



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

## **NASA/Industry Collaboration Examples- Constellation Initial Capabilities Panel**

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

**26 February 2008**

# 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



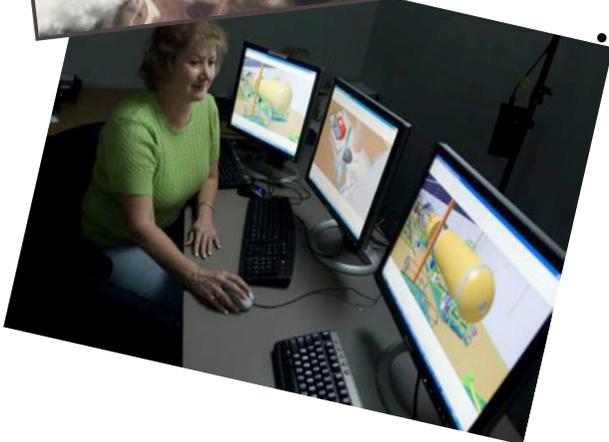
## **NASA Roles**

- 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

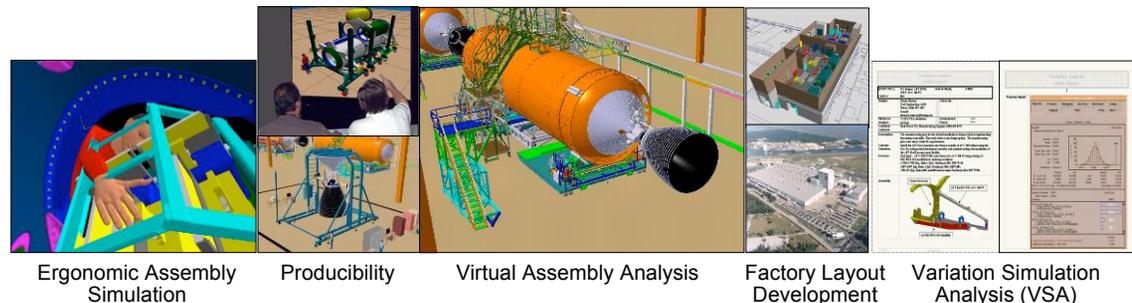
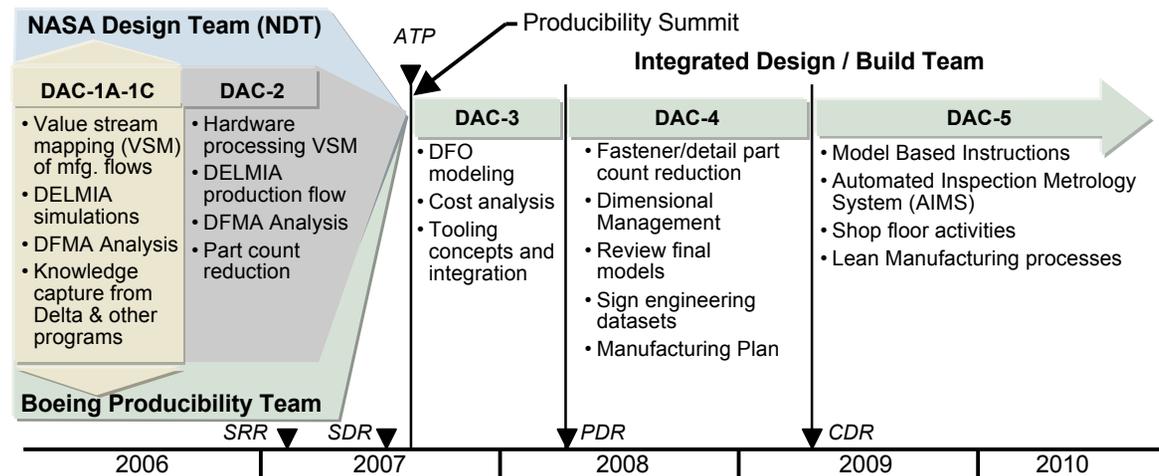


**Transition of NASA Ares Design to Boeing is  
a New NASA Model**

# Our Producibility Approach Dependent on Collaboration With NASA



- Production partners embedded in NDT
- Disciplined approach
- Producibility analyses leverage collaboration and model based product definition



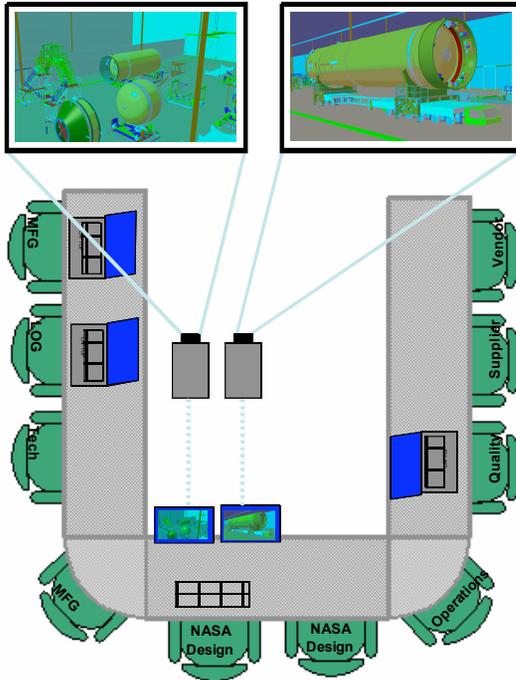
**Collaboration and disciplined approach drives success**

# Producibility Analysis



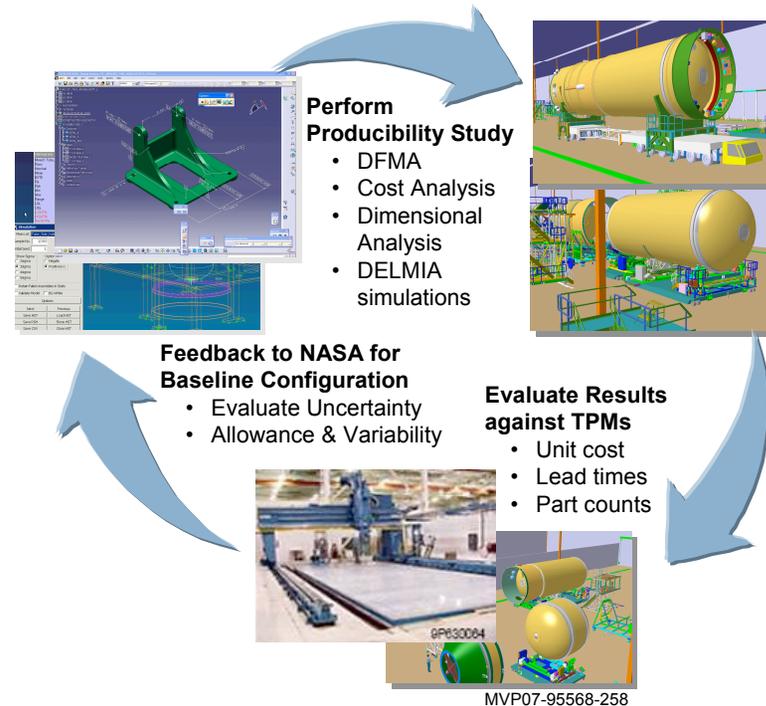
CAD models are an integral part of Producibility Analysis

## Virtual Design Reviews (VDR)



- All stakeholders are present
- Looks for hardware interferences
- Verifies systems routing
- Evaluates Technician access

## Producibility Analysis



- Producibility feed-back loop allows for continuous improvement

**Our producibility collaboration has begun**

# Our Approach Requires Designing the Production Flow Along with the Product

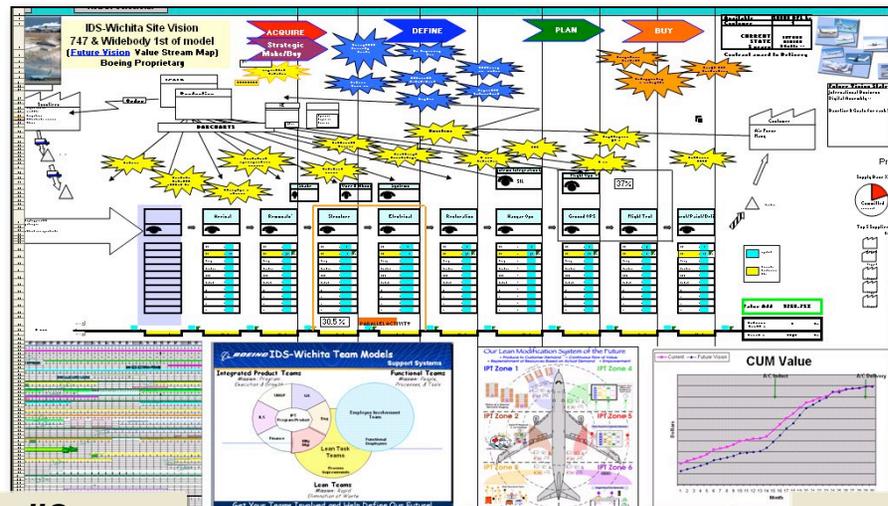


## The Value Stream Approach- Jointly Executed With NASA

### Step #1

#### Objectives

- Customer expectations
- Quality improvement
- Cycle time reduction
- On-time delivery
- Improve cost



### Step #4

#### Action Plan

- Program commitment/ownership
- Team improvement targets
- Team Lean plans
- Seize Opportunities
- Visible to all

### Step #2

#### Value Stream Mapping

- Engage teams in the “How”
- Identify waste in the process (starbursts)
- Seek new value

**A Baseline**

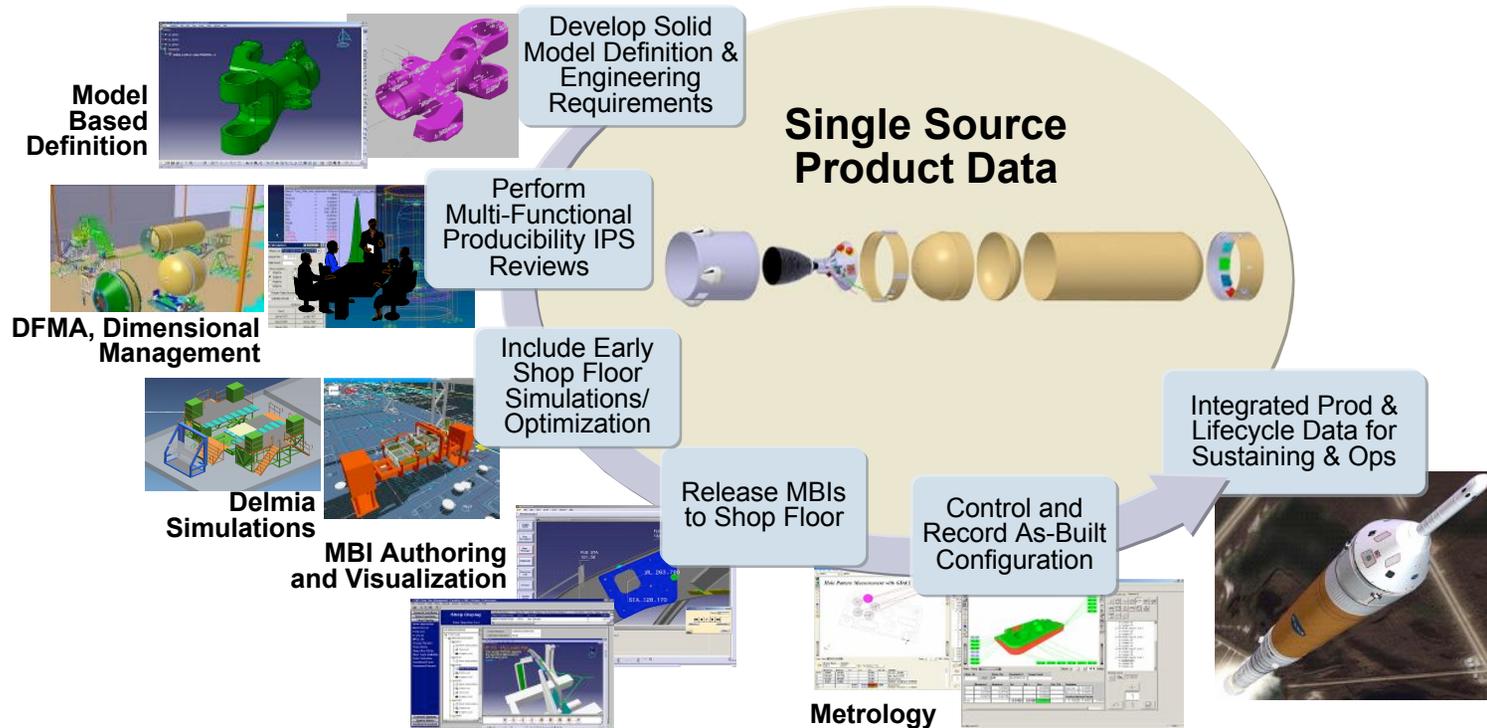
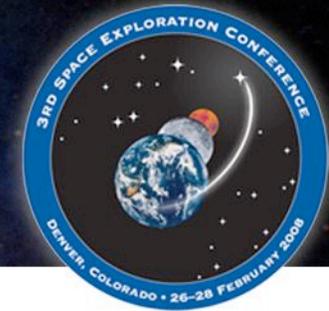
### Step #3

#### Value Stream Analysis

- Design to achieve program vision
- Integrate Lean Best Practices to reduce waste
- Integrate Program Management Best Practices for Execution

**Start with the Answer:  
Program Sets Targets**

# Model Based Definition Reduces Life Cycle Costs

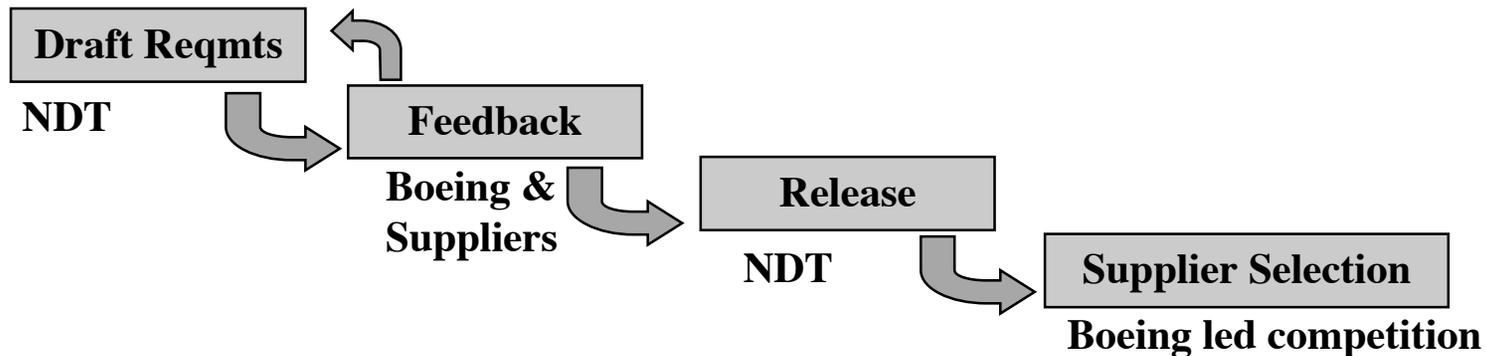


**Reduces Development, Production and Sustainment Cost by Reducing Waste and Defects**

# The Supply Chain Represents Another Opportunity for Beneficial Collaboration



- Requirement definition drives cost effective Supply Chain



- Supply Chain participation key in design phase
  - Infuse supply chain producibility inputs into design
- Requirements should maintain open competition
- Release schedules need to support competition
- Influences ability for Small & Diverse business participation