COMPOSITES FOR EXPLORATION UPPER STAGE

2014-2017

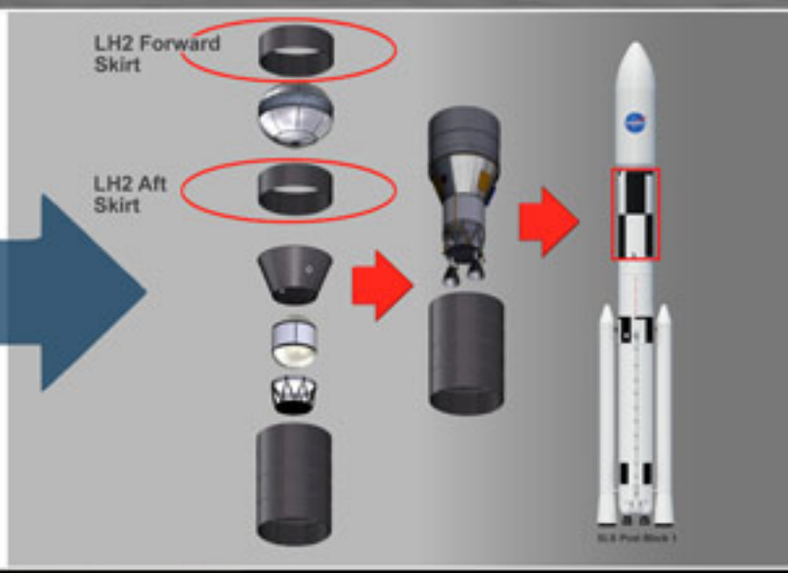
LIGHT WEIGHT

REDUCED COST

THERMAL EFFICIENCY

DEMONSTRATE CONFIDENCE

LH2 Forward Skirt & LH2 Aft Skirt



CEUS

The Exploration Upper Stage (EUS) is needed for the SLS to provide additional capability to travel to deep space. This project will design, build and test a composite LH2 forward and LH2 aft skirt to demonstrate composite structures under relevant environments at the 8.4m diameter scale.

- Composite upper stage improvements over a state-of-the-art metal upper stage include the following advantages:
  - Mass reduction of 20%
  - Cost reduction of 20%
  - Enhanced thermal/boil-off performance.
- The objective is to provide designers a validated alternative structural material candidate in future trade studies for SLS as well as other large space vehicle structures and space science platform structures.

Accelerated Building Block Approach

COUPON & JOINT TESTING

Laminate and sandwich panel coupons generated at multiple NASA sites for equivalency

STRUCTURAL CONCEPTS, DESIGN & ANALYSIS

Structural Test Article Design & Optimization of Virtual Flight Model

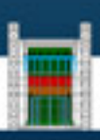
ADVANCED MANUFACTURING

Fabricate 8-segment forward and aft skirt to fit in a 20ft autoclave

MANUFACTURING ANALYSIS & SIMULATION

Test article models and analyses validation

TEST- ANALYSIS CORRELATION



Model correlation will help test predictions