

Assured Access To Space Agile Mission Assurance

Agile Mission Assurance Workshop
21 Jan 2026



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SYD 80/S5

NSSL Mission Assurance 2026



Number of Providers



Level of Risk Acceptance



Volume and Cadence of Launch



Reuse



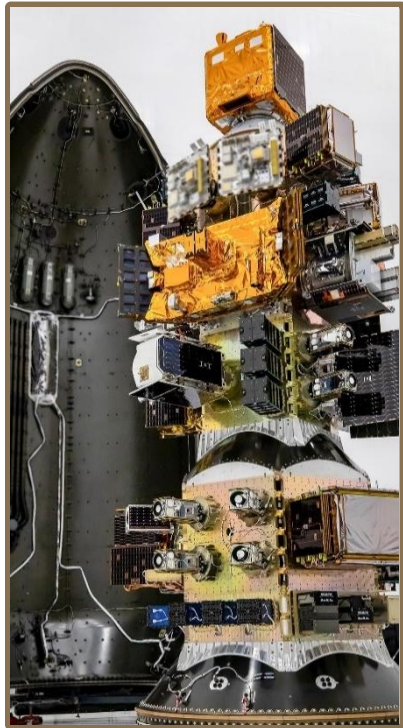
SV & Stack Complexity



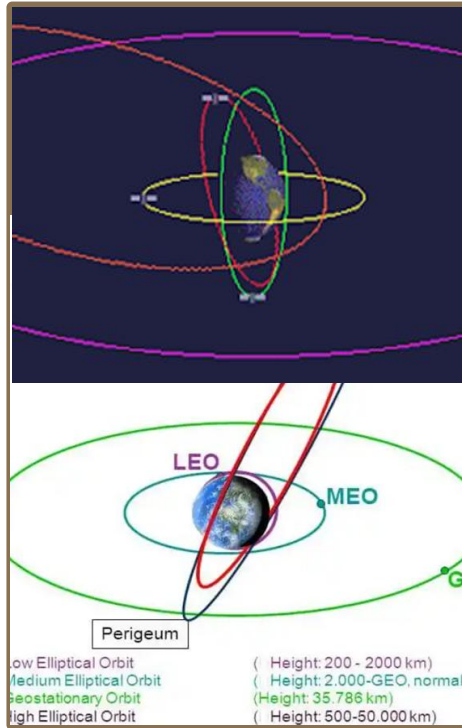
Need for Capability & Urgency

What's Changed

NSSL Mission Assurance 2026



Launch Environments



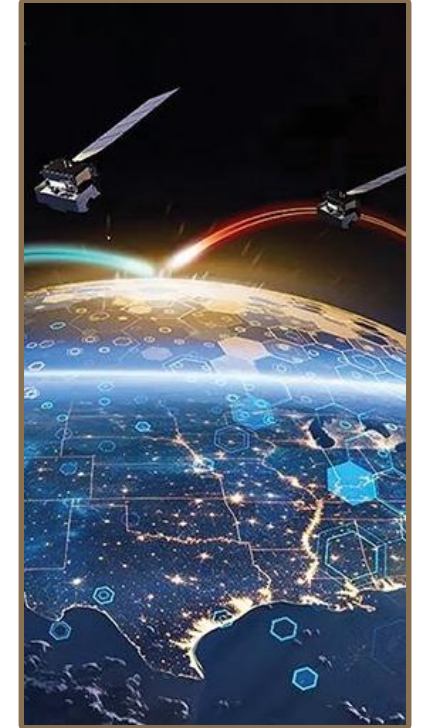
Need to Address All Orbits



Physics



Unforgiveness of Launch



The Need for Successful Mission Execution

What Hasn't Changed



What is Agile Mission Assurance?

- Risk-based, adaptive approach that ensures mission success and safety for space launch systems
- Emphasizes early risk identification, continuous verification, data-driven decisions, and close collaboration between mission assurance, engineering, operations, and leadership
- Iterative process that applies continuous verification, validation--risk assessments evolve as the system evolves, supporting rapid development cycles and frequent launches
- Integrates mission assurance activities continuously throughout design, manufacturing, test, and operations
- Drives data-driven decision-making that uses test data, flight history, manufacturing metrics, telemetry, and anomaly trends to inform readiness and acceptance decisions
- Speed with discipline enables faster launch cadence without compromising public safety, vehicle reliability, or mission objectives

Agile Mission Assurance is Essential For Today's Launch Environment



What is Agile Mission Assurance (AMA)

- **Strategic Intent:** To accelerate the delivery of space capabilities to the warfighter by shifting from rigid, exhaustive verification to a dynamic, risk-informed model of oversight
- **Core Definition:** AMA is a value-driven approach used by SSC to provide launch oversight. It replaces the "one-size-fits-all" checklist with a tailorable framework that scales rigor based on mission criticality and Launch Service Provider (LSP) maturity, allowing the USSF to match the high cadence of commercial LSPs

Feature	Traditional MA	Agile MA
Primary Philosophy	Eliminate all technical risk	Manage risk to meet mission speed
Verification Method	Comprehensive, manual checklists	Value-based, exception-focused
Documentation	Static, milestone-based reports	Real-time, digital data streams
Integration Timeline	High-rigor; typically, 24+ months	Responsive; < 6 months (e.g., TacRS)
Oversight Posture	Arm's length; Government vs. LSP	Collaborative; Integrated "One Team"
Target Assets	High-cost, one-of-a-kind (Class A)	Proliferated, resilient, or R&D (Class C/D)

The USSF "Lanes" Framework for Oversight

Lane 2 (High Rigor): For "No Fail" National Security Space Launch (NSSL) missions (e.g., GPS, Missile Warning). Includes detailed hardware pedigree and full independent verification

Lane 1 (Streamlined): For higher risk-tolerant missions and new entrants. Uses a tiered approach (Tier 0-3) that relies more on FAA licensing and LSP commercial best practices

Agile Mission Assurance enables Speed of Relevance

AATS Launch Programs Key Space Domain Enabler



Maximize On-Orbit Capability

National Security Space Launch (NSSL)



>\$92B in On-Orbit Capability Since 2003

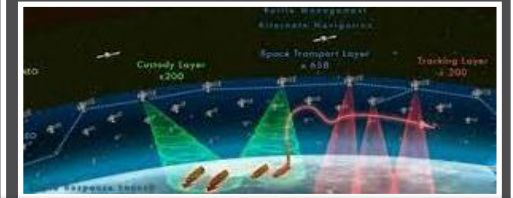
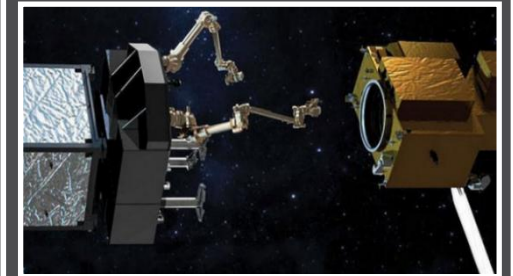
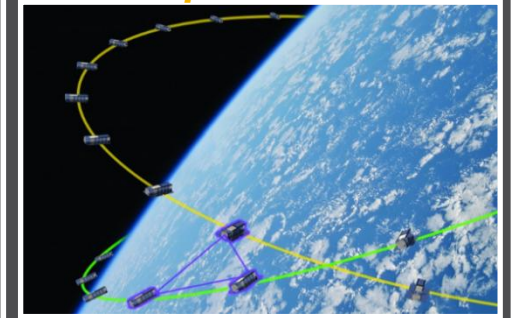
Government Mission Assurance Increases Launch Vehicle Reliability

Multi-Mission Manifesting



Rocket Systems Launch Program (RSLP)

Enables resilient space warfighting capabilities



AATS secures our Nation's interest in, from, & to space



Nation's Eyes & Ears

Secure Comms



Positioning, Navigation & Timing



Space Domain Awareness

Reliable, Resilient, Responsive Launch is Vital to Strategic Competition



AATS Programs Provide Responsive and Reliable Launch

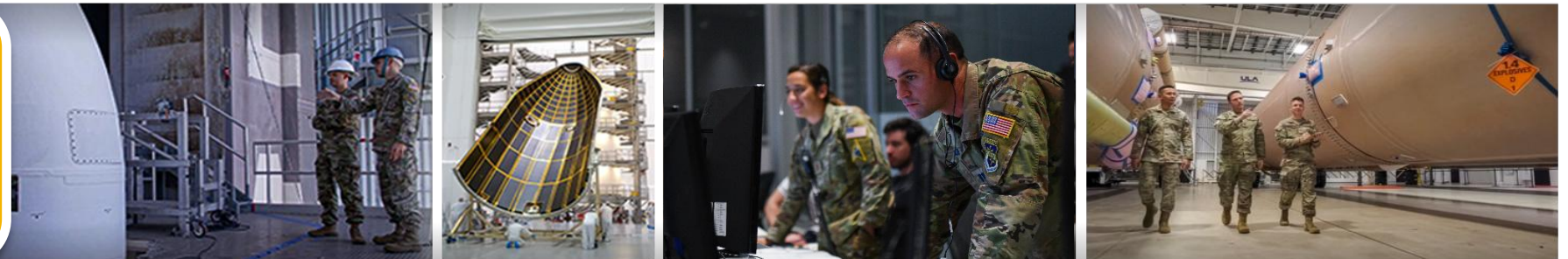
NATIONAL SECURITY SPACE LAUNCH



ROCKET SYSTEMS LAUNCH PROGRAM



MISSION ASSURANCE





25+ Years of NSSL Success Mission Assurance Evolution Timeline

Unprecedented Record of Mission Success - 113 Launches

Refocus on Mission Success

1998 - 2006

- Standardized interfaces
- Encapsulated payloads in processing facility versus on-pad
- Incorporated lessons learned from 1990s launch failures
- **Reinstated rigorous mission assurance process**
- Procure launch as a commercial service

BAR 1999

“Single Line of Accountability for MA”

Stabilize Industrial Base and Reintroduce Competition

2006 - 2013

- Restructured strategy to adapt to commercial market collapse
- **Focused sole-source contracts on Assured Access and Mission Assurance**
- Saved \$4B with Phase 1 Block Buy
- Encouraged new entrant on-ramps

BAR 2010

“Standardized MA Across Programs”

Assure Space Access & Reduce Launch Costs

2014 - 2024

- Harnessed industry innovation to meet Assured Access
- **Embraced reuse to lower launch costs and increase launch tempo**
- Ended reliance on Russian RD-180 propulsion system
- Shared investment in commercial development to meet NSS needs
- Used competition to further reduce costs; saved nearly \$2.7B in Phase 1A and Phase 2 competitions
- Crafted strategy/contracts to enable responsive launch

BAR 2015

“Adapt MA For Maturity of Provider”

Increase LV Variety & Secure Capacity

2025 - 2035

- Created innovative dual-lane strategy
 - Increases number of launch vehicles
 - Puts capabilities on orbit more efficiently
 - Enhances resiliency while decreasing costs
- **Created tiered mission assurance posture according payload risk tolerance**
- **Reduced barriers to entry in Lane 1**
- Added 3rd provider to Lane 2 to increase launch capacity
- Expanded responsive launch

BAR 2023

“Adjust MA processes based on SV risk tolerance”

NSSL Continually Adapts Mission Assurance Strategy To Leverage Commercial Innovation and Align with Mission Requirements

Launch Is No Longer “Cyclical”



1997-1999 Launch Failures:

- 3 Titan IV
- Delta II
- 2 Delta III
- Athena
- 4 NSS Payloads lost (\$3B)

Broad Area Review (BAR, 1999) Recommendations

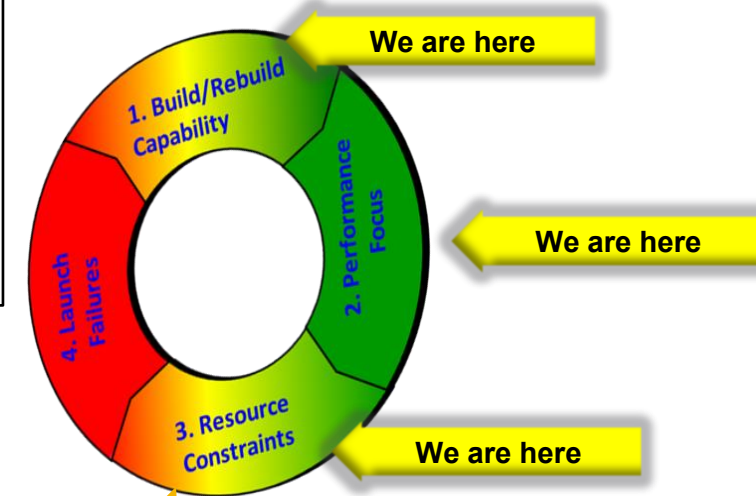
- Single accountability for Space Flight Worthiness Certification
- Reinvigorate rigorous mission assurance (systems engineering and technical oversight)

Key Components of Mission Assurance

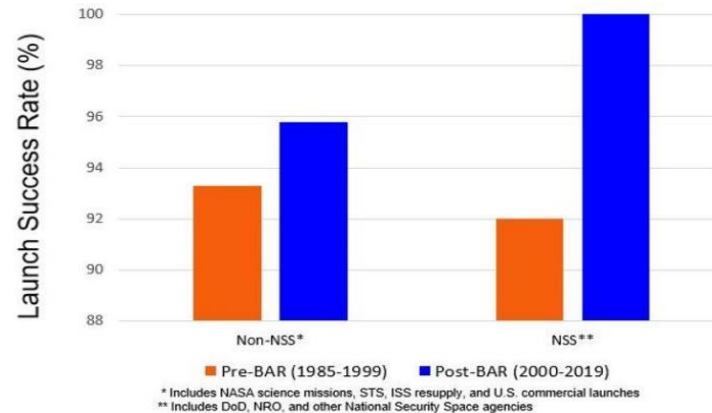
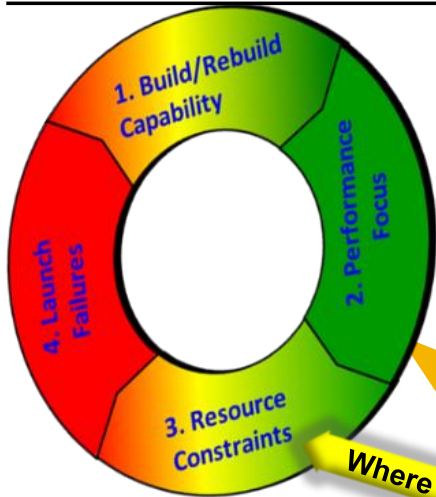
- Qualify and validate the design
- Recurring IV&V and pedigree reviews
- 100% risk identification and mitigation
- Continuous fleet surveillance



Titan IVA-20 (NROL-7), 12 Aug 1998



Launch Success / Failure Cycle



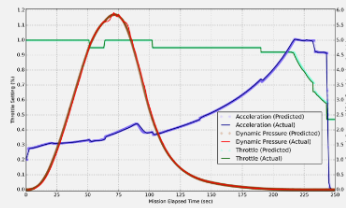
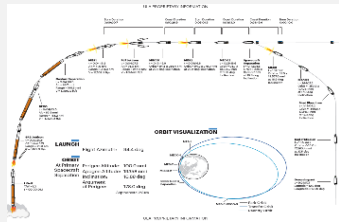
Mission Assurance Must Be Multi-Phase and Multi-Dimensional

Implementation Examples



Launch Verification Matrix (LVM)-Tailoring

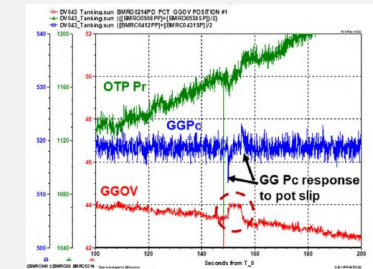
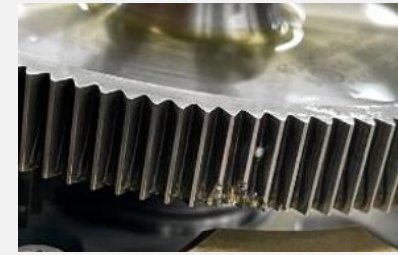
- Adjusting Gov't Independent Verification & Validation (IV&V) to appropriate Depth of Effort
 - Mission Planning and Analysis
 - Flight Software Verification
 - Interface Environments Verification
 - Independent eval of issues, risks, changes



Components	Aerospace Ref. MIL-STD-883C Class Analysis Prediction (°F)	ULA Ref. 9 Class Analysis Prediction (°F)	Operating Limit (°F)	Acceptance (°F)	Qual. (°F)
OCU	30 to 82	-11 to 101	-27 to 127	-47 to 147	-65 to 165
CCU	37 to 81	-8 to 102	-29 to 127	-49 to 147	-67 to 165
INCA	35 to 105	24 to 129	8 to 125	-12 to 145	-30 to 163
SSMB	82 to 106	65 to 136	75 to 165	N/A	75 to 165
EMAC	30 to 106	1 to 138	-29 to 147	-49 to 167	-67 to 185
EMA (Pitch)	14 to 85	16 to 119	-30 to 187	-50 to 207	-68 to 225
EMA (Yaw)	14 to 85	-3 to 114	-30 to 187	-50 to 207	-68 to 225
MRTU	41 to 101	14 to 129	-27 to 137	-47 to 157	-65 to 175

Flight Hardware Verification (Formerly "Pedigree")- Moving from Hardware to Process Review

- Qualification Baseline Verification
- Evaluation of Manufacturing and Test Anomalies
- Process Evaluation and Verification



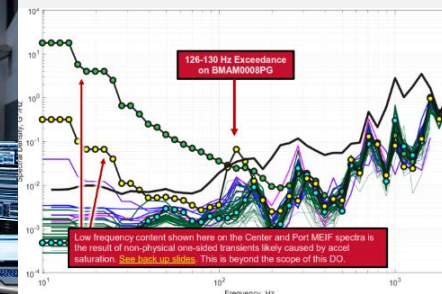
Launch Verification Database (LVDB)- Tailoring

- Launch Site Operations Surveillance
- Launch Site Procedure Review
- Launch Site Test Evaluation
- Day of Launch Operations



Postflight Review-Automating

- Flight Performance Verification
- Preflight Model Verification
- Anomaly Investigation



NSSL Mission Assurance Is A Team Sport



- AATS recognizes the imperative for speed in delivering warfighter capability and is evolving MA practices to match mission risk tolerances
- NSSL payloads are high valued assets, mission success is paramount
 - Achieved through acquiring highly reliable launch systems
 - Executed via Mission Assurance and Space Flight Worthiness Certification processes and procedures
- AATS continues to implement agile modernized mission assurance processes across NSSL to meet the needs for SV customer programs
- Existing mission assurance processes are tailorable, flexible, and accommodate variable SV risk tolerances and an evolving launch industry

MA Framework is Proven and Reliable, Mitigating Risk for Launch as Warranted