



# marshall update 2014

Together, we make bold things happen.

# marshall



# Agenda

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## Welcome

Bobby Watkins – Director, Office of Strategic Analysis & Communications

## Marshall Update Introduction

Patrick Scheuermann – Director, Marshall Space Flight Center

## Marshall 2014 Accomplishments

Teresa Vanhooser – Deputy Director, Marshall Space Flight Center

## Panel

Moderated by **Teresa Vanhooser** – Deputy Director, Marshall Space Flight Center

**Todd May** – Manager, Space Launch System Program Office

**Daniel Schumacher** – Manager, Science & Technology Office

**Lisa Watson-Morgan** – Manager, Chief Engineers Office

**Rhega Gordon** – Deputy Chief Financial Officer

## Contractor Awards



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**Bobby Watkins**

**Director, Office of Strategic Analysis and Communications**





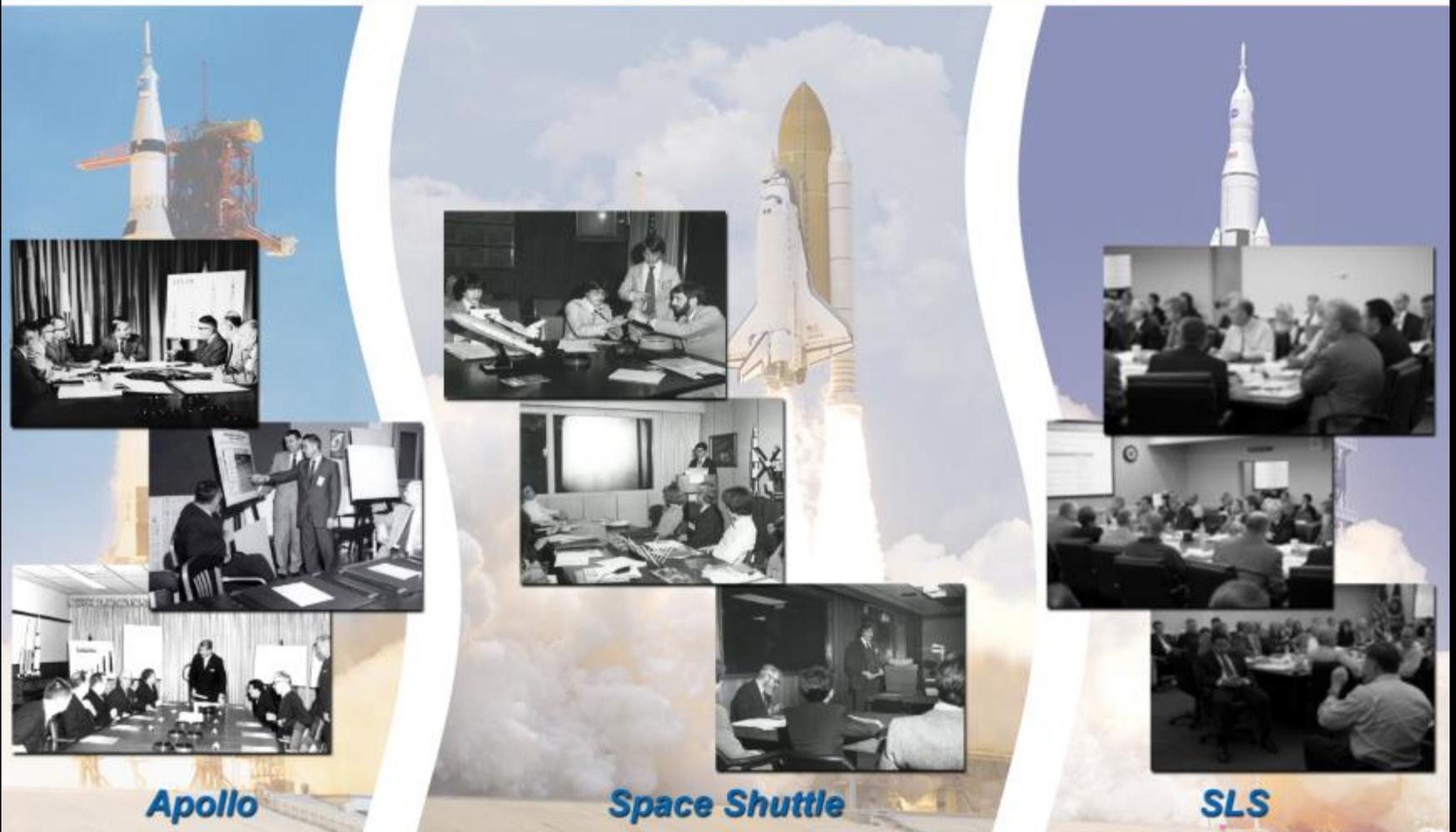
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**Patrick Scheuermann**

**Director, Marshall Space Flight Center**

# Standing on the shoulders of giants... ...delivering the next great ship.

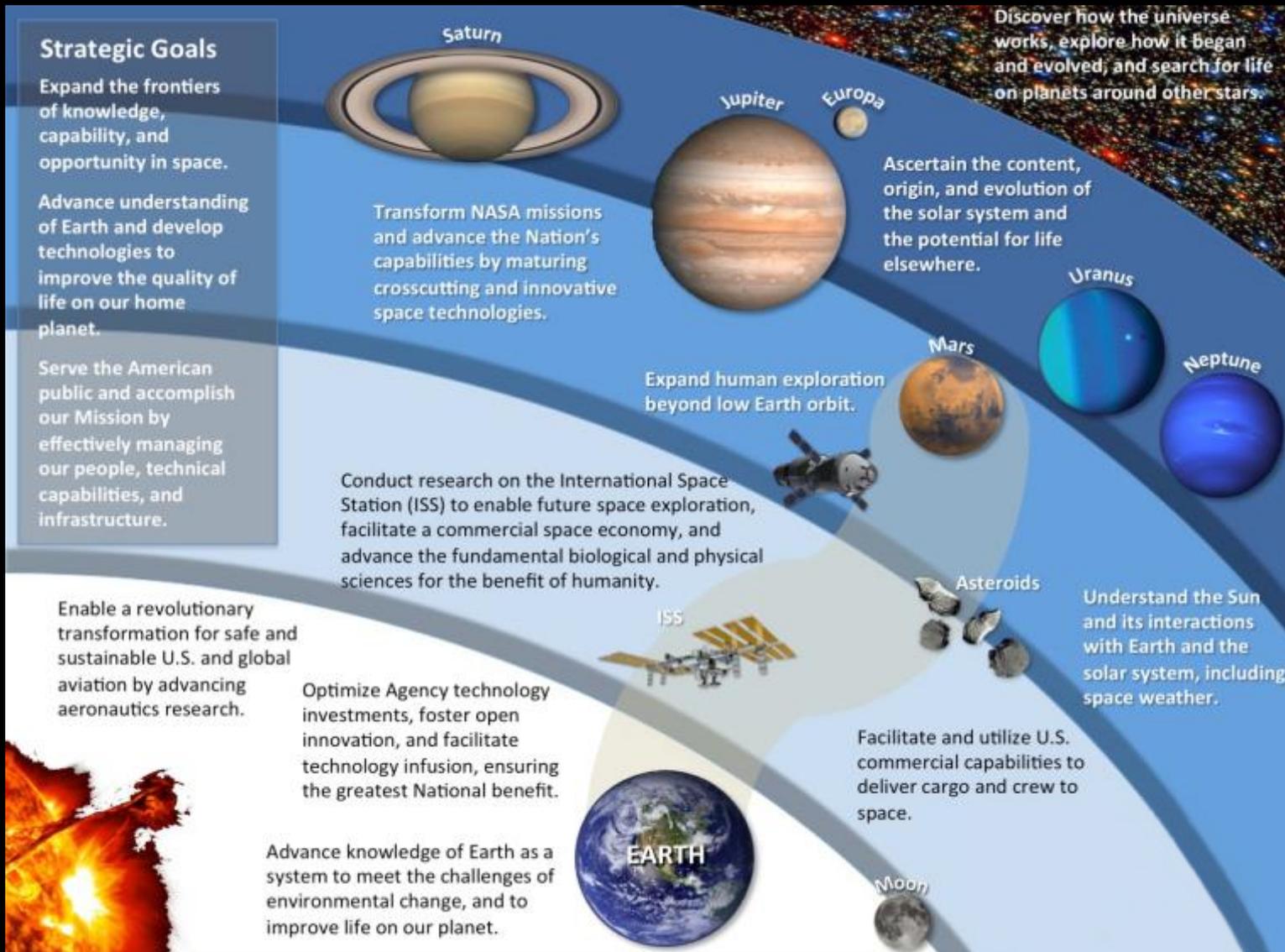


**Apollo**

**Space Shuttle**

**SLS**

# NASA Strategic Goals



# Updating Infrastructure for New Mission Needs



## Providing a more efficient operation

- 30% reduction in energy intensity by 2015
- 26% reduction in potable water use by 2020
- 15% sustainable buildings by 2015



**4.5 million square feet**

of space occupied  
in Huntsville

**1,841 acres**

on Redstone Arsenal

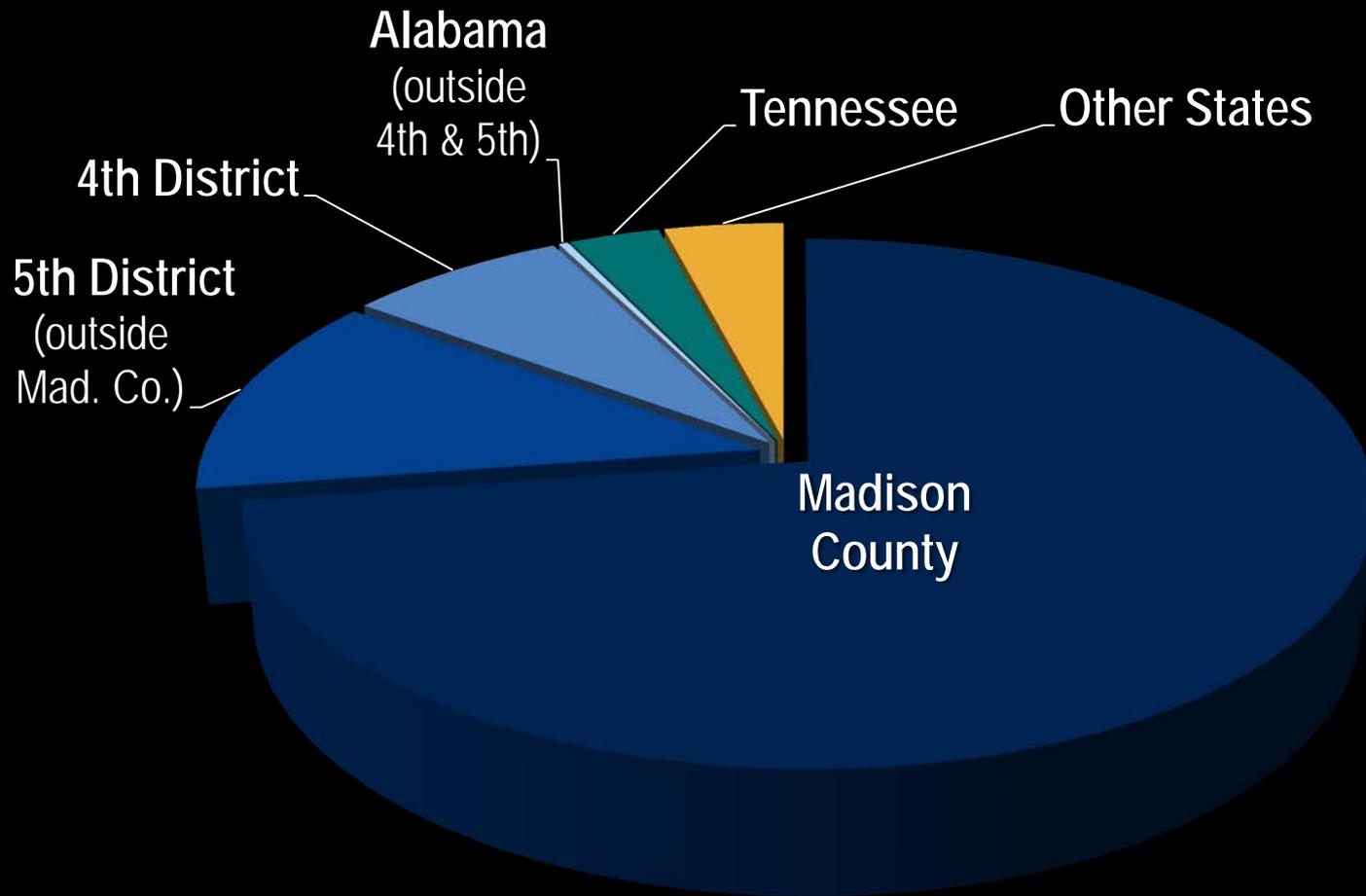


**2.2 million square feet**

of manufacturing space at  
Michoud Assembly Facility

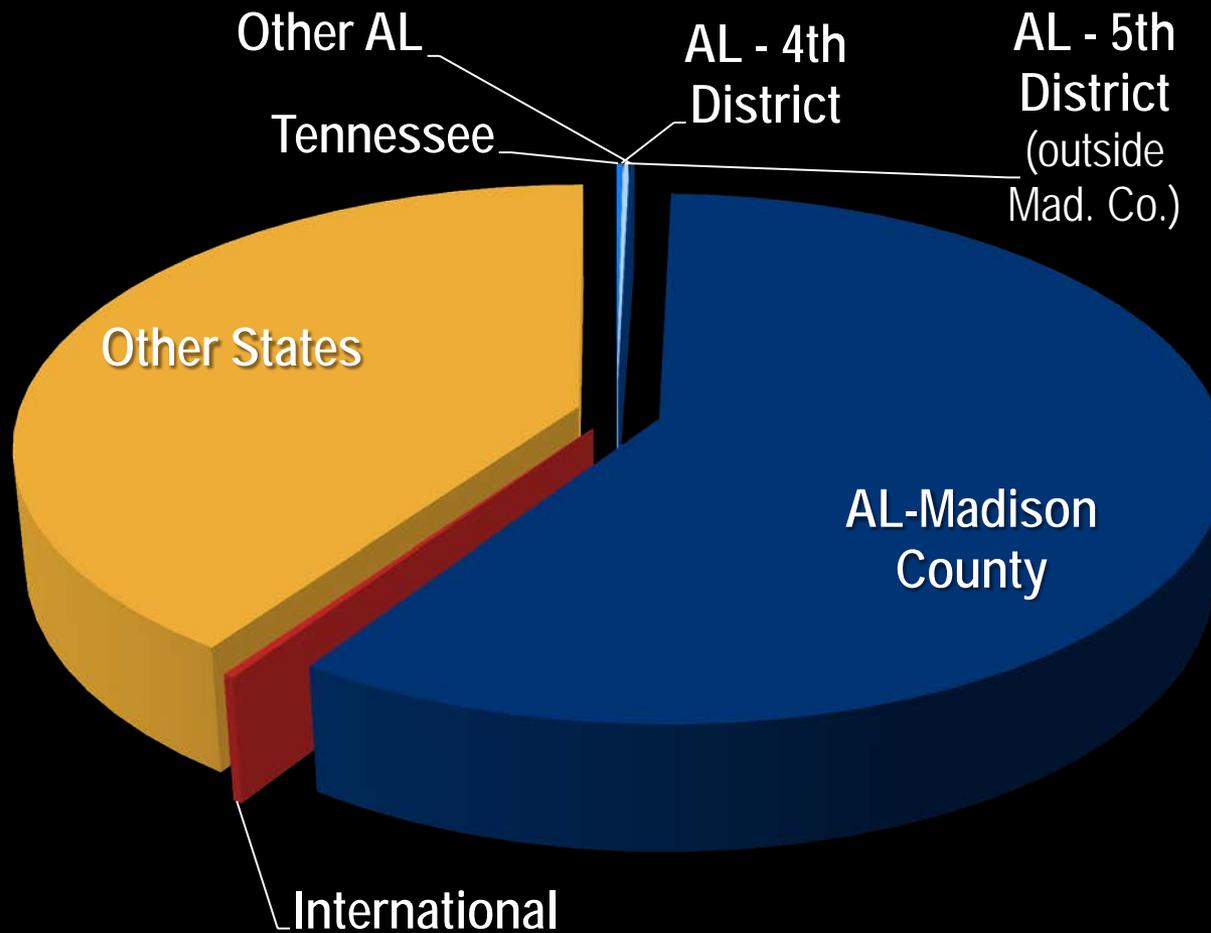
# Marshall Employees and Associated Labor Income

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# Marshall Procurement

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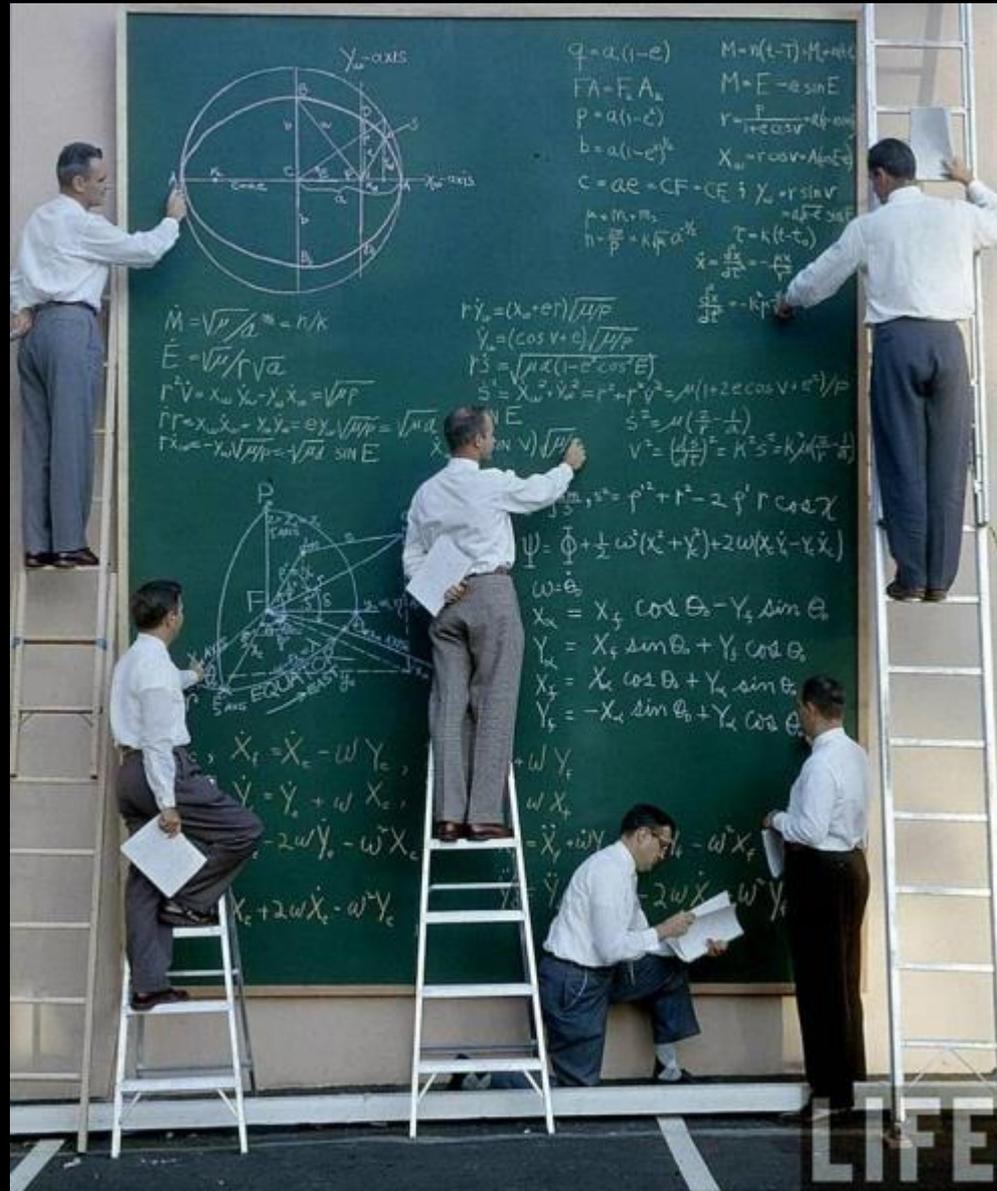


# Administrator's Cup Presented to Marshall

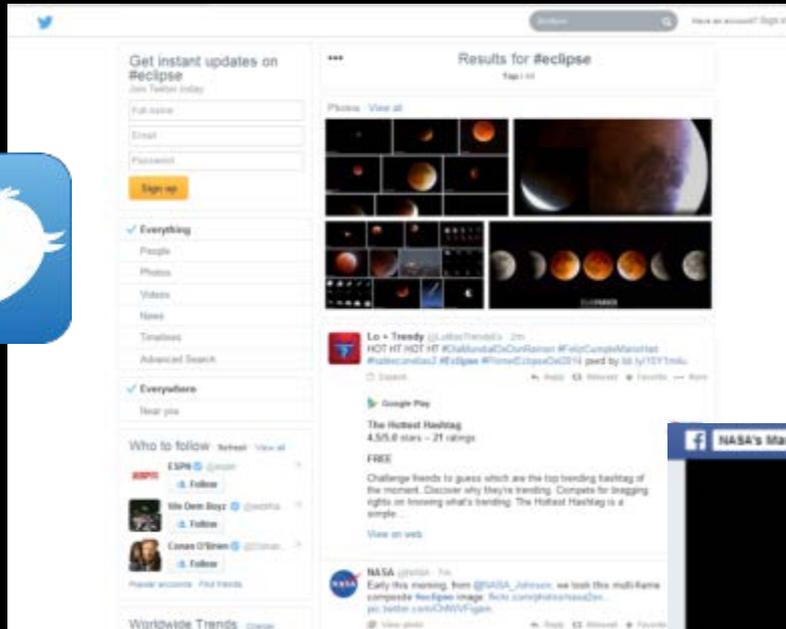
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# Technology



# Social Media Success



views

Ustream: 2.2 million

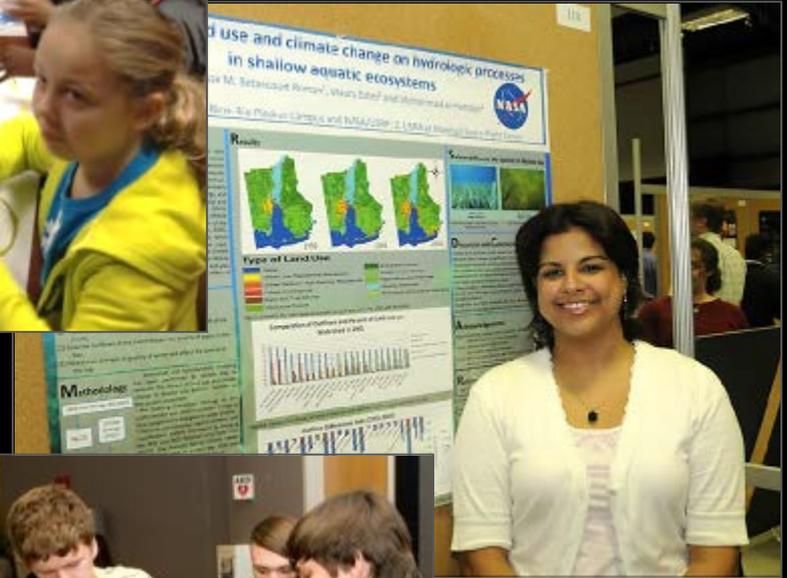
Chat page: 1.4 million

Flickr: 50,000

April 14  
Lunar Eclipse  
Social Media Metrics

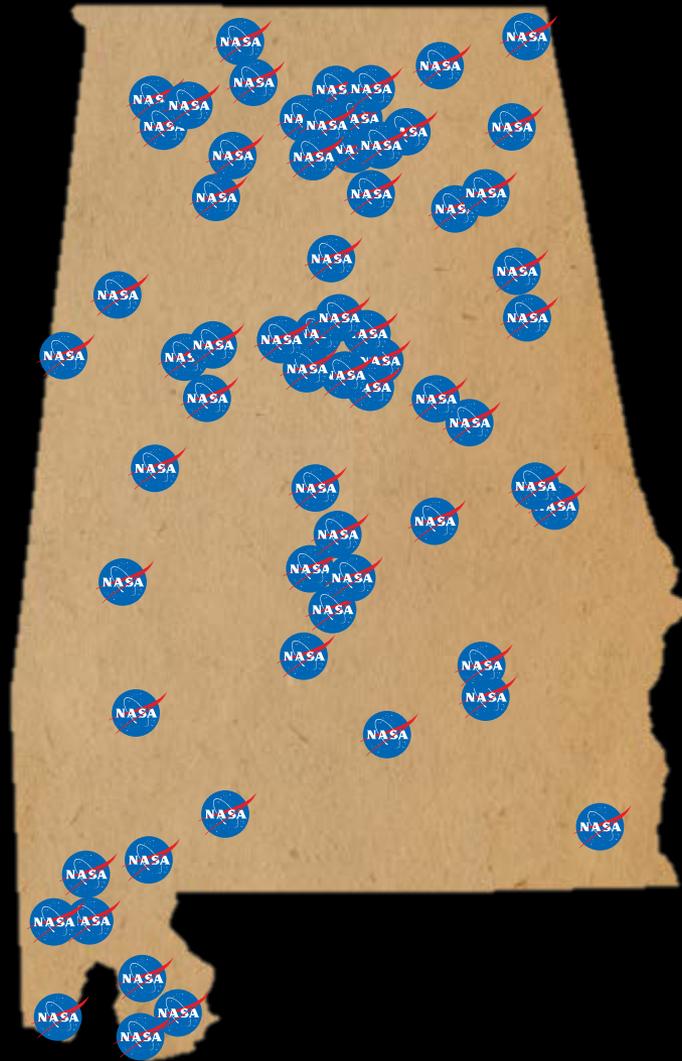


# Workforce Development - STEM



# Educational Outreach Across Alabama

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**Teresa Vanhooser**

**Deputy Director, Marshall Space Flight Center**

# Marshall's Upgraded Payload Operations Integration Center Enhances Station Work



# Marshall Celebrates International Space Station 15th Anniversary

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# Hot-Fire Tests Show 3-D Printed Rocket Parts Can Stand the Heat

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# Marshall's Mighty Eagle Improves Autonomous Landing Software with Successful Flight

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# Marshall, Goddard Scientists Team for Dual-Purpose Science Balloon Mission

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# NASA 'House Teams' Ready for FIRST Robotics Competitions



# Building 4220 Complete to Help Affordably Manage Our Facilities

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# Office of Chief Information Officer Positions Agency as Leader in Integrated Business Systems

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## **Teresa Vanhooser**

**Deputy Director, Marshall Space Flight Center**

**Todd May**

**Manager, Space Launch System Program Office**

**Daniel Schumacher**

**Manager, Science & Technology Office**

**Lisa Watson-Morgan**

**Manager, Chief Engineers Office**

**Rhega Gordon**

**Deputy Chief Financial Officer**



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**Todd May**

**Manager, Space Launch System Program Office**

# Space Launch System Recent Accomplishments

**Launch Vehicle Stage Adapter:** Contract awarded in February 2014.

**Avionics:** Flight software tested at Armstrong using F-18 in November 2013; avionics "first light" marked in January 2014.



**Boosters:** Thrust Vector Control test conducted in October 2013; preparations underway for QM-1.



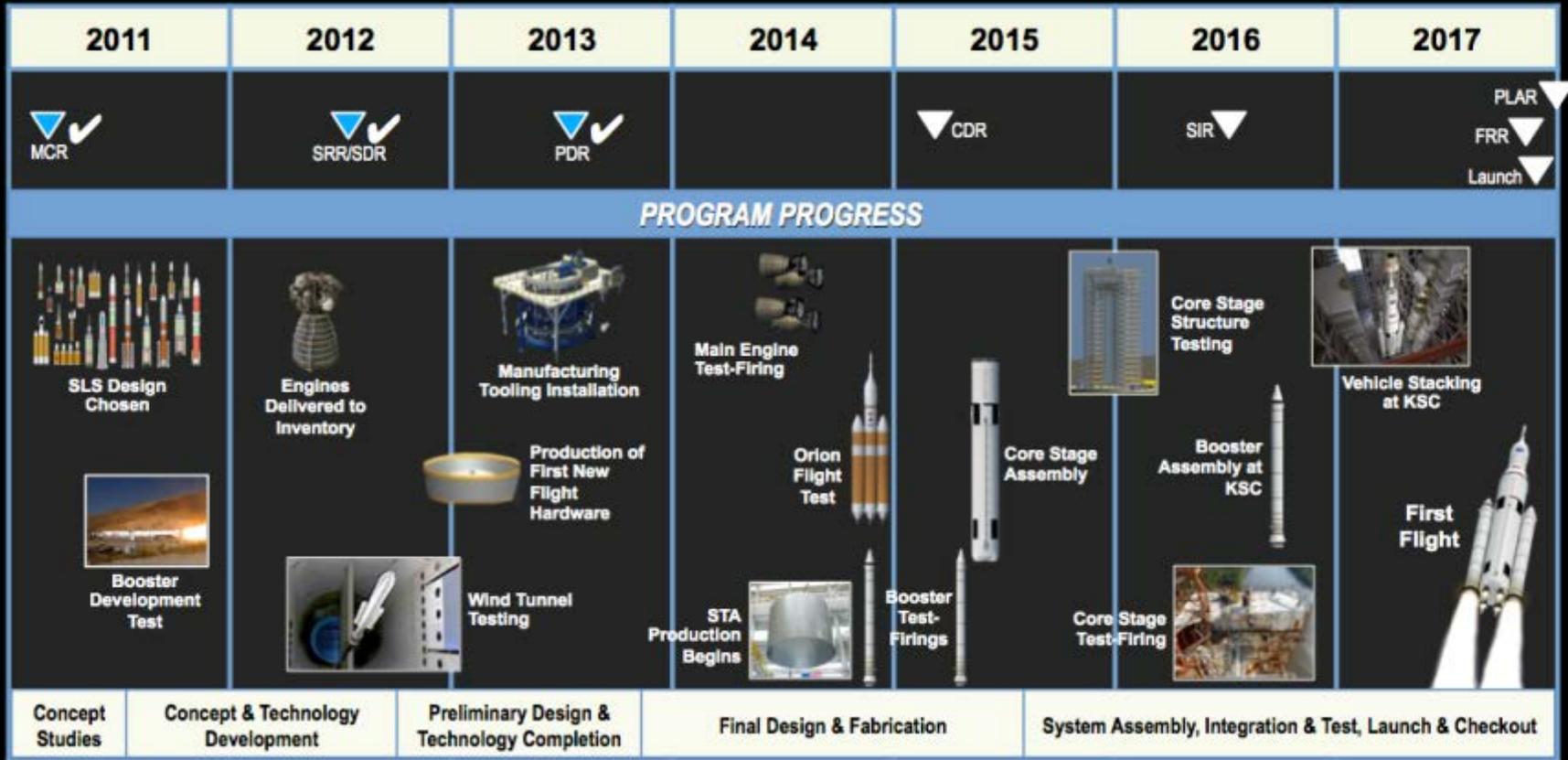
**MPCV-to-Stage Adapter:** First flight hardware delivered to ULA for Exploration Flight Test-1 in Fall 2014.

**Core Stage:** Initial confidence barrels and domes completed; MAF tooling installation to be completed in July 2014.



**Engines:** Thrust frame adapter fitted to A-1 stand at Stennis; RS-25 testing begins July 2014.

# 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





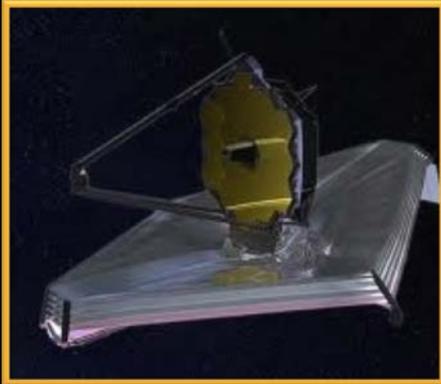
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**Daniel Schumacher**

**Manager, Science & Technology Office**

# JWST Completes Testing at MSFC



# Scientific Research

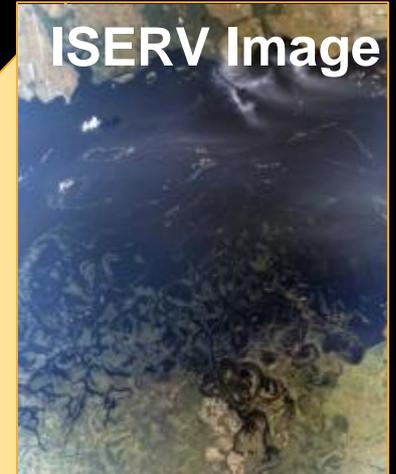
Russian X-Ray  
Telescope Mission



ISS



ISERV Image



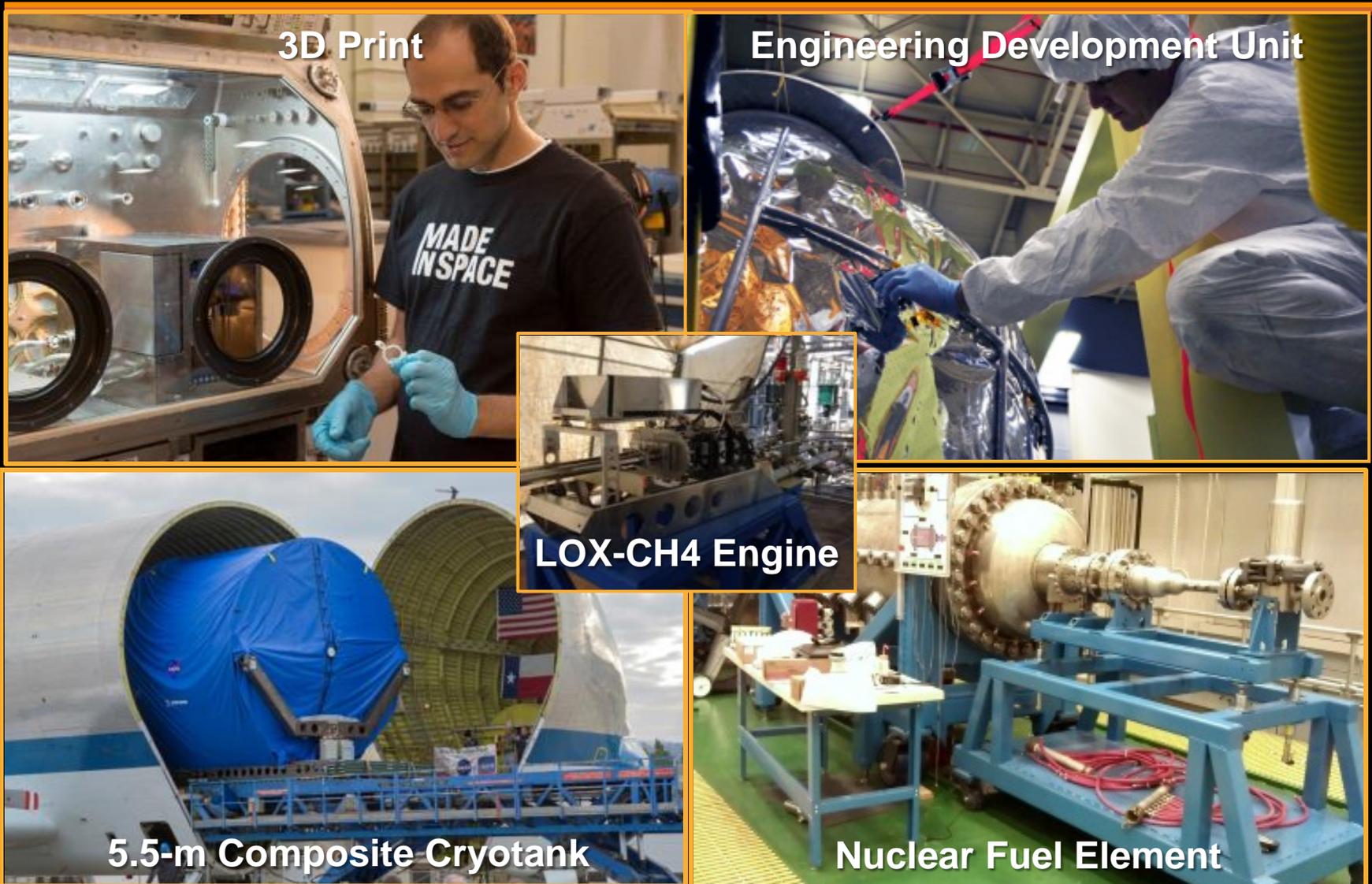
LIS Capability



Chandra



# Technology Development







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**Lisa Watson-Morgan**  
Manager, Chief Engineers Office

# Engineering at Marshall: How we work

## Advanced Concepts



- Concept Definition, Integration, & Analysis
- Architecture Analysis
- Technology Assessments
- Feasibility Studies
- Concept Evaluation

## Space Systems



- Instruments & Payloads
- Environmental Control & Life Support Systems
- Electronics
- Software
- Small Mechanical Systems
- Fabrication & Assembly Services

## Spacecraft & Vehicle Systems



- Systems Engineering & Integration
- Structural Design and Analysis
- Loads & Dynamics
- Mechanisms
- Aero-sciences
- Thermal Design, Analysis, & Control
- Modeling & Simulation
- Guidance, Navigation, & Control
- Terrestrial & Space Environments

## Propulsion Systems



- Propulsion Engineering
- Liquids & Solids
- Component Design and Development
- Fluid Systems Design & Analysis
- Computational Fluid Mechanics
- In-Space Propulsion
- Nuclear Propulsion

## Mission Operations



- Ground Systems Research and Development
- Operation Concepts Analysis and Development
- Mission Operations Planning, Training and Execution
- Supportability & Logistic SE&I
- Ground Support Equipment SE&I
- Operations Facility Management

## Materials & Processes



- Metallics
- Composites
- Ceramics
- Environmental Effects
- Fracture & Failure Analysis
- NDE & Tribology
- Chemistry & Combustion Research
- Materials Control& Informatics
- Advanced Manufacturing

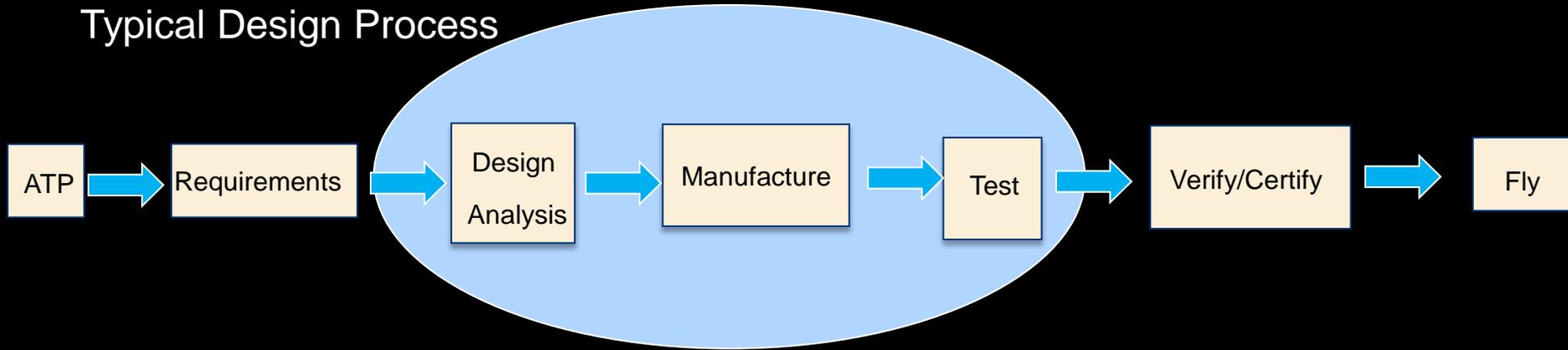
## Test Lab



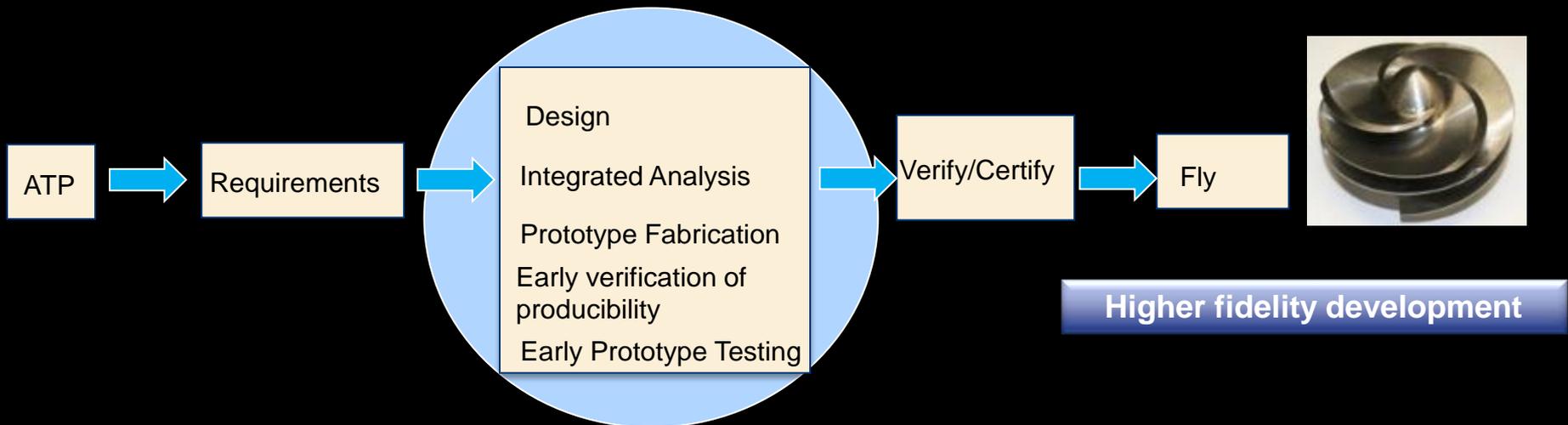
- Propulsion Testing
- Structural Testing
- Thermal Vacuum
- Shock & Vibration
- Acoustic
- Experimental Fluids Test & Development
- Test Support (Piping and Structure Design/Analysis Pressure and Propellants)

# Using Technologies to Alter the Design Process

## Typical Design Process



## Evolved Design Process, Enabled by New Technologies

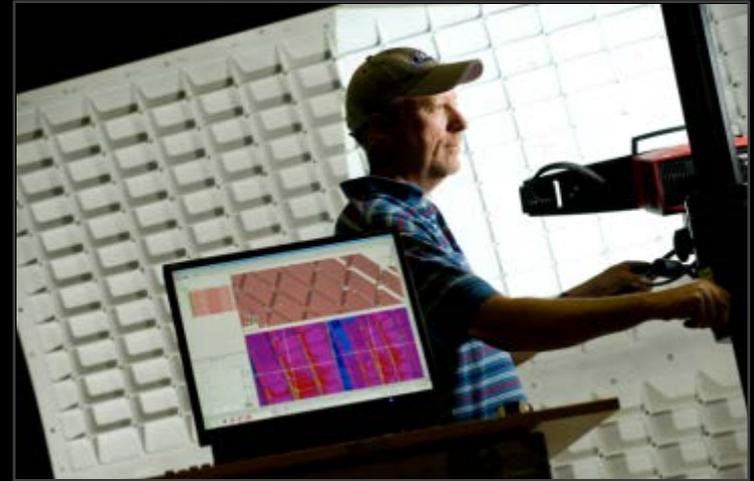


# Engineering Innovates

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Additive Manufacturing



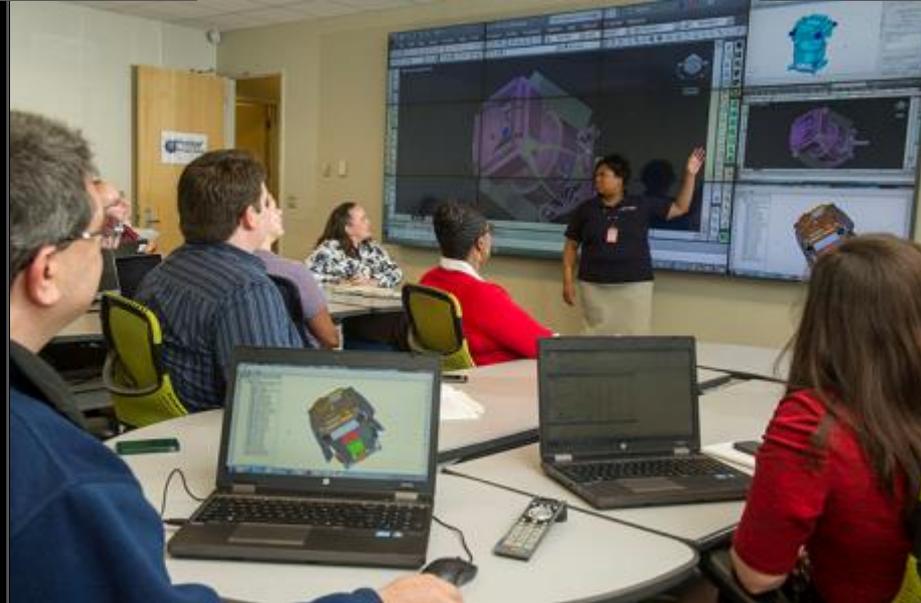
Structured Light Scanning



NanoLaunch 1200

# Engineering's Greatest Asset: People

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**Rhega Gordon**

**Deputy Chief Financial Officer**

# NASA Strategic Plan 2014

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## OUR MISSION

Drive advances in science, technology, aeronautics, and space exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of Earth

Advance understanding of Earth and develop technologies to improve the quality of life on our home planet

Expand the frontiers of knowledge, capability, and opportunity in space

Serve the American public and accomplish our Mission by effectively managing our people, technical capabilities, and infrastructure

# NASA Budget Trends (\$B)

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Agency	FY13	FY14	FY15
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President's Request	17.7	17.7	17.5
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Enacted ('13 w/rescission)	17.5	17.6	
(w/Sequester)	16.9		

## Marshall

President's (est. dist.)	2.2	2.2	2.1
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Budget Received		2.3	
(w/Sequester)	2.3		

***FY14 – Bipartisan Budget Act (Omnibus Bill) executed 1/19/14***

***FY15 – President's release 3/4/14 – In Justification and Review***

# Anticipated Agency Accomplishments in FY 2015

**SLS/Orion:**  
Complete analysis of Orion's Test Flight (EFT-1) & design reviews



**ISS:** Increase utilization with science & technology payload hardware to 70 percent.



Launch 16 science and ISS cargo missions



**Commercial Crew Program:**  
Complete first phase of certification efforts with partners.

**Asteroid Redirect Mission:**  
Hold Concept Review



**Space Tech:**  
Transform technology with several major in-space demos



**JWST:** Deliver primary mirror backplane and backplane support to Goddard Space Flight Center.





# QUESTIONS?

marshall  
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# Large Business Prime Contractor of the Year

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**TELEDYNE**  
BROWN ENGINEERING

# Small Business Prime Contractor of the Year

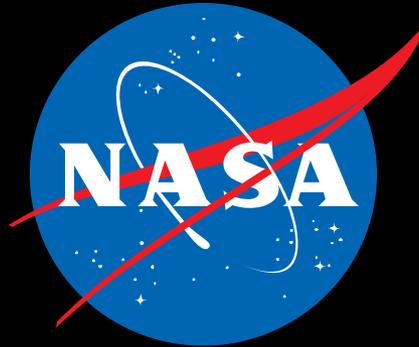
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# Small Business Subcontractor of the Year

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



# Join us for a networking reception upstairs

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## Space Systems ECLSS: In-space Habitation



## Deep Space Habitat Concepts



## ISS Mission Control



## Manufacturing and Processes Advanced Manufacturing: 3D Printing

Selective Laser Melting  
for rocket engine parts

