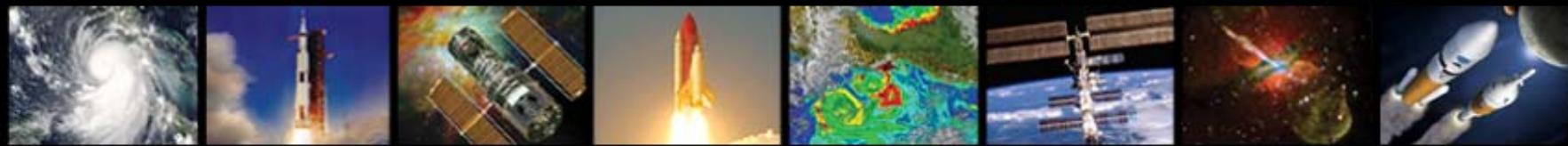




# Marshall Space Flight Center

Launching the Future of Exploration and Science

marshall



# Marshall's Continuing Role in Space Exploration

Lifting from Earth

Living and Working In Space

Understanding Our World  
and Beyond

*Marshall makes significant contributions  
to each primary focus area.*

# Marshall Legacy – Lifting from Earth

1960                      1970                      1980                      1990                      2000                      2010

Redstone team  
launches Explorer I

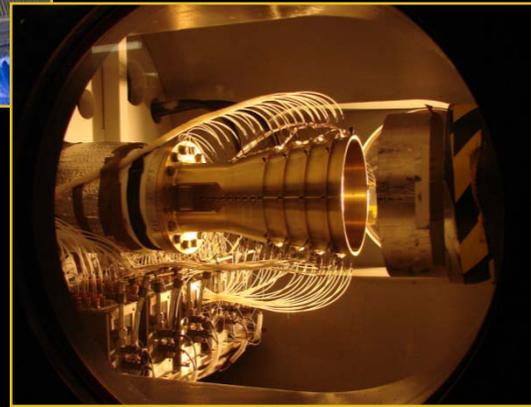
First manned flight—  
Redstone Rocket

**Ares I & V**

**Shuttle** Block 1 engine, Block 2 engine, RSRM, Super Lightweight Tank

**Apollo/Saturn**

**Evolving Transportation Systems Development**  
NGLT, 2GRLV, OSP, SLI, X-33, X-37, Fastrac, NLS, HLLV, Aerospace



# Marshall Legacy – Living and Working in Space

1960                      1970                      1980                      1990                      2000                      2010

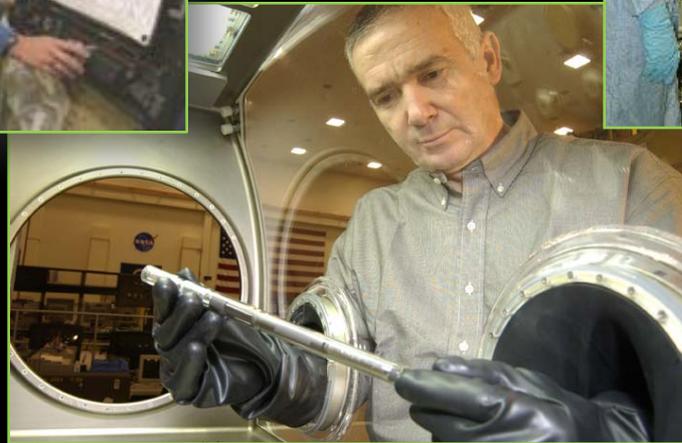
Lunar Roving Vehicle

**Space Station** US Pressurized Modules, Environmental Control and Life Support System, Window Observational Research Facility

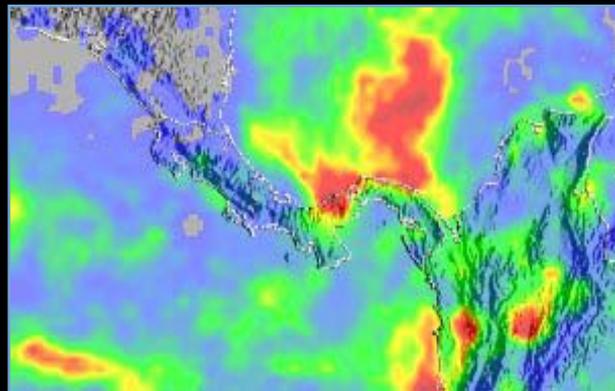
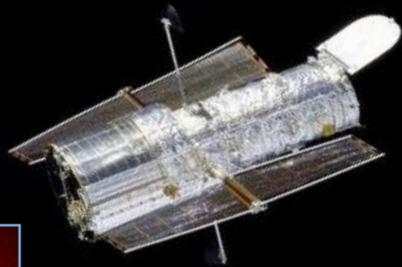
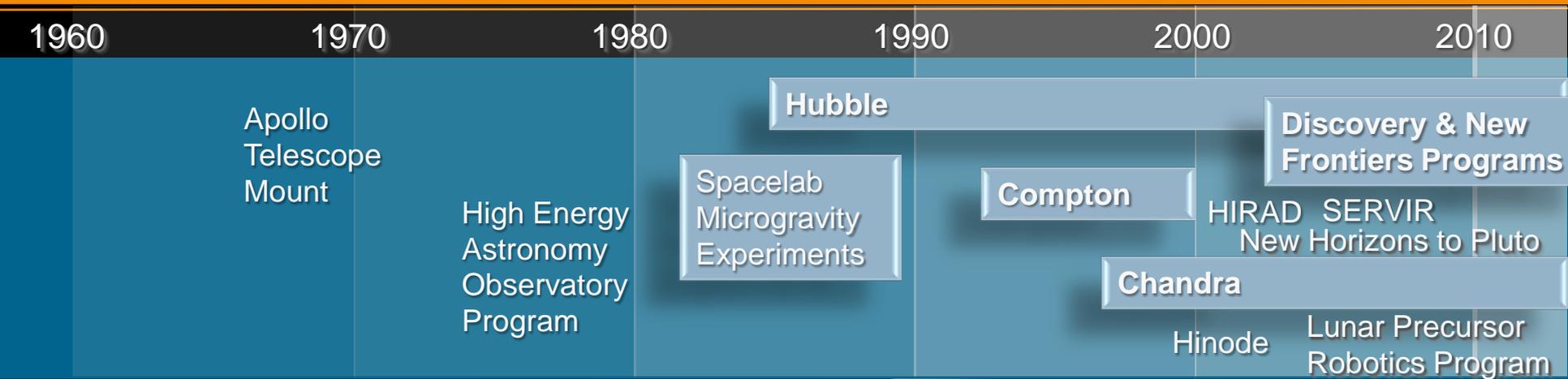
**Skylab**

**Spacelab**

**Human Space Flight Payload Development & Operations** Microgravity Science Glovebox, Materials Science Research Rack, Multi-purpose Logistics Modules, EXPRESS Racks



# Marshall Legacy – Understanding Our World and Beyond

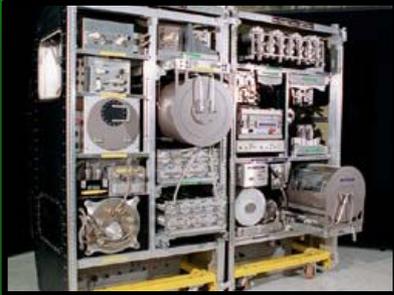


# Marshall Capabilities



## Lifting from Earth

Development of Transportation and Propulsion Systems



## Living & Working in Space

Development and Integration of Large Complex Systems

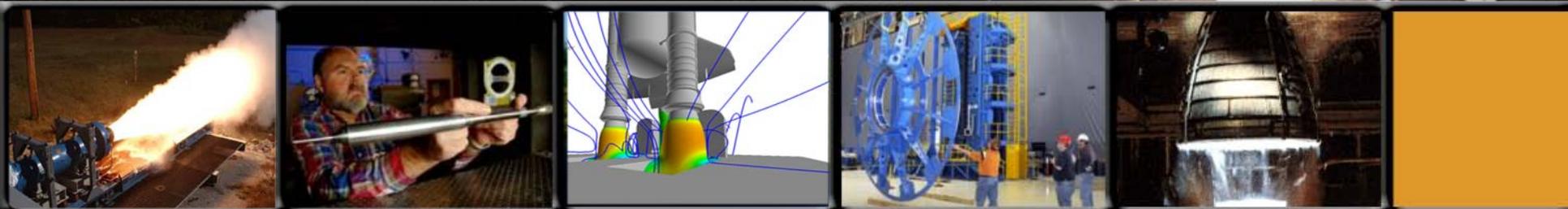


## Understanding Our World and Beyond

Development and Operations of Scientific Spacecraft and Instruments

# Development of Transportation and Propulsion Systems

- Program and Project Management
- Systems Engineering and Integration
- Launch vehicle and in-space transportation systems
- Propulsion systems and components
- Propellant management and delivery systems
- Modeling and simulation
- Manufacturing processes and applied materials
- Fracture and failure analysis of complex metallic and non-metallic systems



# Large Complex Systems Development and Integration

- Program and Project Management
- Systems Engineering and Integration
- Advanced regenerative ECLSS
- Advanced concepts and architectures, costing and modeling
- Large space structures development, integration and testing
- Technology maturation and development



# Development and Operations of Scientific Spacecraft and Instruments

- Scientific spacecraft and instrument development, integration, test and operation
- Earth science, environmental monitoring, weather prediction
- High energy astrophysics and sun/earth systems research and experimentation
- Analytical cargo/payload systems integration and operation
- Large optics research, development, calibration and test
- In-space propellant, propulsion and surface power systems
- Automated rendezvous and capture systems



# Full Life Cycle Capabilities

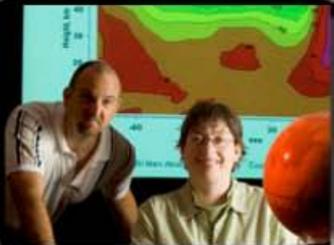
Marshall's capabilities span the full range of the systems engineering life cycle.



***Marshall's unique infrastructure and extensive program and project management experience enable integrated development.***

# Industrial Base

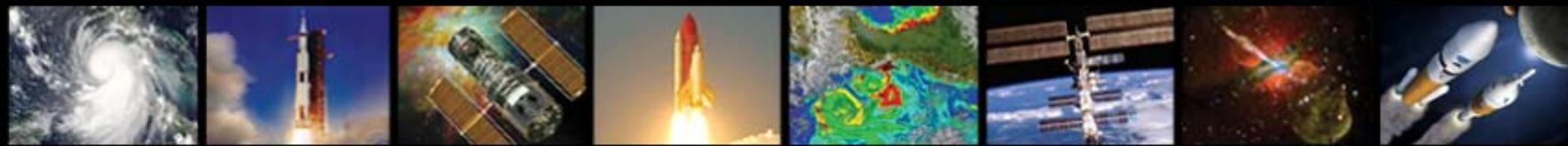
- Key part of a larger local, national, and international industrial base
- History of sharing capabilities through partnerships with industry
- 70+ Space Act Agreements





# Closing Perspective

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Questions?

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