- A safe, low cost, reliable system
- Development of system on cost & schedule
- Broad access to 'best' suppliers
- Low Transition Risk



## **NASA Roles**

- Program Management
- Requirements Development
- Design
- Interface Control
- Assembly Facilities
- Operations & Maintenance

*Strong  
Partnership*

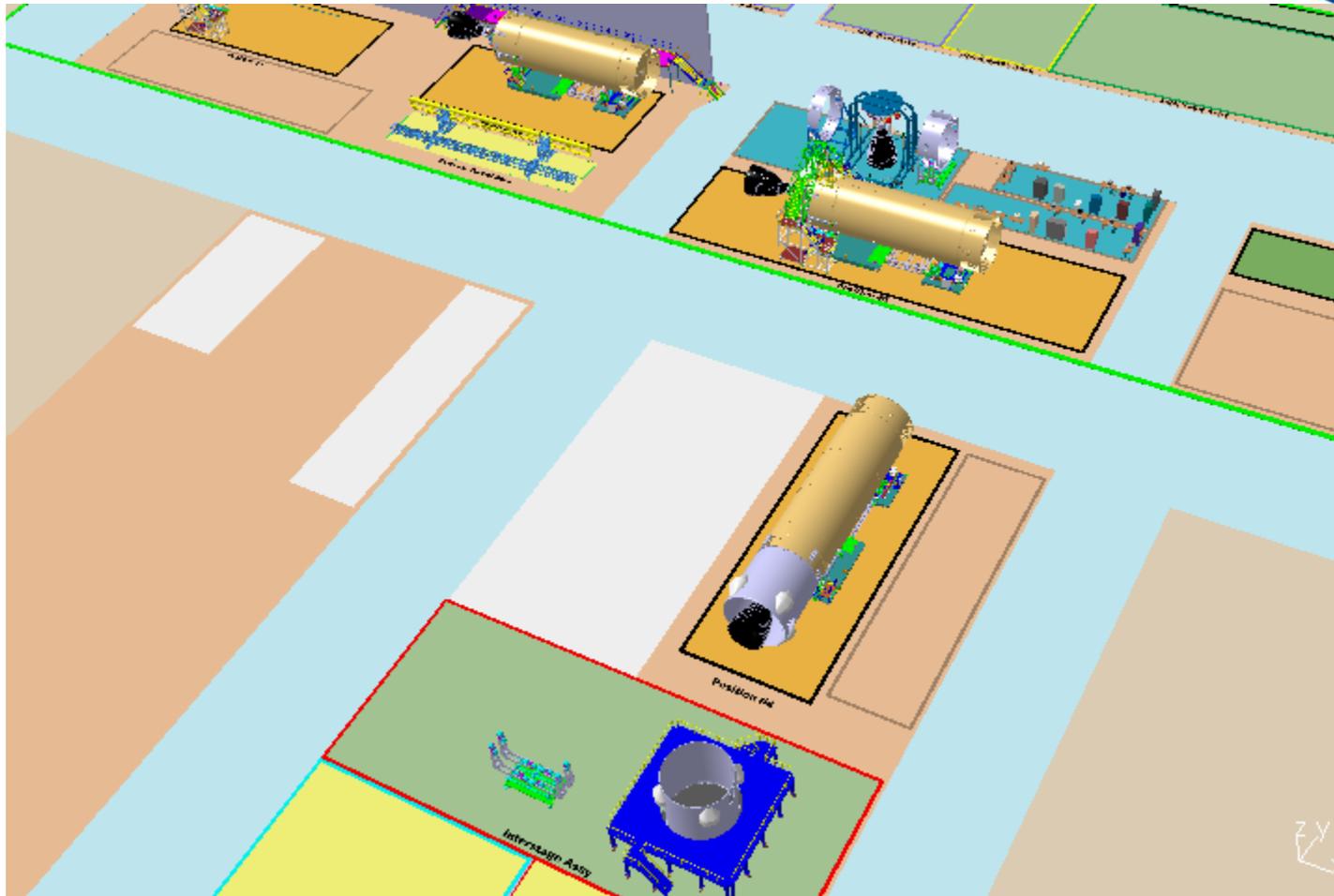
## **Contractor Roles**

- Producibility Engineering
- Engineering Support
- Supplier Management
- Manufacturing & Assembly
- Integration & Test
- Logistics



**Transition of USP & IUA from NASA (Design) to  
Industry (Production) Represents  
a New NASA Model**

# Example Commercial Tool Integration- *DELMIA Simulation*



**Provides Early Impact to Product Flow and Design Decisions**

# STS to Ares Transition Challenges



- **People:**
  - Best using existing expertise and supplier base
  - Blending HSF and ‘new’ cultures
  - Integrating new engineering talent
  - Apply legacy designs and lessons learned
- **Processes**
  - Implementing Lean +
  - Early identification of risk issues
  - Enable new NASA model
- **Facilities**
  - Evolve existing capabilities
- **Funding**
  - Stable Funding, continuous advocacy
  - Fostering demand

