

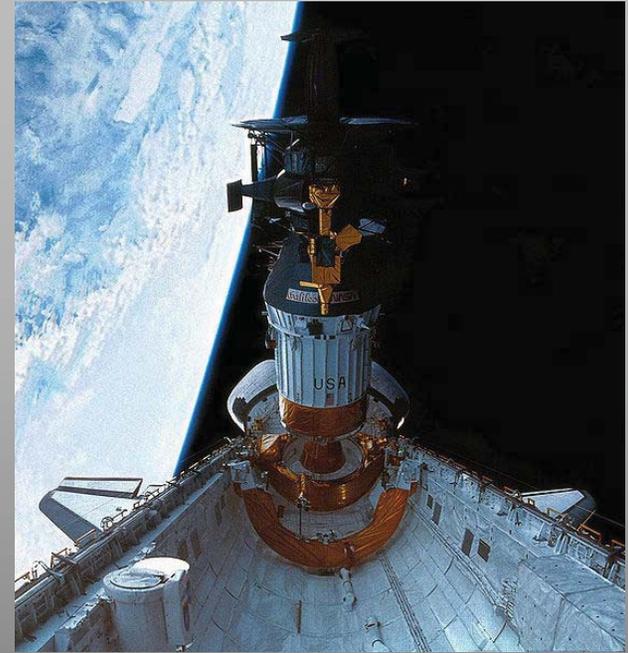


# Space Launch System The Future of Exploration

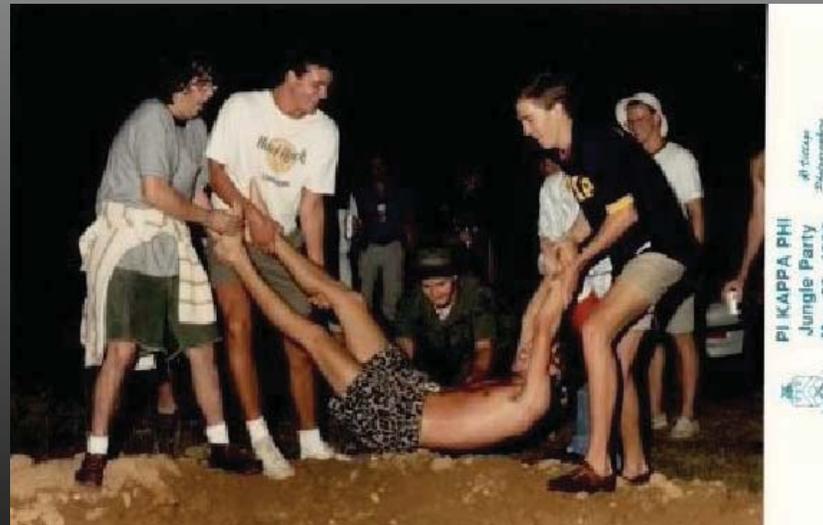
**Brian Matisak, Ground Operations Liaison  
Manager**

[Degree(s) from A.U.: Aerospace  
Engineering]

November 15, 2013



1989





# How I Got Here From AU College of Engineering





STEM Movie with college students and young engineers, etc.



# A Deeper Purpose, A Bolder Mission



**“To reach for new heights...**

and reveal the unknown so that what we do  
and learn will benefit all humankind.”



SLS is the  
first step  
in the  
**journey**  
to Mars



Going to Mars will be difficult.  
**SLS provides the power that it takes.**



## Earth-Sun Libration Points

Serviceable Large Diameter Telescopes



## Asteroids

Human missions

Robotic missions with sample return



## Mars, Phobos, Deimos

Human missions

Single-launch robotic sample return



## Deep Space/Planetary

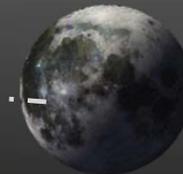
Robotic sample return missions

Reduced flight time (years)



## Earth-Moon Libration Points

Way station



## Commercial Space Stations

Large diameter  
Single launch

## Moon

Large-scale robotic precursor missions  
Human settlement with resource utilization

#SLSInspires

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



# NASA'S Space Launch System

## **Orion:**

Carrying astronauts into deep space

## **Core Stage:**

Newly developed for SLS, the Core Stage towers more than 200 feet tall

## **RS-25 Engines:**

16 Space Shuttle engines are already in inventory

## **Interim Cryogenic Propulsion Stage:**

Based on the Delta IV Heavy upper stage; the power to leave Earth

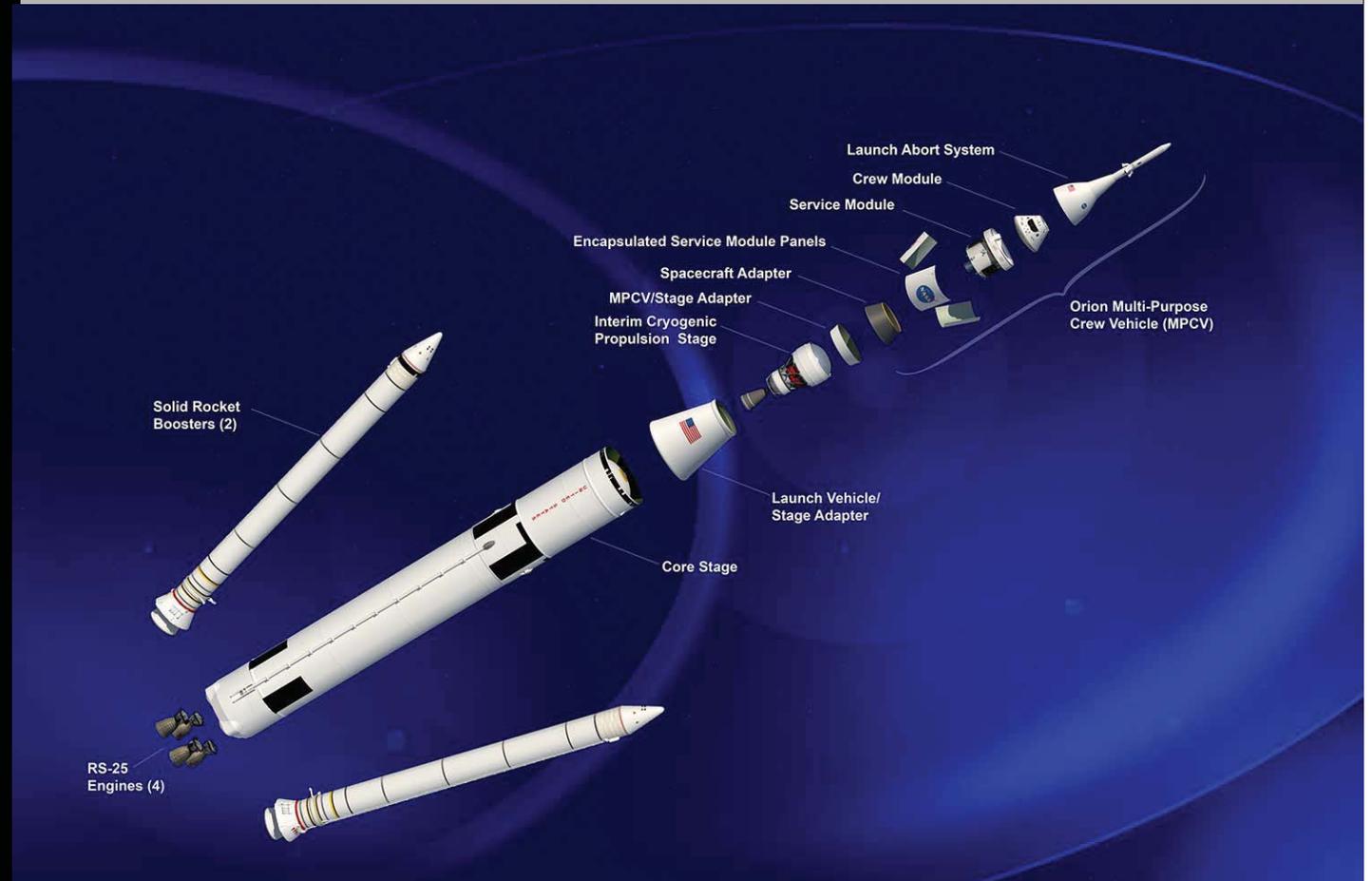
## **Solid Rocket Boosters:**

Built on Space Shuttle hardware; more powerful for a new era of exploration





# 70 Metric Ton Expanded View





# NASA's Space Launch System



Launching Soon.  
Building Today.



# SLS Nationwide Team

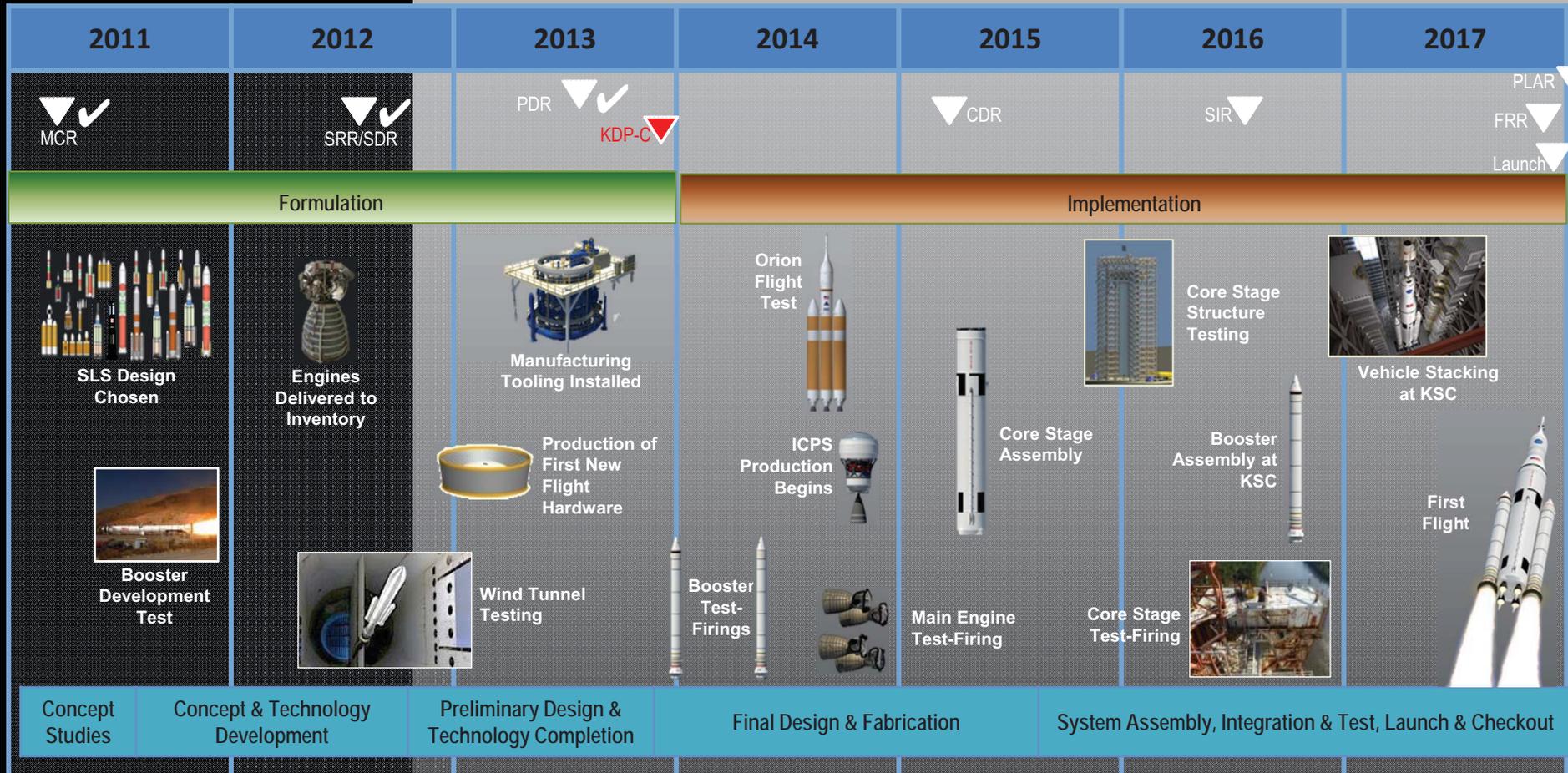


- ◆ Engaging the U.S. Aerospace Industry
- ◆ Strengthening Sectors such as Manufacturing
- ◆ Advancing Technology and Innovation

**224 Subcontracts in 30 States**



# SLS Development Schedule



MCR: Mission Concept Review	CDR: Critical Design Review
SRR: System Requirements Review	SIR: System Integration Review
SDR: System Definition Review	FRR: Flight Readiness Review
PDR: Preliminary Design Review	PLAR: Post-Launch Asses. Review



**'Stack it.  
I'm  
ready.'  
-Tony  
Antonelli**



# Exceeding Expectations



## Engines

Tested selective laser melted part on J-2X at Stennis Space Center (March 2013)



## Boosters

Conducted Thrust Vector Flight Control Test at ATK in Promontory, UT (Jan 2013)

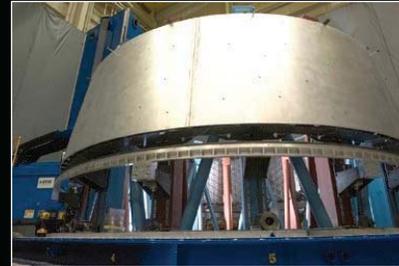


## Core Stage

Transferred Core Stage test panels to Michoud Assembly Facility (MAF) in New Orleans (Spring 2013)



First Core Stage barrel section welded at MAF (July 2013)



## Spacecraft & Payload Integration

Conducted fit-check of the Multi-Purpose Crew Vehicle Stage Adapter at the Marshall Space Flight Center for 2014 Exploration Flight Test (June 2013)

## Advanced Development

Conducted F-1 engine hot-fire testing at Marshall (Jan 2013)



## Systems Engineering & Integration

Tested buffet model in Langley Research Center's Transonic Dynamics Wind Tunnel (Jan 2013)



## On Course for First Flight in 2017



# How Your Major/ Career Connects

## Auburn University College of Engineering Degrees

- ◆ Aerospace Engineering
- ◆ Biosystems Engineering
- ◆ Chemical Engineering
- ◆ Civil Engineering
- ◆ Environmental Science
- ◆ Computer Science
- ◆ Software Engineering
- ◆ Wireless Engineering
- ◆ Electrical Engineering
- ◆ Industrial and Systems Engineering
- ◆ Mechanical Engineering
- ◆ Materials Engineering (Department of Mechanical Engineering)
- ◆ Polymer and Fiber Engineering



Tim Owen



Todd May (SLS Program Manager)



Chris Crumbly



Jan Davis



Dave Whitten



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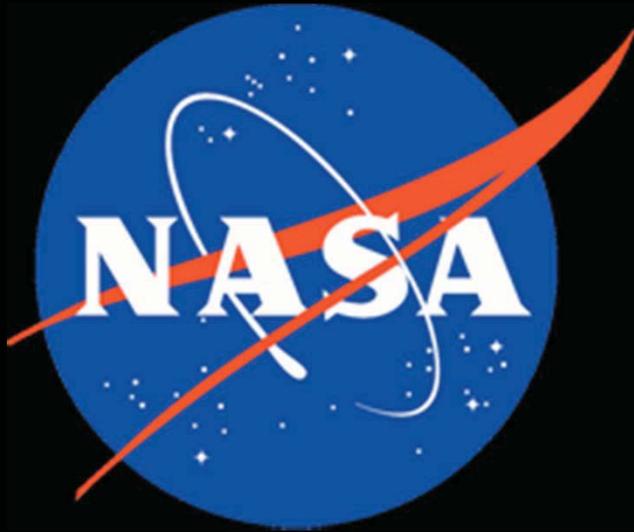
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“Man cannot discover  
**new oceans**  
unless he has the  
**courage to lose**  
**sight of the shore.”**

Join us on  
**the journey**

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# Questions & Answers