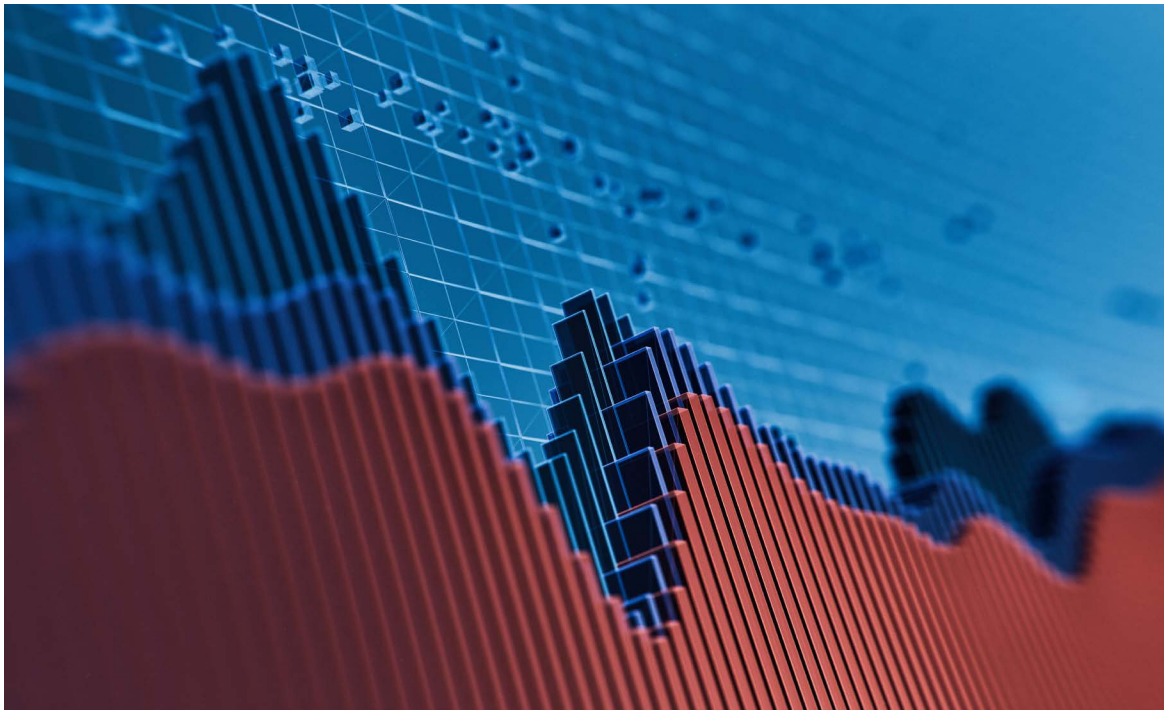




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A Portfolio Assessment Approach to Inform Resource Allocation Decisions



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About This Report

The budget for the Department of the Air Force (DAF) determines which missions, capabilities, and programs the DAF will fund each year. That budget is set through the Planning, Programming, Budgeting, and Execution (PPBE) process. PPBE is the U.S. Department of War's primary resource allocation mechanism;¹ it is an annual process that determines funding requirements and allocates resources accordingly. To align readiness goals with the capability gaps the budget would address, the DAF must set priorities and be able to trace investments back to capability gaps aligned with those priorities. Tracing investments to the capabilities they enable and the priorities they support is more difficult for cross-cutting portfolios that support multiple mission sets but do not directly support operational needs. For the purposes of this report, we define *cross-cutting portfolio* as a portfolio that is managed by a single entity but that contains a collection of investments supporting multiple missions and stakeholders across several functional domains or operational areas.

To support resource allocation in cross-cutting portfolios, RAND Project AIR FORCE was asked to develop an assessment approach to facilitate a structured process for evaluation of portfolios being reviewed within the PPBE process. The approach systematically evaluates capability gaps and the investments proposed within a portfolio, and it supports traceability and defensibility of the budget requested. Furthermore, the approach supports identification of overlaps in investments and capability gaps between the portfolio under review and others across the DAF.

This report, and the Microsoft Excel implementation of the approach,² is intended to support those responsible for managing portfolios and programs in the DAF, who must provide oversight and input to the PPBE process. Those responsible for cross-cutting portfolios with connections to multiple mission sets may find this report and evaluation approach it describes particularly useful. Other stakeholders involved in the PPBE process, including program element monitors (PEMs) and requirements owners, may also find this report useful, providing guidance and suggestions for ways to improve development and traceability through the capability and requirements development and investment processes.

This publication documents work originally shared with the DAF on August 8, 2025. The draft, dated September 2025, was reviewed by formal peer reviewers and DAF subject-matter experts.

RAND Project AIR FORCE

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¹ The Department of War is designated the Department of Defense under Public Law 81-216, National Security Act Amendments of 1949.

² The Excel file is available at www.rand.org/t/RR3667-1.

the United States Air Force and the United States Space Force. PAF provides the DAF with independent analyses of policy alternatives affecting the development, employment, combat readiness, and support of current and future air, space, and cyber forces. Research is conducted in four programs: Strategy and Doctrine; Force Modernization and Employment; Resource Management; and Workforce, Development, and Health.

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Summary

Issue

As part of the Planning, Programming, Budgeting, and Execution (PPBE) process, the Department of the Air Force (DAF) annually submits a budget request to Congress. That budget is meant to reflect a balanced prioritization of resources across multiple competing objectives, including filling the most urgent and critical operational capability gaps. However, cross-cutting portfolios that indirectly support multiple missions, such as enterprise information technology (EIT), installation energy, communications, and water infrastructure, are often underfunded, in part because the PPBE process is not structured to defensibly articulate and prioritize their critical role in mission success.

Portfolio reviews during the planning and programming phases offer opportunities to evaluate proposed resource allocations within and between portfolios. A dedicated assessment and evaluation function for cross-cutting portfolios at this stage could

- ensure that the selection and prioritization of investments within the cross-cutting portfolio are defensible, traceable, and reflect operational and strategic priorities
- inform trades between cross-cutting portfolios and mission-centric investments by better articulating the mission risk associated with not filling capability gaps.

To support the DAF's portfolio reviews, the Program Assessment and Evaluation (PA&E) office asked RAND Project AIR FORCE to develop a structured and repeatable assessment approach for cross-cutting portfolios proposed for future funding.

Approach

We developed an approach to guide the assessment of cross-cutting portfolios, along with a tailorable, prototype Excel workbook that implements this approach.³ The approach structures the evaluation of capability gaps and associated investments and informs the selection and prioritization of investments within a portfolio. It is designed to ensure that investments credibly address capability gaps and align with mission and strategy.

To develop the instrument questions and decision structure, we drew on lessons and observations from our experience supporting PA&E's pilot assessment of the DAF EIT portfolio. This support included reviewing cost data for EIT investments over time, evaluating historical and planning documents, and conducting discussions with DAF stakeholders about roles, responsibilities, and challenges within the EIT portfolio. We supplemented these lessons and observations with a more holistic review of DAF policy documents, past RAND reports on DAF requirements and the PPBE

³ The Excel file is available at www.rand.org/t/RRA3667-1.

process, and relevant academic literature. We then tested and iteratively refined the evaluation approach through a pilot assessment of a subset of the EIT portfolio.

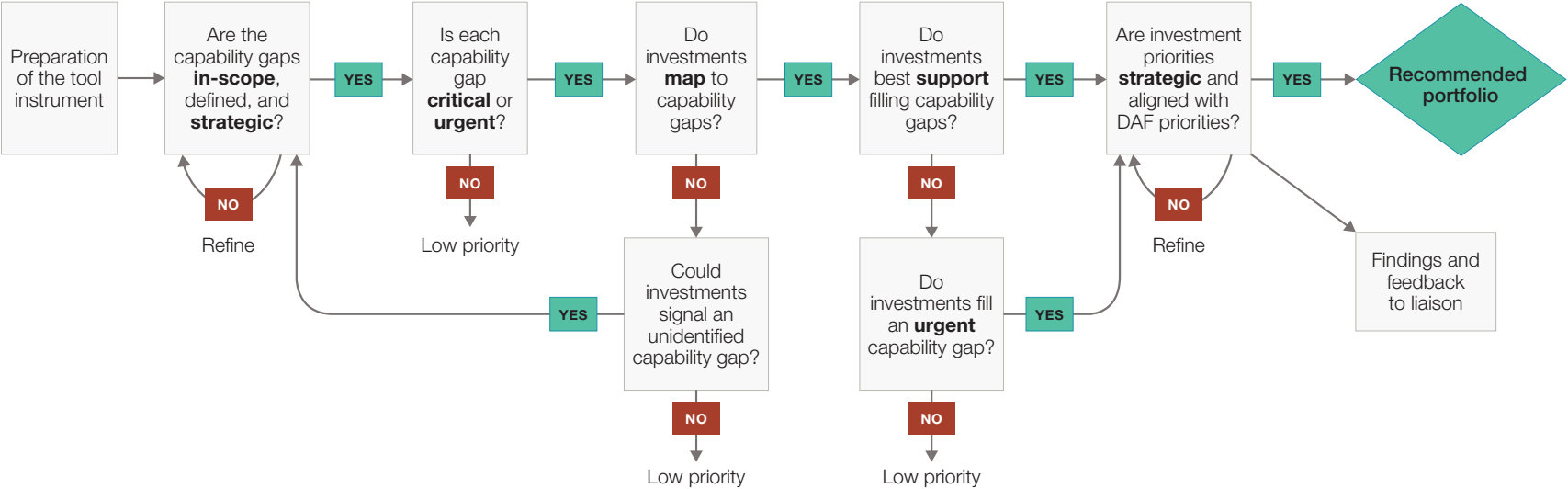
Key Findings

Cross-cutting portfolios, such as EIT, will likely always present unique challenges to portfolio owners and program element monitors (PEMs) working to promote and defend the value of proposed investments to DAF mission success. Our assessment approach provides a valuable portfolio evaluation step designed to inform decisionmakers as they progress through the steps in the PPBE process. Figure S.1 summarizes the steps of the approach, including five evaluation criteria:

- **In-scope:** whether the portfolio is informed by strategy and clearly defined, the capability gaps are relevant to the portfolio's stated mission, stakeholders are identified, and the motivation for review is documented.
- **Critical:** how essential filling each capability gap is to DAF warfighting missions.
- **Urgent:** whether filling each gap is urgent, either because of immediate or pressing threats or because of long lead times to build required personnel or resources.
- **Supportable:** whether each investment was developed using mature, transparent, and defensible processes and methods.
- **Strategic:** whether each investment aligns with leadership priorities and supports strategic objectives; also whether the method of prioritizing investments is objective and leads to clearly differentiated tiers of investment.

From our test of the approach, we found that the process of reviewing appropriate documentation and conducting discussions with stakeholders to assess the portfolio against these criteria provides valuable insights into a portfolio's strengths and weaknesses. Furthermore, outputs can elucidate recommendations for portfolio owners to improve their selection, prioritization, and justification of investments.

Figure S.1. Decision Tool Approach for Portfolio Assessment



Recommendations

Drawing on our discussions with EIT stakeholders and outputs from testing selected EIT investments, we recommend assessing the entire EIT portfolio using this approach. Such an evaluation could support DAF stakeholders as they develop the upcoming fiscal year 2028 Program Objective Memorandum (POM).

More generally, we recommend the following:

- Owners and reviewers of cross-cutting portfolios beyond EIT should apply the assessment approach as they prepare for the POM process.
- Stakeholders involved in capability and requirements development for cross-cutting portfolios should use the evaluation criteria and compile the relevant supporting documentation identified to strengthen decision traceability and improve portfolio management.

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Introduction

The Department of the Air Force (DAF) President's Budget request for fiscal year (FY) 2026 totaled nearly \$211 billion to maintain readiness and address key capability gaps.⁴ To determine which capability gaps the budget would address, and balance those against readiness goals, the DAF must set priorities and allocate resources to its needs. The Planning, Programming, Budgeting, and Execution (PPBE) process is the U.S. Department of War's (DOW's) primary resource allocation mechanism;⁵ it is an annual process that determines funding requirements and allocates resources accordingly.

The PPBE process, however, faces limitations in managing cross-cutting portfolios, such as enterprise information technology (EIT), installation energy, communications, and water infrastructure.⁶ These capabilities often do not map directly to an operational need, even though many missions depend on them. For example, information technology (IT) systems support information-sharing and communication, both critical components to many missions, from command and control to intelligence, surveillance, and reconnaissance (ISR). A cross-cutting portfolio supports multiple missions and stakeholders across several functional domains or operational areas, which complicates how requirements are defined and how investments are substantiated in the PPBE process. This complexity, combined with the PPBE structure—which ties funding to program elements (PEs)—often results in prioritizing highly visible investments (e.g., aircraft, munitions) over enabling infrastructure and, in turn, underfunding or fragmentation of cross-cutting portfolios.

In 2024, DAF established the Program Assessment and Evaluation (PA&E) office, under the Secretary of the Air Force,⁷ to support DAF strategic decisionmaking to improve resourcing decisions within the PPBE process. During its first six months, PA&E conducted a pilot project, supporting the Office of the Secretary of the Air Force, Office of the Chief Information Officer (SAF/CN), in reviewing the portfolio of DAF EIT investments.⁸ RAND Project AIR FORCE supported this effort by reviewing cost data relevant to EIT investments over time, evaluating historical and planning documents, and conducting discussions with stakeholders about roles, responsibilities, and challenges within the EIT portfolio. In addition to informing budget decisions about the EIT portfolio, the pilot

⁴ This reflects DAF discretionary funding; the total DAF budget includes an additional \$36 billion in mandatory funding (Department of the Air Force, Financial Management and Comptroller, "Department of the Air Force President's Budget Request FY26," undated).

⁵ The Department of War is designated the Department of Defense under Public Law 81-216, National Security Act Amendments of 1949.

⁶ See Table 1.1, Key Terms and Concepts, for definitions of cross-cutting portfolios and related terms.

⁷ The office code for PA&E is SAF/AE.

⁸ EIT is defined as "information technology aligned to the Information Environment Mission Area, including the following sub portfolios: connect, protect, compute/store, enterprise services, and end devices" (Air Force Instruction 17-110, *Information Technology Portfolio Management and Capital Planning and Investment Control*, Department of the Air Force, May 23, 2018, p. 7).

was meant to inform process and analytic products for future cross-cutting portfolio reviews. The pilot generated several lessons:

- Engage all stakeholders early in the process.
- Identify the capability gaps being filled by investments, and assess whether they are critical or urgent.
- Assess justification of investment choices and portfolio alignment with leadership priorities.
- Use a flexible but structured assessment process to promote consistency in evaluations and to enable continuous improvement in cross-cutting portfolio development.

These lessons motivate the need for a dedicated assessment and evaluation approach for portfolios like EIT. In this report, we describe and provide guidance for using an assessment approach developed to enable a structured but flexible and traceable process to evaluate DAF investments that support cross-cutting portfolios. At the time of writing, many of the DAF core requirements, capabilities, and budget generating processes were under review and considered likely to change. Furthermore, PA&E's role in reviewing portfolios as a part of the PPBE process was still being refined. As a result, we define the intended user flexibly and illustrate the types of roles and stakeholders necessary to execute the approach and the types of decisions this approach is well suited to inform, but we do not restrict our findings based on the current structure of PA&E.

The next section provides background on the key terms we use in the approach and systems within which the approach operates, primarily the PPBE process and portfolio reviews. The section draws on DAF processes for budget formulation, current at the time of writing.⁹

Background

The assessment approach draws on a small set of core “big A” acquisition concepts to define its units of analysis and objects under review.¹⁰ Table 1.1 provides definitions for the key terms we use frequently throughout this report.

⁹ At the time of writing, the PPBE process was undergoing significant review and reform. Congress established the Commission on PPBE Reform to examine the effectiveness of DoD's resourcing processes (Public Law 117-81, National Defense Authorization Act for Fiscal Year 2022, Section 1004, Commission on Planning, Programming, Budgeting, and Execution Reform, December 27, 2021). The commission's final report offered 28 recommendations to modernize and improve the PPBE system across all phases of the resourcing process (Commission on Planning, Programming, Budgeting, and Execution Reform, *Defense Resourcing for the Future: Final Report*, March 2024). DoD is pursuing related reforms aligned with several of the PPBE commission's recommendations (Office of the Under Secretary of Defense [Comptroller]/Chief Financial Officer, *FY 2026 President's Budget Activities and Proposals in Support of Planning, Programming, Budgeting, and Execution Reform and Other Budget Execution Flexibilities*, July 2025). Although these reforms are ongoing, the PPBE process remains the formal framework guiding DoD resource allocation. As roles, responsibilities, and processes for portfolio evaluation evolve, the DAF can update this approach to reflect those changes and apply it to accelerate future portfolio evaluations.

¹⁰ See the glossary for authoritative source definitions and citations for these and related terms.

Table 1.1. Key Terms and Concepts

Key Term	Definition
Mission	A <i>mission</i> consists of the key tasks to be accomplished and the purpose they serve, identifying what must be done and why. Missions represent distinct operational or strategic objectives that guide the DAF's employment of forces and resources to achieve desired outcomes.
Capability	The means or assets needed to perform the tasks or actions required to accomplish those missions under specified conditions and performance levels.
Capability gap	In the approach, each portfolio is defined by a set of capability gaps. These capability gaps connect to the capabilities needed to carry out DAF missions and speak to the value of the portfolio. Capability gaps can define new capabilities the DAF may need, or describe a sustainment need, where funding is necessary to sustain an existing but critical capability. We draw on concepts from the capability development processes, where a capability gap represents the “inability to meet or exceed a capability requirement, resulting in an associated operational risk, . . . [as a] result of no fielded capability, lack of proficiency or sufficiency in a fielded capability solution, or the need to replace a fielded capability solution to prevent a future gap.”
Investment	Each capability gap in the approach aligns to one or multiple budget lines that provide for a capability and fill the defined gap. In several steps within the assessment approach, we refer to <i>investments</i> as our unit of analysis. An investment, in this case, consists of groupings of budget line items. Investments are associated with an estimated cost determined as part of the resource allocation process. Each investment is generally an allocation of resources intended to develop, procure, field, operate, or sustain a capability or solution (materiel or nonmateriel) that is intended to close a capability gap.
PE	The smallest unit of resource identification in the Future Years Defense Program (FYDP). Each PE represents a distinct set of activities and associated resources that together form the building blocks of the programming and budgeting system. PEs can be grouped to show total resources for a program, system, or other logical or functional grouping.
Program	A “directed, funded effort” to provide “a new, improved, or continuing” capability “in response to an approved need.” Programs are the building blocks of portfolios and are managed to deliver specific capabilities that support mission objectives.
Portfolio	This is the starting point for analysis within the assessment approach. In the approach, a portfolio is a coherent set of programs managed by a single entity and, within those programs, capabilities that all serve a similar set of needs or advance a set of goals.
Cross-cutting portfolio	Contains programs and associated capabilities that support multiple missions and stakeholders across several functional domains or operational areas.

SOURCES: Features information from Chairman of the Joint Chiefs of Staff Instruction 5123.011, *Charter of the Joint Requirements Oversight Council and Implementation of the Joint Capabilities Integration and Development System*, Joint Chiefs of Staff, October 30, 2021, p. GL-8 (defines capability gap); Defense Acquisition University, “Acquisition Program,” webpage, undated-a (defines program).

All DOW components (i.e., military departments and defense agencies) follow the DOW-wide PPBE process to make annual resource allocation decisions.¹¹ The PPBE cycle has four phases—Planning, Programming, Budgeting, and Execution—with some overlap. The cycle “typically begins more than two years before the expected year of budget execution.”¹²

In Planning, each service aligns strategy, policies, and priorities with the latest National Security Strategy and other national guidance. Programming translates those planning decisions—as well as departmental and congressional guidance—into resource allocations and organizes them into programs that span five years in the FYDP. Each component submits a Program Objective Memorandum (POM) to the Office of the Secretary of War (OSW) for Program Review, typically in early summer. During this same period, OSW’s Cost Assessment and Program Evaluation (CAPE) office and the Office of the Under Secretary of War (Comptroller)/Chief Financial Officer (OUSW[C]) conduct concurrent program and budget reviews. Following review and any adjustments, the Secretary or Deputy Secretary of War signs a Program Decision Memorandum that finalizes POM decisions.

Each component then prepares a Budget Estimate Submission (BES), typically in late summer. The BES updates the POM to reflect changes in costs, schedules, or other adjustments, which becomes the new baseline for departmental budget deliberations. In practice, the Budgeting phase overlaps with Programming and produces DOW’s integrated Budget Submission for review by the Office of Management and Budget (OMB), supported by OUSW(C). The Comptroller continues to issue decisions and adjustments throughout this period until DOW’s Budget Submission is finalized and transmitted to OMB for inclusion in the President’s Budget and submitted to Congress. In Execution, programs are carried out, and expenditures and outcomes are monitored against OSW goals, supporting DOW’s Annual Performance Report.

There are opportunities for review and evaluation of program resource allocations within each phase, but this report, and the assessment approach it describes, focuses on Programming and Budgeting, when components develop programs and budgets before POM submission. In the DAF, the set of deliberative bodies that run this process is called the Corporate Structure. During the Programming and Budgeting phase, in the Panel stage, program element monitors (PEMs) advocate for their programs within panels defined around missions and mission support areas. In this Panel stage, trades and compromises are made across missions. These are informed by inputs from Air Force major commands and Space Force field commands and aim to provide a thorough review of PEs relevant to the portfolio.¹³ Portfolios then proceed to the DAF Group stage, which is the first stage in which trades are made across the component (service). Higher-level reviews at the board and council levels refine these decisions. As a final step, DAF strategic priorities and portfolio alignment are reviewed and discussed during the 4-Star Summarizing event.

¹¹ The description of the PPBE process that follows draws on Department of Defense Directive 7045.14, *The Planning, Programming, Budgeting, and Execution (PPBE) Process*, U.S. Department of Defense, January 25, 2013, change 1, August 29, 2017; Defense Acquisition University, “Planning, Programming, Budgeting & Execution Process (PPBE),” webpage, undated-c; Defense Acquisition University, “Program Decision Memorandum (PDM),” webpage, undated-e; Defense Acquisition University, “Program Budget Decision (PBD),” webpage, undated-d; and Brendan W. McGarry, *Defense Primer: Planning, Programming, Budgeting, and Execution (PPBE) Process*, Congressional Research Service, IF10429, December 6, 2024.

¹² McGarry, 2024, p. 1.

¹³ Defense Acquisition University, undated-c.

Assessment Approach

The activities described in the previous section tend to focus on portfolios aligned with specific missions or functional areas. However, numerous DAF organizations have a stake in cross-cutting portfolios, which are often managed at an enterprise level, pulling inputs from multiple sources. For example, SAF/CN manages EIT portfolio planning and conducts annual investment reviews that recommend whether investments should continue, be modified, or be terminated. The process involves numerous other stakeholders and inputs:

- Air Force Deputy Chief of Staff for Warfighter Communications and Cyber Systems (AF/A6), which sets policy for the portfolio
- Air Combat Command, Office of Cyberspace and Warfighting Communications (ACC/A6),¹⁴ which is the requirements owner
- Sixteenth Air Force (Air Forces Cyber) (16AF), Cyber Capabilities Command, and Air Force Installation and Mission Support Center provide inputs to ACC/A6 and other operational stakeholders
- numerous governance bodies (e.g., EIT Council, Information Technology Governance Executive Board and Group) work with SAF/CN to manage the portfolio.¹⁵

This diffuse alignment poses a challenge for PEMs responsible for championing EIT programs and investments within the DAF-wide PPBE process.

The evaluation approach presented in this report is designed for cross-cutting portfolios: those that include programs and associated capabilities supporting multiple missions and stakeholders. It is designed to guide analytic teams supporting portfolio reviews within the PPBE process by systematically evaluating capability gaps and the investments proposed within a portfolio to address them while generating transparent funding justifications. This evaluation informs the selection and prioritization of investments within a portfolio—an objective common to many portfolio reviews. The structured assessment of the approach can also be useful to requirements owners and managers and PEMs by providing an organized and reproducible way to document, assess, and defend portfolio choices in preparation for POM review processes.¹⁶ The approach is not a substitute for analytical elements of the programming and budgeting processes, or for the capability and requirements development processes. Instead, it captures information from those processes to ensure traceability and defensibility in resource allocation.

While outputs and products are generated from use of the approach, a primary outcome of its use is the analytic team's understanding of the portfolio and the value derived from its investments. Such

¹⁴ Recent changes with the DAF organizational structure have shifted these responsibilities from Deputy Chief of Staff for Intelligence, Surveillance, Reconnaissance and Cyber Effects Operations (Headquarters Air Force A2/6) to AF/A6 (see Emmeline James, "Air Force Stands Up A6 for Warfighter Communications, Cyber Systems," U.S. Air Force, July 24, 2025).

¹⁵ At the time of writing this report, new organizational structures and new roles were being considered for the EIT portfolio. The selection of stakeholders discussed here reflects our understanding of the primary EIT stakeholders and relationships at the time we conducted the research.

¹⁶ At the time of writing, many DoD processes for development of capabilities, requirements, and budgets are under review and likely to change. Such DoD changes are likely to affect the DAF. After new processes for resource allocation are finalized, the steps and instruments within this approach should be reviewed and updated to reflect current process and available data and documentation. The fundamental concepts used are likely still relevant to any budgetary review process.

intangible but critical outcomes are common in the field of systems engineering, and this approach draws heavily from related systems-based principles, including (1) provide a clear definition of the system, (2) encourage communication among stakeholders, (3) apply a top-down approach, (4) provide structure to organize an analysis, and (5) support documentation of decisions.¹⁷ Drawing on these principles, the steps we define move the analyst from a bottom-up approach, analyzing specific capability gaps or investments, to a top-down approach, considering how the portfolio captures trade-offs, prioritizes resources, and supports DAF leadership goals. It supports analysts in answering the strategic questions that motivated the portfolio review, requires them to do their homework on the portfolio, and focuses their review of investments by providing a structure and objective. Answering the detailed questions included in the approach requires analysts to critically review documents and talk with stakeholders, steps that help them develop a comprehensive understanding of the portfolio. Stakeholders will likely benefit from participating in the process, too, as systems approaches have been found to support better communication and traceability of information about the system.¹⁸ We avoid being too prescriptive in our approach to allow application to a wide variety of portfolios, and we encourage tailoring the instruments to support a variety of objectives that could motivate a portfolio review.

Overview

Our approach starts with a portfolio. Each portfolio maps to one or multiple capability gaps. Each capability gap maps to one or multiple investments. Capability gaps and investments are evaluated using a set of assessment questions designed to ensure that investments reflect credible requirements and capability gaps, trace to mission and strategy, account for delivery constraints, and remain adaptable as conditions evolve. This is accomplished through a five-step process, with each step triaging capability gaps or investments that lack sufficient documentation or need further analysis. Reviews begin at the portfolio level, which is first decomposed into capability gaps. Steps 1–2 evaluate those gaps. Steps 3–5 shift focus to the investments that constitute the budget for the portfolio.¹⁹ Assessments at each step are accomplished using a set of questions, or instrument,²⁰ that aligns to the approach’s five portfolio evaluation criteria:

¹⁷ Naval Systems Engineering Steering Group, *Naval Systems Engineering Guide*, 2004; Defense Acquisition University, *Defense Acquisition Guidebook*, September 22, 2020; International Organization for Standardization, *Systems and Software Engineering—System Life Cycle Processes*, standard, Geneva, Switzerland, ISO/IEC/IEEE 15288, May 2015; National Aeronautics and Space Administration, *NASA Systems Engineering Handbook*, SP-2016-6105, February 6, 2019; Lauren A. Mayer, William Shelton, Christian Johnson, Daniel Adducchio, Raza Khan, Suzanne Genc, Danielle C. Tarraf, and Nahom M. Beyene, *Improving the Technical Requirements Development Process for Weapon Systems: A Systems-Based Approach for Managers*, RAND Corporation, RR-A997-1, 2022.

¹⁸ Mayer et al., 2022.

¹⁹ Portfolios are often defined by the PEs they fund. These PEs are necessary when navigating many financial and cost data programs but are not analyzed directly within the approach.

²⁰ The instruments developed to evaluate portfolios against these evaluation criteria are grounded in disciplined practices for filling capability gaps and selecting appropriate investments. By drawing on these practices, the evaluation approach enables data-driven analysis with a reproducible process to improve decisionmaking across the DAF. It aims to deliver actionable insights within time, budget, and threat constraints; support strategic decisionmaking aligned with DAF priorities; sustain organizational health; and address long-term challenges. Appendix B describes the design, the rationale for the evaluation criteria used in each step, and the development of the assessment instruments.

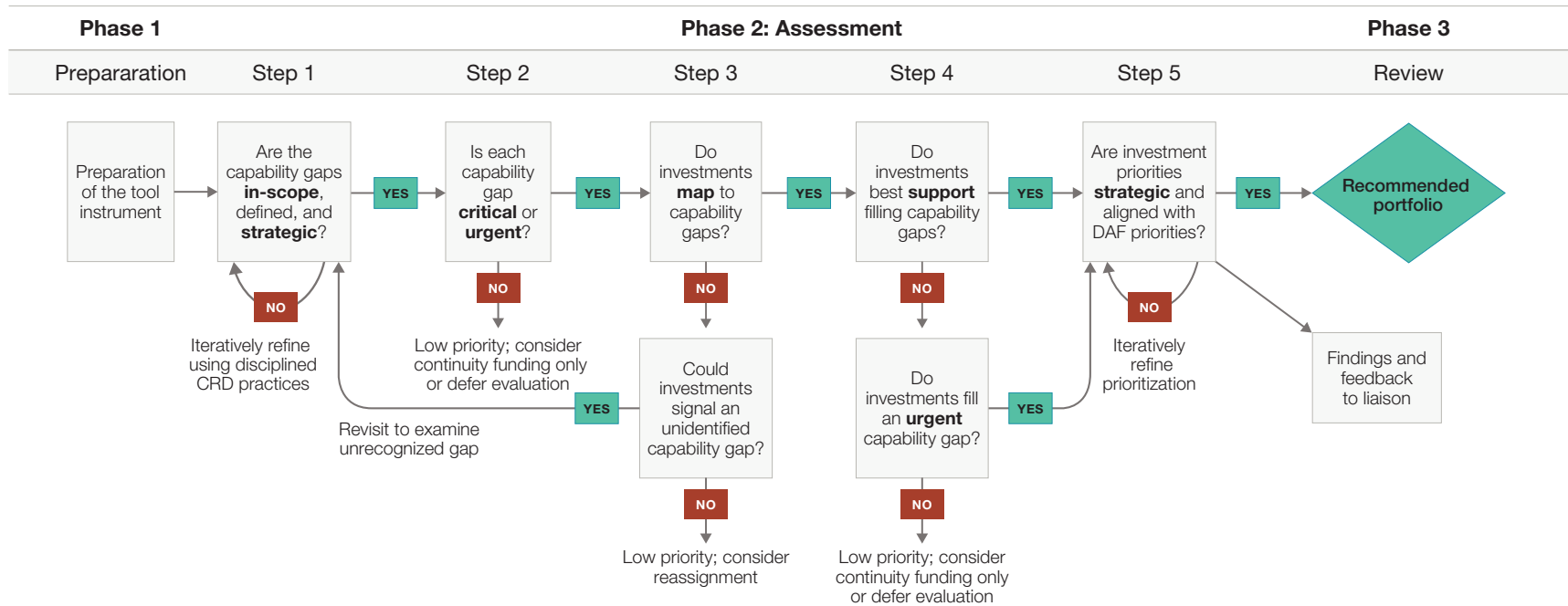
- **In-scope:** whether the portfolio is informed by strategy and clearly defined, the capability gaps are relevant to the portfolio's stated mission, stakeholders are identified, and the motivation for review is documented.
- **Critical:** how essential filling each capability gap is to DAF warfighting missions.
- **Urgent:** whether filling each gap is urgent, either because of immediate or pressing threats or because of long lead times to build required personnel or resources.
- **Supportable:** whether each investment was developed using mature, transparent, and defensible processes and methods.
- **Strategic:** whether each investment aligns with leadership priorities and supports strategic objectives; also whether the method of prioritizing investments is objective and leads to clearly differentiated tiers of investment.

Figure 1.1 summarizes these five steps and the top-line question each step asks that aligns to the criteria.²¹ The accompanying Microsoft Excel workbook, which implements our approach, guides a user through the five steps, implements triaging, and provides a central place to record instrument responses, their justification, and related evidence or artifacts.²²

²¹ Each step evaluates one criterion, with the exception of Step 2, which includes two: whether capability gaps are critical and whether they are urgent. We combine these evaluation criteria because we found that capability gaps can be priorities if they are critical or urgent.

²² The Excel file is available at www.rand.org/t/RRA3667-1.

Figure 1.1. Decision Tool Approach for Portfolio Assessment



NOTE: CRD = capability requirements development

Execution Phases and Timelines

Use of the assessment approach is divided into three phases, expected to take six months total:

- **Phase 1: Preparation (1 month).** Tailor the assessment approach and instruments for a new portfolio review. Update and refine the Excel workbook to reflect any modifications to the approach. Most Phase 1 tasks are the responsibility of DAF leadership and the assigned team leader selected for the portfolio review.
- **Phase 2: Assessment (3–4 months).** Conduct detailed portfolio evaluation using the Excel workbook. The analysis team executes Phase 2, with input from internal and external subject-matter experts (SMEs). Approach execution timelines may be shortened or lengthened as needed.
- **Phase 3: Review (1–2 months).** Characterize or summarize results from Phase 2 to inform POM budget justifications. The team leader works with the analysis team and PEMs to prepare for PEM parades and for group, board, and council review meetings.

Many portfolio reviews must be completed in less than six months to ensure that results can inform DAF leadership on quick-turn decisions. In such instances, collecting data and input from stakeholders—a common driver of longer timelines—can be streamlined and expedited through application of this approach as a workshop. Such a workshop might convene all the key stakeholders and select instrument questions to facilitate group discussion and rapid evaluation of the portfolio. An output of such a workshop could be identifying and justifying the investments considered most important. Alternatively, if the portfolio review is motivated by a specific DAF leadership question, such as how to justify a specific budget disconnect, the workshop should draw on the instruments that support answering that question. Following the workshop, analysts can focus on collecting documentation and additional analysis based on preliminary findings.

Implementation Considerations

The assessment approach, implemented as an Excel workbook, is designed for collaborative use. In practice, effective implementation will require an IT environment that allows multiple users to view, comment, and modify content. While the current Excel workbook is a prototype and does not prescribe a hosting solution or differential permissions, teams should plan for integration into an environment (e.g., SharePoint, Teams, or another controlled-access workspace) that balances collaboration with version control and data integrity.

Limitations and Assumptions

The assessment approach evaluates a portfolio's capability gaps and investments, the processes used to prioritize investments, and whether they support DAF strategic goals. It does not directly inform requirements and capability development processes or recommend changes to the solutions implemented by investments, but it can inform where further analysis might strengthen these other

processes. The approach is designed to support evaluation within the PPBE process as currently defined. As new processes replace the Joint Capabilities Integration and Development System (JCIDS), future adjustments to this portfolio evaluation approach might be required. The approach described here was informed by our experience supporting the PA&E EIT pilot; testing on another cross-cutting portfolio may recommend modifications to improve the approach's overall usefulness. Such testing is also expected to identify additional functionality that could improve the Excel workbook. The workbook that accompanies this report serves as a prototype and, as its function within new DAF processes clarifies a more formalized implementation, could be useful to users.

The approach relies on data, information, and SME inputs specific to each portfolio. Without access to these sources, it cannot reliably evaluate a portfolio or support the portfolio review process. At minimum, data on portfolio-specific investments and their budgeted costs are necessary to implement the evaluation approach. The approach's evaluation criteria and instruments are grounded in disciplined practices identified in the literature and DAF policy, as well as discussions with SMEs and experience with the EIT investment review. However, each portfolio is unique. Assessment teams should adapt evaluation criteria and instrument as needed.

Organization of This Report

This report is organized into three chapters, two appendixes, and a glossary. Chapter 1, this introduction, introduced the assessment approach and motivated its use within the larger PPBE process. Chapter 2 is an implementation guide that walks through each step of the approach and the Excel workbook that implements it. It describes the purpose of each step, explains how to apply the instrument, and discusses how information flows across steps. Chapter 3 concludes the report with a summary of the approach, a high-level demonstration of the prototype Excel workbook, and potential next steps.

This report also includes two appendixes and a glossary. While Chapter 2 provides an overview of the approach's implementation, analysts implementing the approach for detailed portfolio reviews should refer to Appendix A for detailed instructions. Appendix A also provides lists of resources likely to help analysts conduct an assessment. Appendix B documents the methodology and justification for the design of the approach. The glossary defines key terms used in developing the approach.

Implementation Guide

This chapter serves as an implementation guide for the portfolio assessment approach we designed and a prototype Excel workbook that implements the approach. Subsections walk through each phase of the assessment approach and the individual steps for implementation. The approach is intended to be implemented by a small team of independent analysts external to the organization responsible for the portfolio. An external team provides a neutral and fresh perspective during the review. In addition to providing guidance on applying the approach's instruments and the information needed to answer the underlying questions, we describe how the approach triages capability gaps and then investments within the portfolio to make the evaluation process more efficient. This chapter also discusses how to manage the flow of instrument questions and exit criteria that indicate when each step is complete. Appendix A provides additional detailed instructions necessary to use the Excel workbook for a portfolio review, suggested instrument questions, and references to assist analysts in completing the evaluation. Appendix B documents the rationale and supporting documentation about the methods we drew on in developing each step within the assessment approach.

Phase 1: Preparation

During Phase 1, a portfolio is identified for review, roles and responsibilities of participating organizations and personnel are defined, the scope of the evaluation is established, and foundational portfolio documents are compiled. As a final step in the preparation phase, the instruments must be tailored to the specific portfolio, exit criteria defined, and the Excel workbook that implements the approach handed over to the analysis team conducting Phase 2: Assessment.

Identify the Portfolio to Be Reviewed

The assessment approach is most informative if applied at the beginning of the annual PPBE process. If DAF leaders identify portfolios for review at this stage, information gleaned from the conducting the approach should be available to inform the POM and support PEM evaluations. Portfolios considered for review will likely be those relevant to DAF leadership priorities or those with unresolved questions or concerns.

Assign Roles and Responsibilities

Once a portfolio is selected, DAF leadership should select an organization to execute the independent review.²³ The executing organization could be PA&E, which supported the FY 2027 EIT investment review and demonstrated the relevant skills and structure to execute a portfolio review.²⁴ However, another office with the relevant expertise could also serve as the executing organization.

The executing organization is then responsible for assigning roles. At a minimum, every portfolio analysis team will have a team leader, analysts, and internal and external SMEs. The analysis team will be responsible for executing the assessment approach, documenting results and providing input, insights, and suggestions to the PEM(s), Panel chair(s), and the portfolio owner based on their findings. Collectively, the analysis team must have knowledge of

- PPBE processes
- requirements development
- portfolio management
- interviewing and group facilitation methods
- Microsoft Excel skills.

In addition to considering the knowledge and skills needed by personnel across the analysis team, assigning specific roles to individuals will facilitate the process. Suggested roles include the following:

- **Team leader:** Responsible for leading the analysis, tailoring instruments to the portfolio, developing exit criteria to assess whether analyses are complete, providing quality assurance review, and making final decisions. As the interface with DAF leadership, this person must have strong communication skills and knowledge of the PPBE process and DAF strategic goals.
- **Analyst:** Responsible for reviewing documents, data, and interviews and making final determinations to answer each instrument question and execute the overall approach. The team of analysts work together to ensure consistency and accuracy in instrument use. Analysts and the team leader make up the analysis team referenced throughout this report.
- **Facilitator/interviewer:** Should be familiar with the assessment approach and purpose of the portfolio's evaluation. Most importantly, they should have experience or training in interview and facilitation methods. This role requires sufficient knowledge of the portfolio to engage with SMEs and ask follow-up questions relevant to the approach. Furthermore, the role serves as the primary point of contact for all internal and external SMEs.

²³ The general team responsibilities reflect current objectives of portfolio review, and our suggested approach to team structure and the definition of specific roles is informed by (1) stakeholder interviews and reviews of policy and guidance on portfolio management and (2) disciplined practices in capability and requirements development discussed in this report.

²⁴ At the time of writing, a new Requirements and Resourcing Alignment Board is being considered along with review of many DoD processes for development of capabilities, requirements, and budgets, all of which are likely to affect the DAF (Tony Bertuca, "Mahoney Ready to Accelerate Acquisition and Budget Reform," *Inside the Pentagon's Inside Missile Defense*, Vol. 31, No. 19, September 17, 2025). Until processes are finalized and the responsibilities of budget review are assigned to a specific office, the user of this approach must remain flexible. We anticipate that any new process will include a review process, and components of this approach will be useful.

- **SME(s):** While internal and external SMEs will be included in discussions and their expertise elicited to answer many of the instrument questions, at least one team member should have subject-matter expertise relevant to the portfolio and provide context during internal discussions.
- **Liaison:** Representative from the organization that owns the portfolio who is assigned to support the analysis team. As the analysis team completes steps within the assessment approach, this person helps promulgate and distribute information to the appropriate stakeholders. This could be the requirements owner or other key stakeholders with knowledge of the portfolio roles and responsibilities. The liaison also provides continuity and supports implementation of any findings or lessons learned from executing the portfolio assessment approach.

Beyond the analysis team, SMEs with detailed knowledge of the portfolio must be identified. The team leader is responsible for recruiting external SMEs and soliciting their support for the portfolio review. External SMEs should be selected based on the skills and expertise of the analysis team. SMEs with detailed and historical knowledge of the portfolio at the operational and technical levels will provide necessary input to inform the analysis team about the intricacies of need, previous decisions, and pilot programs. SMEs with knowledge of how capability gaps, requirements, and investments are developed and defined will support a thorough understanding of processes and assumptions within the portfolio.

Define the Scope and Motivation of the Portfolio Review

After selecting the team leader and initiating the review, leadership from the executing organization and the team leader should meet with DAF leaders to discuss their motivations for selecting a specific portfolio for review. The goal of this meeting is to answer foundational questions, such as the following:

- What questions or concerns motivated review of this portfolio?
- What role does this portfolio play in directly or indirectly supporting DAF strategic objectives?
- Are there any concerns or problem areas where DAF leaders would benefit from further information?
- Are there specific stakeholders the analysis team should speak with, either because their expertise is relevant to the portfolio or because their input motivated the portfolio review?

Following this conversation with DAF leadership, the executing office and team leader should finalize the analysis team members and roles.

Compile Foundational Documents

With an analysis team assembled, the team can initiate discussions with the liaison and any SMEs referred by DAF leadership. Ahead of these initial discussions, the analysis team should submit an initial request for documents. While documents will be collected throughout Phase 2, during

execution of the assessment approach, some documents are necessary for any portfolio review and should be requested up front to expedite analysis.

Relevant documents may include the following:

- portfolio strategic plan, charter, or equivalent documentation that defines the portfolio's purpose and composition
- historical funding records, defining PEs within the portfolio and past budgets²⁵
- PEM parade documents describing the portfolio during prior PPBE cycles²⁶
- contracts funded within the portfolio
- capability gaps defined within each portfolio
- capability requirements and/or technical requirements defined to fill those capability gaps
- budget line-item data describing investments identified for funding during preliminary POM development processes or generated for the previous FYDP.

Documents do not need to provide an exhaustive history or detail all aspects or decisions within the portfolio. Additional documents recommended for consideration during each step are provided in Appendix A.²⁷

Set Up the Excel Workbook

Drawing on information gathered from discussions with DAF leaders, the team leader should tailor the Excel workbook and complete the initial setup steps (see Appendix A for detailed tasks and instructions). The two most important parts of this step are selecting the instrument questions and defining the exit criteria for each step. Each step of the approach groups instrument questions into categories. Categories provide an organizing structure for the instrument each step uses to evaluate the portfolio. There is a trade-off between the number of questions needed for accurate assessment and overburdening the analysis team. To facilitate an efficient process, we recommend including at least one question in each category but keeping the number of questions as low as possible within any single step. Specific questions should be selected to ensure that the questions posed by DAF leadership can be addressed.

After selecting the relevant instrument questions, the team leader must assign each question a type: required, priority, or standard. Table 2.1 summarizes the three types of questions the team leader can define. These question types are used to develop binary go/no-go classifications that

²⁵ Funding records are typically available through the Program and Budget Enterprise System, known as PBES.

²⁶ A *PEM parade* is a structured review conducted to prepare for developing the POM. During a PEM parade, PEMs present their portfolio of PEs to Corporate Structure Panels to identify potential issues and confirm funding requirements. The materials developed for these reviews (e.g., briefing slides, papers) form the basis for subsequent resource allocation decisions and are compiled into "Brain Books" maintained by each Panel's office of primary responsibility (Department of the Air Force, *Planning, Programming, Budgeting and Execution System Training Program Reference Manual*, produced by Science Applications International Corporation for the Department of the Air Force, Headquarters Air Force, Directorate of Programs [AF/A8], January 2025). PPBE documentation, such as PEM parade documents, are typically available through PBES.

²⁷ Specific documentation types identified throughout these steps are illustrative. Actual sources may differ depending on the type of capability or investment, its life-cycle stage, the responsible service or organization, and other contextual factors.

expedite the assessment. The resulting AND-OR logic defines the flow of questions throughout the approach.

Table 2.1. Overview of Question Types and Implications for Question Logic

Question Type	Definition	Resulting Action Based on Question Response
Required	Questions represent necessary conditions; a “no” disqualifies the capability gap or investment from further analysis	If the analysis team determines that the condition for this question HAS NOT been met, evaluation of this step can cease, and the gaps/investments are not prioritized further. If the condition has been met for this question, proceed with the next question.
Priority	Questions represent sufficient conditions; a “yes” qualifies the capability gap or investment to advance to the end of the step without answering additional questions	If the analysis team determines that the condition for this question HAS been met, evaluation of this step can cease, and the gaps/investments can proceed directly to the next step. If the condition HAS NOT been met for this question, analysts must proceed with the next question.
Standard	Questions contribute to the overall assessment but do not provide enough information alone to assess the capability gap or investment. This is the default question type.	For each of these questions, the analysis team evaluates the condition and records whether the question condition has or has not been met and proceeds with the next question.

When selecting instrument questions, the team leader must also consider the percentage of questions that need to be answered affirmatively for each capability gap (in Steps 1–2) and investment (in Steps 3–5) to advance to the next step. The Excel workbook automatically calculates the score for each capability gap or investment under review.

Based on responses, each capability gap or investment is assigned to one of two sets: Advance or Return. Items in the Advance set have met the required threshold and move forward to the next assessment step. Items in the Return set have not met the threshold or have failed a required question and are sent back for further review, revision, or exclusion. This mechanism ensures that only those capability gaps or investments meeting defined conditions continue through the assessment process.

Define the Unit of Analysis for Each Step

After reviewing the instrument questions, the analysis team must define the unit of analysis for the evaluation. To do this, the analysis team should first enter the necessary datasets into the assessment approach. At a minimum, this includes the PEs and budget line-item data describing investments. If the portfolio already includes defined capability gaps, these should be entered, too. If capability gaps have not been defined, the analysis team should review the foundational documents and the list of investments to define the capability gaps the portfolio is designed to fill.

The defined capability gaps are the default unit of analysis for Steps 1 and 2, meaning the analysis team will walk through the capability gaps one by one and answer the instrument questions for each one. As a check, the analysis team should review all capability gaps and verify that the instrument questions in Steps 1 and 2 can be answered accurately. Analysts should compare input from documents reviewed and stakeholder discussions as an indication of accuracy; conflicting information should prompt follow-up to confirm that responses are accurate. If not, then the analyst should consider whether there are sets of capability gaps that can be grouped or specific capability gaps that should be disaggregated to properly apply the instrument questions. Analysts will have to select the unit of analysis based on the portfolio at hand. Once the unit of analysis is set, it should be used for Steps 1 and 2.

The investments are the default unit of analysis for Steps 3 through 5. Similar to the process used to review the capability gaps, the analysis team should review the budget line-item data used to define investments and verify that the instrument questions in Steps 3 to 5 can be answered accurately. Similar to selecting the unit of analysis for capability gaps, analysts should review investments in context with the instrument questions and determine whether investments should be aggregated or disaggregated to facilitate accurate assessment. Once the unit of analysis is set, it should be used for Steps 3 to 5.

Analysts should complete the instruments in sequence, providing written justification and artifacts, such as policy, reports, analyses, other documents, or SME interviews, to support each answer. At the end of each step, the analyst can see which capability gaps or investments are ready to advance to the next step and which require additional development or refinement before funding.

Define Exit Criteria

As a final action, team leaders must define the exit criteria, or the conditions that must be met for the analysis team to advance to the next step in the assessment approach.²⁸ These exit criteria establish a common standard of sufficiency and ensure that each step answers its top-line question before proceeding. Exit criteria should be defined for each step and tailored to the portfolio being evaluated. The team leader can select one or more exit criteria. To aid in defining the appropriate exit criteria, we provide suggestions for different types. These are options, but the team leader may consider others if needed:

- **Completeness:** Checks that all capability gaps or investments were assessed, selected instrument questions answered, and necessary evidence documented in this step.
- **Logical outcomes:** Evaluates that all capability gaps or investments are assigned to Advance or Return sets and that assignments are logically consistent and support a consistent recommendation for the overall portfolio.

²⁸ Exit criteria are distinct from the evaluation criteria used to assess portfolio performance within each step. Mayer et al. (2022, p. 20) define exit criteria for developing technical requirements as “objective and measurable [criteria] and that clearly delineate the point at which it becomes possible to exit the process with a set of quality (e.g., feasible and affordable) technical requirements.” We apply the same principle by requiring that each step in the approach have clearly defined conditions that must be met before advancing.

- **Conditions satisfied:** Considers whether the instrument responses include a sufficient number of positive responses to meet the minimum threshold to pass on to the next step. Furthermore, the team leader should conduct a quality assurance review of all question responses and evaluations to verify responses are sufficiently justified and reproducible.
- **Documentation:** Confirms that the analysis team provided a “bottom line up front” (BLUF) answer to the step’s top-line question and cited the evidence used.

Phase 2: Assessment—Step 1: Determine In-Scope Capability Gaps

Phase 2, Assessment, includes the tasks and activities necessary to complete the portfolio evaluation. The portfolio assessment approach is divided into five steps.

Step 1 asks whether all PEs and capability gaps are in-scope for the portfolio. The *In-Scope* criterion evaluates the portfolio overall and then capability gaps within it. When evaluating the portfolio overall, the criterion considers the motivation and need for the portfolio, considers the drivers of the DAF review, and identifies the stakeholders with equities in the portfolio—different dimensions that address what is included within the portfolio and portfolio review. To gain additional context, analysts should consider the structure of the portfolio, including the specific PEs defined and how funding within the portfolio is split across appropriations categories.²⁹ When considering the capability gaps within the portfolio, the In-Scope criterion considers whether the capability and defined gaps are logical and defining assumptions reasonable.

The instrument includes a set of questions that assess the portfolio based on the following:

- **Motivation:** Identifies the main challenges with the current portfolio and why it was selected for review by DAF leadership.
- **Stakeholders:** Identifies key stakeholders and whether all stakeholders agree on primary roles and responsibilities (e.g., requirements owner, users).
- **Coherence and Strategy:** Considers whether the portfolio’s programs and capability gaps are internally consistent and logical and whether there are any points of overlap among portfolios. This instrument checks for consistency across capability gaps.
- **Framing Assumptions:** Identifies and verifies the assumptions critical to the portfolio, focusing on management/program structure and mission needs.³⁰

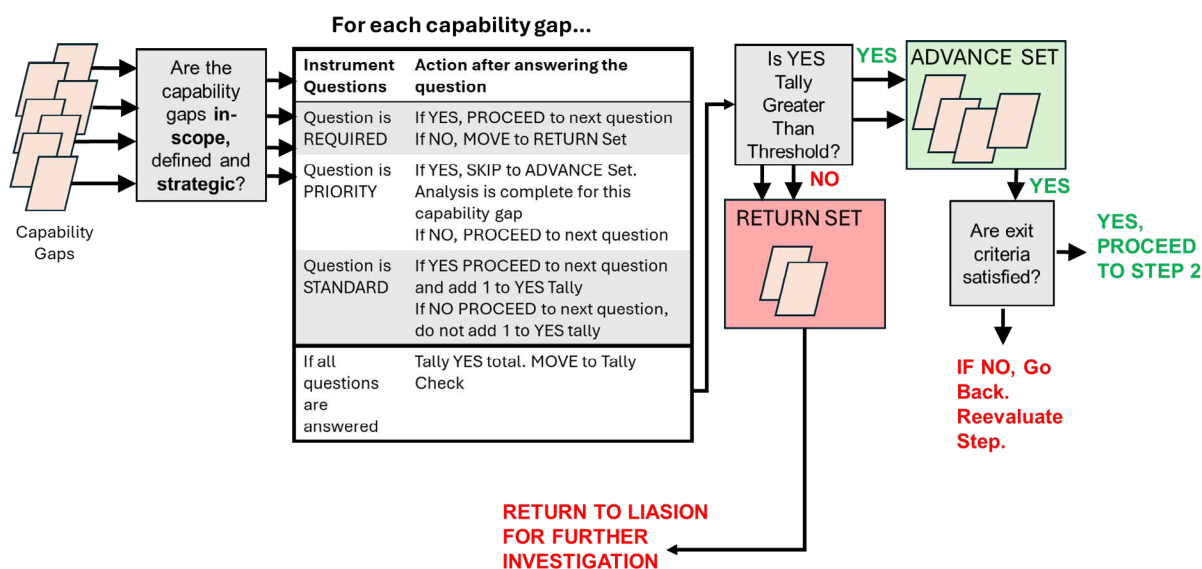
²⁹ While this step focuses on the overall portfolio and its associated capability gaps, considering factors such as appropriations categories or PEs at this stage helps provide additional context. There are five appropriations categories, known as “colors of money”: procurement; operation and maintenance; research, development, test, and evaluation; military construction; and military personnel. Appropriations categories provide context and help indicate whether a portfolio is balanced. For example, a portfolio drawing on mostly operation and maintenance funding may signify that sustainment of existing capabilities are prioritized over filling emerging capability gaps.

³⁰ Framing assumptions are frequently divided into four primary themes: technical, management, requirements, and schedule/cost. Here we draw specifically on the questions within the management and requirements categories. See Mark V. Arena and Lauren A. Mayer, *Identifying Acquisition Framing Assumptions Through Structured Deliberation*, RAND Corporation, TL-153-OSD, 2014.

For each capability gap defined in Phase 1, the analysis team will answer the instrument questions selected during Phase 1, Preparation. A detailed list of tasks comprising Step 1 and a full set of possible questions to evaluate the In-Scope evaluation criterion are available in Tables A.3 and A.4 in Appendix A.

The analysis team is expected to leave this step with a clear understanding of the motivation and scope of the portfolio and the framing assumptions, and of uncertainties important to the capability gaps defined. Figure 2.1 shows the logic flow of capability gaps through the Boolean checks created by the different question types and the how the resulting triage decisions are made. For each capability gap within the portfolio, the analysis team walks through the instrument. Depending on the type of question and the answer assessed, there are different actions, as described previously in Table 2.1. The action taken for each type of question is summarized in the center table in Figure 2.1.

Figure 2.1. Summary of the Logic Gates and Decisions for Step 1



After all questions have been answered, if the capability gap has not already been assigned to the Advance or Return set based on a Required or Priority question, then the “yes” responses are tallied and compared to the threshold. If the total number of “yes” responses exceeds the threshold, the capability gap is moved to the Advance set; if not, it goes to the Return set. After sorting all capability gaps into Advance and Return sets, the analysis team reviews the exit criteria defined for Step 1. If the exit criteria are satisfied and the team leader approves, the step is considered complete. Capability gaps in the Advance set are automatically added to the evaluation sheet for the next step. Capability gaps in the Return set are deprioritized, evidence is recorded, and the gap is removed from further evaluation. Capability gaps that do not advance past triage are also not recommended for further funding until they have undergone evaluation by the liaison, portfolio owner, or PEM. In some instances, this review may identify legacy capability gaps no longer considered relevant, which could be considered for reassignment to other portfolios or defunded.

The framing assumptions documented in Step 1 should be used by the analysis team to inform evaluations in later steps. From this step, the analysis team moves into Step 2, which considers whether capability gaps are critical or urgent.

Phase 2: Assessment—Step 2: Critical and Urgent Capability Gaps to Be Filled

Step 2 evaluates two distinct but related evaluation criteria, asking whether capability gaps are critical and urgent. The *Critical* evaluation criterion measures how important closing a capability gap is to DAF warfighting missions or deterring adversary capabilities. The *Urgent* evaluation criterion captures the time pressure to close that gap because delay would introduce unacceptable risk or because long lead times (e.g., personnel skills and expertise, supply chains, infrastructure) make near-term action necessary. Capability gaps that satisfy either evaluation criterion advance to the next assessment step: A capability gap may advance for operational necessity (critical) or for time-sensitive reasons (urgent), with both paths requiring evidence commensurate to the claim. Furthermore, if a capability gap is considered urgent, it is evaluated in subsequent steps but guaranteed to advance to Step 5 to ensure that all urgent capability gaps are considered for prioritization in PPBE discussions.

The instrument includes a set of questions for the Critical evaluation criterion that assess the portfolio based on the following:

- **Mission Importance:** Identifies whether the capability gap represents a pervasive need that enables or increases the effectiveness of one or more missions important to the DAF, or whether one or more missions would fail if the gap is not filled.³¹
- **Deterrence:** Identifies whether the capability decreases the intent or likelihood of adversary threats.
- **Executability:** Identifies whether filling the capability gap is likely to provide the promised capability and whether funding it poses a risk-benefit trade-off.
- **Evidence:** Identifies whether capability gaps are well documented and tied to DAF strategy.
- **Continuity Needs:** Identifies whether the capability gap represents something that would be hard to develop again if not sustained, and whether a lack of funding could worsen or exacerbate other capability gaps.
- **Uncertainty:** Identifies sources of uncertainty or assumptions in assessing whether a capability gap is critical.

The instrument includes a set of questions to evaluate the Urgent evaluation criterion that assess the portfolio based on the following:

- **Emerging Need:** Identifies whether the capability gap reflects a new or evolving need.

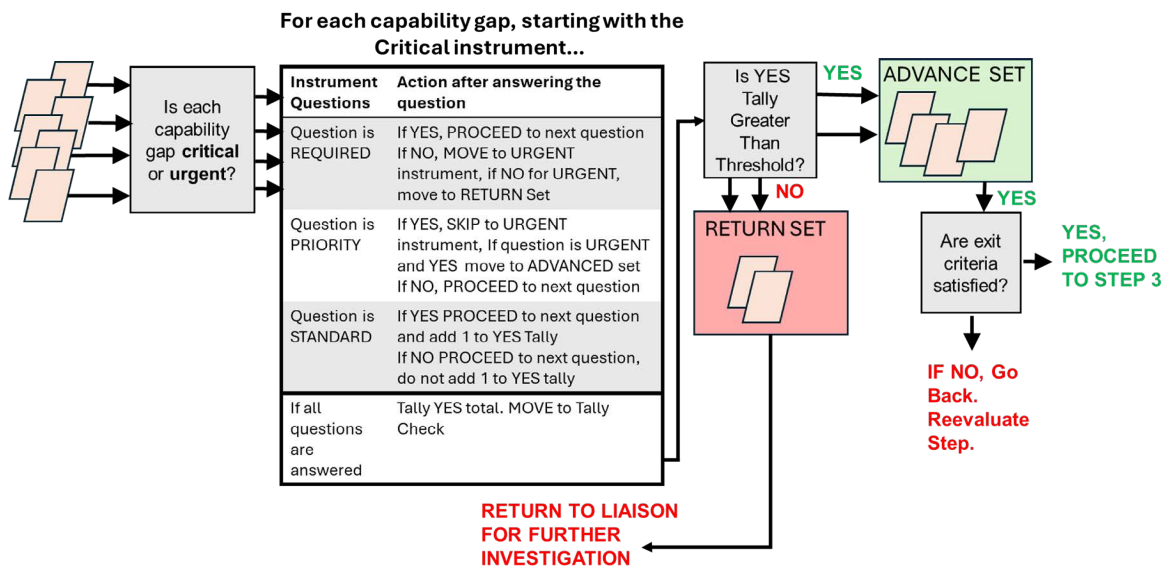
³¹ Cross-cutting portfolios typically enable or increase the effectiveness of multiple missions but on their own do not provide a mission-specific capability. This makes them critical but the value harder to explicitly define.

- **Timeline:** Identifies whether there is a long lead time or lag between funding and filling the capability gap—including acquisition schedule risks and personnel pipeline risks—and whether filling the capability gap has an optimal timing window based on external events.
- **Risk:** Identifies whether there is an optimal time to fill the capability gap and whether delaying action on the capability gap could create additional or more urgent gaps in the future.
- **Uncertainty:** Identifies sources of uncertainty in assessing the urgency of filling the capability gap.

A detail task list describing the steps to complete this step and the full set of instrument questions to evaluate Step 2 are available in Tables A.5, A.6, and A.7 in Appendix A.

For each capability gap, analysts should leave this step with a determination of whether the gap is critical to DAF missions and whether there is time pressure to fill it. The process for completing Step 2 is similar to that for Step 1 in that the analysis team should systematically work through each capability gap, evaluating the questions and assigning each to the Advance and Return sets as appropriate based on the question type or the overall tally of “yes” responses. Figure 2.2 shows the AND-OR logic flow of capability gaps through the Boolean checks and how triage decisions are made.

Figure 2.2. Summary of the Logic Gates and Decisions for Step 2



There are two evaluation criteria within Step 2, each with its own assessment instrument. Capability gaps should be assessed first on whether they are critical and then whether they are urgent. If a capability gap is assigned to the Return set based on the Critical evaluation criterion instrument, it then needs to be evaluated for the Urgent evaluation criterion instrument. Urgent capability gaps are advanced through all steps of the assessment approach, regardless of downstream instrument responses, because of the potential time-sensitive nature of the investment. This does not mean they are priority investments, just that the portfolio owner and PEM need to carefully consider the effects of not funding an Urgent capability gap.

During evaluation in Step 2, if the analysis team is assessing capability gaps as “it depends,” meaning a clear yes or no is not possible, then the team should consider whether the unit of analysis for a specific capability gap needs to be modified. Changes to the unit of analysis should be made selectively, as they require revisiting Step 1 questions and updating responses.

After all questions have been answered and capability gaps are sorted into Advance and Return sets, the analysis team reviews the exit criteria for Step 2. If the exit criteria are satisfied and the team leader approves, the step is considered complete. Capability gaps in the Advance set are automatically added to the evaluation sheet for the next step. Capability gaps in the Return set are deprioritized, recorded with remediation notes, and removed from immediate review until requirements or context changes. Capability gaps that do not advance past triage are not recommended for further funding until they have undergone evaluation by the liaison, portfolio owner, or PEM.

Phase 2: Assessment—Step 3: Mapping of Investments to Capability Gaps

This step tests whether each investment proposed to address specific capability gaps is demonstrably included within the capability gap’s defined scope. The step involves a mapping exercise from investment to capability gap and includes an instrument designed to ensure traceability and operational grounding. That is, each investment should reflect a documented chain from a capability gap to the investment proposed. The focus is substantive: Does the investment effectively meet the claimed need? This check is distinct from the Supportable step that follows, which evaluates how the investment and underlying requirement were produced. Step 3 assesses the alignment between gap, requirement, and investment, bridging between capability gap–focused steps (In-Scope, Critical, Urgent) and investment-focused steps (Supportable, Strategic), and laying a foundation for defensible budget recommendations.

Analyst efforts are split into two phases: (1) conduct the mapping exercise and (2) evaluate the investment mapping with the instrument. The analysis team should be provided with enough information to clearly and concisely map the following elements: (1) defined capability gap (from Step 1), (2) capability requirement(s) and technical requirement(s), (3) proposed investment, (4) claimed gap coverage filled by the investment (e.g., full, partial), and (5) documentary evidence to support the claimed coverage.³²

For example, consider how a network outage in DAF base IT infrastructure could affect mission-related information-sharing. Base infrastructure networks must be able to meet a set performance standard and be resilient to outages up to a defined threshold. These standards define the capability. Using this example to illustrate our mapping step:

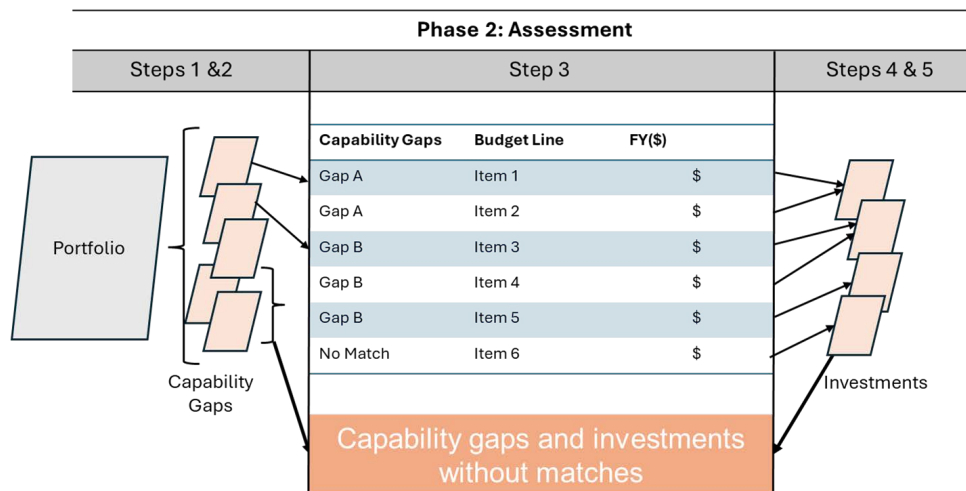
1. The capability gap is the difference between the current capabilities of base EIT network systems and the required capabilities.

³² Where requirements are not well defined, analysts should first attempt to map investments directly to capability gaps. If that is not feasible, they should work with the requirements owner(s) to identify or revise relevant requirements.

2. From this gap, capability requirements—maximum network outage duration—and then technical requirements—such as the performance requirements of devices, switches, and network protocols—needed to fill the gap can be defined.
3. Investments could include the costs of the network equipment or contractor labor expected for system maintenance. From the list of investments, we can identify those that provide the specific capability and technical requirements.
4. For each investment, we then trace back to the capability gap—which system maintenance expenditures were intended to reduce system outages.
5. As a final step, we document and explain the process, such as providing justification that network maintenance (investment) was intended to address a consistent network outage issue (capability gap).

Investments should be mapped to the full set of capability gaps defined ahead of Step 3. Investments that map only to capability gaps that were triaged in Steps 1 or 2 should be added directly to the Return set. This allows the coverage between investments and capability gaps to be accurately assessed. Figure 2.3 illustrates the flow of information through the approach from the portfolio to capability gaps (Steps 1 and 2) to investments (Steps 4 and 5), with Step 3 providing the link between investments and capability gaps.

Figure 2.3. Illustration of the Investments to Capability Gaps Mapping Process



Once all investments have been traced back to the capability gaps defined within the portfolio, the instrument can be used to evaluate alignment. The instrument includes a set of questions that assess the portfolio based on the following:

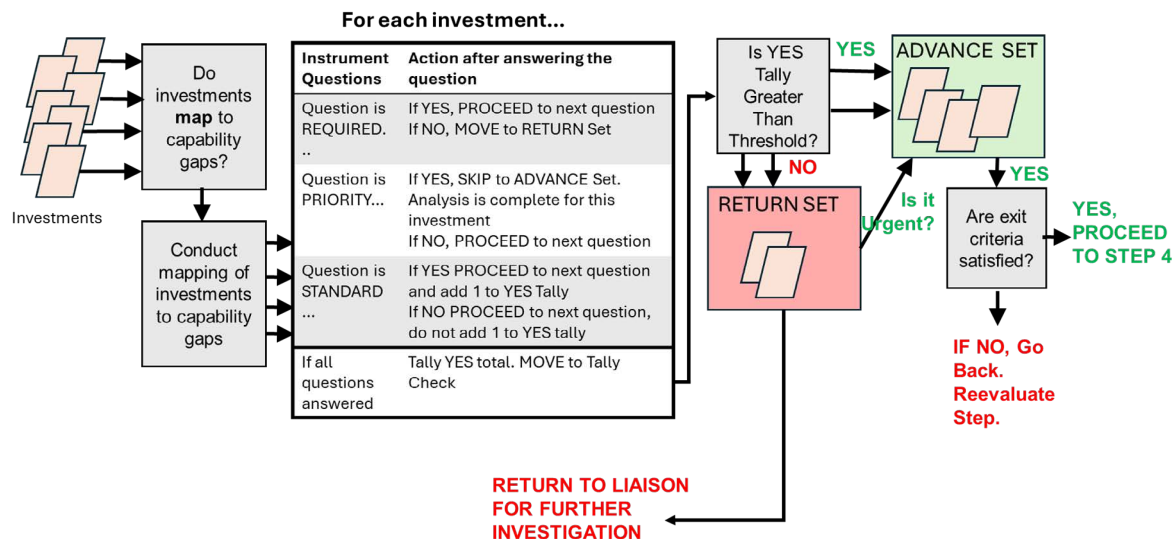
- **Traceability:** Evaluates the links between investments and capability gaps.
- **Coverage:** Determines whether there are
 - redundancies in filling capability gaps (i.e., multiple investments covering the same gaps)
 - unfilled capability gaps (i.e., gaps that are only partially filled by the aligned investments or gaps that have no aligned investments)

- unmatched investments (i.e., investments that do not link to a capability gap).
- **Uncertainty:** Identifies sources of uncertainty in the mapping from investments to capability gaps.

A detail task list describing the steps to complete this step and the full set of instrument questions to evaluate Step 3 are available in Tables A.8 and A.9 in Appendix A. This step checks that one or more of the documentary sources listed in Appendix A are cited and that the investment's stated effect can be traced to specific capability gaps. It does not evaluate how those documents were produced (see Step 4, Supportable).

The analysis team should exit Step 3 with an understanding of the gaps and overlaps in the alignment between investments and capability gaps within the portfolio. The process for completing Step 3 is similar to the previous steps. But rather than consider each capability gap, the analysis team should systematically work through each investment and the mapping of that investment to capability gaps when evaluating the questions. Each investment should be assigned to the Advance or Return sets as appropriate based on the question type or the overall tally of "yes" responses. Figure 2.4 shows the AND-OR logic flow of investments through the checks and how triage decisions are made.

Figure 2.4. Summary of the Logic Gates and Decisions for Step 3



After completing all questions and sorting investments into Advance and Return sets, the analysis team reviews the exit criteria for Step 3. If the exit criteria are satisfied, the step is considered complete. Investments that advance are automatically added to the evaluation sheet for the next step. For investments advanced at triage, the approach pulls instrument responses, results of the mapping, and attached evidence into the workflow.

In reporting to the liaison, the analyst should indicate where overlaps or misalignments exist in the coverage between investments and capability gaps. Overlap indicates possible redundancy in the portfolio and opportunities to eliminate investments without degrading capability. Misalignments indicate that some capability gaps are not being filled by any investments in the portfolio, or that investments added without a defined capability gap may represent unidentified capability gaps. In such

cases, the liaison should consider why and whether additional investments should be proposed in the future.

Phase 2: Assessment—Step 4: Supportable

The Supportable step assesses whether the process used to identify capability gaps, generate requirements, and select investments meets minimum standards of maturity, transparency, and defensibility. The purpose of this step is not to evaluate whether a requirement is technically “right”; it evaluates whether the pathway from problem statement to investment proposal is mature, transparent, and defensible. A Supportable process will show a documented plan, defined decision authorities, transparent records of stakeholder inputs and adjudication, analytic evidence linking alternatives to choices, and explicit records of assumptions and sensitivity testing. Funding decisions based on opaque or ad hoc processes can undermine portfolio credibility.³³ The Supportable evaluation criterion increases confidence in recommended investments, reduces rework during budget and oversight reviews, and identifies where remediation or additional analysis is required before decisions proceed.³⁴

The instrument includes a set of questions that assess the portfolio based on the following:

- **Maturity:** Evaluates whether investments were developed using processes that support well-developed investment decisions.
- **Transparency:** Evaluates whether selected alternatives and investment levels are well documented and whether assumptions and decisions are tracked throughout development.
- **Uncertainty:** Identifies sources of uncertainty in investments.

Evaluations in Step 4 are to be completed on investments advanced from Step 3. During evaluation of Step 4, if the analysis team finds that multiple investments are producing redundant answers, then the team should consider changing the unit of analysis from individual budget line items to investments or sets of investments. Grouping is appropriate when a set of investments was developed through the same process, with shared requirements, decision authorities, and supporting documentation. In these cases, evaluating the process once for the group avoids redundant analysis. If analysts do group investments, they should ensure that all investments in a group fall within the same

³³ See Philip S. Anton, Megan McKernan, Ken Munson, James G. Kallimani, Alexis Levedahl, Irv Blickstein, Jeffrey A. Drezner, and Sydne J. Newberry, *Assessing Department of Defense Use of Data Analytics and Enabling Data Management to Improve Acquisition Outcomes*, RAND Corporation, RR-3136-OSD, 2019, which reports that portfolio analysis within DoD is often ad hoc and that decisions sometimes run counter to available analytic evidence, leading to problematic program outcomes; Jessie Riposo, Megan McKernan, Jeffrey A. Drezner, Geoffrey McGovern, Daniel Tremblay, Jason Kumar, and Jerry M. Sollinger, *Issues with Access to Acquisition Data and Information in the Department of Defense: Policy and Practice*, RAND Corporation, RR-880-OSD, 2015, which notes that limited access to budgeting and acquisition data hampers systematic portfolio analysis and transparency; and David Luckey, David Stebbins, Sarah W. Denton, Elena Wicker, Stephanie Anne Pillion, and Alice Shih, *National Geospatial-Intelligence Agency Resources: Financial Management Programming Evaluation*, RAND Corporation, RR-A659-1, 2022, p. 51, which reports that decision processes lacking clear linkages between performance, goals, and risk management can result in “poor investment and divestment decisions.”

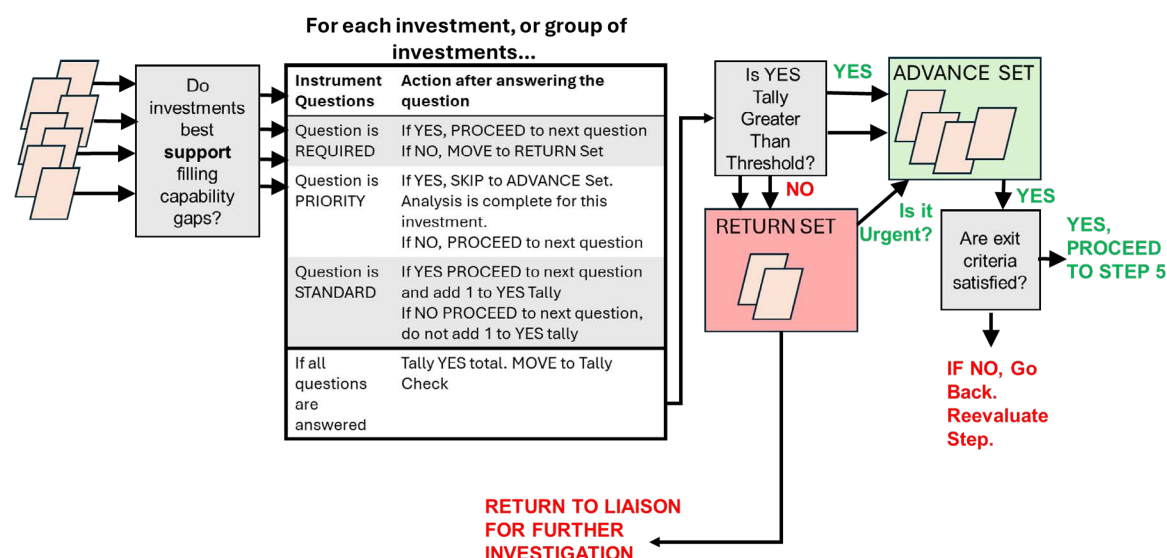
³⁴ These expected benefits are inferred from discussions with portfolio stakeholders and reflect the logic of applying a structured, evidence-based review process.

capability gap.³⁵ As long as all budget line items and investments in a group align with the same capability gap, modifications to the mapping in Step 3 are not required.

A detail task list describing the steps to complete this step and the full set of instrument questions to evaluate Step 4 are available in Tables A.10 and A.11 in Appendix A.

At the end of Step 4, analysts should have identified which investments were developed using mature, traceable, and defensible processes and which were not. The process for completing Step 4 is similar to previous steps in that the analysis team should systematically work through each investment or group of investments, evaluating the questions and assigning investments to the Advance and Return sets as appropriate based on the question type or the overall tally of “yes” responses. Figure 2.5 shows the AND-OR logic flow of investments through the checks created by the selected questions and how triage decisions are made.

Figure 2.5. Summary of the Logic Gates and Decisions for Step 4



After completing all questions and sorting investments into Advance and Return sets, the analysis team reviews the exit criteria for Step 4. If the exit criteria are satisfied, the step is considered complete. Investments that advance are automatically added to the evaluation sheet for the next step. Documents and evidence cited during the supportable evaluation criterion review should be reused as applicable in Step 5 for consistent comparisons across investments. Investments linked to urgent capability gaps in Step 3 advance to the next step, despite any process shortcomings identified during the Supportable assessment. These investments should still be evaluated by the Supportable instrument because information about the processes used to develop and evaluate investments will be

³⁵ Even when multiple investments are linked to a single capability gap, they should be grouped for evaluation in Step 4 only if they share a common development process and supporting documentation. For example, suppose Step 2 defines a capability set around base defense, and Step 3 links three investments to it: (1) a new radar, (2) hardened shelters, and (3) a counter-unmanned aircraft system. If analysts attempt to answer the Step 4 instrument questions for all three at once, the answers might not be comparable (e.g., the radar may have well-documented alternatives but the shelters may not). In such cases, analysts should subdivide the investments into smaller groups so that each group is coherent and the Step 4 questions yield a single, consistent response across investments in the group.

useful to PEMs during later Corporate Structure deliberations. Further, questions related to uncertainty will be useful context when comparing the prioritization of investments in Step 5. Where investments are designated as low priority, only continuity funding is recommended until shifts in requirements or context warrant reconsideration.

Phase 2: Assessment—Step 5: Strategic Tasks

Step 5 evaluates whether the investments in the portfolio are defensible in the context of senior leader priorities, DAF strategy, and the budgetary environment. The focus is on demonstrating that investment priorities are responsive to strategic direction and transparently justified. The instrument questions assess whether there is a defensible basis for resource allocation. Results from this step reinforce senior-level budget deliberations and mitigate the risk of misaligned or low-value investments consuming limited resources.

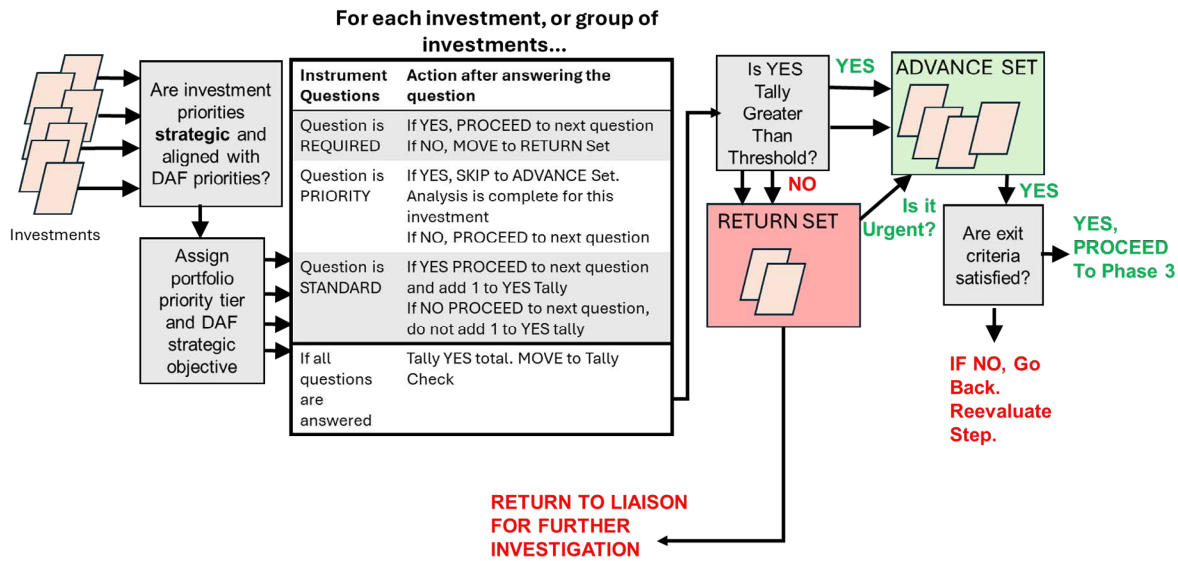
The instrument includes a set of questions that assess the portfolio based on the following:

- **Strategic Alignment:** Assesses how well the total set of portfolio investments support DAF senior leader direction and guidance.
- **Justification:** Evaluates the documentation and evidence connecting investments and the capabilities they are intended to provide to strategy.
- **Prioritization:** Examines the methods used to prioritize investments within the portfolio.
- **Uncertainty:** Identifies sources of uncertainty in portfolio prioritization or risks that investments will not deliver the capabilities intended.

Using the groupings of investments passed from Step 4, the analysis team should apply the questions for Step 5. In some instances, questions are intended to be answered with respect to the overall portfolio. In these instances, the same answer should be copied over for all investments to expedite the assessment. A detail task list describing the steps to complete this step and the full set of instrument questions to evaluate Step 5 are available in Tables A.12 and A.13 in Appendix A.

Analysts should leave Step 5 able to describe how each set of investments and their associated budget line items support DAF strategic priorities. The process for completing Step 5 is similar to previous steps in that the analysis team should systematically work through each investment or group of investments, evaluating the questions and assigning investments to the Advance and Return sets as appropriate based on the question type or the overall tally of “yes” responses. Investments previously mapped to urgent capability gaps are automatically assigned to the Advance set. Figure 2.6 shows the AND-OR logic flow of investments through the checks created by the selected questions and how triage decisions are made.

Figure 2.6. Summary of the Logic Gates and Decisions for Step 5



After completing all questions and sorting investments into Advance and Return sets, the analysis team reviews the exit criteria for Step 5. If the exit criteria are satisfied, the step and the overall portfolio evaluation are considered complete. Investments that pass are considered sound and aligned with DAF priorities. Results of the Strategic evaluation criterion can be aggregated with results from earlier steps to produce an overall investment prioritization evaluation, which can also be used to provide feedback to PEMs, portfolio owners, and stakeholders. Analysts should report their findings to the liaison and provide input to PEMs if requested to support preparation for the PEM parades and DAF group and council reviews in Phase 3.

Phase 3: Portfolio Review

Phase 3 focuses on identifying key findings and aggregating knowledge gleaned from the process to inform PEMs, portfolio stakeholders, and DAF leadership. Outputs from the assessment approach are generated by the analysis team and reviewed by the team leader. Participation in the assessment process is the most important output. Completing the approach provides valuable insights in that it forces the analysis team and stakeholders to systematically evaluate all aspects of portfolio and build a body of evidence to articulate the costs, benefits, and trade-offs of all investments and the capability gaps they fill.

Additional outputs from the assessment approach include documentation of the purpose of the portfolio and how it supports broader DAF strategy, justification for identifying the critical or urgent capability gaps the portfolio aims to fill, a consolidated list of investments and the capability gaps those investments fill, evaluation of the maturity and transparency of the processes used to develop investments, and which capabilities are supported or deferred at specific budget thresholds, including the trade-offs implied.

Table 2.2 provides a summary of the knowledge and outputs developed from each step and the approach overall. This approach provides a detailed assessment of the capability gaps and investments within a portfolio and collects supporting documentation. Analysis and stakeholders can use this step-by-step approach to consider which capability gaps are critical or urgent and which investments propose to fill those gaps. Instruments support a deeper understanding of processes used to develop investments and whether they support DAF strategy.

Table 2.2. Summary of Assessment Steps and Outputs

Step	Instrument Category (Unit of Analysis)	Output
Step 1: In-Scope	Motivation (portfolio)	Summary of DAF leadership priorities and motivation
	Stakeholders (portfolio)	Primary stakeholders and level of clarity of roles and responsibilities
	Coherence and strategy (capability gaps)	Portfolio alignment with DAF strategy objectives and redundancies with other portfolios
	Framing Assumptions (capability gaps)	Assumptions used to define capability gaps
Step 2: Critical	Mission importance (capability gaps)	Capability gaps that enable or increase the effectiveness of one or more missions important to the DAF
	Deterrence (capability gaps)	Capability gaps that, if filled, decrease the intent or likelihood of adversary threats
	Executability (capability gaps)	Risk-benefit trade-off associated with filling each capability gap
	Evidence (capability gaps)	Justification of the alignment between capability gaps and DAF strategy
	Continuity needs (capability gaps)	Capability gaps that provide continuity and, if not funded, represent a loss of capability
	Uncertainty (capability gaps)	Uncertainty associated with critical determinations
Step 2: Urgent	Emerging need (capability gaps)	Capability gaps representing a new or evolving need
	Timeline (capability gaps)	Capability gaps that may have timing sensitivities to consider
	Risk (capability gaps)	Capability gaps where delayed action poses a risk
	Uncertainty (capability gaps)	Uncertainty associated with urgency determinations

Step	Instrument Category (Unit of Analysis)	Output
Step 3: Mapping	Mapping investments to capability gaps (investments)	Mapping of investments to one or more capability gaps
	Traceability (map sets of investments and capability gaps)	Documentation supporting the mapping between investments and capability gaps
	Coverage (map sets of investments and capability gaps)	Redundancies and gaps in the mapping among investments and capability gaps
	Uncertainty (map sets of investments and capability gaps)	Uncertainty associated with the mapping among investments and capability gaps
Step 4: Supportable	Maturity (investments)	Evaluation of the maturity of the process used to develop investments
	Transparency (investments)	Documentation justifying the selection of the investment to fill the associated capability gap(s)
	Uncertainty (investments)	Uncertainty associated with investment supportability
Step 5: Strategic	Strategic alignment (investments)	Determination of which investments support DAF senior leader priorities and which fall outside this scope
	Justification (investments)	Extent to which documentation available supports claims that investments align with capability gaps and DAF leadership goals
	Prioritization (investments)	Overview of how investments were prioritized within the portfolio
	Uncertainty (investments)	Uncertainty associated with the ability of investments to further DAF goals
Overall approach	Summary	Process of assessing the portfolio in an organized and structured way from myriad dimensions defined above

The outputs and knowledge generated from this approach are designed to inform PEMs writing more-detailed budget justification documents and to support portfolio owners as they discuss the value of their portfolios with DAF leadership. For example, within the EIT portfolio, the assessment may show that multiple investments depend on the same underlying network modernization effort. By making these dependencies visible, the outputs help leadership understand how shortfalls in one area could cascade across others, strengthening the case for coordinated resourcing decisions. A well-structured approach and supporting documentation enable reviewers to trace decisions from funding lines to capability gaps, identify where assumptions drive risk, and evaluate whether prioritization methods are defensible.

The ability to triage capability gaps or investments at each step also provides forward-looking signals about investments that may benefit from performance monitoring, further analytic support, or additional development to ensure funded initiatives can deliver intended strategic outcomes. Validated

artifacts produced or cited throughout this and previous steps should be reviewed and those most relevant to the information compiled and shared with the portfolio review lead.

The team leader is responsible for coordinating findings, presenting outputs to the liaison and portfolio owner, and providing answers to follow-up questions from the PEMs as they prepare the POM. The analysis team should be available to assist the team leader when requested but does not have a defined role in Phase 3. Because each portfolio review produces a traceable record of assumptions, prioritizations, and risks, these outputs can be compared across portfolios to surface systemic issues, shared dependencies, or gaps that no single portfolio can resolve on its own.

Discussion

In this report, we provide an implementation guide for a portfolio assessment approach that generates structured and traceable evidence that can inform resource allocation decisions within the PPBE process. The approach's outputs, in turn, serve as inputs that strengthen DAF programming and budget deliberations. The Excel workbook provides a single place for information from each step of the approach to be documented along with the supporting evidence used in the evaluation. This summary workbook and the supporting documents are then provided to the liaison and portfolio owner by the team leader after the assessment is completed.

The liaison is intended to be a permanent member of the portfolio team and is responsible for ensuring that knowledge gained in the assessment is provided to relevant people conducting analyses as part of the PPBE process. For example, the liaison can help PEMs and other participants in DAF group and council review stages by providing input and evidence to help frame both the evidence base and the logic behind proposed resource choices. Information and outputs from Step 5 of the approach, which focus on how investments are prioritized, are a resource to PEMs as they prepare to justify portfolio priorities within the POM.

Portfolio owners can also use outputs from the approach to justify that proposed investments align with DAF strategic objectives when meeting with DAF leadership. The approach process is expected to expose gaps in documentation or unresolved issues—as well as where portfolio components require rescoping or additional analysis—providing a clear record of what can be carried forward and what requires further attention in subsequent PPBE cycles. In this way, the liaison can use information from the approach to help the portfolio owner identify where additional analysis or updates to the portfolio are needed and to enhance existing PPBE processes. The Supportable evaluation criterion asks questions that point to the analyses and practices that would improve the portfolio and ensure that sound investments are made. The liaison who participated in the overall approach will be capable of helping the portfolio owner draw on these resources to improve portfolio development and management processes over time by introducing a transparent, repeatable, and evidence-based foundation.

The approach is designed to be flexible in support of analysis needs on short timelines and adaptable to changes in the PPBE process. Team leaders can tailor the instruments to the timeline available for analysis, and each step triages the most important parts of the portfolio in need of additional analysis while documenting and deprioritizing the rest. The approach can also be executed in a workshop setting to leverage concurrent stakeholder inputs and rapidly complete a portfolio review as needed. In Appendix B, we provide details on the rationale and methods we drew on to develop and define each step. These details are provided to support the executing organization and analysts if the need arises to adapt the approach to different processes and leadership goals.

As a test of the approach and a demonstration of the insights that can be gleaned from its use, we applied it to a subset of the EIT investments reviewed as a part of PA&E's portfolio review. Table 3.1 provides an overview of this assessment, highlighting high-level results (i.e., major findings and opportunities for portfolio improvement) for each step in the approach evaluation.

Table 3.1. Overview of EIT Assessment

Step	Major Finding	Opportunity for Improvement
1: In-Scope	There is a mismatch between the stated goals of EIT portfolio strategy and some capability gaps.	Revealed additional EIT stakeholders and how specific strategies and capability gaps could affect them.
2: Critical or Urgent	Many EIT capability gaps represent critical and urgent needs based on the increasing number of end-of-service and end-of-life components and a history of deferred maintenance.	The identified justification for critical and urgent could be useful to portfolio owners to support stopgap measures where needed.
3: Mapping Investments to Gaps	EIT investments frequently define specific solutions that may fill only part of the defined gaps.	Identified additional investments needed to address capability needs of some EIT systems.
4: Supportable	Comparative cost-effectiveness analyses, such as business case analyses or AoAs, were not completed or not documented.	Highlighted the possibility that additional alternatives (materiel and nonmateriel) may be available and could be evaluated.
5: Strategic	Allocation toward some EIT investments only partially aligns with DAF strategic objectives, such as modernization and cyber resilience.	Revealed trades to be considered between investments focused on sustainment versus emerging needs.

NOTE: AoA = analysis of alternatives.

Our test of the approach confirmed that the process of reviewing appropriate documentation and conducting discussions with stakeholders can generate the evidence necessary to answer instrument questions. The approach was field tested with DAF stakeholders using a subset of EIT investments, and the stakeholders reviewed and found outputs useful for informing investment decisions. Furthermore, through this process, the approach can elucidate recommendations and guidance for the portfolio owner to help improve program investments or identify where new investments may be necessary. Our assessment of a subset of EIT investments elucidated nuanced findings of a complex portfolio; we recommend that future DAF efforts use the approach to assess the entire EIT portfolio. Such an evaluation could benefit stakeholders participating in the upcoming FY 2028 POM.

More generally as a next step, the approach should be refined through further testing through review of another cross-cutting portfolio. This would allow further refinement of its functionality while also providing the review team with a structured approach to ground the next assessment. Each cross-cutting portfolio is likely to face some unique challenges in the POM process. We expect that some small modifications will be necessary for each new portfolio to support unique needs. Further testing will determine whether the flexibility inherent in the current version is sufficient. Furthermore, following DOW and DAF updates to capabilities, requirements, and budgeting processes and

feedback from PA&E and other stakeholders, a more formal implementation of the approach through an updated Excel workbook or implementation on another platform could be developed.

PA&E's review of the EIT portfolio and our detailed review of a subset of EIT investments generated several lessons for future reviews of cross-cutting portfolios. One was the need for a structured but flexible assessment process for cross-cutting portfolios ahead of budget decisionmaking. Such assessments may help to address limitations in the PPBE process for managing cross-cutting portfolios. Use of the assessment approach by stakeholders involved in the requirements development and budgeting processes for cross-cutting portfolios should mitigate at least some of these limitations and create an enduring knowledge base to inform future decisions.

Instructions and Instruments

This appendix provides detailed instructions for setting up and using the assessment approach and Excel workbook, the full set of instrument questions for each assessment step, and recommended references likely to include the information necessary to complete each instrument. It is intended to guide users through initial configuration, question selection and adjudication, and documentation requirements necessary for a rigorous, transparent, and reproducible portfolio review process. Note that these instructions are exclusive to using the Excel workbook to implement the approach; supplementary tasks are identified in the implementation guide section of this report. The Excel file is available at www.rand.org/t/RRA3667-1.

The Excel workbook relies on macros coded within the file. These macros control the functionality of the buttons within workbook, automatic updating features, sheet protections including the password, among others. Any updates to the functionality of the workbook will require review and updates to some macros as well.³⁶ The administrator for this workbook should be able to code macros in Excel.

Phase 1: Preparation (Conducted by Team Leader)

Before beginning the assessment, ensure that you are familiar with the structure and purpose of the approach. The Excel workbook is designed to guide you through each step of the assessment process, allowing you to select relevant instrument questions and define exit criteria tailored to the portfolio under review. The following instructions outline the initial setup required to begin using the approach effectively.

Implementation Tasks

Chapter 2 describes the major activities that make up Phase 1. To help teams implement these activities, Table A.1 summarizes the specific tasks necessary to complete the initial approach preparation stage. The table is designed to serve as a checklist for reference throughout Phase 1 to ensure that all preparatory tasks are completed.

³⁶ Because of the coding of these macros, any changes to tab names must also be changed throughout the macro code or the workbook will not function correctly.

Table A.1. Summary of Phase 1 Preparation Tasks

Task	Responsible Role
Identify the portfolio to be reviewed	DAF leadership
Select the executing organization (SAF/AE, A8, or other office)	DAF leadership
Name a team leader	Executing organization
Assemble the analysis team and assign roles	Team leader
Identify stakeholders and discuss portfolio review	Team leader
Request that stakeholders gather and provide baseline portfolio information ^a	Team leader
Select instrument questions for each step and define question types (i.e., required, priority, standard)	Team leader
Input portfolio description, capability gap, PE, and investment data	Analysis team
Where capability gaps are not defined, review the list of investments and define capability gaps for each investment	Analysis team
Define the unit of analysis and group or separate capability gaps and investments as needed based on the instrument questions selected ^b	Analysis team
Define exit criteria required to transition between steps	Team leader
Define and document timelines for review	Team leader
Hold kickoff meeting with stakeholder and analysis team to initiate the portfolio review	Team leader, stakeholders, and analysis team

^a In this section of the appendix and in each of the following steps, references are provided that are helpful for completing the assessment.

^b Closely related capability gaps can be grouped together. Grouping allows subsequent instrument questions to be answered collectively, making the portfolio more coherent for review and reducing redundant analytical steps.

Analysts should complete the instruments in sequence, providing written justification and artifacts, such as documents or SME interviews, to support each answer. At the end of each step, the analyst can see which capability gaps or investments are ready to advance to the next step and which require additional development or refinement before funding.

Detailed Workbook Instructions

1. Open the Excel workbook and enable macros when prompted.
2. In the Excel workbook, review the “Introduction” and “Tool Instructions” tabs to understand the structure and sequence of the assessment steps.
3. Navigate to the “Portfolio Documentation” tab and enter the portfolio name and assessor names in the designated fields.
4. On the “Capability Gap Data” tab, the analysis team splits the portfolio into defined capability gaps. Specific PEs should be recorded for each capability gap by recording the corresponding program element code (PEC). An annotated screenshot is shown in Figure A.1.

- In cases where capability gaps are closely related, a capability gap grouping can be assigned and then all subsequent instrument questions can be answered for a group of capability gaps.³⁷
 - Where capability gaps are distinct, the capability gap name should be filled in the “Capability Gap Grouping” column.
 - After capability gaps have been defined, click the “Finalize Capability Gap Data” button to update the data used in later tabs.
5. On the “Investments Data” tab, budget line-item data should be loaded for the portfolio by the analysis team. An annotated screenshot is shown in Figure A.2.
- The PEC and appropriations category associated with each budget line should be recorded along with the proposed budget value for each FY in the FYDP.
 - All budget data should be entered in the same units (e.g., then-year millions) unless otherwise specified and the units used recorded.
 - After investments have been defined, click the “Finalize Investment Data” button to update the data used in later tabs.
 - Unique IDs will be assigned to each budget item after the investment data are finalized. If the budget data have distinct identifiers that improve traceability to other datasets, these identifiers should be added in place of the “Autogenerated Unique ID.”
6. On the “Setup & Question Selection” tab, the team leader should document the motivations driving the portfolio review and provide an overview of the portfolio’s goals. If the portfolio addresses specific DAF strategic priorities, those should also be entered on this tab. (See Figure A.3 for an annotated screenshot from the Excel workbook.)
7. The team leader should review and select the specific instrument questions to be used in each step. We recommend including at least one question in each instrument category. An annotated screenshot is shown in Figure A.3. Each question may be designated one of three types:
- Required: Must result in a “yes” response for the capability gap or investment to proceed to the next step.
 - Priority: A “yes” response qualifies the capability gap or investment to advance to the end of the step without answering additional questions.
 - Standard: Contributes to the overall assessment but does not provide enough information alone to assess the capability gap or investment.
- Buttons at the top of each table allow the table to be easily sorted by the category or question type.

³⁷ Capability gap groupings allow related gaps to be assessed collectively and traced to relevant investments, making the portfolio more coherent for review and reducing redundant analytic steps. Groupings may draw on established frameworks, such as joint capability areas or portfolio-specific categories, but analysts should document the rationale used, ensuring that the grouping process is transparent and that results can be compared across reviews.

8. Specify the number of questions that must be answered “yes” for each capability gap (in Steps 1–2) and investment (in Steps 3–5) to advance.³⁸ The number specified must be less than the total number of questions selected and must be greater than total number of required and priority questions.
9. Review and select the exit criteria that must be met before analysts can proceed from one step to the next. Examples of exit criteria are provided in Table A.2.
10. On each of the subsequent “Step” tabs click the “Update Answer Dropdowns” button to ensure all the questions are updated before filling in responses.
11. Once these steps are complete, the Excel workbook is ready for use by the analysis team.
12. When starting the tab for each step in the assessment, the user should review that the questions match those selected under the “Setup & Question Selection” tab. Then, click the button at the top of the sheet labeled “Update Answer Dropdowns” to finalize the questions and update the dropdown menus available.

³⁸ When the assessment is conducted, the workbook automatically tallies responses for each question (+1 for each “yes” response and 0 for each “no” response). The workbook sums these scores for each capability gap or investment and calculates the percentage of affirmative responses. Advancement to the next step is conditioned on whether this percentage meets or exceeds the threshold set by the team leader. If a priority question is answered “yes,” this supersedes the required number of “yes” responses.

Figure A.1. Screenshot of the “Capability Gap Data” Tab, Where the Portfolio Capability Gaps Are Defined

Input Capability Gaps

Each portfolio is defined by Capability Gaps. Analysts should define each under Capability Gap Name. Where the associated program elements are known, the Analyst should record the program element (PEC), use multiple rows with identical PEC values. Where appropriate, the Analyst should select a Capability Gap Grouping which determines the sets of capability gaps and expedites name as in Capability Gap Name. To clear old data, click the “Clear Capability Gap Data Table” button. Once satisfied, click the “Finalize Capability Gap Data” button so following sheets have the data.

Analyst Notes

Optional documentation of notes/assumptions.

Clear Capability Gap Data Table

Finalize Capability Gap Data

PEC	Capability Gap Name	Capability Gap Grouping
1111A	Capability Gap A	Capability Gap Group 1
2222B	Capability Gap B	Capability Gap Group 1
2222B	Capability Gap C	Capability Gap C
1111A	Capability Gap D	Capability Gap D
3333C	Capability Gap E	Capability Gap E
3333C	Capability Gap F	Capability Gap Group 2
1111A	Capability Gap G	Capability Gap Group 2
2222B	Capability Gap H	Capability Gap H
4444D	Capability Gap I	Capability Gap I

3

Enter PECs if known for each capability gap

1

Enter all capability gaps for the portfolio here

2

If needed, capability gap groupings should be defined here. These will be used in subsequent tabs for assessment.

4

Click to finalize the capability gaps and propagate the capability gap data across instrument tabs. This will also update the formatting for all capability gaps entered into the table.

Figure A.2. Screenshot of the “Investments Data” Tab, Where the Portfolio Budget Line-Item Data Are Defined

Input Investment Data, Associated PEC, and FY Costs

Input data in all columns except for Autogenerated Unique ID. Investments can be the same as the budget line item name or can combine line items into larger investment groups. Amounts entered should be in nominal (then-year) dollars. Use the denoted box to indicate the scale of investment amounts in dollars (e.g., millions, billions). To clear old data, click the “Clear Investment Data Table” button. Once satisfied, click the “Finalize Investment Data” button so that following sheets have the updated data. **The first blank row in the table will be assumed to denote the end of the table.**

Analyst Notes

Optional documentation of notes/assumptions.

Click to finalize the investments and propagate the data across instrument tabs

Clear Investment Data Table

Finalize Investment Data

FY scale (e.g., millions, billions):

Millions

Autogenerated Unique ID	Budget Line-Item	Investment	Appropriations Category	PEC	FY27	FY28	FY29	FY30	FY31	FYDP (FY27-31)
Q001	Example Line Item 1	Example Investment 1	Procurement	1111A	\$215.51	\$315.59	\$24.01	\$239.82	\$358.35	\$1,153.28
Q002	Example Line Item 2	Example Investment 1	Procurement	1111A	\$46.90	\$217.70	\$18.04	\$471.79	\$125.75	\$880.18
Q003	Example Line Item 3	Example Investment 2	Operations & Maintenance	2222B	\$359.95	\$30.66	\$280.35	\$236.55	\$306.84	\$1,214.35
Q004	Example Line Item 4	Example Investment 3	Research, Development, Test, and Evaluation	1111A	\$450.11	\$177.01	\$439.72	\$64.87	\$104.69	\$1,236.39
Q005	Example Line Item 5	Example Investment 4	Military Personnel	3333C	\$209.62	\$505.12	\$486.28	\$18.06	\$212.69	\$1,431.77
Q006	Example Line Item 6	Example Investment 5	Other	3333C	\$306.08	\$234.41	\$452.11	\$194.28	\$392.60	\$1,579.48
Q007	Example Line Item 7	Example Investment 6	Procurement	1111A	\$180.23	\$252.23	\$183.80	\$377.13	\$318.12	\$1,311.49
Q008	Example Line Item 8	Example Investment 7	Procurement	2222B	\$229.21	\$509.38	\$520.06	\$124.49	\$484.65	\$1,867.79
Q009	Example Line Item 9	Example Investment 8	Procurement	2222B	\$306.08	\$400.00	\$124.00	\$450.00	\$1,200.00	\$2,480.08
Q010	Example Line Item 10	Example Investment 9	Procurement	3333C	\$180.23	\$200.00	\$600.00	\$40.00	\$300.00	\$1,320.23

1 Enter the name of all proposed budget line items within the portfolio here

4 Define investments, or groups of closely related budget line-items. Where budget-line items are grouped, all budget-line items should be assessed together.

3 Define the appropriations category and the PEC for each budget line-item to allow for traceability between the tool and other budget datasets

2 For each budget line-item defined enter the proposed budget value for each year of the FYDP

Figure A.3. Screenshot of the “Setup and Question Selection” Tab, Where Instrument Questions Are Selected in the Approach and Excel Workbook Implementation

1 Document the leadership goals and motivation for the portfolio review

2 Document strategic DAF priorities relevant to the portfolio selected

3 Select instrument questions relevant to the portfolio assessment

4 For each question selected, select the question type and explain the motivation for selecting the question

5 Define the number of “yes” responses needed for a capability gap/investment to advance to the next stage.

6 Scroll to the right to select instrument questions for other criteria

For Team Leader Only: Select Questions & Specify Strategic Priorities

Selected questions will auto-populate into respective criteria pages. You may add additional questions in the rows below the table. After selecting, determine the question type, “required”, “priority” or “standard”, questions will autopopulate as standard unless changed. Required: must result in a “yes” response for the capability gap or investment to proceed to the next step. Priority: a “yes” response qualifies the capability gap or investment to advance to the end of the step without answering additional questions. Standard: contributes to the overall assessment but does not provide enough information alone to assess the capability gap or investment. Additionally, set the number of questions required to pass, including priorities & requirements. Selected questions will turn green, and priorities & requirements will additionally be bolded. It is recommend to select at least one question per category. Finally, input the DAF Strategic Priorities, and define exit criteria in columns AV onwards.

Leadership Goals and Motivation for Selecting the Portfolio

Optional documentation of the highlights of any meetings with DAF leadership. Document DAF objectives that motivated selection of the portfolio. Strategic priorities should be consolidated and listed the box below.

Analyst Notes

Optional documentation of notes/assumptions.

Input the DAF Strategic Priorities Below

DAF Strategic Priorities
Priority 1
Priority 2
Priority 3
Priority 4
Priority 5

In-Scope

Sort by Category Sort by Selection Sort by Question Type

Category	Question	Selection	Question Type	Explanation	Documentation
Uncertainties	Are stakeholders confident that any gaps or potential uncertainties in the portfolio are minimal and unlikely to impact capabilities or investments?				
Uncertainties	Do budget and requirements owners have the same information and recommendations and narratives about the portfolio?				
Stakeholders	Are requirements documented by stakeholders? Is documentation clear to other stakeholders?				
Stakeholders	Are the core stakeholders clearly defined? (e.g., requirements owners, requirements developer, users, and budget authority)				
Stakeholders	Are the requirements compatible across stakeholder needs?				
Motivation	Has the DAF motivation for reviewing the portfolio been documented in a clearly defined way?				
Motivation	If any pilots or test projects were conducted, were the results documented				

Questions required to pass: 4

Table A.2. Example Exit Criteria

Exit Criterion	Example	Action
Completeness	1. Have all selected instrument questions been answered for each capability gap or investment under review?	If yes, the completeness exit criterion is satisfied. If no, complete the assessment for outstanding capability gaps or investments.
Logical Outcome	1. Does the Advance/Return status assigned to each capability gap or investment accurately reflect the evidence and responses to instrument questions? 2. Is the set of capability gaps or investments advancing to the next step sufficient for further analysis?	If yes, the logical outcome exit criterion is satisfied. If no, review the questions that prompted assignment to the Return set and reassess.
Conditions Satisfied	1. Did the team leader conduct a quality assurance review of all question responses and evaluations? 2. Are instrument responses reproducible based on information documented within the approach?	If yes to both, the evaluation criteria metrics exit criteria are satisfied. If no, analysis team should consult with the team leader to adjudicate.
Documentation	1. Do all questions have evidence or artifacts noted as the source? 2. Has the analyst provided the BLUF result summarizing the outcome of the step?	If yes to both, then the documentation exit criteria have been satisfied.

Phase 2: Assessment—Steps 1 Through 5 General Instructions (Conducted by Analysis Team)

The following instructions apply to each step of the assessment approach. For each step, refer to the relevant instrument table and documentation references provided in the corresponding section. Cells requiring user inputs are shaded yellow. Figure A.4 shows an annotated screenshot of one instrument tab. These steps apply for tabs:

- “Step 1. In-Scope”
 - “Step 2. Critical” and “Step 2. Urgent”
 - “Step 3. Mapping Evaluation”³⁹
 - “Step 4. Supportable”
 - “Step 5. Strategic.”
1. Review the instrument questions displayed in the Excel workbook for the step. These questions are based on selections made by the team leader during setup.
 2. The sheet automatically populates capability gap groupings or investments defined.

³⁹ The tab “Step 3: Map Input Data” includes the exercise of mapping investments to capability gaps and is explained in detail in section “Phase 2: Assessment—Step 3: Mapping Investments to Capability Gaps (Conducted by Analysis Team)” in this appendix.

3. After clicking the “Update Answer Dropdowns” button, the sheet will update all of the questions listed.
4. For each capability gap or investment under review, answer all questions displayed in the workbook. Assign a response of “yes” or “no” to each question.
 - The question type is displayed under each question.
 - Refer to the descriptions in the corresponding step-specific instrument for clarification and context on each question.
 - Where possible, cite supporting documentation or evidence (see corresponding step-specific references).
5. The Excel workbook will automatically tally affirmative responses and calculate the percentage for each capability gap or investment.
 - If the capability gap or investment meets the required percentage of “yes” responses and satisfies all required questions, it is assigned to the Advance set and proceeds to the next step. This is indicated in the workbook with a green “PASS” displayed in the “Category Pass/Fail” column.
 - If a capability gap or investment fails any required question or does not meet the threshold, it is assigned to the Return set for further review, refinement, or deferral.
6. In the “Analyst Notes” box, summarize key findings and record any issues or uncertainties identified during this step for consideration in later stages of the assessment (if Advance) or during review, refinement, or deferral (if Returned).

Figure A.4. Screenshot of the “Step 1: In-Scope” Tab

Tracker automatically records the number of “yes” responses needed to advance, the number of priority or required questions, and a summary of the results

Step 1: In-Scope

Are capability gaps in-scope, defined and aligned with strategy?

Requirements:

Threshold of “Yes” per category needed to pass:

Number of priority questions: 1

Number of required questions: 0

Number of required questions: 0

Results:

One or more capability gaps incomplete.

Click the “Update Answer Dropdowns” button to ensure all the questions selected are populated in the spreadsheet.

Boxes to be filled in manually are light yellow. Fill in each question box per row with either Yes, No, or N/A. Then provide explanations in the associated boxes, and provide reference documents if applicable. No’s will show as red for visibility.

After selecting questions on Question Selection sheet, click below to update the question table so that Yes/No/NA dropdowns extend properly

Update Answer Dropdowns

Analyst documents BLUF findings and observations from the step.

Analyst Notes

Optional documentation of notes/assumptions.

Yellow cells identify where the analyst needs to fill in responses

Capability Gap Grouping	Auto-Pass Based on a	Pass All Requirements?	Answer “Yes” to at Least the Threshold Value?	Category Pass/Fail	Q1. Uncertainties: Are stakeholders confident that any gaps or Q1 Explanation	Q1 Documentation
1 Capability Gap Group 1	FALSE	TRUE	TRUE	PASS	Yes	
2 Capability Gap C	FALSE	TRUE	FALSE	Incomplete		
3 Capability Gap D	FALSE	TRUE	FALSE	Incomplete		
4 Capability Gap E	FALSE	TRUE	FALSE	Incomplete		
5 Capability Gap Group 2	FALSE	TRUE	FALSE	Incomplete		
6 Capability Gap H	FALSE	TRUE	FALSE	Incomplete		
7 Capability Gap I	FALSE	TRUE	FALSE	Incomplete		
8 Capability Gap J	FALSE	TRUE	FALSE	Incomplete		
9 Capability Gap K	FALSE	TRUE	FALSE	Incomplete		
10 Capability Gap L	FALSE	TRUE	FALSE	Incomplete		
11 Capability Gap M	FALSE	TRUE	FALSE	Incomplete		
12 Capability Gap N	FALSE	TRUE	FALSE	Incomplete		
13 Capability Gap O	FALSE	TRUE	FALSE	Incomplete		
14 Capability Gap P	FALSE	TRUE	FALSE	Incomplete		
15 Capability Gap Q	FALSE	TRUE	FALSE	Incomplete		

Automatically populated from “Capability Gap Data” or “Investments Data” tab

Automatically updates a summary for each capability gap/investment evaluated based on the questions answered and if each advances to the next step (PASS) or not (FAIL)

Analyst answers each question, and then provides an explanation and any documentation used to determine the response.

Scroll to the right to answer additional questions. Each question will populate into the table using the same structure.

Phase 2: Assessment—Step 1: In-Scope (Conducted by Analysis Team)

Before answering Step 1 instrument questions, divide the portfolio into distinct capability gaps in the Excel workbook. Each capability gap should represent a specific area where current capabilities do not need documented requirements or objectives. Enter each capability gap as a separate line item in the “Capability Gap Data” tab of the workbook to ensure that responses and assessments are tracked individually.

Chapter 2 describes the major activities that make up Step 1: Determine In-Scope Capability Gaps. Once the capability gaps have been set, move to the “Step 1. In-Scope” tab and follow the general instructions provided earlier in this appendix. To help teams implement these activities, Table A.3 summarizes the specific tasks necessary to complete this step. The table is designed to serve as a checklist for reference throughout Step 1.

Table A.3. Summary of Phase 2: Assessment—Step 1: In-Scope Tasks

Task	Responsible Role
Review and validate grouping logic developed in Phase 1; follow up with analysis team if groupings are inconsistent or insufficiently justified. ^a	Team leader
Answer instrument questions for each capability gap and record the rationale and evidence used.	Analysis team
Evaluate exit criteria and verify that they are met.	Analysis team
Summarize findings before proceeding to Step 2 or designating the capability gap to Return set.	Analysis team
Review and validate findings; follow up with the analysis team if necessary (e.g., evidence insufficient, exit criteria not met, summary of findings unclear).	Team leader
If the capability gap is designated to the Return set, present findings from Step 1 to the liaison for iteration.	Team leader

^a Closely related capability gaps can be grouped together. Grouping allows subsequent instrument questions to be answered collectively, making the portfolio more coherent for review and reducing redundant analytical steps.

For this step, refer to Table A.4 for instrument questions and to the documentation references listed below for supporting evidence.

Assessment Instrument

Table A.4 summarizes the specific questions within the Step 1 assessment instrument and the category each falls under.

Table A.4. Assessment Instrument: Step 1: In-Scope

Category	Instrument Question	Description
Motivation	Has the DAF motivation for reviewing the portfolio been documented in a clearly defined way?	Intended to document the motivations and goals DAF leadership had in selecting the portfolio for investment review.
Motivation	Are the capability gaps addressed by the portfolio documented?	Intended to document the motivation for the portfolio.
Motivation	Are the requirements owner's goals for addressing capability gaps associated with the portfolio defined?	Intended to document the motivation of the requirements owner for managing and executing the portfolio.
Motivation	If any pilots or test projects were conducted, were the results documented, and did they motivate changes in how capability gaps are addressed within the portfolio?	Intended to collect background on the portfolio that could be useful context for later assessment steps.
Stakeholders	Are the core stakeholders (e.g., requirements owners, requirements developer, users, budget authority) clearly defined?	Intended to document the key stakeholders and each stakeholder's perception of the roles and responsibilities of themselves and others.
Stakeholders	Are stakeholder perspectives on capability gaps and associated requirements consistent?	Intended to document misalignments or inconsistencies between stakeholders regarding capability gaps and associated requirements.
Stakeholders	Are requirements for addressing capability gaps documented? Are they clearly communicated?	Intended to document misalignments or inconsistencies between stakeholders regarding capability gaps and associated requirements.
Coherence and strategy	Is the strategic purpose of the portfolio clearly defined and understood by stakeholders?	Intended as a baseline check that all stakeholders have a common understanding and definition of the purpose and scope of portfolio.
Coherence and strategy	Do the capability gaps defined for this portfolio collectively cover its intended scope, with no major omissions or overlaps?	Intended to identify misalignments between capability gaps and the portfolio's scope.
Coherence and strategy	Are the PECs relevant to this portfolio clearly defined? Have the same PECs been maintained over the past X years?	Intended to document the PEC needed to conduct a review of past spending.
Framing assumptions	Are the requirements for addressing identified capability gaps stable and well defined?	Preliminary determination of general alignment between requirements and identified capability gaps. More detailed evaluation will occur in later steps.

Category	Instrument Question	Description
Framing assumptions	Is the portfolio independent of other portfolios?	Indicates if there is joint involvement in the requirements or crossover between portfolios. Intended to identify points of overlap or questions about the portfolio scope.
Framing assumptions	Is the capability gap well understood in terms of scope and timing?	Documents the assumptions driving how capability gaps are defined.
Framing assumptions	Have dependencies within this portfolio been explored? Dependencies between this and other portfolios?	Intended to identify dependencies that could affect the portfolio's execution.
Framing assumptions	Do all identified capability gaps need to be addressed for the portfolio to be successful?	Provides a first indication of the portfolio priorities.
Framing assumptions	Have legal, diplomatic, and security issues been explored?	Intended to document constraints on solutions available to fill specific capability gaps.
Framing assumptions	Can the capability gap be filled without reliance on a system or equipment provided by a commercial party?	Intended to document constraints or time delays that may affect solutions available to fill specific capability gaps.
Framing assumptions	Have the portfolio's workforce needs been explored? Are stakeholders confident the workforce can be retained?	Intended to identify concerns related to workforce and portfolio execution.
Framing assumptions	Are the major areas of scope defined (e.g., facility locations, operational availability, support equipment or infrastructure)?	Indicates potential uncertainties in-scope and evaluates gaps in portfolio scoping.
Framing assumptions	Are the capability gaps defined for this portfolio unique and independent of those addressed through other portfolios or programs?	Intended to identify points of overlap or questions about the portfolio scope.
Uncertainties	Are stakeholders confident that uncertainties in addressing capability gaps are minimal and unlikely to affect associated investments?	Designed to identify sources of uncertainty or critical assumptions made within the program.
Uncertainties	Do budget and requirements owners have the same information, recommendations, and narratives about the portfolio?	Intended to identify uncertainties derived from differences in stakeholder perspectives.

References

To answer these instrument questions, analysts may draw on documents such as the following:

- baseline documents collected in Phase 1
- organization charts and documents identifying stakeholders and other offices with information critical to managing the portfolio or its constituent elements.

Phase 2: Assessment—Step 2: Critical and Urgent (Conducted by Analysis Team)

Move to the “Step 2. Critical” tab and follow the general instructions provided earlier in this appendix. After completing the Critical assessment, move to the “Step 2. Urgent” tab and repeat the instructions. Chapter 2 describes the major activities that make up Step 2. To help teams implement these activities, Table A.5 summarizes the specific tasks necessary to complete this step. The table is designed to serve as a checklist for reference throughout Step 2.

Table A.5. Summary of Step 2: Critical and Urgent Tasks

Task	Responsible Role
Review summary of findings from Step 1.	Analysis team
Answer Critical instrument questions for each capability gap (as grouped in Phase 1) and record what evidence was used to answer each question.	Analysis team
Answer Urgent instrument questions for each capability gap (as grouped in Phase 1) and record what evidence was used to answer each question.	Analysis team
Evaluate the exit criteria and verify they are met.	Analysis team
Summarize findings before proceeding to Step 3 or designating the capability gap as low priority.	Analysis team
Review and validate findings; follow up with the analysis team if necessary (e.g., evidence insufficient, exit criteria not met, summary of findings unclear).	Team leader
If a capability gap is designated low priority (i.e., neither critical nor urgent), consider continuity funding only or defer evaluation; follow up with analysis team and stakeholders to determine trade-offs between continuity funding and deferral; present findings from Steps 1 through 2 to the liaison.	Team leader

NOTE: We use the term *continuity funding* to refer to the minimum level of resources necessary to sustain activities deemed essential through consultation with the portfolio owner and relevant stakeholders.

Assessment Instrument

Table A.6 summarizes the specific questions within the Critical assessment instrument and the category each falls under. Table A.7 summarizes the specific questions within the Urgent assessment instrument and the category each falls under.

Table A.6. Assessment Instrument: Step 2: Critical

Category	Instrument Question	Description
Mission Importance	Has the capability gap been identified as critical to one or more DAF mission areas?	Intended to determine the importance of filling a capability gap to mission success; considers if there is a risk of mission failure if a capability gap is not filled.
Mission Importance	Is the capability gap defined in terms of a measurable effect on mission risk?	Considers if capability definitions and metrics allow the critical instrument to be evaluated.
Mission Importance	Does the capability gap enable missions prioritized by DAF leadership?	Identifies if the capability gap supports missions prioritized by DAF leadership.
Mission Importance	Has a DOW-level organization indicated that filling the capability gap is a priority or a must-do activity?	Some capability gaps are critical because of the priorities of other organizations (e.g., CAPE).
Deterrence	Does filling the capability gap provide a deterrence function by decreasing the effectiveness or delaying the impact of adversary efforts?	Identifies the capability gaps that are critical because of deterrence.
Deterrence	Does filling the capability gap decrease the likelihood of adversary threat (e.g., by altering adversary intent)?	Identifies the capability gaps that are critical because of deterrence.
Deterrence	Does filling the capability gap restrict adversary access needed to attack DAF assets?	Identifies the capability gaps that are critical because of deterrence.
Deterrence	Does filling the capability gap reduce the impact of the adversary threat?	Identifies the capability gaps that are critical because of deterrence.
Executability	Is there a risk that filling the capability gap will not fully deliver the intended effect?	Considers the risk that efforts to fill the capability gap may not achieve intended outcomes.
Executability	Have the dependencies between capability gaps to be filled and impact to mission effectiveness been evaluated?	Intended to determine where dependencies between capability gaps may affect effectiveness.
Executability	Is there evidence that existing capabilities or nonmateriel solutions cannot address the capability gap?	Serves as an indication of rigor in the capability development processes.
Executability	Is the capability gap defined related to failures or gaps in existing systems or other capabilities?	Intended to capture the motivation and drivers in the development of the capability gap.
Evidence	Was the source of the capability gap (e.g., absence, insufficiency, obsolescence) clearly specified?	Intended to document the drivers behind a capability gap.

Category	Instrument Question	Description
Evidence	Was the capability gap aligned with current strategic guidance or force-planning assumptions?	Intended to justify how and what capability gaps within the portfolio are directly linked to strategic priorities. These responses will be relevant to the prioritization assessment in Step 5.
Continuity needs	Is there a risk that a capability needed in the future (workforce or other infrastructure to support it) will be lost if the capability gap is left unfunded?	Considers long-run downstream consequences if a capability gap is not filled.
Continuity needs	In terms of sustainment needs, are there unaddressed capability gaps that could create future capability shortfalls?	Considers whether there is a risk that not filling a gap today may create additional future capability gaps.
Uncertainty	Are there unknowns in adversary capabilities that could affect the effectiveness of proposed alternatives to fill the capability gap?	Intended to capture any uncertainty in the assessment of adversary capabilities that could affect the effectiveness of a deterrence action.
Uncertainty	Do stakeholders perceive the criticality of filling specific capability gaps consistently?	Considers whether all stakeholders agree that filling a capability gap is critical.
Uncertainty	Is the logic behind the capability gap clearly defined?	Considers whether there are holes in the capability development process that should be filled prior to funding.

Table A.7. Assessment Instrument: Step 2: Urgent

Category	Instrument Question	Description
Emerging need	Is filling the capability gap intended to address an emerging threat or new adversary capability?	Identifies capability gaps that are specific to emerging or evolving needs.
Emerging need	Does failure to fill this capability gap in the next X years create unacceptable operational risk?	Identifies capability gaps specific to emerging or evolving needs that require a rapid response or a change in how capability gaps are addressed.
Timeline	Is the timeline to fill the capability gap defined? Is the defined timeline aligned with the urgency of the need?	Considers alignment between the urgency of the need and the timeline required to fill the capability gap. If a current solution is too slow, reevaluation of how the gap is filled should be considered prior to funding.
Timeline	Have long-lead procurement, specialized training, and infrastructure needs been considered that could delay filling the capability gap? Are there other factors that could create a delay between funding and effectively filling the gap?	Intended to characterize specific and specialized needs that could delay efforts to fill the capability gap.

Category	Instrument Question	Description
Timeline	Has filling the capability gap been evaluated for dependencies on private or foreign sources that could delay implementation?	Intended to identify dependencies on private or foreign resources that could affect the timeline for filling the capability gap.
Timeline	Is the capability gap associated with a future need that requires a long time to develop (e.g., training, supply chain development, other long-lead actions)?	Intended to identify long-lead dependencies (e.g., personnel, supply chains) that could affect the timeline for filling the capability gap.
Risk	Is there a risk that not filling this capability gap will create another capability gap?	Considers whether there is a risk that not filling a gap today may create an urgent capability gap elsewhere.
Risk	Are there uncertainties or assumptions in how the capability gap is defined that could lead to additional or more urgent gaps in the future?	Evaluates whether the current definition or understanding of the capability gap could create future risks or unanticipated gaps if underlying assumptions prove incorrect.
Uncertainty	Are there unknowns in adversary capabilities that could affect the effectiveness of proposed alternatives to fill the capability gap?	Considers uncertainties in the underlying threat assessments that drove development of some capability gaps.
Uncertainty	Is the timeline to fill the capability gap defined? Is there low risk that future changes could create a new urgent capability gap?	Considered uncertainty in the timeline assessments used to evaluate how urgent a capability gap is and the potential for future changes to alter assessments.

References

To answer these instrument questions, analysts may draw on documents such as the following:

- force-planning analyses, risk assessments, exercise results, or wargame findings that exhibit the mission value of the capability, assess deterrence, or document mission degradation, operational risk, or second-order risks from defunding or delay
- threat assessments and intelligence reports that demonstrate the immediacy of the capability and identify uncertainties in adversary capabilities or evolving threats
- capability requirements documents and associated decision or validation memos
- analyses of existing capabilities, AoAs, and assessments of nonmateriel solutions that test whether current capabilities could meet the need
- pilot program reports and experimentation results identifying risks or validating approaches to filling capability gaps
- DOW analyses and directives identifying must-do or otherwise critical or urgent needs
- schedule assessments, acquisition strategies, and supporting analyses documenting long-lead procurement, staffing risks, training requirements, infrastructure needs, and supply chain dependencies.

For urgent needs, less comprehensive documentation may be available, but should at minimum include a handoff plan (funding and sustainment pathway), key assumptions, and a basic sensitivity check; where feasible, leading options should include more comprehensive scenario analysis or stress testing.

Phase 2: Assessment—Step 3: Mapping Investments to Capability Gaps (Conducted by Analysis Team)

Chapter 2 describes the major activities that make up Step 3: Mapping Investments to Capability Gaps. To help teams implement these activities, Table A.8 summarizes the specific tasks necessary to complete this step. The table is designed to serve as a checklist for reference throughout Step 3.

Table A.8. Summary of Phase 2 Step 3: Mapping Investments to Capability Gaps Tasks

Task	Responsible Role
Review summary of findings from Step 2.	Analysis team
Conduct mapping to relate each investment to a capability gap.	Analysis team
Answer instrument questions for each set of linked investments and capability gaps and record what evidence was used.	Analysis team
Move investments/investment groups mapped to urgent capability gaps to the Advance set.	Analysis team
Verify that the exit criteria are met.	Analysis team
Summarize findings for proceeding to Step 4 (summary should clearly and concisely map investments to capability gaps), revisiting Step 1 to examine unrecognized gap(s), or designating investments as low priority.	Analysis team
Review and validate findings; follow up with analysis team if necessary (e.g., evidence insufficient, exit criteria not met, summary of findings unclear).	Team leader
If investments signal an unidentified capability gap, present findings and assessment instruments from Steps 1 through 3 to the liaison for further examination.	Team leader
If investments are designated low priority, consider reassignment to another portfolio; follow up with analysis team and stakeholders to determine suitability of investment; present findings from Steps 1 through 3 to the liaison.	Team leader

Before answering Step 3 instrument questions, map each investment in the Excel workbook to the corresponding capability gap(s) identified in Step 1. Each investment should be linked to at least one capability gap. Record these mappings in tab “Step 3. Map Input Data” of the workbook by selecting the capability gap grouping for each investment from the dropdown list. The dropdown list is automatically populated to include all of the capability gaps associated with the same PEC as the investment. In the mapping exercise, analysts may find it useful to trace back each investment to the technical and capability requirements it satisfies before identifying the capability gap those requirements are defined to fill. However, for simplicity, the approach requires the analyst only to record the mapping between investments and capability gaps, as this is the focus within the

instruments. If a portfolio does not have well-defined requirements, analysts should consider reaching out to the liaison and other portfolio stakeholders to suggest that requirements be developed. Time allowing, analysts can work with the requirements owner to identify or develop both capability and technical requirements for the portfolio. The box below, “What Makes a High-Quality Technical Requirement?” provides guidance and additional resources to support technical requirements development.

What Makes a High-Quality Technical Requirement?

This box summarizes practical guidance for developing high-quality technical requirements. It is intended to give analysts a concise reference for mapping requirements to capability gaps in Step 3 of the assessment approach.

A *technical requirement* states what a system must do (functional) or how well it must do it (nonfunctional/quality attribute). High-quality technical requirements are necessary, traceable to a capability gap, and unambiguous. They are verifiable with objective tests or metrics, feasible given constraints, and written at “just enough” level of detail so they do not unduly narrow solutions. Technical requirements should be prioritized and explicitly linked to the capability gap and mission effect they serve.

Key Steps Program Management Offices Follow to Develop High-Quality Technical Requirements

1. Define context, identify stakeholders, and capture operational diagrams (e.g., OV-1s) and use cases to set system boundaries and mission threads.
2. Gather information to identify system constraints and considerations, including market research to establish feasibility and affordability, as well as lessons from legacy and similar programs.
3. Develop a technical and management strategy that sets roles, exit criteria, tools, elicitation, and adjudication processes for generating, integrating, and refining technical requirements.
4. Generate and refine requirements, which involve the following tasks and example tools:
 - a. Define functional boundaries (e.g., through use cases, systems-theoretic process analysis).
 - b. Define functions (e.g., through functional flow block diagrams).
 - c. Derive technical requirements (e.g., through quality attribute workshops [QAWs], bowtie diagrams).
 - d. Analyze, trade off, and refine requirements for affordability, feasibility, and allocation (e.g., through margin analysis, model-based systems engineering [MBSE], house-of-quality matrix).
5. Perform quality assurance: Integrate requirements, check for gaps/conflicts, convert to contract language (“shall” statements), and assess (for, e.g., language, completeness, traceability).
6. Obtain formal feedback (e.g., through stakeholder elicitation, independent/red-team review, and draft requests for proposals) and resolve necessary follow-up actions.
7. Document the process and rationale, collecting lessons to inform future programs’ technical requirements development. All artifacts should be captured for traceability and for reuse in portfolio-level budget justification.

The choice of tools should be tailored to program complexity, timelines, and available expertise. For example, smaller programs can employ context diagrams, use cases, and focused stakeholder workshops; in addition to these tools, larger programs may benefit from MBSE, formal QAWs, and independent red teams.

SOURCES: This summary draws primarily on Mayer et al., 2022; see Appendix D of that document for a detailed walkthrough of steps to develop high-quality technical requirements. Additional references include International Council on Systems Engineering, *Systems Engineering Handbook: A Guide for System Life Cycle Processes and Activities*, 4th ed., John Wiley & Sons, 2015; National Aeronautics and Space Administration, 2019, Appendix C; Nancy G. Leveson, and John P. Thomas, *STPA Handbook*, MIT Partnership for Systems Approaches to Safety and Security, March 2018; Mario R. Barbacci, Robert Ellison, Anthony J. Lattanze, Judith A. Stafford, Charles B. Weinstock, and William G. Wood, *Quality Attribute Workshops (QAWs)*, 3rd ed., Carnegie Mellon Software Engineering Institute, CMU/SEI-2003-TR-016, August 2003; and Alex de Ruijter and Frank W. Guldenmund, “The Bowtie Method: A Review,” *Safety Science*, Vol. 88, October 2016.

Instructions

1. In the “Step 3. Map Input Data” tab, click the “Pull New Data” button to update the table-based data entered in earlier steps.

2. The analyst should see the populated list of budget line items, investments, the assigned unique ID, the PEC, appropriations category, and proposed budget value for each FY.
3. Where investment groups are defined all the associated budget line items should identified by the same Investment. Any changes required to the groups should be made on the “Investments Data” tab and then the “Finalize Investment Data” button clicked.
4. To complete the mapping, the analyst should fill in the “Capability Gap Grouping” column by selecting the appropriate capability gap or capability gap group from the drop-down list that corresponds to each investment line item. Figure A.5 shows an annotated screenshot of this step.

Figure A.5. Screenshot of the “Step 3: Map Input Data” Tab

Step 3: Mapping Investments to Capability Gaps

If the box below indicates that the sheet is ready, click the “Pull New Data” button to pull in the updated data table from the data sheets. Manually add capability gap category names in the final column; the macro button limits the dropdown values such that they can only be one of the input Capability Gap Groupings from the Capability Gap Data sheet that matches the row’s PEC. When you want to view the summary of categories, press the “update mapping summary” button to the right of the table. Iterate until you feel satisfied with the category groupings and add notes to analyst summary box before continuing to In-Scope.

Analyst Notes
Input summary of findings/notes before continuing.

1 Click to update investments data and the drop down lists of capability gaps groupings

2 Data in these columns is populated automatically from the “Investments Data” tab

3 Select capability gap or capability gap grouping that maps to the investment; the same capability gap should be selected for all budget lines within one investment (see Investment 1 which includes two budget line items in this example)

4 Analyst documents BLUF findings and observations from the step.

Sheet not ready, the following steps are incomplete or have failures: Step 1. In-Scope, Step 2. Critical, Step 2. Urgent

Pull New Data from Investments & Capability Gap Data Sheets

No capability gap groups dropped from Critical & Urgent

Autogenerated Unique ID	Budget Line-Item	Investment	Appropriations Category	PEC	FY27	FY28	FY29	FY30	FY31	FYDP (FY27-31)	Capability Gap Grouping
Q001	Example Line Item 1	Example Investment 1	Procurement	1111A	\$215.51	\$315.59	\$24.01	\$239.82	\$358.35	\$1,153.28	
Q002	Example Line Item 2	Example Investment 1	Procurement	1111A	\$46.90	\$217.70	\$18.04	\$471.79	\$125.75	\$880.18	
Q003	Example Line Item 3	Example Investment 2	Operations & Maintenance	2222B	\$359.95	\$30.66	\$280.35	\$236.55	\$306.84	\$1,214.35	
Q004	Example Line Item 4	Example Investment 3	Research, Development, Test, and Evaluation	1111A	\$450.11	\$177.01	\$439.72	\$64.87	\$104.69	\$1,236.39	
Q005	Example Line Item 5	Example Investment 4	Military Personnel	3333C	\$209.62	\$505.12	\$486.28	\$18.06	\$212.69	\$1,431.77	
Q006	Example Line Item 6	Example Investment 5	Other	3333C	\$306.08	\$234.41	\$452.11	\$194.28	\$392.60	\$1,579.48	
Q007	Example Line Item 7	Example Investment 6	Procurement	1111A	\$180.23	\$252.23	\$183.80	\$377.13	\$318.12	\$1,311.49	
Q008	Example Line Item 8	Example Investment 7	Procurement	2222B	\$229.21	\$509.38	\$520.06	\$124.49	\$484.65	\$1,867.79	
Q009	Example Line Item 9	Example Investment 8	Procurement	2222B	\$306.08	\$400.00	\$124.00	\$450.00	#####	\$2,480.08	
Q010	Example Line Item 10	Example Investment 9	Procurement	3333C	\$180.23	\$200.00	\$600.00	\$40.00	\$300.00	\$1,320.23	

Once the investments have been mapped to capability gaps, move to the “Step 3. Mapping Evaluation” tab and follow the general instructions provided earlier in this appendix. For this step, refer to Table A.9 for instrument questions and to the documentation references listed below for supporting evidence.

Assessment Instrument

Table A.9 summarizes the specific questions within the Step 3 assessment instrument and the category each falls under.

Table A.9. Assessment Instrument: Step 3: Mapping Investments to Capability Gaps

Category	Instrument Question	Description
Traceability	Is each investment explicitly linked to a validated capability gap?	Intended to document and identify traceable connections between investments and capability gaps to support development of the justification matrix.
Traceability	Does the investment include documented operational context of the associated capability gap that defines its mission relevance?	Intended to document whether the investment clearly references the operational context of the associated capability gap to demonstrate mission relevance.
Traceability	Is there clear traceability from the investment proposal back to the original capability gap statement?	Intended to document and identify traceable connections between investments and capability gaps to support development of the justification matrix.
Traceability	Does the investment contribute to addressing capability gaps that span multiple portfolios?	Identifies cross-cutting investments that address capability gaps across multiple portfolios, supporting traceability of the investment’s reach.
Traceability	Are the capability gap definitions referenced by the investment current and reflective of recent operational needs?	Intended to document and identify traceable connections between investments and capability gaps to support development of the justification matrix.
Coverage	Are there no other existing or planned investments already addressing this capability gap?	Considers overlap or redundancies between portfolio investments and capability gaps.
Coverage	Are the capability gaps addressed by this investment distinct and not already covered by other funded efforts within the portfolio?	Considers overlap or redundancies between portfolio investments and capability gaps.
Coverage	Does the investment address the full scope of the capability gap?	Considers whether the investment fully addresses the scope of the associated capability gaps.
Uncertainty	Are there any documented risks that an investment will leave a capability gap unfilled?	Consider the uncertainty that an investment will address a capability gap and deliver the intended effect.

References

To answer these instrument questions, analysts may draw on documents such as the following:

- capability requirements documents carried forward from Step 2
- operational test results, exercise reports, wargame findings, or similar demonstrations of capability performance and mission relevance
- operational context artifacts (e.g., mission diagrams, use cases, scenario maps, integration diagrams) showing how the investment contributes to mission threads and where residual risk remains
- task mappings (e.g., to the Universal Joint Task List [UJTL]) that trace the investment's stated effect to specific mission tasks or outcomes⁴⁰
- risk registers or other program documentation that identifies uncertainties in claimed gap coverage or ability to deliver.

Phase 2: Assessment—Step 4: Supportable (Conducted by Analysis Team)

Chapter 2 describes the major activities that make up Step 4: Supportable. To help teams implement these activities, Table A.10 summarizes the specific tasks necessary to complete this step. The table is designed to serve as a checklist for reference throughout Step 4.

Table A.10. Summary of Phase 2 Step 4: Supportable Tasks

Task	Responsible Role
Review summary of findings from Step 3.	Analysis team
Consider grouping investments aligned with the capability gaps defined in Step 1 and document the basis for grouping; consult stakeholders if necessary (e.g., for input on grouping choices where investment overlaps or dependencies exist).	Analysis team
Confirm that investment groupings allow instrument questions in Step 4 to generate a single response for all investments within each group; subdivide groups if needed to ensure coherent alignment.	Analysis team
Review and validate grouping logic; follow up with analysis team if groupings are inconsistent or insufficiently justified.	Team leader
Answer instrument questions for each investment group and record what evidence was used.	Analysis team
Move investments/investment groups mapped to urgent capability gaps to the Advance set.	Analysis team
Verify that the exit criteria are met.	Analysis team
Summarize findings before proceeding to Step 5 or designating investments/groups as low priority.	Analysis team

⁴⁰ Joint Chiefs of Staff, "Universal Joint Task List," database, last updated July 15, 2025.

Task	Responsible Role
Review and validate findings; follow up with analysis team if necessary (e.g., evidence insufficient, exit criteria not met, summary of findings unclear).	Team leader
If investment/group is designated low priority, consider continuity funding only or defer evaluation; follow up with analysis team and stakeholders to determine trade-offs between continuity funding and deferral; present findings from Steps 1 through 4 to the liaison.	Team leader

Within the Excel workbook, review the step 4 instrument questions displayed and verify whether any groups of investments can be appropriately evaluated as a group. Grouping is appropriate when investments were developed through the same process and share requirements, decision authorities, and supporting documentation. In such cases, a single evaluation for the group avoids redundant analysis. Document any regrouping and its rationale in tab “Step 4. Supportable” of the workbook.

Once investments groups have been verified, follow the general instructions provided earlier in this appendix. For this step, refer to Table A.11 for instrument questions and to the documentation references listed below for supporting evidence.

Assessment Instrument

Table A.11 summarizes the specific questions within the Step 4 assessment instrument and the category each falls under.

Table A.11. Assessment Instrument: Step 4: Supportable

Category	Instrument Question	Description
Maturity	Were disciplined systems engineering practices used to develop the investment and its associated capability gap solution?	Evaluates whether systems engineering principles were applied in developing the investment intended to fill a capability gap.
Maturity	Did the process used to determine the investment allow revisiting earlier phases as new information became available?	Assesses whether the investment process incorporated feedback loops to allow adjustment as new information is available.
Maturity	Were breakpoint conditions identified and documented?	Assesses whether thresholds or conditions that would invalidate current investment plans were explicitly defined and recorded.
Maturity	Were less expensive viable alternatives considered to address the capability gap and mitigate mission risk?	Intended to evaluate the breadth of alternative solutions considered to fill the capability gap.
Maturity	Were formal analytic methods applied to compare alternatives under baseline conditions?	Intended to evaluate the whether formal analytic methods were used to evaluate and select alternatives for addressing the capability gap.
Maturity	Was formal market research conducted to assess technologies and vendors relevant to addressing the capability gap?	Intended to evaluate the breadth of alternative solutions considered to fill the capability gap.

Category	Instrument Question	Description
Transparency	Was documentation reviewed and updated as the process evolved?	Documentation is key to transparency. This is the first question before more detailed questions to determine if transparent processes and decisions were made.
Transparency	Were opportunity structures, decision structures, and reconsideration paths defined and used in managing the investment?	Evaluates whether formal mechanisms were established to revisit decisions, adapt to new information, and exploit emerging opportunities. ^a
Transparency	Did the CRD team document a comprehensive set of materiel and nonmateriel alternatives for addressing the capability gap?	Intended to evaluate the breadth of alternative solutions considered to fill the capability gap.
Transparency	Is documentation available for the AoA that was used?	Documentation is necessary for any transparent process. This question also facilitates access to CRD documents.
Transparency	Does documentation clearly link analytic results to rationale for selection/discard?	Intended to identify whether a rationale for selection is transparent and clear.
Transparency	Were lessons learned from the investment captured and shared to inform future capability gap assessments?	Checks whether insights from the process were systematically documented and disseminated to inform investment review and improve future investment decisionmaking.
Transparency	Were applicable DOW specifications, standards, and constraints identified?	Intended to confirm that alternatives considered for the capability gap are aligned with DOW specifications.
Uncertainty	Did the analysis team apply uncertainty management methods (e.g., Decision Making Under Deep Uncertainty, structured scenario analysis)?	Intended to determine whether sound processes for uncertainty management were used when selecting alternatives to address the capability gap.
Uncertainty	Were proposed solutions to the capability gap designed with features robust to identified breakpoint conditions?	Intended to determine whether sound processes for uncertainty management were used when selecting proposed solutions.

^a See also Lauren A. Mayer, Megan McKernan, Yool Kim, William Shelton, Jim Mignano, Sarah W. Denton, Arianne Collopy, Heidi Peters, Grace Van Valkenburg, Igor M. Brin, and Kristin J. Leuschner, *Transforming Capability Requirements Development in the United States Space Force*, RAND Corporation, RR-A2332-1, 2024.

References

To answer these instrument questions, analysts may draw on documents such as the following:

- capability requirements documents, analyses of existing capabilities, AoAs, and assessment of nonmateriel solutions carried forward from Step 3
- market research reports identifying available solutions
- technology readiness assessments of candidate solutions

- analyses of materiel and nonmateriel alternatives
- documented breakpoint conditions and reconsideration paths
- governance rules for decisionmaking, resolving stakeholder disagreements, and adapting to new information
- after-action reports or lessons-learned documentation.

Phase 2: Assessment—Step 5: Strategic (Conducted by Analysis Team)

Chapter 2 describes the major activities that make up Step 5: Strategic Tasks. To help teams implement these activities, Table A.12 summarizes the specific tasks necessary to complete this step. The table is designed to serve as a checklist for reference throughout Step 5.

Table A.12. Summary of Phase 2 Step 5: Strategic Tasks

Task	Responsible Role
Review summary of findings from Step 4.	Analysis team
Answer instrument questions for each investment group from Step 4 and record what evidence was used.	Analysis team
Move investments/investment groups mapped to urgent capability gaps to the Advance set.	Analysis team
Verify that the exit criteria are met.	Analysis team
Summarize findings for proceeding with recommended portfolio (compile supporting artifacts and summaries from Steps 1 through 5 into a defensible narrative for portfolio review) or refining prioritization.	Analysis team
Review and validate findings; follow up with analysis team if necessary (e.g., evidence insufficient, exit criteria not met, summary of findings unclear).	Team leader
If investment prioritization requires refinement, coordinate with analysis team and stakeholders to determine reprioritization; present findings from Steps 1 through 5 to the liaison.	Team leader

Review the instrument questions displayed in the workbook for Step 5 and assess whether existing investment groups allow a single, consistent response to each question. If not, adjust the groupings in the “Investments Data” tab so that all investments within a group can be evaluated together without ambiguity. Document any regrouping and its rationale in tab “Step 5. Strategic” of the workbook.

Once investment groups have been assessed for regrouping, follow the general instructions provided earlier in this appendix. For this step, refer to Table A.13 for instrument questions and to the documentation references listed below for supporting evidence.

In addition to answering the specific instrument questions, investment priorities must be recorded. Figure A.6 shows a screenshot of the additional inputs required for Step 5 within the Excel workbook. For each investment, three types of priorities should be recorded:

- **Portfolio owner priority ranking:** Analysts should utilize stakeholder discussions and documents to record the priorities of the portfolio owner. Priorities are required as a rank ordering of investments. Where investments are tied, they should be assigned the same number to ensure that ranks are distinct.
- **Analyst priority ranking:** Using the assessments completed, the analyst documents their assessment of the rank ordering of all investments. Analyst rankings should match those of the portfolio owner unless the analyst can justify the change based on their assessment of the portfolio.
- **DAF strategic priorities:** Using the list of relevant DAF strategic priorities recorded during setup of the workbook, the analyst will select the strategic priority that each investment supports.

Figure A.6. Screenshot of the “Step 5: Strategic” Tab

Tracker automatically records the number of “yes” responses needed to advance, the number of priority or required questions, and a summary of the results

Step 5. Strategy
Do investment priorities align with overall strategy?

Requirements:
Threshold of “Yes” per category needed to pass:
1
Number of priority questions:
0
Number of required questions:
0
Results:
One or more investments incomplete

After the assessment questions are selected under “Set-up & Question Selection” click this button to lock the questions and update the dropdown menus.

Boxes to be filled in manually are light yellow. Fill in each question box per row with either Yes, No, or N/A. Then provide explanations in the associated boxes, and provide reference documents if applicable. No’s will show as red for visibility.

After selecting questions on Question Selection sheet, click below to update the question table so that Yes/No/NA dropdowns extend properly

Update Answer Dropdowns

Analyst documents BLUF findings and observations from the step.

Analyst Notes
Optional documentation of notes/assumptions.

For rankings, input integer, rows can share ranking

Capability Gap Group	Line Item	PEC	FY27	FY28	FY29	FY30	FY31	FYDP (FY27-31)	Auto-Pass Based on a Priority?	Pass All Requirements?	Answer “Yes” to at Least the Threshold Value?	Category Pass/Fail	Analyst Priority Ranking	Portfolio Owner Priority Ranking	Which of the DAF Strategic Priorities does this support?	Q1. Strategic All linked to strateg
1. Capability Gap Group 1	Example Line Item 1	1111A	\$ 215.51	\$ 315.59	\$ 24.01	\$ 239.82	\$ 358.35	\$ 217.64	FALSE	TRUE	TRUE	Incomplete	1	2	Priority 2	Yes
2. Capability Gap Group 1	Example Line Item 2	1111A	\$ 46.90	\$ 217.70	\$ 18.04	\$ 471.79	\$ 125.75	\$ 281.05	FALSE	TRUE	TRUE	Incomplete	2	2	Priority 2	Yes
3. Capability Gap L	Example Line Item 3	2222B	\$ 359.95	\$ 30.66	\$ 280.35	\$ 236.55	\$ 306.84	\$ 5.06	FALSE	TRUE	FALSE	Incomplete	2	1	Priority 3	No
4. Capability Gap D	Example Line Item 4	1111A	\$ 450.11	\$ 177.01	\$ 439.72	\$ 64.87	\$ 104.69	\$ 180.67	FALSE	TRUE	FALSE	Incomplete	1	1	Priority 4	

Automatically populated from “Investments Data” tab

Automatically updates a summary for each investment evaluated based on the questions answered and if each advances to the next step (PASS) or not (FAIL)

Record the priority ranking for each investment evaluated. Map each investment to one of the DAF strategic objectives identified for the portfolio

As with previous instrument tabs, analyst answers each question and then provides an explanation and any documentation used to determine the response.

Assessment Instrument

Table A.13 summarizes the specific questions within the Step 5 assessment instrument and the category each falls under.

Table A.13. Assessment Instrument: Step 5: Strategic

Category	Instrument Question	Description
Strategic Alignment	Is the capability gap addressed by the investment explicitly linked to strategic guidance or doctrinal sources?	Intended to determine a connection from investments to capability gaps to DAF priorities.
Strategic Alignment	Were applicable missions, tasks, or operational effects mapped through the capability gap to the investment?	Documents how investments enable mission and improve operational outcomes and supports justification for investments.
Strategic Alignment	Was the investment aligned with force design timelines, readiness levels, and performance objectives?	Documents how investments support force design goals and other Air Force performance metrics.
Justification	Was the rationale for how the investment, through its associated capability gap, aligned with strategy clearly articulated?	The importance of a set of investments will not be defensible if it is not traceable and documented.
Justification	Was traceability to strategic sources preserved as the investment evolved?	Intended to evaluate whether documentation maintains clear traceability between the investment, its associated capability gap, and strategic sources.
Justification	Was a clearly documented process used to prioritize the investment relative to others in the portfolio?	Intended to evaluate whether the prioritization process for the investment was transparent.
Prioritization	Was the investment prioritized using a structured decision process (e.g., optimization, multicriteria decision analysis) within the portfolio?	Considers the practices used to determine an investment's priority relative to others within the portfolio. Sound methods support the portfolio recommendations.
Prioritization	Did the prioritization process clearly define tiers of ranking that distinguish the investment's relative importance within the portfolio?	Considers the practices used to determine an investment's priority relative to others within the portfolio. Sound methods support the portfolio recommendations.
Prioritization	Were individual investments compared systematically when ranking investments?	Considers whether investments were systematically compared with one another during ranking.

Category	Instrument Question	Description
Prioritization	Were alternative investments or trade-offs documented that could enable reallocation of resources (e.g., selecting a lower-cost option for this capability gap to enable funding of additional gaps within the portfolio)?	Considers the flexibility of the portfolio to accommodate changes based on the overall portfolio and budget limitations.
Prioritization	Does the prioritization method track dependencies between investments?	Considers whether any capability will be lost or degraded because of the reliance on specific investments.
Prioritization	Based on the information gathered about cross-portfolio dependencies in Step 1, is the investment critical to the success of other portfolios?	Considers whether any capability will be lost or degraded because of the reliance on specific investments.
Uncertainty	Is the investment's priority clearly justified relative to lower-priority investments?	Considers the uncertainty within the portfolio's ranking of investments.
Uncertainty	Has the overall robustness of the investment in filling its associated capability gap been evaluated?	Considers whether the investment's ability to fill the capability gap under uncertainty has been assessed.
Uncertainty	Are you confident the investment will address DAF strategy priorities? Has the risk that the investment will not fully address its associated capability gap been quantified?	Considers whether the investment's ability to fill the capability gap under uncertainty has been assessed.

References

To answer these instrument questions, analysts may draw on documents such as the following:

- National Defense Strategy, National Military Strategy, Air Force strategic planning guidance, and doctrinal publications defining mission relevance
- force design and capability requirements documents carried forward from Step 2
- investment mapping documents carried forward from Step 3
- portfolio prioritization methods and records, including evaluation criteria and scoring approaches
- trade-off analyses and other documentation that distinguish tiers of investment within the portfolio
- artifacts that identify or map intra- and cross-portfolio dependencies.

Summary of Results

After the instruments have been completed for each step, the “Results” tab shows a consolidated summary table. The table provides a single view of the list of investments, the capability gap each maps

to, the priority rank of that investment, and whether the investment passes or fails and at which step. Each portfolio will have unique motivations and questions that must be answered, and analysts can develop additional graphs or visuals to summarize findings from this results table. For example, analysts may distill a capability-centric summary to show, for each capability gap, whether it is addressed by one or more investments or remains uncovered. This view can help identify unaddressed gaps, redundancies, or overconcentration. Within Phase 3, as PEMs and the portfolio owner prepare for briefings to senior leadership, analysts can use these tools to develop tailored analytic products and supporting materials.

Rationale and Sources for Recommended Methods

This appendix summarizes the methodological rationale and the principal sources we relied on when constructing the instruments for each step of the assessment approach. It explains how the approach's questions derive from established methods and disciplines (e.g., problem-structuring, requirements development, robustness/uncertainty approaches, prioritization techniques) and identifies additional literature that can be consulted to validate or extend the approach's analytic design.

We selected the evaluation criteria applied across the five steps based on evidence from decision analysis, defense acquisition, and portfolio management literature, as well as DOW and DAF guidance on capability development and resource prioritization.⁴¹ These sources emphasize the importance of bounding analytic scope, assessing mission criticality and time sensitivity, ensuring traceability between investments and capability gaps, evaluating technical and operational supportability, and maintaining alignment with strategic objectives.

We designed the sequencing and grouping of evaluation criteria across the five steps to mirror the logical progression of a portfolio assessment. Step 1 (In-Scope) establishes analytical boundaries, and Step 2 (Critical and Urgent) combines the two evaluation criteria because either can justify advancing a capability gap to subsequent analysis. This structure reflects the approach's Boolean logic: Gaps that are not critical may still warrant attention if they are urgent, and vice versa. Combining them into a single step ensures that time-sensitive gaps are not excluded prematurely while maintaining analytic rigor for those that are mission critical. Subsequent steps build on this triage. Step 3 (Mapping Investments to Capability Gaps) ensures traceability; Step 4 (Supportable) assesses the maturity of the investment's development process; and Step 5 (Strategic) evaluates alignment with leadership priorities, strategic objectives, and force design plans. This order of operations reflects both analytic dependencies and an intuitive sequence for evaluation within a portfolio context.

We curated the specific questions under each assessment instrument through structured analytic judgment, consistent with previous RAND literature on developing evaluation frameworks.⁴² The instruments serve as structured "empty vessels" that guide analysts in framing the problem, eliciting

⁴¹ Primary sources include Bradley Wilson, Mark V. Arena, Lauren A. Mayer, Chad Heitzenrater, Jason Mastbaum, and Kevin J. Connolly, *A Methodology for Quantifying the Value of Cybersecurity Investments in the Navy*, RAND Corporation, RR-A1356-1, 2022 (for developing the framework and consideration of alternative approaches); and Air Force Instruction 17-110, 2018 (for developing the evaluation criteria and instruments). Specific additional sources are identified in the footnotes to the applicable sections throughout this appendix.

⁴² See Paul K. Davis, Russell D. Shaver, and Justin Beck, *Portfolio-Analysis Methods for Assessing Capability Options*, RAND Corporation, MG-662-OSD, 2008.

and organizing relevant evidence, and supporting defensible decisionmaking under uncertainty.⁴³ The framework itself does not prescribe answers; rather, it organizes information so that analysts can systematically assess the relative merits and risks of alternative investments within the portfolio context.

We refined the framework in consultation with the project sponsor and through insights gathered from discussions with SMEs familiar with Air Force portfolio management practices. These consultations helped ensure that the evaluation criteria reflected both analytic rigor and operational relevance. We also tested the framework using real-world investment portfolios, which provided practical validation of the evaluation criteria's applicability.

This appendix also explains how the approach surfaces assumptions and uncertainties in portfolio decision processes and documentation, and why those insights matter for downstream budgeting and oversight.

Step 1: In-Scope

The In-Scope instrument asks whether all components within the portfolio are coherently defined, support the portfolio's stated goals, and align with DAF mission sets. To build the assessment instrument, we drew on problem-structuring literature. Problem-structuring methods help define the specific decision problem and the decisionmakers' objectives before alternatives are selected, and they help structure productive analyst-stakeholder dialogue about what the portfolio is intended to achieve.⁴⁴ Beyond framing and scoping, the In-Scope instrument documents the roles and responsibilities of key portfolio actors.

A subset of instrument questions captures the portfolio's framing assumptions. *Framing assumptions* are "any explicit or implicit assumptions that are central in shaping cost, schedule or performance expectations."⁴⁵ These are used to quantify and inform the instrument questions that define and track key program assumptions and document uncertainties early in the program life cycle. An auxiliary purpose of the In-Scope step is to surface the portfolio review's motivating questions with stakeholders so everyone has a common baseline before proceeding to later steps.

This step explicitly records assumptions and uncertainties about the portfolio's definition, motivation, and scope. Questions about framing assumptions are intended to reveal weaknesses in portfolio structure that could undermine the validity of defined capability gaps or the likely effectiveness of funded investments. Identifying uncertainties that follow from these assumptions helps analysts target follow-on evaluations of specific capability gaps in Step 2 and investments in Step 4.

⁴³ For further discussion of the "empty vessel" design in portfolio analysis, see Paul K. Davis, Stuart Johnson, Duncan Long, and David C. Gompert, *Developing Resource-Informed Strategic Assessments and Recommendations*, RAND Corporation, MG-703-JS, 2008, p. 117.

⁴⁴ Valerie Belton and Theodor Stewart, "Problem Structuring and Multiple Criteria Decision Analysis," in Matthias Ehrgott, José Rui Figueira, and Salvatore Greco, eds., *Trends in Multiple Criteria Decision Analysis*, Springer, 2010; Ralph L. Keeney, *Value-Focused Thinking: A Path to Creative Decisionmaking*, Harvard University Press, 1992.

⁴⁵ Arena and Mayer, 2014.

Instrument questions within the categories, stakeholders, coherence, and alignment may reveal differences in motivation or understanding among stakeholder respondents. Where stakeholder groups do not provide consistent answers, these differences should be communicated to the liaison for review. In some instances, such as defining the goals or scope of a portfolio, the portfolio owner should provide clarification to stakeholders to ensure a consistent understanding of portfolio scope, priorities, and other defining features. Furthermore, the process of trying to answer questions may identify concerns in the organizational structure or management of the portfolio that could impede successful implementation. In this way, the assessment instrument helps mitigate risks associated with unchecked assumptions by ensuring that issues are documented and routed to the liaison for adjudication.

Step 2: Critical and Urgent

Critical asks whether failure to close a gap would reduce warfighting effectiveness, compromise mission execution, or weaken deterrence. The approach operationalizes this by requiring an explicit mapping from the gap to mission tasks or effects (e.g., using mission threads or task libraries, such as the UJTL), documentary evidence that quantifies mission impact (e.g., exercise results, operational test outcomes, wargame findings), and a statement of residual risk if the investment is not made.⁴⁶ Analysts can strengthen the critical determination by translating qualitative evidence about capability shortfalls into measurable mission metrics (e.g., degraded sortie rates, reduced ISR). This translation may draw on data from operational assessments, modeling and simulation outputs, test reports, or after-action reviews. Corroboration from operational stakeholders can reduce service- or program-centric bias and increase confidence in the assessment.⁴⁷

The Urgent evaluation criterion captures whether the gap must be closed in the near term because delay would impose unacceptable risk or because delivery requires long-lead actions. The approach operationalizes urgency through three evidence checks: validated authority for the urgent claim (e.g., J8 and the Joint Requirements Oversight Council, for Joint Urgent Operational Needs, or the appropriate DAF Urgent Operational Need authority and validation memo), a credible short-term fielding timeline (urgent expectations are generally under two years), and documentation of acquisition tailoring plus transition and sustainment planning.⁴⁸

Urgent solutions without credible transition planning are at elevated risk of failure, so lack of a viable handoff and sustainment path downgrades priority.⁴⁹ Because rapid pathways can bypass full analytic rigor, the approach requires an explicit handoff plan (leveraging the liaison role to

⁴⁶ James A. Leftwich, Debra Knopman, Jordan R. Fischbach, Michael J. D. Vermeer, Kristin Van Abel, and Nidhi Kalra, *Air Force Capability Development Planning: Analytical Methods to Support Investment Decisions*, RAND Corporation, RR-2931-AF, 2019; Joint Chiefs of Staff, 2025.

⁴⁷ Mayer, et al.1, 2024, pp. 44–45, 78–79.

⁴⁸ Department of Defense Instruction 5000.81, *Urgent Capability Acquisition*, U.S. Department of Defense, December 31, 2019; Chairman of the Joint Chiefs of Staff Instruction 5123.01I, 2021; U.S. Air Force, *Capability Development Guidebook*, Vol. 2E: *Urgent Needs Process*, Air Force Futures Requirements Oversight Team, AF/A5DR, July 8, 2022.

⁴⁹ U.S. Government Accountability Office, *Urgent Warfighter Needs: Opportunities Exist to Expedite Development and Fielding of Joint Capabilities*, GAO-12-385, April 24, 2012.

communicate findings), a stated set of key assumptions, and at least a basic sensitivity check; where feasible, leading options should include scenario-based stress testing or other Decision Making Under Deep Uncertainty–style analyses.⁵⁰

To capture assumptions and uncertainties, the assessment collects Critical and Urgent inputs from a broad set of stakeholders. Divergent judgments across stakeholders may reveal underlying assumptions or information gaps that warrant follow-up.⁵¹ These disagreements should be recorded, documenting the assumptions that drive each view and linking the record to the capability for reference.

If targeted analysis or stakeholder discussion does not resolve differences in opinion to definitively classify a capability gap as critical or urgent, the capability gap should be deferred to a future review cycle and considered for continuity funding only, unless new evidence emerges. When a high Critical or Urgent rating lacks corroboration from strategy or force-planning documents, that mismatch should be treated as an uncertainty requiring additional evidence or adjudication by the portfolio owner. Conversely, if findings from the strategic evaluation criterion indicate a priority but stakeholder inputs do not, analysts should investigate possible information shortfalls or timing issues.

Step 3: Mapping Investments to Capability Gaps

The purpose of Step 3 is to convert evidence of traceability into a concise, auditable mapping from gap to requirement to investment to evidence. This mapping translates requirements-level documentation into budget-relevant statements by documenting assumptions and linking requested funding to needed capabilities,⁵² while avoiding reworking or duplicating the requirements owner’s analytic products. Step 3 and the following Supportable assessment draw on disciplined practices in capability development, requirements development, and alternatives analysis and selection.⁵³ This approach also aligns with leading practices in portfolio management, where transparent, auditable mappings and visibility into cross-cutting dependencies improve resourcing decisions and reduce duplication.⁵⁴

The Step 3 instrument is designed to surface and test assumptions about how investments map to capabilities by drawing on diverse stakeholder inputs and subject-matter expertise. This process highlights where assumptions are contested, evidence is incomplete, or a claimed mapping is weak, and

⁵⁰ Leftwich et al., 2019; Mayer et al., 2022; Vincent A. W. J. Marchau, Warren E. Walker, Pieter J. T. M. Bloemen, and Steven W. Popper, eds., *Decision Making Under Deep Uncertainty: From Theory to Practice*, Springer, 2019.

⁵¹ Consistent with Klein’s work on adaptive decisionmaking, the approach treats expert judgment as a valuable signal and records divergent views explicitly so the provenance of tacit knowledge and its assumptions is auditable. See Gary Klein, *Streetlights and Shadows: Searching for the Keys to Adaptive Decision Making*, MIT Press, 2009.

⁵² U.S. Government Accountability Office, *Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Program Costs*, GAO-20-195G, March 12, 2020.

⁵³ Disciplined and traceable practices are drawn from Leftwich et al., 2019; Mayer et al., 2022; and Mayer et al., 2024.

⁵⁴ U.S. Government Accountability Office, *Best Practices: An Integrated Portfolio Management Approach to Weapon System Investments Could Improve DOD’s Acquisition Outcomes*, GAO-07-388, March 30, 2007; U.S. Government Accountability Office, *Weapon System Acquisitions: Opportunities Exist to Improve the Department of Defense’s Portfolio Management*, GAO-15-466, August 27, 2015.

it documents areas where the connection between capability gaps and investments is uncertain and could affect investment outcomes.

By explicitly capturing these uncertainties, the approach helps analysts weigh risk against operational need and deprioritize investments that rest on unresolved assumptions unless they address urgent needs. In doing so, the instrument reduces reliance on untested assumptions and mitigates the risk of committing resources to investments unlikely to deliver as intended. It also provides an avenue for directing feedback to stakeholders about where assumptions may need to be probed and uncertainties addressed.

Step 4: Supportable

A supportable process will show a documented plan, defined decision authorities, transparent records of stakeholder inputs and adjudication, analytic evidence linking alternatives to choices, and explicit records of assumptions and sensitivity testing.⁵⁵ Instrument questions were informed by our review of DAF and DOW requirements processes (e.g., Air Force Instruction 10-601,⁵⁶ AF/A5R Requirements Development Guidebooks, JCIDS).

The maturity category draws on maturity modeling principles. A mature process involves a versioned CRD plan, defined decision gates, assigned authorities, and evidence the process was used before and improved over time; it should also exhibit handoffs between capability, technical, and acquisition teams.⁵⁷ The transparency category reflects visibility into process inputs, stakeholder comments and disagreements, prioritization methods, and selection outcomes.⁵⁸ Transparent records of stakeholder inputs and adjudication are particularly important to counteract potential biases in investment development.⁵⁹ The defensibility category builds on maturity and transparency and asks whether investment selections are logically supported by verifiable analysis; documentation of appropriate analytic approaches and sensitivity checks strengthens defensibility.⁶⁰

⁵⁵ Overfitting and misplaced confidence in analytic results highlight the need for sensitivity checks and out-of-sample thinking when using analysis to support decisions. See Nate Silver, *The Signal and the Noise: Why So Many Predictions Fail—but Some Don't*, Penguin Press, 2012.

⁵⁶ Air Force Instruction 10-601, *Operational Capability Requirements Documentation and Validation*, Department of the Air Force, April 27, 2021.

⁵⁷ Mayer et al., 2024, pp. 44–45, 78–79.

⁵⁸ Mayer et al., 2024, pp. 3–4, 44–45, 78–79.

⁵⁹ Cognitive biases can distort stakeholder judgments in investment decisions, underscoring the need for structured documentation, adjudication processes, and independent review. See Daniel Kahneman, *Thinking, Fast and Slow*, Farrar, Straus and Giroux, 2011.

⁶⁰ For example, predictive analysis is a common analytic approach. However, such methods are poorly suited to conditions of deep uncertainty, where stakeholders cannot agree on the models, probabilities, or framing of a problem. In such contexts, analysts should emphasize robustness rather than optimization, using methods such as Decision Making Under Deep Uncertainty to test how strategies perform across many plausible futures. Scenario stress-testing is one practical tool, exposing investment proposals to a variety of divergent but credible scenarios to assess whether they remain viable under shifting assumptions. For discussion of Decision Making Under Deep Uncertainty methods and their application to defense investment analysis, see Leftwich et al., 2019, pp. 36–49. For further discussion on the role of sensitivity checks in decisionmaking, see Silver, 2012.

The Supportable assessment rests on the assumption that the maturity of an investment's development process is a reliable proxy for its defensibility: Disciplined practices reduce the risk that faulty or unexamined assumptions, unresolved stakeholder disagreement, or gaps in traceability will drive investment decisions.⁶¹ That said, uncertainties remain; even a mature process may embed flawed assumptions, while less mature processes can sometimes produce acceptable outcomes under urgent conditions.

To mitigate these risks, the approach incorporates a triage rule: Investments emerging from lower-maturity processes or processes dependent on many assumptions are generally deprioritized unless they address urgent capability gaps where delay would impose greater cost. By surfacing high-uncertainty areas, the approach highlights where additional analysis or remediation is merited and assembles an auditable documentation trail.⁶² In this way, the Supportable evaluation criterion balances confidence in well-documented processes with pragmatic flexibility while clarifying where assumptions drive risk and where further evidence would improve decision quality.

Step 5: Strategic

The Strategic criterion evaluates the degree to which prioritized investments demonstrably support DAF leadership priorities, strategic objectives, and force design plans. It also examines whether the methods used to develop budget priorities within the portfolio are objective, are defensible, and produce clearly differentiated tiers of investment that reflect those priorities.

The strategic alignment dimension requires analysts to verify that the portfolio tells a coherent story of how resources enable missions and the force design objectives laid out in senior guidance. This framing ensures that portfolios can support budget deliberations where leadership must weigh competing demands across the DAF.⁶³ It is equally important to evaluate the continuity of alignment: As portfolios evolve through requirements development and internal trade-offs, they must preserve a traceable link to the original strategic rationale.⁶⁴ Such traceability in justification helps guard against incremental drift and strengthens the credibility of investment claims when scrutinized by review bodies. This step also evaluates whether prioritization within the portfolio was disciplined and transparent. Senior decisionmakers need confidence that investment rankings reflect genuine differences in value, that dependencies across capabilities are explicit, and that trade-offs are made visible under different budget scenarios.⁶⁵ A rigorous and transparent prioritization process is essential for justifying a portfolio's resource needs in the competitive budget environment.

⁶¹ This assumption is consistent with findings from prior RAND analyses that emphasize that structured, disciplined practices improve decision defensibility and reduce risk. See Leftwich et al., 2019; Mayer et al., 2022; and Mayer et al., 2024.

⁶² For example, *breakpoint conditions* are thresholds or events that indicate when additional analysis or remediation may be needed. See Marjolijn Haasnoot, Jan H. Kwakkel, Warren E. Walker, and Judith ter Maat, "Dynamic Adaptive Policy Pathways: A Method for Crafting Robust Decisions for a Deeply Uncertain World," *Global Environmental Change*, Vol. 23, No. 2, April 2013.

⁶³ Leftwich et al., 2019.

⁶⁴ Department of Defense Directive 7045.20, *Capability Portfolio Management*, U.S. Department of Defense, September 25, 2023, p. 14.

⁶⁵ The assessment instrument draws on a substantial literature addressing the challenge of structuring and communicating complex resource allocation priorities for decisionmakers. See Ralph L. Keeney and Howard Raiffa, *Decisions with Multiple*

As the final assessment stage, Step 5 surfaces uncertainties in investment priorities and provides an opportunity to refine the recommended portfolio based on expert and leadership input. This step highlights where assumptions about strategic alignment or prioritization methods may be contested, incomplete, poorly understood, or dependent on evolving guidance. By incorporating expert judgment and leadership knowledge, the approach ensures that recommendations remain defensible under evolving or constrained circumstances.⁶⁶ Where uncertainties remain—such as unresolved dependencies within or across portfolios or unclear prioritization criteria and tiering—the instrument ensures they are visible and can be explicitly addressed in budget justifications and deliberations.

Objectives: Preferences and Value Tradeoffs, John Wiley & Sons, 1976; Thomas L. Saaty, *Decision Making for Leaders: The Analytical Hierarchy Process for Decisions in a Complex World*, Wadsworth, 1982; Valerie Belton and Theodor J. Stewart, *Multiple Criteria Decision Analysis: An Integrated Approach*, Kluwer Academic Publishers, 2002; and Robert J. Lempert, David G. Groves, Steven W. Popper, and Steve C. Bankes, "A General, Analytic Method for Generating Robust Strategies and Narrative Scenarios," *Management Science*, Vol. 52, No. 4, April 2006.

⁶⁶ Klein, 2009.

Abbreviations

16AF	Sixteenth Air Force (Air Forces Cyber)
ACC/A6	Air Combat Command, Office of Cyberspace and Warfighting Communications
AF/A6	Air Force Deputy Chief of Staff for Warfighter Communications and Cyber Systems
AoA	analysis of alternatives
BLUF	bottom line up front
CAPE	Cost Assessment and Program Evaluation
CRD	capability requirements development
DAF	Department of the Air Force
DoD	U.S. Department of Defense
DOW	U.S. Department of War
EIT	enterprise information technology
FY	fiscal year
FYDP	Future Years Defense Program
IT	information technology
JCIDS	Joint Capabilities Integration and Development System
OSW	Office of the Secretary of War
OUSW(C)	Office of the Under Secretary of War (Comptroller)/Chief Financial Officer
PA&E	Program Assessment and Evaluation (SAF/AE)
PE	program element
PEC	program element code
PEM	program element monitor
POM	Program Objective Memorandum
PPBE	Planning, Programming, Budgeting, and Execution
SAF/AE	Program Assessment and Evaluation, Office of the Secretary of the Air Force
SAF/CN	Chief Information Officer, Office of the Secretary of the Air Force
SME	subject-matter expert
UJTL	Universal Joint Task List

Glossary of Key Terms

This glossary provides definitions for many of the key terms we used to develop the assessment approach and in this report.

assessment: “Determination of the progress toward accomplishing a task, creating a condition, or achieving an objective.”⁶⁷

capability: “The ability to complete a task or execute a course of action in the presence of specified conditions and at a defined level of performance.”⁶⁸

capability gap: “the inability to meet or exceed a capability requirement, resulting in an associated operational risk until closed or mitigated. The gap may be the result of no fielded capability, lack of proficiency or sufficiency in a fielded capability solution, or the need to replace a fielded capability solution to prevent a future gap.”⁶⁹

capability portfolio: “A collection of grouped capabilities as structured by [joint capability areas (JCAs)] and the associated doctrine, organization, training, materiel, leadership and education, personnel, and facilities programs.”⁷⁰

capability requirement: “A capability required to meet organizational roles, functions, and missions in current or future operations. To the greatest extent possible, capability requirements are described in relation to tasks, standards and conditions in accordance with the Universal Joint Task List or equivalent DoD Component Task List.”⁷¹

cross-cutting portfolio: a single portfolio, managed by a single entity, that contains a collection of investments supporting multiple missions and stakeholders across several functional domains or operational areas.

enterprise information technology: information technology aligned to the Information Environment Mission Area, including the following subportfolios: connect, protect, compute/store, enterprise services, and end devices.⁷²

evaluation: in the context of information technology portfolio management, evaluation “is the activity focused on measuring and assessing the outcomes of portfolio investments to determine whether expected benefits were achieved.”⁷³

⁶⁷ Joint Publication 3-0, *Joint Campaigns and Operations*, Joint Chiefs of Staff, June 18, 2022, p. GL-7.

⁶⁸ Department of Defense Directive 7045.20, 2023, p. 19.

⁶⁹ Chairman of the Joint Chiefs of Staff Instruction 5123.01I, 2021, p. GL-8.

⁷⁰ Department of Defense Directive 7045.20, 2023, p. 19.

⁷¹ Air Force Instruction 10-601, 2021, p. 12.

⁷² Air Force Instruction 17-110, 2018, p. 7.

⁷³ Department of Defense Instruction 8115.02, *Information Technology Portfolio Management Implementation*, U.S. Department of Defense, October 30, 2006, p. 5.

Information Environment Mission Area: “Represents, the common, integrated information computing and communications environment of the DoD Information Network (DoDIN). The Information Environment is composed of DoD Information Network assets that operate as, provide transport for and/or assure local area networks, metropolitan area networks and wide area networks. The Information Environment includes computing infrastructure for the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information, with primary emphasis on DoD enterprise hardware, software operating systems and hardware/software support that enable the DoD Information Network enterprise. The Information Environment also includes a common set of enterprise services, which provide awareness of, access to and delivery of information to the DoD Information Network.”⁷⁴

investment: in the context of information technology, “The expenditure of IT resources to address mission delivery and management support. An IT investment may include a project or projects for the development, modernization, enhancement, or maintenance of a single IT asset or group of IT assets with related functionality, and the subsequent operation of those assets in a production environment. All IT investments should have a defined life cycle with start and end dates, with the end date representing the end of the currently estimated useful life of the investment, consistent with the investment’s most current alternatives analysis if applicable. When the asset(s) is essentially replaced by a new system or technology, the replacement should be reported as a new, distinct investment, with its own defined life cycle information.”⁷⁵

joint capability areas (JCAs): “Collections of like DoD capabilities functionally grouped to support capability analysis, strategy development, investment decision making, [capability portfolio management], and capabilities-based force development and operational planning.”⁷⁶

materiel capability solution: “Correction of a deficiency or incorporation of new technology that results in development, acquisition, procurement, or fielding of a new item (including ships, tanks, self-propelled weapons, aircraft, space vehicles and related software & data, spares, repair parts, and support equipment, but excluding real property, installations, and utilities).”⁷⁷

mission: “The essential task or tasks, together with the purpose, that clearly indicates the action to be taken and the reason for the action.”⁷⁸

mission area: “A defined area of responsibility with functions and processes that contribute to mission accomplishment.”⁷⁹

mission thread: “A sequence of end-to-end activities and events presented as a series of steps to achieve a mission.”⁸⁰

⁷⁴ Air Force Instruction 17-110, 2018, p. 21.

⁷⁵ Department of Defense Directive 8000.01, *Management of the Department of Defense Information Enterprise (DoD IE)*, U.S. Department of Defense, March 17, 2016, change 1, July 27, 2017, p. 13.

⁷⁶ Department of Defense Directive 7045.20, 2023, p. 20.

⁷⁷ Air Force Instruction 10-601, 2021, p. 12.

⁷⁸ Joint Publication 3-0, 2022, p. GL-12.

⁷⁹ Department of Defense Directive 8115.01, *Information Technology Portfolio Management*, U.S. Department of Defense, October 10, 2005.

⁸⁰ Department of Defense Directive 7045.20, 2023, p. 20.

nonmateriel capability solution: “Changes to doctrine, organization, training, (previously fielded) materiel, leadership and education, personnel, facilities, or policy implemented to satisfy one or more capability requirements (or needs) and reduce or eliminate one or more gaps, without the need to develop or purchase new materiel capability solutions.”⁸¹

portfolio: A coherent set of programs and associated capabilities that collectively address a related set of needs or goals and is typically organized around a single mission area or functional focus. See *capability portfolio*.

program: “A directed, funded effort that provides a new, improved, or continuing materiel, weapon, information system, or service capability in response to an approved need.”⁸² Programs may follow different acquisition pathways but are all managed to deliver capabilities that meet operational needs.⁸³ Also referred to as an *acquisition program*.

program element (PE): “The primary data element in the FYDP and normally the smallest aggregation of resources used by the Office of the Secretary of Defense (OSD) for analysis. It generally represents a collection of functional or organizational entities and their related resources. PEs are designed and quantified to be comprehensive and mutually exclusive. As the building blocks of the programming and budgeting system, PEs are continually reviewed to maintain proper visibility into the multitude of defense programs. They may be aggregated in a variety of ways:

- To display total resources assigned to a specific program
- To display weapons systems and support systems within a program
- To select specified resources
- To display logical groupings for analytical purposes
- To identify selected functional groupings of resources.”⁸⁴

program element code (PEC): the representation of a program element “consist[ing] of a seven-digit number with an alphabetical suffix that identifies a program, organization or office. The first two digits identify the [Major Force Program (MFP)] that contains the PE (e.g., the PE ‘0203123A’ would indicate a program within MFP 2 - General Purpose Forces). The alphabetical suffix identifies the Service or Defense Agency that has cognizance over a particular program element. For example, ‘A’ indicates an Army program, ‘F’ an Air Force program, ‘N’ a Navy program and ‘M’ a Marine Corps program. This PE structure facilitates compilation of the FYDP for different purposes, such as an appropriation review.”⁸⁵

requirements owner/requirements sponsor: A major command, field command, agency, or Headquarters Air Force organization assigned “to lead the development of capability requirements and associated documentation for their assigned systems, programs, functions and/or missions. Sponsorship includes, but is not limited to advocating for resourcing, manpower, and any other support necessary for the conduct of requirements development activities.”⁸⁶

stakeholder: An organization or individual participating—or with equities—in the associated PPBE process.

⁸¹ Air Force Instruction 10-601, 2021, p. 12.

⁸² Defense Acquisition University, undated-a.

⁸³ Defense Acquisition University, “Program of Record,” webpage, undated-f.

⁸⁴ Defense Acquisition University, “Future Years Defense Program (FYDP),” webpage, undated-b.

⁸⁵ Defense Acquisition University, undated-b.

⁸⁶ U.S. Air Force, *Requirements Development Guidebook*, Vol. 1, *Guidelines, Oversight and Governance*, Requirements Integration Division, AF/A5RP, June 24, 2020, p. 22.

technical requirements: A set of statements defining what a system should do and how well it should be done. Those specifying what to do are often termed *functional* requirements. Those specifying how well something is to be done are termed *nonfunctional* or *quality attribute* requirements.⁸⁷

⁸⁷ Mayer et al., 2022, p. 1.

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