# You Bring the Mission, We'll Bring the Lab: Partnering with MSFC

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August 24, 2026

# Lifecycle Map: From Concept to Closeout

| Concept Phase Evaluation | Development and Testing | Design, Fabrication, Assembly & Integration | Launch, Operations, and Sustainment |
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| Advanced Concepts Office rapidly assesses mission feasibility and optimizes key parameters like ΔV and architecture. | Mature technologies using labs and hardware-in-the-loop tests to validate subsystem performance. | Flight hardware fabrication and integration in cleanroom facilities ensure tight tolerances and flight readiness. | Launch and operations are supported by trained operators; sustainment handles anomaly resolution and lessons learned. |

# MSFC Test & Support for Small Satellites



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| **Early Mission Analysis & Engineering** | MSFC offers rapid mission analysis and systems engineering to optimize smallsat design and ensure verifiable plans |
| **Integration and Environmental Testing** | The facilities at MSFC provide environmental and functional test capabilities that include thermal, vibration, shock, EMI, and propulsion component hot-fire tests. |
| **Operations Support and Real-Time Monitoring** | Huntsville Operations Support Center (HOSC) delivers telemetry, ground data services, automation, and anomaly resolution support |
| **Lifecycle Support for Smallsats** | MSFC supports smallsat teams throughout the entire lifecycle enabling faster iteration and higher mission reliability |

nasa.gov | Image Credit: NASA/Daniel Kocevski

# Assembly, Integration, & Environmental Testing

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| **Facilities for Integration** | MSFC maintains a range of cleanrooms with various capabilities that are equipped for small satellite assembly, checkout, and specialized handling. |
| **Functional & Integrated Testing** | Functional and end-to-end testing is available through MSFC's engineering labs and the Huntsville Operations Support Center (HOSC) for missions needing ground system connectivity |
| **Environmental and Structural Validation** | Facilities offer thermal, vacuum, vibration, shock, acoustics, and EMI/EMC testing to validate satellite performance and durability while performing Day-in-the-Life (DITL) testing |
| **Specialized Labs and Resources** | Adjacent labs provide support for printed electronics, contamination control, propulsion testing, and unique subsystem development. |



# Launch, Operations, and Sustaining Engineering




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| **Pre-Launch Planning and Testing** | HOSC supports mission planning, timeline development, and remote rehearsals using real telemetry and command systems to ensure readiness. |
| **Real-Time Flight Operations** | HOSC provides 24/7 operations support with experienced controllers and engineers for anomaly resolution during satellite flight. |
| **Sustaining Engineering and Configuration Control** | Teams maintain software updates, configuration management, and hardware logistics to ensure mission continuity and readiness. |
| **Post-Mission Review and Lessons Learned** | MSFC conducts de-integration and verification closeout, incorporating lessons learned to improve future satellite missions. |



# NASA Partnerships Front Door

More information on Partnerships with Marshall and other NASA Centers  is available in the kiosk.