

## Marshall Space Flight Center (MSFC)

*Agency Introduction: The FY 2012 budget request for NASA is \$18.7 billion, the FY 2010 enacted level. The NASA Authorization Act of 2010 has provided a clear direction for NASA, and the skilled workforce at NASA Centers is critical to the success of the Act's important objectives.*

**Highlights of MSFC's FY 2012 activities:** The FY 2012 budget proposes \$2,557 million in spending at MSFC.

- \$1,525 million in Exploration: Focus on the development of a heavy lift launch vehicle that will launch the crew vehicle, other modules and cargo for missions in support of exploration beyond low-Earth orbit.
- \$200 million in Space Operations: Continue to support operations on the International Space Station around the clock, sustaining a research platform which is vital for preparing for future human exploration of space and which meets our commitments to the United States' international partners.
- \$164 million in Space Technology for a strategically-guided project aligned with the Center's core competency in design and development of large, composite cryotanks, the Marshall Innovation Fund, disbursement of select SBIR/STTR awards and program funds for the Technology Demonstration Missions and Centennial Challenges Level 2 program offices which MSFC manages.
- \$131 million in Science that contribute towards Earth Science, Planetary Science, Astrophysics and Heliophysics.
- \$5 million to further NASA's Science, Technology, Engineering, and Mathematics (STEM) education efforts.
- \$533 million for Institutional requirements for the Center's operations in support of its mission requirements. This funding includes: \$473 million for Cross-Agency Support; \$60 million for Construction and Environmental Compliance Restoration for minor revitalization and construction projects to repair and modernize center infrastructure to reduce risk of mission disruption due to facility failures. Also includes renovating the East Test Area industrial water distribution system - this project replaces aging piping and equipment to boost pressure and flow to adequate levels.

NASA's Marshall Space Flight Center is located in Huntsville, Alabama. Marshall is a leader in developing and integrating the space and launch vehicle systems that are critical for NASA's space exploration, operations, and science endeavors.

Marshall is one of the Agency's largest field centers with over 4.5 million square feet of space including test, manufacturing and research facilities. Marshall develops and manages many robotic exploration missions. Because of Marshall's unique flight research and test expertise, scientists and engineers also work in partnership with academic institutions and worldwide organizations to improve weather prediction and monitor climate change on Earth. Marshall has managed the key propulsion hardware and technologies of the Space Shuttle to safely sustain Shuttle operations, which are scheduled to end in 2011. Marshall will transition this work, and the Center's work on the Ares I launch vehicle, into the development of a new heavy-lift rocket, the Space Launch System.

Marshall also provides support to the International Space Station through its Payload Operations Center. Drawing on key technical expertise in design, testing and development of the Space Station's environmental control and life support systems, Marshall is NASA's primary Center for coordinating the Agency's research on the Space Station. It also provides Earth-to-station science communications around the clock. Marshall will also continue to support NASA's commitment to science, technology, engineering, and mathematics (STEM) education.

MSFC serves as the Level 2 Program Office for the Technology Demonstration Missions project within Space Technology. Aligned with the Center's technical strengths, MSFC will serve as project manager for the Composite Cryotank work within the Lightweight Materials and Structures project element of Space Technology, implement the Marshall Innovation Fund, and continue to support SBIR/STTR and the Office of the Chief Technologist's Partnerships Innovation and Commercial Space and Strategic Integration activities.

Economic Impact:

NASA Marshall FY 2012 budget:	\$2,557 million
NASA Marshall FY 2012 civil servant workforce (FTE estimate)	2,490
NASA Center Contracts/Grants Obligated (FY 2010) MAF) (Obligation data from the Federal Procurement Data System)	\$2,500 million (MSFC and

Current impact statement(s) to state, region:

Marshall plays a vital role to the economic success of Alabama, as well as the Tennessee Valley area. While the center's impact is strongest in the north Alabama region, all of Alabama benefits from the financial contributions that NASA brings to the state. Based on 2009 economic impact data, the Center's budget has leveraged significant impact for the state, resulting in 8,549 direct and indirect jobs and \$526 million in earnings. Marshall has over 6,000 civil service and contractor employees. Tax revenues, research grants to universities, and outreach to educational organizations are additional means that Marshall provides benefits to the state of Alabama and the nation. Marshall's other expenditures in Alabama exceeded \$1 billion. All these factors come together for a total Alabama economic impact of almost \$3 billion dollars.

Marshall is also responsible for identifying and transferring technology to support economic competitiveness. NASA MSFC partners with local businesses, state agencies, universities and national institutions to support and expand economic competitiveness. Over the past five years, MSFC's efforts resulted in 47 patents.

For nearly a decade MSFC has supported the commercial space industry in their quest to develop and build vehicles that would provide the US with an alternate access to space and developing the systems that will be needed to sustain human transportation to beyond low earth orbit. Examples of Marshall's support to commercial space exploration include:

- Technical support to Space X on the development of the rocket engine that powered their Falcon I vehicle on its first flight in 2008.

- MSFC 2007 inter-center task agreement with JSC to provide engineering technical support to the Commercial Crew and Cargo Office, including design review support and specialized issue resolution or testing of sub-systems. Marshall has been a major contributor to the vehicles and systems that will, by year's end, provide for the first ever commercial re-supply of the ISS.
- Support to the first commercial crew development contracts from JSC in 2010, including working with United Launch Alliance in the design and modeling of their emergency detection system; with Boeing in the design of their commercial crew capsule; and with Paragon in building the first commercial environmental control and life support system.
- Space act agreements (SAAs) with commercial venture companies including Space X and Orbital Sciences Corporation (OSC) to assist with specialized analysis and engineering modeling; provided the modeling and pre-analysis of successful test of OSC's AJ-26 engine at the Stennis Space Center.