



# Designing the Ares I Crew Launch Vehicle Upper Stage Element and Integrating the Stack at NASA's Marshall Space Flight Center



*Neil E. Otte*

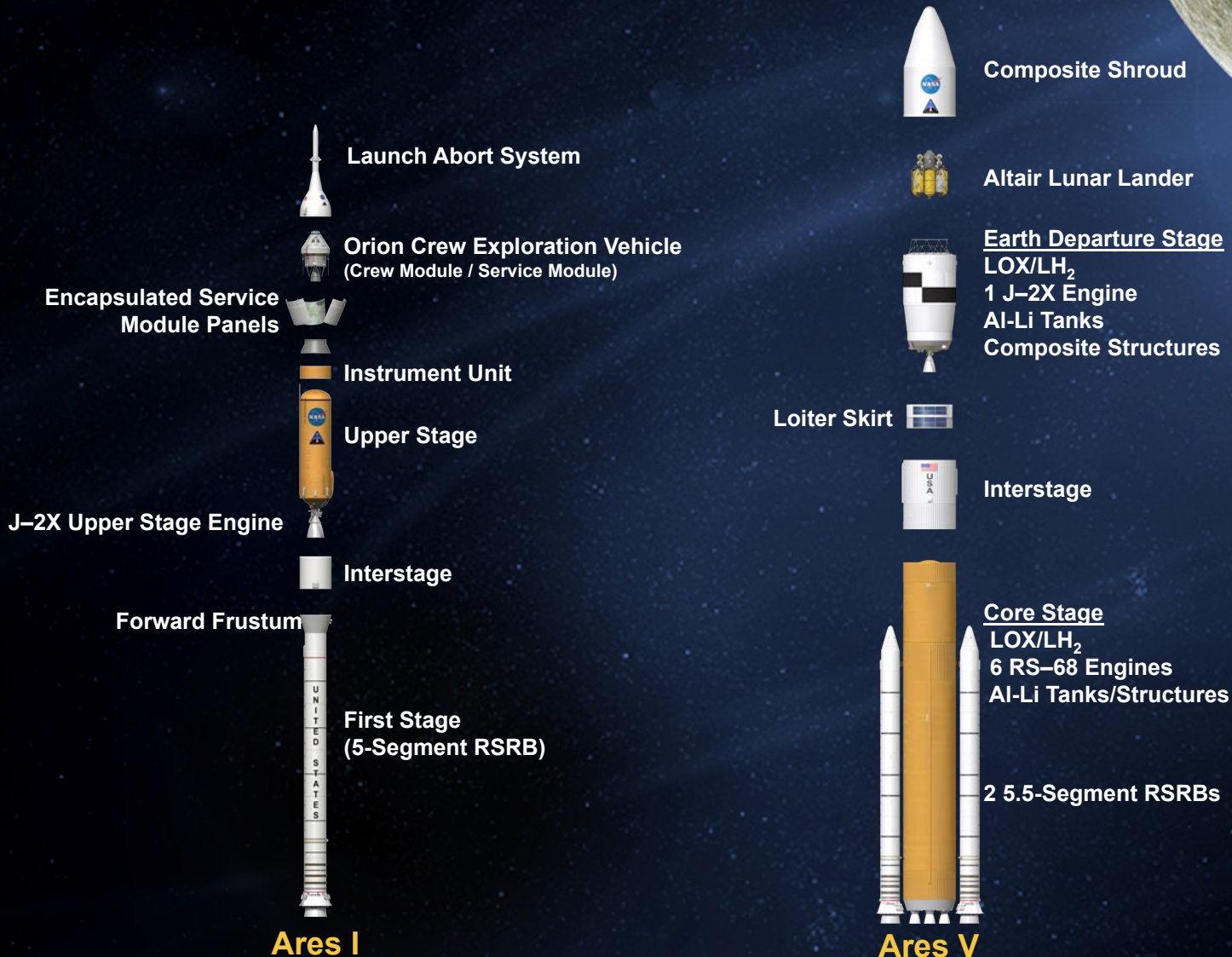
*Ares Projects Chief Engineer*

*AIAA Joint Propulsion Conference 2008*

*July 23, 2008*



# Ares I and Ares V Vehicle Elements



25.5 mT (56.2K lbm) to  
Low Earth Orbit (LEO)

71.1 mT (156.7K lbm) to TLI (with Ares I)  
62.8 mT (138.5K lbm) to TLI  
~187.7 mT (413.8K lbm) to LEO



# First Stage Accomplishments



Nozzle Process Simulation Article  
Promontory, UT



Forward Segment Propellant Core Dry Fit  
Promontory, UT



Main Parachute Fabrication/Columbia, MS  
Main Parachute Test/Yuma, AZ



Solid Rocket Motor Testing  
Promontory, UT



# Upper Stage Accomplishments



Dome Gore Panel Fabrication  
Los Angeles, CA



Dome Gore Panel Chemical Milling  
Los Angeles, CA



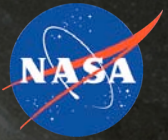
S-IVB Vent Relief Valve Test  
MSFC, AL



New Vertical Weld Tool  
MSFC, AL



# Upper Stage Engine Accomplishments



E-3 Subscale Diffuser Testing  
SSC, MS



Test Stand A-3 Foundation  
SSC, MS



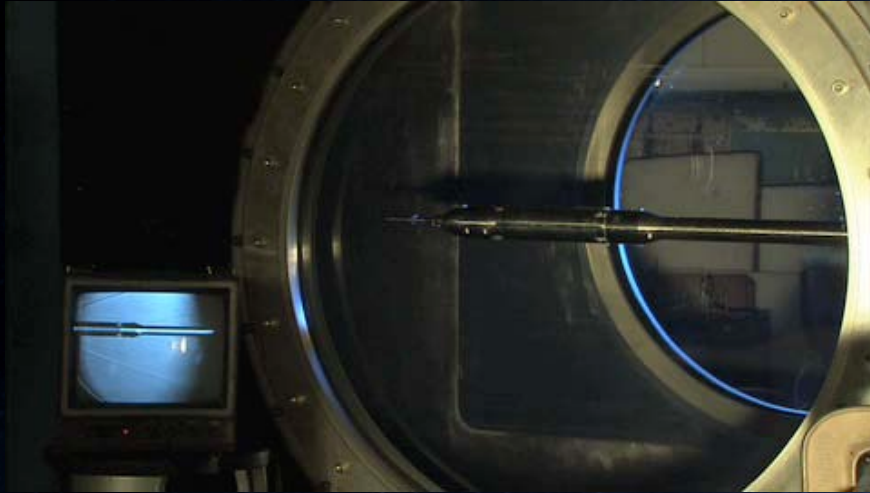
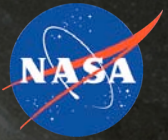
J-2X Powerpack 1A Testing  
SSC, MS



J-2X Materials Testing  
MSFC, AL



# Vehicle Integration Accomplishments



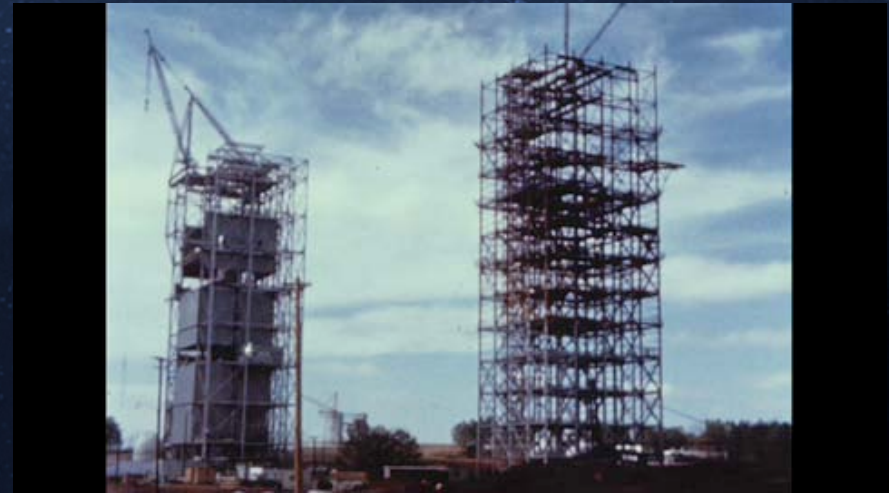
Boeing Polysonic Wind Tunnel  
St. Louis, MO



3% First Stage Reentry Testing  
Arnold Air Force Base, TN



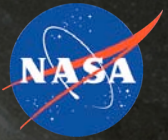
Ares I-X Rigid Buffet Model  
LaRC, VA



Dynamic Test Stand Renovation  
MSFC, AL



# Ares I-X Accomplishments



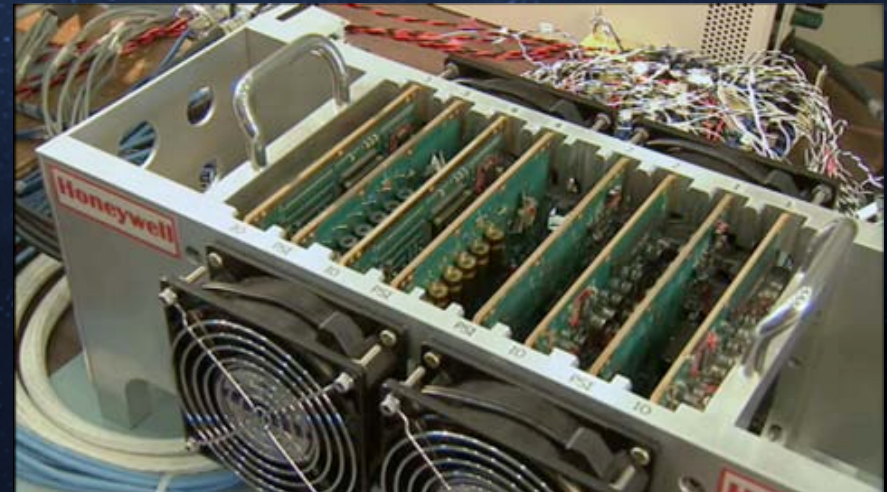
Upper Stage Simulator Assembly  
GRC, OH



Roll Control System Test and Fabrication  
Huntsville, AL and WSTF, NM



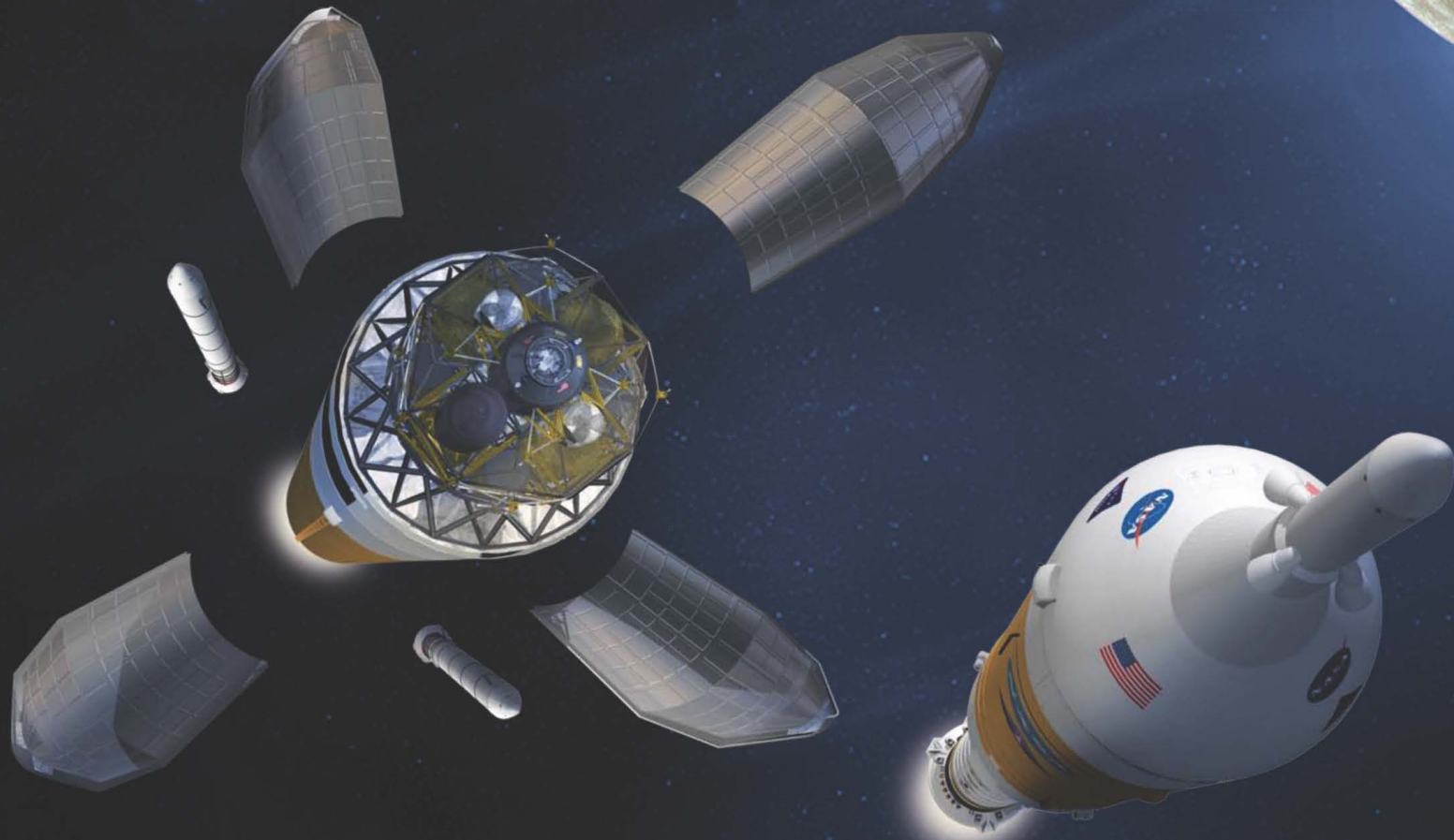
Forward Frustum Fabrication  
Indianapolis, IN



First Stage Actuator Systems Testing  
MSFC, AL

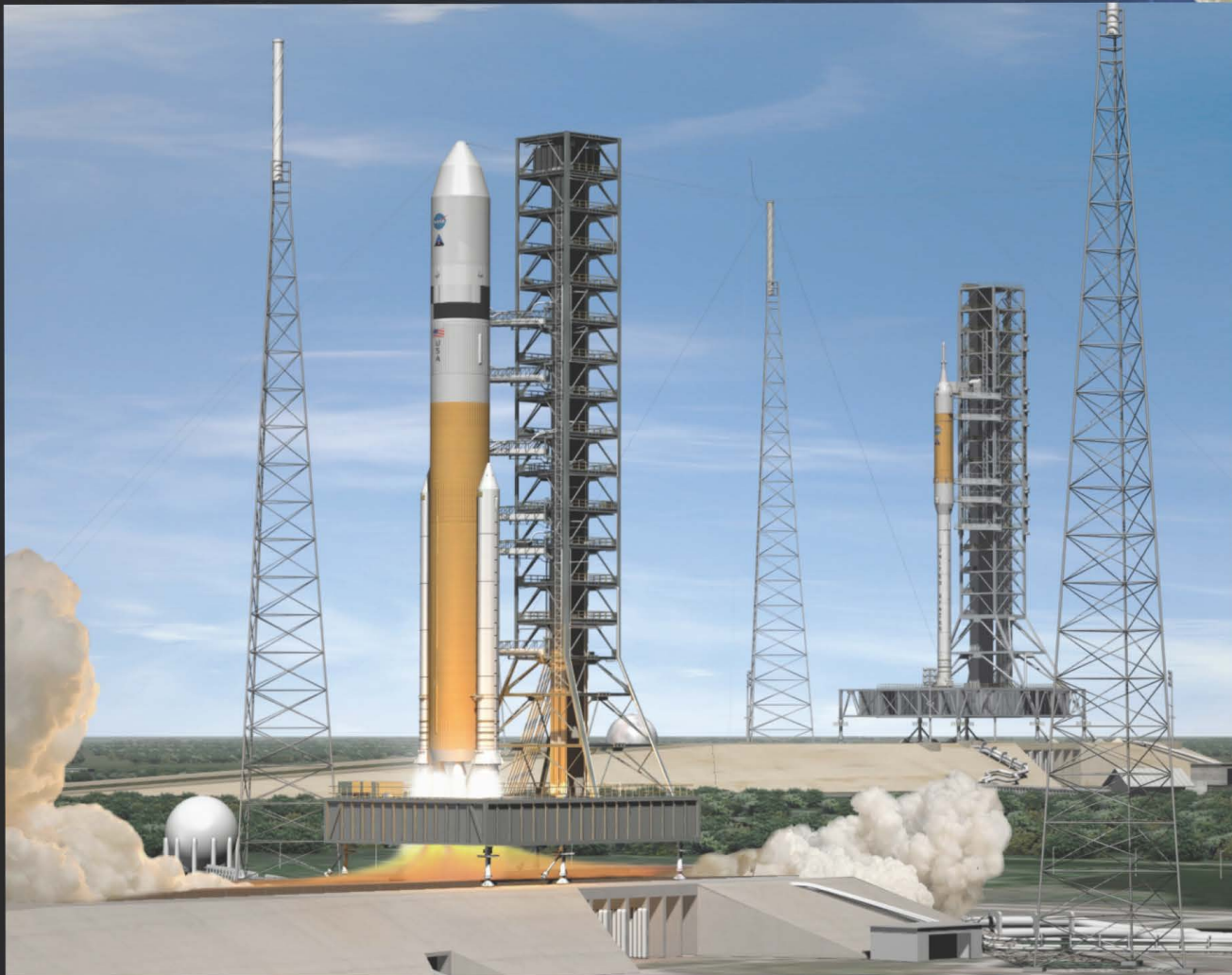


# The Next Giant Leap in Space Exploration





# Questions?



[www.nasa.gov/ares](http://www.nasa.gov/ares)