

Space Environments Testing Management Office (SETMO) Portfolio



Strategic Plan

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Director's Forward

National Aeronautics and Space Administration Space Environments Testing Management Office (SETMO) April 17, 2025

Dear Colleagues and Partners,

It is with great enthusiasm that I introduce the **first Strategic Plan for the Space Environments Testing Management Office (SETMO)**—a roadmap that not only reflects our collective achievements but charts a bold path forward in alignment with NASA's evolving mission priorities.

Developed in close collaboration with the dedicated SETMO team, stakeholders across NASA centers, and mission leaders across the agency, this strategic plan is the product of shared vision, open dialogue, and a commitment to excellence. It underscores our unified effort to ensure that the infrastructure, processes, and services we manage continue to meet the rigorous demands of current and future space missions.

At the heart of this strategy lies a single guiding principle: **mission focus**. Every initiative outlined in this plan is anchored in the needs of NASA's science, exploration, and technology programs. Our goal is to remain not just responsive, but proactive—anticipating the testing needs of missions across the agency and aligning our capabilities to support them with precision and reliability.

As we look ahead, **optimizing capabilities**—both technical and organizational—stands as a cornerstone of our strategic direction. By modernizing test facilities, streamlining operations, and enhancing cross-center collaboration, we aim to increase the agility, effectiveness, and efficiency of the space environments testing enterprise.

This plan reaffirms SETMO's commitment to enabling mission success through robust, reliable, and mission-ready test environments. We are excited to move forward together—leveraging the expertise across NASA and our partners—to realize this vision and strengthen our role in advancing human and robotic exploration.

Thank you for your continued support, insight, and partnership as we bring this strategy to life.

Special thanks to Ted Biess, Wei Hu, and Uzair Irfan, who were instrumental in the plan's formulation, content, and presentation.

Sincerely, Jason S. Coker Director, NASA Space Environments Testing Management Office (SETMO)

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Executive Summary

The Space Environments Testing and Management Office (SETMO) has developed a Strategic Plan that will enable NASA to provide efficient and effective delivery of critical ground test capabilities in Space Environments Testing, High-Enthalpy Materiel Testing, Flight Simulation, and External Radiation Effects Testing. This portfolio encompasses a comprehensive suite of critical infrastructure which include thermal vacuum chambers, acoustic and vibration laboratories, x-ray and optical calibration facilities, motion and fixed based flight simulators, and arc-heaters. In addition to NASA test facilities, SETMO leverages external capabilities at Lawrence Berkeley National Laboratory to provide access to NASA researchers for external radiation testing needed to qualify electronic flight hardware.

The intent of this Strategic Plan is to shift SETMO to a mission driven, strategic, and agile organization. Challenges with aging infrastructure and reduced budgets require SETMO to update our portfolio managements techniques to enable the office to shift focus and resources as Agency priorities change. To build this plan, the SETMO team met with Mission Directorates (MD), NASA Centers, and NASA Headquarters representatives to collect stakeholder input and identify priority focus areas. This stakeholder analysis identified the following five key themes:

- 1. Perform Long-Term Strategic Planning
- 2. Optimize the Capability Footprint
- 3. Advise Programs and Projects and Support Planning
- 4. Sustain Testing Capabilities
- 5. Knowledge Sharing and Best Practices

Based on the analysis of stakeholder input, along with understanding evolving Agency needs, SETMO has identified four strategic goals that will provide SETMO the framework to deliver ground test capabilities that support NASA and the nation into the future. The elements of SETMO's Strategic Plan are intended to meet requirements and policy intent of NPD 8600.1 and NPR 8600.1 which describe the implementation and management of capability portfolios.

- **Goal 1:** Provide testing services that support Agency-level strategic priorities and mission requirements.
- Goal 2: Increase efficiency and effectiveness for the delivery of testing services.
- **Goal 3:** Align and optimize each SETMO capability domain to meet current and future mission requirements.
- **Goal 4:** Plan and coordinate long-term sustainment of critical testing services within the SETMO domain.

These strategic goals constitute a vision for the future of the Agency's ground test capabilities that is safer, efficient, reliable, and sustainable. Each goal has corresponding objectives that will aide in implementation. Follow on work as the plan is implemented will consist of creating a priority structure and commensurate roadmap with initiatives to achieve the stated outcomes of each objective. Envisioning the long-term strategy for the SETMO portfolio provides the basis for new concepts leading to testing innovation and customer benefits.

Introduction

SETMO is responsible for the strategic direction of NASA's High-Enthalpy Material Testing, Flight Simulation, Space Environments Testing, and External Radiation Testing portfolio of capabilities. SETMO advises on test and simulation matters, while managing investments to ensure essential services are available to the test community. SETMO aims to achieve a more efficient, mission-focused state over the coming years. This Strategic Plan will set forth a vision for NASA's critical ground test capabilities aimed at the next decade and beyond. This vision is aimed at prioritizing and adjusting to the changes in future budget outlooks and infrastructure needs that support both SETMO's mission and NASA Master Planning efforts.

To accomplish this vision, the office identified key elements that will need to be improved. These key elements were used to guide the office in the development of the SETMO Strategic Goals and Objectives. These included:

Enhancing Annual Planning. SETMO will strengthen its planning process through a Planning, Programming, Budgeting, and Execution (PPBE) driven approach. This involves aligning mission requirements with service provision, synchronizing capacity and utilization to minimize costs, and ensuring critical capabilities are available when needed. The Strategic Capabilities Assets Program (SCAP) tiering system will be replaced by a new, updated tiering methodology that identifies high-need test capabilities. Sustainment funding that previously funded Tier 1 assets (within the SCAP tiering system) will be redirected to address deferred maintenance. Additionally, SETMO will develop streamlined annual operating plans to secure stakeholder commitments.

<u>Conducting Comprehensive Studies and Assessments.</u> SETMO will undertake detailed studies across its domains to assess and enhance test capabilities. With these studies we will identify mid-to-long-term needs and assess them against both internal and external resources; explore options for scaling, divestiture, and/or leveraging external service providers; and evaluate the health of test and simulation infrastructure. This analysis will include the physical assets and the workforce. Recommendations out of these evaluations may include areas such as cost-sharing strategies that stabilize annual budgets and provide benefits to small projects.

Developing Advanced Digital Tools. SETMO will improve its digital tools to inform decisions and better support stakeholders. Updates of these tools will include directories of internal and external capabilities with detailed performance data and cost details, planning tools for capability management at the Center level, and insights into demand and supply trends to reduce risks and optimize financial outlays.

This Strategic Plan documents SETMO's mission, vision, and strategy and is meant to be a living document in which continual communication with stakeholders and the research community inform its evolution. This document will be updated as assessments are conducted, technologies mature, new technologies emerge, and the community's needs evolve.

Background

NASA has faced many crossroads over its tenure, from inheriting pre and post WWII infrastructure from the National Advisory Committee for Aeronautics (NACA) to expanding significantly during the Apollo era. Through these rapid changes, NASA has ensured that an ample suite of state-of-the-art ground test and simulation capabilities are available to meet new and ambitious mission needs.

In the early to mid-2010s, NASA sought to shift towards a pay-for-services model, which coupled with growing outsourcing to commercial options, caused uncertainties with the financial sustainment of the core technical infrastructure and associated workforce. In response, NASA established the Strategic Capabilities Assets Program (SCAP) and other programs to ensure critical ground test and simulation infrastructure was ready and available for program and project development. The SCAP portfolio evolved to include three distinct capability categories: High Enthalpy Testing, Flight Simulation, and Space Environments Testing.

From 2008 to 2015, the Agency completed several studies to assess NASA's ability to meet its long-range mission requirements. Most notable were the Technical Capabilities Assessment Team (TCAT) deep dive of the Space Environments Testing (SET) domain. The subsequent SET Tiger Team deep dive led to the identification of SET assets recommended for corporate management.

In November 2015, the Mission Support Council (MSC) decided to apply the SET Tiger Team recommendations and authorize a centralized management model which led to the establishment of SETMO. In 2020, a fourth capability category, External Radiation Testing, was added to the SETMO portfolio.

Space Environments Testing

Large-scale and other uniquely purposed chambers replicate extreme space environments to test and certify performance of spacecraft, structures, components, and instrumentation. These space-dedicated testing laboratories assess stresses during liftoff, flight, and extended missions from vibration and sound, electromagnetic radiation, and the general impacts of continued exposure to a vacuum as experienced in space.

Space-focused chambers replicate extreme acoustic effects and simulate launch vibrations by subjecting test articles to severe shaking. Other testing labs assess spacecraft power and electric propulsion systems.

NASA's test chambers are capable of testing large spacecraft. The large test chamber's physical volume and high-fidelity space-simulation capabilities are adjustable for thermalvacuum studies of a wide variety of concepts and components, including entire space vehicles. Several other chambers can be configured to mimic high vacuums, extreme temperatures, wide humidity swings, and high-altitude conditions.



Space Environments Complex (SEC) located at Neil A. Armstrong Test Facility (ATF)

Flight Simulation

Computerized simulation provides real-time, high-fidelity, full-mission, human-in-the-loop capabilities to accurately replicate the control systems of air and space vehicles. Advanced computational and display hardware enable pilots and astronauts to experience and respond to a variety of flight scenarios.

The goal of each simulation is to create realistic flight conditions such that the best possible data is obtained and utilized for real-world operations. Simulations reproduce flight characteristics of vehicles with a high degree of fidelity. Realistic flight cues are delivered to pilots in real time, such that simulated vehicles respond just as quickly as their real-world counterparts.

Researchers remain in constant communication with pilots, monitor information generated by the simulation, and record data in numerous formats for later analysis. These data contain and convey crucial information about the aircraft or spacecraft under evaluation.

NASA simulators can connect to simulators from one NASA Center to another, as well as facilities at the Department of Defense, the Federal Aviation Administration, universities, and private industry to permit real-time multivehicle simulations with audio, video and data links.



Cockpit Motion Facility (CMF) at Langley Research Center

High Enthalpy

Because space exploration necessitates rugged structures, components, and elements to protect both astronauts and instruments from the extreme environments encountered during missions, extensive testing is essential to qualify new thermal protection systems (TPS) materials.

Overseen by the Thermophysics Facilities Branch at NASA Ames Research Center, arc plasma research offer unique ground-based simulation of flight-entry conditions. Premixed air, heated to extreme temperature by a high-power, direct-current discharge, expands through user-selected nozzles to hypersonic velocities similar to those experienced by entry vehicles.

Arc jet testing is conducted on fully instrumented samples, incorporating in-situ miniaturized heat flux, temperature, and recession sensors.



Test article under test at the Ames Arc Jet Facility

External Radiation Testing

As a part of the Nuclear Science Division at Lawrence Berkeley National Laboratory (LBNL), the 88-Inch Cyclotron is used to support ongoing research programs in nuclear structure, astrophysics, heavy element studies, and technology research and development.

Instrumentation at the 88-Inch Cyclotron includes the Berkeley gasfilled separator and the superconducting VENUS ion source, one of the most powerful electron-cyclotron resonance-ion sources in the world.

The 88-Inch Cyclotron is also home to the Berkeley Accelerator Space Effects (BASE) Facility, which provides well-characterized beams of protons, heavy ions, and other medium energy particles that simulate space environments.

The very first single-event effects tests in the world were conducted in this chamber, which continues to be at the forefront of presentday radiation-effects studies.



88-Inch Cyclotron at LBNL

Strategic Planning Process

Beginning in early 2024, SETMO held a series of internal discussions about the current and future state of the portfolio. The purpose of these meetings was to discuss how to update management practices to better align testing capabilities and assets with mission needs. There had been ongoing feedback, primarily from MD stakeholders, that SETMO required fundamental changes to increase value for testing services, reduce a growing backlog of deferred maintenance, and increase activities that could lead to consolidation and divestiture of unnecessary infrastructure. In addition to these concerns, MD representatives provided feedback that SETMO had not effectively transitioned its portfolio management model from SCAP (i.e., financial sustainment) to the one approved by the MSC when SETMO was established (i.e., provide a strategic agency view, and identify and eliminate redundancy across the agency). These discussions, along with MD feedback, led to the initiation of this strategic planning effort.

To begin the strategic planning process, SETMO performed a gap analysis to identify activities requiring updates to current processes/procedures or new implementation. As part of this effort, the SETMO Mission and Vision statement were updated to guide the office towards a desired future state.

Mission: Actively manage and advance SETMO's testing and simulation capabilities to strategically align and support NASA's evolving missions and national aerospace enterprise.

Vision: Lead the way in space and flight simulation testing for the Agency and nation.

Following the SETMO gap analysis, the office performed a stakeholder analysis to understand which SETMO activities would provide greatest value and to discuss concerns. Stakeholder meetings were held with representatives from all MDs (ARMD, ESDMD, SOMD, SMD, and STMD), select SETMO Centers (ARC, GRC, JSC), and NASA Headquarters representatives from OES and OCE. The stakeholder analysis was used to identify themes to aide in the creation of the SETMO Strategic Goals and Objectives.

Beginning in 2025, SETMO is transitioning from pre-planned budgeting for select facilities (i.e., Tier 1 assets) toward investments aimed at addressing years of deferred maintenance and repairs for critical systems across the domain. Starting in 2024, SETMO also initiated a more aggressive effort to identify opportunities for off-ramping infrastructure, either by placing facilities in mothball status or preparing them for divestiture. This process, conducted in collaboration with representatives from MDs, Centers, and Agency Master Planning community, will ultimately require decisive action from NASA leadership.

This Strategic Plan will be the guide for implementation planning to include the creation of near and long-term priorities and roadmaps with initiatives. Future updates to SETMO's Capability Portfolio Management Plan (CPMP) and Capability Portfolio Commitment Agreement (CPCA) will ensure the plan is documented, vetted with key agency leadership, and evolves to reflect changing conditions.

SETMO's success depends on its ability to enhance coordination and collaboration across the NASA community. To achieve this, SETMO will remain objective-based, striving to secure commitments from and alignment with MDs and key NASA Center stakeholders.

Goal 1: Forecast Needs and Advise Stakeholders

Provide testing services that support Agency-level strategic priorities and mission requirements.

SETMO's primary goal is to enable comprehensive testing services that align with the Agency's strategic priorities and mission requirements. By considering the mission in every aspect of our work— from efforts which include long-range planning, developing effective processes, setting office priorities, and investing in facilities—we ensure that all decisions within the SETMO domain contribute to achieving the Agency's priorities. To best adapt to NASA's continuously changing mission, we manage our capability domain as a strategic resource through agency-level advocacy, planning, enhancement, and leveraging of internal and external sources of testing services.

Objective 1.1: Develop an Agency Strategy

Develop an Agency strategy and roadmap for each SETMO capability domain.

This objective focuses on developing a comprehensive Agency strategy and roadmap for each SETMO capability domain, which includes Space Environments Testing, Flight Simulation, High-Enthalpy Material Testing, and External Radiation Testing of electronic components. This includes envisioning a desired future state for each domain and creating Agency roadmaps that outline both near- and long-term implementation plans. Each capability domain will have its unique goals and objectives identified and addressed.

The primary focus of this objective is to analyze and anticipate future testing needs across our domains. This involves identifying upcoming missions and R&D needs, aligning them with our current testing capabilities, and pinpointing any gaps that need to be addressed. This long-term strategy will guide SETMO in determining where facility investments are required, which facilities may no longer support future mission requirements, and whether new testing capabilities need to be developed.

These strategies and roadmaps will inform and drive all other SETMO goals and objectives, as well as annual priorities, plans, and investments. They will evolve over time, aiming to provide the greatest value to stakeholders and customers, improve overall efficiency and effectiveness in delivering testing services, and eliminate unnecessary redundancy.

Areas that inform the development of a Strategic Plan and roadmap include workforce planning, operations and maintenance, standardization, and testing capabilities available through other government organizations, industry, and academia. Conducting a cost-benefit analysis for each option and scenario is essential.

Periodic assessments of the SETMO domains will inform updates to these strategies and roadmaps, ensuring that necessary adjustments are made to each capability domain to maintain alignment with mission.

Objective 1.2: Advocate for Technology Upgrades

Identify, plan, and advocate for technology upgrades and new testing capabilities.

SETMO is committed to enabling Agency testing capabilities to support current and future mission needs. To accomplish this, SETMO will develop processes to identify, plan, and advocate for needed technology upgrades and new testing capabilities. A clear understanding of the future optimal state for each domain includes the identification of technologies addressing programmatic needs (what, where, and when). SETMO's early participation in program and project planning will be key to the success of this objective.

In addition, SETMO will conduct studies and develop credible business cases that demonstrate significant value for MD customers. These could take the form of a white paper that outlines ways to advance the capability domain, such as utilizing digital twins and artificial intelligence. Potential areas to investigate include the use of computational tools alongside experimental tools, leveraging the synergy of test and computational methods.

Although the strategic plans and roadmaps (focus of Objective 1.1) will include significant detail for technology upgrades identified by Center stakeholders (e.g., facility operators, test engineers embedded within programs and projects), the achievement of this Objective further identifies and details high-leverage test and simulation technology upgrades and new testing capabilities. SETMO leadership will advocate for the adoption and implementation of technological advancements to key Agency decision-makers. This includes identifying and securing investments for new technologies through stakeholder engagement and potential partnerships. SETMO will stay engaged with industry working groups to understand advancements in testing.

Objective 1.3: Facilitate Access for R&D Projects

Facilitate test capability access for smaller R&D projects.

To support NASA's mission, it is essential to implement an approach that lowers the cost-to-test barrier for smaller projects and R&D efforts, particularly for low-TRL technologies needed for missions such as returning to the moon and sending humans to Mars. For example, the full cost of testing, such as access to the Arc Jet, may not be feasible for many R&D projects. Providing access to these testing facilities has positively impacted some MDs' (e.g., STMD) ability to perform low-TRL research.

Testing services provided by SETMO's capability components can reduce testing costs to make MD R&D projects feasible. For example, Arc Jet testing at \$100k per day is not affordable for a typical STMD R&D project. However, SETMO can facilitate pricing policy to make testing more affordable or provide alternative capabilities to reduce risk at lower cost.

This Objective is a successor to Objective 4.1, which focuses on developing and implementing a pricing, funding, and cost recovery model. Once Objective 4.1 is mostly achieved, developing processes and guidance to facilitate access to test capabilities for smaller R&D projects can begin.

By achieving this objective, SETMO will ensure that critical testing services are available to NASA's smaller, low-budget initiatives that form the basis for future programs and missions.

Objective 1.4: Advise Programs and Projects

Advise programs and projects when planning tests within the SETMO domain.

SETMO is committed to supporting program leads with their planning and decision-making related to testing services. This Objective focuses on establishing a robust advisory system, ensuring that programs and projects have access to the necessary information and resources for effective testing.

SETMO will publish contact information and available consultation services to facilitate access to advisory support in accordance with best practices identified by SOMD and ESDMD, who have experienced successes with the Rocket Propulsion Testing (RPT) Program. SETMO aims to develop a comparable advisory service that will include a combination of consultations with SETMO's current Subject Matter Experts (SMEs) and the establishment of a working group comprising Center facility managers to discuss and make recommendations. Historically, SCAP and SETMO have provided this advisory function, and the goal is to enhance it.

As the Agency's principal expert, SETMO will provide advice and recommendations to customers on available assets and testing services. This may involve a "first contact" inquiry system that rapidly answers basic questions about testing services and offers recommendations based on customer needs and requirements. This ensures test customers quickly understand their options and appropriate Center Points of Contact (POCs) are identified for further inquiry.

By offering basic information and expert advice, SETMO will help customers make informed decisions about their testing needs. This initiative aims to raise general awareness of SETMO and the available testing services within its domain.

Through this objective, SETMO will enhance its role in facilitating and advising on testing services, ultimately contributing to the success of NASA's programs and projects.

Objective 1.5: Advise the Agency

Advise and inform Agency decisions that impact SETMO capability domains.

SETMO will play a critical role in advising Agency leadership, programs, and other stakeholders on strategy, planning, and testing for the capability domain, which includes facilities, assets, and external testing services. This Objective is to ensure that SETMO provides comprehensive and unbiased advice, recommendations, and insights for all key Agency decisions regarding the capability domain.

SETMO staff SMEs will assist all Agency stakeholders by offering expertise and guidance. For every significant decision impacting the capability domain, SETMO will either advise, recommend, and/or concur, ensuring a thoughtful and considered Agency perspective is provided to NASA leadership and other key stakeholders. This perspective applies to the entire portfolio, encompassing both internal and external testing services.

As the Agency's principal expert, SETMO will offer advice and recommendations for capability strategy and planning to Agency and Center leadership. This includes informing decisions about which capability components and their assets should be improved or divested and identifying areas where NASA should invest in new technologies. The scope of this advisory role covers the entire capability domain, including facilities, assets, and external testing services.

SETMO's advisory function relies on information, including databases, studies, whitepapers, and assessments. By leveraging all this data, SETMO will provide well-founded recommendations and insights to support decision-making processes at the Agency level.

Through this objective, SETMO will enhance its role as an unbiased advisor for testing services, ensuring that Agency leadership and stakeholders receive thoughtful and expert guidance.

Goal 2: Streamline Processes and Develop Tools

Increase efficiency and effectiveness for the delivery of testing services.

To enhance the efficiency and effectiveness of testing services, SETMO will develop management processes that ensure office resources and priorities for each capability domain are aligned to mission needs. Establishing a mission-driven classification methodology for strategic assets will ensure alignment with both mission needs and customer requirements. This alignment will be reassessed periodically to sustain all capability components for mission and strategic stakeholder requirements.

SETMO will enable digital transformation and improve data management for better decision-making. By establishing common management processes and best practices, SETMO will create a portfolio with desired balance of capability, capacity, and quality. Active management of portfolio capacity and operational readiness levels will ensure responsiveness to mission demand, while minimizing testing service delivery cost.

Annually assessing the difference between projected demand and actual utilization will help calibrate resources. Improving decision-making processes for changes to capability, capacity, and quality will ensure periodic realignment with customer needs, SETMO's strategy, and available resources. This comprehensive approach will optimize the delivery of testing services, providing high-value solutions for NASA's mission success.

Objective 2.1: Develop Processes to Rebalance Each Domain

Develop management processes to rebalance each capability domain in response to mission needs and requirements.

This objective emphasizes the development of management processes used by SETMO to make informed decisions for actively managing the portfolio based on evolving mission needs and requirements. Criteria will be established to maintain the optimal mix of capabilities, capacity, quality, cost, and risk. Rebalancing efforts will occur periodically and incorporate inputs such as MD priorities; emerging program and project test requirements; overall demand and utilization; as well as agency-wide campaigns (e.g., lunar exploration).

To achieve this alignment, SETMO will establish a baseline for capacity and readiness levels across all capability components. This includes determining the current operational readiness of each component (i.e., Capability Operational Readiness Levels - CORL) within the portfolio. This includes understanding the required CORL ranging from full three-shift operations to mothballing or divestment. By actively defining readiness levels, excess capacity can be minimized, ensuring the efficient allocation of agency resources.

A key element of this objective is managing portfolio capacity in response to demand forecasting. Each year, SETMO will evaluate the disparity between forecasted demand and actual utilization. Historical data often reveals gaps between projections and real usage, partly due to optimistic forecasts by facility operators. By calibrating future projections based on past data, SETMO will refine its planning to better align resources with mission objectives during the execution year.

Additionally, SETMO will consider the balance between immediate testing needs and future scenarios where a testing capability is retained for risk mitigation. SETMO will also identify opportunities to augment internal capabilities with external services when necessary.

Through these efforts, SETMO will maintain a well-managed, agile portfolio that addresses both current and future requirements. By standardizing readiness levels, actively managing capacity, and leveraging data-driven assessments, the process ensures sustained alignment with mission needs while minimizing redundancy and inefficiency.

Objective 2.2: Establish a Mission-Driven Classification

Establish a mission-driven classification methodology and process for strategic assets within the SETMO domain.

This objective focuses on developing a mission-driven classification methodology for each capability component within the SETMO domain. The current two-tier system, based solely on funding status, is inadequate and requires revision to support updated management processes, such as investment and divestment decisions.

The revised classification methodology will account for the uniqueness and importance of each of NASA's testing capabilities. When determining uniqueness of a particular facility, SETMO will consider if the capability is strategic to the nation providing a one-of-a-kind service which would be critical to NASA's long-term goals. In addition, assets supporting fundamental engineering and R&D capabilities will be considered. These assets tend to be smaller, and may not directly support existing NASA missions, but can be critical to achieving long-term mission goals or future programs.

By implementing a revised classification system, SETMO will enhance asset categorization to better support mission-driven management processes.

Objective 2.3: Enable Digital Transformation

Enable digital transformation and improve data management to better inform decision-making.

This objective focuses on enabling digital transformation and enhancing data management resulting in reliable and actionable data to inform the SETMO decision process. Key activities include migrating heritage data, identifying essential data for management processes, planning data acquisition, and selecting analytical tools.

The Annual Operating Plan (AOP) and SETMO quarterly reporting formats will be revised to streamline processes, reduce redundancy, and improve efficiency. The AOP will establish a year-of-execution baseline, while quarterly reports will reflect updates to this baseline. Updated asset classifications will guide specific data requirements for each capability component. Improved data collection will ensure higher data quality—delivering recent, relevant, and accurate information. Trusted data will enable informed decisions, better resource prioritization, and improved performance.

SETMO will establish metrics and measures to support ongoing performance assessments. An improved Management Information System (MIS) will centralize data collection and analysis. This will facilitate reporting, trend identification, and performance tracking. Standardized reporting through the MIS will highlight how capability components contribute to NASA's mission, fostering transparency.

Continuous improvements to data management processes will ensure SETMO's decision process remains efficient, data-driven, and aligned with mission priorities.

Objective 2.4: Establish Best Practices

Establish common management processes and best practices for capabilities within the SETMO domain.

This objective focuses on creating and refining common facility management processes and best practices for capabilities within the SETMO domain. The goal of this objective is to support facilities by proposing processes that enhance efficiency, effectiveness, and operational consistency. These processes will be regularly evaluated to ensure alignment with NASA's evolving mission, while remaining adaptable to address emerging challenges or opportunities.

As SETMO's capability portfolio matures, asset-by-asset assessments will be conducted, potentially leveraging a Capability Maturity Model. This approach will provide a clear pathway toward greater standardization and maturity, ensuring facilities are managed appropriately based on their mission significance, staffing availability, and the requirements they support. For instance, high-priority facilities may adhere to elevated standards, reflecting their critical role in supporting NASA's overarching priorities and objectives.

Evaluations will encompass key management areas such as pricing models; test readiness; implementation of maintenance practices such as Reliability-Centered Maintenance (RCM) and Condition-Based Maintenance (CBM); and adherence to both SETMO and agency-wide policies. This ensures that management practices remain efficient, consistent, and aligned with established best practices.

Additionally, incorporating lessons learned and benchmarking against comparable organizations or industry standards will enable SETMO to adopt innovative methods and drive continuous improvement. By embedding these practices, SETMO will ensure its management processes remain robust and responsive to both current and future mission needs.

Goal 3: Optimize Portfolio

Align and optimize each SETMO capability domain to meet current and future mission requirements.

SETMO will work to ensure the Agency's capability footprint is sited, aligned, and evolved to meet current and future mission requirements. This involves establishing clear criteria and processes for making informed decisions on the investment and divestment of assets. Additionally, SETMO will develop a comprehensive catalogue of testing services and interactive facility guides to support program and project planning efforts, helping them quickly find the best testing options and identifying the experts to consult with. SETMO aims to create a well-balanced capability footprint that fulfills Agency needs without unnecessary duplication or redundancy.

Objective 3.1: Establish a Process for Investment and Divestment

Establish criteria and a process for strategic investment and divestment of SETMO domain assets.

This objective focuses on defining criteria and establishing a clear process for strategic investment and divestment of SETMO domain assets to optimize resources and align with mission priorities. SETMO is committed to supporting Agency initiatives to reduce infrastructure expenses. This will be accomplished by identifying opportunities to consolidate testing capabilities and reduce redundant infrastructure; divesting in capabilities that do not support long-term NASA mission needs; and investing in technology upgrades to improve efficiency.

A near-term initiative involves restarting the Facility Maintenance Management (FMM) Program to address high-priority deferred maintenance needs. This includes shifting SETMO annual sustainment funding for certain capability components and redirecting them toward priority maintenance projects.

SETMO will develop tools to help identify facilities requiring further evaluation for investment or divestment. These tools will help track facility performance and value to the customer to ensure SETMO budget is being allocated in an efficient manner to support a need to reduce overall customer testing costs.

Objective 3.2: Develop a Catalog of Testing Services

Develop a catalog of testing services and interactive facility guides to assist Program and Project planning.

This objective focuses on creating a comprehensive catalog of testing services and interactive facility guides to support program and project planning within the SETMO domain. SETMO will maintain awareness of available testing services across both internal and external domains, providing stakeholders with critical insights to inform their decision process. The catalog will feature detailed inventories of assets, testing services, and capabilities, enabling programs and projects to efficiently plan for required testing.

Center personnel, who are most familiar with the testing capabilities, will perform periodic reviews and updates to ensure accuracy and efficiency. This approach streamlines the process and empowers Centers to maintain up-to-date information.

SETMO's catalog will consolidate insights from each capability domain, covering in-house facilities and external testing services. External collaboration with industry, academia, and government entities will ensure a comprehensive understanding of the testing landscape. The catalog should have sufficient information for program and project customers to explore and identify cost-effective external testing services.

By integrating internal and external resources and providing an interactive guide, this objective will enhance planning efficiency, maximize value, and improve alignment with mission objectives. The catalog will be a dynamic, evolving resource to ensure testing services and assets are effectively utilized in support of NASA's goals.

Objective 3.3: Periodically Assess Each Domain

Perform periodic assessments to review and adjust each testing domain.

SETMO will conduct periodic assessments to ensure NASA's testing domains remain aligned with strategic priorities and evolving mission needs. These assessments will inform stewardship plans and evaluate testing domain capacities, costs, and associated risks to meet current and future requirements.

The outcome of these domain assessments culminates in actionable recommendations designed to optimize customer value. These recommendations may include strategies for investment or divestment and will be presented to key SETMO decision-makers (e.g., Space Environments Testing Control Board-SETCB).

These assessments will include the exploration of opportunities for consolidation. Consolidation of testing capabilities offers significant potential for cost reductions and efficiency gains. This could involve centralizing capabilities within fewer locations, reducing the number of centers, or even divesting facilities and assets that are no longer mission critical. The upcoming flight simulation assessment will include these consolidation opportunities as a key area of exploration.

Another focus area will include workforce considerations. As consolidation efforts are considered, the impact on the workforce will remain a top priority. Maintaining access to skilled personnel with the necessary competencies to support NASA's future state is vital. Innovative workforce management strategies will be explored, such as sharing skilled personnel between Centers to address surge testing needs and identifying external capabilities outside the Agency.

Goal 4: Maintain, Sustain, and Modernize Facilities

Plan and coordinate long-term sustainment of critical testing services within the SETMO domain.

This goal ensures the long-term sustainment of critical testing services within the SETMO domain through careful planning and coordination. This involves developing and implementing a robust pricing, funding, and cost recovery model to support the financial sustainability of SETMO domain capabilities. Additionally, creating agreements with stakeholders that clearly define responsibilities, and financial obligations will facilitate the ongoing support and collaboration necessary to maintain these essential testing services. These agreements will be periodically reviewed to ensure SETMO financial commitments are aligned with long-term mission requirements.

Objective 4.1: Develop a Pricing Model

Develop and implement a pricing, funding, and cost recovery model.

SETMO will revise its current charging and funding model to ensure the long-term sustainment of its assets and testing capabilities. The lack of consistently applied pricing, funding, and cost recovery model has caused inefficiencies and challenges for Center personnel who manage and operate testing facilities. A new approach will address these issues and align key stakeholders with implementation.

Additionally, policies will be established to make financial sustainment processes transparent, fair, and predictable. These steps address existing gaps and support collaboration with stakeholders, including MDs, Centers, and the Office of the Chief Financial Officer (OCFO).

A current initiative that supports this objective includes an assessment of costs and recovery methods for SETMO Tier 1 components that is expected to be completed by March 2025. The assessment will evaluate cost estimates, recovery practices for internal and external users, and their alignment with full-cost goals. The aim is to standardize the pricing methodology for SETMO domain capabilities across centers.

Objective 4.2: Establish Responsibilities and Financial Obligations

Develop agreements with stakeholders that establishes responsibilities and financial obligations needed to sustain critical testing services.

To sustain critical testing services, SETMO will establish agreements with stakeholders that define responsibilities and financial commitments. These agreements will align with the revised pricing, funding, and cost recovery model developed to achieve Objective 4.1. These agreements will be time-limited, covering specific fiscal years, with periodic reevaluation to ensure alignment with evolving requirements and financial needs of test facilities. This approach marks a shift from the current static sustainment model.

A central component of this effort will be identifying SETMO, MD, Center, and test customer roles and financial obligations under the updated model. SETMO will consider leveraging existing boards (i.e., SETCB) to review and approve decisions such as topics that include funding models and pricing policies.

Stakeholder coordination is key, with periodic reviews to ensure that resources are allocated effectively. Capability domains may have varying priorities, and the process will be tailored to address these differences while maintaining overall alignment with mission and SETMO goals. These agreements will provide a transparent and structured framework for financial sustainment.

Summary

SETMO's Strategic Plan will advance testing and simulation capabilities to meet NASA's evolving mission needs and broader aerospace priorities. This comprehensive framework addresses critical challenges such as deferred maintenance, infrastructure optimization, and process efficiency, while emphasizing stakeholder alignment and collaboration as central to its success.

The plan focuses on four Strategic Goals: forecasting mission needs, streamlining management processes, optimizing the capability portfolio, and sustaining and modernizing facilities. Together, these goals will enable SETMO to operate as a mission-driven organization, delivering high-value testing services and fostering agency-level advocacy. By transitioning to strategic investments and implementing targeted infrastructure changes, SETMO is taking decisive steps to ensure agility, efficiency, and responsiveness.

Aligned with its updated Mission and Vision, SETMO is dedicated to building a well-balanced capability portfolio, avoiding redundancy, and strengthening NASA's operational effectiveness. Through transparency, stakeholder engagement, and commitment to continuous improvement, this Strategic Plan positions SETMO to anticipate future needs, support long-term agency goals, and lead innovation in space and flight simulation testing.