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**Subject: NASA Capability Portfolio Management Requirements**

**Responsible Office: Office of Strategic Infrastructure**

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PREFACE

P.1 PURPOSE

This document establishes the Capability Portfolio Management (CPM) requirements by which the National Aeronautics and Space Administration (NASA) will define, plan, support, strategically manage, evaluate, improve, and disposition (i.e., closeout, divest) capability portfolios and capability components consistent with the governance model contained in NASA Policy Directive (NPD) 1000.0, NASA Governance and Strategic Management Handbook.

P.2 APPLICABILITY

1. This NASA Procedural Requirements (NPR) is applicable to NASA Headquarters and NASA Centers, including Component Facilities and Technical and Service Support Centers. This directive applies to the Jet Propulsion Laboratory (JPL), a Federally Funded Research and Development Center (FFRDC), and other contractors only to the extent specified or referenced in the appropriate contracts.
2. This NPR applies to all capability portfolios and associated components managed or funded by NASA. Agency capability portfolios and components are to be managed using this NPR when an Agency capability has been approved by the Mission Support Council (MSC) Chair to be managed in an integrated manner as a portfolio. The current list of capability portfolios is maintained by the Office of Strategic Infrastructure (OSI).
3. In this NPR, all mandatory actions (i.e., requirements) are denoted by statements containing the term “**shall**.” The terms: “may” or “can” denote discretionary privilege or permission, “should” denotes a good practice and is recommended but not required, “will” denotes expected outcome, and “are/is” denotes descriptive material.
4. In this directive, all document citations are assumed to be the latest version unless otherwise noted.

P.3 AUTHORITY

1. National Aeronautics and Space Act, as amended, 51 U.S.C. § 20113(a).
2. NPD 8600.1, NASA Capability Portfolio Management.

P.4 APPLICABLE DOCUMENTS AND FORMS

1. NPD 1000.0, NASA Governance and Strategic Management Handbook.
2. NPD 1000.3, The NASA Organization.
3. NPD 1001.0, NASA Strategic Plan.
4. NPR 1400.1, NASA Directives and Charters Procedural Requirements.
5. NPR 1441.1, NASA Records Management Program Requirements.
6. NPR 7120.5, NASA Space Flight Program and Project Management Requirements.
7. NPR 7120.7, NASA Information Technology and Institutional Infrastructure Program and Project Management Requirements.
8. NPR 7120.8, NASA Research and Technology Program and Project Management Requirements.
9. NPR 8000.4, Agency Risk Management Procedural Requirements.
10. NPR 8800.15, Real Estate Management Program.
11. NPR 8820.2, Facility Project Requirements (FPR).

P.5 MEASUREMENT/VERIFICATION

Compliance with this NPR is verified through periodic benchmarks and assessments conducted under the authority of the Office of Strategic Infrastructure (OSI) Assistant Administrator. Results from these benchmarks and assessments are communicated to senior management who ensure corrective actions are identified, implemented, and tracked to closure. The OSI Assistant Administrator has responsibility for regularly collecting and tracking measurement data on compliance.

P.6 CANCELLATION

None.

Calvin Williams, Assistant Administrator,

Office of Strategic Infrastructure

# Introduction

## Background

### This document establishes the overarching management requirements by which NASA will strategically manage functionally similar mission-critical capabilities (a combination of workforce, competencies, assets, equipment, processes, and technologies) through capability portfolios established and sustained by NASA consistent with the governance model contained in NPD 1000.0. The desired outcome of Capability Portfolio (CP) Strategic Management is greater efficiency, effectiveness, and value in the delivery of products and services to NASA programs and projects.

### The Mission Support Council (MSC) initiates Establishment efforts for a capability portfolio. The MSC Chair approves or disapproves Strategic Management of a capability portfolio following completion of Establishment efforts.

### Capability portfolios represent collections of functionally similar capability components (often geographically dispersed across multiple Centers) that are grouped to support centralized management, analysis, strategy development, decision making, workforce development, and planning. NASA services common requirements through capability portfolios.

### Capability components (i.e., individual capabilities within larger capability portfolios) are quantifiable; that is, they can be measured, ranked, and prioritized. Portfolio management processes support decision making by providing an awareness of the value, criticality, needed sustainment level, and overall resources (including human capital) for capability components based on both current requirements and strategic needs. The need to sustain the entire capability portfolio within constrained resources creates a need for prioritization of capability components.

### The purpose of NASA Capability Portfolio Management (CPM) is to define, sustain, and ensure the effectiveness of the NASA capabilities needed to achieve NASA’s vision, mission, strategic goals, and objectives. This is achieved through centralized management that includes an Agency-wide strategy that is aligned (and periodically updated and realigned) with Agency needs and requirements aggregated across multiple Mission Directorates, Centers, programs, and projects.

#### CPM aims to identify and sustain an optimal mix of capabilities (e.g., in-house wind tunnels or rocket test stands) suited to meet Agency requirements and constraints, determine the most effective and efficient way to manage these capabilities (may include products and services provided by other agencies, industry, and academia), and determine where these capabilities (and the products and services they provide) should be located within the Agency.

#### CPM provides NASA with the ability to do the following:

1. Evaluate, prioritize, and optimize a group of capability components within a capability portfolio;
2. Identify and achieve needed Agency capability, capacity, and quality for a capability portfolio based on Agency and national needs and requirements (i.e., aggregated Agency demand);
3. Generate information for a capability portfolio to support Agency decision making;
4. Allocate resources (e.g., people, funding) based on customer needs and requirements aligned with Agency strategy and priorities (e.g., technical priorities established by Capability Leadership Teams (CLTs));
5. Strategically manage capability components within the Agency in a way that balances the needs and demands of programs and projects and external partners (other agencies, vendors); and
6. Continuously improve effectiveness and efficiency.

#### A capability portfolio provides products and services to multiple programs and projects over a period that can span several decades. While a product or service delivered (e.g., chemical propulsion test, wind tunnel test) can have defined goals, objectives, requirements, cost, a beginning, and an end, the capability portfolio delivering the product or service has no defined ending and will typically change and adapt over time to achieve greatest value for the Agency based on current and future programmatic needs and requirements.

#### Requirements for new, enhanced, and augmented capabilities within a portfolio are developed in response to programmatic requirements and industry opportunities that are aligned strategically with Agency and capability leadership priorities.

## Document Structure

### This document is organized as follows: Chapter 2 describes capability portfolios and capability components, provides an overview of capability portfolio Establishment, Strategic Management, and Termination activities, defines capability portfolio oversight and approval, and describes reviews of capability portfolios; Chapter 3 describes in detail the Establishment, Strategic Management, and Termination activities and requirements; Chapter 4 defines specific CPM roles and responsibilities; and Chapter 5 describes the handling of Dissenting Opinions and the process for tailoring requirements.

### The appendices contain definitions, acronyms, templates for the Capability Portfolio Commitment Agreement (CPCA) and the Capability Portfolio Management Plan (CPMP), the NPR 8600.2 Waiver Template, a description of the Capability Operational Readiness Levels (CORLs), a description of Level of Service (LoS) Strategy and its relationship to funding models, a requirement reference table, and references.

# Managing Capability Portfolios

## Capability Portfolios and Components

### Sponsoring Mission Directorates conduct Establishment efforts for a capability portfolio. The MSC Chair approves or disapproves Strategic Management of a capability portfolio and its constituent capability components following completion of Establishment efforts with the objective of meeting customer requirements for products and services in the most effective and efficient way possible.

### A capability portfolio comprises all specifically identified capability components (Agency assets and activities) that meet similar or like requirements (e.g., wind tunnel testing, rocket propulsion testing, space environments testing) and the personnel that operate them. Assets that do not meet minimum thresholds (e.g., a minimum test section area for wind tunnels) or are used in specialized applications (e.g., low Technology Readiness Level (TRL) for Research and Development (R&D)) may be excluded. The capability components are typically distributed geographically across multiple Centers.

### Capability components are the underlying structure for delivering products and services to customers. A capability component may be a specific asset (e.g., rocket test stand, wind tunnel) and the personnel (Full Time Equivalent (FTE)/Work Year Equivalent (WYE)) that operate it or a complex dedicated to an end-to-end process needed by programs and projects (e.g., integration and testing complex performing space and launch environments testing).

### The sponsoring MDAA selects a Capability Portfolio (CP) manager to strategically manage the capability portfolio. The CP manager reports through the MDAA and maintains a cross-Agency perspective and absence of bias in decision making. Capability portfolios have multiple stakeholders including Centers, participating Mission Directorates, and Agency capability leaders; and multiple customers including NASA programs and projects, NASA Centers, and external customers. The CP manager works collaboratively with stakeholders and customers to understand current and future demand for portfolio products and services and to balance the capability components, their associated CORLs, and limited Agency resources with customer demands for products and services. The CP manager works collaboratively with Centers involved in the capability portfolio to develop and implement processes for understanding funding requirements, developing funding models and customer charging schemes, and assigning customers to capability components. These processes, which may differ from one capability portfolio to another, are documented in the Capability Portfolio Commitment Agreement (CPCA) and the Capability Portfolio Management Plan (CPMP). Centers manage, maintain, and operate the capability components in accordance with the agreed-to processes.

### The environment in which capability portfolios exist is dynamic. The nature of customer requirements may change over time, requiring changes to the capability components that comprise the portfolio. Changes may range from enhancements of existing components and addition of new components to divestment of components. These changes may be addressed through various means ranging from tasks implemented under Center procedures to major projects implemented under Agency project management NPRs (i.e., NPRs 7120.5, 7120.7, 7120.8, and 8820.2).

### The capability portfolio may propose projects based on capability gaps. Once approved by CP authorities, a project is assigned to a Center for implementation. The implementing Center selects the project manager, coordinates/collaborates with the CP manager on the appropriate governing NPR and on project requirements, and provides oversight of project implementation.

### Additionally, a NASA program or Center may initiate projects that impact a capability portfolio independently from the capability portfolio based on needs identified by a program or Center. In these cases, the CP manager and the program or Center coordinate early in the project Formulation Phase, and the CP manager provides guidance, requirements, and/or recommendations for the project and approves the project’s plans. Any unresolved issues or concerns the CP manager may have are elevated for resolution through the project’s governance council. Once approved, the project is implemented under the authority of the NASA program or Center.

## Capability Portfolios: Establishment, Strategic Management, and Termination

A capability portfolio is a long-term investment that may span decades. It goes through three main sets of activities: Establishment, Strategic Management, and Termination.

### **Establishment.** When leadership determines that it may be in NASA’s best interest to strategically manage a group of functionally similar capabilities in an integrated manner, it initiates the Establishment of a capability portfolio of capability components. Establishment activities include scoping and defining the portfolio, designating its sponsoring Mission Directorate, identifying the capability components of the portfolio, developing a management strategy and approach, designating a CP manager, and preparing the Capability Portfolio Commitment Agreement (CPCA). A decisional review is held at the MSC to determine whether to formally establish a capability portfolio, i.e., to transition to Strategic Management activities.

### **Strategic Management.** The Strategic Management of a portfolio comprises key portfolio management processes that repeat throughout the portfolio’s life span They include maintaining a strategy; supporting the budget process; securing funding; designing and developing new capabilities within the portfolio; evaluating component capabilities and assets for need of maintenance, upgrade, or divestment; analyzing the capability environment inside and outside of NASA; understanding capability supply and demand; assigning customer requirements to capability components that can deliver products and services; leading and communicating; assessing the health of the capability and its component parts; and identifying and implementing improvements and enhancements to the capability to meet future needs.

### **Termination.** When NASA leadership determines it is no longer in NASA’s best interest to strategically manage a capability portfolio in an integrated manner, it initiates Termination of the portfolio. A termination decision triggers activities including developing a termination strategy and plan and closing out all activities associated with the capability portfolio.

### Figure 2.2-1 shows the activities of Establishment, Strategic Management, and Termination of a capability portfolio.

#### 

Figure 2.2-1. Capability Portfolio Activities

## Capability Portfolio Oversight and Approval

This section describes NASA’s management oversight for capability portfolios. It defines lines of authority, governance, and the Decision Authority.

### **Lines of Authority**

#### Any effort to strategically manage a capability horizontally across Centers, Mission Directorates, programs, and projects inherently involves a level of complexity, multi-factor decision making, and negotiation between stakeholders with sometimes competing interests.

#### In the course of daily operations, a CP manager may work to facilitate agreement below the strategic management line of authority. For example, if a project requesting access to a capability component disagrees with a capability component manager, resolution should move through a Center line of authority. If portfolio capability might be impacted, the CP manager might want to bring into the discussion at these lower levels stakeholders that may include the Capability Portfolio Advisory Board, the Center CP representative, the Capability Leadership Team (CLT) for this capability, and the program manager. If additional resolution is needed, discussion might move up through the chain of Division Chief, Center Engineering Director, to Center Director or similar chain of authority within a Center.

#### While the CP manager should attempt to resolve issues at the lowest possible level, disagreements that cannot be resolved at the Center level are referred to the sponsoring Mission Directorate and then to the MSC if necessary for resolution. As lower levels are adjudicated up the CPM line of authority, the final authority rests with the MSC Chair.

#### It is possible that an issue that starts as a Center capability component availability issue might end up being a strategic issue that needs adjudication above the Center level. Another more complicated disagreement that might require escalation above the level of the CP manager would be an issue that crosses Centers. For example, a Center might want to build a new facility to provide services for a project based at that Center. The project needing the component service might suggest using facilities existing at another Center instead of paying for a new facility. The Center with the existing asset might indicate it doesn't have the capacity to give the program or project priority. The resolution for this issue might need escalation to the MSC and possibly assistance from the Agency Program Management Council (APMC).

#### The CPM line of authority is distinct from the Dissenting Opinion processes and applies only to capabilities strategically managed in a portfolio. The Dissenting Opinion process is available when someone strongly believes a decision made by the Agency is sufficiently detrimental to the Agency's interests or values to elevate the issue through a formal Agency process. See Section 5.1 for more information on the Dissenting Opinion process. Additional information and a detailed explanation of the Dissenting Opinion process can be found in the *NASA Space Flight Program and Project Management Handbook*.

### **Governance**

#### Each capability portfolio has the MSC as its governing council to provide management oversight. The authorities for managing a capability portfolio are defined in Table 2.3-1.

Table 2.3-1 Capability Portfolio Governance and Authorities

| **Role / Responsibility / Function** | **Title / Council** | **Comments** |
| --- | --- | --- |
| **Decision Authority for Strategic Management and Termination decisional reviews** | MSC Chair | * Optional decisional reviews may be added per Decision Authority discretion during Strategic Management. |
| **Governing Council** | MSC | * Decision Authority might request joint MSC/APMC as the governing council. |
| **Governing Documents** |  | * CPCA * CPMP |
| **Approving authority to initiate Establishment of a capability portfolio** | MSC |  |
| **Approving official for the CPCA** | MSC Chair | * The CPCA must be approved to transition into Strategic Management. * Updated every 5 years or less. |
| **Approving official for the CPMP** | MDAA | * Timeframe for development of the CPMP is established in the CPCA * Updated every 5 years or less. |
| **Decision Authority for significant changes decisional review** | MSC Chair | * Significant changes are defined by threshold(s), criteria, and constraints in the CPCA. * Requires an updated CPCA. |
| **Selecting official for an advisory board (if needed)** | MDAA | * MDAA may determine if an existing board or council can perform this function. |
| *Note: CPMPs and other planning documents will reflect modifications due to the comments above and document the attendant rationale for the change.* | | |

#### The Decision Authority is the individual authorized by the Agency to make important decisions about capability portfolios. The Decision Authority signs the CPCA and conducts decisional reviews. The CP manager prepares plans for conducting reviews, including decisional reviews, and addresses the approach to periodicity and type of portfolio reviews as part of the CPCA and CPMP approved by the Decision Authority in coordination with the MSC. The scope of the capability portfolio is defined in the CPCA. Unless delegated and documented in the CPCA, the Decision Authority is the MSC Chair.

#### For any given capability portfolio, an advisory board is recommended and should include representation from each Mission Directorate utilizing services provided by the capability portfolio and the hosting Center.

#### The CP manager is responsible for periodically evaluating the efficiency, effectiveness, and performance of the capability portfolio and capability components. The Capability Portfolio Advisory Board can aid this process. The evaluation focuses on how well the capability portfolio is aligned with Agency needs, how well commitments are being met, and how well management processes are being followed. Additional advice, inputs, and recommendations can be obtained from stakeholders that include CLTs, which provide insight and input based on Agency and national needs and strategic directions, and the Mission Directorate and the Center CP representatives. In addition, Centers are responsible for the oversight, management, and sustainment of the portion of the capability portfolio that operates at that Center. Centers **shall** evaluate all work related to the capability within the capability portfolio that operates at that Center. The evaluation may be provided by a Center Management Council (CMC). The designated Center evaluator or CMC provides its findings and recommendations to the CP manager in support of the evaluation of the portfolio by the MSC.

## Reviews

Reviews relevant to a capability portfolio comprise decisional reviews, capability portfolio reviews, and other reviews.

### **Decisional Reviews**

#### Decisional reviews determine a capability portfolio's readiness to proceed, approve significant changes to the capability portfolio, or terminate the capability portfolio. A decisional review occurs at three milestones: (1) transition from Establishment activities to Strategic Management activities (including approval of the CPCA); (2) a significant change (“significant” is defined in the CPCA and approved by the Decision Authority) in the composition, management, or funding of the capability portfolio; and (3) transition from Strategic Management activities to Termination activities. Any additional, optional decisional reviews that are required by the Decision Authority will be documented in the CPCA.

#### To support the decision process, the CP manager, in coordination with the Mission Directorate, determines the materials to be submitted during the decisional review. These materials may include: the governing council (e.g., the MSC) recommendations; capability portfolio review report(s) (see Section 2.4.2); the CP manager’s recommendation; CLT recommendations; any CMC recommendations; relevant Agency priorities and roadmaps; cost estimation reports; relevant lessons learned; and any documents requiring the Decision Authority’s signature (e.g., CPCA). The Decision Authority may also request additional documentation to support the decisional review.

#### The Decision Authority’s decision is based on consideration of a number of factors, including but not limited to the following:

1. Continued relevance of the capability portfolio and its components to the Agency’s vision and mission as defined by NPD 1001.0, NASA Strategic Plan and current Agency strategic implementation planning.
2. Efficiency, effectiveness, and affordability with respect to the Agency’s resources.
3. Agency, Mission Directorate, institutional, program, or project risks mitigated or managed by the capability portfolio.
4. Evaluation of capability programmatic demand (aggregated program and project requirements) versus capability capacity (supply) available in-house and external to the Agency able to meet the capability requirements.
5. Preparation and readiness to proceed and viability of proposed changes to the capability portfolio.

#### The results of a decisional review are documented in retrievable CP documentation. If no changes are required following the decisional review, the Decision Authority signs applicable documents, which may include a decision memorandum and a CPCA. If changes are required, the documents are revised, all signatures are obtained, and the documents are resubmitted to the Decision Authority for final signature.

### **Capability Portfolio Reviews**

#### CP reviews are essential elements of managing and evaluating the performance of Agency capabilities. CP managers **shall** identify the reviews appropriate for each capability portfolio in coordination with the sponsoring MDAA and the CP Decision Authority to ensure the continued relevance (alignment with Agency vision and mission), performance, effectiveness, and affordability of the capability portfolio.

#### Evaluation of the performance of a capability portfolio occurs at different levels among different stakeholders. In developing the review requirements, CP managers should consider the need for internal reviews conducted by the CP manager, sponsoring Mission Directorate reviews; advisory board reviews, stakeholder reviews, and/or external reviews independently performed by outside organizations.

#### Planned CP reviews are identified in the CPCA. The approach to conducting the reviews and the review team structure are documented in the CPMP. The CP manager selects review team members for internal reviews and coordinates selection of review team members with the MDAA for stakeholder reviews and external reviews.

### **Other Reviews**

#### Capability portfolios may also be reviewed as part of other Agency and Directorate reviews such as the annual MSC CPM Annual Review and the Agency Baseline Performance Review (BPR) where capability portfolios report performance in the larger context of their sponsoring Mission Directorate. CP managers are expected to support these reviews.

# Capability Portfolio Requirements

## Capability Portfolio Establishment

### **Initiate Effort to Establish a Capability Portfolio**

#### The MSC has the authority to initiate the effort to establish a capability portfolio. The MSC is responsible for ensuring that the start of a new capability portfolio is in line with the Agency’s vision and mission as defined by NPD 1001.0, NASA Strategic Plan. The decision to initiate the effort is documented in a MSC decision memorandum.

#### The MSC **shall** appoint the sponsoring MDAA for the capability portfolio. The MDAA may allocate discretionary funds or utilize funding specifically designated by the Office of the Administrator to conduct activities associated with establishing a capability portfolio. These funds may be allocated by the MDAA to specific Centers, managed internally, or used to fund external studies associated with the potential capability portfolio.

### **Select the Capability Portfolio Manager**

#### The MDAA or their delegated representative **shall** assign a CP manager to manage the effort to establish the capability portfolio (i.e., initiate scoping and definition and initial planning).

#### If the CP manager resides at a Center, the MDAA or their delegated representative coordinates the assignment of the CP manager with the Center Director.

#### The MDAA or their delegated representative **shall** provide to the CP manager, in writing, the purpose, capability domain, and constraints of the capability portfolio. This may be in the form of a one-page document signed by the MDAA, budget guidance, or MSC decision memorandum as appropriate for the type, size, and complexity of the capability portfolio.

### **Establishment Activities**

#### Establishment activities are conducted by the CP manager. These activities include developing a strategy for managing the capability portfolio; performing initial planning for managing the portfolio; scoping and defining the capability portfolio; developing an estimate of the total annual cost of operating and sustaining the portfolio and defining the associated funding model; and establishing the sourcing strategy for the capability portfolio.

#### The CP manager develops the strategy for strategically managing the portfolio. This includes identifying the environment in which the capability portfolio will be strategically managed; identifying the portfolio’s customers, stakeholders, and partners; identifying any constraints on the capability portfolio and any opportunities available to the portfolio; identifying areas of high risk for the portfolio; developing strategic themes or focus areas for the portfolio, their alignment with NASA’s strategic goals, and their associated value; and developing the strategic direction for evolution of the portfolio including an estimate of resources required over time for capability enhancement/replacement and technology development. The strategic direction for portfolio evolution capitalizes on strengths, identifies investment priorities, and addresses weaknesses, gaps, and risks.

#### The CP manager performs the initial planning for how the capability portfolio will be strategically managed. This includes developing goals, objectives, and targets for the capability portfolio; identifying the products and services, and to what level, to be provided by the capability portfolio to NASA’s programs and projects and external customers; establishing the portfolio’s NASA governance and management structure and approach; defining the organizational structure, roles, and responsibilities; documenting how performance of the capability portfolio will be evaluated, including identifying performance metrics; establishing the thresholds, criteria, and constraints that determine the need for a decisional review to approve CP actions and significant changes; documenting the review approach; describing the approach to data management and alignment with Agency Information Technology (IT) security policies and procedures; and determining what documentation is needed (such as a portfolio risk management plan.). The detailed planning is completed as part of the Strategic Management activities. The CP manager also identifies the timeframe for completion of detailed planning and approval of the CPMP. (See Section 3.2 for information on detailed planning and the CPMP.)

#### The CP manager scopes and defines the capability portfolio. This includes gaining an understanding of the capabilities associated with the portfolio that exist within NASA, other agencies, industry, and academia, as well as characterizing any capabilities within the domain that will not be included in the portfolio. It also includes conducting an analysis to understand current and future needs and requirements for the portfolio’s products and services aggregated across all Mission Directorates, programs, and projects. The CP manager will:

1. Develop and maintain an inventory for the capability portfolio that includes all associated capability components and the products and services delivered. The inventory should include detailed information such as workforce (FTE/WYE), critical skills and competencies, assets, equipment, processes, and technologies.
2. Establish and maintain a scheme for classification and decomposition of the capability portfolio that facilitates planning, control, cost analysis, and other analyses (e.g., identification of capability gaps and excess capacity).
3. Establish and maintain a description and inventory of the “core capability;” that is, the minimum workforce (FTE/WYE), competencies, assets, equipment, processes, and technologies below which NASA and other critical stakeholders (e.g., Department of Defense (DoD)) will assume unacceptable risk to current and future missions.
4. Develop and maintain a catalog of external sources used by the capability portfolio to deliver products and services.
5. Characterize the insight role for capabilities within the domain that are not included in the portfolio.

#### The CP manager estimates the total annual cost of operating and sustaining the portfolio, develops the funding model for the capability portfolio, and establishes a process to secure the level of funding needed to operate and sustain the capability portfolio and its components. (See Appendix G for a description of the level of service strategy and its relationship to funding models.) The CP manager provides the following:

1. A transparent customer charging scheme for products and services that is communicated to relevant stakeholders. This includes a description of cost items, categories, and the structure used for customer charging.
2. A process to determine the total annual cost of operation and sustainment (past and current) of the capability portfolio and its components broken down by customer and Mission Directorate contribution. This includes program direct, external customer reimbursables, Center Management and Operations (CM&O), and CP direct funding (e.g., the Rocket Propulsion Testing (RPT) portion of total funding).
3. A concept of operation for acquiring annual funding (i.e., a funding model: the combination of Mission Directorate funding, program/project user fees, and reimbursables).
4. A process to establish and allocate the resources provided annually to capability components to achieve the needed CORL (see Appendix F) and to maintain the capability components.

#### The CP manager establishes how the portfolio will source products and services through capabilities available either in-house and through other agencies, partners, and academia. This includes articulation of the strategy to reevaluate the locations where products and services are currently provided to achieve a more optimized portfolio that considers Agency workforce priorities, Mission Directorate acquisition strategies, Center roles and responsibilities, and impacts to customers. The CP manager also identifies a process for periodic reevaluation of the sourcing strategy to ensure an optimized portfolio.

### **Capability Portfolio Commitment Agreement (CPCA)**

#### The CPCA is an agreement between the Decision Authority and the sponsoring MDAA and is necessary for the capability portfolio to transition from Establishment to Strategic Management. The content of the initial CPCA reflects the maturity of the capability portfolio at the beginning of Strategic Management. Prior to approval of the CPCA, the sponsoring MDAA coordinates with the Decision Authority, any participating MDAAs, and any Center Directors that have capability components that reside at their Centers to ensure their commitment to support the capability portfolio.

Table 3.1-1 Approval for CPCA

|  |  |
| --- | --- |
| **MSC Chair** | Approves |
| **Sponsoring MDAA** | Recommends |
| **Participating MDAA (when not the sponsor)** | Concurs |
| **Center Directors with capability components** | Concurs |
| **Center Directors without capability components** | Informed |

#### The sponsoring MDAA or designee **shall** develop a CPCA. The CPCA documents the results of the Establishment activities and includes the portfolio goals and objectives, the products and services to be provided, the scope and definition of the portfolio, the approach for achieving the goals and objectives, performance metrics for evaluating portfolio performance, the portfolio authorities and governance and organizational structure, portfolio costs and approach for securing funding, the sourcing strategy, high risk areas, internal and external dependencies, and planned reviews.

#### The CPCA may take the form shown in the template provided in Appendix C or any other form as appropriate for the type, size, and complexity of the capability portfolio. The CPCA is signed by the sponsoring MDAA and Center Directors and approved by the Decision Authority.

#### The CP manager **shall** update the CPCA every five (5) years. Updates may occur more frequently if there are significant changes as defined in the CPCA (see Section 3.1.3.3) and as determined by the CP manager or MDAA. The updated CPCA is reviewed and approved using the same process as the original.

#### The CPCA may be used to document delegation of authority as specified in Table 2.3-1.

### **Approval to Transition to Strategic Management**

#### The Decision Authority **shall** conduct a decisional review to determine approval for a capability portfolio to transition to Strategic Management. The decisional review is held at the MSC. If Establishment planning is not sufficient to approve the transition, the Decision Authority may direct the CP manager to continue the Establishment effort or to modify the Establishment plans based on identified weaknesses. If the Decision Authority determines that concepts for the potential capability portfolio do not meet minimum requirements, a decision to discontinue the Establishment effort may be made. If the Establishment planning is sufficient, the Decision Authority authorizes the capability portfolio to transition to Strategic Management.

#### As part of the decisional review, the Decision Authority reviews the CPCA and any other relevant data requested to ensure that the CP objectives are aligned with the Agency’s vision and mission as defined by NPD 1001.0.

#### The decision is documented in retrievable CP documentation. The documentation should include the authorization to transition to Strategic Management, any other decisions made, and any actions assigned. If no changes are required following the decisional review, the Decision Authority signs the CPCA. If changes are required, the CPCA is revised, all signatures are obtained, and the document is resubmitted to the Decision Authority for final signature.

## Capability Portfolio Strategic Management

### **Strategic Management Activities**

#### Strategic Management activities are developed and conducted by the CP manager. Once developed, these activities and associated processes are documented in the CPMP (see Section 3.2.2) and are repeated throughout the span of the portfolio's Strategic Management. Strategic Management activities include the following:

1. Update, maintain, and implement processes developed as part of the Establishment activities:
2. maintain the overall CP strategy;
3. complete detailed planning for how the portfolio will be managed;
4. update the scope and definition of the portfolio, including updating capability inventories and catalogs and maturing the understanding of customer requirements (see Section 3.2.1.2);
5. refine and maintain the estimated annual cost, funding model, and processes for securing funding (see Section 3.2.1.5); and
6. mature, adjust, and implement the sourcing strategy (see Section 3.2.1.3).
7. Develop and implement processes for strategically managing and maintaining oversight of the capability components; evaluating CP performance; and managing change, improvement, and evolution of the capability portfolio. (These processes are described in Sections 3.2.1.4, 3.2.1.6, and 3.2.1.7, respectively.)

#### **Understanding Customer Requirements.** The CP manager develops and maintains a process to understand and influence current and future customer demand for CP products and services to ensure the portfolio’s ability and capacity (in-house and external) to meet those demands and to achieve Agency objectives in fostering and servicing demand in an optimized manner. This process includes activities to:

1. Establish and maintain a constructive relationship with customers (e.g., programs and projects that need products and services) and other stakeholders (e.g., Mission Directorate CP representatives, Centers operating capability components, and Technical Fellows).
2. Coordinate with customers and other stakeholders to identify sources of demand, demand characteristics (such as demand confidence, constraints, and purposes of need), and strategic requirements to inform both CP strategy and operational plans.
3. Coordinate with customers and other stakeholders to identify new and changed products and services that are needed to resolve identified capability gaps.
4. Maintain on-going communication and liaison with customers to assure best fit of capabilities (combination of in-house and external) with customer needs and requirements.
5. Collect and aggregate Agency requirements to create, maintain, and confirm a CP demand baseline; and analyze and prioritize requirements from programs and projects, external customers, and other Agency stakeholders (e.g., Technical Fellows and groups performing research and innovation).
6. Coordinate and advise NASA program and project customers on sourcing (in-house and external) needed products and services and related acquisition trade studies.
7. Review and concur on all Agency acquisitions and procurements having requirements for products and services that can be provided by the capability portfolio.

#### **Sourcing and Managing Customer Requests.** The CP manager strategically manages the assignment of customer requests to capability components. The CP manager:

1. Assesses historical demand and projected future needs to define demand patterns in order to understand and predict the impact of mission needs on the portfolio and inform the sourcing strategy.
2. Establishes a process for assignment of customer requirements to sites capable of providing products and services considering Agency-defined Center roles and responsibilities; Agency workforce priorities; the alignment of capability component capabilities, capacity, and constraints with customer requirements; the customer implications of non-local service delivery; and the priorities for optimizing critical resources.
3. Matures the sourcing strategy (i.e., assigning delivery of products and services to capability components within the portfolio) based on analysis and prioritization based on value (i.e., the ability to meet and the relative importance of meeting NASA and other stakeholder needs and requirements); mission criticality; customer and supplier risk, and overall Agency cost implications.
4. Surveys the capabilities of external sources (i.e., other agencies, academia).
5. Adjusts the sourcing strategy in response to changes in the products and services required by customers and changes in internal and external capabilities (e.g., when vendors develop capabilities for products and services that are equal to or better than those available in-house).
6. Manages customer requests for products and services based on the sourcing strategy.

#### **Capability Portfolio and Component** **Oversight.** The CP manager strategically manages and maintains oversight of the capability components within the portfolio to achieve the right mix of capabilities, capacity, and level of service and to ensure that the capability portfolio achieves needed capacity (for individual components and the entire portfolio) to meet customer needs and requirements in a cost-effective and timely manner. (See Appendix G.) The CP manager:

1. Communicates with Center CP representatives that deliver products and services to provide needed and effective guidance, communicate CP strategic direction, and maintain awareness of local tactical plans.
2. Maintains aggregated, integrated operational plans for delivery of products and services that translate and align with the CP overall strategy; and maintains oversight of products and services delivered.
3. Establishes a process for developing cost estimates for delivering products and services to customers.
4. Establishes reporting requirements for all in-house capabilities within the capability portfolio. Reports may include operational plans for delivery of products and services at the capability component level, actual deliveries of products and services, maintenance and improvement investments, unscheduled maintenance, corrective actions, facility utilization, risks, and performance metrics.
5. Establishes a process for maintaining cognizance and insight into capability components within the capability domain but not the portfolio.
6. Facilitates consistency and standardization across capability components in developing processes for providing products and services (e.g., customer service agreements, training procedures), establishing metrics for measuring performance, and setting performance goals.
7. Adjusts the CORLs of each capability component and their level of service based on targeted Agency capacity and demand, which is based on customer requirements.
8. Approves alternate uses of capability components within the portfolio in support of innovation and new customers.

#### **Estimate Annual Cost and Secure Funding.** The CP manager refines and maintains the estimate of the total annual cost of operating and sustaining the portfolio and the portfolio funding model and secures the appropriate level of funding to operate and sustain the portfolio. (The initial annual cost estimate, funding model, and process for securing funding is developed as part of the Establishment activities (see Section 3.2.3.5).) Securing funding includes supporting the NASA Planning, Programming, Budgeting, and Execution (PPBE) process and schedule, including providing input relative to CP strategy and priorities into strategic planning guidance and program resource guidance documents, ensuring that planning and budgeting and the investments described are aligned with NASA mission needs and requirements, and collaborating with Centers to identify and resolve budget issues.

#### **Evaluate Capability Portfolio Performance.** The CP manager assesses the performance of the capability portfolio and its components and identifies changes needed to CP strategy, objectives, processes, products, and services to improve reliability, quality, performance, and cost effectiveness. The CP manager:

1. Analyzes planned versus actual performance and identifies trends. Determines underlying causes of performance problems and identifies and prioritizes changes needed to address those causes.
2. Identifies CP risks and develops actions to mitigate risks.
3. Utilizes CP reviews (see Section 3.2.3) for recommendations, vetting, and validation of topics and items such as CP strategy, objectives and targets, and issue resolution.

#### **Manage Change, Improvement, and Evolution.** The CP manager strategically manages change, improvement, and evolution of the capability portfolio and its components to continuously align products and services delivered by the capability portfolio with changing Agency needs and requirements and to support established objectives and targets for the capability portfolio. The CP manager:

1. Analyzes requirements and identifies strategic investments to address capability gaps, advancements in technologies, needs for capability enhancements, opportunities, threats, and new and changed products and services needed to support customers.
2. Develops and maintains a Capability Portfolio Master Plan that provides a detailed description of the needed future state for the capability components and the processes for delivering products and services. This plan defines the process and approach to evolve the set of capability components to better support current and future customers and requirements. The plan informs the development and prioritization of changes to be implemented. It serves as a guide for the assessment of infrastructure improvements and associated investments including modernization, upgrades, and new construction. It also addresses funding sources, the scope of projects that may be needed, and the strategic divestments and investments that need to be aligned with Center Master Plans and the Agency Master Plan.
3. Develops a process for estimating the total cost of ownership (TCO) for the capability portfolio and its components. For capability components, the cost of ownership may include estimated resources to achieve different CORLs. The TCO is used to help the CP manager evaluate the value-to-cost ratio of component capabilities.
4. Evaluates the financial impact of proposed changes to the capability portfolio and its components. Changes may include products and services provided, the level of sustainment for each capability component, targeted Agency capacity, level of service, investments, and divestments. (See Appendix G.)
5. Coordinates and guides policy and design and development efforts to facilitate consistency and standardization across capability components and investments in systems, architectures, and technologies. Examples include software standards, equipment specifications, interface control, and personnel certifications.
6. Reviews and approves all investments to maintain, enhance, and improve the capability portfolio and its components. Investments may include significant enhancements of capability components and enabling infrastructure, development of new capability components, and construction of facilities.
7. Supports decisional reviews for changes and investments that exceed thresholds or meet criteria and constraints as defined in the CPCA. Reviews, approves, and/or concurs on all other changes and investments.
8. Represents the capability portfolio to Agency management and councils and effectively provides and presents information that supports strategic decision making.

### **Develop the Capability Portfolio Management Plan (CPMP)**

#### The CPMP is an agreement between the MDAA and the CP manager that details how the capability portfolio will be managed and is used by the governing council to determine if the capability portfolio is fulfilling its requirements. The CPMP is developed and approved within the timeframe specified in the CPCA. Prior to approval of the CPMP, the CP manager coordinates with the sponsoring MDAA, any participating MDAAs, and any Center Directors that have capability components that reside at the Centers to ensure their concurrence.

#### The CP manager **shall** develop a CPMP. The CPMP documents the results of the Strategic Management activities and includes goals, objectives and metrics; customers, beneficiaries, and stakeholders; the authority, governance, and management structure; the capability portfolio products and services, scope and definition, schedule, and resources; the approach for aligning capabilities with demand; internal and external relationships; the strategy for securing adequate funds and the funding model; the sourcing strategy; the scheme for classification and decomposition of the portfolio; the Capability Portfolio Master Plan; plans for data management and risk management; and planned reviews. Once approved, the capability portfolio and its capability components are operated as described in the CPMP.

#### The CPMP may take the form shown in the template provided in Appendix D or any other form as appropriate for the type, size, and complexity of the capability portfolio. The CPMP is signed by the CP manager and Center Directors and is approved by the sponsoring MDAA.

Table 3.2-1 Approval for CPMP

|  |  |
| --- | --- |
| **MSC Chair** | Informed |
| **Sponsoring MDAA** | Approves |
| **Participating MDAA (when not the sponsor)** | Concurs |
| **CP manager** | Recommends |
| **Center Directors with capability components** | Concurs |
| **Center Directors without capability components** | Informed |

#### The CP manager **shall** update the CPMP every five (5) years. Updates may occur more frequently if there are significant changes as defined in the CPCA and determined by the CP manager and sponsoring MDAA. Note that it is common to change portfolio content (i.e., add and subtract capability components) due to necessary CP changes as it adapts and realigns in response to Agency needs and requirements. The updated CPMP is reviewed and approved using the same process as the original.

#### The CP manager ensures that the CPCA and CPMP are consistent in terms of content. If changes are required, the approval process for the applicable document(s) will be followed.

### **Conduct Reviews**

#### **Decisional Reviews**

1. **Approval for Significant Changes to a Capability Portfolio.** The Decision Authority as shown in Table 2.3-1 **shall** conduct a decisional review when significant changes occur to a capability portfolio. Significant is defined in the CPCA and can include changes in the composition, management, or funding of the capability portfolio. The decisional review is held at the MSC.
2. The CP manager, in coordination with the Mission Directorate, will provide the materials needed to support the decisional review as described in Section 2.4.1. In addition to the materials described in Section 2.4.1, a description of the proposed change is provided. Changes may include changes to the management strategy, scope and definition, total annual cost estimate, funding model, and sourcing strategy for the capability portfolio. Examples of changes to scope and definition include significant enhancements to existing capability components, addition of new capability components, and divestment of capability components.
3. The CP manager will prepare a revised CPCA and CPMP to reflect the proposed change.
4. As part of the decisional review, the Decision Authority will ensure that the change to the capability portfolio is aligned with the Agency’s vision and mission as defined by NPD 1001.0, NASA Strategic Plan.
5. The decision is documented in retrievable CP documentation. The documentation should include the authorization to implement the change, any other decisions made, and any actions assigned. If no changes to the revised CPCA and CPMP are required following the decisional review, the approving officials sign the revised documents. If changes are required, the revised CPCA and CPMP are updated, all signatures are obtained, and the documents are resubmitted to the approving officials for final signature.
6. **Approval to Terminate** **a** **Capability Portfolio.** If a need arises to terminate a capability portfolio, the Decision Authority as shown in Table 2.3-1 **shall** conduct a decisional review to terminate the capability portfolio. The decisional review is held at the MSC.
7. The CP manager, in coordination with the Mission Directorate, will provide the materials needed to support the decisional review as described in Section 2.4.1. In addition to the materials described in Section 2.4.1, these materials may include the rationale for termination of the capability portfolio; the impact of termination on the Agency or Mission Directorate; an estimate of the total cost of termination; and a termination strategy and close out plan, including disposition of portfolio assets and capability components.
8. As part of the decisional review, the Decision Authority will ensure that the termination of the capability portfolio is aligned with the Agency’s vision and mission as defined by NPD 1001.0, NASA Strategic Plan.
9. The termination decision is documented in retrievable CP documentation. The documentation should include the authorization to terminate the capability portfolio, any other decisions made, and any actions assigned.

#### **Capability Portfolio Reviews**

1. The CP manager **shall** conduct or support CP reviews as essential elements of strategically managing and evaluating a capability portfolio. These reviews may include internal reviews conducted by the CP manager, sponsoring Mission Directorate reviews, advisory board reviews, stakeholder reviews, and/or external reviews independently performed by outside organizations.
2. The CPMP includes the scope of planned CP reviews, the approach to conducting the reviews, the frequency and timeline for the reviews, the criteria (e.g., technical, cost, performance) that will be used in the reviews, and the review team(s) structure.
3. The CP manager will select review team members for internal reviews and coordinate selection of review team members with the MDAA for stakeholder reviews and external reviews.
4. The CP manager will ensure planned reviews are accomplished in accordance with the CPMP and results are adjudicated in a timely manner.

#### **Other Reviews.** The CP manager will support reviews of the capability portfolio as part of other Agency and Directorate reviews such as the annual MSC CPM Annual Review and the Agency Baseline Performance Review (BPR) where capability portfolios report performance in the larger context of their sponsoring Mission Directorate.

## Capability Portfolio Termination

### The CP manager **shall** conduct Termination activities when approved by the Decision Authority. These include closing out all activities associated with the capability portfolio. The portfolio management structure is dissolved, the capability components are decoupled strategically, and portfolio assets and capability components are dispositioned in accordance with the termination strategy.

### The CP manager develops a final capability portfolio report, documenting results of the portfolio such as performance relative to goals, technologies developed, lessons learned, and any recommendations from the termination review. The final report is captured as part of the portfolio’s retrievable records. See NPR 1441.1, NASA Records Management Program Requirements for more information.

# Capability Portfolio Roles and Responsibilities

## Summary of Specific Roles and Responsibilities

### The roles and responsibilities of senior management are defined in NPD 1000.0, NASA Governance and Strategic Management Handbook, and further outlined in NPD 1000.3, The NASA Organization. This section delineates the roles and responsibilities specific to carrying out the requirements of this NPR.

### The MSC Chair is responsible for oversight of all capability portfolios at the Agency level, serving as the capability portfolio Decision Authority as specified in Table 2.3-1, and approving the CPCA. The MSC Chair monitors the status and performance of capability portfolios through reports from the capability portfolio governing council, the MSC, and through Agency-level reviews such as Baseline Performance Reviews (BPR). The MSC is responsible for initiating efforts to establish capability portfolios, assigning capability portfolios to sponsoring Mission Directorates, and conducting the CPM Annual Review. CP decisional reviews are held at the MSC..

### The sponsoring MDAA is responsible for management and oversight of all capability portfolios sponsored by their Directorate including budgets, schedules, and requirements. The sponsoring MDAA responsibilities include the following:

1. Chair the Mission Directorate governing council and serve as the Decision Authority, when delegated as described in Table 2.3-1.
2. Following approval by the MSC, manage the effort to establish a capability portfolio as described in Section 3.1.
3. Appoint the Capability Portfolio (CP) manager for each capability portfolio.
4. Develop the CPCA and recommend approval to the MSC Chair as described in Table 2.3-1.
5. Support development and approve the CPMP as described in Table 2.3-1.
6. Provide oversight of the capability portfolio and report the status periodically to the MSC and Agency-level management.
7. Conduct and/or support any reviews required by this NPR.
8. Concur/non-concur on waivers to CP requirements as described in Section 5.2. A written explanation for a non-concurrence should be provided.
9. Determine the need for termination of the capability portfolio and make recommendations to the Decision Authority as described in Table 2.3-1.
10. Serve as the Selecting Official for advisory boards as described in Table 2.3-1.

### The Office of Strategic Infrastructure (OSI) Assistant Administrator responsibilities include the following:

1. Establish and maintain CPM policy.
2. Establish Agency-level boards and teams, as needed, to address Agency-level CPM policies, issues, and strategies.
3. Maintain the official list of capability portfolios and their capability components including a description of the capability.
4. Approve or disapprove waivers to CP requirements under OSI authority as described in Section 5.2. A written explanation for disapproval should be provided.

### Participating MDAA and sponsoring MDAA responsibilities include the following:

1. Obtain the CP manager’s approval on acquisition and procurement strategies when they include requirements for products or services similar to those provided by the capability portfolio.
2. Collaborate with the CP manager to identify, request, and fund the appropriate capability component (in-house or external) for products and services that meet Mission Directorate needs and requirements.
3. Identify requirements to the CP manager for new capability or enhanced capability that is needed to resolve identified capability gaps.
4. Coordinate with the CP manager all investments, divestments, or changes that could affect a capability portfolio to assure strategic alignment with CP and Agency objectives.
5. Concur/non-concur on a recommendation to terminate the capability portfolio. A written explanation for a non-concurrence should be provided.
6. Assign a Mission Directorate CP representative to serve as the Point of Contact (POC) for the capability portfolio.
7. Assign and support requested representatives to Agency-level boards and teams to address CPM policies, issues, and strategies.
8. Support reviews required by this NPR.

### Center Directors are responsible for establishing, developing, and maintaining the institutional capabilities (processes and procedures, human capital, facilities, and infrastructure) required for the operation and maintenance of the capability components that reside at their Center. Center Director responsibilities include the following:

1. Assign a Center CP representative to serve as the Point of Contact (POC) for the capability portfolio.
2. Concur/non-concur on the CPCA and the CPMP. A written explanation for a non-concurrence should be provided.
3. Support the CP manager to establish key processes for strategically managing the capability portfolio.
4. Coordinate with the CP manager to establish consensus on capability component charging schemes.
5. Assign Center representatives to CP reviews and other reviews as required (when the reviewer is not the Center CP representative).
6. Operate and maintain capability components at the Center consistent with strategic guidance (included in CPCA and CPMP) at the CORL and funding level approved by the CP manager.
7. Coordinate with the CP manager to establish the process and data necessary to estimate the total annual cost of ownership for the capability portfolio and its components.
8. Negotiate proposals and cost estimates with customers for products and services delivered by the Center's capability components and obtain concurrence from the CP manager.
9. Seek external customers for the Center's capability components.
10. Coordinate with and obtain approval from the CP manager on investments, refurbishments, and modernizations to maintain or upgrade capability components and associated facilities and enabling infrastructure needed to resolve identified capability gaps, technology enhancements, divestments, and alternative uses for the Center's capability components.
11. Oversee and manage projects and tasks assigned to the Center that impact the capability portfolio, enhance capability components, develop new capability components, and divest of capability components.
12. Provide Center-level reports, assessments, and data for capability components that reside at the Center and projects and tasks implemented by the Center.
13. Obtain approval from the CP manager on acquisition, procurement, partnership, and agreement strategies when they include product and/or service requirements similar to those provided by the capability portfolio, or propose to use capability components.
14. Concur/non-concur on a recommendation to terminate the capability portfolio. A written explanation for a non-concurrence should be provided.

### The NASA Chief Engineer and MDAAs who have responsibility for technical (discipline, system, service, or research) Capability Leadership Teams (CLTs) are responsible for providing technical support to the CP manager during Establishment, Strategic Management and Termination activities of capability portfolios. This support is typically provided by the assignment of a Technical Fellow and/or a Capability Leader who coordinates with the CP manager, other Technical Fellows, and CLTs. These responsibilities include the following:

1. Develop a long-term strategic assessment of the Agency’s need for the technical capabilities that influence the capability portfolios.
2. Identify and inform the CP manager about new products and services made possible through emerging technologies and new vendors.
3. Provide the CP manager with strategic direction from the perspective of Technical Fellows and/or CLTs on a desired future state for Agency technical capabilities for alignment and consideration within the CPMP.
4. Coordinate with the CP manager on evaluations, analyses, prioritization, and identification of needed changes to the capability portfolio.
5. Identify and inform the CP manager about future needs and requirements, capability gaps, technology trends, opportunities, threats, and changes to internal and external environment for the technical capability.
6. Assign representatives to CP reviews and other reviews as required by this NPR.

### The CP manager is responsible for conducting Establishment activities, Strategic Management activities, and Termination activities for the capability portfolio. The CP manager responsibilities include the following:

1. Serve as the Agency’s senior manager for the capability portfolio and the products and services it delivers. This includes all Agency capabilities within the capability portfolio’s domain and cognizance of capabilities available through other agencies, vendors, and academia.
2. Support the development of the CPCA, develop the CPMP, and prepare all required updates to both documents.
3. Execute the CPMP.
4. Provide direct support to Agency programs and projects (e.g., determine component(s) within the portfolio that best fit program and project requirements, deconflict utilization of the capability components, and resolve capability gaps based on future program and project requirements).
5. Coordinate with Center Directors, MDAAs, and other key stakeholders to establish the CP funding process.
6. Establish a CP-level charging scheme for products and services.
7. Establish the process and data necessary to estimate the total annual cost of ownership for the capability portfolio and its components.
8. Support decisional reviews, and lead or support CP reviews and other reviews required by this NPR.
9. Coordinate with customers and other stakeholders to identify sources of demand; demand characteristics (such as demand confidence, constraints, and purposes of need), and strategic requirements to inform both CP strategy and operational plans.
10. Ensure continued relevance of the capability portfolio and its components to the Agency’s vision and mission and current Agency strategic implementation planning.
11. Determine needed investments, divestments, and other changes to the capability portfolio. Initiate, assign an implementing organization to, and strategically manage associated projects and tasks including establishing requirements, prioritizing work, and establishing funding. Approve or disapprove termination of projects and tasks.
12. Approve or disapprove Center Director and program or project manager plans for investments, refurbishments, and modernizations to maintain or upgrade capability components and associated facilities and the enabling infrastructure needed to resolve identified capability gaps, technology enhancements, divestments, and alternative uses for capability components. Approve or disapprove the termination of any such plans.
13. Provide concurrence or non-concurrence on all Space Act Agreements (SAAs), Task Agreements, or other binding agreements that utilize capability components. A written explanation for a non-concurrence should be provided.
14. Concur/non-concur on waivers to CP requirements as described in Section 5.2. A written explanation for a non-concurrence should be provided.
15. Determine the need for and recommend significant changes to the capability portfolio.
16. Recommend termination of the capability portfolio.
17. Serve as an advisor to the MSC Chair and other senior officials on matters pertaining to CPM.

## 

# Chapter 5. Dissenting Opinions and Tailoring Requirements

## 5.1 Process for Handling Dissenting Opinions

### 5.1.1 MDAAs, the OSI Assistant Administrator, and CP managers **shall** ensure Dissenting Opinions are elevated through the Dissenting Opinion process described in this section in accordance with the following principles. All participants within a capability portfolio will 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.

### 5.1.2 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 CP operates, CP participants often have to determine where they stand on a decision. In assessing a decision or action, a CP 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.

### 5.1.3 When time permits, the disagreeing parties jointly document the issue, including agreed-to 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.

### 5.1.4 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 CP 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.

## 5.2 Tailoring Requirements

#### 5.2.1 NPR 1400.1 provides a process for tailoring requirements. The requirements in this NPR are minimized to allow flexibility for different capability portfolios. However, if the need arises to tailor a requirement, a waiver is required from the requirements holder, OSI.

#### 5.2.2 The person requesting a waiver to an NPR 8600.2 requirement **shall** document the request including the rationale, a risk evaluation, and reference to all material that provide the justification for acceptance; obtain concurrence from the CP manager and the sponsoring MDAA; provide an information copy to the Office of the Chief Engineer and MDAAs with responsibility for technical capability leadership; and submit the request to the OSI Assistant Administrator for approval. Appendix Eprovides a template for a waiver request.

#### 5.2.3 Waivers to NPR 8600.2 requirements are adjudicated by the officials shown in Table 5.2-1.

Table 5.2-1 Waiver Approval for Capability Portfolios

|  |  |  |  |
| --- | --- | --- | --- |
| CP Manager | Sponsoring MDAA | OSI Assistant Administrator\* | NASA Chief Engineer and MDAAs with responsibility for technical capability leadership teams |
| C | C | A | I |

C = Concurs; A = Approves; I = Informed

\*May be elevated using the Dissenting Opinion process described in Section 5.1

Appendix A. Definition of Terms

**Acquisition.** The process for obtaining the systems, research, construction, and supplies that NASA needs to fulfill its missions. Acquisition, which may include procurement (contracting for products and services), begins with an idea or proposal that aligns with the NASA Strategic Plan and fulfills an identified need and ends with the completion of the program or project or the final disposition of the product or service.

**Acquisition Strategy**. NASA's strategic acquisition process supports obtaining, or advancing the development of, the systems, research, services, construction, and supplies to fulfill the Agency's mission and other activities which advance the Agency's statutory objectives. Within the framework of this strategic acquisition process, NASA utilizes multiple authorities to meet these objectives. NASA's authorities include, but are not limited to, grants, cooperative agreements, international agreements, and Space Act Agreements (SAAs), in addition to NASA's acquisition authority to contract for goods and services through procurements. The Agency also has the authority to enter into other types of arrangements depending on the circumstances, such as Inter-Agency Agreements (IAAs), leases, concession agreements, property loan agreements, and Cooperative Research and Development Agreements (CRADAs).

**Agency Program Management Council**. The Agency’s senior decision-making body regarding all programmatic activities and program-related issues. The APMC baselines and assesses the performance of NASA programs and projects and ensures implementation and compliance with program and project management requirements. The APMC may initiate a joint meeting with the MSC to discuss recommendations that affect both programmatic and institutional areas. Additionally, the APMC may provide strategic, cross-cutting recommendations to the Executive Council, which is NASA’s highest decision-making body. The APMC is chaired by the NASA Associate Administrator, and its members include the Deputy Associate Administrator, Chief Engineer, Chief of Safety and Mission Assurance, Associate Administrators of NASA’s five Mission Directorates, Center Directors, Chief Financial Officer, Chief Information Officer, Chief Health and Medical Officer, Chief Scientist, Chief Technologist, and General Counsel.

**Approval**. Authorization by a required management official to proceed with a proposed course of action. (When multiple approvals are required, all must be obtained in order to proceed.) Approvals are documented in retrievable capability portfolio records.

**Asset**. Any item of economic value owned by NASA. This includes facilities and equipment. This does not include personnel.

**Capability**. The ability of a system comprising a combination of workforce (Full Time Equivalent (FTE)/Work Year Equivalent (WYE)), competencies, assets, equipment, processes, and technologies to provide products and services to achieve objectives or meet requirements. See also “Technical Capability.”

**Capability Component**. An individual capability within a larger capability portfolio. A system comprising people (FTE/WYE), equipment, facilities, processes, resources, competencies and technologies. For example, a wind tunnel and the personnel that manage, operate, and maintain it.

**Capability Leadership Model** . A model designed to advance NASA’s technical capabilities to meet long-term missions, optimize deployment of capabilities across its major facilities, and transition capabilities that are no longer needed by institutionalizing capability management into the Agency’s annual planning and budgeting processes.

**Capability Leadership Team** . A group that assists a (technical) capability leader and is composed of a representative from each Center that conducts work in the technical capability area. See also “Technical Capability Leader.”

**Capability Operational Readiness Levels** . A tool for describing the operational readiness of capability components consistently across capability portfolios. Operational readiness is defined in terms of ability and capacity to provide products and services to customers. This ability and capacity are based on the asset/facility status of the capability component (the operational state of equipment and systems that comprise the capability component (e.g., active, inactive, mothballed), current utilization (e.g., by a specific current program)), and the personnel status of the capability component (the type of work the assigned personnel are able to perform and their expertise and skill levels (e.g., perform test and operations; perform preventive and corrective maintenance)). There are seven capability operational readiness levels.

**Capability Portfolio**. A collection of functionally similar capability components and enabling portfolio infrastructure managed together to meet NASA’s strategic needs, goals, and objectives. For example, ground-based aeronautics testing capability achieved through use of NASA wind tunnels.

**Capability Portfolio Advisory Board**. A group of stakeholders chartered and chaired as described in the CPCA to address Agency-level CPM policies, issues, and strategies. The board may include Technical Fellows, members of relevant CLTs, and others from relevant technical communities. The board provides stakeholder and Agency guidance and input to the CP manager in the process of managing the capability portfolio. The board’s role is to facilitate cross-Agency communication and conflict resolution on issues surrounding demand and utilization and scalability (capacities and/or capabilities) for the capability portfolio.

**Capability Portfolio Commitment Agreement** . The agreement between the Decision Authority and sponsoring MDAA that authorizes transition from Establishment to Strategic Management. A CPCA can be considered an executive summary of the CPMP. The content of the initial CPCA reflects the maturity of the capability portfolio.

**Capability Portfolio Management** . The centralized management of capability portfolios to achieve NASA strategic goals and objectives.

**Capability Portfolio Management Plan (CPMP).** An agreement between the MDAA and the CP manager that details how the capability portfolio will be managed and is used by the governing council to determine if the capability portfolio is fulfilling its requirements. The CPMP documents the results of the strategic management activities and includes goals, objectives and metrics; customers, beneficiaries, and stakeholders; the authority, governance, and management structure; the capability portfolio products and services, scope and definition, schedule, and resources; the approach for aligning capabilities with demand; internal and external relationships; the strategy for securing adequate funds and the funding model; the sourcing strategy; the scheme for classification and decomposition of the portfolio; the Capability Portfolio Master Plan; plans for data management and risk management; and planned reviews.

**Capability Portfolio Manager**. The person assigned to manage a capability portfolio.

**Capability Portfolio Master Plan**. A document that provides a detailed description of the needed future state for the capability components within a capability portfolio and the processes for delivering products and services. The plan defines the approach to evolving the set of capability components to better support current and future customers and requirements, informs the development and prioritization of change to be implemented, and serves as a guide for assessing infrastructure improvements and associated investments including modernization, upgrades, and/or new construction. It also addresses funding sources, the scope of projects that may be necessary, and strategic divestments and investments that need to be aligned with Center Master Plans and the Agency Master Plan.

**Capacity**. The available amount of a capability. For example, available testing hours from a wind tunnel.

**Center Director.** The person responsible for establishing, developing, and maintaining the institutional capabilities (processes and procedures, human capital, facilities, and infrastructure) required for the execution of capability components., including the system of checks and balances to ensure the technical and scientific integrity of capability components assigned to the Center.

**Center Management Council.** The council at a Center that performs oversight of capability components by evaluating all capability component work executed at that Center.

**Centralized Management.** The strategic oversight of capability portfolios across the Agency to optimize the delivery of quality and cost-effective products and services to internal and external customers and to align the delivery with Agency wide strategic planning.

**Component Facilities.** Complexes that are geographically separated from the NASA Center or institution to which they are assigned, but are still part of the Agency.

**Core Capability.** The minimum workforce (FTE/WYE), competencies, assets, equipment, processes, and technologies below which NASA and other critical stakeholders (e.g., DoD) will assume unacceptable risk to current and future missions.

**Customer/Beneficiary.** The intended beneficiary or user of the capability portfolio results. Typically, a customer is a NASA program or project. Customers may also be external entities.

**Decision Authority.** The individual authorized by the Agency to make important decisions on capability portfolios under their authority.

**Decisional Review.** The event at which the Decision Authority determines the readiness of a capability portfolio to: (1) transition from Establishment activities to Strategic Management activities (including approval of the CPCA); and (2) transition from Strategic Management activities to Termination activities. The event at which the Decision Authority approves a significant change (“significant” is defined in the CPCA and approved by the Decision Authority) in the composition, management, or funding of the capability portfolio.

**Demand Baseline.** An aggregated collection of customer requirements for a capability portfolio. The demand baseline is confirmed by the customers (Mission Directorates, NASA programs and projects, Centers, and external entities) annually and updated as needed by the CP manager.

**Directorate Program Management Council .** The senior management group, chaired by an MDAA or designee, responsible for evaluating programs and projects executed within that Mission Directorate and overseeing implementation according to Agency commitments, priorities, and policies. For some capability-related issues, the MDAA may carry forward the DPMC findings and recommendations to the MSC.

**Enabling Infrastructure.** Lesser facilities, structures, retention, supply, distribution and control systems that are not directly part of a capability component or component facilities but are essential for its operations such as gases and support fluids, propellants, high pressure water, steam, pumping stations, high voltage power systems, and equipment.

**Evaluation.** The continual, self- and independent (i.e., outside the advocacy chain of the capability portfolio) assessment of the performance of a capability portfolio and incorporation of the evaluation findings to ensure adequacy of planning and execution according to plan.

**Gap Analysis.** An assessment of the CP products and services needed by customers against the availability of those products and services to identify areas where availability may need to be modified.

**Governing Council**. The senior management group responsible for providing management oversight of a capability portfolio, its capability components, and related projects. The council has the responsibility of periodically evaluating the cost, schedule, risk, and performance of capability portfolios under its purview. The evaluation focuses on whether the capability portfolio is meeting its commitments to the Agency and is following appropriate management processes.

**Infrastructure Requirements.** The facilities and environmental, aircraft, personal property, equipment, and information technology resources that are needed to support capability portfolios.

**Investment.** A resource and financial commitment made by the Agency, Mission Directorate, or Center.

**Level of Service**. The products and services the capability portfolio intends to deliver to customers in support of Agency strategic objectives measured under various criteria of quality, quantity, and availability associated with a defined funding model. (See Appendix G.)

**Metric.** A measurement taken over a period of time that communicates vital information about the status or performance of a system, process, or activity. A metric should drive appropriate action.

**Mission Support Council.** The Agency's senior decision-making body regarding the integrated Agency mission support portfolio. The council members are advisors to the MSC Chair. The MSC assesses and determines mission support requirements to enable the successful accomplishment of the Agency's Mission. The MSC is the governing council for capability portfolios, initiates efforts to establish capability portfolios, and assigns capability portfolios to sponsoring Mission Directorates.

**Participating Mission Directorate.** A Mission Directorate that has a stakeholder interest in a capability portfolio.

**Portfolio**. A collection of projects, programs, capability components, sub-portfolios, and/or activities managed as a group to meet NASA’s strategic needs, goals, and objectives.

**Program.** A strategic investment by a Mission Directorate or Mission Support Office that has a defined architecture and/or technical approach, requirements, funding level, and a management structure that initiates and directs one or more projects. A program defines a strategic direction that the Agency has identified as needed to accomplish Agency goals and objectives.

**Project.** A specific investment having defined requirements, a life-cycle cost, a beginning, and an end. A project also has a management structure and may have interfaces to other projects, agencies, capability portfolios, and international partners. A project yields new or revised products that directly address NASA’s strategic needs.

**Resource.** Budget, workforce, schedule, and other infrastructure elements that support NASA assets and can be used by individuals or organizations to facilitate effective functioning.

**Risk.** In the context of mission execution, risk is the potential for performance shortfalls that may be realized in the future with respect to achieving explicitly established and stated performance requirements. The performance shortfalls may be related to any one or more of the following mission execution domains: (1) safety, (2) technical, (3) cost, and (4) schedule. (See NPR 8000.4, Agency Risk Management Procedural Requirements.)

**Risk Assessment.** An evaluation of a risk item that determines: (1) what can go wrong, (2) how likely is it to occur, (3) what the consequences are, (4) what the uncertainties are that are associated with the likelihood and consequences, and (5) what the mitigation plans are.

**Risk Management.** Risk management includes Risk-Informed Decision Making (RIDM) and Continuous Risk Management (CRM) in an integrated framework. RIDM informs systems engineering decisions through better use of risk and uncertainty information in selecting alternatives and establishing baseline requirements. CRM manages risks over the course of strategic management of the capability portfolio to ensure that safety, technical, cost, and schedule requirements are met. (See NPR 8000.4,Agency Risk Management Procedural Requirements.) These processes are applied at a level of rigor commensurate with the complexity, cost, and criticality of the capability portfolio.

**Safety.** Freedom from those conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment.

**Security.** Protection of people, property, and information assets owned by NASA that covers physical assets, personnel, IT, communications, and operations.

**Sponsoring Mission Directorate.** The Mission Directorate assigned by the MSC to provide management and oversight of a capability portfolio.

**Sourcing Strategy.** A strategy that considers a variety of factors in matching customer requirements with the capability component to service those requirements. Sourcing strategy considerations may include Center roles and responsibilities, maintenance of internal competencies, financial and schedule factors, capacity, transformational objectives, and industry maturity and availability. The overall goal of a sourcing strategy is to achieve an optimized portfolio that addresses Agency goals and objectives, supports the CP strategy, enables the CP’s strategic direction, and fully satisfies customer requirements.

**Stakeholder.** Any party that has an interest in the outcome or deliverable of a capability portfolio. Stakeholders include customers, beneficiaries, and organizations that will work on or provide support to the capability portfolio.

**Strategic Management.** The process of formulating and implementing strategies to accomplish Agency-level long-term goals and make consequential decisions.

**System.** The combination of elements that function together to produce the capability required to meet a need. The elements include all hardware, software, equipment, facilities, personnel, processes, and procedures needed for this purpose.

**Systems Engineering.** A disciplined approach for the definition, implementation, integration, and operation of a system (product or service). The emphasis is on achieving stakeholder functional, physical, and operational performance requirements in the intended use environments over planned life within cost and schedule constraints. Systems engineering includes the engineering processes and technical management processes that consider the interface relationships across all elements of the system, other systems, or as a part of a larger system.

**Tailoring.** The process used to adjust or seek relief from a prescribed requirement to accommodate the needs of a specific task or activity (e.g., capability component). The tailoring process results in the generation of waivers.

**Technical Capability.** NASA defines a technical capability as the equipment, facilities, infrastructure, property, support, and workforce required to accomplish a program or project. As part of its Capability Leadership Model (CLM), NASA has categorized its technical capabilities into four types – discipline, system, research, and service.

**Technical Capability Leader.** A senior technical or subject matter expert in a technical capability area who acts as an advisor and provides senior NASA management with a strategic perspective on the current and future health of the technical capability and its ability to meet long-term mission needs.

**Total Cost of Ownership (TCO) -** A financial estimate intended to establish the full (direct and indirect) costs of a component capability. The TCO is used to help the CP manager evaluate the value-to-cost ratio of component capabilities. The TCO is determined through processes established by the CP manager to support the need for differentiated understanding of costs in support of decision-making to achieve capability portfolio efficiency and alignment. The TCO processes are documented in the CPMP.

**Waiver.** A documented authorization releasing a capability portfolio from meeting a requirement.

Appendix B. Acronyms

APMC Agency PMC

BPR Baseline Performance Review

CLT Capability Leadership Team

CoF Construction of Facilities (funding)

CORL Capability Operational Readiness Level

CM&O Center Management and Operations

CMC Center Management Council

CP Capability Portfolio (as an adjective)

CPCA Capability Portfolio Commitment Agreement

CPM NASA Capability Portfolio Management

CPMP Capability Portfolio Management Plan

CRADA Cooperative Research and Development Agreement

CRM Continuous Risk Management

DoD Department of Defense

DPMC Directorate Program Management Council

FFRDC Federally Funded Research and Development Center

FPR Facility Project Requirements

FTE Full-Time Equivalent

HQ Headquarters

IAA Inter-Agency Agreement

IT Information Technology

JPL Jet Propulsion Laboratory

LoS Level of Service

MDAA Mission Directorate Associate Administrator

MSC Mission Support Council

NASA National Aeronautics and Space Administration

NOA New Obligational Authority

NODIS NASA Online Directives Information System

NPD NASA Policy Directive

NPR NASA Procedural Requirements

OSI Office of Strategic Infrastructure

POC Point of Contact

PPBE Planning, Programming, Budgeting, and Execution

R&D Research and Development

RIDM Risk-Informed Decision Making

RPT Rocket Propulsion Testing

SAA Space Act Agreement

SCAP Shared Capability Asset Program

TCO Total Cost of Ownership

TRL Technology Readiness Level

U.S.C. United States Code

WYE Work Year Equivalent

Appendix C. Capability Portfolio Commitment Agreement (CPCA) Template

**C.1 CPCA Title Page**

**Capability Portfolio Commitment Agreement**

(Provide a title for the capability portfolio and designate a short title or proposed acronym in parentheses if appropriate.)

It is the responsibility of each of the signing parties to notify the other in the event that a commitment cannot be met and to initiate the timely renegotiation of the terms of this agreement.

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Mission Directorate Associate Administrator Date

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Center Director(s) Date

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Mission Support Council Chair Date

Figure C-1 Capability Portfolio Commitment Agreement Title Page

**C.2 CPCA Template**

CAPABILITY PORTFOLIO COMMITMENT AGREEMENT

(CAPABILITY PORTFOLIO TITLE)

**1.0 GOALS AND OBJECTIVES**

Identify the relevant goals and objectives for the capability portfolio. Describe the capability portfolio’s relationship to the Agency’s vision and mission, as defined by NPD 1001.0, NASA Strategic Plan. Describe the capability portfolio’s relationship to sponsoring Mission Directorate’s goals and objectives as documented in their strategic plan. Describe why the capability portfolio is required – describe customer (internal and external) needs and requirements that can be met through products and services provide by the capability portfolio. Convey the public good of the capability portfolio to the taxpayer, stated in a way that can be understood by the average citizen.

**2.0 PRODUCTS AND SERVICES / SCOPE AND DEFINITION**

Describe the capabilities, including assets, and enabling infrastructure, and levels of service within the capability portfolio necessary to deliver products and services to NASA's programs and projects and external customers. Characterize the boundary conditions (in as much detail as possible) for what will be included in the capability portfolio and what will not be included. Provide a list or catalog of the capability components, along with facilities and enabling infrastructure available at the NASA Centers. Identify what is not included in portfolio. If applicable, provide a list or catalog for external sources – other agencies, industry and academia.

Detailed lists and catalogs can be provided as separate documents or appendices as needed.

**3.0 STRATEGY**

Describe the plan for how the capability portfolio will achieve its goals and objectives. Identify customers, stakeholders, partners, and relationships with external organizations, other agencies, or international partners. Describe constraints on the capability portfolio and any opportunities. Describe the strategic themes or focus areas for the portfolio. Describe the strategic direction for the evolution of the capability portfolio, addressing strengths, weaknesses, capability gaps, investment priorities, risks, and risk mitigation. Provide an estimate of funding and human resources required over time for capability enhancement/replacement and technology development.

Identify the timeframe for completion of detailed planning and approval of the Capability Portfolio Management Plan. Identify other documentation needed (e.g., a capability portfolio risk management plan).

**4.0 AUTHORITY [GOVERNANCE AND MANAGEMENT]**

Describe the NASA organizational structure, roles, and responsibilities for managing the capability portfolio and components from the Decision Authority (MSC Chair or delegated) to the sponsoring MDAA to the Centers involved. Include lines of authority and reporting and the governing council for oversight of the capability portfolio. Identify the CP manager.

Define the thresholds, criteria, and constraints that determine the need for a decisional review to approve capability portfolio actions and significant changes.

**5.0 PERFORMANCE**

Document how performance of the capability of the portfolio will be evaluated, including identification of performance metrics with goals and targets needed to achieve the CP objectives.

**6.0 BUDGET DEVELOPMENT AND INTEGRATED FUNDING**

Define levels of service including common and variable parts of CP services. Describe the estimated cost for the capability portfolio to operate, and the CP funding model(s). For the capability portfolio content, define annual budgetary estimates in support of the initial PPBE five year run out including specific estimates for: operations; maintenance and refurbishment; and funding estimates for any planned strategic initiatives, renewals. or upgrades including human resources and procurements. Describe the budget contingency strategy. Describe how the appropriate level of funding is secured to operate and sustain the capability portfolio and its components. Describe the funding model(s) specific to the capability portfolio and the cases of usage. Describe the funding elements that are necessary for the capability portfolio to achieve its strategic objectives that are budgeted outside of the CP budget, appearing instead as line items in the budgets of other areas of the Agency. Describe CP funding model responsibilities levied on Centers, Mission Directorates, or other customers to support both fixed and variable costs (e.g., direct labor, consumables, materials, program-unique facility modernizations, etc.) which are to be funded by non-CP entities as a direct cost. To the extent feasible, include a description of the different sources of funding and their approximate percentage (e.g., CM&O 15%, CP direct 55%, program direct 25%, reimbursable 5%). Include a description of the customer charging scheme for products and services. Describe estimated reimbursable funding from outside the Agency and the strategy for ensuring those reimbursements.

**7.0 SOURCING STRATEGY**

Include a brief statement of how the capability portfolio provides products and services through capabilities available either in-house and through other agencies, partners, and academia. This includes a description of how the capability portfolio periodically reevaluates the locations where products and services are provided to achieve a more optimized portfolio, considering Agency workforce priorities, Mission Directorate acquisition strategies, Center roles and responsibilities, and impacts to customer needs.

**8.0 HIGH-RISK AREAS**

Identify the areas of highest risk for the capability portfolio (covering safety, technical, institutional, funding, cost, or schedule issues) in which failure may result in changes to the capability portfolio’s cost, schedule, or performance. This section should identify, where possible, the specific risk drivers (e.g., external facility or capability does not provide agreed-to level of access to NASA.

**9.0 INTERNAL DEPENDENCIES [AND AGREEMENTS]**

Identify the NASA support from other Mission Directorates and Centers and formal agreements necessary for the capability portfolio to meet objectives.

**10.0 EXTERNAL DEPENDENCIES [AND AGREEMENTS]**

Explain the involvement of external organizations, other Government agencies, or international support necessary to meet the capability portfolio objectives. Include a brief overview of relationships with such external organizations. Include an identification of the commitments being made by the external organizations, other Government agencies, or international partners and a listing of the specific agreements to be concluded. Any unique considerations affecting implementation of required NASA policies and processes necessitated by the external involvement should be clearly identified.

**11.0 REVIEWS**

Specify the type of capability portfolio reviews that are planned during strategic management to ensure the continued relevance (alignment with Agency vision and mission), performance, effectiveness, and affordability of the portfolio. Types of capability portfolio reviews include internal reviews conducted by the CP manager, sponsoring Mission Directorate reviews, advisory board reviews (if applicable), stakeholder reviews and/or external reviews independently performed by outside organizations. Provide the frequency and approximate timeframes for these reviews.

Identify other reviews that the capability portfolio will support such as the MSC CPM Annual Review and the Agency Baseline Performance Review.

**12.0 WAIVERS**

Identify known waivers that will be sought for the capability portfolio. Provide rationale consistent with CP characteristics such as scope, complexity, visibility, cost, safety, and acceptable risk.

**13.0 CPCA ACTIVITIES LOG**

Provide and maintain a log of all CPCA activities, including revisions that reflect all changes and waivers to the original CPCA. This log includes the information shown in Table C-1 and may be supplemented with an attached addendum for each change, describing the change. The CPCA should be updated whenever significant change makes it necessary.

Table C-1 Sample Capability Portfolio Commitment Agreement Activities Log

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** | **Event** | **Change** | **Addendum** | **Termination Review Required** | **MDAA Signature** | **Center Director(s) Signature** | **MSC Chair Signature** |
| dd/mm/yy | Revalidation | None | N/A | No |  |  |  |
| dd/mm/yy | Revalidation | None | N/A | No |  |  |  |
| dd/mm/yy | Approval of significant change | Addition of change N | Ref. #1 | No |  |  |  |

Appendix D. Capability Portfolio Management Plan Template

The MDAA may authorize use of an alternative format with compatible content.

**D.1 Capability Portfolio Management Plan Title Page**

**Capability Portfolio Management Plan**

(Provide a title for the candidate capability portfolio and designate a short title or proposed acronym in parentheses, if appropriate.)

It is the responsibility of each of the signing parties to notify the other in the event that a commitment cannot be met and to initiate the timely renegotiation of the terms of this agreement.

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Capability Portfolio Manager Date

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Center Director(s) Date

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Mission Directorate Associate Administrator Date

Figure D-1 Capability Portfolio Management Plan Title Page

**D.2 Capability Portfolio Management Plan (CPMP) Template**

CAPABILITY PORTFOLIO MANAGEMENT PLAN

(CAPABILITY PORTFOLIO TITLE)

**1.0 CAPABILITY PORTFOLIO OVERVIEW**

**1.1 Introduction**

Briefly state the background of the capability portfolio and its current state, including the results of establishing the portfolio, decisions, and documentation. If applicable, provide a brief description of intended future states and desired enhancements to address identified capability gaps.

**1.2 Goals and Objectives**

State the goals and specific objectives of the capability portfolio with clear traceability to the Agency’s vision and mission, as defined by NPD 1001.0. Goals and objectives should include commitment to safety and mission success. Describe high-level objectives and how these objectives flow down from the capability portfolio to components.

**1.3 Customers, Beneficiaries and Stakeholders Identification and Advocacy**

Identify the main customers, beneficiaries, and stakeholders of the capability portfolio and the process to be used to ensure customer and stakeholder advocacy.

**1.4 Scope, Products and Services**

Describe the capabilities, including assets, enabling infrastructure, and levels of service within the capability portfolio necessary to deliver products and services to NASA's programs and projects and external customers. Identify and describe insight into domain components outside of the capability portfolio. Establish and maintain a description and inventory of the “core capability” for the portfolio.

Provide a list or catalog of the capability portfolio components, along with facilities and enabling infrastructure available at the NASA Centers. If applicable, provide a list or catalog for external sources – other agencies, industry, and academia. Detailed lists and catalogs can be provided as separate documents or appendices as needed.

**2.0 AUTHORITY, GOVERNANCE and MANAGEMENT**

Identify the CP manager and the location (HQ or Center) where the CP manager resides and each Center’s responsibilities, if relevant. Identify the governing program management committee or council(s) for oversight of the capability portfolio and the approving official for decisional reviews. Describe the NASA organizational structure and management roles and responsibilities for managing the capability portfolio including lines of authority and reporting. Briefly describe the respective roles, responsibilities, and relationships between all parties involved in capability component operations and sustainment. If applicable, illustrate the organization graphically. Include stakeholder advisory board, steering committee, and advisory groups (e.g., CLTs).

**3.0 STRATEGIC MANAGEMENT**

**3.1 Activities**

Briefly describe the scheme for classification and decomposition of the capability portfolio.

Describe the way the capability portfolio will relate to other institutions within NASA as well as outside of NASA. Identify the responsibilities of each NASA Center as they relate to capability portfolio goals and objectives.

Describe the process for estimating the Total Cost of Ownership (TCO) for the capability portfolio and its components.

Describe the analytical process used to identify, prioritize, and approve changes, investments, and divestments to the capability portfolio to continuously align products and services with changing Agency needs and requirements and to support established objectives and targets for the capability portfolio.

Describe the process by which projects initiated by the capability portfolio are approved and implemented.

Briefly discuss how policy and design and development efforts are coordinated to facilitate consistency and standardization across capability components and investments in systems, architectures, and technologies.

Describe the process used to review and concur/non-concur on Space Act Agreements (SAAs) and similar binding agreements that propose use of the capability portfolio and its components.

**3.2 Schedule**

Provide a schedule of capability portfolio strategic activities and events and capability component utilization and CORL covering the next five (5) years of the capability portfolio. Include all applicable events, such as delivery dates for significant enhancements, scheduled reviews, and updates to the CPCA and CPMP. Include the strategy for addressing schedule updates when impacts to the schedule occur during strategic management. The schedule may be provided as a separate document or appendix.

**3.3 Alignment of Capacity with Demand**

Describe the current customer demand for the capability portfolio’s products and services. When possible, provide a demand forecast for the next five (5) years. Discuss how current and future customer demand for products and services are determined to ensure the portfolio’s ability and capacity (in-house and external) to meet those demands including any assumptions and data sources. Describe how current available capacity (i.e., a combination of in-house, vendor, other agency, and academia) is matched to meet this demand. Describe how significant discrepancies between capacity and demand will be resolved (e.g., changing operational readiness of capability components, access to vendor services).

**3.4 Funding Model(s)**

Describe the process for the annual budget development for the capability portfolio.

Identify the annual cost for the operations and sustainment of the capability portfolio. Include all elements such as operations; maintenance and refurbishment; and funding estimates for any planned strategic initiatives, renewals or upgrades, including human resources and procurements. Identify yearly New Obligation Authority (NOA) full cost estimates for operations, facility construction, institutional support (maintenance), enhancements, technology, management and reserves. Identify annual civil service and contractor workforce levels that are funded with portfolio resources.

Describe the approach for securing the appropriate level of funding to operate and sustain the capability portfolio and its components. Include a description of the different sources of funding and their approximate percentage (e.g., CM&O 15%, capability portfolio direct 55%, program direct 25%, reimbursable 5%). Include a description of the customer charging scheme for products and services.

**3.5 Controls and Compliance**

Describe the process by which the capability portfolio ensures compliance with NASA policies and directives, as well as other applicable requirements. Describe the process for controlling changes and for updating the CPMP accordingly. Characterize key capability portfolio parameters (cost, technical, products and services delivered, new capability components) which will require MSC Chair, MDAA, or CP manager approval for change. Define the thresholds, criteria, and constraints that determine the need for a decisional review to approve capability portfolio actions and significant changes. Define the thresholds, criteria, and constraints that determine the need for MDAA approval of capability portfolio actions and significant changes.

**3.6 Relationships**

**3.6.1 Internal**: Identify the NASA support from other Mission Directorates and Centers and formal agreements necessary for the capability portfolio to meet objectives. Lists of agreements can be provided as separate documents or appendices as needed.

**3.6.2 External**: Describe the involvement of external organizations, other Government agencies, or international support necessary to meet the capability portfolio objectives. Include a brief overview of relationships and formal agreements concluded with such external organizations. Lists of agreements can be provided as separate documents or appendices as needed.

**3.7 Sourcing Strategy**

Describe the sourcing strategy used for assignment of customer requirements to sites capable of providing products and services considering Agency-defined Center roles and responsibilities; Agency workforce priorities; the alignment of component capabilities, capacity, and constraints with customer requirements; the customer implications of non-local service delivery; and the priorities for optimizing critical resources.

Discuss how the capability portfolio periodically reevaluates the sourcing strategy to achieve an optimized portfolio including adjustments in response to changes in the products and services required by customers and changes in internal and external capabilities. Included in the reevaluation are Agency mission priorities, Mission Directorate acquisition strategies, Center roles and responsibilities, and customer needs for product and service delivery at specific locations. Describe rationale for sustaining in-house capabilities, civil service workforce, and NASA facilities. Describe how the appropriate balance between NASA civil servants and/or NASA facilities versus other sources is determined. Provide a high-level evaluation of opportunities to leverage the expertise and capabilities of other government agencies and partners.

**3.8 Performance**

Describe how performance of the capability portfolio will be evaluated, including identification of performance metrics with goals and targets needed to achieve the capability portfolio objectives. Identify performance metrics in an objective, quantifiable, and measurable form.

**3.9 Capability Portfolio Master Plan**

Describe the approach and timeframe for developing and maintaining a capability portfolio Master Plan that provides a detailed description of the needed future state (combination of workforce (FTE/WYE), competencies, assets, equipment, processes, and technologies) for the capability components and the processes for delivering required products and services. Include how the capability portfolio evolves to achieve alternative methods and processes for delivery of products and services, and alternative approaches to sourcing (i.e., balance of in-house and external). Discuss the alignment of the Capability Portfolio Master Plan with Agency and Center Master Plans.

Describe any principles and guidance for design and development of the capability portfolio and its components. Include a description of how services, systems, architectures, technologies, processes, and metrics are consistent or standardized within the capability portfolio and among its components.

Describe how future needs and requirements, capability gaps, technology trends, opportunities, threats, and changes to internal and external environment are identified. Describe how new and changed products and services (that resolve identified capability gaps) are identified, prioritized, and planned.

**3.10 Data Management**

Describe the approach to data management utilized for the capability portfolio including what data will be captured, how the data will be collected, stored, and accessed, plans for data rights, services, and alignment with Agency IT security policies and procedures.

**3.11 Risk Management**

Summarize the risk management approach used for the capability portfolio, including appropriate actions to mitigate risk to the capability portfolio and actions to mitigate customer risks.

**4.0 REVIEWS**

Specify the approach, criteria, and review team structure for the capability portfolio reviews that are planned during strategic management. Describe how the CP manager selects review team members for internal reviews and coordinates selection of review team members with the MDAA for stakeholder reviews and external reviews. Provide the frequency and approximate timeframes for these reviews.

Describe the approach to support other reviews such as the MSC CPM Annual Review and the Agency Baseline Performance Review.

Identify any optional decisional reviews required by the Decision Authority during the Strategic Management set of activities.

**5.0 RECORDS MANAGEMENT**

Describe how capability portfolio records will be managed as defined in NPR 1441.1, NASA Records Management Program Requirements.

**6.0 WAIVERS**

Describe the process for the submittal and approval or disapproval of waivers to the requirements of this NPR. Identify known waivers that the capability portfolio has obtained or will obtain against NASA policies, directives, or other applicable external requirements.

**7.0 DISSENTING OPINIONS**

Briefly discuss the process for handling Dissenting Opinions as described in this NPR.

**8.0 CPMP ACTIVITIES LOG**

Provide and maintain a log of all CPMP activities, including revisions that reflect all changes to the original CPMP. This log includes the information shown in Table D-1 and may be supplemented with an attached addendum for each change, describing the change. The CPMP should be updated whenever significant change makes it necessary.

Table D-1 Sample Capability Portfolio Management Plan Activities Log

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Date** | **Event** | **Change** | **Addendum** | **Decisional Review Required** | **MDAA Signature** | **Center Director(s) Signature** |
| dd/mm/yy | Revalidation | None | N/A | No |  |  |
| dd/mm/yy | Approval of significant change | Addition of change | Ref. #1 | Yes |  |  |

Appendix E. NPR 8600.2 Waiver Template

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name of Capability Portfolio Requesting Waiver: | Date of Request: | Date Waiver is Needed: | | |
| Name and Organization of Initiator: | Requirement to be Waived: | | | |
| Specific Deliverable Affected: | Waiver To:  € Policy € Procedure € Requirement € Other  € Additional information is attached | | | |
| Original Requirement of Document to be Waived (list Appropriate Sections or Text): | | | | |
| Waiver Requested: | | | | |
| Reason/Justification (Attach additional information, if necessary): | | | | |
| Risk Assessment of the Capability Portfolio if Waiver is Approved: | | | | |
| Required Signatures | Signature | | Date | Approve/Concur (Yes/No) |
| Capability Portfolio Manager (concurs) |  | |  |  |
| Sponsoring MDAA (concurs) |  | |  |  |
| Office of Strategic Infrastructure (OSI) Assistant Administrator (approves) |  | |  |  |

Figure E-1 Capability Portfolio Management Waiver Template

Appendix F. Capability Operational Readiness Level (CORL)

**1.0 CAPABILITY OPERATIONAL READINESS LEVELS OVERVIEW**

**1.1 Introduction**

The Capability Operational Readiness Level (CORL) is a tool for describing the operational readiness of capability components consistently across capability portfolios. Operational readiness is defined in terms of ability and capacity to provide products and services to customers. This ability and capacity are based on the Asset/Facility Status and Personnel Status of the capability component:

1. Asset/Facility Status: The operational state of equipment and systems that comprise the capability component (e.g., active, inactive, mothballed) and current utilization (e.g., by a specific current program). Facility status and utilization categories are described in NPR 8800.15, Real Estate Management Program.
2. Personnel Status: The type of work assigned personnel are able to perform and their expertise and skill levels (e.g., perform test and operations; perform preventive and corrective maintenance).

There are seven capability operational readiness levels. A summary of the seven CORLs, including the Asset/Facility Status and Personnel Status associated with each level, is provided in Table F1-1. Detailed information for each CORL is provided in Tables F2-1 through F2-7.

**1.2 Potential Uses of CORL**

Mission Directorates, CP managers, and Centers may use the CORL to:

1. Provide information on resources required to sustain a specific CORL for capability components.
2. Provide information on resources required to transition a capability component from one CORL to another.
3. Perform trades to determine the resources that could be saved by transitioning a capability component to a lower CORL.
4. Effectively communicate to Agency management and stakeholders the implications of reduced budgets in terms of reduced CORLs for capability components.

**1.3 Capability Operational Readiness Level Summary**

Table F1-1 provides a summary of each CORL in terms of Facility Status and Personnel Status.

Table F1-1 Capability Operational Readiness Level Summary

|  |  |  |  |
| --- | --- | --- | --- |
| # | Capability Operational Readiness Level | Asset/Facility Status | Personnel Status |
| 1 | Production Maximum  or  Maximum Capacity (1) | Active | Multiple Shift Operation – Able to Meet Unique Requirements  or  Staffing to Meet Maximum Production for Capability (2) |
| 2 | Intermediate/Extended Production  or  Intermediate/Extended Capacity (1) | Two-Shift Operation  or  Staffing to Meet Intermediate Production Level (3) |
| 3 | Production Minimum  or  Minimal Capacity (1) | Single-Shift Operation – Able to Meet Typical Requirements  or  Staffing to Meet Minimum Production Capability |
| 4 | Standby – Core Test and Maintenance Crew Only | Inactive - Standby | Core Test and Maintenance Personnel Only |
| 5 | Standby – Core Maintenance Crew Only | Core Maintenance Personnel Only |
| 6 | Dormant or Mothballed | Inactive - Mothballed | No Dedicated Personnel – Keeping Track of Core Personnel |
| 7 | Dispositioned or Divested | Inactive - Abandoned | No Dedicated Personnel |
| Dispositioned |

(1) CORL names are synonymous

(2) May be less than 3-shift operation

(3) Approximate midpoint between CORL 1 and CORL 3

**2.0 CAPABILITY OPERATIONAL READINESS LEVEL DETAILED DEFINITIONS**

Tables F2-1 through F2-7 provide detailed information for CORLs 1 through 7, respectively.

Table F2-1 Capability Operational Readiness Level 1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | Capability Operational Readiness Level | | Asset/Facility Status | | Personnel Status | |
| 1 | Production Maximum  or  Maximum Capacity | Ability to… (one or more may apply):  - Provide preparation, testing, and operations at maximum capacity  - Provide multiple shift operations up to 3 shifts  - Utilize multiple test positions simultaneously at different stages of preparation and testing | Active | Utilization:  - For a specific current program, near-term program, or institutional requirement  - For reimbursable work as part of a Space Act Agreement  Maintenance:  - Fully maintained operational and safe; all preventive maintenance is performed  - Corrective maintenance is performed for safety  Storage:  - Equipment not prepared for long term storage | Multiple Shift Operation – Able to Meet Unique Requirements  or  Staffing to Meet Maximum Production for Capability | Sufficient personnel (e.g., test crew) are available to:  - Perform test and operations  - Prepare for tests or operation  - Perform preventive and corrective maintenance  - Support multiple shifts up to 3 shifts and/or multiple test positions OR support maximum production for capability  Training and Certification  - All assigned personnel are adequately trained and have acquired all required certifications |

Table F2-2 Capability Operational Readiness Level 2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | Capability Operational Readiness Level | | Asset/Facility Status | | Personnel Status | |
| 2 | Intermediate/Extended Production  or  Intermediate/Extended Capacity | Ability to… (one or more may apply)  - Provide preparation, testing, and operations  - Provide multiple shift operations up to 2 shifts  - Utilize multiple test positions simultaneously at different stages of preparation and testing | Active | Utilization  - For a specific current program, near-term program, or institutional requirement  - For reimbursable work as part of a Space Act Agreement  Maintenance  - Fully maintained operational and safe; all preventive maintenance is performed  - Corrective maintenance is performed for safety  Storage  - Equipment not prepared for long term storage | Two-Shift Operation  or  Staffing to Meet Intermediate Production Level (3) | Sufficient personnel are available to:  - Perform test and operations  - Prepare for tests or operation  - Perform preventive and corrective maintenance  - support multiple shifts up to 2 shifts and/or multiple test positions OR support intermediate production level for capability  Training and Certification  - All assigned personnel are adequately trained and have acquired all required certifications |

Table F2-3 Capability Operational Readiness Level 3

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | Capability Operational Readiness Level | | Asset/Facility Status | | Personnel Status | |
| 3 | Production Minimum  or  Minimal Capacity | Ability to… (one or more may apply)  - Provide preparation, testing, and operations using minimally required resources  - Provide 1 shift operation only with routine hardware/configuration  - Utilize only one test position when it is possible to simultaneously use several (possibly at different stages of preparation and testing) | Active | Utilization  - For a specific current program, near-term program, or institutional requirement  - For reimbursable work as part of a Space Act Agreement  Maintenance  - Fully maintained operational and safe; all preventive maintenance is performed  - Corrective maintenance is performed for safety  Storage  - Equipment not prepared for long term storage | Single Shift Operation – Able to Meet Typical Requirements  or  Staffing to Meet Minimum Production Capability | Sufficient personnel are available to:  - Perform minimal test and operations  - Prepare for typical/routine tests or operations  - Perform preventive and corrective maintenance  - Ability to augment staff and train them to achieve higher capacity readiness status (e.g., achieves CORL 1 or CORL 2)  - Support a single shift and/or single test position OR support minimum production for capability  Training and Certification  - All assigned personnel are adequately trained and have acquired all required certifications |

Table F2-4 Capability Operational Readiness Level 4

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | Capability Operational Readiness Level | | Asset/Facility Status | | Personnel Status | |
| 4 | Standby – Core Test and Maintenance Crew Only | Personnel are able to…  - Perform preventive and corrective maintenance (personnel may be assigned to maintain multiple assets/facilities)  - Augment and train additional personnel to achieve sufficient staff for operations and testing (CORL 3 minimum)  Personnel are NOT able to…  - Provide preparation, testing, and operations due to insufficient staff  - Some assigned personnel who have "core" knowledge and expertise to operate have primary duty to perform preventive and corrective maintenance | Inactive - Standby | Utilization  - Temporarily not in use  - Will potentially be used to meet specific near-term or future program and/or institutional requirements and must be maintained  Maintenance  - Minimal preventive maintenance performed to maintain availability for testing and/or operations  - Program approved preventive maintenance measures taken to maintain vital or essential operating system in a state of availability for future use  - Minimal corrective maintenance is performed for safety  Storage  - Equipment not prepared for long term storage | Core Test and Maintenance Personnel Only | Minimal “core” personnel are available to:  - Perform required approved preventive and corrective maintenance  - Maintain sufficient knowledge and experience to fully maintain and operate - additional staff is required to achieve single-shift operation (CORL 3) or greater capacity (CORL 1 & CORL 2)  - Augment and train staff to achieve single-shift testing and operations (CORL 3) or greater capacity (CORL 1 & CORL 2)  - Maintain and utilize equipment to ensure continued operability and timely return to “Active” status (i.e., CORL 1, CORL 2, & CORL 3) |

Table F2-5 Capability Operational Readiness Level 5

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | Capability Operational Readiness Level | | Asset/Facility Status | | Personnel Status | |
| 5 | Standby – Core Maintenance Crew Only | Personnel are able to…  - Perform preventive and corrective maintenance (personnel may be assigned to maintain multiple assets/facilities)  Personnel are NOT able to…  - Provide preparation, testing, and operations due to insufficient staff  - Train additional personnel needed for higher CORLs since they do not collectively possess the "core" knowledge needed for operations and testing  - Primary duties of personnel who have "core" knowledge and expertise for operations and testing are to perform preventive and corrective maintenance  - Remaining staff may not collectively possess the right mix of "core" knowledge and expertise needed for operations and testing | Inactive - Standby | Utilization  - Temporarily not in use  - Will potentially be used to meet specific near-term or future program and/or institutional requirements and must be maintained  Maintenance  - Minimal preventive maintenance performed to maintain availability for testing and/or operations  - Program approved preventive maintenance measures taken to maintain vital or essential operating system in a state of availability for future use  - Minimal corrective maintenance is performed for safety  Storage  - Equipment not prepared for long term storage | Core Maintenance Personnel Only | Minimal “core” personnel available to:  - Perform approved preventive and corrective maintenance  - Maintain and utilize equipment to ensure continued operability and timely return to “Active” status (i.e., CORL 1, CORL 2, & CORL 3) |

Table F2-6 Capability Operational Readiness Level 6

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | Capability Operational Readiness Level | | Asset/Facility Status | | Personnel Status | |
| 6 | Dormant or Mothballed | - Asset/facility deactivated, personnel reassigned  - No near-term program requirements  - Future requirements identified and/or capability retained to mitigate national and Agency-level risks | Inactive – Mothballed | Utilization  - Deactivated  - No near-term program requirements  - Future requirements are identified and/or the asset/facility is being maintained to mitigate national and Agency-level risks  Maintenance  - Appropriate, program-approved, preventive maintenance measures are taken to prevent deterioration of vital or essential systems or placed in protective storage  - Minimal corrective maintenance is performed for safety only  - Other corrective maintenance is performed with Center approval  Storage  - Utility systems and collateral equipment are shut down and properly prepared for long term inactivity to prevent significant deterioration  - Selected systems (e.g., cathodic protection systems) are kept in operation and inspected  - Appropriate interior environmental controls are operating to prevent significant deterioration  - Exterior envelope is inspected on a planned basis and work performed as needed to maintain the integrity of exterior shell (a.k.a., building envelop)  - Based on consultation with Center Environmental staff, hazardous materials have been identified and removed where appropriate | No Dedicated Personnel – Keeping Track of Core Personnel | No Dedicated Personnel  - All personnel (e.g., core personnel) are reassigned  - Personnel are available only on a part-time basis for preventive and corrective maintenance  - When possible, Center management keeps track of core personnel to reconstitute capability when and if needed |

Table F2-7 Capability Operational Readiness Level 7

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | Capability Operational Readiness Level | | Asset/Facility Status | | Personnel Status | |
| 7 | Disposi-tioned or Divested | - Deactivated, personnel are reassigned  - No near-term and future program requirements | Inactive – Abandoned | Utilization  - Deactivated  - No plans for future reactivation  - No near-term and future program requirements  General  - Asset/facility systems and collateral equipment is considered for excess and/or identified for use at other NASA locations  - Abandoned is an interim, temporary state used when it is not possible (e.g., resources not available, asset/facility is integrated into a larger complex) or advantageous to ‘disposition’ the asset/facility using one of the following methods - public benefit conveyance, federal transfer, sale, lease termination, lease expiration, and demolition  Maintenance  - The asset/facility is in the condition in which it has been “walked away from”  - Preventive and corrective maintenance has ceased for all asset/facility systems, subsystems, equipment, components, etc. (except in the case of safety)  Storage  - All utilities are secured and disconnected at the first service equipment location outside facility  - The asset/facility is secured to prevent pilfering of economically salvageable materials  - Based on consultation with Center Environmental staff, hazardous materials have been identified and removed where appropriate | No Dedicated Personnel | No Dedicated Personnel  - All personnel (e.g., core personnel) are reassigned  - Personnel are available only on a task-order basis for preventive and corrective maintenance (for safety only) |
| Disposi- tioned |

Appendix G. Level of Service Strategy

A service level, or Level of Service (LoS), typically tells a customer what to expect from a service provider in response to requirements. In the context of CPM, the LoS term tells the Agency what to expect from a capability portfolio in support of the Agency’s strategy.

The needs of the Agency differ for each capability portfolio resulting in different LoS strategies and associated funding models. In all cases, the goal of the LoS strategy for a capability portfolio is to ensure the sustainment of a core technical capability for current and future missions. Some capability portfolios have strategic objectives that require higher LoS and in some cases, a capability portfolio may have multiple service levels to address specific CP strategies within the existing situational environment.

It is important to note that all funding models are limited and do not allow for significant capability investments. For example, capability portfolios have to rely on Mission Directorate and Construction of Facilities (CoF) funding for large investments. And the Partial Operations and Demand Responsive funding models depend on customer revenue, which provides a risk to the Center and the capability portfolio for funding gaps.

Table G-1 below shows some example linkages between LoS and funding models. It is not inclusive of all CP LoS/funding model scenarios.

Table G-1. Level of Service Strategy Related to Funding Model

| **Level of Service Strategy** | **Funding Model** |
| --- | --- |
| **Core Technical** – defined by analytical assessment of demand and requires CORL transitions to align with demand fluctuations. An example of this is the Rocket Propulsion Test (RPT) capability portfolio. | **Critical Core** – A critical minimum capacity across multiple components is set and funded by the CP manager. Agency customers pay for test article integration and operations. Reimbursable customer charges are defined by methodology developed by the capability portfolio and the Center. |
| **Full Operations** – defined by a set, planned capacity for individual component facilities. Examples of this are the Aero-sciences Evaluation and Test and High-End Computing capability portfolios. | **Full Operations** - Funding is provided by the CP manager for a defined “full operational” capacity. In this model, funding is not directly linked to customer demand. Agency customers pay for unique requirements or consumables as defined by the CP manager. This funding level may also include resourcing for maintenance, capability advancement, and technology refresh as well as resourcing for a level of new test technology development and adaptation. The extent of inclusion of these items in the funding model will be defined in the CPCA. Reimbursable customer charges are defined using methodology developed by the capability portfolio and the Center. |
| **Partial Operations** - defined by a level of operational offset above the minimum core but less than planned capacity. Examples of this are funded assets within the Shared Capability Asset Program (SCAP) capability portfolio. | **Partial Operations –** Funding is provided by the CP manager at a level that provides a partial operational capacity. In this model, funding is not directly linked to customer demand. Agency customers pay for unique requirements or consumables as defined by the CP manager. Reimbursable customer charges are defined using methodology developed by the capability portfolio and the Center. As this funding model is partially dependent on customer funding, it does carry a level of risk to the Center and the capability portfolio in its ability to address funding gaps. |
| **Demand Responsive** – defined by an assessment of direct demand and greatly influenced by Center strategy. Agency strategy is influenced by Center control of capability access and recommendations on strategic investments and divestments. Examples of this are non-funded SCAP capability portfolio components and components in the Space Environments Testing Management Office capability portfolio. | **Demand Responsive** – Funding is provided by some combination of Mission Directorate or Institutional funding outside of the portfolio and is typically defined within a Task Agreement between the customer and the Center where the service is provided. Reimbursable customer charges are defined by capability portfolio charging schemes. As this funding model is wholly dependent on customer funding, it does carry a level of risk to the Center and the capability portfolio in its ability to address funding gaps. |

Appendix H. Requirement Reference Table

The following table is provided as a reference to each of the requirements in this NPR and provides the owner of that requirement. This table is for information and not intended to be a formal compliance matrix.

| **Section** | **Requirement** | **Source** | **Owner** |
| --- | --- | --- | --- |
| 2.3.2.4 | Centers **shall** evaluate all work related to the capability within the capability portfolio that operates at that Center. The evaluation may be provided by a Center Management Council (CMC). The designated Center evaluator or CMC provides its findings and recommendations to the CP manager in support of the evaluation of the portfolio by the MSC. |  |  |
| 2.4.2.1 | CP reviews are essential elements of managing and evaluating the performance of Agency capabilities. CP managers **shall** identify the reviews appropriate for each capability portfolio in coordination with the sponsoring MDAA and the CP Decision Authority to ensure the continued relevance (alignment with Agency vision and mission), performance, effectiveness, and affordability of the capability portfolio. |  |  |
| 3.1.1.2 | The MSC **shall** appoint the sponsoring MDAA for the capability portfolio. The MDAA may allocate discretionary funds or utilize funding specifically designated by the Office of the Administrator to conduct activities associated with establishing a capability portfolio. These funds may be allocated by the MDAA to specific Centers, managed internally, or used to fund external studies associated with a potential capability portfolio. |  |  |
| 3.1.2.1 | The MDAA or their delegated representative **shall** assign a CP manager to manage the effort to establish the capability portfolio (i.e., initiate scoping and definition and initial planning). |  |  |
| 3.1.2.3 | The MDAA or their delegated representative **shall** provide to the CP manager, in writing, the purpose, capability domain, and constraints of the capability portfolio. This may be in the form of a one-page document signed by the MDAA, budget guidance, or MSC decision memorandum as appropriate for the type, size, and complexity of the capability portfolio. |  |  |
| 3.1.4.2 | The sponsoring MDAA or designee **shall** develop a CPCA. The CPCA documents the results of the Establishment activities and includes the portfolio goals and objectives, the products and services to be provided, the scope and definition of the portfolio, the approach for achieving the goals and objectives, performance metrics for evaluating portfolio performance, the portfolio authorities and governance and organizational structure, portfolio costs and approach for securing funding, the sourcing strategy, high risk areas, internal and external dependencies, and planned reviews. |  |  |
| 3.1.4.4 | The CP manager **shall** update the CPCA every five (5) years. Updates may occur more frequently if there are significant changes as defined in the CPCA (see Section 3.1.3.3) and as determined by the CP manager or MDAA. The updated CPCA is reviewed and approved using the same process as the original. |  |  |
| 3.1.5.1 | The Decision Authority **shall** conduct a decisional review to determine approval for a capability portfolio to transition to Strategic Management. The decisional review is held at the MSC. If Establishment planning is not sufficient to approve the transition, the Decision Authority may direct the CP manager to continue the Establishment effort or to modify the Establishment plans based on identified weaknesses. If the Decision Authority determines that concepts for the potential capability portfolio do not meet minimum requirements, a decision to discontinue the Establishment effort may be made. If the Establishment planning is sufficient, the Decision Authority authorizes the capability portfolio to transition to Strategic Management. |  |  |
| 3.2.2.2 | The CP manager **shall** develop a CPMP. The CPMP documents the results of the Strategic Management activities and includes goals, objectives and metrics; customers, beneficiaries, and stakeholders; the authority, governance, and management structure; the capability portfolio products and services, scope and definition, schedule, and resources; the approach for aligning capabilities with demand; internal and external relationships; the strategy for securing adequate funds and the funding model; the sourcing strategy; the scheme for classification and decomposition of the portfolio; the Capability Portfolio Master Plan; plans for data management and risk management; and planned reviews. Once approved, the capability portfolio and its capability components are operated as described in the CPMP. |  |  |
| 3.2.2.4 | The CP manager **shall** update the CPMP every five (5) years. Updates may occur more frequently if there are significant changes as defined in the CPCA and determined by the CP manager and sponsoring MDAA. Note that it is common to change portfolio content (i.e., add and subtract capability components) due to necessary CP changes as it adapts and realigns in response to Agency needs and requirements. The updated CPMP is reviewed and approved using the same process as the original. |  |  |
| 3.2.3.1a | The Decision Authority as shown in Table 2.3-1 **shall** conduct a decisional review when significant changes occur to a capability portfolio. Significant is defined in the CPCA and can include changes in the composition, management, or funding of the capability portfolio. The decisional review is held at the MSC. |  |  |
| 3.2.3.1b | If a need arises to terminate a capability portfolio, the Decision Authority as shown in Table 2.3-1 **shall** conduct a decisional review to terminate the capability portfolio. The decisional review is held at the MSC. |  |  |
| 3.2.3.2a | The CP manager **shall** conduct or support CP reviews as essential elements of strategically managing and evaluating a capability portfolio. These reviews may include internal reviews conducted by the CP manager, sponsoring Mission Directorate reviews, advisory board reviews, stakeholder reviews, and/or external reviews independently performed by outside organizations. |  |  |
| 3.3.1 | The CP manager **shall** conduct Termination activities when approved by the Decision Authority. These include closing out all activities associated with the capability portfolio. The portfolio management structure is dissolved, the capability components are decoupled strategically, and portfolio assets and capability components are dispositioned in accordance with the termination strategy. |  |  |
| 5.1.1 | MDAAs, the OSI Assistant Administrator, and CP managers **shall** ensure Dissenting Opinions are elevated through the Dissenting Opinion process described in this section in accordance with the following principles. All participants within a capability portfolio will 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. |  |  |
| 5.2.2 | The person requesting a waiver to an NPR 8600.2 requirement **shall** document the request including the rationale, a risk evaluation, and reference to all material that provide the justification for acceptance; obtain concurrence from the CP manager and the sponsoring MDAA; provide an information copy to the Office of the Chief Engineer and MDAAs with responsibility for technical capability leadership; and submit the request to the OSI Assistant Administrator for approval. Appendix Eprovides a template for a waiver request. |  |  |

Appendix I. References

NASA Mission Directorates and Centers are required to comply with all applicable Agency directives, not limited to those listed in this appendix. The documents listed in this appendix are provided as a guide to help determine the requirements for CPM that are imposed outside this document. Applicable directives not cited in this document should be identified in Center processes and practices.

Similarly, not all related references or other resources for CPM are identified.

**I.1 Statutes and Regulations**

1. The National Aeronautics and Space Act, as amended, 51 U.S.C. § 20113(a)

**I.2 NASA Policy Documents**

1. NPD 1000.5, Policy for NASA Acquisition
2. NPD 1200.1, NASA Internal Control

**I.4 NASA Handbooks**

a. NASA/SP-2014-3705, NASA Space Flight Program and Project Management Handbook.