



**Department of Transportation
Office of the Chief Information Officer**

**Integrated Program Planning and
Management (IPPM) Practitioner's Guide**

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Revision History

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1.0	First release of IPPM Practitioner's Guide	IPPM Team	05/17/2010
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Document Owner

This document is owned and maintained by the Office of Secretary of Transportation (OST). For questions, please contact Walter McDonald at (202) 366-6067 or at walter.mcdonald@dot.gov.

Online Source Information

All IPPM related materials, including the guides, templates, and summary framework can be found on the OST Office of the Chief Information Officer (OCIO) SharePoint website.

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Section 1. Introduction

Purpose

The Department of Transportation's (DOT) Integrated Program Planning and Management (IPPM) Practitioners Guide identifies the processes and activities necessary to ensure that investments in information technology (IT) programs and projects are properly planned and managed throughout their lifecycle. It leverages principles and best practices in the areas of Acquisition program management, Enterprise Architecture, Capital Planning and Investment Control, Records Management, and Security Management to provide an integrated approach to the procurement and oversight of information resources.

The artifact templates for the aforementioned areas can be found as links throughout the document and are also available on the DOT IPPM SharePoint site (which is linked here). The utilization of the artifacts and templates will ensure the appropriate stakeholder engagement throughout a program's lifecycle. The Practitioner's Guide aids in ensuring appropriate planning prior to making a decision to invest or continuing to invest in IT resources. It also ensures the proper focus is placed on performance, cost effectiveness, security, privacy, and architectural alignment to execute the procurement and management oversight of investments. Additionally this guide provides additional information and instruction on how to progress through each of the IPPM phases, e.g. inputs and outputs required.

Scope of Applicability

This guidance applies to all DOT Secretarial Offices and Operating Administrations¹ for the procurement and management of all IT resources. This guidance is intended to complement policies and instructions provided for the planning, budgeting, procurement, and lifecycle management of IT resources, e.g., the Transportation Acquisition Regulation, Transportation Acquisition Manual, and the Acquisition Management System, the Integrated Program Planning and Management (IPPM) Practitioner's Guide,² and federal mandates such as the Federal Information Security Management Act of 2002 (FISMA).

Legislative Authority

The IPPM is based on ensuring compliance with the goals and objectives outlined in the Clinger-Cohen Act of 1996. The primary purpose of this law was to streamline IT acquisitions and to emphasize lifecycle management as a capital investment. The policy includes:

- The improvement of the management of agency's Information Systems (IS), including the acquisition of IT, by implementing the relevant provisions of the Paperwork Reduction Act of 1995, and the Government Performance and Results Act of 1993.
- Refocus IT management to support directly their strategic missions, implementing an investment review process that drives budget formulation and execution for IS.

¹ All recommendations and requirements contained in this guidance are applicable to all Components but only to the extent that such requirements and recommendations are consistent with the expressed language contained in 49 U.S.C 106, 40110, 40121

- Establish clear accountability for information resources management activities by creating agency Chief Information Officers (CIOs) with the visibility and management responsibilities necessary to advise the agency head on design, development, and implementation of those systems.
- Cooperate in the use of IT to improve the productivity of Federal programs.
- Improve the management and use of IT within and among agencies.

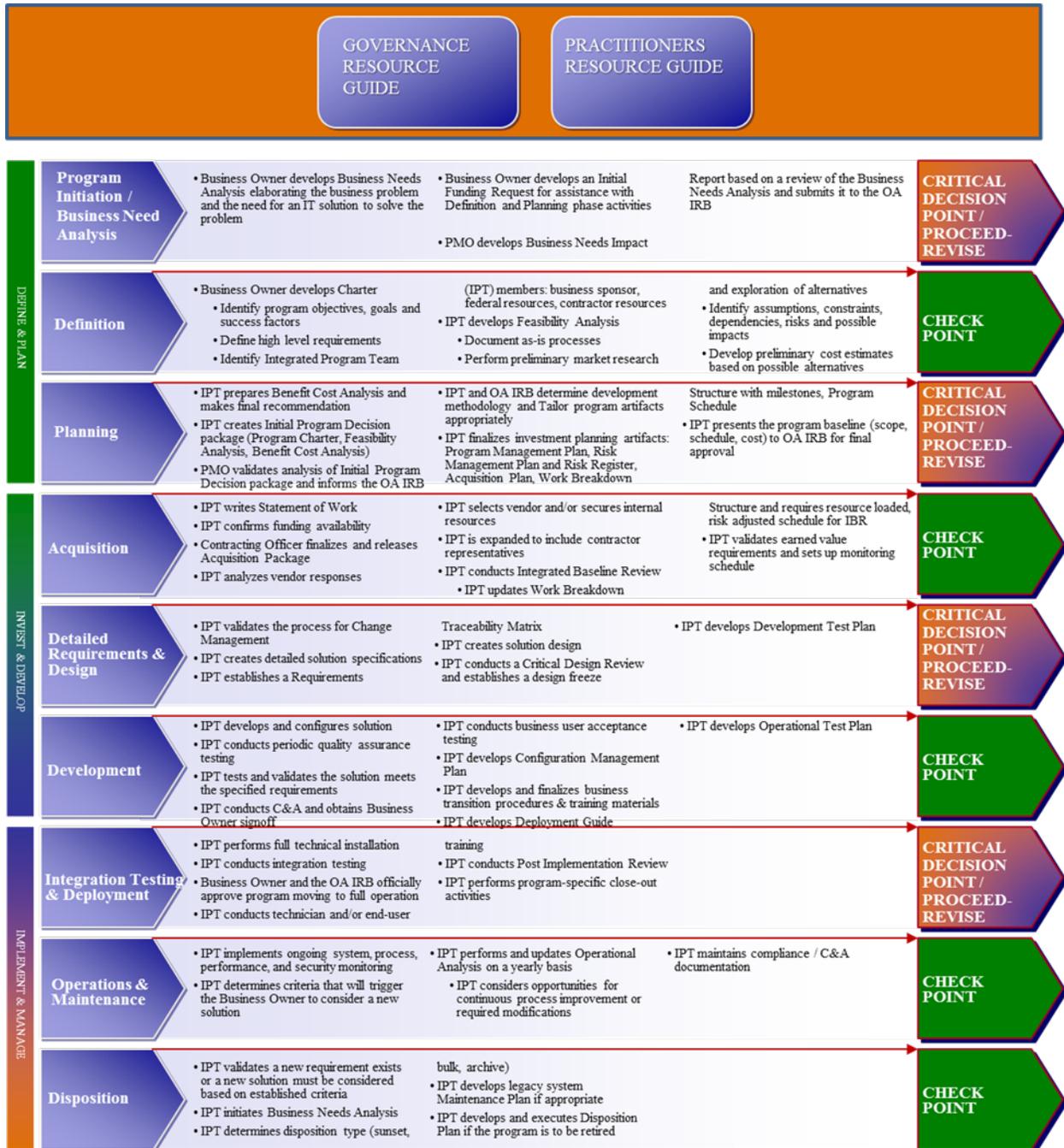
How to Use This Guide

The IPPM Practitioners Guide provides IPT members and Business Owners with an understanding of the processes to successfully plan and manage an IT investment or program throughout its lifecycle. Explanations in this guide refer to the program artifact templates, which provide specific instructions and details of the processes and in some cases have examples of the minimum expected content. These artifact templates can be found as links indicated by the artifact's name throughout the guide. They can also all be found on the DOT Office of the Chief Information Officer (OCIO) intranet website.

The DOT OCIO recognizes that the OAs may have different definitions for the terms "investment", "program", and "project" than how they are defined and used in this guide. In general, however, the IPPM framework and guidance is intended to be applied to all IT throughout the department. IPPM defines these terms in Appendix A. The OAs can therefore map their IT efforts to the IPPM framework however best suits the OA depending on how they organize their IT portfolio.

Section 2. IPPM Framework Overview

IPPM Framework- At a Glance



IPPM Phase Objectives

Based on the IPPM processes laid out in the framework, the high-level objectives for each phase are provided below:

Phase 1: Program Initiation/Business Need Analysis - The Business Owner identifies a business need or performance gap and justifies the use of IT as the solution. The Business Owner may also secure funding for additional definition and planning activities.

Phase 2: Definition -The Business Owner begins to identify program objectives, solution goals and critical success factors. They develop the Charter and explore alternatives based on preliminary market research and conduct a detailed Feasibility Analysis.

Phase 3: Planning - The IPT prepares all final recommendation documentation and completes detailed planning activities.

Phase 4: Acquisition - The Business Owner secures products and services to accomplish the Program requirements.

Phase 5: Detailed Requirements & Design - The IPT finalizes the specification of business requirements and the technical design conforming to those requirements. The resulting design provides both the functional and technical component details on what the system is going to perform and how it is going to accomplish the task(s).

Phase 6: Development - The Business Owner and the IPT oversees and monitors the effective construction and/or configuration of the solution. The outcome of this phase is a technical solution that fulfills the identified business need and closes or substantially reduces the performance gaps.

Phase 7: Integration Testing & Deployment - The IPT and the Business Owner carry out the effective transition of the solution into the operational environment.

Phase 8: Operations & Maintenance - The IPT and the Business Owner maintain the solution and ensure it continues to deliver value.

Phase 9: Disposition - The Business Owner or stakeholders determine if the solution no longer has business value or technical relevance, or no longer meets the original requirements. The outcome of this analysis is the consideration of a new technical solution, and retirement of the legacy system.

Section 3. IPPM Framework Phases

Phase 1: Program Initiation/Business Need Analysis



Objectives

- In this phase, the Business Owner identifies a business need or performance gap and justifies the use of IT as the solution. The Business Owner may also secure funding for additional definition and planning activities.

Inputs

- Identify the business need and/or performance gap

Processes / Tools / Techniques

- Business Owner develops Business Needs Analysis elaborating the business problem and the need for an IT solution to solve the problem
- Business Owner develops an Initial Funding Request for assistance with Definition and Planning phase activities
- PMO develops Business Needs Impact Report based on a review of the Business Needs Analysis and submits it to the OA IRB

Outputs

- Business Needs Analysis
- Initial Funding Request
- Business Needs Impact Report

Critical Decision Point – Proceed / Revise

- OA IRB approves the Business Needs Analysis and Initial Funding Request or they have the Business Owners revise the Business Needs Analysis prior to moving into the Definition Phase.

Phase 1: Program Initiation/Business Need Analysis

Objectives

- In this phase, the Business Owner identifies a business need or performance gap and justifies the use of IT as the solution. The Business Owner may also secure funding for additional definition and planning activities.

Inputs

The key input activity to begin this phase is:

- Identify the business need or performance gap

Additional inputs that may be used for reference and/or informative purposes are:

- Business Need/Performance Gap Supporting Documentation (includes past performance data, emails, newspaper accounts, impending legislation, preliminary market research reports, etc.)
- The Enterprise Architecture, which may include similar existing capabilities in other segments or already identify the capability gap.

Processes/Tools/Techniques

- **Business Owner develops Business Needs Analysis elaborating the business problem and the need for an IT solution to solve the problem.**

The Business Owner uses the Business Needs Analysis (section two of the template) to define the business problem or performance gap, describe the current environment in which this problem exists, justify the need for an IT solution, and develop possible costs and timeframes for a potential solution. The Business Owner and identified stakeholders will base all future work related to this effort on this foundation. The template contains specific guidance for what is required in each section to successfully complete and support the analysis.

- **Business Owner develops Enterprise Architecture (EA) artifacts, in consult with the EA Program Office (EA PO), either update the existing identified capabilities and their artifacts or develop new artifacts for the Target Architecture.**

The Business Owner reviews the existing EA artifacts related to their identified business problem or performance gap, to check for alignment with the DOT Enterprise Architecture and if the capability exists within another Business Owner's organization or whether the capability is already identified as part of the EA target architecture. If the EA includes existing related artifacts the Business Owner will either reference the existing EA documentation or recommend update to the EA Program Office, as appropriate. The EA Enterprise Architect reviews the Business Needs Analysis and ensures alignment with the DOT Enterprise Architecture. Any proposed changes or modifications must be approved by the appropriate enterprise architecture governance board (EAB) prior to submission to the DOT IRB.

The key portions of the Business Needs Analysis include:

- Defining the business needs and performance gaps
- Describing the background information supporting the proposal
- Conducting a “current state” assessment
- Identifying the high level benefits to pursuing an IT solution to the problem
- Listing the key stakeholders
- Summarizing rough cost estimates of a hypothetical solution
- Summarizing timeframe estimates of a hypothetical solution
- Providing a compelling justification for the investment

- **Business Owner develops an Initial Funding Request for assistance with Definition and Planning phase activities.**

If the Business Owner needs assistance with the research, analysis, and documentation efforts in the proposed program’s definition and planning phases, an Initial Funding Request (section three of the template) must be completed to secure the funding for additional services. The request, if approved, provides the Business Owner with seed money to establish a program team, identify and analyze alternative solutions, and plan for a selected solution’s lifecycle. These activities are described in detail in the Definition and Planning phases of the IPPM framework.

- **OA Program Management Office (OA PMO) develops Business Needs Impact Report based on a review of the Business Needs Analysis and submits it to the OA Investment Review Board (IRB).**

The Business Owner engages the Enterprise Architecture Program Office to ensure that the needed capability does not already exist or is not already planned within the OA or DOT. The Business Owner will provide the EA PO the Concept Overview Diagram (draft is acceptable in this phase). Both parties will then review the concept against the EA target and transition plan to develop any needed EA artifacts. The Business Owner then develops their Business Needs Analysis and Initial Funding Request (if necessary) and forwards the documentation to the OA PMO.

The OA PMO then conducts a review of the Business Needs Analysis (the Initial Funding Request will be forwarded on to the OA IRB; the OA PMO does not need to assess the request) and develops a Business Needs Impact Report. The report documents the OA PMO’s assessment of the architectural fit of the IT need in the DOT IT portfolio. It also lists the known impacts that investing in this proposal will have on other IT investments or departmental processes, and provides initial considerations for the Business Owner if this proposal is pursued. These considerations might include additional risks, possible alternatives, and recommended communication links. The OA PMO also assesses the strength of the justification provided. The OA PMO’s findings and recommendations are sent to the OA IRB to inform the OA IRB’s assessment and final proposal decision. Any information directed to the Business Owner may be sent to them at the discretion of the OA PMO and OA IRB.

Outputs

The key outputs to this phase are:

- Business Needs Analysis
- Initial Funding Request, if required
- Business Needs Impact Report

Critical Decision Point – Proceed/Revise

- **OA IRB approves the Business Needs Analysis and Initial Funding Request or they have the Business Owner revise the Business Needs Analysis prior to moving into the Definition Phase.**

This is a critical decision point. If the OA IRB determines that additional analysis needs to be performed and/or specific considerations need to be addressed, it will document its decision and make a request to the Business Owner. The OA IRB may reject the proposal based on OA priorities or external constraints (congress or department priorities, budget constraints, etc.). If the OA IRB approves the proposed investment, the Business Owner may continue to the Definition Phase of the IPPM framework.

Phase 2: Definition



Objectives

- In this phase, the Business Owner begins to identify program objectives, solution goals and critical success factors. They develop the Charter, explore alternatives based on preliminary market research and conduct a detailed Feasibility Analysis .

Inputs

- Business Needs Analysis
- Initial Funding Request
- Business Needs Impact Report

Processes / Tools / Techniques

- Business Owner develops Charter
 - Identify program objectives, goals and success factors
 - Define high level requirements
 - Identify Integrated Program Team (IPT) members: business sponsor, federal resources, contractor resources
- IPT develops Feasibility Analysis
 - Document as-is processes
 - Perform preliminary market research and exploration of alternatives
 - Identify assumptions, constraints, dependencies, risks and possible impacts
 - Develop preliminary cost estimates based on possible alternatives

Outputs

- Charter
- Concept Overview Diagram
- Concept of Operations
- Feasibility Analysis

Control Gate

- Business Owner approves and signs off on Charter and Feasibility Analysis prior to the IPT beginning the Planning Phase.

Phase 2: Definition

Objectives

- In this phase, the Business Owner begins to identify program objectives, solution goals and critical success factors. They develop the Charter, explore alternatives based on preliminary market research and conduct a detailed Feasibility Analysis.

Inputs

The key inputs to begin this phase are the outputs from the Project Initiation/Business Needs Analysis phase:

- Business Needs Analysis
- Initial Funding Request with appropriate approval signatures
- Business Needs Impact Report

Processes / Tools / Techniques

- **Business Owner develops Charter**
 - Identify program objectives, goals and success factors
 - Define high level program/project requirements
 - Identify Integrated Program Team (IPT) members; business sponsor, federal resources, contractor resources

The Business Owner develops the Charter to expand on the information provided in the proposed investment's Business Needs Analysis. The Charter lays out the initial high level foundation of the program. This can be modified and updated as additional analyses are completed and program decisions are finalized.

The Charter introduces the DOT and/or OA strategic goals to which the proposed investment aligns. It also decomposes the high level strategies into detailed objectives or expected performance outcomes.

The Business Owner also establishes high-level requirements in the Charter. Requirements may be organized into functional and performance categories. The functional category could include the functions and processes the program must be able to execute. The performance category could include the performance levels of program function execution, program availability, program capacity, and program failure contingencies. The Business Owner may also provide a technical category, which could include the specific hardware, software, coding, and data requirements of the program.

In addition, critical success factors are developed in the Charter. While meeting all requirements and expected benefits are important for any program, the Business Owner should examine factors that are specifically critical to the program throughout its lifecycle. These can include areas such as securing specific executive buy-in, establishing communication with another agency or OA, or meeting particular deadlines.

Finally, the Charter documents the human capital resources that will be part of the solution planning, development, implementation, and operation. At a minimum, this organizational structure should include the OA IRB, the proposed membership of the IPT (consisting of both federal and contractor resources if they have been identified individually, or position/group descriptions if they have not been specifically identified), and members of any working groups within the OA that will be working on components of the program. Additionally, the [Charter](#) establishes responsibilities for each of these resource components, and includes an assessment of the resources the organization needs to secure. Assigning responsibility early in the investment's maturity provides all assigned and incoming team members a clear understanding of the role they play in the progress of the investment.

- **IPT develops Concept Overview Diagram**
 - Depict the main operational concepts and unique operations aspects
 - Include the interactions between the envisioned solution and its operating environment, including external systems and users/stakeholders

A concept overview diagram (S-1, FEA Framework Artifacts can be found at OMB by logging in with your MAX username and password) describes a mission or scenario. It shows the main operational concepts and interesting or unique operational environment aspects. It describes the interactions between the subject architecture and its environment, and between the architecture and external systems. Text is to accompany the diagram as graphics alone are not sufficient for capturing the necessary architectural data.

The Concept Overview Diagram identifies the stakeholders and operations involved to orient and focus detailed discussions. Its aids human communication, and it is intended for presentation to high-level decision-makers. It provides a quick, high-level description of what the architecture is supposed to do, and how it is supposed to do it.. The intended usage of the Concept Overview Diagram includes:

- Putting an operational situation or scenario into context.
- Providing a tool for discussion and presentation; for example, aids industry engagement in acquisition.
- Providing an aggregate illustration of the details within the published high-level organization of more detailed information in published architectures.

The content of the Concept Overview Diagram depends on the scope and intent of the Architectural Description, but in general it describes the business activities or missions, high-level operations, organizations, and geographical distribution of assets. The model frames the operational concept (what happens, who does what, in what order, to accomplish what goal) and highlights interactions to the environment and other external systems. However, the content is at an executive summary-level as other models allow for more detailed definition of interactions and sequencing.

- **IPT develops Concept of Operations (ConOps) document**
 - Develop an overview of the Concept of Operations for the planned solution

- Follow the ConOps template, Appendix D

The ConOps document describes how the system, that provides the needed capabilities, will be used. It is presented from various stakeholder and end-user viewpoints. The ConOps is intended to transform the sometimes vague needs that motivated the project into more specific clearly stated operational requirements. There are a variety of goals for developing a Concept of Operations including the following:

- Define the high-level system concept
- Describe the current and target environment
- Identify how the proposed solution will operate
- Define the major interfaces
- Identify any needed changes to the environment, including procedures
- Derive high-level requirements, especially user requirements
- Provide the criteria to be used for verifying the proposed solution's operational suitability
- Identify stakeholder responsibilities
- Obtain stakeholder agreement of the above stated goals
- Describe the services and capabilities

The IPT is to follow this template in developing the document. The template includes guidance for tailoring of the document to suit the magnitude of the program/project.

- **IPT develops Feasibility Analysis**
 - Document as-is processes
 - Perform a preliminary market research and exploration of alternatives
 - Identify assumptions, constraints, dependencies, risks and possible impacts
 - Develop preliminary cost estimates based on possible alternatives

The IPT develops the Feasibility Analysis to define and document the “as-is” environment and business processes, as well as identify, assess, and recommend possible investment alternatives.

Documenting the program's current environment ensures all internal components are appropriately mapped and understood by the IPT. For example, an internal component might be a legacy system or a particular group of stakeholders. External influences on the potential program should also be considered. Assessing the interactions and dependencies of these components will show if the current business processes are organized and operating in the most efficient and effective manner. If they are not, a business process reengineering effort may be in order. It might be better to change the business processes and then apply IT to fit the processes, or first implement IT and allow the processes to be established around it. The IPT should conduct a thorough examination to help distinguish the best course of action. Requirements may change after any business process reengineering efforts are completed.

The IPT should then conduct preliminary market research to see what alternative solutions exist. Research can take on many forms from discussions with subject matter experts, to online searches, to site visits with vendors and businesses. By conducting market research, the IPT obtains information on what alternatives exist, and will get ideas for which are not feasible or

viable for the problem at hand. This should result in several investment options to analyze further. The range of alternatives should be kept manageable and avoid similar but slightly different alternatives. The IPT should select alternatives that demonstrate significant differences in cost, schedule, risk and performance so that a meaningful trade space can be provided to the decision maker.

The Feasibility Analysis details the assumptions the IPT is making as it conducts the analysis of each alternative. The IPT lists the constraints being imposed on each of the alternatives, and includes specific risks when performing the analysis.

The core of the Feasibility Analysis is an assessment of the potential improvements, benefits, time and resource costs, and impacts of an alternative. The impacts can include both positive and negative features/influences of an alternative on program areas such as security, organization, facilities, operation, and hardware/software. The research costs for each of the identified alternatives can be based on rough order of magnitude (ROM) estimating principles; however, the IPT should conduct the same level of cost estimation for all alternatives with reasonable and logical supporting calculations and data. Additionally, more detailed estimates will be made during the Benefit Cost Analysis, which is conducted in the next phase of the IPPM framework. The key element is for the IPT to establish these approximations independently of contractor participation or input (specifically, contractors who may later bid for the work). As the potential program matures, the OA IRB will verify that the program estimates, and any budget requests that accompany them, were derived from independent analysis, not based on a supply-side contractors' estimates.

Once the analysis has been conducted, the IPT assesses the results and determines the alternative that shows the greatest potential to sufficiently and cost effectively satisfy the business need or close the performance gap. The IPT will separately document the solution requirements and any technical, schedule, cost or other programmatic assumptions prior to market research. The IPT will then conduct market research, as appropriate, to determine the feasible solutions based upon those requirements.

The Feasibility Analysis will provide a summary of each alternative along with the cost estimate, and any identified cost, schedule or technical risks. It must clearly identify each potential solution's possible impacts to the existing (as-is) environment. Not only will it identify positive improvements that may be realized but also any potential negative impacts to existing systems, applications and infrastructure. It will identify any process changes that are to be made in order to realize business value with the possible solution alternative. The analysis will also document the extent to which each potential solution is expected to fulfill the documented requirements set. This will serve to justify the selected alternative and why the other alternatives were not selected. Any additional source documents for the analysis should be referenced and delivered with the Feasibility Analysis. The recommended alternative will be the focus of the activities completed in the Planning Phase.

Outputs

The key outputs of this phase are:

- Charter
- Concept Overview Diagram
- Concept of Operations
- Feasibility Analysis

Control Gate

- **Business Owner approves and signs off on Charter and Feasibility Analysis prior to the IPT beginning the Planning Phase.**

The IPT presents the Charter (if updated) and Feasibility Analysis to the Business Owner, who either signs off on the artifacts or requests additional research and analysis. The Business Owner approves the document, with a signature and date, prior to beginning the Planning Phase. This approval is stored as a program artifact and made available upon the request of the OA IRB or other governing body.

- **Enterprise Architecture Board approves the Concept Overview Diagram and concurs with the Concept of Operations diagram.**

The IPT will provide the appropriate EA governance board (DOT or OA) a briefing on its proposed investment and the possible solutions. The presentation is to include a summary of the capability shortfall, an assessment of the alignment to the existing EA, and any newly developed artifacts that were coordinated with the EA Program Office.

The EAB will assess the following:

- Are the technologies identified in the solution consistent with the target TRM?
- Does the technical approach embrace re-usability
- Is the data required by this project already available or will it be made available to others?
- Are modifications to the EA necessary to accommodate the proposed system and have they been through the Technical Control Board for insertion approval?
- Does the solution conform to DOT data standards?
- Are the IT components identified in the Application Architecture?
- Does the project provide an enterprise-wide solution?
- Have elements been identified for re-use, enhancement or creation of new services?
- Is the project aligned with a DOT IT Portfolio?

Phase 3: Planning



Objectives

- In this phase, the IPT prepares all final recommendation documentation and completes detailed planning activities.

Inputs

- Business Needs Analysis
- Initial Funding Request
- Business Needs Impact Report
- Charter
- Concept Overview Diagram
- Concept of Operations
- Feasibility Analysis

Processes / Tools / Techniques

- IPT prepares Benefit Cost Analysis and makes final recommendation
- IPT creates Initial Program Decision package (Charter, Feasibility Analysis, Benefit Cost Analysis)
- PMO validates analysis of Initial Program Decision package and informs the OA IRB
- IPT and OA IRB determine development methodology and tailor the program artifacts appropriately
- IPT finalizes investment planning artifacts: Program Management Plan, Risk Management Plan and Risk Register, Acquisition Plan, Work Breakdown Structure with milestones, Program Schedule
- IPT presents the program baseline (scope, cost, schedule) to OA IRB for final approval

Outputs

- Benefit Cost Analysis
- Configuration Management Plan
- Program Management Plan
- Risk Management Plan and Risk Register
- Work Breakdown Structure with milestones
- Program Schedule
- Acquisition Plan
- Authorized Program Baseline
- Business Process Diagram
- Functional Requirements Document

Critical Decision Point – Proceed / Revise

- OA IRB gives final approval for the program baseline (scope, schedule and costs) and validates program artifacts are complete prior to beginning the Acquisition Phase.

Phase 3: Planning

Objectives

- In this phase, the IPT prepares final recommendation documentation and completes detailed planning activities.

Inputs

The key inputs to begin this phase are the outputs from the Definition phase:

- Charter
- Concept Overview Diagram
- Concept of Operations
- Feasibility Analysis.

Additional inputs that may be used for reference and/or informative purposes are:

- Business Needs Analysis
- Initial Funding Request
- Business Needs Impact Report

Processes / Tools / Techniques

- **IPT prepares Benefit Cost Analysis and makes final recommendation**

Once the Business Owner has approved the initially proposed solution based on the results of the Feasibility Analysis, the IPT conducts a Benefit Cost Analysis of the proposed solution. The Benefit Cost Analysis is a more comprehensive, scientific benefit and cost assessment process than completed in previous analyses. This will provide a strong, data-driven final investment solution recommendation to the OA IRB.

In the Benefit Cost Analysis template, the cost section has been divided into the three high-level stages commonly found in Office of Management and Budget (OMB) guidance and exhibits: Planning, Acquisition, and Operations and Maintenance. Note that although these stages are also the titles of phases in the IPPM Framework, they encompass additional phases due to their broad, high-level nature. Therefore, each OMB stage in the template indicates the IPPM phases to which it aligns. Completing this section will provide a first draft of the spending tables found in the Exhibit 53 and Exhibit 300 (if determined to be a major investment) for the proposed investment solution. It can also provide a foundation from which to develop the program's Work Breakdown Structure (WBS) and Schedule later in the Planning Phase.

The benefits section of the Benefit Cost Analysis template has been divided into two types: quantitative benefits and qualitative benefits. Quantitative benefits can be represented numerically. They are either hard cost savings, or they can be translated into approximate dollar value sums using logical assumptions and relational formulas. In other words, all quantitative benefits should be represented as dollar sums, unless a justification can be made that no logical assumptions or formulas could be used to generate a dollar value. Qualitative benefits cannot be

represented numerically, and do not have dollar values. These benefits can include, but are not limited to, improved employee morale, enhanced organizational image, improved communications, higher customer satisfaction, greater accessibility, and environmental benefits.

Once all the proposed program solution's costs and benefits are identified and valued, the final piece of the Benefit Cost Analysis is a comparative analysis. The template explains the necessary calculations to produce the proposed solution's net present value, benefit/cost ratio, and payback period. The net present value equals the proposed solution's future net quantitative benefits represented in "today's dollars". The benefit/cost ratio identifies the relationship between the net present values of the quantitative benefits and costs of the proposed solution. The payback period indicates the approximate time in which the proposed solution's cumulative sum of quantitative benefits first exceeds its cumulative sum of costs, expressed in current dollars. If this does not occur, the payback period would indicate the net cost trend during the proposed solution's lifecycle.

After completing the Benefit Cost Analysis, the IPT and Business Owner either confirm that their proposed solution will be recommended to the OA IRB, or perform additional analysis to identify a better possible solution.

- **IPT creates Initial Program Decision package (Charter, Feasibility Analysis and Benefit Cost Analysis)**

The IPT compiles the data and documents that were produced in the previous Definition Phase, the Charter and Feasibility Analysis, as well as the Benefit Cost Analysis to create the Initial Program Decision package. This package is then sent to the OA PMO as well as the OA IRB for evaluation and validation. All documentation produced up to this point is to be made available to either of these groups upon request to help inform the process.

- **OA PMO validates analysis of Initial Program Decision package and informs the OA IRB**

The OA PMO conducts an analysis of the Initial Program Decision package. It validates the logic and comprehensiveness of the analyses and decisions made by the Business Owner and IPT. Any questions or clarifications needed by the OA PMO are communicated to the Business Owner. The OA IRB also reviews the Initial Program Decision package at this time.

Once the OA PMO completes its analysis and resolves any questions or issues with the Business Owner, it informs the OA IRB of its findings. The OA IRB decides to: 1) accept the program into its investment portfolio, 2) ask the Business Owner and IPT to reconsider their proposed solution or modify certain elements of their proposal, or 3) not move forward with the program at this time. The OA IRB decision is captured in meeting minutes.

If the OA IRB decides to accept the program into its IT portfolio, it also determines whether it is a major, non-major, small, or micro investment. The program may be classified based on factors such as its projected costs, complexity, visibility, and priority. Additionally, with the help of the

OA PMO, the OA IRB decides how the program will be represented in Office of Management and Budget (OMB) IT and budget reporting.

- **IPT develops Configuration Management Plan**

The IPT develops a Configuration Management Plan (CMP) that establishes the processes and known future updates for maintaining or enhancing the solution's performance, functional and physical attributes, and integration between solution components and their external dependencies. It includes the processes to develop, control and maintain program artifacts such as management plans, contractual documents and requirements sets. The IPT is to follow the any OA templates, Government, or industry standards to develop the CM Plan. Once the CMP is complete it is implemented for all program/project artifacts.

- **IPT and OA IRB determine development methodology and tailor the program artifacts appropriately**

Based on the nature and complexity of the program solution, as well as any external constraints or requirements, the IPT and the OA IRB determine the optimal development methodology for the program solution. Development methodologies can be categorized as either waterfall or iterative.

A waterfall methodology stresses a structured, disciplined progression through well defined stages of program design and development. Its benefits include precise budgeting and schedule planning, simplified resource tasking and management, and quicker impact determination for potential program changes. Program testing is typically not stressed until total program development has been completed. This can increase the risk of missing design flaws until the testing stage, which can cause significant problems for multiple program components. If the IPT determines it will use a waterfall methodology, it aligns its initial plan with the processes indicated in phases four, five, and six of the IPPM framework.

An iterative methodology is characterized by a series of "design and develop" cycles. One approach might focus on the initial design and development of core program features with additional functionalities created by successive iterations. Another approach might emphasize the design and development of certain program components or modules from conception to completion during each cycle. Deployment of a program may vary depending on the type of iterative methodology used and nature of the program. If functionalities can stand alone after an iteration, and are beneficial to end-users, then those components might be deployed. Or, deployment might occur after multiple iterations have been completed. The benefits of an iterative methodology include quicker identification of design flaws due to the emphasis of per-iteration testing, faster roll-out of high-priority program components or functions, and increased flexibility to address changing program requirements. Potential drawbacks of an iterative methodology include budgeting and scheduling difficulties, increased risk of scope creep, a tendency to insufficiently document the work and management activities, and creating a "burning platform," where an interim release fails and all subsequent releases fall off schedule. If the IPT determines it will use an iterative methodology, it aligns its initial planned iterations

with the processes indicated in phases four, five, six, and possibly seven (depending on how the IPT plans to deploy the program) of the IPPM framework.

Once a development methodology has been determined, the IPT and OA IRB tailor the program management artifacts to best suit the particular program. Tailoring is primarily determined by the program's classification (major or non-major) and development methodology. The IPT is to use the *IT Investment Work Pattern Tables*, found in **Appendix C**, to determine a minimum set of artifacts as recommended by the DOT OCIO. Tailoring based on other program characteristics could lead to varying levels of artifact detail, or to the determination of supplemental artifacts to be developed in addition to the minimum artifact set. The IPT and OA IRB consult the OA PMO to help determine a fair and sufficient level of artifact development and upkeep.

- **IPT finalizes investment planning artifacts: Program Management Plan, Risk Management Plan and Risk Register, Acquisition Plan, Work Breakdown Structure with milestones, Program Schedule**

This is the point in the program's maturity where the core solution-specific planning begins. The artifacts that are produced from this point forward constitute the backbone elements the Business Owner and the IPT will use to manage day to day progress and ensure the program is implemented on time and on budget. These artifacts will also be used by the OA PMO and OA IRB when making program decisions or assessing the status of the program. The Program Management Plan and Program Schedule are to be consistent with the EA. Any discrepancies will be coordinated with the EA Program Office,

Program Management Plan

The Program Management Plan is typically the first artifact developed by the IPT once a solution is approved by the OA IRB. It sets expectations and indicators for investment performance, defines the additional management artifacts to be produced (the results of any artifact tailoring completed in the previous process step), and specifies the solution-specific investment deliverables and development methodology. It also explains the approach to many management practices that must be considered when delivering an IT solution, including scope, schedule, cost, resource, risk, acquisition, communication, quality, and acceptance management. Depending on the type, expected size, and complexity of the program, many of these management practices will require their own plans that detail the associated processes and findings. Others, however, may be sufficiently explained and tracked in the Program Management Plan. The IPT clearly identifies these distinctions using simple referencing and labeling techniques (e.g., reference a Risk Management Plan in the Program Management Plan when summarizing the program's risk management approach, or use language such as, "The following Communications Plan will be used to manage the flow of information," and include the plan directly in the Program Management Plan).

Risk Management Plan and Risk Register

The Risk Management Plan states how the program will identify, analyze, prioritize, mitigate, and report risks throughout the investment lifecycle. It clearly indicates the scheduled and ad

hoc expectations and processes for program lifecycle risk management. The Risk Management Plan lays the foundation for a risk “early warning system,” and explains how the program identifies and reacts to potential or realized risks.

The Risk Management Plan may include a process for first determining how an identified risk will be handled. There are numerous methods to handling risk, including:

1. *Avoidance:* Risk avoidance is changing the program’s approach to eliminate the risk or condition, or to protect the program objectives from its impact. Although the IPT can never eliminate all risk events, some specific risks may be avoided.
2. *Transference:* Risk transfer is seeking to shift the consequence of a risk to a third party together with the ownership of the response. Transferring the risk simply gives another party the responsibility for its management; it does not eliminate it.
3. *Mitigation:* Mitigation seeks to reduce the probability and/or consequences of an adverse risk event to an acceptable threshold. Taking early action to reduce the probability or impact of a risk is more effective than trying to resolve it once the risk has been realized and becomes an issue.
4. *Acceptance:* This technique indicates that the IPT has decided not to change the program’s approach to deal with a risk or is unable to identify any other suitable response strategy. Active acceptance may include developing a contingency plan to execute, should the risk occur and become an issue. Passive acceptance requires no action, leaving the IPT to deal with the risk if it occurs.

The Risk Register is used to document the outcomes of the processes explained in the Risk Management Plan. It includes all the risks identified for the program, their probability and impact analysis results, their priority rank, any mitigation strategies associated with each risk, and the current status of each risk. Additionally, risk points of contact (POC), identification participants, version/update log, and any additional analysis performed is included in a program’s comprehensive Risk Register.

Work Breakdown Structure (WBS)

The WBS is a deliverable-oriented hierarchical decomposition of the work to be executed by the IPT and other stakeholders. The lowest level of the WBS is represented by work packages that will be scheduled, cost estimated, monitored, and controlled.

The WBS must meet the following minimum requirements:

1. Must contain all work elements (scope)
2. Must be structured to support cost estimation
3. Must be broken down to levels that satisfy status reporting, including schedule, costs, resources, and performance, as well as earned value metrics if required
4. Must be broken down to levels that identify all work activity in the way it is planned to be performed

Program Schedule

The Program Schedule is developed based on the program's comprehensive WBS, identifying the activities necessary to complete all work packages. As the program schedule is being composed, the IPT should consider the processes and deliverables detailed in the forthcoming phases of the IPPM framework. The following are the guidelines for developing a schedule:

1. *Develop an activity list:* An activity is a specific component of a work package performed during the course of a program. An activity list is a comprehensive list of all work or effort within the scope of the program. Sources of information for this list include the WBS, subject matter experts (SMEs), and the IPPM framework.
2. *Develop a milestone list:* A milestone list includes deliverables or other major developments throughout the lifecycle of the program. Depending on the size of the work packages created in the WBS, the completion of a work package may act as a suitable milestone.
3. *Sequence activities by identifying dependencies (internal and external):* The majority of activities have dependencies (predecessors or successors). A dependency is a relationship between two activities and should be documented.
4. *Minimize the use of lag time:* Lag is the interval of time between a predecessor and successor activity or milestone. It is the amount of time typically associated with no effort between activities. A robust schedule offers visibility into when lag time is present and what efforts were made to minimize it.
5. *Estimate the duration of activities:* Use historical data such as past program schedules, lessons learned, known constraints, risk analysis, and expert judgment to estimate the duration of activities.
6. *Determine the critical path:* Once all the dependencies have been identified, the critical path(s) can be determined. The critical path is the longest sequence of dependant activities having no lag time. This path determines the duration of the program.
7. *Assign resources to the activities:* Resources are named DOT staff or contractor resources. Once the appropriate resources have been secured, they can be assigned to specific activities, creating increased accountability throughout the program. For activities six months or more in the future, the labor categories of required resources are acceptable if the name has not yet been identified. For programs having earned value management (EVM) requirements, resource costs should also be tied to the schedule.

Acquisition Plan

The Acquisition Plan describes the program's approaches to acquiring all hardware, software, and contractor development and support services during the life of the program. It also validates the need and estimated cost of all potential acquisitions.

In accordance with FAR 7.104, acquisition planning begins as soon as the need and solution type are identified, preferably well in advance of the fiscal year in which contract award or order placement is necessary. An Acquisition Plan fulfills the acquisition planning requirements of FAR 7.105, 7.106 and 7.107. This covers all acquisitions, including those acquired by contract,

Blanket Purchase Agreement (BPA), orders under task order or delivery order contracts (for example Federal Supply Schedule (FSS), Government Wide Acquisition Contracts (GWACs), etc.), Basic Ordering Agreements (BOAs), Indefinite Delivery/Indefinite Quantity (IDIQ) contracts, and Interagency Agreements (IAAs). IPT members should be identified as the primary coordinators for contracting, budget, legal, security and technical aspects. At a minimum, all acquisition planning and execution activities must be coordinated with and approved by an appointed Contracting Officer (CO).

The Acquisition Plan template focuses on all aspects of the plan and process. The two major components of the Acquisition Plan are:

1. *Acquisition Plan:* This section describes all applicable materials and services needed for the program. It includes acquisition plan status, acquisition summary information, applicable conditions, costs, capability or performance, delivery requirements, trade-offs for service, and acquisition streamlining. It provides a clear, explicit detail as to why and how this program will operate.
2. *Plan of Action:* This section explains how the IPT will attain the necessary program materials and services. It includes competition requirements, source selection procedures, acquisition considerations, and contract administration. It also defines inherently government functions, security considerations, and milestones for the acquisition process. Once this section is complete, a clear path and understanding on attaining the program specific materials and services should be detailed.

Updates to the program schedule and/or WBS should be made as appropriate based on any developments that occur while completing the Acquisition Plan (e.g., multiple acquisitions determined to be completed in phases, trade-offs lead to requirements changes, etc.)

Security Planning

The IPT should ensure its program solution will comply with all applicable security requirements defined in the Federal Information Security Management Act (FISMA). In an effort to assist IPTs and Business Owners implement the provisions of FISMA, the National Institute of Standards and Technology (NIST) created a series of Special Publications (SP). The ones of particular relevance at this point in the program's maturity include NIST SP 800-18, which discusses security plans, and NIST SP 800-53, which contains a standardized set of security requirements for most IT programs. In addition to these documents, the DOT has specific IT security policies. DOT IPTs and Business Owners should review these to determine if any further security procedures or requirements related to their management, development, and deployment efforts are needed. The DOT's security policies can be found under the Cybersecurity functional areas.

The IPT and Business Owner should contact the DOT Information Assurance and Privacy Management Office (IAPMO) or their OA Information Security Officer for additional information regarding security requirements and planning.

- **IPT presents the program baseline (scope, cost, schedule) to OA IRB for final approval.**

Once the background artifacts are completed the IPT submits its program schedule, WBS, and projected cost to the OA IRB for final approval to move into the Acquisition Phase. (Note that if the artifacts have been substantially completed, they can still be submitted and then be finalized after the Acquisition Phase based on the current knowledge of the program solution and the services determined to be needed to continue.) The program cost should be broken down sufficiently in the WBS and schedule to allow the OA IRB a clear “line of sight” as to where and when funds will be allocated and expended.

- **IPT develops the High-level Business Process Diagram.**

The IPT develops the business process diagram (B-1 FEA Framework Artifacts can be found at [OMB](#) by logging in with your MAX username and password) presenting the hierarchical structure of organizational activities. The diagram also depicts the activities performed and the stakeholders performing the activities to consume and produce resources.

The IPT is to describe the operations that are normally conducted in the course of achieving a mission or a business goal. Describe the operational activities (or tasks); Input/Output flows between activities, and to/from activities that are outside the scope of the intended solution.

The B-1 diagram can be used to:

- Clearly delineate lines of responsibility for activities when coupled with OV-2.
- Uncover unnecessary operational activity redundancy.
- Make decisions about streamlining, combining, or omitting activities.
- Define or flag issues, opportunities, or operational activities and their interactions (information flows among the activities) that need to be scrutinized further.
- Provide a necessary foundation for depicting activity sequencing and timing
-

The B-1 is to describe the:

- Relationships or dependencies among the activities.
- Resources exchanged between activities.
- External interchanges (from/to business activities that are outside the scope of the model).

The intended usage of the B-1 includes:

- Description of activities and workflows.
- Requirements capture.
- Definition of roles and responsibilities.
- Support task analysis to determine training needs.
- Problem space definition.
- Operational planning.
- Supply support analysis.
- Information flow analysis.

- **IPT develops the functional requirements document.**

The functions needed from the solution are identified through functional analysis and documented. The IPT will then create a requirements document that clearly states all of the functional requirements, including interface requirements, security, and any known performance requirements (data exchange rate, for example). The document should include:

- Descriptions of data to be entered into the system
- Descriptions of operations performed by each function
- Descriptions of work-flows performed by the solution
- Descriptions of system reports or other outputs
- Description of system data entry, both user types and modes of entry
- How the system meets applicable regulatory requirements

The IPT developed FRD is to possess following characteristics:

- It demonstrates that the solution provides value to the organization in terms of the business objectives and business processes.
- It contains a complete set of requirements for the solution. It leaves no room for anyone to assume anything not stated in the FRD.
- It is solution independent. The FRD is a statement of what the solution is to do—not of how it works. The FRD does not commit the developers to a design. For that reason, any reference to the use of a specific technology is entirely inappropriate in an FRD.

The IPT is to follow any prescribed OA Functional Requirements document templates that apply to their organization. If one does not exist the OST FRD template is to be used.

Outputs

The key outputs of this phase are:

- Benefit Cost Analysis
- Configuration Management Plan
- Program Management Plan
- Risk Management Plan and Risk Register
- Work Breakdown Structure with milestones
- Program Schedule
- Acquisition Plan
- Authorized Program Baseline
- High-level Business Process Diagram
- Functional Requirements Document

Critical Decision Point – Proceed/Revise

- **OA IRB gives approval for the program baseline (scope, schedule and costs) and validates program artifacts are complete prior to beginning the Acquisition Phase.**

The OA IRB uses the program artifacts presented and information provided in the meeting (if conducted) to determine if the program should move forward. If the OA IRB determines that the program, as presented, does not merit full investment, it either requests additional planning be completed or decides to stop the program. If the OA IRB decides everything is in order and an investment in the presented technology and program is in fact the right course of action, it would document its approval.

Phase 4: Acquisition



Objectives

- In this phase, the Business Owner secures products and services to accomplish the Program requirements.

Inputs

- Benefit Cost Analysis
- Configuration Management Plan
- Program Management Plan
- Risk Management Plan and Risk Register
- Work Breakdown Structure with milestones
- Program Schedule
- Acquisition Plan
- Authorized Program Baseline
- Business Process Diagram
- Functional Requirements Document

Processes / Tools / Techniques

- IPT writes Statement of Work
- IPT confirms funding availability
- Contracting Officer finalizes and releases Acquisition Package
- IPT analyzes vendor responses
- IPT selects vendor and/or secures internal resources
- IPT is expanded to include contractor representatives
- IPT conducts Integrated Baseline Review
 - IPT updates Work Breakdown Structure and requires resource loaded, risk adjusted schedule for IBR
 - IPT validates earned value requirements and sets up monitoring schedule

Outputs

- System/Application Interface Diagram
- EA Impact Assessment
- Security Controls List
- Statement of Work
- Signed contract(s)
- Validated Work Breakdown Structure
- Resource loaded and risk adjusted Program Schedule
- Earned value techniques
- Updated artifacts as appropriate
- Updated IPT membership list

Control Gate

- The Business Owner informs the OA IRB that the contract was awarded and the IPT is ready to begin Detailed Requirements and Design Phase.

Phase 4: Acquisition

Objectives

- In this phase, the Business Owner secures products and services to accomplish the Program requirements.

Inputs

The key inputs to the Acquisition Phase are the outputs from the Planning Phase and include:

- Benefit Cost Analysis
- Configuration Management Plan
- Program Management Plan
- Risk Management Plan and Risk Register
- Work Breakdown Structure with milestones
- Program Schedule
- Acquisition Plan
- Authorized Program Baseline
- High-level Business Process Diagram
- Functional Requirements Document

Processes/Tools/Techniques

- **IPT develops the System/Application Interface Diagram**

The IPT will develop the application interface diagram (A-1 FEA Framework Artifacts can be found at [OMB](#) by logging in with your MAX username and password), or system/application interface diagram, showing the solution under consideration.

The A-1 diagram is used to depict systems and sub-systems and identify the resource flows between them. The A-1 is to depict all systems and sub-systems comprising the intended solution, their interfaces, the external systems that it directly interfaces with, and the interactions amongst all of these. The diagram is also to depict the human aspects of the architecture, and how these interact with systems/applications.

- **IPT Coordinates with EA Program Office on the EA Impact Assessment**

The IPT will meet with the EA PO and provide their WBS, program schedule and a copy of the draft approved baseline, along with any other program documents. The EA PO will then initiate an EA impact assessment determining the proposed acquisition's consistency with the architecture. The EA PO will likely need additional data to complete all of the artifacts needed for the EA framework. If the EA PO finds that some level of inconsistency exists with the EA, but, a change to the EA is warranted the IPT will then develop EA updates and present those to the EA governance board for approval.

- **IPT develops the Security Controls List**

The IPT is to document the total set of security controls from which the vendor may choose in order to develop the solution. As input into creating this list, the IPT should consult National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53, SP 800-37 and Federal Information Processing Standard Publication 200.

- **IPT writes Statement of Work (SOW)**

The IPT uses a SOW to detail its expectations and requirements for the work to be completed by potential contractors/vendors supporting the program solution. Depending on the nature of the work, the SOW should also provide the solution deliverables and an estimated timeframe to complete the effort. The program baseline, which includes the program's WBS, schedule, and expected costs, as well as the program's Acquisition Plan, can provide the foundation from which to write the SOW. The program baseline should already have incorporated the appropriate processes, deliverables, and considerations detailed in the IPPM framework, and the IPT should ensure the SOW includes the applicable IPPM elements for the work specified.

The SOW should provide the following details of the program and specified work:

- Background
- Purpose
- Services Required
- Deliverables
- Constraints
- Government Furnished Information
- Period of Performance
- Acceptance Criteria
- Type of Contract

If internal resources are to be secured in place of or in conjunction with contractor resources, the SOW should clearly define the Federal resource duties or the delegation and the inherently governmental work required for effort completion.

- **IPT confirms funding availability**

The IPT works with the appropriate OA budget personnel to ensure funding is available for the work specified in the SOW. While funding requirements may change based on contractor/vendor responses once the SOW (and additional information included in the total Acquisition Package) is released, funding as projected and approved in the program's baseline should be available to commit.

- **Contracting Officer finalizes and releases Acquisition Package**

In addition to the SOW, the acquisition process requires numerous legal, financial, and justification documents. These documents collectively are called the Acquisition Package, or

solicitation. The IPT should work with its CO to ensure the package is complete, accurate and ready for vendor review. With the many components and complexities of acquisition regulations and systems, the ease of completion of the Acquisition Phase is largely dependent on how well the IPT details and follows its Acquisition Plan, and the open and consistent communication with its CO. The DOT Transportation Acquisition Manual contains a Contract File Checklist which provides a list of the steps to completing, compiling, and releasing the Acquisition Package. In some cases, the baseline dollar amount of the specified work in the Acquisition Package will affect which documents are required.

The CO helps direct the IPT through the many steps of the Contract File Checklist leading up to solicitation release. Once all necessary pre-solicitation activities and documentation are complete, the IPT and CO formally release the Acquisition Package for contractor/vendor bidding.

- **IPT analyzes vendor responses**

While the solicitation is available to the public, the IPT and CO may conduct information conferences, and question and answer sessions. Based on clarification needs or any new information affecting the program (e.g., legislation, funding, executive direction), the IPT and CO may have to update or amend its solicitation. Contractors/Vendors then submit their proposals for the specified work.

Once the solicitation deadline has been reached and all proposals submitted, the IPT begins its formal review. The IPT includes other resources during the review, particularly the CO, representatives from other programs planned to interact with the IPT's program solution, and any SMEs not already part of the IPT. As the group reviews the proposals, it may formulate additional questions that should be sent to all submitting contractors/vendors for further clarification. Additionally, contractor/vendor site visits and presentation meetings may be set up to further assess capabilities, facilities, and gather additional information on the bidders.

An important part of the analysis and evaluation is a detailed review of the cost proposed. The IPT should perform a thorough comparison of the specified work's baseline cost and the proposed costs of the contractors/vendors. If a proposal does not come in close alignment with the baseline budget completed by the IPT, further analysis should be conducted as to whether the proposal has sufficient justification for the pricing submitted. Depending on the specificity and nature of the work provided in the SOW, critical work elements may have been included in a proposal's pricing that were not anticipated when the work was originally baselined by the IPT.

In addition to cost, all potential contractors/vendors should be assessed on their technical and management qualifications, and their approaches to meeting the work requirements indicated in the SOW. Proven past performance on other programs similar to the work being requested should also be factored into the assessment. A bidding organization's personnel can have a major influence on the success of a program, so a thorough analysis of resumes should also be a factor in the decision. The IPT should balance their assessment of the costs and what they are getting for those costs to ensure a well informed and justified selection is made. Additionally,

the CO should be able to provide additional guidance for how to best evaluate contractor/vendor responses.

- **IPT selects vendor and/or secures internal resources**

Based on the analysis of the responses to the solicitation, the IPT determines the contractor/vendor that presents the strongest qualifications, management practices, and reasonable costs to complete the specified work. The IPT should document the reasons it selected a particular contractor/vendor over others. Additionally, any federal resources required as part of the program moving forward should be secured, whether they are management or design/development resources.

Once the decision has been made, the Business Owner should inform the OA IRB of its decision. Contractor/vendor on-boarding would commence soon after the contract has been finalized.

- **IPT is expanded to include contractor representatives**

Once the appropriate contractors have been on-boarded, they become an integral part of the IPT. The government members of the IPT should meet with the contractor management personnel and ensure the team has a clear understanding of the oversight responsibilities for each member.

- **IPT conducts Integrated Baseline Review**

- IPT updates Work Breakdown Structure and requires resource loaded, risk adjusted schedule for IBR
- IPT validates earned value requirements and sets up monitoring schedule

The Integrated Baseline Review (IBR) is a critical, comprehensive evaluation of the program baseline. It addresses inherent risk and how realistic the program baseline is. It is a joint assessment by the government and contractors, now jointly called the IPT, that must be performed before any design or development work has started, additional work scope added, or task dates modified.

The IBR process results in a mutual understanding of the program baseline between government team members and their contractor counterparts. The technical, functional, and integration requirements are reviewed a final time to ensure they are viable and reasonable. Contractors may present additional considerations based on their assessment of the program baseline that the government team members should review and determine if any scope, schedule, or cost updates need to occur.

Based on the program's classification and Acquisition Plan, the contract established with the contractors should clearly state whether EVM is required. If EVM is required, the government team members should assess and either request modification or approve the contractor's EVM system, including the EVM techniques they plan to use with their task schedule, the types of analysis that will be completed, and their reporting processes.

Once the work baseline has been sufficiently reviewed and any issues and/or additional considerations are addressed, the IPT begins the Detailed Requirements and Design Phase.

Outputs

The key outputs of this phase are:

- System/Application Interface Diagram
- EA Impact Assessment
- Security Controls List
- Statement of Work
- Signed contract(s)
- Validated Work Breakdown Structure
- Resource loaded and risk adjusted Program Schedule
- Earned value techniques
- Updated artifacts as appropriate
- Updated IPT membership list

Control Gate

- **The Business Owner informs the OA IRB that the contract was awarded and the IPT is ready to begin Detailed Requirements and Design Phase.**

The Business Owner informs the governing body that the contractor has been selected and a contract has been put in place to begin the next phase of the program. When the final contract and any amendments post-IBR are within the original program scope no action is required from the OA IRB. If contract negotiations or the IBR identify needed changes that will result in any baseline changes (cost, schedule or performance), the IPT is to meet with the PMO to discuss the changes. Once PMO concurrence is obtained the IPT will then seek OA IRB approval.

Phase 5: Detailed Requirements & Design



Objectives

- In this phase, the IPT finalizes the specification of business requirements and the technical design conforming to those requirements. The resulting design provides both the functional and technical component details on what the system is going to perform and how it is going to accomplish the task(s).

Inputs

- System/Application Interface Diagram
- EA Impact Assessment
- Security Controls List
- Statement of Work
- Signed contract(s)
- Validated Work Breakdown Structure
- Resource loaded and risk adjusted Program Schedule
- Earned value techniques
- Updated artifacts as appropriate
- Updated IPT membership list

Processes / Tools / Techniques

- IPT validates the process for Change Management
- IPT creates detailed solution specifications
- IPT establishes a Requirements Traceability Matrix
- IPT creates solution design
- IPT conducts a Critical Design Review and establishes a design freeze
- IPT develops Development Test Plan

Outputs

- Solution Specifications
- Verification Requirements Traceability Matrix
- Final Solution Design
- Development Test Plan
- Updated Configuration Management Plan
- Technology Standards List
- High-Level Network Diagram
- Development Test Plan

Critical Decision Point – Proceed / Revise

- Business Owner reviews the outcomes of the Critical Design Review; they may have the IPT revise the design prior to final approval. Then the IPT can begin the Development Phase.

Phase 5: Detailed Requirements & Design

Objectives

- In this phase, the IPT finalizes the detailed business requirements and the technical design meeting to those requirements. The resulting design provides both the functional and technical component details on what the system is going to perform and how it is going to accomplish the task(s).

Inputs

The key inputs to begin this phase are:

- System/Application Interface Diagram
- EA Impact Assessment
- Security Controls List
- Statement of Work
- Signed contract(s)
- Validated Work Breakdown Structure
- Resource loaded and risk adjusted Program Schedule
- Earned value techniques
- Updated artifacts as appropriate
- Updated IPT membership list

Additional inputs that may be used for reference and/or informative purposes are:

- Other updated program artifacts (Risk Register, Program Management Plan, etc.)
- Updated IPT membership list

Processes / Tools / Techniques

- **IPT reviews the Change Management process and updates as appropriate**

The Change Management process is reviewed to assess if any modifications are necessary in the event changes occurred to the program, including its scope, cost, schedule, performance, organization, and reporting.

- **IPT creates solution specifications**

The IPT converts the functional, performance, interface, data and network requirements document developed during the Definition and Planning phases into unified solution specifications used by designers and developers to draw up, script, build, test, and integrate the solution. Note that solution specifications can be generated at different times for different programs or at multiple times in a program's lifecycle. This depends on the development methodology, when SMEs that are generating the system specifications are part of the IPT, and any external program cost or schedule constraints. The IPPM framework introduces the process of developing system specifications when the IPT includes the design (and very likely

development) contractors. Another appropriate time to conduct this process could be before the acquisition of any design and development services. At this time, if the IPT has the knowledge and SMEs to generate the detailed system specifications, they may be generated and included as part of the solicitation for the design and development services. This would provide potential vendors with additional information from which to develop a more definitive bid for the work.

Regardless of when the system specifications are created, the IPT should review their necessity, alignment with identified requirements, and influence to cost and schedule (if any). The program baseline provides the approved scope, cost, and schedule constraints for this process. System specifications that are critical to the program's successful operation that may influence the program baseline are monitored by the Business Owner. If it is determined additional cost and/or time is needed to implement the specification, the Business Owner is to present a justification for the rebaseline to the OA IRB for review and approval.

- **IPT establishes a Verification Requirements Traceability Matrix**

The Business Owner should pay attention to confirming the alignment of the functional, technical, architectural, and system environment specifications to the program requirements. This can be tracked and documented using a Verification Requirements Traceability Matrix (VRTM). The VRTM is also linked to the program's WBS and schedule so that all specifications identified are developed, tested and implemented during the forthcoming IPPM phases. The VRTM provides a valuable "line of sight" from the program's initial planned requirements through to the final delivered product(s). The VRTM describes the allocation of system (or application) requirements to lower levels within the system, including hardware and software. It defines the test method that will be used to verify that each requirement within the matrix is met by the solution. The VRTM identifies the purpose and objectives of each test procedure, and documents the criteria for determining the success or failure of the system/component under test. Finally, the VRTM will identify the planned approval authority (role-based) for each test. It provides clear and immediate justification for the work to be performed. The VRTM is kept up to date and accurate throughout the design, development, testing and deployment of the program.

- **IPT creates solution design**

Using the system specifications identified, the IPT creates a more complete solution architecture. The EA artifacts created during the previous efforts are expanded to include detailed logical and physical models, rather than just conceptual models and high level logical models. This solution architecture is to include artifacts documenting the system design constraints, as well as detailed hardware, software, data, and internal communication (hardware to software interaction) architectures. These architectures should include both the functional and programmatic details of their components. Depending on the type of solution, the design could also be realized through the use of prototyping or modeling.

Solution designs can be constructed in various ways. Using a top-down approach, the designers first identify and link major solution components and interfaces, and then expand design layouts as they identify smaller subsystems and connections. Using a bottom-up approach, the designers

first identify and link minor program subsystems and interfaces, then expand design layouts as they identify larger components and connections. The IPT can utilize these options or other approaches to best suit their needs.

The end result to this process is for the IPT to know the necessary hardware, software, and data components of the solution, how these components interact with one another, and how they satisfy the system specifications.

- **IPT conducts a Critical Design Review and establishes a formal design baseline**

The Critical Design Review (CDR) is conducted once the IPT has completed all necessary solution design. CDR is conducted to see if the solution design will meet all specified requirements within cost, schedule, risk, and other program constraints. It is the final “proof of concept” review before beginning solution fabrication, demonstration and test.

The IPT reviews each solution component to ensure all input and output connections have been identified and all interrelated components are compatible. Additionally, program components are reviewed for satisfactory cost, schedule and performance conditions. Finally, the IPT assesses the known risks of each component, updating their Risk Register accordingly.

Once the CDR is complete and all identified revisions are made, the IPT establishes a design baseline that will be placed under formal Configuration Management.” While final approval is needed from the Business Owner, this proposal is accompanied by any justifications for necessary changes to the program baseline. Refer to the “Critical Decision Point” of this IPPM phase for additional information.

- **IPT updates the Configuration Management Plan, as necessary**

The IPT reviews the Configuration Management Plan to see if any of the processes conducted during this phase have uncovered a need to modify the existing CM processes to more appropriately meet the program needs.

- **IPT develops Technology Standards List**

The IPT reviews the post-CDR design and develops a Technology Standards List (FEA Artifacts can be found at [OMB](#) by logging in with your MAX username and password) that includes all planned technologies and applications within that design. The list will also include the status of any technologies within industry and the Government (*i.e.* emerging, current, contained or sunset). This list is coordinated with the OA Technology Control Board (TCB) and the EA PO. With EA PO concurrence the list is then presented to the DOT TCB for approval and inclusion in the application or technical reference model as appropriate.

- **IPT develops the High-Level Network Diagram**

The IPT develops the network diagram depicting the solution the systems with which it will interface, the systems from which it requires data (even if obtained through another system’s

interface) the information/data inputs and outputs, and the resource flows amongst the interdependent systems comprising the network. It is intended to show all logical and physical connectivity within the environment, or network infrastructure, in which the system will operate.

- **IPT develops development test plan**

The development test plan provides a clear, time-phased approach to the testing of the solution at designated stages or milestones during its development. It ensures any solution component functional or compatibility issues are identified as early as possible to avoid compounding the problem in the future. The plan must include what will be tested, how it will be tested, and the testing criteria and acceptance thresholds that will be used. This information is to be consistent with that provided in the VRTM, which is used as an input to the test plan.

In addition to functional and integration testing, the IPT should include its approach to quality assurance testing, including what performance standards (and coding standards for software development efforts) must be met or exceeded to ensure the solution and the management of the program is of sufficient quality. These standards can be taken or extrapolated from solution performance requirements, performance and quality management considerations when developing the program management plan and system specifications, or established standards from accredited institutions or organizations. Also, the IPT consults the Business Owner for any additional criteria from which to test quality; the Business Owner may have additional ways in which to define a quality program solution. Quality assurance testing should be performed periodically throughout the development of the program solution. This is one of the key processes of the IPPM framework.

Finally, the development test plan should clearly explain how the IPT will react to a failed test (e.g., develop a Plan of Action and Milestones, notify the Business Owner of the results). It is in no one's interest to have any program component fail; however having a clear process for handling failed tests in advance ensures the program continues to move forward and minimizes any delays in development efforts.

The development test plan provides the means to identify and isolate functional, integration, and quality issues so they can be fixed before they impose additional risks to the program. The IPT should note that sufficient time to test the program components should already be incorporated into the program's schedule.

Outputs

The key outputs of this phase are:

- Solution Specifications
- Verification Requirements Traceability Matrix
- Proof of Concept or Prototype
- Final Solution Design
- Development Test Plan
- Updated CM Plan
- Technology Standards List

- High-Level Network Diagram

Critical Decision Point – Proceed/Revise

- **Business Owner reviews the outcomes of the Critical Design Review; they may have the IPT revise the design prior to final approval. Then the IPT can begin the Development Phase.**

The Business Owner's approval of the final proposed design becomes the formal establishment of the program's baseline. When the design is baselined, it is controlled in accordance with the Business Owner approved Configuration Management Plan. Any proposed changes are documented, reviewed, approved, and audited in accordance with that CM Plan. Any changes resulting in a program baseline change must be justified and taken to the OA IRB for final approval.

Phase 6: Development



Objectives

- In this phase, the Business Owner and the IPT oversees and monitors the effective construction and/or configuration of the solution. The outcome of this phase is a technical solution that fulfills the identified business need and closes or substantially reduces the performance gaps.

Inputs

- Solution Specifications
- Verification Requirements Traceability Matrix
- Final Solution Design
- Development Test Plan
- Updated Configuration Management Plan
- Technology Standards List
- High-Level Network Diagram
- Development Test Plan
- Validated Work Breakdown Structure
- Resource loaded and risk adjusted Program Schedule

Processes / Tools / Techniques

- IPT develops and configures solution
- IPT conducts periodic quality assurance testing
- IPT tests and validates the solution meets the specified requirements
- IPT conducts C&A and obtains Business Owner signoff
- IPT conducts business user acceptance testing
- IPT develops Configuration Management Plan
- IPT develops and finalizes business transition procedures & training materials
- IPT develops Deployment Guide
- IPT develops Operational Test Plan

Outputs

- Completed C&A
- Training materials
- Deployment Guide
- Operational Test Plan
- Logical Data Model
- Network Diagram

Control Gate

- Business Owner informs the OA IRB that the development is complete and that the IPT is ready to begin the Integration Testing and Deployment phase.

Phase 6: Development

Objectives

- In this phase, the Business Owner and the IPT oversees and monitors the effective construction and/or configuration of the solution. The outcome of this phase is a technical solution that fulfills the identified business need and closes or substantially reduces the performance gaps.

Inputs

The key inputs to this phase are:

- Solution Specifications
- Verification Requirements Traceability Matrix
- Proof of Concept or Prototype
- Final Solution Design
- Development Test Plan
- Updated CM Plan
- Technology Standards List
- High-Level Network Diagram

Additional artifacts that should be used and updated throughout this phase are:

- Validated Work Breakdown Structure
- Resource loaded and risk adjusted Program Schedule

Processes/Tools/Techniques

- **IPT develops and configures solution**

The IPT executes the development tasks in accordance with the program's schedule. Status of development progress is communicated to the appropriate members of the IPT (Program Manager, Technical Lead, etc.) on at least a monthly basis. It can be communicated in the form of cost, schedule, risk assessment, and performance data. Additionally, the IPT is to consult with the OA PMO to ensure it is complying with all federally mandated status reporting processes and providing the appropriate information.

If the program has established an Earned Value Management System (EVMS), earned value data is reported and calculated at multiple levels of a program's WBS to allow IPT members to pinpoint the causes of any cost and schedule variances and assess the impact of these variances on larger segments of the program, or the program as a whole.

Program status is provided to the appropriate OA IRB either at expected quarterly reviews or other scheduled meetings. Proposed program baseline changes are presented to the OA IRB with sufficient justification for approval.

- **IPT conducts periodic quality assurance testing**

Throughout the program solution development, the IPT dedicates particular attention to the testing and assessment of the quality of the program solution and management. Solution and management quality standards are those included in the program's Development Test Plan. The plan likely references multiple sources for the standards. It also sets the minimum management and solution performance thresholds (and other components of quality as determined by the Business Owner and IPT management) for IPT members and solution components. Quality assurance testing can be performed in conjunction all the other testing covered by the ITP. This will ensure program components, and eventually the solution as a whole, is fully compliant with all standards, requirements, and specifications.

- **IPT tests and verifies the solution meets the specified requirements**

As a culmination of the periodic testing performed throughout development, the IPT conducts verification of the solutions's final configuration functions, integration, and performance. Using the Development Test Plan and Verification Requirements Traceability Matrix, the IPT ensures that the final solution meets all standards, requirements, and specifications. Documenting these final tests and receiving appropriate IPT member sign-off constitutes the completion of the solution specific development activities. This can be done using the Verification Requirements Traceability Matrix.

- **IPT conducts C&A and obtains Business Owner signoff**

The IPT conducts a Certification and Accreditation (C&A) process once the program solution has been finalized and validated against all specifications and requirements. As explained by the Federal C&A Resource Center, "The process of reviewing the management, operational and technical security controls of an information system is called *Certification*. The 'authorization to operate', given by a senior official and based on the results of the certification, is called *accreditation*." The C&A process should be completed as defined in NIST SP 800-37. In addition, the process must comply with all policy in DOT Order 1351.6 *Certification, Accreditation and Security Assessments (CA) Controls*. The IPT must thoroughly review these documents, as well as reach out to the OA ISSO and DOT IAPMO, to ensure they are performing the necessary security assessment requirements.

Once the IPT has completed the C&A process for its program, it submits the C&A package to the Business Owner. The Business Owner confirms that the C&A was comprehensive and all necessary security controls were tested and complete. The Business Owner signs the authorization letter if the systems' C&A presents an acceptable risk posture.

- **IPT conducts business user acceptance testing**

While program success is largely dependent on how well the program solution satisfies the business need or closes the performance gap, it also is determined by how positive the end-users respond to it. Therefore, the IPT is to conduct user acceptance testing prior to solution deployment and installation. User acceptance testing assesses the program's user-friendliness

and surveys users' overall satisfaction with the end product. Additionally, it ensures all necessary and expected functionality is available to the users. It is typically completed by a relatively small group of end-users and may include a set of instructions to help them navigate the solution or perform a series of activities. The testers are encouraged to make any comments or critiques of the final solution throughout the testing process. Recommendations and suggestions from this test group are recorded and analyzed for consideration as future updates to the solution.

- **IPT develops and finalizes business transition procedures & training materials**

As the solution design is being fabricated and packaged to be launched, the IPT develops the necessary procedures for the transition of any legacy business processes to the new solution driven procedures. These procedures include stakeholder awareness, operator and end-user logistical transition, and standard operating procedures. Stakeholder awareness addresses how the IPT will make all those affected by the solution aware of its implementation. Logistical transition includes geographical changes, activity time changes, as well as role and responsibility changes. Business transition activities yet to be executed should have clearly defined planned completion dates.

In addition to standard operating procedures, the technicians and/or end-users may require additional training materials due to the nature or complexity of the program solution. These training materials may be in the form of presentations, demonstrations, instruction or service manuals, Web-based training courses, troubleshooting guides, competency tests, and many others. The IPT should ensure there are sufficient training materials and access to these materials before the program goes live in the production environment.

- **IPT develops Deployment Guide**

At this time, the IPT develops the Deployment Guide, which indicates how the program solution is going to be installed, or introduced into the operational environment. Specifically, it will indicate the locations and priority of distribution and installation of the program solution, as well as the installation/deployment vehicle. Additionally, the Deployment Guide includes all the identified risks and mitigation strategies (which can also be included in the program's Risk Management Plan and Risk Register) for the deployment phase of the program. Beyond these elements, the Deployment Guide may vary in specificity and content depending on the knowledge of the individuals deploying the solution (the developers, end-users, etc.), the level of complexity of the program solution, the development methodology used by the IPT, flexibility of deployment options (if multiple), and several other factors. Regardless, the Deployment Guide is to detail how the program solution will be successfully implemented, and a clear timeframe of the necessary steps.

Once the IPT drafts the Deployment Guide, it then submits it to the Business Owner for review and approval. The Business Owner ensures the plans and processes for solution deployment are efficient and meet expectations/requirements. If any deployment changes are requested by the Business Owner, the IPT must update the Deployment Guide accordingly and inform any IPT

members impacted by the changes. After any modifications are addressed, the Business Owner documents their approval of the Deployment Guide.

The IPT makes any necessary updates to their program schedule and/or WBS based on the deployment plans detailed in the Deployment Guide.

- **IPT develops Operational Test Plan**

In order to ensure the program solution is continually tested in the areas of performance, functionality, integration, security, and quality, the IPT develops the Operational Test Plan. The Operational Test Plan is also to include the plans and procedures for conducting the program solution integration testing, which is completed after the full installation of the solution into the production environment (see *Phase 7: Integration Testing & Deployment*). This plan should reference the program's Configuration Management Plan and any security requirements documentation or legislation to support periodic solution testing expectations and procedures. Testing locations, personnel, and test reporting processes should also be included in the plan. Finally, the Operational Test Plan should clearly explain how the IPT will react to a failed test (e.g., develop potential solution options and cost and schedule estimates, notify the Business Owner of the results, etc.). It is in no one's interest to have any operational program component fail; however, having a clear process for handling failed tests in advance ensures the program can minimize any delays in deployment or down time during operation.

The IPT should make any necessary updates to their program schedule and/or WBS based on the approaches to testing detailed in the Operational Test Plan.

- **IPT develops the Logical Data Model**

The IPT will develop a logical data model (D-1 FEA Framework Artifacts can be found at OMB by logging in with your MAX username and password) that depicts all entities and the entity relationships. In order to ensure data models are consistently expressed, the IPT will also develop a data dictionary of data definitions. The resulting logical data model will document the data and information that is associated with the information exchanges of the architecture. The previously developed High-Level network diagram may be used as an input to develop the logical data model.

D-1 is used to document the business information requirements and structural business process rules of the segment architecture. It describes the information that is associated with the solution. Included are information items, their attributes or characteristics, and their inter-relationships.

- **IPT develops the Network Diagram**

The IPT refines the High-Level network diagram to provide more detail than the high-level network diagram (I-1 FEA Framework Artifacts can be found at OMB by logging in with your MAX username and password) previously developed with such information as protocols, connections, and connection types or standards. I-1 is also updated with any newly identified interfaces (connections) and the communication flows. The diagram is to include any known

protocols or performance parameters such as memory, throughput and/or bandwidth requirements.

Outputs

The key outputs of this phase are:

- Completed C&A
- Training materials
- Deployment Guide
- Operational Test Plan
- Logical Data Model
- Network Diagram

Control Gate

- **Business Owner informs the OA IRB that the development is complete and that the IPT is ready to begin the Integration Testing and Deployment phase.**

As detailed in the processes of this IPPM phase, Phase 6: *Development*, the OA IRB reviews the status of the program on a quarterly basis, monitoring the program's cost, schedule, and management activities. As part of this status reporting, the Business Owner must inform the OA IRB when all program development efforts have been completed, as well as when they have reviewed the program's C&A and Deployment Guide. Notwithstanding any OA IRB objection or request for further explanation, the IPT then begins the Integration Testing and Deployment phase.

Phase 7: Integration Testing & Deployment



Objectives

- In this phase, the IPT and the Business Owner carry out the effective transition of the solution into the operational environment.

Inputs

- Completed C&A
- Training materials
- Deployment Guide
- Operational Test Plan
- Logical Data Model
- Network Diagram
- Validated Work Breakdown Structure
- Resource loaded and risk adjusted Program Schedule

Processes / Tools / Techniques

- IPT performs full technical installation
- IPT conducts integration testing
- Business Owner and the OA IRB officially approve program moving to full operation
- IPT conducts technician and/or end-user training
- IPT conducts Post Implementation Review
- IPT performs program-specific close-out activities

Outputs

- Post Implementation Review
- Updated Configuration Plan
- Completed Verification Requirements Traceability Matrix

Critical Decision Point – Go-Live / Revise

- Business Owner and the OA IRB give final approval of the solution before going live in the operational environment.

Phase 7: Integration Testing & Deployment

Objectives

- In this phase, the IPT and the Business Owner carry out the effective transition of the solution into the operational environment.

Inputs

The key inputs to this phase are:

- Completed C&A
- Training materials
- Deployment Guide
- Operational Test Plan
- Logical Data Model
- Network Diagram

Additional artifacts that used and updated throughout this phase are:

- Updated Configuration Management Plan
- Validated Work Breakdown Structure
- Resource loaded and risk adjusted Program Schedule

Processes/Tools/Techniques

- **IPT performs full technical installation**

The IPT introduces the program solution into its production environment. The technical installation should follow the processes and procedures planned in the program's Deployment Guide. Program solution installers should provide frequent (preferably weekly) status reports to IPT management to ensure accurate deployment monitoring. Any issues or changes that occur during the installation process should be documented as part of the change management and risk management processes for the program. Necessary changes that impact the program's baseline should be brought to the attention of the OA IRB for review.

- **IPT conducts integration testing**

Once the program solution is fully installed, the IPT conducts final functional/performance/integration testing of all the solution components and their integration with all interacting environment components. Additionally, any quality standards or expectations set by the IPT are tested. These tests should follow the processes and procedures of the program's Operational Test Plan. They ensure the program solution is fully integrated into the production environment and performs at the standards and expectations set by the IPT. Any test failures should be brought to the attention of the program management and assessed for causes and potential solutions. Cost and time estimates for necessary fixes are approximated. Program solution fixes that impact the program's baseline must be brought to the attention of the OA IRB for review.

- **Business Owner and the OA IRB officially approve program moving to full operation**

Once program integration testing results pass the acceptance standards, the Business Owner and OA IRB conducts one final meeting to discuss any last concerns or issues. If nothing that would preclude the program from going live is concluded, the Business Owner and OA IRB document and sign off their approval of the program proceeding to full operational capability. Full operation includes making the solution available to all technicians and end-users, using real data inputs, and establishing the system as the authoritative source for its specific outputs. The move to full operation may also trigger the execution of certain business transition procedures established in the previous phase of the program (additional stakeholder awareness, user logistical transition, etc.).

- **IPT conducts technician and/or end-user training**

The IPT utilizes the training materials developed for program technicians and/or end-users to conduct comprehensive training. Depending on the program, training can be delivered through presentations, demonstrations, simulations, written guidance, or using many other vehicles. The IPT provides a means for participants to document any critique and recommendations for improving the training.

- **IPT conducts Post Implementation Review**

The Post Implementation Review allows the Business Owner and IPT members, including the Program Manager, to assess the management processes and overall program success through the design, development, and deployment phases. It provides an opportunity to document lessons learned and improved management practices to support the maturity of DOT IT program management.

The Post Implementation Review is completed by the Business Owner, Program Manager, and other members of the IPT (including Federal employees and contractors). Expectations are set by the Business Owner regarding the privacy of information included in the Post Implementation Review. This includes how an assessment of the management of the program will be kept anonymous and not explicitly shared with management representatives to avoid any possible IPT member tensions. Lessons learned and any examples/recommendations for management best practices are consolidated and sent to the OA PMO to help inform other IPTs with present and future IT efforts.

- **IPT performs program-specific close-out activities**

The IPT completes any program-specific activities necessary to complete the program's transition from development and deployment to a fully operational state. These may include IPT personnel changes and logistics, debriefing meetings to executives, privacy of information agreements, and many others depending on the nature of the program and any requirements by the Business Owner or applicable DOT IT policies.

Outputs

The key outputs to this phase are:

- Post Implementation Review Report
- Updated Configuration Plan, if necessary
- Completed Verification Requirements Traceability Matrix

Control Gate

- **Business Owner and the OA IRB give final approval of the solution before going live in the operational environment.**

Please refer to the third process of this phase, “Business Owner and OA IRB officially approves program moving to full operation”, which is the equivalent of this control gate. The processes indicated after this third process typically include the IPT members involved in the design, development, and deployment phases of the program. Therefore, they are included in this phase, since the IPT members may change significantly once the program reaches operations and maintenance.

- **Enterprise Architecture reviews and approves testing.**

Enterprise Architecture Board assesses the following:

- Has user acceptance testing identified any gaps in required capabilities?
- Will the system provide all of the business capability as planned?
- Are there gaps in business capability?
- Have any new business capabilities been defined?
- Is the data required by the system already available or will it be made available?
- Are the requisite Information Sharing Agreements in place?
- Does the system include all components assigned to it for each release?
- Does the system include all technology assigned to it for each release?
- Is the technology being deployed still align with the TRM?
- Are all changes required for EA alignment completed for this phase?

Phase 8: Operations & Maintenance



Objectives

- In this phase, the IPT and the Business Owner maintain the solution and ensure it continues to deliver value.

Inputs

- Post Implementation Review
- Updated Configuration Plan
- Updated Solution Architecture, including Technology Standards Profile
- Updated Detailed Design Specification(s)

Processes / Tools / Techniques

- IPT implements ongoing system, process, performance, and security monitoring
- IPT determines criteria that will trigger the Business Owner to consider a new solution
- IPT performs and updates Operational Analysis on a yearly basis
 - IPT considers opportunities for continuous process improvement or required modifications
- IPT maintains compliance / C&A documentation

Outputs

- Operational Analysis
- Updated C&A

Control Gate

- OA IRB, in conjunction with the IPT and the Business Owner, conducts quarterly reviews of the scope, schedule and costs, and conducts a yearly detailed review of the Operational Analysis.

Phase 8: Operations & Maintenance

Objectives

- In this phase, the IPT and the Business Owner maintain the solution and ensure it continues to deliver value.

Inputs

The key inputs for this phase are:

- Post Implementation Review Report
- Updated Configuration Management Plan
- Updated Solution Architecture, including Technology Standards Profile
- Updated Detailed Design Specification(s)

Processes / Tools / Techniques

- **IPT implements ongoing system, process, performance, and security monitoring**

The IPT must continuously monitor and test the solution to ensure it is performing at acceptable standards and all security requirements are met. As required by OMB, quantifiable performance metrics are used as the standard indicators, to be tested at least annually. These performance metrics may change due to the program's Configuration Management Plan, as additional functionality and capacity are realized. Program configuration releases are also be tracked in the program's schedule.

It is important to note that the program monitoring requires not only testing and analysis, but also reporting and communication processes. Technicians and other members of the IPT monitoring and operating the solution provide clear reports to management in a format agreed upon by the two parties. Typical performance reporting by the technicians is to include not only raw performance data, but also comparative and trend analysis, risk identification and status, problem/issue identification, and recommended remedial activities. These requirements, as well as other program specific reporting requirements as determined by the Business Owner and program management, provide more useful data for decision making and ensure the program is still consistently monitoring program risk.

- **IPT determines criteria that will trigger the Business Owner to consider a new solution**

The IPT must be aware of and develop criteria for internal and external factors and circumstances that would trigger the consideration of a new program solution. Internally, the IPT determines criteria for the integrity of program performance (e.g., how well the program is satisfying the business need identified when the program was first proposed), cost of operations, and stakeholder satisfaction. Determination of these criteria could require updates to program monitoring and reporting processes to ensure the appropriate data in the correct format is being

presented to program management. This data may also be collected and analyzed in the program's annual Operational Analysis, which is discussed in more detail in the next IPPM process.

The IPT is also to consider external triggers for new program solution consideration. Regulatory or legislative actions by the federal government could result in a significant shift in program area requirements. If these requirements can't be easily incorporated into the current program, the IPT may need to start performing some initial exploration of alternatives. Additionally, the introduction of new DOT or OA policies or strategic directions may result in changing IT portfolio priorities. A shift in priorities could lead to budgetary or resource allocation changes, consolidation efforts, or other changes that would cause significant enough changes to the program to force the consideration of a different solution. Other programs that communicate or interact with the IPT's program are monitored for potential modifications/replacements that could impact the program's ability to perform its job. These impacts may be too costly or detrimental to the program for its sustainment, causing a new solution to be considered.

- **IPT performs and updates Operational Analysis on a yearly basis**
 - IPT considers opportunities for continuous process improvement or required modifications

The Operational Analysis is an annual (typically aligned with the fiscal year) examination of the program in terms of its strategic alignment, stakeholder satisfaction, financial performance, technical performance, and opportunities for program improvement. The IPT conducts this analysis as part of their overall program monitoring and testing processes. It should also serve as the program's annual report to the OA IRB for review. The "new solution trigger" criteria established in the previous IPPM process should align with the data and conclusions drawn from the Operational Analysis.

First, the IPT assesses the program as it aligns to the federal government, DOT, and OA mission and business goals and initiatives. They are to present a clear justification for the continued funding and operation of the program based on these strategic priorities. Recognition of any changing priorities, however, must be reflected in the Operational Analysis, as well as their potential impact to the program.

Stakeholder satisfaction is a key indicator for assessing the success of the program and determining whether or not to sustain it. Therefore, a method for the assessment of stakeholder satisfaction is clearly indicated in the Operational Analysis (e.g., surveys, user group meetings, stakeholder focus groups, etc.), as well as the results of the assessment. The IPT is to make sure that the stakeholders have the opportunity to make any recommendations for how to best remedy any identified deficiencies or issues.

The operational cost of the program is tracked to determine if there are any particular components of the program that are experiencing any significant cost variances, or differences between actual and planned costs (not to be confused with EVM variance techniques). The IPT accurately compares the funding they were allocated with the actual costs they accumulated in the time period specified for the operational cost analysis. Explanations must be provided when

variances occur, specifically the reasons for the variances and how the IPT will handle the financial circumstances.

An annual summary of the program's performance using the performance metrics established during the planning of the program (and possibly updated throughout the program's maturity) is reported in the Operational Analysis. Depending on the outcomes of the performance tests and analysis, as well as any scheduled configuration or other operational activities for the upcoming year, the IPT may baseline their next set of program performance metrics. Additionally, based on the outcomes of the performance analysis, stakeholder satisfaction assessment, and internal IPT meetings, any performance improvement opportunities identified are included in the Operational Analysis.

In addition to program performance, the logistical processes that drive the program should be assessed for their level of efficiency. While these processes were analyzed and planned during the first few phases of the program, their transition to an operational state may lead to the identification of process improvement opportunities. These opportunities, as well as any performance improvement opportunities, are analyzed for their cost, impact to other internal and external processes, and benefit to program stakeholders. Business Owner and/or OA IRB (if program baseline is affected) consultation and approval should be sought when potential process or performance modifications would result in significantly improved program utilization and efficiency.

The program's annual Operational Analysis ensures the program is delivering necessary services and functions at an acceptable level of performance in a cost effective way.

- **IPT maintains compliance/C&A documentation**

The IPT performs the necessary annual security controls (requirements) monitoring and assessment as explained in the NIST SP 800-37, *Continuous Monitoring Phase*. Additionally, the IPT reviews DOT Order 1351.37 *Departmental Cybersecurity Policy* to ensure they comply with all departmental security control policies. Finally, the IPT uses the guidance provided in the NIST SP 800-53a to help them assess the effectiveness of several security controls implemented for the program.

The IPT is to reach out to the DOT IAPMO for additional information and/or questions regarding security compliance and reporting requirements.

Outputs

The key outputs to this phase are:

- Operational Analysis
- Updated C&A

Control Gate

- **OA IRB, in conjunction with the IPT and the Business Owner, conducts quarterly reviews of the scope, schedule and costs, and conducts a yearly detailed review of the Operational Analysis.**

The OA IRB continues to monitor the program while it is operational. The Business Owner and IPT provides brief status reports on a quarterly basis to ensure the OA IRB is aware of any issues or newly identified risks that may require their consultation in the future. Additionally, the program is monitored to ensure any enhancement activities have the appropriate level of program management rigor applied to them. At the very least, the OA IRB is provided the program's annual Operational Analysis, which will assist them when organizing and prioritizing their annual IT portfolio.

Phase 9: Needs Initiation/Disposition



Objectives

- In this phase, the Business Owner or stakeholders determine if the solution no longer has business value or technical relevance, or no longer meets the original requirements. The outcome of this analysis is the consideration of a new technical solution, and retirement of the legacy system.

Inputs

- Operational Analysis
- Updated C&A

Processes / Tools / Techniques

- IPT validates a new requirement exists or a new solution must be considered based on established criteria
- IPT initiates Business Needs Analysis
- IPT determines disposition type (sunset, bulk, archive)
- IPT develops legacy system Maintenance Plan if appropriate
- IPT develops and executes Disposition Plan if the program is to be retired

Outputs

- Business Needs Analysis
- Maintenance Plan
- Disposition Plan

Control Gate

- OA IRB agrees with the high-level Business Needs Analysis and authorizes the Business Owner and the IPT to conduct a detailed exploration of current business needs and possible alternatives.

Phase 9: Needs Initiation/Disposition

Objectives

- In this phase, the Business Owner or stakeholders determine if the solution no longer has business value or technical relevance, or no longer meets the original requirements. The outcome of this analysis is the consideration of a new technical solution, and retirement of the legacy system.

Inputs

The key inputs to begin this phase are:

- Operational Analysis
- Updated C&A

Processes/Tools/Techniques

- **IPT validates a new requirement exists or a new solution must be considered based on established criteria**

Using the information generated from the most recent Operational Analysis and/or any quarterly operational status reports, the IPT may identify a new business need or performance gap (requirement). The IPT will also consult the EA PMO to see if a capability gap has been identified that is related to the solution. The EA is also used to see if any other existing solution offers the capability(ies) identified as a gap by the IPT's operational analysis. The new requirement is assessed as to whether modifications or enhancements to the current or other existing DOT solutions can satisfy it, or the proposition of a new IT solution needs to be considered. If current solution modifications can solve the deficiency, they should be analyzed for their cost, impact to other internal and external processes, and required time until implementation. If, however, several "new solution trigger" criteria established in the previous IPPM phase (Phase 8: *Operations and Maintenance*) have been reached or exceeded, and/or the analysis of current program modifications prove them to be exceedingly costly or negatively impact other processes and programs, the requirement is established as a new IT effort and the IPT should initiate a Business Needs Analysis.

- **IPT initiates Business Needs Analysis**

The IPT, in coordination with the Business Owner, completes a Business Needs Analysis to justify the new requirement. The IPT refers to the processes in Phase 1: *Program Initiation/Business Needs Analysis* of this guide for additional information, and continue through the IPPM framework to further plan, develop, and implement a new IT solution.

- **IPT determines disposition type (sunset, bulk, archive)**

With the start of a new IT effort, the IPT determines the future of the current solution. Depending on the size, complexity, and dependencies, as well as how much of the solution will

be replaced by the potential new solution, the current solution can either be retired (disposed) or archived. Typically, if it is determined that the solution is to be retired, it is done so in a progressive manner. This is also called a “sunset” disposition and involves the steady decrease in functionality and serviceability over time, as new IT solutions and their configuration releases are introduced to replace solution components. This is continued until the solution is made obsolete. The program may, however, be completely overhauled in a bulk disposition if the new solution can sufficiently replace the solution at the time of its deployment. Ultimately, if the solution is to be disposed, the type of disposition should be determined as part of the development of a comprehensive Disposition Plan (discussed further in the final process of this phase).

Another option the IPT may consider is to archive the solution, or to remove all practical serviceability of the solution, but maintain it as a legacy system for historical referencing purposes. Archiving a solution is typically only done under rare circumstances, such as extremely high program full disposition costs or an inability to convert critical data generated and/or stored by the solution to a compatible format for use elsewhere (likely the new solution replacing it). In this case, the IPT would develop a legacy system Maintenance Plan.

- **IPT develops legacy system Maintenance Plan if appropriate**

If the IPT determines it will archive the program, they develop a Maintenance Plan which explains where the legacy system will be maintained, who will be responsible for it, what security controls will be completed, and an explanation of the expected costs to archive the legacy system. The Maintenance Plan may also be used as the status document for the legacy system. Any changes in legacy system status can be recorded in the Maintenance Plan (or another suitable document as determined by the responsible IPT member).

- **IPT develops and executes Disposition Plan if the program is to be retired**

If the IPT determines the solution is to be retired, it develops and executes a Disposition Plan. The Disposition Plan is to include the following information:

1. Schedule of disposition activities
2. Identified data to be transferred or stored for reuse
3. Identified hardware and equipment to be disposed or reused
4. Communication Plan to inform stakeholders of disposition
5. Verification of security compliance for the disposition of classified programs
6. Program artifact storage plans

Outputs

The possible outputs (depending on disposition type) of this phase are:

- Business Needs Analysis
- Maintenance Plan
- Disposition Plan

Control Gate

- **OA IRB agrees with the high-level Business Needs Analysis and authorizes the Business Owner and the IPT to conduct a detailed exploration of current business needs and possible alternatives.**

The OA IRB reviews the Business Needs Analysis and consults with the OA PMO regarding sufficient justification and initial estimations (of benefits, cost, schedule, etc.). If the OA IRB determines that additional analysis needs to be performed and/or specific considerations need to be addressed, it will document its decision and make a request to the Business Owner. The OA IRB may reject the new requirement based on OA priorities or external constraints (congress or department priorities, budget constraints, etc.). If the OA IRB approves the proposed investment, the Business Owner may continue to the Definition Phase of the IPPM framework.

Appendix A: Definitions List

****Please note – some of the terms within this table are not in alphabetical order and are grouped according to subject relativity. ****

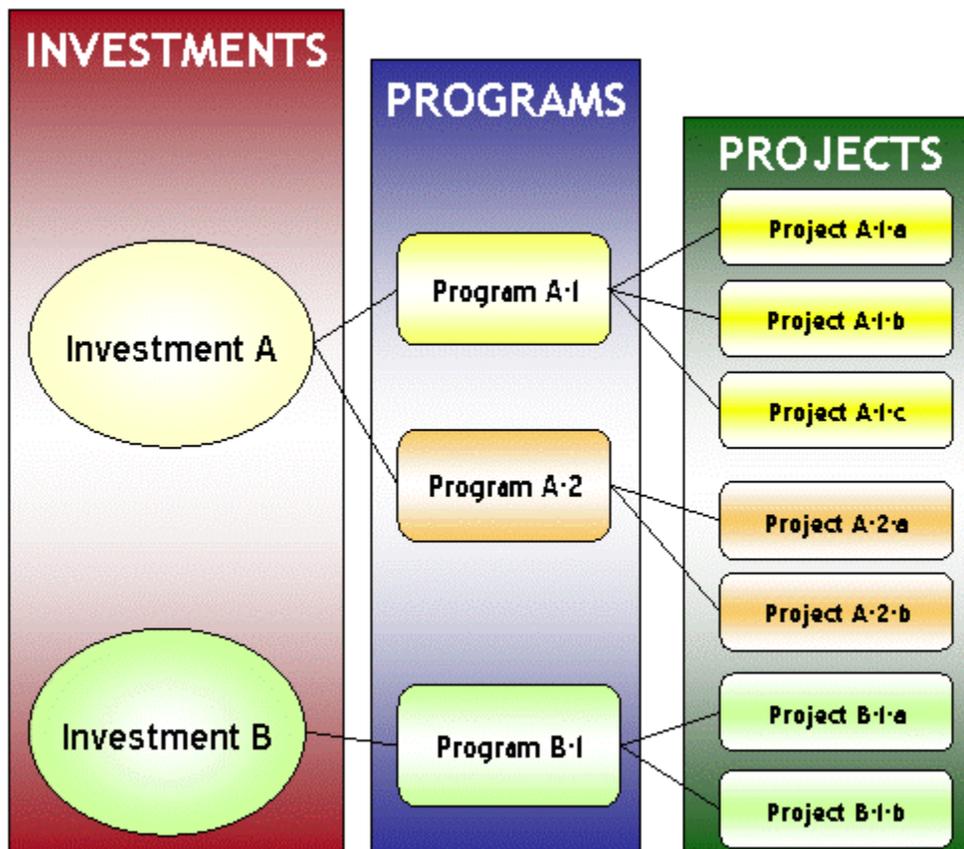
Term	Definition
Alternative Analysis	Definition and comparison of viable alternatives to fulfill business and Information management requirements. For more information on alternative analysis for major IT investments, refer to OMB Circular A-11 Section 300.
Assumptions	Assumptions are factors that, for planning purposes, are considered to be true, real or certain. Assumptions affect all aspects of project planning, and are part of the progressive elaboration of the project. Project teams frequently identify, document, and validate assumptions as part of their planning process. Assumptions generally involve a degree of risk.
Background Artifacts	Documents created in the process of making sound business decisions regarding IT investments including, but not limited to, alternatives analysis, benefit cost analysis, risk management plan, security plan, work breakdown structure, etc. They are also included as supporting documents for Exhibit 300s.
Baseline	The original approved plan (for a program, project, a work package, or an activity), plus or minus approved scope changes. Usually used with a modifier (e.g. program baseline, cost baseline, schedule baseline, performance measurement baseline).
Business Owner	A critical player to the success of IT systems and services is the business owner. The business owner is: the champion of the IT service initiative; a customer for whom the IT service is provided; the recipient of the IT system services; and the owner of the requirements for the system/service throughout the complete life cycle, from Program Initiation/Business Needs analysis through Disposition.
C & A	Certification and Accreditation (C & A) is a comprehensive assessment of the management, operational, and technical security controls in an information system, made in support of security accreditation, to determine the extent to which the controls are implemented correctly, operating as intended, and producing the desired outcome with respect to meeting the security requirements for the system. Accreditation is the official management decision given by a senior agency official to authorize operation of an information system and to explicitly accept the risk to agency operations (including mission, functions, image, or reputation), agency assets, or individuals, based on the implementation of an agreed-upon set of security controls.
CIO	The Chief Information Officer (CIO) is responsible for overseeing the processes and stakeholders who benefit from the success of DOT’s Integrated Project Planning & Management Investment Control (IPPM) program as well as an efficiently run IT investment portfolio.
Charter	A document issued by senior management that formally authorizes the existence of a program or project. And it provides the manager with the authority to apply organizational resources to future program and project activities.
Commodity IT	Information Technology services that include IT infrastructure (data centers, networks, desktop computers and mobile devices); enterprise IT systems (email, collaboration tools, identity and access management, security, and web infrastructure); and business systems (finance, human resources, and other administrative functions).
Constraint	Applicable restriction that will affect the performance of the project. Any factor that affects when an activity can be scheduled.
Contract	A contract is a mutually binding agreement that obligates the seller to provide the

	specified product and obligates the buyer to pay for it.
CPIC	Capital Planning and Investment Control (CPIC) is the process through which DOT’s Operating Administrations identify how a business need or opportunity can be addressed through technology. Coupled with the business area’s strategic planning activities, CPIC can help the business area to identify business opportunities and anticipate issues which may need technological solutions.
EA	An integrated set of components that captures organizational assets with the purpose of providing a basis for informed decision making across the enterprise. An EA includes a baseline architecture, target architecture and a sequencing plan. EA alignment refers to how well activities support the transition to the DOT Target Architecture. EA is a resource that should be consulted by the IPT during system planning and development. For example, it may be used to verify that a proposed system is not duplicative with existing systems or to determine what existing services and/or target technologies may be leveraged by the program.
Earned Value Management	<p>Earned Value Management (EVM) is a project management technique used for measuring project progress in an objective manner. EVM combines measurements of technical performance (i.e., accomplishment of planned work), schedule performance (i.e., behind/ahead of schedule), and cost performance (i.e., under/over budget) within a single integrated methodology. When properly applied, EVM provides an early warning of performance problems. Additionally, EVM promises to improve the definition of project scope, prevent scope creep, communicate objective progress to stakeholders, and keep the project team focused on achieving progress.</p> <p>OCIO is considering three levels of Earned Value Management:</p> <ul style="list-style-type: none"> • Earned Value Management 748: ANSI EIA 748 compliant Earned Value Management tracking meeting OMB’s requirements. Currently being considered for only the largest, most complex or highest risk investments. ANSI EIA 748 includes accounting system integration and <i>total</i> project definition including both contractors and federal FTE activities and costs. • Earned Value Management: Non ANSI standard Earned Value Management involving key aspects of EVM but eliminating some details that contribute to increased workloads and cost. Currently being considered for use with the majority of DOT investments to provide a balance between investment control capability and project overhead. <p>Cost/Schedule Tracking: For Small and Micro investments, cost/schedule tracking will provide basic investment tracking.</p>
FAC-P/PM	“Federal Acquisition Certification Program and Project Manager”. Project management certification level defined by the Federal Acquisition Institute. This certification represents an increase in mandatory project manager certification requirements focusing on acquisition competencies.
GAO	The U.S. Government Accountability Office is the investigative arm of the Congress (Legislative branch).
Goal	An aim towards which an Endeavour is directed. This type is also used for Objectives. An Objective is a high level planning item that sets an aim for the business to attain its Goals. Most organizations define Goals and Objectives together. A Goal and Objective can lead to another Goal and Objective.
IBR	Integrated Baseline Review (IBR) is a government-led review that is intended to ensure the government and contractor mutually understand program scope, schedule, resources, inherent risk, and management approach, and to ensure early and adequate planning. The IBR identifies risk items that naturally become part of the risk management plan. An IBR provides an opportunity for parties to review the Performance Measurement Baseline

	(PMB) and to reach agreement on the PMB's: (1) scope of work; (2) schedule; (3) resources requirements; (4) risks; and, (5) assigned EV recognition methods.
Information	The term "information" means any communication or representation of knowledge such as facts, data, or opinions in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual forms.
Initiative	Created by an organization in response to a driver or internal directives and defines the scope of the organizational work efforts performed.
Inter-governmental	These investments cross agency boundaries and are typically managed by a lead agency or shared service provider on behalf of participating agencies. DOT reports the investment but does not actively manage it (unless DOT is providing the service).
IPPM	The Integrated Program Planning & Management process is the process through which DOT's business areas identify how a business need or opportunity can be addressed through technology. Coupled with the business area's strategic planning activities, IPPM can help the business area to identify business opportunities and anticipate issues which may need technological solutions.
IPT	An Integrated Program Team (IPT) is a multi-disciplinary team led by a program manager responsible and accountable for planning, budgeting, procurement and life-cycle management of the investment to achieve its cost, schedule and performance goals. Team skills should include: budgetary, financial, Integrated Project Planning & Management, procurement, technical, architecture, earned value management, security, and other staff as appropriate.
IRB	The Investment Review Board (IRB) is comprised of DOT employees selected by their Departments/ Divisions who conduct IT investment reviews and assures the alignment of IT capital investments with the Department's strategic plan.
IT	Information Technology is any proposed acquisition of information technology or information technology-related resources to support a defined business need.
Maintenance	A change or group of changes to IT solutions that already exist in production, to enable them to operate according to the most recent set of approved requirements, and do not change functionality, features or capabilities. These requests typically result from defect/bug fixes, minor adjustments due to infrastructure changes, vendor patches/service pack releases, and minor version upgrades, but are not emergency/urgent, allowing for planned activities.
Milestone	A significant event in the program; usually completion of a major deliverable.
Mission Critical	The Federal Information Security Management Act requires agencies to identify telecommunications or information systems that if subject to loss, misuse, disclosure or unauthorized access, would have a debilitating impact on the mission of an agency. The Department accomplishes this through its FISMA and COOP activities. For purposes of this classification, we are using the COOP definition.
Mixed Life-Cycle	Mixed life-cycle investment means an investment having both development/modernization/enhancement (DME) and steady state components. For example, a mixed life-cycle investment could include a prototype or module of a system that is operational with the remainder of the system in DME stages; or, a service contract for steady state on the current system with a DME requirement for system upgrade or replacement.
Objective	Each goal has one or more objectives that define the principal areas of DOT concern within the overall goal. They may also provide quantitative measures of future performance and may list several "Strategic Targets" that provide additional quantification of Agency objectives.
OCIO	Office of the DOT CIO (OCIO) is the DOT business area whose responsibility it is to establish, maintain, and publish the IT Strategic Plan while ensuring that it is in alignment

	with the Department Strategic Plan and also making sure that DOT's IT programs and projects align with IT strategic outcomes
PMLC	A Program Management Lifecycle document outlines the program lifecycle processes (including processes and procedures from project initiation, to planning, to execution, monitoring and control) which Federal program managers are expected to implement and monitor.
Process	A permanent or semi-permanent collection of measurable, auditable, and repeatable activities that result in an output.
Quality Assurance	The process of evaluating overall project performance on a regular basis to provide confidence that the project will satisfy the relevant quality standards.
Requirements	<p>A requirement is a statement that identifies a solution or process operational, functional, or design characteristic or constraint, which is unambiguous, testable or measurable, and necessary for solution or process user/stakeholder acceptability. singular documented need of what a particular product or service should be or perform. It is a statement that identifies a necessary attribute, capability, characteristic, or quality of a system in order for it to have value and utility to a user.</p> <p>Business requirements describe in business terms what must be delivered or accomplished to provide value.</p> <p>Functional requirements identify what a solution or process must accomplish to produce needed behavior and/or results describe the functionality that the system is to execute.</p> <p>Performance requirements describes the measurable criteria that identifies a quality or attribute of a function or how well a functional requirement must be accomplished.</p>
Risk	An uncertain event or condition that, if it occurs, has a positive or negative effect on a program's objectives.
Risk Management Plan	Documents how the risk processes will be carried out during the program.
Specification	A document that fully describes a design element or its interfaces in terms of requirements (functional, performance, constraints, and design characteristics) and the qualification conditions and procedures for each requirement.
Stakeholder	Individuals and organizations that are actively involved in the program, or whose interests may be positively or negatively affected as a result of program execution or completion. They may also exert influence over the program and its results.
Statement of Work (SOW)	A narrative description of products or services to be supplied under contract. The SOW may also include the period of performance, acceptance criteria, and other information.
Strategy	A Strategy is a statement controlling what the business intends to do to achieve its goals and objectives.
System	An interconnected set of information resources organized for the collection, processing, maintenance, transmission, and dissemination of information, in accordance with defined procedures, whether automated or manual.
Task	Part of a set of actions which accomplish a job or assignment in a fixed interval of time.
WBS	The Work Breakdown Structure is a fundamental program/project management tool that defines the total scope of a program/project by describing planned outcomes and the work packages (activities) that deliver those outcomes.
Work Package	A deliverable at the lowest level of the WBS, when that deliverable may be assigned to another project manager to plan and execute. This may be accomplished through the use of a subproject where the work package may be further decomposed into activities.

Investment	Funding based on the program business case that supports acquiring, employing or producing IT or IT-related assets. The relationship between Investments, Programs and Projects are graphically represented below. IT investment portfolio is the reporting level to OMB using the OMB Exhibit 53 and Exhibit 300s.
Program	The aggregation of multiple, inter-dependent projects to consistently achieve business results, commonly including management of projects and attached resources as a portfolio, and incorporating continuous improvement of business processes and outcomes. A Program is a temporary organization or structure set up to drive and coordinate changes (such as Initiatives, Projects) in a business. The relationship between Investments, Programs and Projects are graphically represented below
Project	A temporary endeavor with defined start and end points undertaken to accomplish an approved IT investment, creating a unique product or service. Also, a discrete planned effort to achieve a specific goal or result within a predefined timeframe. The relationship between Investments, Programs and Projects are graphically represented below
Activities	Activities are discrete functions or components of a Project. Activities would align with work packets in a Work Breakdown Structure and give the Program manager a comprehensive list of functions that must be carried out in order to complete a Project.



OMB	U.S. Office of Management and Budget is an agency in the Executive Office of the President which is responsible for assisting the President in overseeing the preparation of the federal budget and to supervise its administration in Executive Branch agencies. In
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	addition, OMB oversees and coordinates the Administration's procurement, financial management, information, and regulatory policies. In each of these areas.
[OMB Circular] A-127	Office of Management and Budget Circular No. A-127 prescribes policies and standards for executive departments and agencies to follow in developing, operating, evaluating, and reporting on financial management systems.
[OMB Circular] A-130	Office of Management and Budget Circular A-130 prescribes federal information management requirements, including electronic systems, records management, information dissemination, IT security, and privacy.
[OMB Circular] A-11	Office of Management and Budget Circular No. A-11 outlines the requirements and exhibits which executive departments and agencies must complete for the federal budget process. Agencies must submit A-11 exhibits and artifacts annually in September.
Exhibit 300	IT investment business case summary required by the Office of Management and Budget as defined in OMB Circular A-11 Part 7.
Exhibit 300 Background Artifacts	Documents created in the process of making sound business decisions regarding IT investments including, but not limited to: Benefit-Cost Analysis and Alternatives Analysis meeting requirements laid out in OMB Circular A-94. Risk Management Plan meeting requirements laid out in OMB Circular A-11 Security Plan meeting requirements laid out by FISMA Acquisition Strategy meeting requirements laid out in the FAR Privacy Impact Assessment meeting requirements laid out in E-Government Act of 2002 Earned Value Management reports meeting ANSI EIA standard 748 Project Manager certification meeting requirements established by the Federal Acquisition Institute
Exhibit 53	IT portfolio summary required by the Office of Management and Budget as defined in OMB Circular A-11 Part 7.
Financial Management System	A system defined as “financial” according to the standards provided in OMB Circular A-127.
Major	Major investment means a system or acquisition requiring special management attention because of its importance to the mission or function of the agency, a component of the agency or another organization <ul style="list-style-type: none"> • Is for financial management and obligates more than \$500,000 annually • Has significant program or policy implications • Has high executive visibility • Has high development, operating, or maintenance costs • Is funded through other than direct appropriations • Or is defined as major by the agency’s capital planning and investment control process. <p>OMB may work with the agency to declare other investments as major investments. You should consult with your OCIO representative about what investments to consider as "major." Systems not considered "major" are "non-major."</p>
Non-Major	Non-Major IT Investment means any initiative or investment not meeting the definition of major defined above but is part of the agency's IT Portfolio. All non-major investments must be reported individually on the exhibit 53.
DME	Development/Modernization/Enhancement (DME) means the program cost for new investments, changes or modifications to existing systems to improve capability or performance, changes mandated by the Congress or agency leadership, personnel costs for investment management, and direct support. For major IT investments, this amount

	should equal the sum of amounts reported for planning and acquisition plus the associated FTE costs reported in the exhibit 300
Development	The program costs for a new or existing investment associated with building or configuring the solution to address the problem.
Modernization	The program costs for an existing investment associated with adding functionality or adding capacity to help address additional problems. Enhancements are typically referred to in terms of point releases or versions.
Enhancement	The program costs for an existing investment associated with adding functionality or adding capacity to help address additional problems. Enhancements are typically referred to in terms of point releases or versions.
Steady State	Pertains to activities performed as part of systems or infrastructure deployment activities following the completion of development, implementation, commissioning and acceptance. This includes post-production activities required to keep these systems operational and responsive to users' needs as originally intended. Steady state/maintenance investments do not include enhancements or new development.
Planning, Acquisition, and Operations and Maintenance Costs	<p>Planning means preparing, developing or acquiring the information you will use to design the project; assess the benefits, risks, and risk-adjusted life-cycle costs of alternative solutions; and establish realistic cost, schedule, and performance goals, for the selected alternative, before either proceeding to full acquisition of the capital project or useful segment or terminating the project. Planning must progress to the point where you are ready to commit to achieving specific goals for the completion of the acquisition.</p> <p>Acquisition is the procurement and execution of the project and includes system development modernization or enhancement (D/M/E).</p> <p>Operations and Maintenance includes the ongoing resource requirements necessary to support continued functioning of the delivered project. These costs include user support (e.g. responding to help desk tickets), refresher training, ongoing information security compliance (e.g. internal controls monitoring), operational analyses, and minimal adaptive maintenance (where planned).</p>

Appendix B: Acronyms List

AP	Acquisition Plan
BCA	Benefit Cost Analysis
BOAs	Basic Ordering Agreements
BPA	Blanket Purchase Agreement
CIO	Chief Information Officers
CO	Contracting Officer
DME	Development Modernization Enhancement
DOT	Department of Transportation
EVM	earned value management
FISMA	Federal Information Security Management Act
FSS	Federal Supply Schedule
GWAC	Government Wide Acquisition Contracts
IAs	and Interagency Agreements
IAPMO	Information Assurance and Privacy Management Office
IBR	Integrated Baseline Review
IDIQ	Indefinite Delivery/Indefinite Quantity
IPPM	Program Planning and Management
IPT	Integrated Program Team
IRB	Investment Review Board
IS	Information Systems
IT	information technology
ITMRA	Information Technology Management Reform Act
NIST	National Institute of Standards and Technology
OA	Operating Administrations
OCIO	Office of the Chief Information Officer
OMB	Office of Management and Budget
PMO	Program Management Office
PMP	Program Management Plan
POC	Point of Contact
RMP	Risk Management Plan
ROM	rough order of magnitude
RTM	Requirements Traceability Matrix
SME	subject matter expert
SOW	statement of work
SP	Special Publications
WBS	Work Breakdown Structure
CDR	Critical Design Review
EVMS	Earned Value Management System
C&A	Certification and Accreditation
PIR	Post Implementation Review

Section 3: IT Investment Work Pattern Tables

Major Investment Work Pattern

- Required – must be completed and submitted to OMB as part of the updated guidance provided to the Department
- Optional – it is recommended this be completed, but is not a required artifact to be submitted to OMB
- Update – The initial artifact should be updated as you enter a new phase in the development process to help ensure any changes to the environment have been evaluated and incorporated into the overall Program Management Plan

Non-Major Investment Work Pattern

Supporting Artifacts	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8	Phase 9
Consolidated Investment Plan	Recommended	Update	Update	Update	Update	Update	Update	Update	
Initial Funding Request	Optional		Update						
Program Charter		Optional							
Feasibility Analysis		Optional (recommended)							
Concept of Operations		Optional							
Benefit Cost Analysis			Optional (recommended)	Update	Update	Update	Update	Update	
Program Management Plan			Optional (recommended)	Update	Update	Update	Update	Update	
Risk Management Plan			Optional (recommended)	Update	Update	Update	Update	Update	
Risk Register			Optional (recommended)	Update	Update	Update	Update	Update	
Acquisition Plan			Optional (recommended)	Update	Update	Update	Update	Update	
Work Breakdown Structure			Optional	Update	Update	Update	Update	Update	
Program Schedule			Optional	Update	Update	Update	Update	Update	
Statement of Work				Optional					
Requirements Traceability Matrix					Optional				
Development Test Plan					Optional				
Certification & Accreditation						Recommended	Update	Update	
Configuration Management Plan						Optional	Update	Update	
Deployment Guide						Optional			
Operational Test Plan						Optional	Update	Update	
Post Implementation Review							Optional		
Operational Analysis								Recommended	
Disposition Plan									Optional

- Recommended – this is optional on the part of the OA, but provides an overview of the program that is useful to the Business Owners and Governance bodies
- Required – must be completed and submitted to OMB as part of the updated guidance provided to the Department
- Optional (recommended) – it is recommended this be completed, but is not a required artifact
- Update – The initial artifact should be updated as you enter a new phase in the development process to help ensure any changes to the environment have been evaluated and incorporated into the overall Program Management Plan