
DASSAULT SYSTEMES
A Case Study:
Using Delmia at Kennedy Space Center to support NASA's Constellation Program
Tracey Kickbusch
NASA KSC - Chief, Computational Sciences Branch
Bob Humeniuk
The Boeing Company - Systems Engineer
Dream to Life:
Envision and Invent the Future

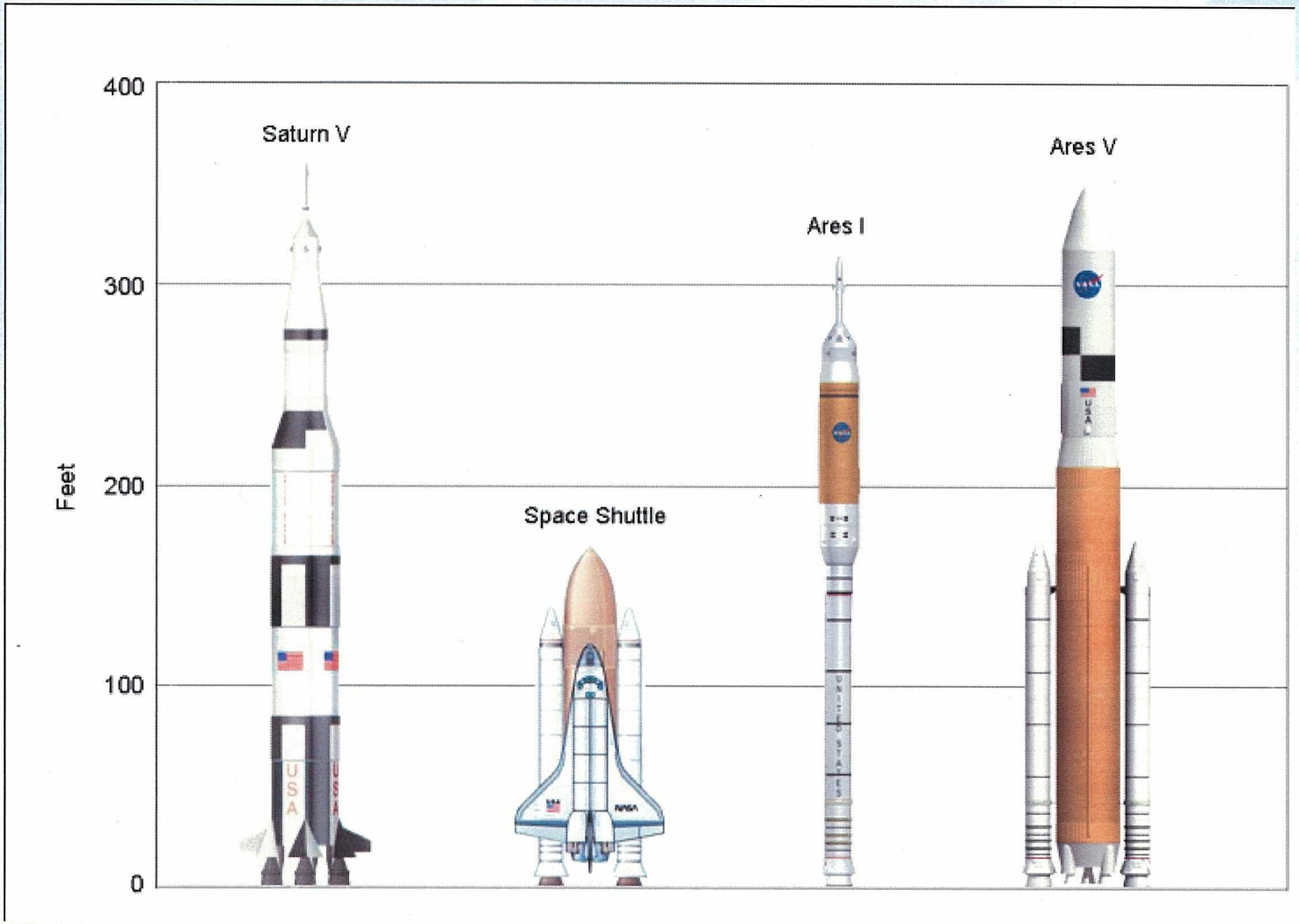
KSC Design Visualization Group

- Ten person Civil Service and Boeing team
- Provide support to numerous NASA programs
  - Constellation
  - Launch Services
  - Space Station
  - Shuttle
- Perform simulation of ground operations leading up launch
- Use Delmia to make sure operations are feasible, efficient, and safe

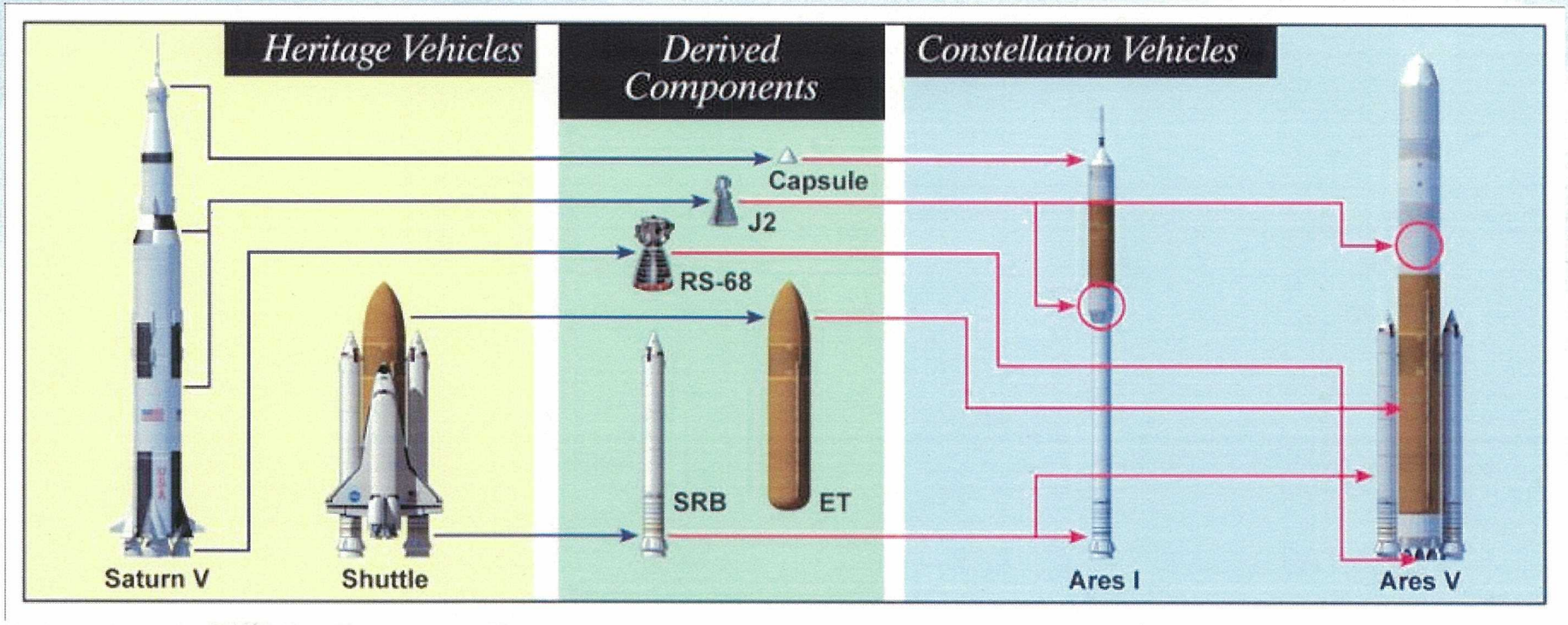
KSC Design Visualization Group

- Performed ground operation simulations since the mid 1980's
  - Every few years go through a cycle to pick the software that will work best for us
- Awards
  - ITSEC

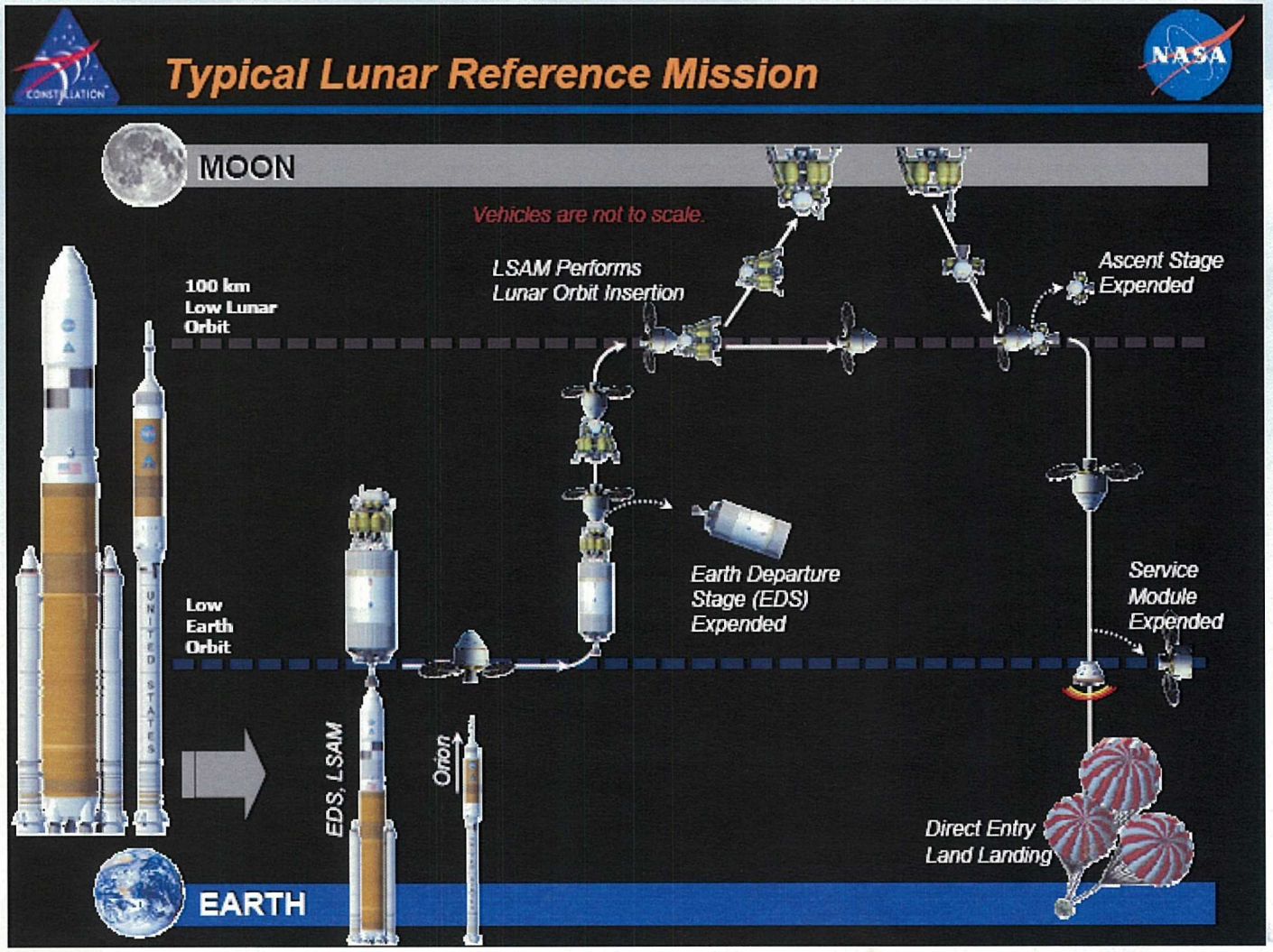
NASA's Constellation Program



NASA's Constellation Program



NASA's Constellation Program



Ares 1 Ground Processing Prelimary Design Review Video

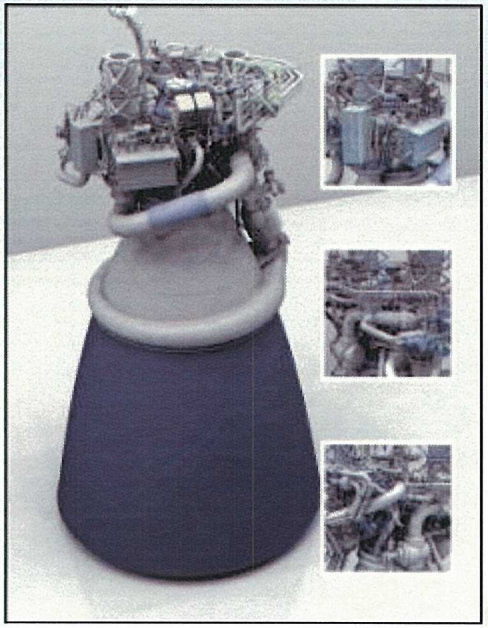
- SHOW You Tube VIDEO HERE!

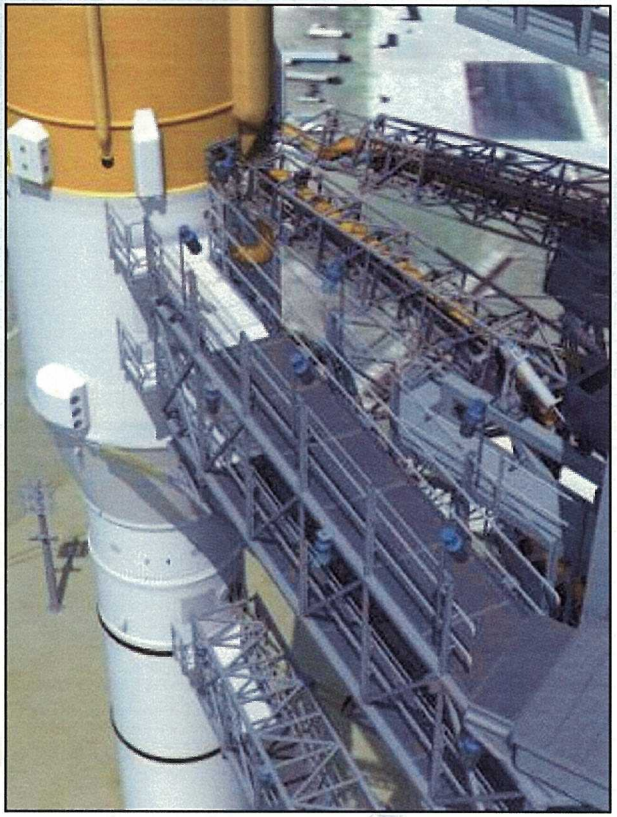
Challenges and how we use Delmia at Kennedy Space Center

- 5 Major Challenges
  - Dealing with Large Data Sets from multiple CAD systems
  - Creating & updating exiting KSC infrastructure
  - Gathering requirements and meeting customer objectives
  - Creating realistic life-like simulations
  - Providing quick turn-around on a wide variety of deliverables

Challenge 1:
Dealing with large data sets

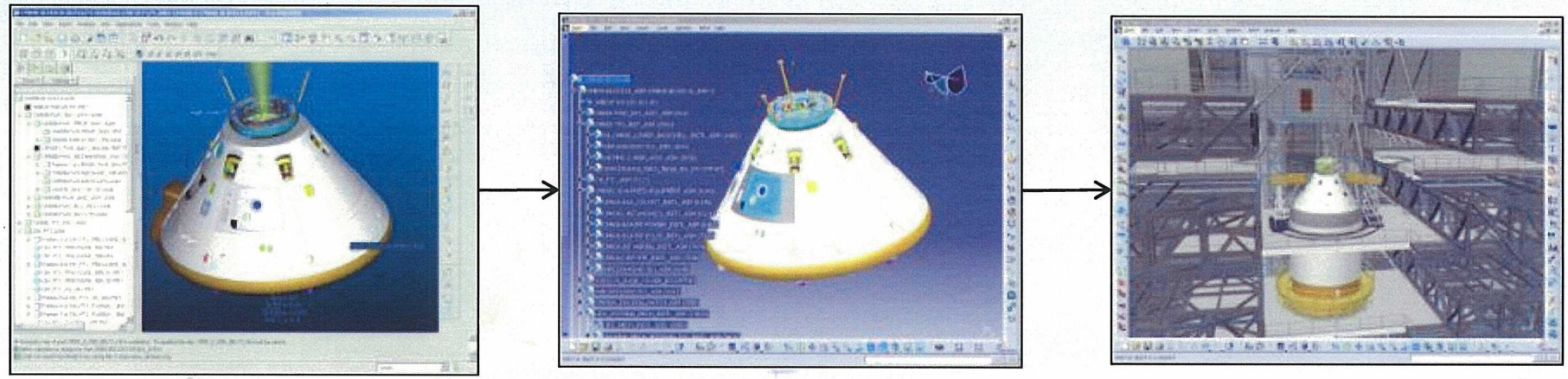
- We are not part of the traditional design cycle
- Receive CAD models from dozens of companies
- No control of file formats and configurations
- Receive huge/complex top level assemblies
- Designs are constantly changing





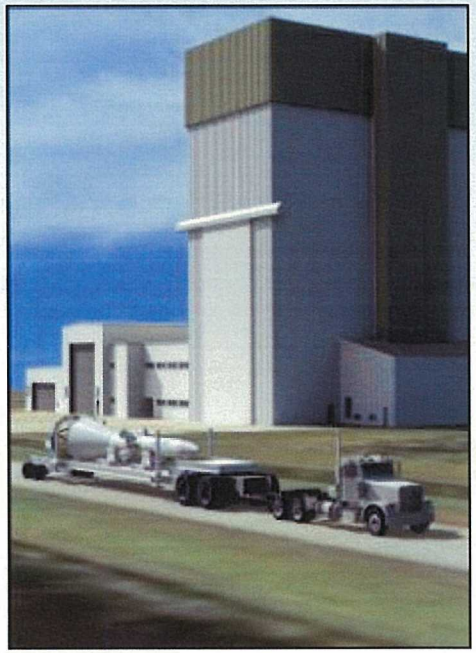
Our Delmia Solution: Dealing with large data sets

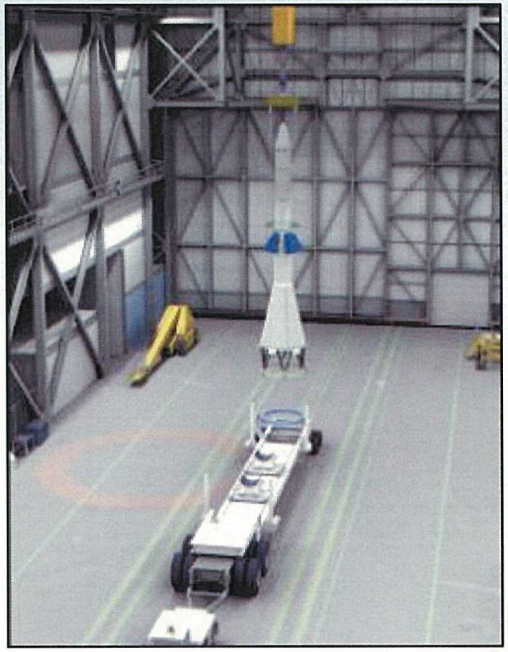
- Use native CAD tools and export STEP
- Develop custom processes
- Manage data with file system/naming
- Embed meta data into top level Products
- Use CGR's and released cache



Challenge 2:
Creating & Maintaining KSC's Infrastructure

- Most buildings at KSC were built in the 60's
- Thousands of Engineering Orders..changes
- Thousands of ground support equipment
- Limited budget & resources

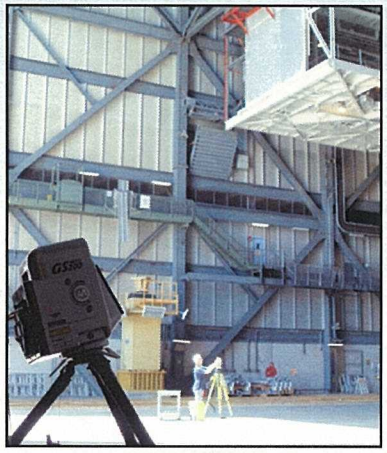




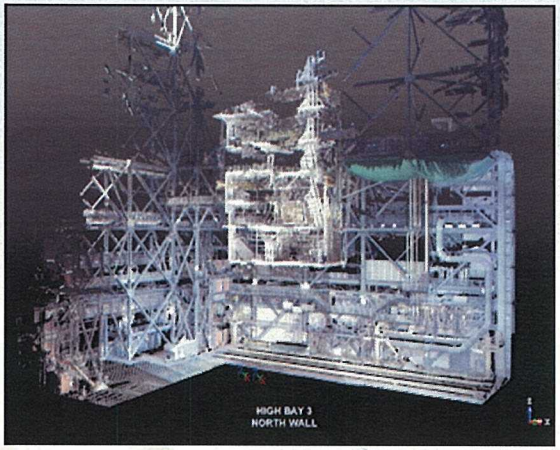
Our Delmia Solution:

Creating & Maintaining KSC's Infrastructure

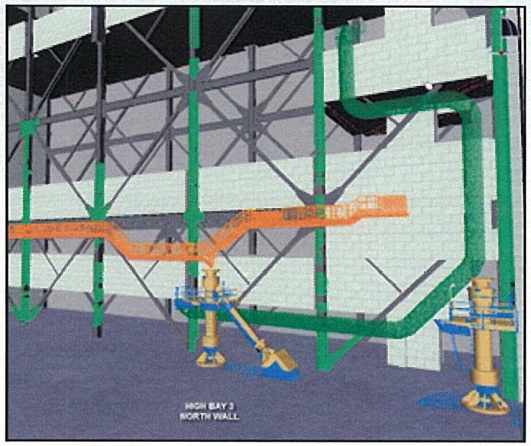
- Utilize short range and long range scanners
- Create 3D models from scan data in Delmia
- Use point clouds in simulation
- Model only what is needed
- Use texture maps when ever possible



Scanning →



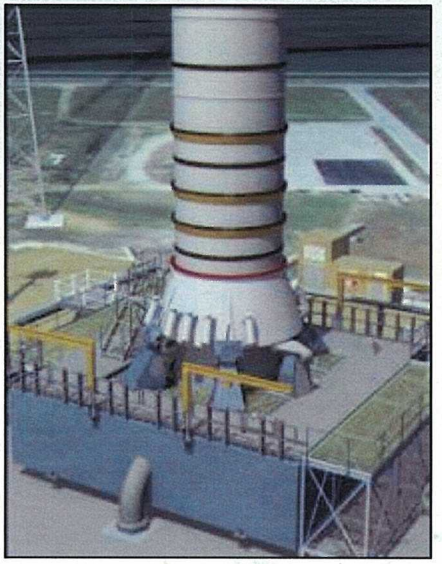
Point Cloud →



Point Cloud Integration into Simulation

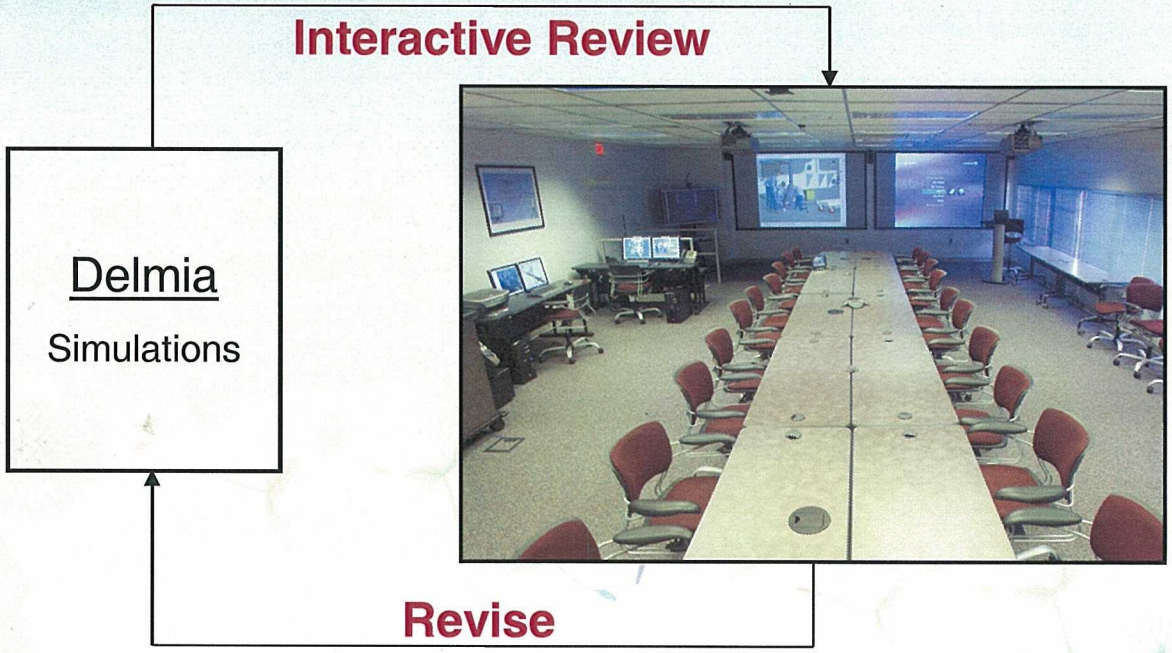
Challenge 3:
Gathering customer requirements & meeting objectives

- Way too many customers
- Way too many systems & subsystems
- Way too many ideas on how things should be done
- Extremely complex systems
- Constantly changing plans, designs, & operations
- Limited "life" of our products



Our Delmia Solution:
Gathering customer requirements & meeting objectives

- Dedicated conference room for Delmia
- Real time planning session with all stake holders
- Real time "what-if" support
- Capture all issues and email out by end of meeting
- Collaborate by streaming video to web-x server



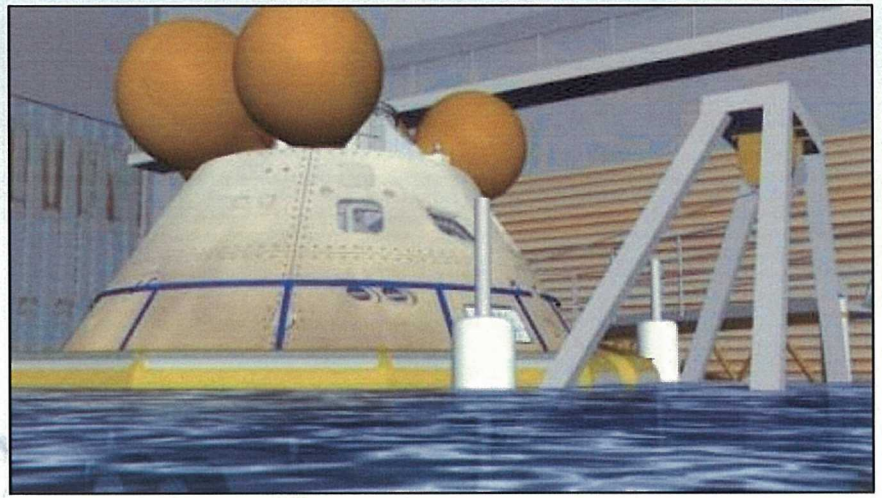
Challenge 4:
Creating Life-Like Simulations

- Engage the customer with the solution not the CAD tool
- People equate quality to accuracy
- Customers are used to seeing rich 3D environments (TV, movies)
- Our competitors use animation tools

Our Delmia Solution:

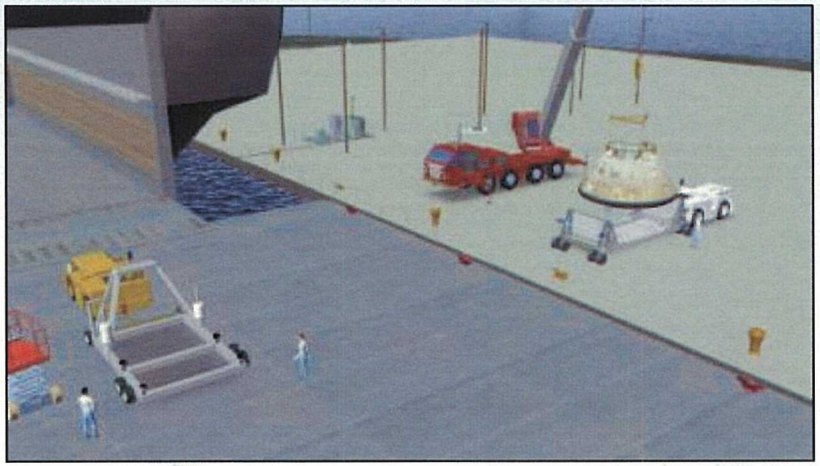
Creating Life-Like Simulations

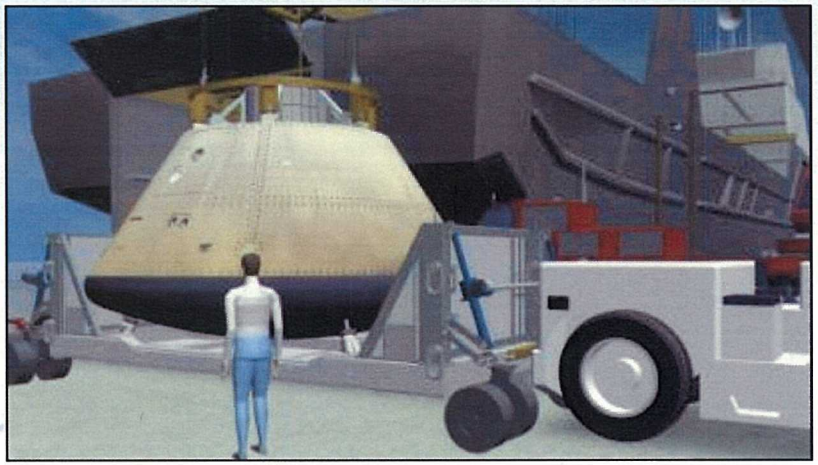
- Invest the time in creating & applying texture maps and materials
- Utilize high end Nvida graphics cards with 32xAA & lots of texture memory
- Utilize Real-time rendering options and shaders
- Utilize Photostudio



Challenge 5:
Providing quick turn-around on varied products

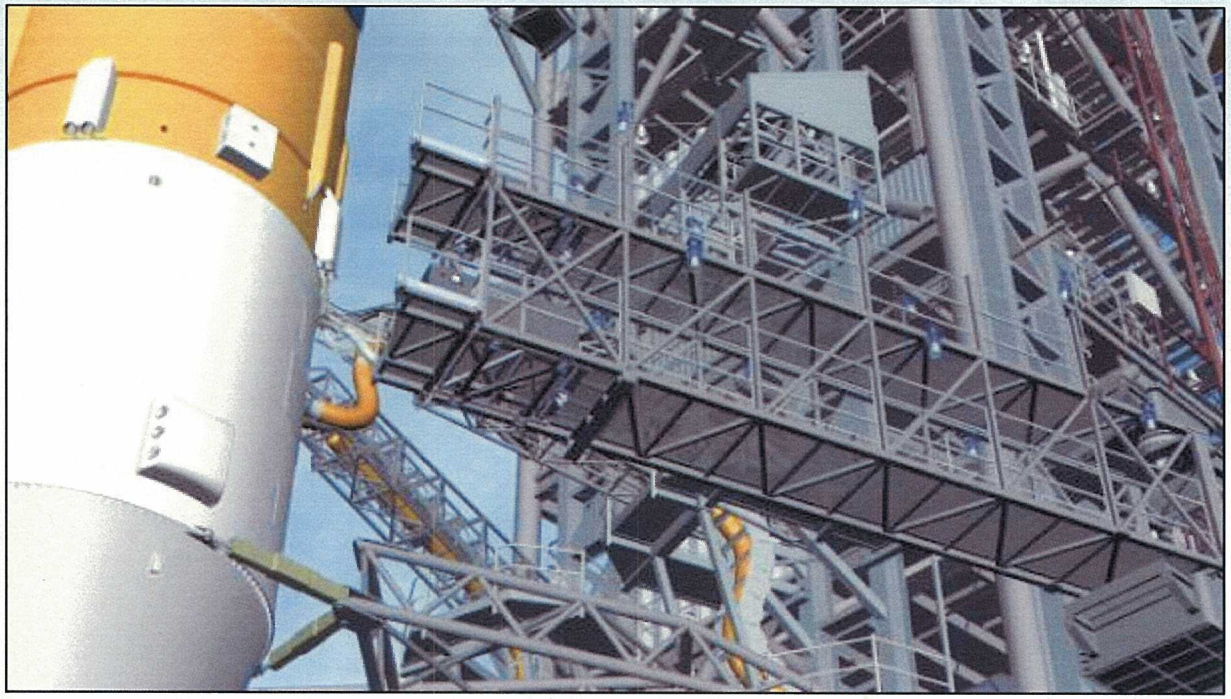
- Video's are outdated before they are finished
- Numerous still images are required
- Customers want high quality graphics at last minute
- Turning over (releasing) CAD models
- Turning over (releasing) visualization models





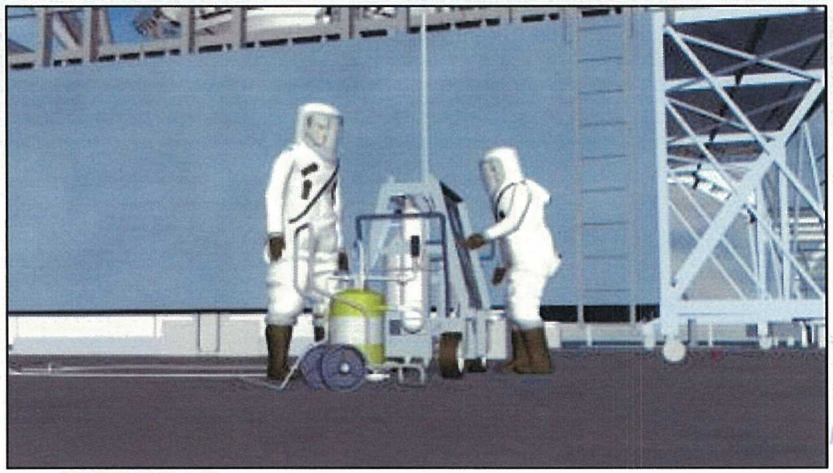
Our Delmia Solution:
Providing quick turn-around on varied products

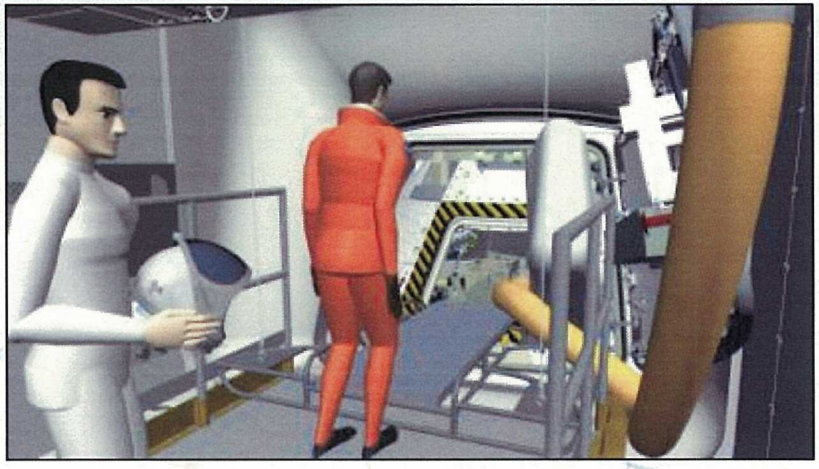
- Stream HD Delmia simulation to Non-linear editor for video production
- Create still images directly from HD video
- Photostudio rendering from Processes
- Custom STEP, VRML, OBJ exporter



Summary:
What has made us successful

- Dassault Systems Tools
  - Commonality in interface/file formats
  - Best of class applications
  - Wide/deep product offering
  - Support





Summary:
What has made us successful

- Placement under the IT organization
  - Leverage IT support
  - Wider reach into many programs and organizations
  - Share resources and cost across programs
  - Surge capability

Summary:
What has made us successful

- Multidiscipline, diverse, cross trained team
  - End-to-end product control
  - Implementation of “Value Stream Mapping”
  - Provides growth and learning opportunities
  - Stimulates new idea and business opportunities
    - FAST, COST EFFECTIVE PRODUCTS WITH HIGH QUALITY!