

Capability Portfolio Commitment Agreement (CPCA)

Space Environments Testing (SET) Management Office (SETMO)

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INTRODUCTION

This CPCA for the combined Strategic Capabilities Assets Program (SCAP) and SET capability portfolios managed by SETMO is an agreement between the Mission Support Council (MSC) Chair and the Mission Support Directorate (MSD) Associate Administrator and includes concurrence from Center and Laboratory Directors with capability components at their Centers and Mission Directorate Associate Administrators (MDAAs).

Approval of this CPCA:

- authorizes SETMO to transition from Establishment activities to Strategic Management activities
- formally incorporates the larger group of Agency-owned SET capability components identified per MSC decision in November 2015 into the existing SCAP capability portfolio to form the SETMO capability portfolio
- authorizes SETMO to preserve critical Agency SETMO capability components while simultaneously implementing a managed approach for reducing redundant and/or obsolete infrastructure that is no longer strategically aligned with NASA's mission

BACKGROUND

In August 2005, the NASA Strategic Management Council (SMC) approved the creation of an Agency-level asset management program, SCAP, to preserve key NASA capabilities that met certain criteria (e.g., minimum size). SCAP evolved to include three distinct capability categories: High Enthalpy Testing, Flight Simulation, and SET.

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 SET domain across Mission Directorates and Centers and the subsequent SET Tiger Team deep dive which led to the identification of the SET assets recommended for corporate management.

In November 2015, the MSC decided to apply a centralized management model to SET capabilities. Specifics of this MSC decision are as follows:

- *Establish SET capability management model under MSD to include SET assets within SCAP and assets identified in decision package MSC-2015-10-01.*
- *Centralized management areas for test [to include Rocket Propulsion Test Program (RPT), SCAP, Aeronautics Evaluation and Test Capabilities (AETC), and High-End Computing Capability (HEC)] will adopt consistent management roles as applicable.*
- *Funding model will be the existing funding model, where funding for the portfolio will remain where it is today. SET manager can propose a new funding model to the Agency through the MSC if the current funding model is driving issues and/or inefficiencies.*

In September 2016, SETMO was established within MSD's Office of Strategic Infrastructure (OSI) to manage the combined SCAP/SET capability portfolio. As part of the Planning,

Programming, Budgeting, and Execution (PPBE) for Fiscal Year (FY) 2020, a fourth capability category, External Radiation, was added to SETMO.

1.0 GOALS AND OBJECTIVES

NASA's vision is realized through the successful execution of its missions. SETMO indirectly enables mission success by achieving best value for the Agency and its customers by strategically and centrally managing the SETMO capability portfolio and leveraging external capabilities when in the best interest of the Agency.

To meet capability portfolio objectives, SETMO is focused on the achieving following goals:

1. **Continually Increase Value Delivery** as measured through:
 - a. Timeliness and reliability of support for prioritized Agency testing requirements
 - b. Increased alignment of capability components (and their capacities) with projected test demand
 - c. Effective risk identification and realized risk reductions
 - d. Continued relevance of the capability portfolio and enhancements in test capabilities
 - e. Satisfied test customers through operational professionalism and efficiency

2. **Strategically Reduce Budget Requirements and Threats** as measured through:
 - a. Common testing practices and cross-Center synergies
 - b. Expanded level of less-costly testing alternatives to meet Agency requirements
 - c. Realized efficiencies, consolidations, or operational savings including divestiture or reduction in the operational readiness levels for capabilities where return on investment is inadequate

SETMO capabilities support the 2018 NASA Strategic Plan's goals and objectives with the primary focus on Strategic Goal 4: Optimize Capabilities and Operations.

- Strategic Objective 4.2: Enable Space Access and Services. Support the strategic capabilities needs of NASA's programs.
- Strategic Objective 4.6: Sustain Infrastructure Capabilities and Operations. Enable NASA's Mission by providing the facilities, tools, and services required to efficiently manage, operate, and sustain the infrastructure necessary to meet mission objectives.

SETMO aligns with and supports the MSC decision (MSC-2017-06-002) to adopt an Agency goal of 25% reduction in infrastructure assets over 20 years for strategic rightsizing/alignment of NASA's infrastructure.

2.0 SCOPE, PRODUCTS, AND SERVICES

The SETMO capability portfolio (Tier 1 and Tier 2) comprise approximately 175 ground test capability components across nine NASA Centers and external sources. Each capability component is a system comprising workforce (i.e., FTE/WYE), equipment, facilities, processes, resources, competencies, and technologies that delivers products and services. Some capability components directly and/or indirectly support other listed SETMO capabilities as part of an existing consolidation at a Center to allow for integrated testing services. Also, at some Centers,

there are similar assets, such as cleanrooms used for integration and/or build-up that are not within the scope of SETMO.

SETMO capability components fall into four major categories as shown in Table 1.

Table 1. SETMO Capability Categories

Capability Category	Description
High Enthalpy Testing	Large arc jet test facilities, recognized strategic capability components
Flight Simulation	Motion based and stationary aeronautics flight simulation test facilities
Space Environments Testing	Facilities whose primary use is related to spacecraft and instrument development and qualification, space technology development, human rated space environments, and launch environments. Capability component types include vacuum, thermal/vacuum, and thermal chambers; vibration tables; acoustic labs; cleanrooms; and electromagnetic interference (EMI)/electromagnetic compatibility (EMC), magnetic, optical, X-ray, solar spectrum, and ionizing radiation facilities.
External Radiation	Services procured from external sources to meet the Agency requirements for high-energy radiation testing.

The SETMO Tier 1 is the collection of those capability components approved by the Agency SMC in August 2005 for SCAP sustainment funding. The SETMO Tier 2 is the collection of those capability components approved by the Agency SMC in August 2005 that were not provided SCAP sustainment funding and those capability components added through the November 2015 MSC decision that created SETMO. SETMO Tier 1 and Tier 2 capability components are listed in Appendix C - NASA SETMO Tier 1 and Tier 2 Capability Components.

Testing services provided to SETMO customers vary and are dependent on customer requirements. These services include test planning and set-up; test article installation; test article modification; data acquisition, reduction, and analysis; qualification test services; and test imaging. These services are Center-managed and the specific service levels provided are negotiated between the test customer and the Center capability component manager per Center procedures.

Performance/operational thresholds are used to determine if/when SETMO Director concurrence or notification is required for the acquisition of new capability components or the use of existing capability components. These thresholds are defined in the SETMO Capability Portfolio Management Plan (CPMP).

SETMO recognizes that decision processes need to consider Center end-to-end capabilities. Some of the components included in these end-to-end capabilities might not be in the SETMO capability portfolio.

In addition, SETMO recognizes there is enabling infrastructure required by each capability component, and further identification of infrastructure interfaces will be accomplished by SETMO and the Centers during the first year of Strategic Management of the SETMO capability portfolio.

SETMO also maintains cognizance of external capabilities and services that fall within the capability portfolio scope.

3.0 STRATEGY

SETMO capability components are key enablers for accomplishing the Agency's Aeronautics, Human Exploration and Operations, Science, and Space Technology mission objectives. The SETMO strategy effectively and proactively:

1. Manages the capability portfolio as a strategic Agency resource, giving consideration to Agency-defined center roles and responsibilities to sustain, maintain, modernize, enhance, and develop infrastructure and a skilled workforce at a level based on current and projected test requirements and available funding. The lack of requirements or constraints in funding result in prioritization decisions that change the planned capacity or operational readiness level of capability components or increase costs to customers.
2. Ensures sustained capability components have mission requirements, strategic stakeholder requirements, or have been identified as potentially required for future missions and are being sustained for risk mitigation purposes pending mission requirement maturation.
3. Provides program management (cost, schedule, technical) for all sustained capability components and monitor and report how capability components contribute to the Agency's mission. As an element of management, the SETMO will integrate risks from and mitigations for the capability components within the Risk Management Plan.
4. Provides annual review of business practices, including the offset of customer charging through the use of sustainment funding, to ensure consistency with Agency policy.
5. Ensures continued relevance of the capability portfolio by developing short- and long-range plans for capability components.
6. Evaluates and provides decisions to Agency and Center leadership on assessments that involve changes to the capability portfolio in accordance with requirements and strategic guidance included in NPD/R 8600.1, this CPCA, and the CPMP.
7. Implements actionable decision management. SETMO conducts strategic alignment assessments of all capability components through an established analytical decision framework with guidance and review from the Space Environments Testing Control Board (SETCB).
8. Develops financial management proposals. Potential changes in SETMO budgets are achieved after strategic alignment assessments through a budget rationalization review that incorporates requirements for sustainment, maintenance, and modernization and advancement.
9. Advises customers with respect to capabilities to inform the development of realistic test campaigns.
10. Provides a concur or non-concur for investments, divestments, acquisition strategies, procurements, agreements, and changes to capability portfolio capability components in

accordance with requirements and strategic guidance included in NPD/R 8600, this CPCA, and the CPMP.

11. Provides a concur or non-concur on waivers from CPM requirements as described in NPR 8600.1, Section 5.2. A written explanation for a non-concurrence is provided.
12. Maintains cognizance and insight into external capabilities that fall within the capability portfolio.
13. Serves as the Agency's principal advocate and authority for the capability portfolio and its components both internal to the Agency and with external partners.

The SETMO CPMP defines the implementation details for the SETMO strategy. The SETMO Capability Portfolio Strategic Plan defines the implementation details for specific alignment assessments.

3.1 Tier 1 and Tier 2 Capability Components

Tier 1 capability components are provided sustainment funding but must rely on customer revenue and funding from CM&O to fully recover the costs necessary to operate at planned capacity. Tier 2 capability components are not provided sustainment funding and rely on customer revenue and funding from CM&O to fully recover the costs necessary to operate at planned capacity.

SETMO is responsible for continually monitoring conditions associated with the Tier 1 and Tier 2 capability components. This includes strategic testing needs from the Agency and testing capabilities external to NASA. SETMO manages its budget to best meet the needs of stakeholders, and changes in Tier 1 funding are based on strategic need and risk. SETMO advises Agency leadership on the state and disposition of the capability components. Changes in Tier 1 and Tier 2 capability components are expected due to changing Agency programs and projects and the Agency's goal of a 25% reduction in infrastructure assets over 20 years.

SETMO conducts strategic alignment assessments of Tier 1 and Tier 2 capability components with guidance and review from the SETCB. These alignment assessments evaluate each sub-component category to optimize the value capability components and resources provide to the Agency by:

- Gaining situational understanding of sub-capability portfolio elements, their capacities, costs, and risks, and identifying the criteria that informs element value in meeting requirements.
- Providing pairwise ranking of each element with prioritization conducted to the level where it is relevant.
- Developing decisional scenarios/options, to produce a limited number of practical alternatives, and identifying criteria for evaluating those options. For situations where there is insufficient data for analytical evaluation, relevant *good enough* data requirements are defined to support the evaluation of Agency intent to align supply with demand.
- Developing an action plan for improving resource allocation and or capability portfolio investment or divestment and rationalizing any increase in operational readiness levels, strategic investment requirements, and any increased funding requirement.

Alignment assessment methodology and details are documented in the SETMO CPMP and SETMO Capability Portfolio Strategic Plan. An integrated plan will be developed within three months of MSC approval of the SETMO transition to Strategic Management. The integrated plan will prioritize sub-capability alignment assessments and will identify the milestones associated with the completion of assessments to support PPBE23 and those that will support PPBE24.

3.2 Customers, Stakeholders, and Partners

The predominate customers of SETMO products and services are the programs and projects sponsored by NASA Mission Directorates (~ 90%). SETMO capability components also supports other government agencies (e.g., Department of Defense (DoD), Federal Aviation Administration) and commercial space vendors (e.g., Boeing, SpaceX).

SETMO stakeholders include internal and external customers, Mission Directorates, Centers with SETMO capability components, capability leadership teams, and the SETCB.

3.3 Constraints / Challenges

The constraints and challenges capability components include:

- **Funding Levels.** Flat or decreasing funding for SETMO capability components results in fewer investments in maintenance and modernization, more run-to-fail situations, and more costs being passed to testing customers, which might result in missed mission milestones.
- **Location.** The SETMO capability components are geographically dispersed, which creates a challenge to sharing workforce and capabilities.
- **Changing Requirements.** The technical capabilities and the capability components contained within SETMO are dynamic and evolve as NASA missions and Agency requirements change.
- **Agency Culture.** Centralized management requires Agency-level decision making, funding, planning, strategic management, standardization, and controls to shape and evolve the tiers.

3.4 Opportunities

The opportunities for capability components include:

- **Knowledge Sharing.** The sharing of best practices across the SETMO capability components makes it possible for all personnel to perform their jobs better.
- **Standardization.** Common business practices and standardized hardware, software, technology, training, and reporting across similar capability components can:
 - Lower the cost of capability component operations and maintenance.
 - Provide customers with greater options for needed products and services.
 - Lower customer and capability portfolio risks.
 - Enable hardware and software to move between capability components when needed.

- **Skill Retention.** Centralized management provides ongoing Agency-level awareness of the skilled personnel (FTE/WYE) that are available and retained. As the number of skilled personnel changes at different Centers, SETMO can work with Centers to retain skilled personnel to the greatest extent possible through periods of low utilization.

3.5 Strategic Themes or Focus Areas

SETMO is focused on the following areas:

- Maturing central and strategic management processes. This includes:
 - Understanding the capability, condition, current capacity, costs to own, and the products and services delivered;
 - Recurring assessment of utilization trends and current and future mission requirements; and
 - Developing recommendations for NASA leadership regarding the SETMO capability components.
- Enhancing Agency-level perspective and decisions.
- Identifying and leveraging external capabilities when benefit and risk evaluations are favorable to the Agency.
- Conducting alignment assessments
- Developing the SETMO Capability Portfolio Strategic Plan.

3.6 SETMO Capability Portfolio Management Plan (CPMP)

The SETMO CPMP has been developed in parallel with the CPCA and is being routed for approval at the time of CPCA final signature. The CPMP provides further definition concerning the management approach that will be used. In instances where contradiction to the CPCA and CPMP are noted, the CPCA takes precedence.

Final CPMP approval is anticipated several months after CPCA approval. Further updates to the CPCA and CPMP will be published as a result of changes to the listing of capability components in Appendix C and/or as a result of changes to the charter and scope of SETMO.

4.0 AUTHORITY, GOVERNANCE, AND MANAGEMENT

The authorization to establish the SETMO capability portfolio is documented in NASA MSC decision MSC-2015-10-001 (November 2015). The authorization to transition the SETMO capability portfolio to strategic management is documented in NASA MSC decision MSC-2020-08-0021 (August 2020). The SETMO capability portfolio is governed by NPD 8600.1, *Capability Portfolio Management* and NPR 8600.1, *NASA Capability Portfolio Management Requirements*.

MSD is the sponsoring Mission Directorate for the SETMO capability portfolio, and SETMO is aligned with the MSD Program Management Council (MSPMC). The line of responsibility, authority, and accountability is from the NASA Administrator to the MSD Associate Administrator, to the OSI Assistant Administrator, to the SETMO Director. The SETMO Director, who serves as the SETMO capability portfolio manager, leads a team that includes the

Deputy Director, Chief Engineer, Chief Strategist, Capability Component Manager, and Business Manager.

Each NASA Center with SETMO capability components assigns a point of contact (POC) who serves as the primary interface for SETMO-sponsored activities. The Center POC should have sufficient authority, insight, and ability to verify that investments and divestments support Center goals and commitments. The POC for External Radiation is the Agency Electronic Parts Manager. The MSD/SETMO organizational hierarchy is shown in Figure 1.

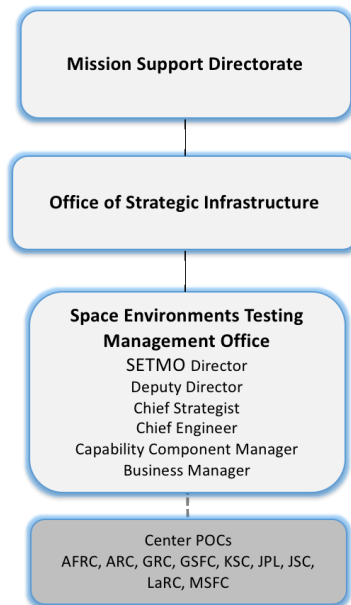


Figure 1. MSD/SETMO Organizational Hierarchy

The SETCB provides Agency input, guidance, and decisions on utilization, strategic investments and divestments, and scalability (capacities and/or capabilities) for the SETMO capability portfolio. SETCB includes Mission Directorate and Center representatives. Centers are invited to SETCB meetings and engage in ad hoc SETCB activities. Additional SETCB details are contained in the CPMP.

Center POCs and SETCB members advise SETMO of Center, program, project, and Mission Directorate intentions to make investments that may impact the SETMO capability portfolio.

Per MSC decision MSC-2020-08-0021 (August 2020), the SETMO Director is the Decision Authority for all decisions except Tier 1 divestments. The MSC Chair retains Decision Authority for Tier 1 divestments. The SETMO Director is responsible for the execution of the goals and objectives defined in Section 1.0. This includes assessment of capability components regardless of their tier and disposition of Tier 2 capability components. Tier 2 divestments are made only after completion of alignment assessments for capability category sub-capabilities (e.g., the vibration sub-capability within the SET capability category). A combination of decisional reviews in accordance with NPD/R 8600.1 are used for the strategic management of the capability portfolio. These are outlined in the CPMP and include:

- Additions or deletions of capability components in the SETMO capability portfolio.

- Construction of new SETMO capability components when the value of the new capability component exceeds \$1 million regardless of the funding source.
- Large modifications to existing SETMO capability components when the value of the modification exceeds \$1 million regardless of the funding source.
- Divestment of a Tier 2 capability component.
- Changes to the SETMO funding model.
- Changes to the role of the SETCB.

In accordance with Agency policy, the dissenting opinion process is used by Centers and Mission Directorates to bring to the MSC Chair disagreement with decisions made by the SETMO Director. The MSC Chair also decides divestment reclaims.

The MSC Chair is the Decision Authority for the:

- Transition of the SETMO capability portfolio from Establishment activities to Strategic Management activities
- Transition of the SETMO capability portfolio from Strategic Management activities to Termination activities.
- Divestment of a Tier 1 capability component.

The MSC annually reviews SETMO for scope, responsibilities, issues, and risks.

5.0 PERFORMANCE

SETMO is committed to full compliance with the capability portfolio management requirements documented in NPD/R 8600.1. These requirements are prioritized to best align with the situational environment: capability components and enabling infrastructure that are aged and, in some cases, unreliable; importance for reliable performance in support of highly visible, costly and important Agency missions; and, the need for affordable solutions. Specific management performance elements which are of priority are:

- SETMO annual review of the operational status of its capability components to assess the costs and benefits of individual capability components against testing requirements and needs and to make appropriate decisions to invest in upgrades and to divest where advantageous.
- Development of integrated utilization schedules to assist in achieving schedule commitments for all SETMO activities and to focus on successful achievement of major milestones.
- Ensured balance of near-term financial stewardship with long-term capability and risks including management of SETMO operational readiness states to realize an optimal balance of operations, maintenance, and modernization investments.
- Mitigation of maintenance issues with particular attention to those evaluated as having a very high risk to test.

The reliable delivery of testing services is a critical performance metric in support of customer

needs. The established, annual SETMO Agency Performance Indicator is rated green after a minimum of 90% overall availability of the Tier 1 capability components is reported. Availability is a measure of readiness and reliability and is calculated by subtracting unplanned downtime from time sold and dividing the result by time sold.

Testing performance is measured through customer satisfaction surveys. The performance metric is to achieve 85% or better overall customer satisfaction score for Tier 1 testing services. SETMO collaborates with Centers in the development of Annual Operating Plans (AOP) for the SETMO Tier 1 capability components. The development starts in April with a milestone to complete the AOP by September 30th. The AOP serves as the operational baseline for the year of execution.

SETMO ensures facility maintenance and modernization activities do not adversely affect Agency requirements and uses Agency programmatic requirements to govern the implementation of activities in meeting testing milestones and schedule commitments.

Quarterly and annually, SETMO reviews Center operational performance against the planned baseline established in the AOP.

SETMO provides input to the quarterly Agency Baseline Performance Review and is also reviewed annually by the MSD and the MSC against the goals and objectives identified in Section 1.

6.0 BUDGET AND FUNDING MODEL

A fundamental factor in implementing centralized and strategic management is funding. The current SETMO model employs a partial, centrally-managed funding strategy, and consistent with MSC Decision Package MSC-2015-10-001, utilizes available funding to meet programmatic goals and objectives and operational sustainment and improvement strategies.

At the inception of SCAP in 2006, the budget level was set to sustain capability components at a *ready to produce* state with Centers establishing cost recovery strategies needed to meet planned capacity. Since 2006, the SCAP budget has declined, and the purchasing power has eroded to the point where capability components are sustained at a less than *ready to produce* state and with associated undesirable consequences (e.g., backlogged maintenance, unplanned downtime, instability in capability readiness, lack of technology advancement). Also, the SCAP-sustained capability components are not funded for the full complement of workforce (FTEs and WYEs).

The SETMO budget is established through the Planning, Programming, Budgeting and Execution (PPB&E) process with specific guidance from MSD and OSI. SETMO operates under a constrained budget with funding determined by MSD. Within these limits, SETMO makes an initial allocation of funds among the capability components. Each test site then prepares an operating budget, divided among civil servant labor, travel, and various categories of procurements, to fit their allotted funds. MSD provides approximately \$27 million/year (in FY20 \$) to sustain SETMO Tier 1 capability components at less than a *ready to produce* state and to provide a limited level of maintenance funding for Tier 1 and Tier 2 capability components. Per this funding model, Tier 1 capability components must rely on customer revenue and funding from CM&O to fully recover the costs necessary to operate at planned capacity, and Tier 2 capability components must rely on customer sustainment and revenue and funding from CM&O

to fully recover the costs necessary to operate at planned capacity. The current SETMO PPBE22 run out is shown in Appendix D – SETMO Budget Run Out.

Constraints in funding result in prioritization decisions that increase costs to customers or change the planned capacity or operational readiness level of capability components. Potential changes in SETMO budgets are requested through the annual PPBE Issue Paper process and realized after strategic alignment assessments through a budget rationalization review that incorporates requirements for sustainment, maintenance, modernization, and advancement.

SETMO competes in the Construction of Facility (CoF) process for supplemental resources necessary to achieve strategic objectives. All CoF resources realized are programmed outside of the SETMO budget.

7.0 SOURCING STRATEGY AND SOURCING DECISIONS

SETMO uses the term “capability portfolio realignment” (i.e., realigning the capability components within tiers to more efficiently or effectively meet expected future demand) instead of “sourcing strategy” and the term “test assignment” (i.e., assigning testing requirements to specific capability components) instead of “sourcing decision.”

When SETMO identifies opportunities to use, acquire, develop, or modify capability components in the SETMO capability portfolio to meet mission requirements, SETMO works with the Mission Directorates, Centers, SETCB, NASA Tech Fellows, and Systems Capability Team Leads to determine the best approach for capability portfolio realignment and/or test assignment.

For capability portfolio realignment, SETMO also concurs or non-concurs on or is notified of:

- Investments, divestments, acquisition strategies, procurements, or agreements that seek to build or develop new capabilities, improve existing capabilities, or divest of capabilities that fall within the SETMO capability portfolio and thresholds defined in the CPMP, whether NASA or a NASA investment in a non-NASA capability. Recent examples include the Arc Jet modernization and the JSC Building 49 divestment.
- Acquisition strategies, procurements, and agreements to obtain products and services from external capabilities that fall within the SETMO capability portfolio. A recent example includes the external radiation block buy for testing electronic parts.

For most test assignments, SETMO customers interact and negotiate directly with Center capability component managers (i.e., facility managers) for information, planning, scheduling, developing cost estimates, and conducting tests. SETMO engages only in significant test assignments for major programs and projects (e.g., James Webb Space Telescope (JWST) testing in JSC Chamber A, Orion testing at Plum Brook Station (PBS)) and under other rare circumstances (e.g., a Center cannot resolve a schedule conflict and requests help, or external customers are making test inquiries with multiple Centers).

SETMO concurrence and notification processes are described in the SETMO CPMP.

Engagement points are essential for ensuring that concurrence or notification occurs as early as possible in the timelines, review cycles, and decision-making processes of the MDAA, Center, and program and project management. Early engagement points ensure that the plans of the

MDAA, Center Director, program manager, and project manager are consistent with the strategic direction and approved plans of the SETMO capability portfolio.

Specific methodologies have been established to serve as engagement points for agreements in general and for agreements established as part of competed missions. These methodologies are described in the SETMO CPMP.

8.0 HIGH-RISK AREAS

SETMO has identified three risks to the capability portfolio. These are:

- **Arc Jet Modernization.** The Arc Jet Complex is aged, funding for the infrastructure is very limited, and equipment failure could disable the capability for up to 24 months which could result in critical and costly delays in verifying and validating entry thermal protection systems for planned crewed, robotic, and commercial missions.
- **Funding Levels.** Flat or decreasing funding for SETMO results in fewer investments in maintenance and modernization, more run-to-fail situations, and more costs being passed to testing customers, which might result in missed mission milestones.
- **Agency Culture.** Centralized management requires Agency-level decision making, funding, planning, strategic management, standardization, and controls needed to shape and evolve the capability portfolio.

SETMO uses a Continuous Risk Management Process per NPR 8000.4, *Risk Management Procedural Requirements* to inform investment and divestment decisions. SETMO utilizes Center and third-party capability component condition and risk assessments as input to the Continuous Risk Management Process. SETMO provides a centrally-managed, risk-based allocation for maintenance projects for the SETMO capability portfolio.

Risk management is a distributed function in SETMO, and each of the Centers identifies, assesses, and mitigates potential risks within its own activities. SETMO maintains an integrated Risk Management Plan which includes Center-identified risks for prioritized mitigation projects and activities.

9.0 INTERNAL DEPENDENCIES AND AGREEMENTS

The successful implementation of Agency CPM depends on the support of the MSC Chair, MSC, OSI Assistant Administrator, sponsoring and participating MDAAs, Mission Directorate program and project managers, Office of the Chief Engineer, Office of the Chief Financial Officer, Office of the Chief Information Officer, Center Directors, and Center capability component managers. Chapter 4 of NPR 8600.1 delineates the roles and responsibilities of these parties in CPM. No additional internal dependencies and agreements are necessary for the SETMO capability portfolio to meet its objectives.

SETMO collaborates with Centers in the development of AOPs for the SETMO Tier 1 capability components. These AOPs serve as the operational baseline for the year of execution and document agreements between SETMO and the Centers.

10.0 EXTERNAL DEPENDENCIES AND AGREEMENTS

SETMO has several external dependencies and agreements.

NASA has multiple agreements with National facilities that provide heavy ion and proton radiation testing for the Agency. SETMO is collaborating with and provides funding to the Agency Electronics Parts Manager to consolidate these agreements and locations for electronic parts external radiation testing. This collaboration allows NASA to maintain access to external facilities at highest risk through a block buy of time and to consolidate and centralize management of multiple existing agreements and contracts to reduce administrative overhead and streamline access.

NASA also has an agreement with the DoD/NASA National Partnership for Aeronautical Testing (NPAT) to expand cooperation between the two parties for aeronautical test facilities including wind tunnels, propulsion test facilities, simulation facilities, and open-air ranges. The SETMO Director is a member of the NPAT board and works to address topics of mutual interest including planned improvements, alterations, or operational changes to aeronautical test facilities, and initiatives to promote and preserve the specialized workforce associated with aeronautical test facilities.

SETMO works with external partners such as the NPAT and relevant American Institute of Aeronautics and Astronautics working groups to communicate National needs. SETMO also communicates with them during divestment assessments to ensure National needs are considered.

11.0 REVIEWS

The SETMO capability portfolio has recurring performance, informational, and specific decisional reviews with the MSC, MSD, and SETCB.

MSC decisional reviews authorize transition of the capability portfolio from Establishment activities to Strategic Management activities and from Strategic Management activities to Termination activities.

MSD evaluates the efficiency, effectiveness, and performance of the SETMO capability portfolio on a recurring basis. These evaluations focus on how well the capability portfolio is aligned with Agency needs, how commitments are being met, and how well policy and management processes are being followed. SETMO is reviewed annually by the MSPMC and during the PPBE process and quarterly through the Baseline Performance Review.

The SETCB provides Agency input and guidance on utilization, strategic investments and divestments, and scalability (capacities and/or capabilities) for the SETMO capability portfolio and its capability components. SETMO meets with the SETCB quarterly.

SETMO conducts quarterly reviews with the Centers. Guidance, templates, and spreadsheets for these reviews are documented in the CPMP.

12.0 WAIVERS

No waivers against NASA policies, directives, or applicable external requirements are required. Waivers are archived in accordance with the CPMP.

13.0 CPCA ACTIVITIES LOG

All CPCA activities, including revisions that reflect all changes to the original CPCA, are documented in the format defined in Table 2. This log may be supplemented with an attached addendum (Ref. #X) for each entry that describes the change. The CPCA is revalidated or updated every five years. Updates occur more frequently if there are significant changes.

Table 2. Capability Portfolio Commitment Agreement Activities Log

Date	Event	Change	Addendum	Term Review	Sponsoring MDAA Sign	Participating MDAA(s) Sign	Center Director(s) Sign	MSC Chair Sign	CIO Sign when req'd
10/14/20	Initial Signatures	None	None	No	Yes	Yes	Yes	Yes	NR
mm/dd/yy	Revalidation	None	N/A	No					
mm/dd/yy	Revalidation	None	N/A	No					
mm/dd/yy	Approval of significant change	Addition of change N	Ref. #1	No					

Appendix A - Glossary

Agency Strategic or Required Capability Components. Capability components with unacceptable or high risk to Agency mission or reputation for loss or inability to function. With unacceptable or high risk, some mission objectives may still be achieved but with significant impact. All capability components in the SETMO capability portfolio are Agency Strategic or Required capability components.

Capability Component. An individual capability within Tier 1 or the larger Tier 2. It is a system comprising workforce (i.e., FTE/WYE), equipment, facilities, processes, resources, competencies, and technologies that delivers products and services; for example, a wind tunnel and the workforce that manages, operates, and maintains it or a complex dedicated to an end-to-end process.

Capability Domain. Defined in NPD/R 8600.1, but not used by SETMO. Instead, SETMO uses the phrase “SETMO Capability Tier 2” (or Tier 2) with corresponding definition.

Capability Portfolio. A specific collection of functionally similar site-specific capability components and enabling infrastructure strategically managed together to meet NASA's strategic goals and objectives. For example, the Aerosciences Evaluation and Test Capabilities (AETC) capability portfolio includes selected NASA wind tunnels and aero-propulsion testing capability components. The capability portfolio for SETMO consists of Tier 1 and Tier 2 capability components, is defined in the CPCA, and is maintained as a configuration-managed element within the CPMP.

Capability Portfolio Realignment. Realigning the capability components within a capability portfolio to more efficiently or effectively meet expected future demand. SETMO uses the term “capability portfolio realignment” instead of “sourcing strategy.”

Center Point of Contact (POC). The POC assigned by each NASA Center with SETMO capability components. The Center POC serves as the primary interface for Center management regarding SETMO-sponsored activities. The Center POC should have sufficient authority, insight, and ability to verify that SETMO requirements are being satisfactorily addressed.

Centralized Management. A management, reporting, and communications approach led by a central authority to ensure tactical and strategic decisions are made at the appropriate levels and are provided an integrated Agency perspective.

Dormant. A period of extended quiescent status for an operational capability component.

Establishment. The first of three sets of activities characterizing the lifespan of a capability portfolio. When leadership determines that it may be in NASA’s best interest to strategically and centrally manage a group of functionally similar capabilities in an integrated manner, it initiates the Establishment of a capability portfolio of capability components.

A decisional review is held at the MSC to determine whether to formally establish a capability portfolio and transition to active strategic management status; i.e., to transition to Strategic Management activities.

Long-term (sustainment). When a capability component has been fully funded (i.e., for sustainment and test-related costs) by a customer or group of customers for five years or more.

Sourcing Decisions. The assignment of customer requests to capability components.

Sourcing Strategy. A strategy for acquiring capability portfolio products and services through capabilities available in-house and through other agencies, vendors, partners, and academia. The sourcing strategy goal is to achieve an optimized capability portfolio that addresses Agency goals and objectives, supports the capability portfolio strategy, enables the capability portfolio's strategic direction, and satisfies customer requirements.

Space Environments Testing Control Board (SETCB). The SETCB provides Agency input and guidance on utilization, strategic investments and divestments, and scalability (capacities and/or capabilities) for the SETMO capability portfolio.

Space Environments Testing Management Office (SETMO). The office responsible for managing the SETMO capability portfolio.

SETMO Capability Portfolio Manager. The person assigned to strategically and centrally manage the SETMO capability portfolio. The SETMO Director serves as the SETMO Capability Portfolio Manager.

SETMO Capability Tier 1. The SETMO Capability Tier 1 is 10 ground test capability components across five NASA Centers. Tier 1 capability components are generally larger and more complex than Tier 2 capability components. SETMO strategically and centrally manages Tier 1 capability components to meet NASA's strategic goals and objectives.

SETMO Capability Tier 2. The SETMO Capability Tier 2 encompasses over 130 ground test capability components across nine NASA Centers. Tier 2 capability components are generally smaller and less complex than Tier 1 capability components. SETMO maintains cognizance over Tier 2 capability components.

SETMO Director. The SETMO Director manages the SETMO. The SETMO Director serves as the SETMO capability portfolio manager and leads the team that manages the capability portfolio.

SETMO Management Tiers. SETMO defines two management tiers (i.e., Tier 1 and Tier 2) to ensure application of appropriate levels of insight and oversight. Under this system, capability components in Tier 1 report frequently and in-depth. The reporting depth and frequency is decreased for capability components in Tier 2.

Significant. Per NPD/R 8600.1, used to characterize changes in a capability portfolio for which the MSC Chair has decision authority.

Strategic Capabilities Assets Program (SCAP). The Agency established SCAP in 2006 to ensure select critical test capability components are operationally ready to meet mission and program requirements by sustaining a skilled workforce and performing essential maintenance. The program supports essential core technical capability components: arc jets, simulators, thermal vacuum chambers, wind tunnels, and space radiation environments.

Strategic Management (function). A series of integrated efforts that enable the Agency to establish and execute strategy, make decisions, allocate resources, develop and implement plans, and measure performance of the capability portfolio.

Strategic Management (set of activities). The second of three sets of activities characterizing the lifespan of a capability portfolio. These activities include key capability portfolio management processes associated with both the strategic and centralized management aspects of CPM that repeat as long as the capability portfolio is active.

Termination. The third of three sets of activities characterizing the life span of a capability portfolio. When NASA leadership determines it is no longer in the Agency's best interest to strategically and centrally manage a capability portfolio in an integrated manner, it initiates termination of the capability portfolio.

Test Assignment. The assignment of testing requirements to specific capability components. SETMO uses the term "test assignment" instead of "sourcing decisions."

Appendix B - Acronyms

AA	Associate Administrator
AETC	Aeronautics Evaluation and Test Capabilities
AFRC	Armstrong Flight Research Center
AJ	Arc Jet
AOP	Annual Operating Plan
ARC	Ames Research Center
CIO	Chief Information Officer
CM&O	Center Management and Operations
CMF	Cockpit Motion Facility
CPCA	Capability Portfolio Commitment Agreement
CPM	Capability Portfolio Management
CPMP	Capability Portfolio Management Plan
DoD	Department of Defense
DoE	Department of Energy
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
ESTA	Energy Systems Test Area
FSF	Flight Simulation Facilities
FTE	Full-Time Equivalent
FY	Fiscal Year
GRC	Glenn Research Center
GSFC	Goddard Space Flight Center
HECC	High-End Computing Capability
I&TC	Infrastructure and Technical Capabilities
ISS	International Space Station
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
JWST	James Webb Space Telescope
KSC	Kennedy Space Center
LaRC	Langley Research Center
MDAA	Mission Directorate Associate Administrator
MPPF	Multi-Payload Processing Facility
MSFC	Marshall Space Flight Center
MSC	Mission Support Council
MSD	Mission Support Directorate
NASA	National Aeronautics and Space Administration
NPAT	(DoD/NASA) National Partnership for Aeronautical Testing
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
OSI	Office of Strategic Infrastructure
PaIG	Programmatic and Institutional Guidance
PBS	Plum Brook Station
PHSF	Payload Hazardous Servicing Facility
POC	Point of Contact
PPBE	Planning, Programming, Budgeting, and Execution
PRB	Program and Resources Guidance

RF	Radio Frequency
RPTP	Rocket Propulsion Testing Program
SCAP	Strategic Capabilities Assets Program
SEC	Space Environments Complex
SESTL	Space Environment Simulation and Testing Laboratory
SET	Space Environments Testing
SETCB	Space Environments Testing Control Board
SETMO	Space Environments Testing Management Office
SMC	Strategic Management Council
SSDIF	Spacecraft Systems Development and Integration Facility
SSMS	Safety, Security, and Mission Services
SSPF	Space Station Processing Facility
TCAT	Technical Capabilities Assessment Team
TVAC	Thermal Vacuum (chamber)
VMS	Vertical Motion Simulator
WFF	Wallops Flight Facility
WSTF	White Sands Test Facility
WYE	Work-Year Equivalent

Appendix C – SETMO Tier 1 and Tier 2 Capability Components

SETMO TIER 1 CAPABILITY COMPONENTS

SETMO #	Capability Component Name
25	GRC VF-5
26	GRC VF-6
28	GRC Space Environment Complex
119.1	JSC Thermal Vacuum Chamber A
120	JSC Thermal Vacuum Chamber B
184	MSFC Sunspot Thermal Vacuum Testing Facility
185	MSFC Chamber V20 Thermal Vacuum Facility
1001	LaRC Flight Simulation Facilities
1000	ARC Vertical Motion Simulator
2000	ARC Arc Jet Complex
3000	DoE Lawrence Berkeley National Lab (LBNL)

AFRC CAPABILITY COMPONENTS IN SETMO TIER 2

SETMO #	Capability Component Name
226	SOFIA Mirror Coating Chamber

ARC CAPABILITY COMPONENTS IN SETMO TIER 1

SETMO #	Capability Component Name
1000	Vertical Motion Simulator
2000	Arc Jet Complex

ARC CAPABILITY COMPONENTS IN SETMO TIER 2

SETMO #	Capability Component Name
2	Dynavac Chamber
3	Tenney Altitude Chamber
4	Humidity Chamber (Despatch)
5	Sub-Zero Chamber (CSZ-32)

**GRC CAPABILITY COMPONENTS IN
SETMO TIER 1**

SETMO #	Capability Component Name
25	VF-5
26	VF-6

**GRC CAPABILITY COMPONENTS IN
SETMO TIER 2**

SETMO #	Capability Component Name
9	VF3
10	VF7
12	VF11
14	Lunar Dust Adhesion Bell Jar
15	VF8
16	VF10
17	VF12
18	VF13
19	VF16
20	VF17
21	VF20
22	VF21
23	VF67
24	Small Multi-Purpose Research Facility (SMiRF)
32	Glenn Extreme Environments Facility (GEER)
228	VF4
249.1	Structural Dynamics Lab MB C-60
249.3	Structural Dynamics Lab Ling 4022

**GRC-PBS CAPABILITY COMPONENTS IN
SETMO TIER 1**

SETMO #	Capability Component Name
28.1	SEC Space Power Facility (SPF)
28.2	SEC Mechanical Vibration Facility (MVF)
28.3	SEC Reverberant Acoustic Test Facility (RATF)

**GRC-PBS CAPABILITY COMPONENTS IN
SETMO TIER 2**

SETMO #	Capability Component Name
28.4	SEC B1411 Assembly Area
29	Combined Effects Chamber (K-chamber)

**GSFC CAPABILITY COMPONENTS IN
SETMO TIER 2**

SETMO #	Capability Component Name
44	Thermal Vacuum Facility 225
45	Facility 237
46	Facility 239
47	Thermal Vacuum Facility 238
48	Space Environment Simulation 290
50	Facility 232
51	Facility 233
52	Mag Test Site
53	Medium EMI/EMC Facility
54	Large EMI/EMC Facility
58	100-m X-ray Line
59	600-m X-ray Line
229	Chamber 246 "Deep Chamber"
230	Optical Calibration Chamber
245.1	Vibration Test Facility 409 UD T-4000
245.2	Vibration Test Facility 410 UD T-2000
245.3	Vibration Test Facility 411 UD T-4000
245.4	Vibration Test Facility 412 UD T-2000
246	Acoustic Test Facility
260	SSDIF - High Bay Cleanroom
261	MMS Cleanroom
262	Spacecraft Checkout Area

**GSFC - WFF CAPABILITY COMPONENTS IN
SETMO TIER 2**

SETMO #	Capability Component Name
49	GSFC-WFF TVAC Chamber
242	Sounding Rocket Processing Vacuum Chamber (White Elephant)

**JPL CAPABILITY COMPONENTS IN
SETMO TIER 2**

SETMO #	Capability Component Name
61	B 313-T6
62	B 144-T1
63	B 306-TV-24
64	6' Plexiglas Chamber within Anechoic Chamber
65.1	B 144 TV-12
65.2	B 144 TV-13
65.3	B 144 TV-14
65.4	B 144 TV-15
65.5	B 144 TV-16
65.6	B 144 TV-18
65.7	B 144 TV-19
65.8	B 144 TV-20
65.9	B 144 TV-21
66	B 144 TV-22
67	B 144-TV 8
68	B 313-TV-27
69	B 306 FOU D
70	B 144 TV-7
71	B 144 TV-10
72.1	B 306 TV-11 (11' Optics TVAC Chamber)
73	B 248 TV-10 (10' Space Simulator)
74	2-m d Helmholtz Coils
75	3.7-m d Helmholtz Coils
76.1	25' Space Simulator
83	148 High Bay Electric Test Chamber 8' d x 16' l
84	Patio Chamber 10' d x 26' l
85	Ion Chamber 1
86	Ion Chamber 2
87	Ion Chamber 3
88	Ion Chamber 4
231	MAM Horizontal Vacuum Chamber, 8' d x 42' l (60 m ³ /2110 ft ³)
232	HCIT 8' Vacuum Chamber
233	Large Electric Propulsion Chamber
234	5' x 9' Vacuum Chamber
235	"Green" Vacuum Chamber
250.1	Vibration Lab LDS-994
250.2	Vibration Lab Ling-355
250.3	Vibration Lab LDS-964-1
250.4	Vibration Lab LDS-964-2
251	Acoustic Test Chamber
264	B 179 - High Bay Cleanrooms 1
265	B 179 - High Bay Cleanrooms 2
266	100 D (Bldg 150)
267	High Bay (Bldg 306)

**JSC CAPABILITY COMPONENTS IN
SETMO TIER 1**

SETMO #	Capability Component Name
119.1	Thermal Vacuum Chamber A
120	Thermal Vacuum Chamber B

**JSC CAPABILITY COMPONENTS IN
SETMO TIER 2**

SETMO #	Capability Component Name
89	Thermal Chamber H
91	8' Chamber
92	11' Chamber
93	ETA/Airlock Chamber
95	Space Station Airlock Test Article Chamber (SSATA)
97	Vent Flow
98	Portable Life Support System (PLSS) Chamber
101	B353 20' Chamber (ESTA 20')
105	20' Chamber
111	Chamber E
112	Chamber P
113	B351 15' Chamber
238.1	Radiant Heat Facility Chamber 1
238.2	Radiant Heat Facility Chamber 2
240	EM Drive Vacuum Chamber
252.1	General Vibration Lab (GVL)-Ling 4022H
252.2	General Vibration Lab (GVL)-Ling 4022V
252.3	General Vibration Lab (GVL)-Ling 335
252.4	General Vibration Lab (GVL)-Ling 310 Dual
252.5	General Vibration Lab (GVL)-Spectral Dynamics
252.6	General Vibration Lab (GVL)-HRVTB
253	Spacecraft Acoustic Lab (SAL)
254	Sonic Fatigue Lab (SFL)

**JSC-WSTF CAPABILITY COMPONENTS IN
SETMO TIER 2**

SETMO #	Capability Component Name
104.1	SESTL Rough Vacuum Chamber
104.2	SESTL Rough Vacuum Chamber
106	Test Stand 302
107	Test Stand 303
116	SESTL Essex Cylindrical Chamber
117.1	SESTL Webber Chamber 1
117.2	SESTL Webber Chamber 2
118	SESTL CVI Self Heated Chamber

**KSC CAPABILITY COMPONENTS IN
SETMO TIER 2**

SETMO #	Capability Component Name
130	Right (East) Altitude Chamber
131	Left (West) Altitude Chamber
268	PHSF High Bay
269	SSPF High Bay
270	High Bay Clean Room
271	O&C High Bay/Low Bay
272	MPPF High Bay
273	Intermediate Bay - SSPF

**LARC CAPABILITY COMPONENTS IN
SETMO TIER 1**

SETMO #	Capability Component Name
1001	Flight Simulation Facilities (CMF)

**LARC CAPABILITY COMPONENTS IN
SETMO TIER 2**

SETMO #	Capability Component Name
133.1	8x15' Space Simulation Chamber
133.2	5x5' Thermal Vacuum Chamber
133.3	6x6' Thermal Vacuum Chamber
137	16-meter Vacuum Chamber
138	8-foot Vacuum Chamber
257.1	Vibration Laboratory U-D T2000
257.2	Vibration Laboratory U-D T4000
258	Structural Acoustic Loads & Transmission Facility (SALT)
259	Thermal Acoustic Fatigue Apparatus (TAFA)
274	40' Clean Room

**MSFC CAPABILITY COMPONENTS IN
SETMO TIER 1**

SETMO #	Capability Component Name
184	Sunspot Thermal Vacuum Testing Facility
185	Chamber V20 Thermal Vacuum Facility

**MSFC CAPABILITY COMPONENTS IN
SETMO TIER 2**

SETMO #	Capability Component Name
172	V-1
173	V-2
174	V-3
175	V-4
176	V-5
177	V-6
178	V-7
179	V-8
180	V-9
182	V-14
183	V-15
188	Thermal/Altitude Chamber TA-1
191	Thermal/Humidity Chambers TH-4
192	Thermal/Humidity Chambers TH-5
193	Thermal/Humidity Chambers TH-6
195	TS300 20' Chamber
196	TS300 12' Chamber
199.1	X-Ray Cryogenic Facility (XRCF)
199.2	XRCF 4' Cryo Chamber
199.3	XRCF 4' Preconditioning Chamber
199.4	XRCF Contamination Evaluation Chamber
199.5	XRCF Clean Room
203.1	Stray Light Test Facility
214	3' Pulsed Power Test Chamber
215	3' Iodine Propulsion Test Chamber
216	High-Power Plasma Propulsion Research Test Chamber
217	Nuclear Power and Cryogenic Fluid Technology Test Chamber
255.1	East Vibration Laboratory U-D T-4000
255.2	East Vibration Laboratory U-D T-4000
255.3	West Vibration Laboratory U-D T-2000
255.4	West Vibration Laboratory U-D T-2000
255.5	West Vibration Laboratory U-D T-4000A
255.6	West Vibration Laboratory U-D T-4000A
256	Acoustic Test Facility

**EXTERNAL CAPABILITY COMPONENTS IN
SETMO TIER 1**

SETMO #	Capability Component Name
3000	DoE Lawrence Berkeley National Lab (LBNL)

Appendix D - SETMO Budget Run Out

Infrastructure and Technical Capabilities (I&TC)	FY20	FY21	FY22	FY23	FY24	FY25	FY26
SETMO (\$M)	\$41.50	\$44.42	\$44.42	\$44.42	\$44.42	\$44.42	\$44.42
Flight Simulation	\$10.11	\$10.06	\$10.06	\$10.06	\$10.06	\$10.06	\$10.06
High Enthalpy Testing	\$9.00	\$8.97	\$8.97	\$8.97	\$8.97	\$8.97	\$8.97
Space Environments Testing	\$6.20	\$6.28	\$6.28	\$6.28	\$6.28	\$6.28	\$6.28
External Radiation	\$1.80	\$2.72	\$2.72	\$2.72	\$2.72	\$2.72	\$2.72
Maintenance Projects	\$14.40	\$16.39	\$16.39	\$16.39	\$16.39	\$16.39	\$16.39

The SETMO budget resides in Safety, Security, and Mission Services Authorization, under the Infrastructure and Technical Capabilities (I&TC) Program. The SETMO budget is structured by capability component categories (e.g., Space Environments Testing) and funds are allocated to individual capability components (e.g., GRC SEC) within the capability portfolio.

Note: Funding for the ARC Arc Jet Modernization Program is contained within the Maintenance Projects line.