Capability Portfolio Management Plan (CPMP)

Space Environments Testing (SET) Management Office (SETMO)

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1.0 CAPABILITY PORTFOLIO OVERVIEW

1.1 Introduction

This CPMP for the combined Strategic Capabilities Assets Program (SCAP) and SET capability portfolios is an agreement between the Mission Support Directorate (MSD) Associate Administrator and the SETMO Director and includes concurrence from Center and Laboratory Directors with capability components at their Centers and participating Mission Directorate Associate Administrators (MDAAs). The SETMO CPMP provides the details to the goals and principles identified in the Capability Portfolio Commitment Agreement (CPCA).

Approval of this CPMP:

- authorizes SETMO Strategic Management activities
- 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

SETMO manages the SETMO capability portfolio of testing capabilities and assets to ensure that they are ready to address NASA and National mission testing requirements. The SETMO capability portfolio adapts to align with evolving NASA and National strategies and priorities and to optimize Agency resources. This is accomplished through the implementation of policy and guidance, targeted assessments, informed decision making, effective and efficient resource management, proactive deployment of common operational and business practices, enhanced capability planning and review, and the mitigation of near-term and strategic risks through capability sustainment and operational flexibility.

1.2 Background

In August 2005, the NASA Strategic Management Council approved the creation of an Agency-level asset management program, SCAP, to preserve key NASA capabilities that met certain criteria (e.g., minimum size). This program 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 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 Mission Support Council (MSC) decided to apply a centralized management model to SET capabilities. Specifics of this MSC decision are:

- *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 the MSD 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.

Also in 2016, the MSC mandated the development of Agency policy and procedural requirements for Capability Portfolio Management (CPM) to provide direction and guidance for sustaining an optimal mix of capabilities suited to meet Agency requirements and constraints. NPD 8600.1, *Capability Portfolio Management* and NPR 8600.1, *NASA Capability Portfolio Management Requirements* provide the guidance and requirements for this CPMP.

1.3 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 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 alignment of NASA's infrastructure.

1.4 Customer, Beneficiary, and Stakeholder Identification and Advocacy

The predominate customers of SETMO products and services are the programs and projects sponsored by Agency 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). Appendix O – Historic Utilization of SETMO Capability Components, depicts the utilization by NASA Mission Directorates, other Government entities, and external customers.

SETMO capability portfolio stakeholders include internal and external customers, Mission Directorates, Centers with SETMO capability components, capability leadership teams (CLTs), NASA Tech Fellows, and the Space Environments Testing Control Board (SETCB).

1.5 Scope, Products, and Services

The SETMO capability portfolio (Tier 1 and Tier 2) comprise approximately 175 ground test capability components across nine NASA Centers. 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

Component 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 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 – 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 also used to determine when SETMO Director concurrence or notification is required. These thresholds are provided in Appendix G – Thresholds for SETMO Director Concurrence and Notification.

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.

2.0 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 Center management regarding SETMO-sponsored activities. The Center POC should have sufficient authority, insight, and ability to verify that investments and divestments support Center commitments. The POC for External Radiation is the Agency Electronic Parts Manager. The MSD/SETMO organizational hierarchy is shown in Figure 1.

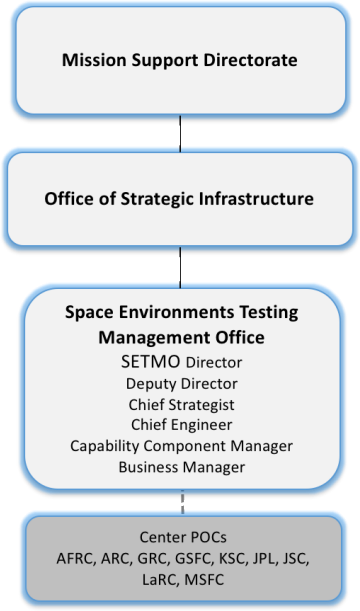


Figure 1. MSD/SETMO Organizational Hierarchy

The SETMO organization is shown in Appendix E – SETMO Personnel. Positions and entities and their roles and responsibilities in SETMO are described in Table 2.

Table 2. SETMO Roles and Responsibilities

Position or Entity	**Responsible for . . .**
SETMO Director	managing the capability portfolio as described in NPR 8600.1; executing Decision Authority
SETMO Deputy Director	supporting the SETMO Director in execution of his/her responsibilities.
SETMO Chief Strategist	developing and documenting strategies as they relate to the SETMO capability portfolio. Also engages in Agency policy activities.
SETMO Chief Engineer	managing and executing the SETMO Risk Management and Investment Project Processes, the SETMO Concurrence and Notification Process, third-party assessments, and SETMO quarterly reviews.
SETMO Capability Component Manager	managing and maintaining the capability component inventory database, SETMO Records and Data Management systems, and SETMO quarterly review reporting templates and spreadsheets; coordinating input from Centers for quarterly reviews; and performing analysis and rollup of Center data inputs for SETMO Director use in Agency-level reviews, discussions, and decisions.
SETMO Business Manager	managing and coordinating all SETMO business functions.

Position or Entity	Responsible for . . .
SETMO Subject Matter Experts	informing management in all aspects of the technical capabilities.
Centers	implementing projects within the SETMO capability portfolio and managing in accordance with their respective governance structures.
Center POCs	advising SETMO of Center, program, project, and Mission Directorate intentions to make investments that may impact the SETMO capability portfolio.
SET Control Board (SETCB)	providing Agency input, guidance, and decisions on utilization, strategic investments and divestments, and scalability (capacities and/or capabilities) for the SETMO capability portfolio.
MSC Chair	executing the Decision Authority role for capability portfolio transitions as described in NPR 8600.1 and for the dissenting opinion process; leading the annual MSC review of capability portfolios.

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 1.3. 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 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 reclamas.

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.

3.0 STRATEGIC AND CENTRALIZED MANAGEMENT

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 for strategic and centralized management 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, SETMO integrates 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 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 Capability Portfolio Strategic Plan defines the implementation details for specific alignment assessments.

3.1 Activities

Many activities make up the overall strategic and centralized management of the SETMO capability portfolio.

SETMO continually works with internal NASA organizations, Centers, programs/projects, the SETCB, CLTs, NASA Tech Fellows, and System Capability Leadership Team Leads to achieve Agency strategic goals and objectives.

3.1.1 SETMO Management Tier Structure

SETMO defines management tiers to ensure appropriate levels of insight and oversight are applied to the various capability components. Under this system, Tier 1 capability components have more frequent and in-depth reporting, and the reporting depth and frequency decrease for Tier 2 capability components. The management tiers are described in Table 3.

Table 3. SETMO Management Tiers

Tier	Components and Assets	Insight and Oversight
Tier 1	Agency strategic or required capabilities	SETMO provides sustainment funding. Capability components are eligible for SETMO maintenance funding. Centers provide quarterly reporting.
Tier 2	NASA capability components	Funded through programs/projects and Center Management and Operations (CM&O) or Infrastructure and Technical Capabilities (I&TC) funding. SETMO does not provide sustainment funding for these capability components, but maintenance funding is available for special circumstances. Centers provide a mix of annual and quarterly reporting.
	External capabilities	Includes aerospace capability components and assets in other government agencies, industry, and academia. SETMO does not provide sustainment funding for these capability components, but maintains cognizance of inventory, size, and location.

Tier 1 capability components are provided sustainment funding but must rely on customer revenue and funding from CM&O/I&TC 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/I&TC 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.

Appendix C – SETMO Tier 1 and Tier 2 Capability Components lists all SETMO capability components. Appendix J – SETMO Quarterly Reporting Requirements identifies the annual and quarterly review reporting requirements for each management tier. Appendix K – SETMO Quarterly Reporting Template contains the guidance and template used by Centers for quarterly review reporting. Appendix L – SETMO Quarterly Reporting Spreadsheet is used by Centers to create the metrics tables linked to the slides used in the quarterly reviews.

3.1.2 Total Cost of Ownership (TCO)

The TCO includes all sources of funding used to sustain and operate a capability component. SETMO works with Centers to understand costs of ownership and sustainment for their capability components. These costs are used for reporting, budget advocacy, and alignment assessments.

Some capability components at Centers are grouped into logical work and fund centers where the capability components are collocated and use shared staff. SETMO develops consistent cost elements and groupings, and the SETMO Business Manager is responsible for developing guidance for TCO and collecting, collating, and archiving data from the Centers.

3.1.3 SETMO Investment Project Process

SETMO makes investments in the capability portfolio through a balanced, risk-informed process. When evaluating potential investment projects, the SETMO Chief Engineer considers input from Center POCs gathered during monthly reviews and special data calls, third-party capability component assessments, and the SETMO Risk Management Process. Using a process that includes Center POCs and SETMO subject matter experts, the SETMO Chief Engineer prioritizes potential investment projects and presents the prioritized list of projects to the SETMO Director for final concurrence and funding.

Centers are responsible for implementing investment projects and reporting status to SETMO in accordance with Appendix J – SETMO Quarterly Reporting Requirements and Appendix K – SETMO Quarterly Reporting Template.

3.1.4 SETMO Standardization, Consistency, and Common Practices

SETMO recognizes the role of Working Groups of the American Institute of Aeronautics and Astronautics and trade conferences as valuable tools to encourage and implement standardization,

strategic direction, and common practices across NASA's capability portfolios and encourages, enables, and funds Center participation in these forums.

SETMO sponsors operational and safety training for capability component personnel and provides travel funding when requested. SETMO also coordinates industry tours and talks when available to discover and share best practices.

SETMO works collaboratively with Centers and Mission Directorates to develop and maintain key documents, strategies, business practices, and operational norms.

3.1.5 SETMO Third-Party Assessments

SETMO performs independent assessments on SETMO Tier 1 capability components to identify overall condition, possible capability enhancements, maintenance gaps, and potential divestments. This practice brings objectivity and consistency to the evaluation of maintenance practices and investment needs for SETMO capability components.

3.1.6 Thresholds for SETMO Director Concurrence and Notification

As outlined in NPD 8600.1 and NPR 8600.1, Centers, programs and projects, and Mission Directorates are responsible for notifying or receiving concurrence from the SETMO Director prior to making decisions that influence or change the SETMO capability portfolio.

The purpose of the NASA policy is to ensure consistency with the established and approved plans and direction of the SETMO capability portfolio for:

- Investments, divestments, acquisition strategies, procurements, or internal and external agreements that seek to build or develop new capabilities, improve existing capabilities, or divest of existing capabilities, whether NASA or NASA investment in a non-NASA capability.
- Acquisition strategies, procurements, or internal and external agreements that seek to obtain products and services from external capabilities or commit the use of Tier 1 capability components. This may be done at the individual strategy, procurement, or agreement level or at an integrated Center level on a periodic basis.
- Operational changes to a capability component within the capability portfolio.

SETMO has established specific thresholds for operational activities associated with these investments, divestments, acquisition strategies, procurements, internal and external agreements, and operational changes to a capability component, and requires notification to or concurrence from the SETMO Director when these thresholds are exceeded. Appendix G – Thresholds for SETMO Director Concurrence and Notification identifies these thresholds.

Guidelines for when concurrence or notification should be obtained are established by engagement points described in Section 3.1.7.

Concurrence and notification processes are described in Section 3.1.8.

3.1.7 Engagement Points

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, JPL Lab 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 and directed missions. These methodologies are described in Sections 3.1.7.1, 3.1.7.2, and 3.1.7.3, respectively.

3.1.7.1 Engagement Points for Agreements

The MSD Partnership Office, SETCB, and Center POCs are required to seek concurrence as early as possible during the development of external agreements with external entities (i.e., private industry, other U.S. Government agencies, academia, and other stakeholders) when SETMO Tier 1 capability components are included. The SETMO Director currently has insight into external agreement development through:

- Coordination with the Centers' partnership leads; and
- Abstracts forwarded to NASA headquarters for review and vetting using two systems: the NASA Partnership Agreement Maker (PAM) and the NASA System for International and External Relations Agreements (SIERA).

Additional methodologies for gaining insight into external agreement development will be identified during the first year of Strategic Management of the SETMO capability portfolio.

The SETMO Director reviews external agreements with external entities when SETMO capability components are included and concurs or non-concurs based on NASA policy. Review and concurrence of external agreements by the SETMO Director:

- Enables general cognizance of testing services being utilized by external customers.
- Ensures that NASA's in-house capabilities are sustained only for supporting NASA mission requirements and strategic national needs.
- Ensures that Centers do not enter into external agreements that prevent SETMO from executing its Agency-level strategy.

The SETMO Director's concurrence is *not* required in cases where:

- Only generic testing services are known when the external agreement is being developed.
- Testing services are a line item included within a product delivery (e.g., instrument build, test, and delivery).

Center capability component managers are required to notify the SETMO Director at quarterly meetings of external agreements with external entities, including agreements in development and agreements in place, when SETMO Tier 2 capability components are included.

3.1.7.2 Engagement Points for Competed Missions

SETMO recognizes that Mission Directorates use Announcements of Opportunity (AOs) and other methods to compete work that typically requires space environments testing. SETMO consults with Mission Directorates in the development of AOs for Tier 1 capability components to ensure that the AOs:

- Inform proposers of NASA test capabilities that are potentially available for their use; and
- Provide guidance on the potential investment of NASA funds in new or existing capability components, whether in-house or external.

At the appropriate time in the proposal review process for competed missions that require Tier 1 capability components, the Mission Directorates are required to provide SETMO with details on:

- Proposed testing services (i.e., test assignments).
- Any proposed investments of NASA funds for in-house or external capabilities within the SETMO capability portfolio (capability portfolio realignment).

3.1.7.3 Engagement Points for Directed Missions

SETMO recognizes that Mission Directorates use directed work that typically requires space environments testing. SETMO consults with Mission Directorates in the formulation phase to ensure:

- Mission planners are cognizant of NASA test capabilities potentially available for their use; and
- Concurrence or notification is provided for the potential utilization of SETMO capability components; and,
- Concurrence or notification is provided for the potential investment of NASA funds in new or existing capability components, whether in-house or external.

Mission Directorates are required to provide SETMO with relevant details before Pre-Key Decision Point B, including the Systems Requirements Review, Acquisition Strategy Meeting, and Mission Definition Review or System Definition Review for directed missions that could require Tier 1 capability components including:

- Proposed testing services (i.e., test assignments).
- Any proposed investments of NASA funds for in-house or external capabilities within the SETMO capability portfolio (capability portfolio realignment).

3.1.8 SETMO Concurrence and Notification Processes

The concurrence and notification processes provide capability portfolio oversight, insight, and cognizance to the SETMO Director and enable capacity alignment and minimization of capability redundancies. Concurrence and notification actions are initiated through formal requests.

Formal requests to SETMO are made by submitting Form CN001 in Appendix I – Concurrence/Notification Form via email**.** SETMO processes and evaluates the impacts to the capability portfolio and dispositioned requests are signed by the SETMO Director (or designee),

returned to the Center, and archived as an amendment to the respective AOP. Approved activities are tracked by SETMO through Center quarterly reporting.

In lieu of request forms, some requests may be initiated using:

- SETMO maintenance and repair project data calls. SETMO allocates maintenance and repair funding each year and submitting a maintenance and repair project is considered a request. Funding of a project constitutes concurrence, and funded projects are required to provide status updates during quarterly reviews.
- The AOP. Each fiscal year, Centers with Tier 1 capability components are required to prepare and submit an AOP to SETMO, and the content included in the AOP is considered a request. The signed AOP satisfies any concurrence or notification requirements for significant changes in capability component function; significant changes to operational status; investment, major upgrade, replacement, improvement or addition to an existing capability component; creation or divestment of a capability component; obtaining testing services external to the capability portfolio; test assignments; and external agreements including Space Act Agreements.
- Discussion at quarterly reviews. Changes to operating capacities are expected due to changes in customer schedules and requirements. Unless the net annual estimated operating capacity deviates from the AOP, Centers can use the quarterly review to notify and update SETMO on changes in quarter-to-quarter operating capacity.
- SETCB Meetings. Identification of projects through the SETCB or direct engagement between a requesting stakeholder (CLT, Center, program, or project) and SETMO are considered on a case-by-case basis with the appropriate approach for each case.
- Direct contact. In the event of an emergency, Centers may contact the SETMO Chief Engineer by phone or email, proceed with addressing the emergency repair, and follow up with the formal concurrence/notification process to document the activity.

The SETMO Chief Engineer is responsible for documenting, dispositioning, and archiving these requests.

3.1.9 SETMO Annual Operating Plan

In collaboration with SETMO, the Centers create and maintain an AOP for each Tier 1 capability component each fiscal year. Guidance and a template are provided in Appendix H – SETMO Annual Operating Plan Template.

The Center inputs contain plans that might require SETMO Director concurrence or notification in accordance with Appendix G – Thresholds for SETMO Director Concurrence and Notification. For example, Center input to the AOP might include a plan for local contract(s) to provide overflow vibration testing, and the Center submission serves as the documented request for SETMO Director concurrence or notification. Center labor, procurement (to include maintenance requirements), and travel are requested, negotiated, and documented in the AOP.

The approved SETMO AOP serves as the record and baseline for the year of execution. SETMO maintains configuration control of and provides access to the AOP. The AOP also includes a change form for requests, concurrence, and a record of revisions to the AOP during the year of execution.

3.1.10 SETCB

While one of the purposes of the SETCB is to guide (advise, recommend, encourage, counsel) the strategic management of the SETMO Capability Portfolio assigned to the MSD Office of Strategic Infrastructure (OSI), the SETCB also makes integrated decisions (resolve, determine, settle, choose, commit) related to that capability portfolio that have multi-organizational impact(s).

SETCB members represent the major stakeholders of SETMO capabilities, and the SETCB ensures the SETMO Capability Portfolio (Tier 1 and Tier 2 capability components) align with NASA's strategic goals, Mission Directorate (MD) requirements, and Agency business needs.

The SETCB guides the SETMO Director and MSD in the development and execution of tactical and strategic plans and develops collaborative recommendations and makes decisions to improve the effectiveness of strategic and centralized capability management. Plans, recommendations, and decisions could include operations, maintenance, modernization, capability advancements (strategic investments), and test technologies (improvements to test technologies and test techniques) necessary to sustain SETMO capabilities, SETMO budget and the allocation of resources, and divestments for technical capabilities no longer required for Agency missions.

The members, frequency and level of engagement, and processes are described in the SETCB Charter.

3.1.11 SETMO Capability Component Divestment

SETMO capability portfolio divestments are required to align with evolving Agency requirements and needs. Opportunities and recommendations for divestment are considered individually and are brought to the attention of the SETMO Director through a variety of methods including Center recommendations, SETMO alignment assessments, the SETCB, or the MSC.

The SETMO Director consults with all capability component stakeholders when developing a decision package for divestment. Divestments are assigned to the NASA Headquarters Facilities and Real Estate Division for execution, and all divestment activities are reported semi-annually to the MSC.

3.1.12 SETMO Business Management

3.1.12.1 Budget Formulation – PPBE Process

SETMO PPBE guidance is provided annually in the MSD Program and Resources Guidance (PRG). SETMO PPBE revalidation guidance and templates are distributed to the Centers and developed in accordance with the PPBE schedule. SETMO PPBE revalidation is requested from each Center with capability components in the SETMO capability portfolio, even if they have not received sustainment funding.

- All Centers are requested to identify any funding issues associated with the operations budgets they submit.
- Workforce levels are negotiated with each Center to ensure capability component availability with an appropriate level of skill retention.
- Planned utilization is also requested on the revalidation worksheet with actual and planned sources of funding (NASA or external) identified.

- The utilization and funding source data are compiled and reported in the annual SETMO PPBE program review. The NASA budget formulation system (N2) is updated and maintained as determined by the PPBE schedule.
- Center labor rates are requested and used to develop the final SETMO budget submission and to update N2 for the Program Analysis and Alignment (PAA) and Program and Institutional Guidance (PaIG) releases.

3.1.12.2 Phasing Plans

Phasing plans are requested in October from Centers with SETMO Tier 1 capability components. Guideline trace worksheets are completed for each funded capability component and distributed to each Center for phasing plan development. Phasing plans include labor funding and complement, procurement, and travel guidelines. These phasing plans serve as the basis of analysis for the Agency Baseline Performance Review. Mid-year updates are requested following receipt of the enacted fiscal year appropriations. Updated guidelines are allocated to the Centers based on final guidelines received by SETMO.

Center phasing plans for current year funds and prior-year carry-in are reviewed and integrated by SETMO to develop and submit plans that are realistic, valid, and executable. Phasing plans are utilized for monthly and quarterly actuals versus plans variance analyses. Labor and procurement underruns are monitored, and underruns in labor dollars are reallocated to maintenance investment projects.

3.1.12.3 I&TC Funding

I&TC is the new name (starting in FY21) for the CM&O appropriation.

3.1.12.4 Budget Execution

The SETMO work breakdown structure is used for budget planning and funds distribution and is reviewed and updated annually to support appropriate funding model financial tracking and reporting requirements and communication.

Guideline trace worksheets are completed for each funded capability component and used for the management of guideline changes through the fiscal year. Program Authority is distributed incrementally to each Center for labor, procurement, and travel when SETMO receives authority guidance. Funds distribution worksheets are completed for each funded capability component and adjusted with each funding distribution. Guideline trace and funds distribution worksheets are reconciled monthly with Center analysts.

Prior year un-costed funds are monitored to track costing and the de-obligation of funding no longer required after final contract closeout. Prior year funds are pulled back to the SETMO budget and held for the future to fund contract closeouts from prior years.

Centers complete financial reports for presentation at SETMO quarterly reviews. See Appendix M – Quarterly Business Reporting Templates for additional information and examples. All budget execution and financial documents are archived on the SETMO SharePoint site.

3.1.12.5 Maintenance Project Funding

SETMO provides maintenance funding to preserve availability and reliability and to address high-risk capability conditions, gaps, and unplanned needs. The funding allocated to the capability components for approved maintenance projects or upgrades is monitored on a monthly basis using the SETMO Maintenance Project Funding Reporting Template. Phasing plans are submitted by Centers with a description of the project and schedule including obligation and cost. This template tracks obligation, cost, schedule, and technical issues until the completion of the project and is due to the SETMO Business Manager by the fifth of each month. The monthly reports are analyzed for obligation and cost status and then forwarded to the SETMO Chief Engineer for review and to address technical issues or concerns. Cost underruns or overruns are addressed by SETMO management. SETMO-funded project reporting is also included in quarterly and annual reviews. All documents are archived on the SETMO SharePoint site.

3.1.12.6 Travel

Through the PPBE revalidation worksheets, Centers request travel funding annually to support quarterly reviews and the management and operation of capability components. Annual guidelines are approved and included in the AOP, and travel is monitored monthly and quarterly. Travel over-guideline requests or reallocation of funds from procurement or labor are reviewed and approved on a case-by-case basis. Travel is also monitored for underruns, which are utilized within SETMO for other prioritized travel or for maintenance and repair projects.

3.1.12.7 External Radiation Facilities (Radiation Block Buy)

The Agency Electronics Parts Manager provides monitoring and quarterly reporting on the SETMO Tier 1 external radiation facilities. Programmatic and budget documents associated with radiation block buy activities are archived on the SETMO SharePoint site.

3.1.12.8 SETMO Business Rules

SETMO operates per the following business rules:

- Total Center allocations cannot exceed the funding provided by the Agency
- Center allocations cover the cost of labor identified in N2
- Program Authority is distributed incrementally for labor, procurement, and travel.
- Center labor underruns are evaluated for cause
    - an underrun resulting from customer testing is shared equally with the Center, and the SETMO share is redirected to maintenance projects
    - an underrun resulting from overstated Center labor rates is not shared and the funding is redirected to maintenance projects
- Carry out (and carry in) is limited to one month for Tier 1 capability components
- SETMO is not responsible for Center budget gaps

3.2 Schedule

SETMO schedules are shown in two appendixes:

- Appendix F – SETMO Schedule depicts the routine and recurring milestones associated with the strategic and centralized management of the SETMO capability portfolio, and
- Appendix N – SETMO Tier 1 Five-Year Schedule shows an example of the roll-up of demand for SETMO Tier 1 capability components.

The SETMO schedule has three parts as described in Table 4.

Table 4. SETMO Schedule Parts

Schedule Part	Description
Strategic Management Cycles	Identifies the development and updating of required key documents and ensures the SETMO strategy and capability portfolio content are planned commensurate with the Agency's budget processes.
Meetings and Reviews	Ensures timely communication and evaluation of the technical and programmatic execution of SETMO.
Planned Investments	Identifies key maintenance and capability advancement projects intended to sustain and improve capability components.

3.3 Alignment of Capacity with Demand

SETMO develops utilization trends and forecasts as part of the strategic and centralized management of the capability portfolio.

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-capability 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.

The SETMO alignment assessment methodology is:

1. Start the alignment assessment. Develop and approve a charter for the alignment assessment team with scope, assumptions, team members, and schedule. The assessment lead should select team members from MDs, Centers, and the relevant technical communities.

2. Document the performance and condition. Document the technical capabilities and parameters, operational characteristics, condition, and cost of each capability component in the assessment group and known issues risks in performance and/or condition. Identify enabling infrastructure and any co-dependencies (e.g., Machine A and Machine B cannot operate at the same time). Use the Facility Condition Index process to validate/update the capability components and the enabling infrastructure.
3. Establish Agency relevance. Evaluate each capability component in the assessment group for relevance to the 2018 NASA Strategic Plan, the Agency Master Plan, and the Executive Council decision on Center primary and secondary roles. Use the Mission Dependency Index process to validate/update mission relevance.
4. Prioritize. Use the performance, condition, and Agency relevance results to prioritize the capability components at the sub-capability level. Provide pairwise prioritization of each capability component to inform later assessment steps, recommendations, and decisions.
5. Determine demand. Use recent historical utilization to set a baseline and identify projected demand with confidence levels for each capability component.
6. Identify strategic requirements. Work with MD and technical community representatives to identify Mission Directorate requirements that extend beyond the current budget horizon.
7. Evaluate cost. Determine costs for capability component changes in capacity and/or operational readiness level and investments needed to address projected demand and Agency strategic requirements. Determine an acquisition strategy and schedule for the execution of required investments.
8. Identify alternatives. Identify alternative options to address projected demand and Agency strategic requirements. Alternatives are developed for each assessment but might include leveraging external capabilities or implementing workload concentration.
9. Develop scenarios/options. Develop a limited number of practical solutions and the criteria for evaluation of those solutions. Define relevant good enough data requirements for situations where there is insufficient data for analytical evaluation.
10. Develop a recommendation. Develop an action plan for the recommended option for review by the SETCB. Rationalize any change in capability component funding and utilize the annual PPBE process to implement funding changes.

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. See Section 3.9 for additional information.

Through alignment assessments, SETMO aligns capacity with both short-term and long-term demand.

3.4 Funding Model(s)

A fundamental factor for implementing centralized and strategic management and sustaining operations is funding. A funding model has four parts, all of which need to work together for the Agency to have testing services. These parts are described in Table 5.

Table 5. Funding Model Parts

Funding Model Part	Description
Agency to capability portfolio (i.e., annual funding)	The annual funding the Agency provides to a capability portfolio and the purpose for the funding (e.g., for sustainment).
Capability portfolio to Center (i.e., Center allocation)	The funding a capability portfolio provides to the Centers for capability component sustainment, non-routine maintenance, and improvement and modernization projects.
Customer to Center (i.e., Center Charging Model)	The funding provided by internal and external customers based on the requirement to cover test-related costs. The Center charging model can also include sustainment costs for customers that utilize the facility on a long-term basis.
CM&O/I&TC	Centers use CM&O/I&TC or other pooled funding to support maintenance and capability advancement investments and to address any budget gaps not covered by the capability portfolio to Center allocation and the Center charging model.

3.4.1 SETMO Funding

SETMO employs a centrally-managed funding strategy, and consistent with MSC Decision Package MSC-2015-10-001, requires funding to meet programmatic and operational sustainment goals.

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/SETMO 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 SETMO-sustained capability components are not funded for the full complement of workforce (FTEs and WYEs) required for operations.

The SETMO annual funding is composed of three elements as shown in Table 6.

Table 6. SETMO Funding

Funding Element	Funding for . . .
Sustainment	Tier 1 capability components. Sustainment maintains some level of staff, staff proficiency, tools, routine maintenance, and enable operations of capability components during periods of low utilization. Customers who require increased capability component throughput bear the cost of increased staff and must plan in advance to allow adequate time for Centers to react to demand.
Maintenance	Funding for planned and unplanned repairs that is centrally managed and utilizes a risk-based prioritization and selection process. Capability

	components request repair funds from SETMO, and all SETMO Tier 1 and Tier 2 capability components are eligible.
Modernization	Funding for capability modernization that is centrally managed and utilizes an Agency-based prioritization and selection process.

The maintenance and modernization elements permit SETMO to address reliability and availability issues and emerging customer requirements.

The SETMO budget is established through the PPBE 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.

3.4.2 SETMO to Center Allocation

The SETMO allocation of funding to the Centers provides sustainment for capability components that are part of the SETMO Tier 1 and maintenance and modernization funding. Grouped operations are common, and sustainment funding is provided at the group level where appropriate. The annual allocations are documented in the SETMO AOP, which establishes the capability component baseline for the year of execution.

3.4.3 Center Charging Model

Although the responsibility of the Centers, SETMO collaborates with the Centers to develop charging models for internal and external test customers that reflect Agency policies for customer charging in NASA facilities. Center charging models cover test-related costs and sustainment costs in cases when a customer utilizes the facility on a long-term basis. SETMO capability components charge external customers full cost to test.

3.4.4 Infrastructure and Technical Capabilities (I&TC)

Centers use I&TC (or CM&O) or other pooled funding to support maintenance and capability advancement investments and to address any budget gaps not covered by the SETMO to Center allocation and the Center charging model.

3.5 Controls and Compliance

The SETMO Chief Strategist engages in Agency policy development and review activities, and through these activities, ensures compliance with NASA policies, directives, and other applicable requirements. Relevant policies and directives are brought to the attention of the SETMO Director and communicated to SETMO Center POCs for awareness and implementation.

- See Section 8.0 for details on the process for implementing and controlling changes and updating the CPMP.
- See Section 2.0 for the characterization of the key parameters (cost, technical, products and services delivered, new capability components) that require SETMO Director approval and the transitions that require MSC Chair approval.
- See Appendix G for thresholds used to determine when SETMO Director concurrence or notification is required.

3.6 Relationships

3.6.1 Internal Dependencies and Agreements

The successful implementation of Agency CPM is highly dependent 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.

3.6.2 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 sits on 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 and communicates with them during divestment assessments to ensure National needs are considered.

3.7 Sourcing Strategy and Sourcing Decisions

SETMO uses the term "capability portfolio realignment" (i.e., re-aligning the capability components 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 Leadership 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 this 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 is the external radiation block buy for testing of 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 recognizes that testing is an integral process within the overall spacecraft and instrument development process. It is SETMO's intent for the organization performing the development and/or integration (as delineated in a proposal) to appropriately plan test assignments in a way that optimizes overall success of the mission. SETMO does not perform test assignment for competed missions. SETMO limits test reassignment to directed missions, and only prior to Preliminary Design Review, which allows the review board to evaluate the reassignment as part of the review process.

3.8 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 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 AOP 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 MSPMC and the MSC against the goals and objectives identified in Section 1.3.

3.9 SETMO Capability Portfolio Strategic Plan

Changes in Tier 1 and Tier 2 capability components are expected and are a reflection of changing Agency programs and projects and the Agency's goal of a 25% reduction in infrastructure assets over 20 years. As part of strategic and centralized management of the SETMO capability portfolio, SETMO will develop a strategic plan in FY21. The plan will be updated as needed and will include:

- Alignment with Agency and Center Master Plans.
- Principles and guidance for design and development of the capability portfolio and its components.
- The identification of enabling infrastructure required by each capability component and the associated interfaces with Center institutional systems and equipment.
- Identification of future needs and requirements, capability gaps, technology trends, opportunities, threats, and changes to internal and external environment.
- Identification, prioritization, and planning for new and changed products and services (that resolve identified capability gaps).
- Standardization of services, systems, architectures, technologies, processes, and metrics within the capability portfolio and among its capability components.
- Methodology for recurring alignment assessments of the needed future state (combination of workforce (FTE and WYE), competencies, assets, equipment, processes, and technologies) for the Tier 1 and Tier 2 capability components and the processes for delivering required products and services.
- Identification of the order and schedule for sub-capability alignment assessments.
- Evolution of capability components to be added, improved, operating under a different readiness level, or divested.
- Evolution of the capability portfolio to leverage alternative methods and processes for delivery of products and services and alternative approaches to sourcing (i.e., balance of in-house and external).
- A long-term capability portfolio alignment plan to efficiently and effectively meet expected future demand.

Strategic development efforts are already underway through the scheduled assessment of flight simulators in FY20 and FY21 and planning for modernization of the Arc Jet Complex to meet future NASA requirements. Associated with strategic alignment assessments are:

- Implementation of actionable decision management. Strategic alignment assessments include the identification and evaluation of sub-capability capability components through an established analytical decision framework with guidance and review from the SETCB.
- Development of a financial management proposal. 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.

The schedule for the first version of the SETMO Capability Portfolio Strategic Plan is shown in Table 7.

Table 7. SETMO Capability Portfolio Strategic Plan Schedule

Milestone	Schedule (MSC Approval is the Starting Point)
Complete CPMP and submit for review/approval	2 months
Establish the SETCB	2 months
Establish an Analytic Decision Framework to include sub-capability identification and a sub-capability evaluation plan	3 months
Complete the development of the SETMO Capability Portfolio Strategic Plan	3 months

Complete sub-capability alignment assessments for:
• Flight Simulation
• High Enthalpy Testing
• Adjustment to SETMO capability portfolio for exclusions and like (i.e., *discovered*) capability components
  • Vibration
  • Acoustic
  • Assembly
  • Clean Rooms
  • Other
	In time to support PPBE23

Complete sub-capability alignment assessments for Chambers: • Electric Propulsion • Human Rated • ISRU • Specialty • Other	In time to support PPBE24
PPBE Budget Rationalization Reviews	In time to support PPBE 23 and PPBE24

Note: The CPCA has to be signed as a condition of MSC approval

3.10 Risk Management

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.

4.0 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 alignment of the capability portfolio 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. SETMO meets with the SETCB quarterly.

SETMO conducts quarterly reviews with Centers. The purpose of these reviews is to provide information and status both from the Centers to SETMO and from SETMO to the Centers. The quarterly reviews are held both telephonically and face-to-face. The locations of the face-to-face meetings are most often at one of the Centers and occasionally at a location where outside entities own and operate facilities similar to those in the SETMO capability portfolio. Tours and presentations by these outside entities allow the presentation and discussion of industry best practices. Special topic presentations by the Centers are also encouraged to provide lessons learned, best practices, and discussions of technical challenges and solutions.

Appendix J – SETMO Quarterly Reporting Requirements describes the content of each quarterly review for the SETMO Tier 1 and Tier 2 capability components. Appendix K – SETMO Quarterly Reporting Template is a template provided by SETMO to the Centers to use when preparing quarterly presentations.

Even though processes for providing products and services (e.g., customer service agreements, training procedures) are the responsibility of each Center, opportunities for standardization are often topics discussed at quarterly reviews and are encouraged when they make sense. The use of SETMO-provided templates and spreadsheets for reporting also encourages standardization of business practices. Examples of standardization include common definitions for utilization,

availability, downtime, and unplanned downtime. Financial reporting using SETMO-provided spreadsheets also encourages the standardization of business practices.

5.0 RECORDS AND DATA MANAGEMENT

SETMO uses SharePoint to maintain its records and store its data, including configuration control and archiving, consistent with NPR 1441.1, *NASA Records Management Program Requirements*.

Records stored include the CPCA, CPMP, and AOP; SETMO presentations to Agency councils; issue and white papers; quarterly and annual review information provided to OSI, MSD, and the MSC; board information; risk management plans; maintenance investment plans and results; waivers; change notification sheets; disagreement/dissenting opinion issue papers and results; PPBE issue papers; and project plans.

Data items stored include quarterly reports from Centers, SETMO performance metrics, and financial planning and execution data.

Other data and information that result from the strategic and centralized management of the capability portfolio are also stored on the SharePoint system.

6.0 WAIVERS

No waivers against NASA policies, directives, or applicable external requirements are required. Waivers are archived in accordance with Section 5.0, Records and Data Management.

7.0 DISAGREEMENTS AND DISSENTING OPINIONS

SETMO considers disagreements, disputes, and decision appeals to all aspects of this management plan subject to the process identified in NPR 8600.1.

SETMO works all issues with Centers and Mission Directorates to reach agreement at the lowest possible level whenever possible.

MDAAs, the MSD Associate Administrator, the OSI Assistant Administrator, and the SETMO Director shall ensure dissenting opinions are elevated through the Dissenting Opinion Process in accordance with the following principles:

- All stakeholders in the SETMO capability portfolio have full and open discussions with all facts made available to understand and assess issues. Diverse views are fostered and respected in an environment of integrity and trust with no suppression or retribution.
- Unresolved issues of any nature within a capability portfolio should be quickly elevated to achieve resolution at the appropriate level. In the teaming environment in which the capability portfolio operates, capability portfolio participants often have to determine where they stand on a decision. In assessing a decision or action, a capability portfolio participant has three choices: agree, disagree but be willing to fully support the decision, or disagree and raise a Dissenting Opinion. At the discretion of the dissenting person(s), a decision may be appealed to the next higher level of management for resolution.
- When time permits, the disagreeing parties jointly document the issue, including agreed-upon facts, discussion of the differing positions with rationale and impacts and the parties' recommendations. The joint documentation is approved by the representative of each view,

concurred with by affected parties, and provided to the next higher level of management with notification to the second higher level of management. In cases of urgency, the disagreeing parties may jointly present the information stated above orally with all affected organizations represented, advance notification to the second-higher level of management, and documentation follow-up.

- Management's decision/action on the dissent memorandum (or oral presentation) is documented and provided to the dissenter and to the notified managers and becomes part of retrievable MSC documentation. If the dissenter is not satisfied with the process or outcome, the dissenter may appeal to the next-higher level of management. The dissenter has the right to take the issue upward in the organization, even to the NASA Administrator if necessary.

8.0 CPMP ACTIVITIES LOG

All CPMP activities, including revisions that reflect all changes to the original CPMP, are documented in the format defined in Table 8. This log may be supplemented with an attached addendum (Ref. #X) for each entry that describes the change. The CPMP is revalidated or updated every five years. Updates occur more frequently if there are significant changes.

Table 8. Sample Capability Portfolio Management Plan Activities Log

Date	Event	Change	Adden-dum	Decision Review?	Sponsoring MDAA Sign	Participating MDAA(s) Sign	Center Director(s) Sign	CP Mgr. Sign	CIO Sign when req'd
10/14/20	Initial signatures	None	None	Yes (MSC)	Yes	Yes	Yes	Yes	NR
mm/dd/yy	Revalidation	None	N/A	No					
mm/dd/yy	Approval of significant change	Addition of change	Ref. #1	Yes					

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	VF5
26	VF6

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

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 FOUD
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 m3/2110 ft3)
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)

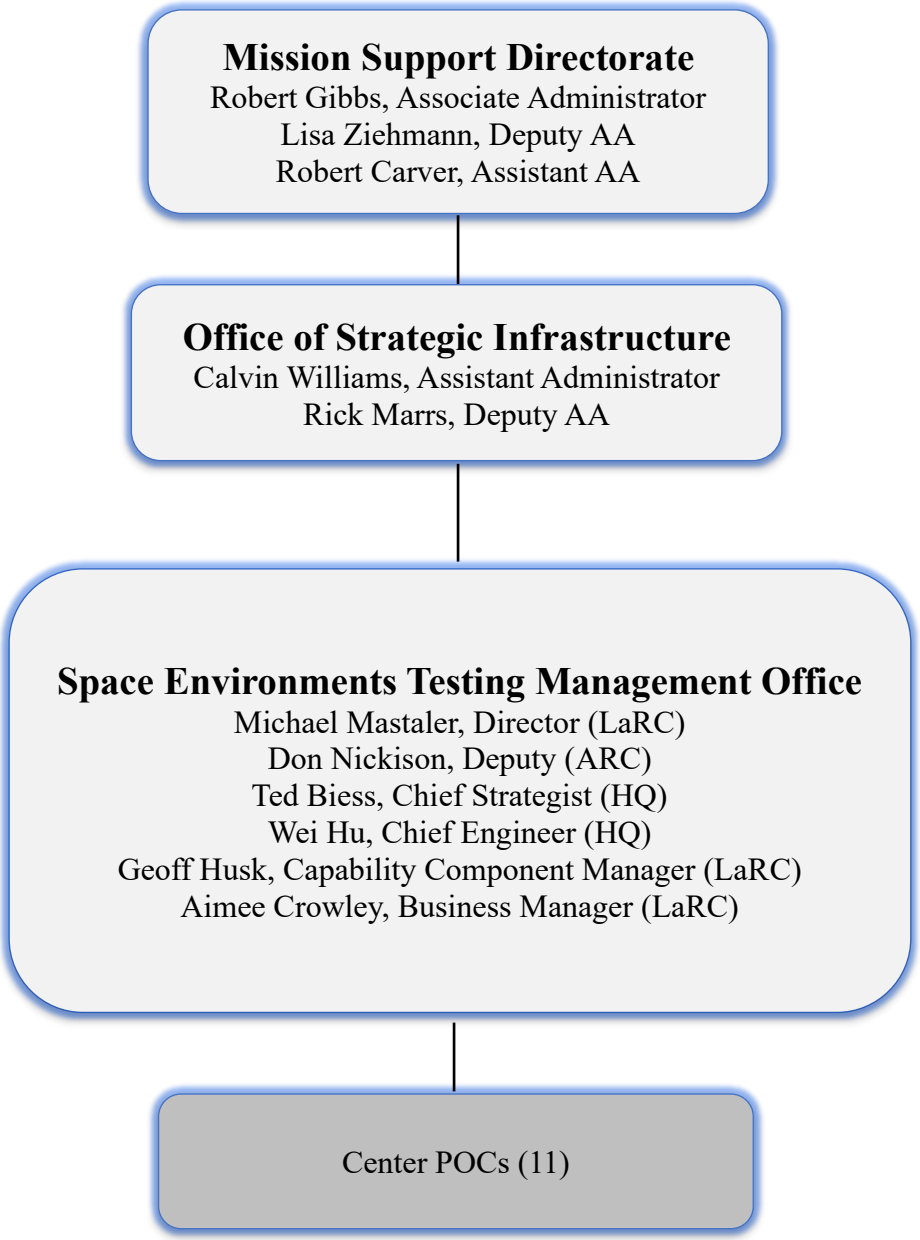
Appendix D – SETMO Budget Run Out

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

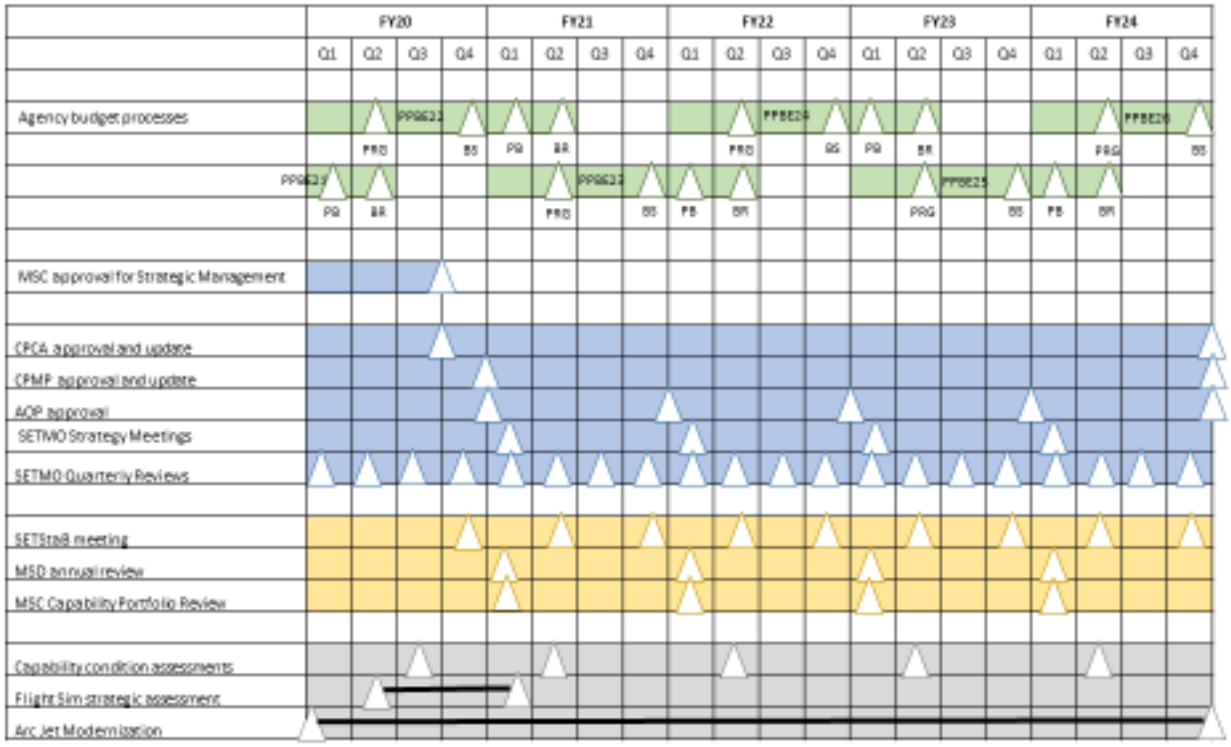
The SETMO budget currently resides in Safety, Security, and Mission Services Authorization, under the Infrastructure and Technical Capabilities (I&TC) Program. The SETMO budget is structured by capability component categories (e.g., Space Environments Testing) and funds are allocated to individual capability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

Appendix E – SETMO Personnel



Appendix F – SETMO Schedule



PRG = Program and Resources Guidance
BS = Budget submittal
PB = Passback
BR = Budget rollout

Appendix G – Thresholds for SETMO Director Concurrence and Notification

Operational Activity	SETMO Director Concurrence Required	SETMO Director Notification Required
Significant change in capability component function	SETMO Tier 1	SETMO Tier 2
Significant changes to operational status. (i.e. bringing a capability component from dormant to operational, or operational to dormant; or other change in status as defined by NPD 8800)	SETMO Tier 1	SETMO Tier 2 - Delegated to Center Directors, include in quarterly reporting and via email
Non-routine maintenance	Projects >$1M	Projects >$250K
Investment, major upgrade, replacement, improvement or addition to an existing capability component (including demolition of existing hardware)	Projects >$1M	Projects >$250K
Creation of capability components Divestment of capability components	Projects >$1M SETMO Tier 1	Projects >$250K SETMO Tier 2
Obtaining testing services external to the capability portfolio	Testing Services >$500K	Testing Services >$100K
Test assignment	N/A, except as noted in Section 3.7	SETMO Tier 1 - Delegated to Center Directors, include in quarterly reporting SETMO Tier 2 - Delegated to Center Directors, include in annual reporting
External agreements	SETMO Tier 1	SETMO Tier 2- Customers noted in quarterly reporting
Significant changes to the AOP	Concurrence required per AOP configuration management process	N/A
Termination of plans for investments, divestments, and improvements that previously received SETMO Director concurrence/notification	Concurrence required for investments, divestments, and improvements that previously received SETMO Director concurrence	Notification required for investments, divestments, and improvements that previously received SETMO Director notification

Appendix H – SETMO Annual Operating Plan Template

1. Tier 1 Overview
    a. Scope
        i. Cross Center Collaborations
    b. Roles and Responsibilities
2. FYXX Details
    a. Project and Subproject Management (Operational norms)
    b. Travel
    c. Operations & Maintenance
        i. Operations
            1. Center by Center Operations
        ii. Maintenance
            1. Center by Center Maintenance
    d. Center Concurrence Requests
    e. Capability Advancements (Future Goal)
3. Project Controls
    a. Risk Management
    b. Status Reporting
    c. Configuration Management

Appendix A – FYXX Center Budget Summaries
Appendix B – FYXX Center Facility Rates
Appendix C – Minimum Sustainability
Appendix D – SETMO Change Notification Sheet

Appendix I – Concurrence/Notification Form

Center:_____ Requestor:_____ Date:_____	Urgent ☐ Non-Urgent ☐	Change #:_____ AOP:_____ SETMO Use Only
SETMO Director Concurrence ☐ SETMO Director Notification ☐	Permanent Change ☐ Temporary Change ☐ Dates:_____to_____	
Description of Change(s): (Operational Activity)		
Reason of Change(s):		
SETMO Director Notification ☐ Date:_____ SETMO Director Concurrence:_____ Date:_____		

Appendix J – SETMO Quarterly Reporting Requirements

SETMO Tier 1 (Every quarter unless otherwise noted)	**SETMO Tier 2** (Every quarter unless otherwise noted)
Description of Components/Complex (Q1)	Description of Components (Q4)
Technical Content/Performance Status (Stoplight Chart)	
Activity Highlights	Activity Highlights (optional)
Planned Capacity	
Downtime Summary	
Availability and Utilization Metric Summary	Availability and Utilization Metric Summary (Q4)
Schedule Summary	
Risk Summary	
Maintenance & Repair	Maintenance & Repair Highlights (if SETMO Funded)
Top Maintenance and Repair Needs	
Budget Execution Summary	
Other Issues, Concerns, Topics	Other Issues, Concerns, Topics (optional)
Customer Satisfaction	

Appendix K – SETMO Quarterly Reporting Template

See SETMO SharePoint File/SETMO CPMP Appendix Files

Sample chart from above reporting template:

Template

SETMO Quarterly Report – X Qtr FYXX

Center / Asset Name
Approved maintenance project title / WBS #(s)
Approved project date (Funded project year) and POC xxx

		Fund FY	$ / %	Fund FY	$ / %
Cost	Approved Guideline:	FYxx	$ K	/ FY15	$xxK
Schedule	Percent Committed:	FYxx	xx%	/ FY15	xx%
Technical	Percent Obligated:	FYxx	xx%	/ FY15	xx%
	Percent Costed:	FYxx	xx%	/ FY15	xx%
	Other Funding sources				
	CMO	FYxx	$K	/ FY15	$xxK
	ARMD/ xxx	FYxx	$K	/ FY15	$xxK
	SCAP Maintenance	FYxx	$K	/ FY15	$xxK

Description of photo(s)

Description: Description of Project

Planned Activities: provide project start date, description of planned activities, upcoming milestones, etc.

Issues: Provide description of issues.

Progress: Provide description of progress, and planned end date.

Appendix L – SETMO Quarterly Reporting Spreadsheet

See SETMO SharePoint File/SETMO CPMP Appendix Files

Example page in above spreadsheet:

Actual Schedule FYXX			Quarter X												
Asset	Customer	Organization/Project	Month					Month				Month			
			1	7	##	##	##	4	##	##	##	4	##	##	##

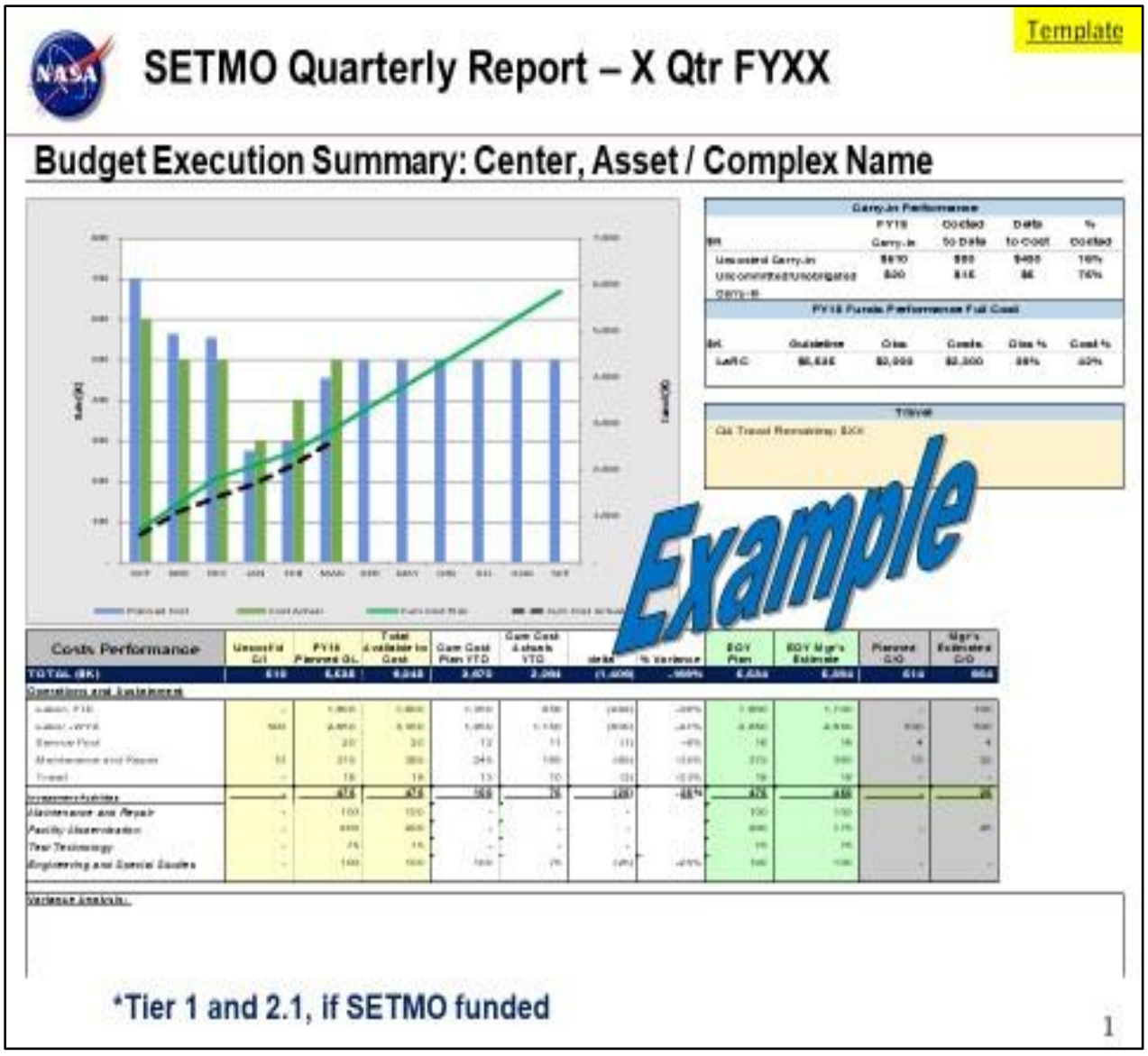
Worksheet Notes:
1. Cells that are light grey are drop-down selections
2. Cells that are dark grey is available for input

- ARMD
- HEOMD
- SMD
- STMD
- Other Nasa
- DoD
- Other Gov
- Academia
- Commercial
- M&R
- Open

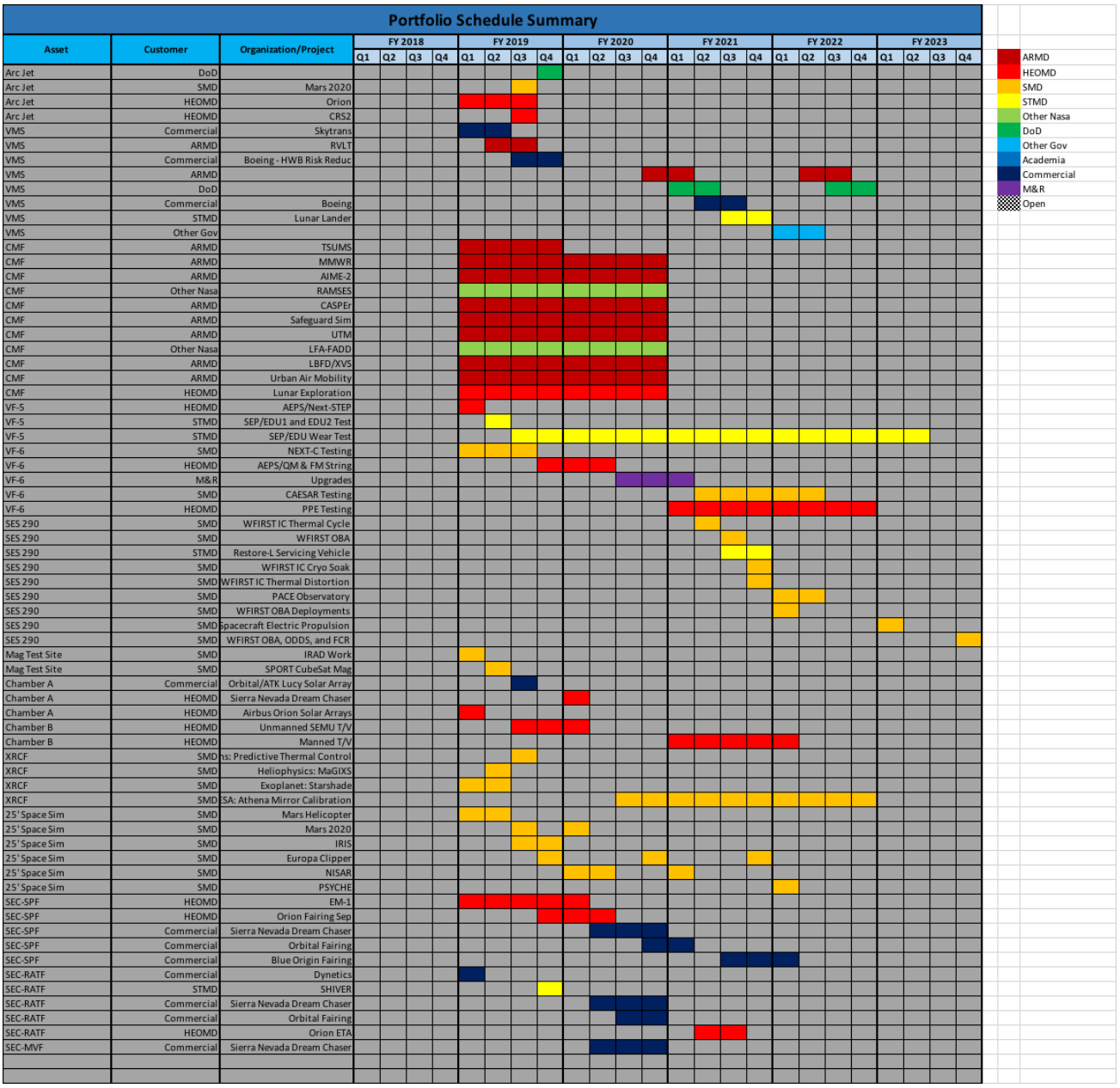
Appendix M – Quarterly Business Reporting Templates – DRAFT

See SETMO SharePoint File/SETMO CPMP Appendix Files

Example page in above spreadsheet:

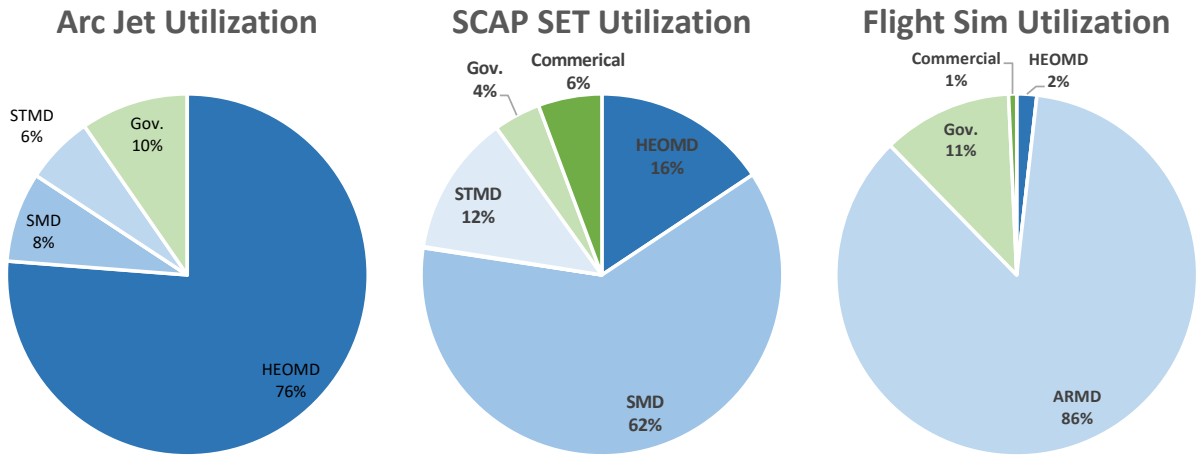


Appendix N – SETMO Tier 1 Five-Year Schedule



Appendix O – Historic Utilization of SCAP Capability Components

SCAP Utilization Averages by Customer, FY12-FY17



ARC: Arc Jet

GRC: VF5, VF6
GRC PBS: SPF
GSFC: 225, 238, SES, ATF
JPL: 25', 10', ATC
JSC: Chambers A,B
MSFC: V20, Sunspot, XRCF

ARC: VMS
LaRC: FSF