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National Geospatial-Intelligence Agency Resources

Financial Management Programming Evaluation



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Preface

Over the past decade, the National Geospatial-Intelligence Agency (NGA) has evolved its organization multiple times, along with the process it uses for managing its resource investments. Each of these iterations was done to address challenges and inefficiencies. NGA is now considering additional steps to improve its process and is seeking to improve its practices through internal improvements, such as gaining an understanding of the how previous changes had affected the overall effectiveness of its resource management process, and through what can be learned from other organizations.

NGA asked the RAND Corporation to review the programming phase of the Intelligence Planning, Programming, Budgeting, and Evaluation (IPPB) process.¹ We explored changes to this phase of IPPBE at NGA, as well as the conditions, causes, and effects of these changes, for three separate periods: pre-2013, 2013–2018, and 2018 to the present, (i.e., the pre-portfolio era, the portfolio era, and the associate director and resource deputy era, respectively). We analyzed relevant literature, including assessments from other U.S. Department of Defense and Intelligence Community organizations, to identify best practices. We also conducted interviews with past and present senior NGA leadership to identify insights, findings, and recommendations for improving the programming phase of the NGA IPPBE process.

The research reported here was completed in February 2021 and underwent security review with the sponsor and the Defense Office of Prepublication and Security Review before public release.

This research was sponsored by NGA and conducted within the Cyber and Intelligence Policy Center of the RAND National Security Research Division (NSRD), which operates the National Defense Research Institute (NDRI), a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the Unified Combatant Commands, the Navy, the Marine Corps, the defense agencies, and the defense intelligence enterprise.

For more information on the Cyber and Intelligence Policy Center, see www.rand.org/nsrd/intel or contact the director (contact information is provided on the webpage).

¹ Intelligence Community Directive 116, “Intelligence Planning, Programming, Budgeting, and Evaluation System,” McLean, Va.: Office of the Director of National Intelligence, September 14, 2011.

Contents

Preface	iii
Figures	vii
Tables	ix
Summary	xi
Acknowledgments	xvii
 CHAPTER ONE	
Introduction	1
Background	1
Methodology	2
Limitations	6
Structure of the Report	6
 CHAPTER TWO	
The Intelligence Planning, Programming, Budgeting, and Evaluation Process:	
An Overview	9
Overview	9
IPPBE Versus PPBE	9
The Planning Process Plays a Critical Role in Programming	15
 CHAPTER THREE	
Policy and Guidance	23
Overview	23
National-Level Programming Policy for the Intelligence Community	23
Strategic Direction and Guidance Ensure Unity Across Early Phases of IPPBE	31
 CHAPTER FOUR	
Information Visibility	37
Overview	37
The Programming Phase Is Integral to the Budgeting Phase	37
Information Technology Infrastructure and Tracking Are Critical for Program Visibility	39

CHAPTER FIVE

Roles and Relationships	45
Overview	45
Frequent Stakeholder Input and Information Sharing Are Critical Throughout All Phases of IPPBE	45

CHAPTER SIX

Oversight and Accountability	51
Overview	51
Programming Should Include Measures of Performance and Effectiveness	51

CHAPTER SEVEN

Findings, Recommendations, and Conclusion	57
Overview	57
How to Read the Process Maps	57
Findings and Recommendations	58
Conclusion	67
Ideas for Future Research	69

APPENDIX

U.S. Army Case Study	71
-----------------------------------	----

Abbreviations	73
----------------------------	----

References	77
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Figures

1.1.	The Focus of This Project: Programming	1
1.2.	Framework for Tracing National Geospatial-Intelligence Agency Issues Through Policy Resolution	5
2.1.	Example Intelligence IPPBE Process Timeline, Using PPBE as Baseline.....	14
2.2.	Example Defense PPBE Process Timeline.....	15
2.3.	The National Geospatial-Intelligence Agency's IPPBE Process.....	15
3.1.	Intelligence Community Capability Requirements Process	27
3.2.	National Geospatial-Intelligence Agency 2025 Strategy Snapshot	30
7.1.	Example Process Map Across Three National Geospatial-Intelligence Agency Financial Resource Management Eras	58
7.2.	Thematic Analysis of Programming Phase at the National Geospatial-Intelligence Agency	58
7.3.	Phases of the IPPBE Process Across National Geospatial-Intelligence Agency Financial Management Eras.....	59
7.4.	Planning Process Standardization Across National Geospatial-Intelligence Agency Financial Management Eras.....	60
7.5.	External Guidance Across National Geospatial-Intelligence Agency Financial Management Eras.....	61
7.6.	Internal IPPBE Guidance and Perceptions Across National Geospatial-Intelligence Agency Financial Management Eras	62
7.7.	Internal Prioritization and Timelines Across National Geospatial-Intelligence Agency Financial Management Eras	63
7.8.	Budget Visibility Across National Geospatial-Intelligence Agency Financial Management Eras.....	64
7.9.	Systems and Data Across National Geospatial-Intelligence Agency Financial Management Eras.....	65
7.10.	Roles and Responsibilities Across National Geospatial-Intelligence Agency Financial Management Eras.....	66
7.11.	Oversight and Accountability Across National Geospatial-Intelligence Agency Financial Management Eras.....	68

Tables

1.1.	Boolean Searches Developed for Database Extraction	4
1.2.	Organizational Themes Elicited from National Geospatial-Intelligence Agency Interviews.....	6
2.1.	Comparison of the Processes, Authorities, Guidance, and Roles of the Intelligence IPPBE Process and the Defense PBBE	11
2.2.	Intelligence Community Elements Receiving National Intelligence Program and Military Intelligence Program Funding.....	13
3.1.	Intelligence Community Directives That Address the IPPBE Process.....	25
3.2.	National Geospatial-Intelligence Agency Strategy Objective Examples, 2013–2017—Portfolio Resource Management Era.....	28
5.1.	National Geospatial-Intelligence Agency IPPBE Roles and Primary Responsibilities Across Resource Management Eras	46
6.1.	Best Practices for Developing and Managing Program Costs.....	53

Summary

The National Geospatial-Intelligence Agency (NGA) asked the RAND Corporation to review the programming phase of the Intelligence Planning, Programming, Budgeting, and Evaluation (IPPBE) process.¹ To do so, we analyzed three separate eras of NGA financial management (FM) eras: pre-2013, 2013–2018, and 2018 to the present, (i.e., the pre–portfolio era, the portfolio era, and the associate director and resource deputy [AD/RD] era, respectively). We sought to determine the conditions, causes, and effects of performance and effectiveness and of previous changes to this phase of NGA IPPBE for each era.

Research Questions

We focused on several key questions: How has the programming phase within the NGA resource management process evolved over time? What prior studies of agencies' IPPBE processes exist? Which, if any, of their findings or recommendations might be applicable to the NGA programming phase?

To answer these questions and others, we compared current and historic NGA programming processes with each other and, when possible, with those of other Intelligence Community elements and at other U.S. government elements, primarily the U.S. Department of Defense. The objective was to identify possible actions that NGA could take to improve its processes to improve resource management outcomes.

Overview of Findings and Recommendations

Procedural Documentation for the Programming Phase

Finding

The programming phase should have its own procedural documents because it is not an isolated process. The planning phase can set the direction for programmatic decisions, and programmatic decisions directly affect budgetary processes. Best practices suggest that a continuous, transparent exchange between stakeholders at both levels is critical to an effective IPPBE process.

¹ Intelligence Community Directive 116, "Intelligence Planning, Programming, Budgeting, and Evaluation System," McLean, Va.: Office of the Director of National Intelligence, September 14, 2011.

Recommendation

- Develop guidance and codify documentation that outline a consistent, repeatable IPPBE process with clear roles and responsibilities and a timeline that includes starting and stopping points, and deliverables required, for each phase of the process.

Need for a Clearly Defined and Standardized Planning Process

Finding

Several Department of Defense and Intelligence Community elements, including NGA, have struggled to establish clearly defined, standardized planning processes. A standardized planning process would provide numerous benefits across the IPPBE process.

Recommendations

- At the end of the planning phase, produce documented guidance (including risk analysis) for the program build.²
- Clearly differentiate the programming phase from the planning phase and include Analyses of Alternatives, major issue studies, and further consideration of risks and divestments.
- Develop clear guidance documents that outline a consistent, repeatable IPPBE process with clear roles and responsibilities and starting and stopping points for each phase (as discussed earlier).

External Guidance and Requirements

Finding

There is a lack of external guidance and requirements, and there are few internal governance structures. External guidance that clearly communicates expectations for National Intelligence Program– and Military Intelligence Program–funded IPPBE processes would benefit NGA by setting standards and by imparting best practices and lessons learned from other departments and agencies.

Recommendations

- Cultivate relationships with the Office of the Secretary of Defense, the Under Secretary of Defense for Intelligence and Security, and the Office of the Director of National Intelligence and request instructions for deliverables.
- Develop a consistent briefing protocol for interactions with Congress.
- Conduct a full analysis of other agencies' processes to integrate best practices and lessons learned. Emulate the success of the National Security Agency and National Reconnaissance Office in articulating strategic vision, cost, schedule, and performance metrics.

Need for Consistent Guidance

Finding

While some guidance for the programming phase exists within NGA, the guidance is insufficient and is frequently changed by incoming leadership, making it less than useful. Internal perceptions of the programming process suggest a lack of transparency in

² A *program build* incorporates planning, guidance, requirements, and funding to situate the program (e.g., platform, software, tool) in relation to the overall IPPBE process.

resource decisionmaking, and challenging timelines negatively affect NGA's ability to prioritize investments.

Recommendations

- Develop clear, consistent guidance documents for the programming phase that provide explicit directives for aligning the program build with planning decision documents and the NGA mission and strategic goals. This guidance should be developed in coordination with Corporate Assessment and Program Evaluation, the chief financial executive, and the assistant directors and resource deputies.
- Strengthen program management reviews and develop mission performance teams.
- Clearly define conditions for success, build integration, and improve mission-resource alignment.

Visibility into the Budget Process

Finding

NGA faces challenges in leadership visibility into the budget process, difficulty tracing funds across the IPPBE process, and understaffing—all of which affect the agency's ability to execute funds. At the end of this research, we learned that decisions were actively being made to hold FM accountable for the budget process and that few FM staff had been allotted to the ADs and RDs accountable for the planning and programming phases, respectively.

Recommendations

- Encourage greater understanding of mission, roles, and responsibilities.
- Develop a standardized briefing format that connects funds across IPPBE phases and communicates how resource decisions advance NGA's strategic goals.
- Redefine the budget cycle as a year-round process, allowing for reprioritization and change taking time to enforce and increasing emphasis on effective planning and programming to enhance the budgeting phase.

Challenges to Be Addressed

Finding

NGA experiences data management, interoperability, and data access and visibility challenges. NGA lacks measures of performance and measures of effectiveness for the programming process.

Recommendations

- Develop data management protocol processes to ensure that data inputs consistently have high quality.
- Provide Organization Requirements and Budgeting Information Tool (ORBIT) access to those responsible for all applicable portions of the IPPBE process.
- Develop a transition plan to support the seamless transition of data to the proposed, modernized requisition system; outline how the system will integrate with all related existing systems; set standards for data input, management, and updating; and develop appropriate procedures for transferring existing data into the system.

Roles Within the Organization

Finding

The transitions between eras in NGA have led to the creation or shifting of several roles within the organization.

Recommendation

- Develop clear guidelines concerning the roles, responsibilities, and authorities of ADs, RDs, key components, and FM and the relationships between each of these positions. *At the time of this writing, decisions were being made within NGA about how to restructure roles and responsibilities for each phase of the IPPBE process.*

Reporting to Congress and Other Stakeholders

Finding

NGA has struggled to provide consistent briefings to Congress and to respond to questions from external stakeholders consistently; accountability for contributions to the IPPBE process appears lacking.

Recommendations

- Give the chief financial executive ultimate decision authority and develop an outcome-based assessment with the support of the director and deputy director. This does not preclude NGA leadership from conducting independent assessments of the IPPBE process and of annual acquisition plans, programs, and budgets.
- Hold individuals accountable for their required tasks and develop a culture of accountability in which all members of the office understand their contributions to NGA's outward-facing submissions and image.
- To mitigate confusion, develop a clear understanding of internal and external controls and how they relate to each other.

Conclusion and Ideas for Future Research

Information gained from both the literature review and interviews highlights multiple acquisition restructuring periods across the U.S. Department of Defense, the service components, and the intelligence community that were undertaken to try to create and implement seamless transitions between Planning, Programming, Budgeting, and Evaluation and IPPBE process phases. While NGA has conducted several previous internal studies to identify areas for IPPBE process improvement, our research is the first to synthesize findings between external literature and findings gleaned from structured SME interviews to highlight crucial program process issues for NGA leadership to absorb and address in any future IPPBE restructuring phase.

Pre-Portfolio Era

The pre-portfolio era at NGA was the first major attempt to reconcile long-standing issues across the IPPBE process, leading to the creation of data repositories, efforts to develop metrics that could assist business processes, and efforts to increase senior leadership engagement with service components to ensure equal representation in program priorities. Structural changes implemented during this period, however, led to decreased leadership budget visibility because information stovepipes developed across components.

Portfolio Era

The NGA portfolio era was a reaction to some of the challenges encountered in the pre-portfolio era. This new construct created several new organizational challenges. Portfolio managers were dual-hatted as component directors, which overburdened managerial workflow processes. In addition, internal IT-acquisition solutions, such as ORBIT and GEO-F, inherently decreased program process visibility, given the strict built-in user access constraints.

Associate Director and Resource Deputy Era

The AD/RD era at NGA addressed some of the programming problems created under the pre-portfolio and portfolio eras, but it, too, created new organizational challenges that were exacerbated by external COVID-19 challenges. Key challenges included a lack of transparency across investment and divestment decisions leading to difficulties in congressional justifications. The AD/RD era, however, saw the organizational restructuring of portfolio managers to remove their dual-hat function, instituted a council of deputies to provide initial validation and prioritization of mission needs, subordinated RDs to ADs to assist with defining program budget requirements, and successfully aligned resources to strategic outputs and outcomes.

Future Era

NGA is now entering a fourth period of acquisition restructuring that is intended to improve on how the planning and programming phases are managed. ADs will become responsible for the planning phase and will be supported by the RDs. The PDs (some of whom were former RDs) will gain primary responsibilities for the programming phase, while FM staff from the Financial Management Resource and the Financial Management Matrix offices will retain responsibility for budgeting, execution, and evaluation. Incorporating research findings from this research will prepare NGA for continued geospatial-intelligence mission excellence in this new era.

Ideas for Future Research

In addition to the observations noted in the findings, recommendations, and conclusions presented throughout this report, we suggest that the planning, budgeting and execution, and evaluation phases would merit further research that would yield additional relevant results across the IPPBE spectrum:

- **Planning:** Our literature review and interviews provided limited visibility into the planning process but served as necessary indicators to suggest that a focused planning process effort would reveal other important insights for NGA leadership consideration.
- **Budgeting and evaluation:** Although this research provided some initial observations on this phase (as a secondary priority), additional research would greatly assist FM and the chief financial executive in determining how best to derive the greatest benefit from the newly designed programming era.
- **Evaluation metrics:** Understanding the various stakeholder needs across IPPBE processes could help NGA leadership detect when programs are off track quickly. This could be beneficial when relaying NGA's strategy to Congress during restrained budget environments.

Acknowledgments

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Introduction

Background

The National Geospatial-Intelligence Agency (NGA) asked the RAND Corporation to review the programming phase of the Intelligence Planning, Programming, Budgeting, and Evaluation (IPPB) process (see Figure 1.1).¹ To do so, we analyzed three separate eras of NGA financial management (FM) eras: pre-2013, 2013–2018, and 2018 to the present, (i.e., the pre-portfolio era, the portfolio era, and the associate director and resource deputy (AD/RD) era, respectively). We sought to determine the conditions, causes, and effects of performance and effectiveness and of previous changes to this phase of NGA IPPBE for each era.

Figure 1.1
The Focus of This Project: Programming



SOURCE: Adapted from Intelligence Community Directive (ICD) 116, 2011.

¹ ICD 116, “Intelligence Planning, Programming, Budgeting, and Evaluation System,” McLean, Va.: Office of the Director of National Intelligence, September 14, 2011.

Methodology

We used a mixed-methods approach for data collection and analysis to illuminate connections across the NGA resource management eras, identify areas for improvement, and align best practices. We combined thematic analysis, modified root-cause analysis, and process analysis in a novel approach that preceded the evaluation of our analyses.

We focused on several key research questions: How has the programming phase within the NGA resource management process evolved over time? What other prior studies of agencies' Planning, Programming, Budgeting and Execution, and Evaluation (PPBE) processes exist? Which, if any, of their findings or recommendations might be applicable to the current programming phase at NGA?

To answer these questions and others, we compared current and historic NGA programming processes with each other and those at other Intelligence Community (IC) elements and at the U.S. Department of Defense (DoD) to identify actions NGA could take to improve its processes.

Focusing on the programming phase of IPPBE and other U.S. government PPBE processes, we gathered data through a document review and by interviewing key stakeholders inside and outside NGA, then analyzed the data collected and, finally, evaluated the analyses to determine the conditions, causes, and effects of the issues we uncovered. The document review included NGA instructions, policies, directive, manuals, and guidance. We also reviewed FM policies and assessments of DoD and U.S. government agency PPBE processes. The interviews included past and present NGA leaders and stakeholders.

In our analysis stage, we described the features and performance of the programming phase for each of our three eras of NGA resource management, then determined what changes occurred between each set of resource management processes and what issues prompted the change. We described the features and performance of the programming phase from other IPPBE assessments and assessments of other agency IPPBE processes and documented the key findings and recommendations from the literature review. We documented key observations or findings from other phases or processes that we evaluated that were intrinsically linked to the programming phase, such as planning phase activities, which take place before programming, and budgeting activities, which occur after programming.

In our evaluation phase, we determined the effects of changes in the NGA programming phase across the different eras, then compared the features and performance extracted from other IC IPPBE and U.S. government PPBE processes with current NGA processes. Finally, we consolidated the recommendations from previous assessments that were relevant to NGA programming. These included external assessments from federally funded research and development centers, the U.S. Government Accountability Office (GAO), departmental offices of inspector generals (IGs), and congressional studies and correspondence and internal IC and DoD (and its service component level) acquisition authorities and guidance.

Literature Review Methodology

The literature review included a meta-analysis documents extending back to the 1970s to capture findings and recommendations from other studies relevant to NGA, as well as to capture major historical organizational changes that had been made in an effort to create efficiencies in the programming phase. This time span aligned with our three time frames: the pre–

portfolio era (pre-2013), the portfolio era (between 2013 and 2018), and NGA's current acquisition construct of the AD/RDs.

The key questions for the literature review were about what prior studies of agencies' PPBE processes exist and which, if any, of their findings or recommendations might be applicable to the programming phase at NGA. To answer these research questions, we focused on identifying processes within the programming phase and on documents that focus on (or are interdependent of) the programming phase, such as the output phase of the planning process, or those that serve as inputs to the budgeting phase.² Examples of keywords used to retrieve relevant literature are provided in Table 1.1.

Interview and Coding Methodology

Among the ways we collected data for this research, we held unclassified 60-minute, semistructured interviews with subject-matter experts (SMEs) within NGA's Corporate Assessment and Program Evaluation (CAPE) program build cohort.³ Interview questions fell into five main categories:

- understanding NGA resource management constructs
- understanding NGA resource management authorities and processes
- mission support and communication tools
- strategic priorities and resource mission alignment
- observations on best practices from other agencies.

In total, we conducted 24 interviews over the course of this project (August through November 2020).

First-Cycle Coding

We employed a two-cycle coding approach to understand the information gained through interviews with former and current NGA senior leaders. This approach is well documented within the academic literature. Saldaña described it this way: "First cycle coding is a way to initially summarize segments of data. Pattern Coding, as a second cycle method, is a way of grouping those summaries into a smaller number of categories, themes, or concepts."⁴

Therefore, our first step focused on creating subsets of interview data that would be categorized—or *themed*—to enable our analysis. Saldaña explained that creating codes is distinct from creating themes: "A theme is an outcome of coding, categorization, or analytic reflection, but it is not something that is, in itself, coded."⁵ For example, while geospatial intelligence (GEOINT) financials (GEO-F) might be frequently coded as a term or phrase throughout interviews, that term might be used in conjunction with *integration*, *access*, or

² To ensure a comprehensive collection of literature, we worked with RAND Knowledge Services, which comprises experienced and professional research librarians located in RAND's Washington Office. This team employs unique search syntax and functionalities across a wide variety of academic, military, and other open-source information, ensuring that our literature review captured the documents were most relevant to this research task. Databases parsed for this task included Academic Search Complete, Business Source Complete, Scopus, and Web of Science.

³ A *program build* incorporates planning, guidance, requirements, and funding to situate the program (e.g., platform, software, tool) in relation to the overall IPPBE process.

⁴ Johnny Saldaña, *The Coding Manual for Qualitative Researchers*, Thousand Oaks, Calif.: Sage Publishing, 2015, p. 236.

⁵ Saldaña, 2015, p. 15.

Table 1.1
Boolean Searches Developed for Database Extraction

Department or Agency	IPPBE or PPBE	Search Terms
Office of the Director of National Intelligence (ODNI) Central Intelligence Agency (CIA) U.S. Department of Energy (DoE) Intelligence and Counterintelligence U.S. Department of Homeland Security (DHS) Security and Intelligence Analysis U.S. Coast Guard (USCG) Intelligence (CG-2) U.S. Drug Enforcement Administration Office of National Security Intelligence Federal Bureau of Investigation U.S. Department of State (Bureau of Intelligence and Research) U.S. Department of the Treasury (Office of Intelligence and Analysis) Undersecretary of Defense for Intelligence and Security (USD[I&S])	IPPBE	National Intelligence Program (NIP) Systems & Resource Analyses (SRA) Major Issue studies Consolidated Intelligence Guidance (CIG) Independent cost estimate (ICE) Analysis of Alternatives (AoA) Strategic Program Briefings Resource decisions Cost-performance benefits Investment decisions Divestment decisions
National Security Agency (NSA) NGA National Reconnaissance Office (NRO) Defense Intelligence Agency (DIA) U.S. Army Intelligence U.S. Navy Intelligence U.S. Air Force (USAF) Intelligence U.S. Marine Corps Intelligence	PPBE	Military Intelligence Program (MIP) CAPE

repository, and the usage of *GEO-F* cannot provide additional meaning without the application of the subsequent theme to provide more context.

The coding approach we used a combination of the *units* and *aspects* of social organization, a method Lofland et al. developed and refined over the course of three decades.⁶ The coding approach uses nine units that are combined into the following three aspects of social organization:⁷

- cognitive aspects or meanings (e.g., ideologies, rules, self-concepts, identities)
- emotional aspects or feelings (e.g., sympathy, workplace satisfaction)
- hierarchical aspects or inequalities (e.g., racial inequality).

Second-Cycle Coding

Our first-cycle coding method generated several themes that required further parsing to relay information that senior NGA program staff could operationalize.⁸ We then employed a form of second-cycle coding known as *pattern coding* to add further value to NGA decisionmak-

⁶ Saldaña, 2015. The most recent edition of Lofland's own work is John Lofland, David A. Snow, Leon Anderson, and Lyn H. Lofland, *Analyzing Social Settings: A Guide to Qualitative Observation and Analysis*, 4th ed., Belmont, Calif.: Wadsworth Publishing, 2005.

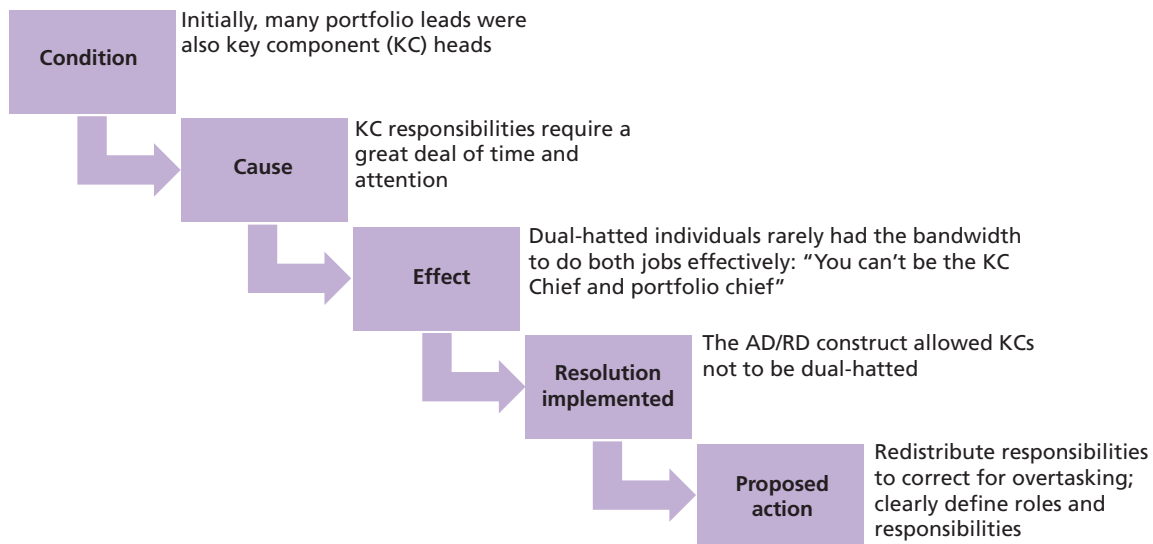
⁷ Saldaña, 2015, pp. 16–17.

⁸ Saldaña suggests that, "Like coding, thematic analysis or the search for themes in the data is a strategic choice as part of the research design that includes the primary questions, goals, conceptual framework, and literature review" (Saldaña, 2015, p. 200).

ers. Pattern coding was useful in this context because it allowed us to observe the frequency, salience (prominence), and common groupings across interview notes to trace particular linkages between implemented policies, activities, actions, and effects on the program phase of the IPPBE process. We used a framework to consider conditions, causes, effects, and any NGA resolutions implemented to address programmatic areas of concern.⁹

Figure 1.2 illustrates this framework. As interviewees described their personal and wider organizational experiences as NGA transitioned through each of the three programmatic eras of interest, we first captured interview observations (*conditions*). The conditions were likely *caused* by something; therefore, we next captured each cause of the observed condition to understand why the condition occurred. Following this logic, each cause had a noticeable, or observable, organizational *effect*, which we captured next. Because our tasking included understanding how an action in one era might have positively or negatively affected subsequent programmatic operations in future eras, we needed to account for whether the implemented action (the effect) was positive or not. We recorded this as the *resolution implemented*.¹⁰ The implemented resolution had its own effect. If that resolution was widely believed to have been successful, we recorded that observation as a best practice. Finally, we recorded implemented resolutions that were not effective and that created additional problems as findings and future

Figure 1.2
Framework for Tracing National Geospatial-Intelligence Agency Issues Through Policy Resolution



SOURCE: Interview data.

⁹ For more on pattern coding as a second-cycle method, see Matthew B. Miles, A. Michael Huberman, and Johnny Saldaña, *Qualitative Data Analysis: A Methods Sourcebook*, 4th ed., Thousand Oaks, Calif.: Sage Publications, 2019; Carl Auerbach and Louise B. Silverstein, *Qualitative Data: An Introduction to Coding and Analysis*, New York: New York University Press, 2003; and Klaus Krippendorff *Content Analysis: An Introduction to its Methodology*, 4th ed., Thousand Oaks, Calif.: Sage Publications, 2018.

¹⁰ For example, one action in the pre-portfolio era might have led to greater problems in the portfolio era or created unforeseen consequences in the AD/RD era.

recommendations as *proposed actions*. This framework is loosely based on guidance from the DoE Office of Inspector General and GAO in trying to identify organizational friction.¹¹

In Chapter Seven, our findings and recommendations are accompanied by process maps showing how the conditions, causes, effects, and resolutions implemented flow across the three financial resource management eras at NGA.

In Table 1.2, we present a list of organizational themes that were elicited from interviews conducted with previous and current NGA leadership and SMEs.

Limitations

Few of the documents we reviewed focused specifically on programmatic doctrine or program-related best practices. In fact, most official documents and guidance focus on the budgeting and execution phase, indicating a key gap later confirmed through interviews. The lack of clear programmatic guidance and associated best practices is a defense- and IC-wide issue. Despite this issue, we were able to identify observations, recommendations, and best practices through available open-source literature to draw comparisons with the programming phase and note the most relevant areas of relevance to assist future organizational NGA acquisition strategy.

Structure of the Report

In this report, we summarize information and findings resulting from our research, analysis, and evaluation and identify best practices and recommendations for supporting NGA resource management processes. Chapters Two through Six present thematic areas of analysis informed by both the literature review and interview data analysis and evaluation. Within each thematic

Table 1.2
Organizational Themes Elicited from National Geospatial-Intelligence Agency Interviews

Assessment Themes	Example Topics
Organizational structure	Roles of branches and how they map to divisions
Infrastructure	Information technology (IT) environments and tools
Communication	Information flows within NGA and with stakeholders
Culture	Shared values, beliefs, and norms
Strategy	Strategy development and implementation plans
Leadership	Decisionmaking, transparency, and communication
Human resources	Training, role clarity, performance appraisal, and accountability
Metrics	Performance management
Processes	Integration of work across groups

¹¹ For example, see DoE, Office of Inspector General, Office of Audits, Deputy Inspector General for Audits and Inspections, *Audit Manual*, Release 8, Washington, D.C., 2014.

chapter, we review existing literature on the programming phase of the IPPBE process. Chapter Two provides a brief overview of the IPPBE process, key differences between the intelligence acquisition functions and the DoD PPBE process, and provides literature and interview findings on the role of planning in the programming phase. Chapter Three examines existing programming guidance at the national and strategic levels before proceeding to associated literature and interview findings on NGA guidance. Chapter Four highlights the role of the IT needed to support the acquisition process. Chapter Five provides an overview of NGA roles and relationships across the three acquisition eras, noting best practices from the literature and observations for improving stakeholder interaction during the programming phase. Chapter Six relays research findings based on oversight and accountability, which include best practices for metric development and comments from interviews that highlight the need for increased use of measures of performance and effectiveness for NGA stakeholders. Chapter Seven presents our cumulative research findings and recommendations and notes possible future areas of research for NGA leadership. The appendix presents a case study.

The Intelligence Planning, Programming, Budgeting, and Evaluation Process: An Overview

Overview

During the Kennedy and Johnson administrations, there was an increasing emphasis on systems analysis and operations research techniques—especially within the Office of the Secretary of Defense (OSD).¹ Former Secretary Robert McNamara introduced the Planning, Programming and Budgeting System (PPBS), centralizing and strengthening DoD’s ability to conduct resource planning and challenge service and joint analyses of force requirements, weapon systems, and other matters.² The IPPBE process was later developed under the Nixon administration in an effort to advance IC programmatic accountability.³

IPPBE Versus PPBE

NGA, much like other elements of the IC, uses the IPPBE process. The IPPBE process is similar to the DoD PPBE process; however, there are some key areas of difference. One key difference between the two processes is that IPPBE NIP funds are fenced or protected from being used for anything other than their intended programmatic purpose.⁴

The IC IPPBE process allocates funding and personnel resources supporting IC-wide capabilities through the development and execution of NIP and its associated budget. NIP addresses priorities described in national security-related documents, such as the National Intelligence Strategy. The IPPBE process applies to all 17 components of the IC. Program managers

¹ Eric V. Larson, *Force Planning Scenarios, 1945–2016: Their Origins and Use in Defense Strategic Planning*, Santa Monica, Calif.: RAND Corporation, RR-2173/1-A, 2019.

² Larson, 2019.

³ The Congressional Research Service (CRS) has explained that the IPPBE process was originally used for the Consolidated Intelligence Budget. Three programs (the National Foreign Intelligence Program, Tactical Intelligence and Related Activities Program, and the Joint Military Intelligence Program) formed the basis for what we now call the National Intelligence Program (NIP) and Military Intelligence Program (MIP). See Anne Daugherty Miles, *Intelligence Community Programs, Management, and Enduring Issues*, Washington, D.C.: Congressional Research Service, R44681, November 8, 2016.

⁴ Furthermore, the actual budgeting phase under the IPPBE process also includes “execution,” leading to “evaluation” as a separate process in the acronym. See Michael E. DeVine, “Intelligence Planning, Programming, Budgeting, and Evaluation (IPPBE) Process,” Washington, D.C.: Congressional Research Service, IF10428, April 24, 2019.

control NIP resources aligned with requirements for IC capabilities, such as GEOINT, signals intelligence, and human intelligence—capabilities that could span several IC components. The DoD PPBE process provides the funding for service components and DoD intelligence agencies (DIA, NSA, NGA, and NRO) required to organize, train, and equip military forces for combat and for covering all necessary support missions. The senior leader for intelligence in each service—the *component manager*—manages that service’s MIP resources in accordance with USD(I&S) guidance and policy.⁵ See Table 2.1 for an additional comparisons of IPPBE and PBPE processes, authorities, guidance, and roles.

DoD uses the PPBE process model.⁶ Because of this model’s complex framework, DoD had previously asked RAND to provide a guidebook that documents “key but enduring aspects of how the Office of the Chief of Naval Operations implements the PPBE process.”⁷ The guidebook’s authors found that the PPBE process overlaps with two other DoD processes: the Defense Acquisition System and the Joint Capability Integration and Development System. PPBE requires all three processes to work together to be effective. The authors noted that the

[k]ey phases and decision points in the PPBE process include strategic planning, issuance of guidance, requirements assessment, the building and integration of the POM [program objective memorandum], POM review (to determine whether it complies with guidance), end game (or final decision process), and budget review.⁸

Including key stakeholders is also necessary for an effective PPBE process.⁹

Total intelligence spending is usually understood as the combination of NIP, which supports strategic planning and policymaking, and MIP, which supports military operational and tactical levels of planning and operations.¹⁰ There are four defense NIP programs, eight nondefense NIP programs, and ten MIP programs. Six IC elements have both NIP and MIP funding sources for the following programs: Consolidated Cryptologic Program (CCP), General Defense Intelligence Program (GDIP), NGP (executed by NGA), National Reconnaissance Program (NRP), and the Special Reconnaissance Program.

⁵ Brendan W. McGarry, “Defense Primer: Planning, Programming, Budgeting and Execution (PPBE) Process,” Washington, D.C.: Congressional Research Service, IF 10429, December 11, 2020.

⁶ CRS notes that DoD’s final phase, execution, also known as

execution review, is intended to evaluate program results. The execution review occurs at the same time as the program review (to prioritize the programs that best meet strategic goals) and the budget review (to decide how much to spend on each program). Thus, execution review is intended to assess a program’s actual performance compared to its planned performance. (McGarry, 2020)

⁷ Irv Blickstein, John M. Yurchack, Bradley Martin, Jerry M. Sollinger, and Daniel Tremblay, *Navy Planning, Programming, Budgeting, and Execution: A Reference Guide for Senior Leaders, Managers, and Action Officers*, Santa Monica, Calif.: RAND Corporation, TL-224-NAVY, 2016.

⁸ Blickstein et al., 2016, p. x.

⁹ For example, in the Navy, fleet commanders, type commanders, system commands, program executive offices, and warfare centers work together to achieve PPBE consensus resulting in the issuance of the POM.

¹⁰ Michael E. DeVine, *Intelligence Community Spending: Trends and Issues*, Washington, D.C.: Congressional Research Service, R44381, June 18, 2018. This report examines intelligence funding over the past several decades, with an emphasis on 2007–2018. In this period, total national and military intelligence program spending dollars have been publicly disclosed on an annual basis. Budget execution—intelligence-related spending—has remained relatively constant over the past decade in comparison with national defense spending, representing approximately 11 percent of the total defense budget.

NGA's director manages NGP, which funds NGA's national-level GEOINT-related activities throughout the IC. NGA relies on collection from overhead reconnaissance (air and space) and surface and undersea platforms to provide the raw data it needs to produce finished intelligence products. Examples of GEOINT products range from three-dimensional maps and charts to computerized databases. For example, "the Globe" is an NGP investment that consolidates its legacy search tools into a single enterprise search system. Table 2.2 breaks down NIP and MIP funding across all IC elements.

Table 2.1

Comparison of the Processes, Authorities, Guidance, and Roles of the Intelligence IPPBE Process and the Defense PPBE

	IPPBE	PPBE
Applies to	NIP funds associated with all 17 IC elements	MIP funds associated with all DoD IC elements.
Guidance	ICD 116, 2011	Department of Defense Directive (DoDD) 7045.14, <i>The Planning, Programming, Budgeting, and Execution (PPBE) Process</i> , Washington, D.C.: U.S. Department of Defense, January 25, 2013, incorporating change 1, August 29, 2017
Budget building blocks	Functional—organized around intelligence capabilities	Organizational—organized around the military services
Budget categories	Mission management Collection and operation Processing and exploitation Analysis and production Enterprise management Research and technology Enterprise information technology	Operations and maintenance Military personnel Research, development, test, and evaluation Procurement Military construction Shipbuilding
Role of manager	Program managers as intermediaries between the organizations the Director of National Intelligence (DNI) and NIP fund	Component managers deal directly with OSD.
Planning phase	Identifies IC strategic priorities and major issues to be addressed in the programming phase. Analyzes impacts of sustaining current capabilities, long-term trends, and alternative future challenges. Identifies and analyzes strategic issues and future customer needs. Identifies gaps and shortfalls by analyzing current IC capabilities.	Reviews the President's National Security Strategy, the Secretary of Defense's National Defense Strategy, and the CJCS's National Military Strategy) to ensure the resulting Defense Planning Guidance aligns with the administration's policy goals. ^a Defense Planning Guidance, developed with input from the CJCS, military services, and combatant commanders, typically contains guidance on investments and divestments for the services and helps inform their POMs.
Programming phase	The Assistant Director of National Intelligence (ADNI) for SRA led the programming phase. Provides options to frame DNI resource decisions through AoAs and studies that assess cost-performance benefits. Conducts major issue studies. Develops ICs. Develops CIG. Deconflicts and integrates guidance for MIP-funded and joint NIP/MIP-funded activities. Manages the Strategic Program Briefings	The DoD CAPE Director leads this phase. Analyzes anticipated effects of present-day decisions on the future force. Begins with the head of each military service and defense agency developing a POM, which describes proposed resource requirements (forces, manpower, and funding) for programs over five years. POMs prioritize and adjust programs in the Future Years Defense Program (FYDP).

Table 2.1—Continued

	IPPBE	PPBE
Budgeting phase	Budgeting and execution activities addressed in IPPBE have the goal of producing and implementing an annual consolidated NIP budget. Develops the intelligence program budget submission. Develops and issuing DNI decision documents to adjust NIP program resources. Develops the NIP portion of the President's budget. Ensures the budget submission is executable, aligned with the CIG, and reflects performance-based budget decisions.	Under Secretary of Defense (Comptroller) and Chief Financial Officer (CFO) leads the budgeting phase, in which the military services complete a budget estimate submission for the first year of the FYDP. Comptroller reviews the budget submissions to ensure appropriate funding and fiscal controls, phasing of the efforts over the funding period, and feasibility of execution within the budget year. Comptroller analysts work with service counterparts to review budget requests and ensure they align with the unified defense budget.
Execution or evaluation phase	Assesses the effectiveness of IC programs, activities, major initiatives, and investments in implementing DNI guidance in the context of their original objectives, measures of effectiveness, metrics, outcomes, benefits, shortfalls, and costs. Produces • Strategic evaluation reports— independent evaluations of prior major issue decisions and intelligence investments to assess their effectiveness relative to expected outcomes, success measures, prior investments, cost benefits, and potential utility • Budget and performance reports— assessments of IC-wide budget, performance, and execution measures to enable performance-based budget decisions • NIS progress assessment—an assessment of IC progress toward achieving the goals and objectives of the NIS to inform decisions and products in each phase of the IPPBE System • IC strategic assessment—an annual assessment of the implications for the IC of policy and strategy changes, long-term trends, and alternative future challenges to inform decisions and products in each phase of the IPPBE System.	Also known as execution review, is intended to evaluate program results. Execution review occurs at the same time as the program review (to prioritize the programs that best meet strategic goals) and the budget review (to decide how much to spend on each program). Thus, execution review is intended to assess a program's actual performance compared with its planned performance.

SOURCES: CRS, based primarily on Miles, 2016, and DeVine, 2018. See also Joint Publication 2-01, *Joint and National Intelligence Support to Military Operations*, July 5, 2017, p. F-9. Process phase comparative information Reproduced from ICD 116, 2011, and McGarry, 2020.

^a The National Security Strategy, the National Defense Strategy, and the National Military Strategy are updated periodically to reflect emerging threats and U.S. posture to respond to those threats.

Table 2.2
Intelligence Community Elements Receiving National Intelligence Program
and Military Intelligence Program Funding

Component	MIP Sources	NIP Sources
CIA	N/A	CIA Program
Combatant commands	DIA	GDIP, NGP, CCP
DIA	DIA	GDIP
DHS	N/A	Department-specific NIP
DoE		
U.S. Department of Justice		
U.S. Department of State		
U.S. Department of the Treasury		
DoD	Department- and service- specific OSD	CCP, GDIP, NGP, NRP (associated with NSA, DIA, NGA, and NRO)
NGA	NGA	NGP
NRO	NRO	NRP
NSA	NSA	CCP
ODNI	N/A	Community Management Account
USDI	OSD	N/A
U.S. Special Operations Command	U.S. Special Operations Command	GDIP, NGP, CCP

SOURCE: Adapted from DeVine, 2018.

ADNI/SRA managed the synchronization across the IPPBE process and leads the planning and programming phases for the IC.¹¹ The planning phase of IPPBE defines boundaries and establishes a framework that guides the program build, which ultimately creates a coherent narrative when recommending the budget that goes to Congress. Not defining these boundaries during the planning phase sets up a less-than-desirable situation in the programming phase.

As the planning phase transitions into the programming phase, planning outputs are employed to guide the program build, which culminates in the CIG, which NIP and MIP program managers use to finalize program and budget submissions moving into the first year of the budgeting phase.¹² During the budgeting phase and evaluation process, the ADNI CFO

¹¹ As part of an ODNI reorganization in summer 2020, SRA was reorganized into a new office with many of the same functions: Requirements Cost & Effectiveness. See DeVine, 2019.

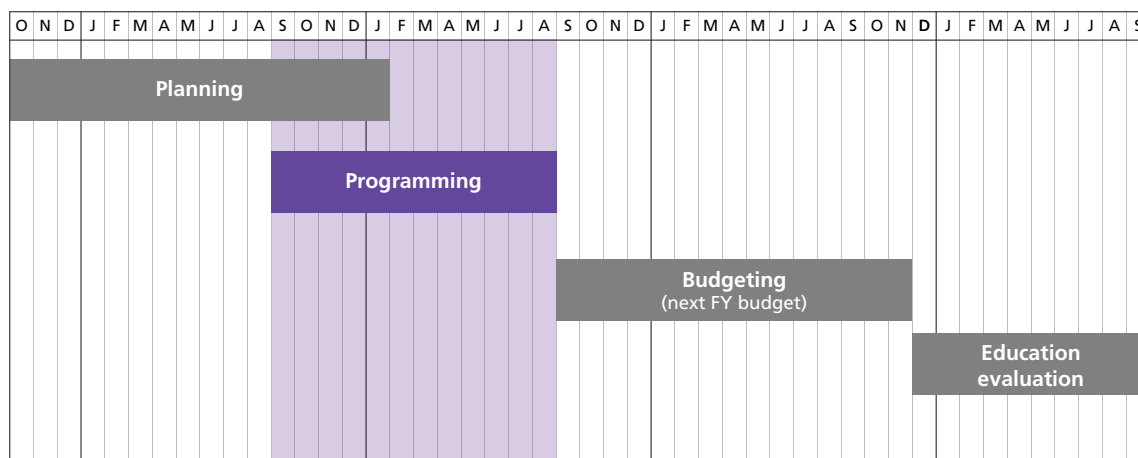
¹² CRS has noted that all 17 IC agencies use the IPPBE (NIP) process for programs if the agency is funding an activity that “supports more than one department or agency (such as satellite imagery), or provides a service of common concern for the IC (such as secure communications)” (Anne Daugherty Miles, “Defense Primer: Budgeting for National and Defense Intelligence,” Washington, D.C.: Congressional Research Service, IF10524, December 5, 2016b). The NIP funds the “CIA and the strategic-level intelligence activities associated with the National Security Agency, Defense Intelligence Agency and National Geospatial-Intelligence Agency” (Miles, 2016b). Agencies might also receive MIP funding “if it funds an activity that addresses a unique DOD requirement” (Miles, 2016b). Finally, “MIP funds may be used to sustain, enhance, or increase capacity/capability of NIP systems” and that the “DNI and USD(I) [Under Secretary of Defense for Intelligence] work together in a number of ways to facilitate the ‘seamless integration’ of NIP and MIP intelligence efforts. Mutually beneficial programs may receive both NIP and MIP resources” (Miles, 2016b). See also McGarry, 2020, and Robert A. Mirabello, “Guide to the Study of Intelligence: Budget and Resource Management,” *Intelligencer*, Vol. 20, No. 2, Fall/Winter 2013.

is responsible for producing the congressional budget justification books (CBJBs), which help justify the details associated with individual programs. Evaluation is a continuous process that assess the effectiveness of NIP and MIP programs, which ultimately informs current and future IPPBE decisions. Figure 2.1 depicts a generalized intelligence programming process over a multiyear timeline. Figure 2.2 adds granular-level PPBE process cycle information as programmed from fiscal years (FYs) 2019 to 2023.

The programming process at NGA focuses heavily on the last year of the planning process before the budget year. This timeline, however, puts a strain on the acquisition strategy because, once the programming process enters the budget year, little time and opportunity to adjust remain to produce the program build. Program builds are typically at least two FY cycles behind execution, which can complicate the analytic workflow and lead to funding shifting around year to year.

Our analysis of the NGA IPPBE process found little distinction between the planning, programming, and budgeting phases. Many of our interviews indicated that there was a lack of high-fidelity planning that provided sufficient detail for execution of the planning phase. For example, interviewees generally agreed that NGA would continue to struggle without robust planning processes. Generally, NGA moves to the program build in the last year of the planning phase, when frameworks and controls should be clearly defined. Without a structured planning process, the programming phase at NGA typically begins by mitigating issues that planning did not address. At the time of writing this report, NGA was making decisions to define roles and responsibilities more clearly for each phase of the IPPBE process. One of the first decisions to be implemented, in approximately May 2021, is to hold programming deputies (PDs) accountable for the programming phase and FM accountable for the budgeting phase.¹³ We, however, have little insight into whether standardized processes will also be part of this new alignment. See Figure 2.3 for an overarching diagram of the NGA IPPBE process, with descriptions of issues for each phase.

Figure 2.1
Example Intelligence IPPBE Process Timeline, Using PPBE as Baseline

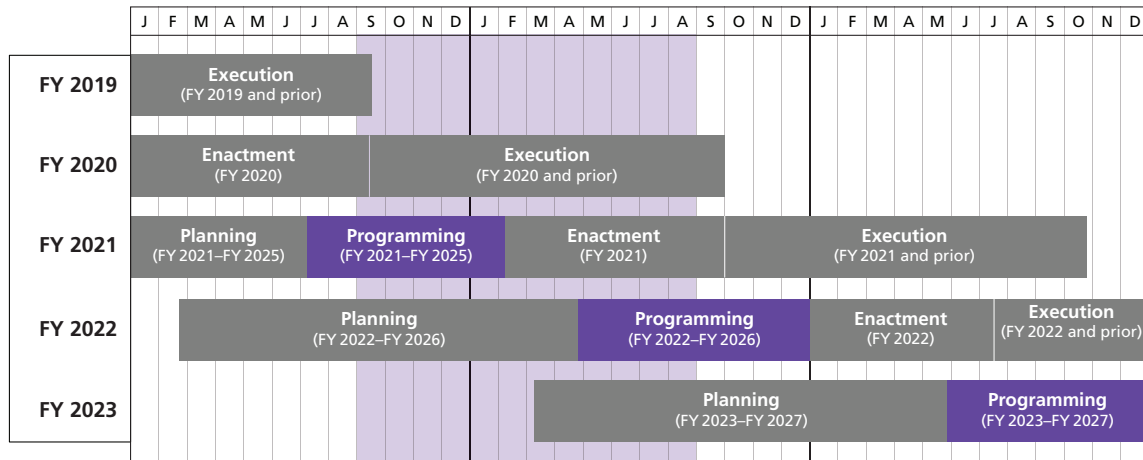


SOURCE: Interview data augmented by U.S. DoD PPBE timeline in Blickstein et al., 2016, p. 9, and interview data.

NOTE: We use the PPBE for comparison purposes here (nearly identical in form and function) because the open-source documents we reviewed did not adequately display overall IPPBE timelines.

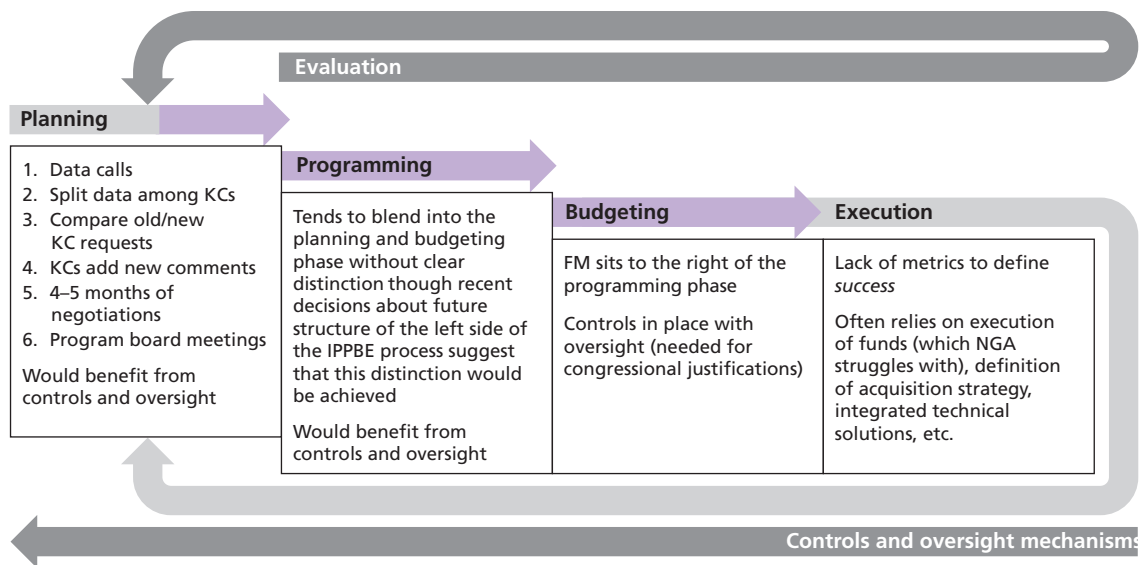
¹³ PDs were called RDs prior to May 2021.

Figure 2.2
Example Defense PPBE Process Timeline



SOURCE: McGarry, 2020.

Figure 2.3
The National Geospatial-Intelligence Agency's IPPBE Process



SOURCE: Interview data.

The Planning Process Plays a Critical Role in Programming

The literature suggests that the quality of planning directly affects programming effectiveness.¹⁴ Planning efforts across the IC and DoD tend to be more informal than later phases of

¹⁴ This review included documents and literature over the past three decades that focused on best practices and lessons learned across federal government departments and agencies. Examples of the literature we reviewed include defense and

IPPBE Phases**Finding:** Phases of the IPPBE Process Are Poorly Defined and Structured

The programming phase of the NGA IPPBE process blends into both the planning and budgeting phases without clear procedural distinction. The NGA planning process is often misaligned with the program build itself, the effects of which flow through the remainder of the IPPBE process. This misalignment occurs when outputs from the planning phase do not adequately inform the subsequent programming and budgeting phases.

As the IPPBE process is viewed chronologically from the beginning (planning) to the end (evaluation), the levels of control and oversight increase. The budgeting phase has controls as a requirement from congressional oversight, but the programming and planning phases have few controls and oversight mechanisms.

The conditions, causes, and effects of the lack of standardized processes, year to year, across the NGA IPPBE framework derive from variation between phases of the IPPBE process, lack of clearly defined definition of the IPPBE phases, and shifting strategic priorities, as detailed in the table.

	Variation Between IPPBE Phases	Lack of Clear Phase Definition	Shifting Priorities
Conditions	Phases of the IPPBE process have differing degrees of structure and flexibility. Early phases (planning and programming) are more flexible and less structured because there are fewer restrictions and controls; the process for later phases (budgeting and execution) is more rigid because there are more oversight, restrictions, and controls.	NGA lacks a clearly defined or unified programming process. As a result, personnel without the proper training or expertise are tasked with building programs and developing, managing, and briefing the budget.	Shifting strategic priorities disrupt offices' ability to align programming with NGA priorities. As a result, initiatives are developed and resources aligned, but the capabilities remain unrealized as broader strategic priorities shift again.
Causes	Each year, aspects of the planning and programming processes are conducted differently (e.g., planning buckets are renamed annually).	Staff responsible for portions of the programming and planning processes might not have the requisite financial and programmatic experience or training.	The execution year is overemphasized, leading to a lack of focus on the planning, programming, and budgeting phases.
Effects	Processes lack complete standardization and, therefore, are frequently not repeatable.	It is difficult to track program spending. Little ability exists to conduct cost-benefit analyses for processes or structures.	It is difficult to track program spending. Program funds are aperiodically underexecuted.
NGA resolution implemented	At the time of this writing, ongoing decisions being made to define roles and responsibilities for individual phases might include a standard documentation component.		
RAND recommendation	Develop guidance and codify documentation that outline a consistent, repeatable IPPBE process with clear roles, responsibilities, and starting and stopping points for each phase.		

the IPPBE process. Planning for future programs is commonly addressed through informal working groups or committees that interpret senior leaders' strategic direction into guidance for subsequent IPPBE phases. When planning guidance is unclear (or entirely lacking) across departments and agencies, the subjective interpretation of strategic guidance into viable agency

programs can vary, depending on acquisition experience and organizational knowledge.¹⁵ Planning guidance might also change rapidly, as dictated by both the operational and strategic environment. In contrast, DoD service components make extensive use of AoAs during the planning stage to understand investment and divestment decisions. The translation of agency or departmental strategy and guidance into the planning phase and subsequent program phase appears to be critical for mission success.

Department of Defense

The overall DoD PPBE process has faced GAO criticism over the past 15 years. The criticism has focused on such factors as a lack of data collection, commitment of funds prior to cost and feasibility assessments, difficulties in maintaining oversight of program management among service components, and other organizational culture issues that have prevented information sharing.¹⁶ GAO suggests that a combination of such factors has caused an overcommitment of program funds across FYDP cycles; led to a lack of prioritization across program elements (both at DoD and in the services); and created information stovepipes within service components, in which individual requirements might be determined without external validation.¹⁷ Although GAO has issued several recommendations, five would seem to offer beneficial insight for improving the programming phase at NGA:¹⁸

- implementing a review process that takes early stock of needs and resources and commits the resources incrementally
- prioritizing programs according to costs, benefits, and risks
- requiring precise cost, schedule, and performance information for each program alternative
- empowering program managers to make difficult investment and divestment decisions
- establishing accountability across all portfolios.

GAO has suggested that private-sector companies often use an integrated portfolio management approach to achieve successful product development.¹⁹ By using an integrated approach to acquisition, companies assess product investments collectively at the enterprise level rather than as independent or unrelated initiatives when weighing costs, benefits, and risks according to established criteria. Companies then select the products that match prom-

¹⁵ This was a common theme throughout our interviews with personnel who have also worked across a variety of IC agencies.

¹⁶ For example, see GAO, *Improved Use of Available Data Needed to Better Manage and Forecast Service Contract Requirements*, Washington, D.C., GAO-16-119, February 2016a; GAO, *DOD Management Approach and Processes Not Well-Suited to Support Development of Global Information Grid*, Washington, D.C., GAO-06-211, January 2006; GAO, *Adopting Best Practices Can Improve Innovation Investments and Management*, Washington, D.C., GAO-17-499, June 2017a.

¹⁷ GAO, *Actions Needed to Ensure National Guard and Reserve Headquarters Are Sized to Be Efficient*, Washington, D.C., GAO-14-71, November 2013.

¹⁸ The IC has also struggled historically to create a uniform planning process. For example, a 2004 RAND report assessed the effectiveness and completeness of the NSA's "buy versus make" policy, finding that NSA is the only agency with a separate written policy; other agencies have an informal understanding that "buy" is the preferred method for obtaining capabilities and have working definitions of what constitutes a product that is made versus one that is bought (Leslie Lewis and Roger Allen Brown, *Assessing "Buy Versus Make" Policy and Practices at the National Security Agency*, Santa Monica, Calif.: RAND Corporation, 2004, Not available to the general public). For example, both NGA and NRO designate any in-house modification of a commercially acquired item as bought, while NSA categorizes such items as made.

¹⁹ GAO, 2017a.

ising market opportunities within resource restraints and constraints and in alignment with overall strategic goals. All investment decisions receive frequent reviews, and those that do not meet expectations could be divested. DoD has incorporated this mindset in its PPBE management processes, requiring a governance structure with leadership buy-in, clearly defining roles and responsibilities, empowering portfolio managers, and instituting cross-organization accountability. The next four subsections highlight external assessments of service-level acquisition programming processes and capture recommendations, when available, to provide an awareness of programmatic issues across other government and service entities. The RAND reports we cite in these subsections examine U.S. Army, Department of the Air Force (DAF) U.S. Navy, and USCG acquisition processes within the DoD PPBE context and provide important insights on the criticality of the planning phase.

U.S. Coast Guard

One report addressing the mix of airpower required to help USCG execute its variety of missions across the entire geographic domain for operations over the next 30 years found that, “To plan, program, and budget more comprehensively, the USCG should capture or estimate any unmet demand requiring aviation assets. Without a more formal system of capturing unmet demand, quantifying what the size and composition *should* be remains difficult.”²⁰ USCG also relies on third-party organizations to assist in estimating procurement and life-cycle costs, which hinders visibility into cost-calculating methods, draws on different cost-estimating models for each equipment system, and precludes subsequent “what-if” or follow-up analyses.²¹

U.S. Navy

A report examining the Navy Aviation Maintenance System (an IT system used to inform naval planning processes) evaluated alternatives to achieve greater planning quality by incorporating a stringent cost, risk and schedule framework.²² RAND researchers suggested that system outputs for planning purposes needed to be streamlined (a repeatable process), supportable (user accessibility, integration with other systems and ability to update or ingest new information), and product-centric (ready to integrate into a product life-cycle management ecosystem).²³

²⁰ One key factor for USCG was that the agency had not incorporated latent demand signals within their AoA scenarios. Instead, USCG collects system activity through the Asset Logistics Management Information System, but these data do not indicate what should have been done or what the priorities were among various mission tasks. See Jeremy M. Eckhause, David T. Orletsky, Aaron C. Davenport, Mel Eisman, Raza Khan, Jonathan Theel, Mark Thibault, Dulani Woods, and Michelle D. Ziegler, *Meeting the U.S. Coast Guard Airpower Needs: Assessing the Options*, Homeland Security Operational Analysis Center operated by the RAND Corporation, RR-3179-DHS, 2020, p. xviii. For more on achieving planning flexibility to meet future requirements, see Irv Blickstein, Tim Conley, Brynn Tannehill, Abby Schendt, and Jason Michel Etchegaray, *Gap Analysis and Alternatives Analysis of the Coast Guard Cost Estimating Workforce*, Homeland Security Operational Analysis Center operated by the RAND Corporation, RR-2047-DHS, 2018.

²¹ Furthermore, USCG only has 22 full-time equivalents (FTEs) to conduct cost analysis spread across its FM and acquisition directorates. See Blickstein et al., 2018, p. x.

²² Bradley Wilson, Jessie Riposo, Thomas Goughnour, Rachel M. Burns, Michael J. D. Vermeer, Ajay K. Kochhar, Angelena Bohman, and Mel Eisman, *Naval Aviation Maintenance System: Analysis of Alternatives*, Santa Monica, Calif.: RAND Corporation, RR-2974/1-NAVY, 2020.

²³ Wilson et al., 2020. This report also found that the Navy must pursue up-front efforts to clean historical data. A lack of current aircraft configuration data will result in misleading analytics and hinder efforts to improve aircraft availability. For more on existing stovepipes within Naval planning stages, see Bradley Wilson, Jessie Riposo, Thomas Goughnour, Mel

Several detailed planning and programming requirements could present issues for the Navy, the software provider, and the integrator in terms of agreeing to changes, especially within functional requirements or other requirements that lack specific attributes. Such factors could lead to budget and schedule failures as the Navy attempts to modernize its supply systems. The Navy makes extensive use of AoAs in PPBE planning stage to gain greater insight on its investment and divestment decisions.

While not a formal AoA, another RAND research effort analyzed four potential carrier variants (including a descoped 100,000-ton variant of the *Ford*-class carrier; a 70,000-ton *Forrestal*-size carrier; a 43,000-ton Landing Helicopter Assault variant; and a 20,000-ton escort-size carrier resembling those operated by allied navies) against future warfighting requirements.²⁴ The report assessed lower-cost alternatives to the *Ford*-class carrier program, which has encountered high shipbuilding costs and taken on a large share of the Navy shipbuilding budget. Specifically, the analysis tested whether each carrier variant could support joint campaigns under the most stressing scenarios; support integrated air wings, including airborne early warning and electronic attack; and operate at the ranges tactical air can carry out missions. The report evaluated the cost comparisons with the current *Ford*-class program and factored in weight changes, nonrecurring engineering expense for new designs, different equipment, potential loss of learning from new designs, and force structure changes needed to support new platforms.²⁵

RAND researchers have also sought to understand whether computer-aided simulation could improve visibility into whether AoAs would “advance the ability of companies and regulators” to select more informed alternatives.²⁶ Regulatory decisions are often the product of ad hoc approaches rather than formal decision-analysis methods. Developing criteria for decision quality as part of a well-executed planning phase; developing and testing formal tools for structuring decision processes; and creating effective analytic-deliberative processes to involve a range of participants for the purposes of framing and interpretation can all improve decisionmaking. Therefore, the goal of an AoA might be to identify a single, optimal alternative; to rank the entire set of alternatives; or to differentiate between acceptable and unacceptable alternatives.

Eisman, Angelena Bohman, Shane Tierney, and Rachel M. Burns, *Naval Operational Supply System*, Santa Monica, Calif.: RAND Corporation, RR-2403-NAVY, 2018.

²⁴ Bradley Martin and Michael E. McMahon, *Future of Aircraft Carrier Options*, Santa Monica, Calif.: RAND Corporation, RR-2006-NAVY, 2017, p. xi.

²⁵ Martin and McMahon, 2017, suggests that arguments favoring earlier recapitalization include hedging against the technical risk associated with the aging KC-135 fleet, the existence of future budget constraints, and the additional capabilities that new tankers would offer. Arguments favoring delayed recapitalization including hedging against uncertainties that could reduce the desirability of new tankers and the existence of very near-term budget restraints and constraints. Finally, if additional tankers are needed to meet the future requirement, the present value of the cost of closing the gap would be greater the more rapidly new systems are acquired.

²⁶ Timothy F. Malloy, Virginia M. Zaunbrecher, Christina M. Batteate, Ann Blake, William F. Carroll, Jr., Charles J. Corbett, Steffen Foss Hansen, Robert J. Lempert, Igor Linkov, Roger McFadden, Kelly D. Moran, Elsa Olivetti, Nancy K. Ostrom, Michelle Romero, Julie M. Schoenung, Thomas P. Seager, Peter Sinsheimer, and Kristina A. Thayer, “Advancing Alternative Analysis: Integration of Decision Science,” *Environmental Health Perspectives*, Vol. 125, No. 6, June 13, 2017, p. 2.

U.S. Air Force

The National Research Council (NRC) has evaluated the USAF intelligence, surveillance, reconnaissance (ISR) capability planning process.²⁷ In 2009, USAF developed and implemented Capability Planning and Analysis (CP&A). In 2011, under the auspices of the NRC and the Air Force Studies Board, USAF requested a study to improve CP&A—specifically, to provide the service with foundational analytics to aid decisionmaking in light of overall future defense spending and the need to manage trade-offs across missions, domains, time horizons, and types of platforms. Through CP&A, the process employs SMEs “from across the service who consider strategic guidance, analyze operational needs, determine operational gaps, conduct risk and solutions analysis, and produce a master plan to guide investment.”²⁸ It is considered to be lengthy, personnel-intensive, and unable to respond quickly to revisions in assumptions and requirements. The report found a lack of integrated modeling, simulation, and analysis tools to provide traceability from requirements to capability and for conducting operationally relevant trade-space analysis across the doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P) framework. USAF needs responsibility for evaluating and informing decisions on ISR capabilities that are diffuse, overly personnel intensive, and divided among many organizations, making for a lengthy process. The planning process also lacks adequate process definition and formal interaction between both USAF core functional elements and contributions from other services and agencies. The corporate process disassembles and stovepipes functional components before making decisions and without considering the broader ISR trade space.

USAF CP&A lacks the ability to respond in a timely way with appropriate fidelity to meet the increasing speed of technology development, operational requirements, and the required decrease in planning-cycle time, particularly in the cyberspace domain. Additionally, CP&A does not adequately consider affordability as part of the trade space. Other services and organizations, including the Army, Navy, and USD(I), follow best practices in terms of structured analysis, cross-departmental collaboration, and consideration of enterprise capabilities.

U.S. Army

In spring 2011, the Army Office of Business Transformation identified a significant shortcoming in the planning aspect of the Army Planning, Programming, Budgeting, and Execution System (PPBES) and asked RAND Arroyo Center to examine the issue. In unpublished RAND research, Wade Markel, Joshua Klimas, and Duncan Long offered various options with tangible elements and intangible elements. These researchers focused on the force structure portion of each option, including both the operational Army and the generating force, focusing particularly on the operational Army force structure. The conclusion was that it is possible to produce responsive, first-order estimates of investment options’ costs and inherent risks that decisionmakers find credible.

The Army also conducts AoAs on its watercraft capabilities. The authors of a previous RAND report performed an AoA for the Joint High-Speed Vessel, a (then) new class of sur-

²⁷ NRC, *Capability Planning and Analysis to Optimize Air Force Intelligence, Surveillance, and Reconnaissance Investments*, Washington, D.C.: National Academies Press, 2012.

²⁸ NRC, 2012, p. 2.

face ship to be acquired by the Army, Navy, and Marine Corps over the following decades.²⁹ The authors identified and assessed a concept of operations for the ship, the capabilities needed to fulfill that concept of operations, alternative platforms and systems that could provide the requisite capabilities, the operational effectiveness of these platforms and systems, and the life-cycle costs associated with each option. The report presents five scenarios (major combat operations, counterinsurgency, combat logistics force support of naval operations, humanitarian assistance and disaster relief, and theater security cooperation) and four design alternatives (militarized versions of commercial vessels; commercial concepts redesigned for specific range, speed, and payload capabilities; concepts based on vessels recently leased by the services for high-speed transport; and concepts based on Littoral Combat Ship hull forms) that met the services' requirements for speed, payload, and range. A review of the literature on planning revealed that inadequate data collection, committing funds prior to analysis of programs or requirements, barriers to information sharing, and insufficient planning oversight can lead to problems in subsequent acquisition phases. These planning issues have been well documented throughout DoD and service component PPBE processes. Some best practices have included taking an integrated portfolio management approach to achieve successful product development (as in the private sector); conducting AoAs to gain more insight on investment and divestment decisions; using computer-aided simulations to test program variants; and creating a planning process that prioritizes programs according to costs, benefits, and risks.

NGA would benefit from implementing clearly defined standard operating procedures (SOPs) preceding the IPPBE process and creating a procedural bridge between planning and programming to ensure inputs from the former are integrated into the latter.³⁰ Increased specificity in programming documentation and clearer delineation of AD, RD, and FM roles and responsibilities might help alleviate issues relating to the ability to make informed investment and divestment decisions, which ultimately affect the ability to develop a justifiable budget submission to Congress.

²⁹ John F. Schank, Irv Blickstein, Mark V. Arena, Robert W. Button, Jessie Riposo, James Dryden, John Birkler, Raj Raman, Aimee Bower, Jerry M. Sollinger, and Gordon T. Lee, *Joint High-Speed Vessel*, Santa Monica, Calif.: RAND Corporation, MG-501-A, 2006, Not available to the general public.

³⁰ One GAO report evaluated the AoA process that NGA used to select a site for its new campus. It measures NGA's AoA process against GAO best practices for AoAs. Cost estimating is a critical aspect of developing an AoA; however, NGA only partially met the requirement for developing life-cycle cost estimates. GAO found that, without full life-cycle cost planning, decisionmakers might not have a complete picture of the costs for each alternative and could have difficulty comparing alternatives because of a lack of accurate information. GAO also suggested that, for decisionmakers to make an informed decision, cost estimates must reflect the degree of uncertainty or include a range of costs to convey a level of confidence for each alternative to achieve a most likely cost. See GAO, *Analysis of Alternatives Approach for a New Site Reflects Most Characteristics of a High-Quality Process*, Washington, D.C., GAO-17-643, July 2017b.

Standardizing the Planning Process

Finding: NGA lacks a clearly defined, standardized, and consistently executed planning process.

This finding has three aspects: planning phase standardization, planning informing programming, and internal understanding of planning. Several DoD and IC elements, including NGA, have struggled to clearly define and standardize planning processes. A standardized planning process would provide numerous benefits to later phases of the IPPBE process; as one interviewee stated: "The more that can be done during the planning phase, the better the program would be." A historical emphasis on the program build has led to a lack of emphasis on the planning phase. Because less time and effort have gone into planning, planning decisions do not consistently influence the program build. Interviewees also noted, however, that NGA is in the process of developing more-deliberate planning and programming phases.

	Planning Phase Standardization	Planning Informing Programming	Internal Understanding of Planning
Conditions	Planning phase lacks completely standardized processes.	Planning decisions are not consistently referenced and enforced during the program build.	Perceptions and understanding differ about how much time and effort to put into the planning phase.
Causes	The planning phase includes little risk analysis, which exacerbates an inability to conduct risk analysis for later phases in IPPBE process.	The planning phase does not consistently produce documented guidance for the programming phase.	Consistent lack of understanding of risk for investments or divestments.
Effects	Lack of a structured planning process turns into programming disputes, which then complicate the budget process.	Planning decisions are not effectively communicated into the programming phase, leading to some or all planning decisions not carrying over into the program build.	Each individual component, portfolio manager, and AD generates programming goals, which might not be aligned with objectives identified in the planning phase.
NGA resolutions implemented	RDs created.	No NGA resolutions implemented.	No NGA resolutions implemented.
RAND recommendations	The programming phase should be clearly differentiated from the planning phase and should include AoAs, major issue studies, and further consideration of risks and divestments.	Completion of the planning phase should include the production of documented guidance (including risk analysis) for the program build.	Develop clear guidance documents that outline a consistent, repeatable IPPBE process with clear roles and responsibilities and starting and stopping points for each phase (see p. 16).

Policy and Guidance

Overview

NGA is one of six U.S. intelligence elements that has both MIP and a NIP funding sources.¹ The director of NGA serves as both program manager for NGP NIP funds and component manager for NGA MIP funds. Joint Publication 2-03 explains that the NGA mission is to

[m]anage and produce GEOINT in accordance with (IAW) Title 10, USC, Section 442, and Title 50, USC, Section 3045. Title 10, USC, directs NGA to develop a system to facilitate the analysis, dissemination, and incorporation of likenesses, videos, and presentations produced by ground-based platforms, including handheld or clandestine photography taken by or on behalf of human intelligence collection organizations or available as open-source information, into the National System for Geospatial Intelligence (NSG). Title 10, USC, Section 442, does not include the authority for NGA to manage tasking of handheld or clandestine photography taken by or on behalf of human intelligence collection organizations.²

Our review of the literature focused on comparing the NGA resource management programming process to other IC and DoD processes to elucidate best practices and recommendations for improving the NGA IPPBE programming phase. Although federal agencies, departments, and public and private sectors have vast repositories of documents that examine the IPPBE (or PPBE) writ large, very few of the documents contain findings relevant to the programming phase of that process. This chapter focuses specifically on the IC IPPBE process and excludes myriad acquisition documents that govern DoD- and component-level acquisition processes.

National-Level Programming Policy for the Intelligence Community

Several documents guide the conduct of NIP acquisition within the IC, although very few provide institutional policy on the programming phase. This section briefly outlines the function

¹ Other organizations include CIA, DIA, NRO, and NSA; these are organizations with an intelligence mission that are not limited to the IC components defined by statute.

² See Joint Publication 2-03, *Geospatial Intelligence in Joint Operations*, Washington, D.C.: Joint Chiefs of Staff, July 5, 2017, p. I-2.

of IPPBE as stipulated within the Intelligence Reform and Terrorism Prevention Act (IRTPA) of 2004 and is followed by a discussion of policy contained in ICDs.³

Intelligence Reform and Terrorism Prevention Act

IRTPA, which passed in the wake of the September 11, 2001, attacks, placed NIP funds under the oversight and direction of DNI.⁴ CRS defines NIP funding as encompassing the “programs, projects, and activities of the intelligence community,” but does not include “programs, projects, or activities of the military departments to support tactical combat operations.”⁵ DNI authorities under IRTPA allow for the management of appropriations for the NIP by “directing the allotment or allocation of such appropriations . . . that respects and does not abrogate the statutory responsibilities” of heads of departments and agencies.⁶ Because of the redesignation of the foreign intelligence program to the NIP in IRTPA, DNI has issued multiple ICDs that govern the conduct of IC acquisition.

IRTPA anticipates guidance from ODNI to the heads of departments and agencies in preparing the NIP budget based on White House priorities. Congress appropriates funds for intelligence mostly in defense appropriations legislation; OMB then apportions funds to the various NIP agencies accordingly. In practice, however, ODNI and OSD share responsibility for budget execution, which can lead to such issues as the following: (1) Ambiguity over responsibility results in disagreements among executive branch agencies, which is primarily an issue for NGA, NRO, and NSA. (2) Competing goals and priorities arise from respective roles of ODNI and OSD. It is not clear whether a separate appropriations bill would yield a more holistic approach to intelligence budgeting or merely complicate ties between intelligence and closely related DoD programs.⁷

The separate DoD and ODNI budget processes for the national intelligence agencies complicate matters. The OSD-led PPBE process is designed to provide funds for organizing, training, and equipping military forces for combat and to cover all necessary support functions, including intelligence. The ODNI IPPBE system is designed to fund intelligence capabilities across disciplines (signals intelligence, human intelligence, etc.). Program managers coordinate across these disciplines with respect to programs that might be undertaken by more than one agency. Both PPBE and IPPBE contribute to preparation of the President’s annual budget, but complex efforts are required to crosswalk the programs for consistency in data presentation to Congress and OMB.

³ Pub. L. 108-458, Intelligence Reform and Terrorism Prevention Act (IRTPA) of 2004, December 17, 2004.

⁴ Pub. L. 108-458, 2004.

⁵ CRS notes that, under 50 USC 401a(6), “Intelligence efforts to support tactical military operations comprise the Military Intelligence Program (MIP) are mostly funded in the budgets of the military departments” (Richard A. Best, Jr., *The Intelligence Appropriations Process: Issues for Congress*, Washington, D.C.: Congressional Research Service, R42061, December 16, 2011, p. 1).

⁶ See Pub. L. 108-458, 2004, 50 USC 403 note. (sec. 1018). In addition, CRS notes that, “One issue is the built-in ambiguity that can result in disagreements among executive branch agencies that may impede intelligence missions, although major disagreements can be referred to the President. This is primarily an issue for the major intelligence agencies of DoD, including NSA, the NRO, and the NGA” (Best, 2011, p. 3).

⁷ See Best, 2011.

Intelligence Community Directives

ICDs provide the IC authoritative but general guidance on how to conduct the programming function. ICD 116 guides the IPPBE process for each of the 17 IC elements, although other ICDs also play a role in IPPBE functions: ICDs 104, 106, 109, 115. Table 3.1. provides the purpose of each of these documents.⁸

ICD 104 was formulated to enable the IC to “evaluate progress regularly, address key intelligence gaps, and establish accountability for results,” with subsequent acquisition-related ICDs expanding on the tenets set forth in ICD 104.⁹ This process is to be conducted concurrently “with ICD 116, ICD 109.”¹⁰

Table 3.1
Intelligence Community Directives That Address the IPPBE Process

	ICD 104 (2013)	ICD 106 (2008)	ICD 109 (2010)	ICD 115 (2012)	ICD 116 (2011)
Title	National Intelligence Program (NIP) Budget Formulation and Justification, Execution, and Performance Evaluation	Intelligence Community Strategic Enterprise Management	Independent Cost Estimates	Intelligence Community Capability Requirements Process	Intelligence Planning, Programming, Budgeting, and Evaluation System
Purpose	Established policy for the formulation, justification, execution, and performance evaluation for the NIP budget.	Established the IC Strategic Enterprise Management (IC-SEM) system.	Established policy on preparing independent ICEs and agency cost positions in support of the development, determination, and effective execution of NIP.	Established a framework for the development, documentation, assessment, validation, and approval for IC capability requirements (ICCRs).	Established overarching policy and management framework relevant to NIP development and budget execution authorities.
Updates	Replaced ICD 104, Budgeting for Intelligence Programs, May 17, 2006; Rescinded ICD 901, Program Management Posture Adjustment Notification, June 23, 2008.	Superseded by ICD 116.	N/A	Rescinded DNI Memorandum E/S 01301, IC Capability Requirements, December 4, 2009.	Rescinded ICD 106.

⁸ ICD 104, “National Intelligence Program (NIP) Budget Formulation and Justification, Execution, and Performance Evaluation,” McLean, Va.: Office of the Director of National Intelligence, April 30, 2013; ICD 106, “Intelligence Community Strategic Enterprise Management,” McLean, Va.: Office of the Director of National Intelligence, October 16, 2008 (superseded by ICD 116); ICD 109, “Independent Cost Estimates,” McLean, Va.: Office of the Director of National Intelligence, April 26, 2010; ICD 115, “Intelligence Community Capability Requirements Process,” McLean, Va.: Office of the Director of National Intelligence, December 21, 2012; ICD 116, 2011.

⁹ We considered including ICD 801 in this section, which discusses the intent to require program management plans to include cost, schedule, and performance goals, as well as program milestone criteria, but does not describe program level activities (ICD 801, “Acquisition,” McLean, Va.: Office of the Director of National Intelligence, August 16, 2009). In addition, while ICD 109 sets the policy for preparing ICEs and agency cost positions to support NIP development and therefore is only focused on the budget phase of the IPPBE process.

¹⁰ ICD 104, 2013; ICD 109, 2010.

ICD 106 established the framework for IC-SEM (and was superseded by ICD 116 in 2011). The IC-SEM process consists of three core functions: planning, programming, and budgeting. These functions are interdependent; each is informed and guided by the products and decisions of the other two functions. Execution is a critical function that occurs alongside IC-SEM's core functions. Execution-year activities conducted by IC elements are actively managed through tools (e.g., implementation plans, performance reports) that produce the data and insight necessary to conduct IC program, performance, and budget reviews. Programming through the IC-SEM includes translating the intelligence planning guidance document into specific capability outcomes that the IC must achieve; identifying key capability gaps and shortfalls, duplicative capabilities, and potential trade-offs between and among capability choices; supporting the development of repeatable analytic processes to facilitate intra- and interportfolio analysis; applying appropriate frameworks, activities, tools, and techniques to perform capability-based and outcome-oriented assessments and evaluations; and facilitating development of capability approaches and solution sets within which NIP portfolio managers conceive and develop options.¹¹

ICD 115 established a framework to support the ICCR process (see Figure 3.1).¹² The ICCR process “examines and determines whether a need can be met by an existing materiel capability or by requiring a new or modified materiel solution,” in turn setting the “strategic direction” for the IPPBE process.¹³ Part of the ICCR process includes conducting an AoA (based on critical intelligence needs), which relies on research to assess whether other options might be more viable. Although ICD 115 does not provide an overview of how the ICCR process relates to the programming phase, it provides important information on factors related to the programming process.¹⁴

¹¹ Other programming activities listed in ICD 106, 2008, included

- (4) Assessing alternative capability choices to meet identified needs, to include analyses of interdependencies and interrelationships among current and future programs and systems across the NIP, and, where appropriate, the MIP;
- (5) Facilitating development of capability approaches and solution sets within which NIP Portfolio Managers conceive and develop options; . . .
- (7) Producing an intelligence capability programming guidance document to be distributed during the first quarter of each fiscal year, for the 5-or 6-year period beginning two fiscal years hence;
- (8) Identifying and analyzing key issues associated with the capability programming guidance, and with the assistance of the NIP Portfolio Manager(s), develop an initial set of materiel and nonmateriel solution alternatives;
- (9) Overseeing the development of and documenting requirements that are used in the acquisition process and other IC-SEM related activities;
- (10) Coordinating with departments that have NIP components to approve requirements that serve national and departmental customers;
- (11) Developing performance requirements for acquiring, operating, and manning and supporting new systems, to include key performance parameters, schedule, and cost; and,
- (12) Identifying new major acquisition needs and forwarding them to the IRB for consideration. (ICD 106, 2008, p. 3)

ICD 106 was superseded by ICD 116.

¹² ICD 115, 2012.

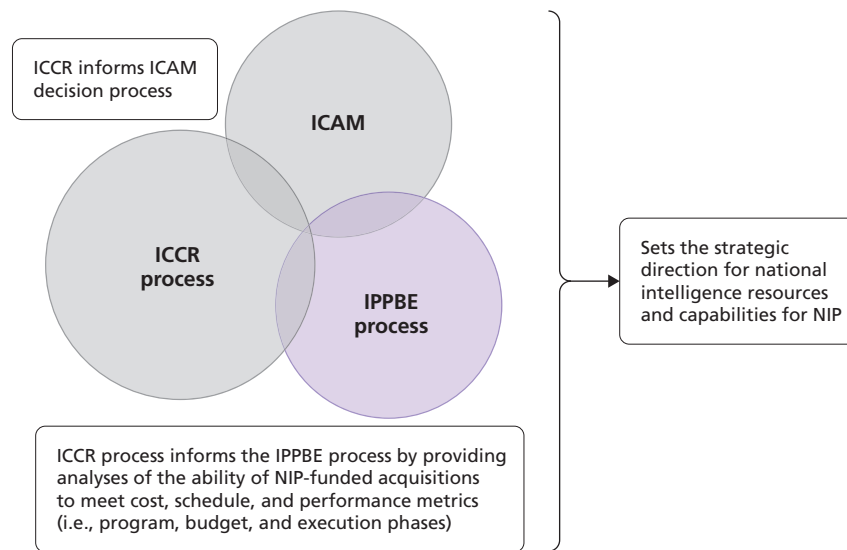
¹³ ICD 115, 2012.

¹⁴ ICD 115, 2012, states that the ICCR process

consists of five distinct, yet interdependent, phases:

- a. Understanding IC mission and enterprise needs;
- b. Assessing alternatives;

Figure 3.1
Intelligence Community Capability Requirements Process



SOURCE: ICD 115, 2012.

ICD 116 serves as the foundation IPPBE process document for each of the 17 IC elements.¹⁵ This ICD also describes the AoA process to assess acquisition programs in the cost-benefit context. For example, major issue studies were conducted through the ODNI SRA component functions to assess “high impact community issues and provide feasible alternatives.”¹⁶ ICD 116 also notes the importance of developing CIG to document “IC strategic priorities and conveys DNI direction for building the United States intelligence program and budget,” where deconfliction between MIP and NIP funded programs is crucial for acquisition success.¹⁷ Lastly, ICD

c. Developing capability requirements;

d. Validating and approving capability requirements; and e. Informing the IC Planning, Programming, Budgeting, and Evaluation (IPPBE) system, and IC Acquisition Model (ICAM) process for execution of system development.

3. The ICCR process, along with the ICAM process and the IPPBE system, sets strategic direction for national intelligence resources and capabilities for the NIP. (ICD 115, 2012, p. 2)

¹⁵ ICD 116, 2011, requires certain features for IC acquisition processes. For example, for programming, the ICD requires the following:

- (1) Conducting Major Issue Studies, which assess and analyze high impact cross community issues and provide feasible alternatives;
- (2) Developing Independent Cost Estimates (ICE), which provide a total life-cycle cost estimate for Major System Acquisitions and other programs of interest;
- (3) Developing the Consolidated Intelligence Guidance (CIG), which documents IC strategic priorities and conveys DNI direction for building the United States intelligence program and budget;
- (4) Deconflicting and integrating guidance for MIP-funded and joint NIP/MIP funded activities into the CIG; and
- (5) Managing the Strategic Program Briefings, which provide a strategic-level dialogue between the DNI and each Program Manager regarding incorporation of DNI priorities and other CIG direction into their program build. (ICD 116, 2011, p. 2)

¹⁶ The SRA component no longer exists at ODNI. As part of a reorganization in summer 2020, SRA was reorganized into a new office, Requirements Cost & Effectiveness, with many of the same functions. See DeVine, 2019. Also see ICD 116, 2011.

¹⁷ The CIG is largely recognized as joint USD(I&S) and DNI programming guidance. See ICD 116.

116 discusses management of the IC's Strategic Program Briefings that are intended to provide a "strategic-level dialogue between DNI and each Program Manager regarding incorporation of DNI priorities and other CIG direction into their program build."¹⁸

NGA Strategy Guidance

NGA leadership issues strategy documents to outline various mission functions to achieve its organizational strategic objectives. Under Director Letitia Long, the 2013–2017 strategy outlined seven strategic objectives as shown in Table 3.2.

Many of the objectives at the time focused on creating transparent data repositories, developing metrics to assist business processes, and leading in the identification of future GEOINT needs. Director Long's tenure was marked by a desire for senior leadership to be transparent with NGA components that began in the pre-portfolio era (pre-2013) and led to program management changes in the subsequent portfolio era.¹⁹ Interviewees noted that, during the pre-portfolio era, the chief financial executive (CFE) had a powerful role in the IPPBE process, and the CFE's influence only grew as the agency moved to the portfolio era.

Interviewees noted that NGA's portfolio resource management era (2013–2018) was marked by Director Robert Cardillo's goal to compete with commercial industry and inject

Table 3.2
National Geospatial-Intelligence Agency Strategy Objective Examples, 2013–2017—Portfolio Resource Management Era

	Description
Content	Create and make easily accessible and usable GEOINT content that addresses key intelligence questions and anticipates the entire range of our consumers' needs.
Open IT environment	Deliver a robust, safe, secure, and agile data framework and interfaces that foster community sharing of data and application development.
Analytic capabilities	Meet customer needs through anticipatory GEOINT analysis.
Customer service	Lead the identification of new and emerging GEOINT capabilities for content, products, and services in anticipation of future intelligence and operational GEOINT needs.
Workforce	Adopt enterprise solutions to achieve a lean, agile, and responsive workforce.
Workplace	Strengthen counterintelligence and security functions for people, facilities, and network/systems in support of achieving the strategy.
Corporate and functional management	Improve performance through the development and use of metrics. Strengthen corporate functions through an efficient and consistent set of streamlined business processes.

SOURCE: Adapted from NGA, *NGA Strategy: 2013–2017*, Springfield, Va., May 2012.

¹⁸ Discussions with NGA staff suggest that the strategic program briefings have not been conducted since 2018 and were to be replaced with focused capability sessions. However, it is unclear whether the focused capability sessions have occurred since then. In 2011, DNI also released the IC IT Enterprise Strategy to achieve "more efficient direction for planning, developing, and operating Intelligence Community IT" in support of ICD 116. See ODNI, "Intelligence Community Information Technology Enterprise Strategy, 2012–2017," undated, and ICD 116, 2011.

¹⁹ Director Long also brought extensive financial management experience from other senior positions throughout the defense and intelligence community.

financial management expertise back into the first two phases of the agency's IPPBE process.²⁰ The 2015 strategy took a markedly different approach to mission achievement; the 2013 strategy focused on improving internal processes and developing subject-matter expertise within the agency, but the 2015 strategy focused on increased partnerships, both within the IC, and external to the U.S. government, within the private sector.²¹ In June 2015, Director Cardillo stated that the new strategy was, among other things, aimed “to build speed and flexibility into our acquisition process.”²²

The 2017 NGA Strategy defined four strategic goals in the following areas to achieve the director's intent:

1. **Inspire and grow our world-class workforce**—includes inserting “accountability into performance metrics for the agency and individuals.”
2. **Fuel and drive the entire global GEOINT community**—includes implementing “governance, standards and enterprise services with our partners that enable interoperability and build resilience and operational strength in the GEOINT community” and transforming its “acquisition tradecraft and contracting services to enable efficient and mutually beneficial partner and supplier engagement.”
3. **Secure and deliver the nation's most trusted GEOINT**—includes staying “ahead of the rapidly improving decision cycles of our adversaries.”
4. **Anticipate opportunity and foresee threats**—includes taking “advantage of technology from academic, corporate, and government-military partners to create strategic capabilities with mission advantage.”²³

The most recent strategy (2025), developed under Director Robert Sharp, is unique in that this is the first time an accompanying director's intent informs the NGA strategy.²⁴ Multiple interviews with NGA personnel familiar with the planning and programming phases suggest that this increased visibility and guidance for the agency has greatly assisted in helping to operationalize NGA's vision. This linkage is shown in Figure 3.2.

National-Level Programming Policy Across Other Federal Departments and Agencies

MIP-related PPBE processes, which include DoD, the service components, and others (see Table 2.2) rely primarily on Title 10 authorities (section 151), DoDD 7045.14, and Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3100.01B and CJCSI 8501.01B for policy.²⁵ Open-source policy on the program phase of PPBE in other Executive Branch departments and agencies, however, presents a critical knowledge gap for acquisition stakeholders.

²⁰ One interviewee, in particular, stated that, “Director Cardillo came in and wanted to infuse the agency with the ability to answer the relevant questions about [the programming] in a way that was not possible before.”

²¹ The 2015 strategy has been archived, although it is still available online from the *FCW* website: NGA, *NGA Strategy: 2015*, undated.

²² Sean Lyngaas, “New NGA Strategy Touts Automation, Commercial Capabilities,” *FCW*, June 23, 2015.

²³ NGA, *NGA Strategy: 2025*, undated, pp. 4–5.

²⁴ At least in the public sphere. See Robert D. Sharp, “NGA Director's Intent,” Springfield, Va.: National Geospatial-Intelligence Agency, undated.

²⁵ U.S. Code, Title 10, Section 151, Joint Chiefs of Staff: Composition; Functions; DoDD 7045.14, 2017; CJCSI 3100.01D, *Joint Strategic Planning System*, Washington, D.C.: Joint Chiefs of Staff, July 20, 2018; CJCSI 8501.01B, *Chairman of the*

Figure 3.2
National Geospatial-Intelligence Agency 2025 Strategy Snapshot

NGA director's intent The director's intent is an expression of the conditions the organization must establish to accomplish its mission and desired end state. • Give primacy to core missions • Be the world's premier GEOINT force • Relentlessly pursue a whole-of-enterprise approach	NGA strategy The NGA strategy describes the ways and means through which it will achieve the objectives set forth in the intent. • People • Partnerships • Mission today • Mission tomorrow
NGA mission imperatives Mission imperatives are those specific and concrete functions and capabilities NGA must do well to achieve its operational mission. • Assured positioning, navigation, timing, and targeting • Accelerated tasking orchestration • Data access/integrity • Analytic workflow modernization	NGA moonshot A moonshot is an operational goal by which NGA organizes, prioritizes, and measures the progress of its overall effort. NGA delivers trusted GEOINT with the speed, accuracy, and precision required to hold at risk the strategic forces our adversaries use to project power and threaten the United States and our allies.

SOURCE: NGA 2025 Strategy.

Although extensive information is available on the DoD FYDP (part of the PPBE) process, which describes how DoD plans for its organize, train, and equip mission for Title 10 missions, no explicit policy governs the IC programming process for the IC.²⁶ While the CIG provides general IC guidance, it does not cover process as much as it directs which areas should receive funding during the programming phase. In addition, the IPPBE and PPBE processes are overseen, managed, organized, and structured differently. For example, the PPBE process relies on service elements as its basic building blocks, but the IPPBE relies on expenditure centers. The PPBE is organized around the military services, but the IPPBE is organized around capabilities. Critics of this dual process suggest that it does not allow ODNI to provide overall management and direction, reduce inefficiencies, or undertake necessary transfers and reprogramming in a rapidly changing global environment. More than 90 percent of intelligence appropriations are “hidden” within the DoD budget, but DoD and ODNI budget submissions still differ in format while masking substantial overlap in national and military intelligence programs. Both the executive and legislative branches have struggled to ensure a coherent and seamless approach to funding and executing intelligence programs.²⁷

CRS has noted two key NIP- and MIP- related issues that endure despite the issuance of national-level PPBE and IPPBE policy. First, the integration of the PPBE and IPPBE processes

Joint Chiefs of Staff, Combatant Commanders, Chief, National Guard Bureau, and Joint Staff Participation in the Planning, Programming, Budgeting and Execution Process, Washington, D.C.: Joint Chiefs of Staff, August 21, 2012.

²⁶ Although ICD 116 provides amplifying information on products intended to inform the programming process (e.g., major issue studies, ICEs, deconfliction information), the document does not provide granular process-level (“how to”) information.

²⁷ Best, 2011.

has presented several challenges because of how each is managed, leading to program-start delays.²⁸ Second, transparency within the IPPBE process continues to hinder congressional oversight. For example, many NIP-related programs are highly classified and can lead to a siloed understanding of their merits.²⁹ Third, a lack of financial auditability has led to two outcomes: Agencies have difficulty justifying spending across program portfolios, which, in turn affects congressional willingness to continue to support such programs. One Senate report in FY 2010 stated that:

The bottom line is that more than ten years after the President called for action, and more than four years after the Committee anticipated receiving auditable statements, the five agencies are still unable either to produce auditable financial statements or receive favorable audit opinions on those that are auditable. The current projection for doing so is at least four years away.³⁰

This means that Congress is left to determine how to balance competing agency requirements and funding across several programs—many of which might not be visible to uncleared congressional members or staff. In 2014, in Pub. L. 113-126, Congress mandated financial financial statement auditability for CIA, DIA, NGA, NRO, NSA, and ODNI.³¹ Multiple interviewees suggest that the cost-schedule performance framework instituted by NSA and NRO serves as a community exemplar for congressional interaction.³²

Strategic Direction and Guidance Ensure Unity Across Early Phases of IPPBE

Organizational leadership typically provides the overall strategic context for mission achievement across federal departments and agencies. Strategic direction and guidance from leadership can enable organizations to meet their IPPBE goals and objectives when such objectives are clearly defined, adopted, and operationalized at the mission level. The literature suggests

²⁸ Miles, 2016a.

²⁹ CRS explained that

congressional oversight is distributed across a number of committees. Committee interactions with IC officials occur generally in closed sessions for any discussion of program or operation specifics. Classified transcripts are maintained by the committees and are made available on a limited basis to Members of Congress. Since there is no automatic declassification system for congressional documents, it is unclear if, or when, such materials will become available to the public. (Miles, 2016a, p. 45)

³⁰ U.S. Senate, Select Committee on Intelligence, *Intelligence Authorization Act for Fiscal Year 2010: Report with Additional Views to Accompany S. 1494*, 111th Cong., 1st sess., S. Rept. 111-55, July 21, 2009, p. 58.

³¹ U.S. Senate, Select Committee on Intelligence, *Intelligence Authorization Act for Fiscal Year 2014: Report to Accompany S. 1681*, 113th Cong., 1st Sess., S. Rept. 113-120, November 13, 2013.

³² One interviewee suggested that

cost schedule performance is how NRO speaks to the Hill and the Hill has told us over and over again how helpful that is because it's simple . . . they are able to tie their mission to their dollars and talk about it in a cost schedule performance way that doesn't change because its numerical, streamlined, organized, and simplified way of communicating to the Hill.

Another interviewee noted that "I admired NRO results from their process and was so open to best practices from Westfield." (RAND interviews with current and former senior NGA executives, October–November 2020)

External Policy Direction

Finding: There are no external policy and guidance and requirements; few internal governance structures; and, perhaps, a misunderstanding of IRTPA legislation requirements.

External guidance that clearly communicates expectations for NIP- and MIP-funded IPPBE processes would benefit NGA by setting standards and imparting best practices and lessons learned from other departments and agencies. Strengthening relationships with OSD, USD(I&S), and ONDI would create more open lines of communication with overseers and consumers; however, NGA might reap these benefits only by establishing standard briefing templates for the planning and programming phases to ensure unified, clear communication with Congress and partners.

The ICDs provide a strategic overview for IC acquisition processes. This includes providing guidance for AoAs, the interplay between the identification of requirements, and the budgeting and evaluation (performance) phases of the IPPBE process. ICDs, however, do not provide useful direction for stakeholders involved in the programming phase. The evolution of NGA strategy has revealed the increased need to streamline acquisition processes (including the automation of the business process), involve external stakeholders, and increase GEOINT partnerships (both within the IC and with the private sector) and the importance of developing performance metrics to retain a customer-centric focus.

	Lack of External Guidance	Few Internal Governance Structures	IRTPA Legislation Requirements
Conditions	DoD and IC elements across the U.S. government also suffer from lack of SOPs and/or documentation on exactly how to conduct the programming phase.	Governance structure is discussed for budgeting and execution phases, but not planning or programming phases.	IRTPA prioritized NIP-funded missions, including NGA, yet the perception remains that the NGA budget is cut more frequently than those of other agencies.
Causes	NGA receives little guidance or oversight from OSD, OMB, or other federal departments and agencies.	AD/RDs and the director disagree over how the IPPBE process should be driven, a struggle enabled by lack of clear guidance concerning roles and responsibilities.	IRTPA legislation and sequestration led to a requirement for greater detail in programming but also increased complication and confusion within NGA.
Effects	Lack of external guidance and standardized procedures within the IPPBE process affects NGA's ability to clearly communicate with partners and Congress, undermining confidence in NGA from oversight, other federal departments and agencies and external partners.	Justifications for investments and divestments are frequently insufficient.	Frequent misalignment of mission and resources, exacerbated by NGA not meeting the requirement to develop an acquisition strategy.
NGA resolution implemented	No observed NGA resolutions.		
RAND recommendations	Cultivate relationships with OSD, USD(I&S), and ONDI and request instructions for deliverables. Develop a consistent briefing template and protocol for interactions with Congress.	Conduct a full analysis of other agencies' processes to integrate best practices and lessons learned. Emulate the success of NSA and NRO in articulating strategic vision, cost, schedule, and performance metrics.	

that a lack of clear guidance, especially during the planning and programming phase, can have cascading effects within subsequent phases of IPPBE.³³

The National Institute for Public Policy has published a series of reports that recommends issuing strategic-level guidance to support acquisition at structural and managerial levels within the IC.³⁴ The institute has suggested that “many of the problems besetting the IC have their roots in structural and organizational dysfunctions,” thus necessitating structural reform.³⁵ The institute stated that, because IC agencies tend to establish unique doctrine, the IC should create a senior management education system with curriculum on “IC doctrine, resource management, and leadership and staff work.”³⁶ Although this report predates the creation of the ODNI in 2004, many of the observations noted still remain, namely that “defense intelligence resources are managed in a fragmented, if not chaotic manner” and require strong leadership to direct acquisition processes in fulfilling mission objectives.³⁷

The DoD Office of the IG also notes issues that could arise when leadership guidance is not well translated into planning and programming activities. For example, in June 2020, the DoD IG sought to understand the extent to which service components were executing security measures to protect data and technologies from cyber threats.³⁸ The IG found that, while the Joint Artificial Intelligence Center had made progress in implementing a governance framework and standards to combat external cyber threats, it had not met strategic obligations required by the FY 2019 NDAA, the DoD Artificial Intelligence (AI) Strategy, or other strategic-level DoD guidance. The DoD chief information officer, in response to the report, agreed to

establish a biannual AI portfolio review with all DoD Components; a central repository for AI projects; legal and privacy standard operating procedures; and a strategy for collaboration by focusing on early and frequent interaction with users and Service program offices.³⁹

This would ensure that strategic direction was translated into operation requirements.

A DHS IG report examining U.S. Customs and Border Protection (CBP) progress in implementing the DHS Acquisition Life Cycle Framework found that CBP does not have the acquisition capabilities required to implement its role in the DHS mission.⁴⁰ The IG report

³³ This is especially important in standing up new organizations, such as the U.S. Space Force. A 2020 report explains how USAF will be “organized, trained and equipped” to conduct its responsibilities as an armed force through cooperation with U.S. Space Command and other space components across the services. The Space Force intends to develop a distinct acquisition system for defensive space capabilities. CSO directed the Space Force to “not default to current processes” regarding the requirements and the program/budget. Department of the Air Force, *Comprehensive Plan for the Organizational Structure of the U.S. Space Force*, Washington, D.C., February 2020, p. 16.

³⁴ Bernard C. Victory, ed., *Modernizing Intelligence: Structure and Change for the 21st Century*, Fairfax, Va.: National Institute for Public Policy, January 2002, p. v.

³⁵ Victory, 2002, p. xvii.

³⁶ Victory, 2002, p. xviii.

³⁷ Victory, 2002, p. xix.

³⁸ DoD, Office of the Inspector General, *Audit of Governance and Protection of Department of Defense Artificial Intelligence Data and Technology*, June 29, 2020, p. i.

³⁹ DoD, Office of the Inspector General, 2020, p. ii.

⁴⁰ DHS Acquisition Life Cycle Framework involves four phases: Need (describe the problem); Analyze & Select (find alternatives and resource requests); Obtain (create and analyze capabilities); and Produce/Deploy and Support and Dispose

notes that CBP did not conduct an AoA to determine the most “effective, appropriate, and affordable solutions to obtain operational control of the southern border” and instead relied on old estimates to conduct this work.⁴¹ CBP also did not employ a “sound or well-documented methodology” to determine which sections of the border needed physical barriers and did not finalize an internal plan to implement the strategy to regulate the border.⁴² The IG found that, in addition to translating strategic guidance into effective planning and programming activities, stakeholders must ensure that the organizational vision can be achieved when there are competing program requirements that can lead to inadequate congressional justification documentation.⁴³

(generate and sustain capabilities). Each phase leads to an acquisition decision event, which is a review that is conducted before starting the next phase. See DHS Directive 102-01, Acquisition Management Directive, Washington, D.C.: U.S. Department of Homeland Security, July 28, 2015.

⁴¹ Office of Inspector General, Department of Homeland Security, *CBP Has Not Demonstrated Acquisition Capabilities Needed to Secure the Southern Border*, July 14, 2020, p. 6.

⁴² Office of Inspector General, Department of Homeland Security, 2020, p. 6.

⁴³ The IG report noted that,

Congress required the Department submit a risk-based plan for improving security along the U.S. border that identifies the planned locations, quantities, and types of resources. The plan must also include a description of the methodology and analyses used to select specific resources for deployment to particular locations. In its 2017 Impedance and Denial Strategy, Border Patrol documented its process for identifying and prioritizing impedance and denial investments along the southern border. Border Patrol intended for its process to lead to informed investments that achieve the greatest possible operational impact, are feasible in terms of constructability, and are scalable to available budgetary resources. However, Border Patrol did not use a sound methodology to identify and prioritize these investments. Border Patrol did not document its justification for re-ordered priority rankings for border wall construction, or how evaluation criteria were weighted. It also used only a single fiscal year of border activity data as a basis for prioritizing construction locations. Without a comprehensive, well-documented approach, Border Patrol cannot be certain it is making fully informed investment decisions and investing in border locations that could best benefit from physical barriers. (Office of Inspector General, Department of Homeland Security, 2020, pp. 8–9)

Internal Guidance

Finding: There are four aspects of this finding: issues associated with IPPBE phase guidance and timeline, poor internal perceptions of programming, and prioritization of Investments. While informal guidance for the programming phase might exist within NGA, such guidance is frequently changed by incoming leadership. Internal perceptions of the programming process suggest lack of transparency in resource decisionmaking and challenging timelines negatively affect NGA's ability to prioritize investments.

Across the IC and U.S. government, organizations struggle to produce and refine guidance documents for programming. Because of the lack of clear guidance and processes within NGA, the implementation of the planning and programming phases varies across budget cycles and between ADs and RDs. NGA would benefit from a consistently conducted process within the organization to not only enhance resource-mission alignment but also to combat the widespread negative perception of the IPPBE process.

	IPPBE Phase Guidance	Internal Perceptions	Prioritization of Investments	IPPBE Timeline
Conditions	Guidance for the programming phase exists; however, it is not definitive and is frequently adjusted.	Components have negative perceptions of the programming phase.	Investments are consistently prioritized over divestments, and few major studies are conducted to inform decisionmaking.	The timeline for the planning and programming phase is challenging, with program guidance being provided relatively late and with decisions for the program build being made in the last section of the program build. Programming deadlines are frequently missed. FM is then under pressure to develop a justifiable budget for submission in a short time.
Causes	Implementation of the planning and programming phases varies between ADs and RDs, enabled by nuances in SOPs.	The broad perceptions are that components are not equally asked to absorb divestments and that feedback from components is not equally weighted in decisionmaking.	Divestment decisions are avoided, and discussions of possible divestments often result in compromises.	Program guidance is often released after the program build is already in process, challenging the ability to connect programmatic decisions with guidance or planning process.
Effects	The lack of consistent internal guidance on planning and programming processes exacerbates challenges in later phases and allows inconsistent implementation of processes between ADs and RDs.	Lack of transparency into investment and divestment decisionmaking leads to poor communication between KCs and RDs.	Prioritization is challenging because program owners resist lowering the priority levels of their programs. Some necessary but low-salience programs are not prioritized in guidance, such as the NGA strategy, despite the fundamental need for such programs (i.e., adoption of new analytic modeling software).	Decisions are often made in a rushed way and are not informed by emergent need studies.

Internal Guidance —Continued				
	IPPBE Phase Guidance	Internal Perceptions	Prioritization of Investments	IPPBE Timeline
NGA resolutions implemented	Previous efforts have been made to develop a governance board, AD/RD resource capabilities board, but these are not necessarily used or followed during decisionmaking. In addition, members of these boards tend to have little financial or budgeting experience. ^a Ongoing restructuring decisions—programming phase might operate on an annual cycle.			
RAND recommendations	Develop clear, consistent guidance documents in coordination with NGA CAPE, the CFO, and the ADs/RDs for the programming phase. These documents should provide explicit directives for aligning the program build with planning decision documents and the NGA mission and strategic goals.	Clearly define conditions for success and build integration and improve mission-resource alignment.	Strengthen program management reviews and develop mission performance teams.	
^a Note that this governance board has been dissolved.				

Information Visibility

Overview

The NGA budgeting phase relies on valid inputs from both the planning and the programming phases for successful portfolio execution. The budgeting phase also performs a critical function in providing the necessary congressional justification for continued funding for NGA strategic programs. This chapter presents best practices from the literature, examines the relationship between budgeting and the other phases of the IPPBE process, and explores how the budgeting roles and mission at NGA have evolved from the pre-portfolio era to the present—including the role of IT in supporting budget visibility and decisionmaking.

The Programming Phase Is Integral to the Budgeting Phase

The lack of transparency both during and in the final period of the programming phase can lead to uninformed program divestment, cost overruns, and inadequate congressional justifications. Because the program phase is inexorably linked to budgeting, this section focuses on documents that explore this organizational relationship.

External assessments of program phase effects on the subsequent budget phase have been a major focus of GAO study over the past several decades. For example, in 1983, GAO noted that, “significant opportunities remain . . . in improving the Federal financial management processes.”¹ Between 1982 and 1983, the U.S. Comptroller General conducted several planning sessions with a newly created joint GAO-DoD working group to understand and implement program and budgeting process improvements.² Since the early 1980s, subsequent GAO assessments have continued to identify issues and suggest recommendations for improving the linkage between programming and budgeting.³ Some findings have been that “efforts to

¹ Charles A., Bowsher, *Progress in Improving Program and Budget Information for Congressional Use*, Washington, D.C.: U.S. General Accounting Office, OACG-84-2, November 8, 1983. Also see Joint Department of Defense and Government Accounting Office Working Group, *The DOD Planning, Programming, and Budgeting System*, Washington, D.C.: U.S. General Accounting Office, OACG-84-5, September 1983.

² GAO explained that, “The Department of the Treasury and OMB issued their ninth annual report to the Congress (March 1983) in accordance with 31 U.S.C. 1113(e)(3). The statute requires that the Director of OMB and the Secretary of the Treasury annually report to the Congress on their plans for addressing program and budget information needs. They are also required to include plans for implementing changes to classifications and codes to meet the information needs of the Congress as well as the status of prior year system and classification implementations” (Bowsher, 1983).

³ For example, see GAO, *Information on Workforce, Organizational Structure, and Budgeting for Selected Programs*, Washington, D.C., GAO-19-209, March 2019.

link resources with results must begin in the planning phase with some fundamental understanding about program goals” and that “past initiatives often foundered because no mechanism existed to reconcile or even to address these legitimate, but at times competing, views.”⁴ DoD has needed to “add an accountability system or feedback loop to its Planning, Program and Budgeting System that would adequately inform top DoD officials and Congress on the progress made on major problems and projects.”⁵ Finally, “DoD approves proposed programs with much less consideration of its overall portfolio and commits to them earlier and with less knowledge of cost and feasibility.”⁶

The National Nuclear Security Administration (NNSA) budget phase (within the PPBE construct) has been the subject of GAO scrutiny since 2003,⁷ resulting in 18 GAO reports.⁸ The GAO examined the structure of the NNSA PPBE process, the extent to which NNSA reviews its budget estimates, and how the NNSA decides on resource trade-offs.⁹ The 2012 report found that NNSA should develop a more robust budget review planning cycle, improve the formal process for reviewing budget estimates, and reinstitute an independent analytical capability to assess the effects of the planning and programming stages.¹⁰ One of the key issues for NNSA is that the organization relies on an informal system to review and validate budget estimates that is not consistent with established PPBE policies at DoE. GAO found that the NNSA PPBE process was not informing OMB or congressional budget decisions because it occurred too late in the budget cycle (after the submission of the President’s budget to Congress). Therefore, NNSA could not ensure a credible and reliable budget because it assessed the accuracy of the processes used to develop budget estimates rather than the accuracy of the estimates themselves and is only conducted for a small portion of the overall budget.¹¹

⁴ U.S. General Accounting Office, *Past Initiatives Offer Insights for GPRA Implementation*, Washington, D.C., AIMD-97-46, March 1997.

⁵ Some problem areas were in “providing more program stability; using the funds prudently; defining objectives for use of funds; maintaining program visibility; and accountability over program execution.” See Charles A. Bowsher, *Defense Budget Increases: How Well Are They Planned and Spent*, Washington, D.C.: U.S. General Accounting Office, PLRD-82-62, April 13, 1982.

⁶ GAO, *An Integrated Portfolio Management Approach to Weapon System Investments Could Improve DOD’s Acquisition Outcomes*, Washington, D.C., GAO-07-388, March 2007.

⁷ NNSA is a semiautonomous agency within DoE and is responsible for the nation’s nuclear weapons, nonproliferation, and naval reactors programs. See GAO, *NNSA’s Reviews of Budget Estimates and Decisions on Resource Trade-Offs Need Strengthening*, Washington, D.C., GAO-12-806, July 2012.

⁸ For example, GAO, *NNSA Should Further Develop Cost, Schedule, and Risk Information for the W87-1 Warhead Program*, Washington, D.C., GAO-20-203, September 2020b (a public version of a classified report that GAO issued in February 2020). Information that NNSA or DoD deemed classified or sensitive has been omitted; Joseph W. Kirschbaum and Allison Bawden, “Nuclear Weapons Sustainment: Improvements Made to Budget Estimates in Fiscal Year 2019 Joint Report, but Opportunities Remain to Enhance Completeness,” letter and briefing slides, Washington, D.C.: U.S. Government Accountability Office, GAO-20-37R, November 2019; GAO, *NNSA Should Adopt Additional Best Practices to Better Manage Risk for Life Extension Programs*, Washington, D.C., GAO-18-129, January 2018; GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, Washington, D.C., GAO-09-3SP, March 2009; U.S. General Accounting Office, *Opportunities Exist to Improve the Budgeting, Cost Accounting, and Management Associated with the Stockpile Life Extension Program*, Washington, D.C., GAO-03-583, July 28, 2003.

⁹ As laid out within NNSA’s established policies, instructions, guidance, and internal reports.

¹⁰ GAO noted that there at least two PPBE phases going on at any given time.

¹¹ The lack of a formal evaluative mechanism for determining whether corrective actions have been taken in response to previous findings further limits the process’s effectiveness. NNSA uses a variety of tools to structure resource trade-

In March 2020, the GAO Director of Natural Resources and Environment testified before the House Subcommittee on Strategic Forces, Committee on Armed Services that NNSA should consider moving to a portfolio management approach to align its various programs to its budget.¹² GAO recommended that (1) NNSA should use an “independent team” to assist in risk management; (2) should set time frames for life-cycle cost estimates and an “integrated master schedule” for all programs; (3) integrate best practices suggested by the Project Management Institute, which include the optimization of

their portfolios of programs and projects by assessing their capability and capacity to finance specific portfolio components; determining which portfolio components should receive the highest priority; and identifying components to be suspended, reprioritized, or terminated.¹³

NGA has experienced issues similar to those GAO outlined regarding NNSA’s accuracy and reliance on informal validation of budget estimates and difficulty in aligning programming with the budgeting cycle.

Information Technology Infrastructure and Tracking Are Critical for Program Visibility

The integration of IC IT has been a key strategic priority for ODNI for the past decade. James Clapper, during his tenure as DNI, stated that “[s]uccessful integration requires a Global IT infrastructure through which the IC can rapidly and reliably share intelligence with those who need it.”¹⁴ DNI Clapper made the implementation of the IC IT Enterprise (IC-ITE) a strategic intelligence priority, which continued under subsequent DNI Daniel Coats.¹⁵ The 2017 IC-ITE also reminds executive branch intelligence agencies of the requirements set forth in ICD 501:

ICD 501 directs that IC elements have the “responsibility to provide” and authorized IC personnel have the “responsibility to discover and request” data that can contribute to their assigned mission. This sharing imperative also applies to law enforcement, the rest of government, and our international partners. To instill these disciplines in the IC, we must

offs, including integrated priority lists—which program activities according to their importance for meeting mission requirements—that are meant to provide management with estimates of how various funding scenarios would influence program activities. NNSA, however, has weakened its ability to conduct this type of comparative analysis by disbanding its Office of Integration and Assessments, which was founded in response to previous IG and GAO recommendations.

¹² Allison B. Bawden, “NNSA’s Modernization Efforts Would Benefit from a Portfolio Management Approach: Statement of Allison B. Bawden, Director Natural Resources and Environment,” testimony before the Subcommittee on Strategic Forces, Committee on Armed Services, U.S. House of Representatives, Washington, D.C.: U.S. Government Accountability Office, GAO-20-443T, March 3, 2020.

¹³ See Project Management Institute, Inc., *The Standard for Portfolio Management*, 3rd ed., Newtown Square, Pa., 2013. The institute is a not-for-profit association that provides global standards for, among other things, project and program management. These standards are used worldwide and provide guidance on how to manage various aspects of projects, programs, and portfolios. As cited by Bawden, 2020, p. 14.

¹⁴ Intelligence Community Chief Information Officer, “IC IT Enterprise,” fact sheet, undated.

¹⁵ See ODNI, “Intelligence Community Information Environment (IC IE) Data Strategy 2017–2021,” undated b.

Budget Visibility

Finding: The three elements of this finding are low visibility, traceability of funds, and internal visibility. NGA experiences challenges in leadership visibility into the budget process, difficulty tracing funds across the IPPBE process, and understaffing—all of which affect the agency's ability to execute funds.

The programming phase of IPPBE should be dedicated to providing analytically based options for resource decisions in a transparent way that uses outputs from the planning phase (such as AoAs) to prepare for developing a justifiable budget submission in the budgeting phase. Programming should not be considered in isolation from the rest of the IPPBE process—each phase of the IPPBE process enables and strengthens the ability to conduct subsequent phases. Other IC-wide guidance that NGA should track includes ODNI-produced major issue studies, total life-cycle cost estimates (which requires the ability to trace dollars), and annual production of the CIG.

At the end of this research, we learned that decisions were being made to assign responsibility and accountability for the budget process to FM, with few FM staff being allotted to the ADs and RDs accountable for the planning and programming phases, respectively. Because each phase of the IPPBE process builds on and is dependent on previous phases, isolating any phase might impede collaboration and transitions between phases.

	Low Leadership Visibility	Low Traceability of Funds	Low Internal Visibility
Conditions	The budget process involves little leadership visibility into investment and divestment decisionmaking and little measurement of how programs advance NGA strategic goals.	NGA FM submits an initial budget request to ODNI, which then provides comments requiring FM adjudication; NGA resubmits a final budget to ODNI. Once ODNI and FM agree, the final budget is submitted to Congress.	Programming and budgeting in one FY are sometimes irreconcilable with those for the previous FY.
Causes	Directors have varying degrees of visibility into the budget during the IPPBE process but have greater visibility of the budget in execution years. Budget visibility is challenged by execution at the component level, consistently shifting funds, limited evaluation capability, and limited ability to link budget to planning and programming phases.	The consistent focus is on expanding budget and investments rather than on understanding risk, identifying potential divestments, or understanding current spending.	FM is challenged by understaffing, lack of subject-matter expertise on resource management, and accumulation of roles and responsibilities.
Effects	Lack of visibility is detrimental to informed decisionmaking. Components struggle to conduct and articulate cost-benefit analyses for funding requests, including sustainment funding.	Little ability exists to connect budget to strategic goals, challenging the ability to implement new strategic vision.	FM, components, and program managers have limited visibility of program budgets. Funds are perpetually underexecuted.
NGA resolutions implemented	AD structure was designed to help consolidate funding.	Currently, NGA is conducting a study to trace the movement of funds through the IPPBE phases.	KCs were given the ability to realign funds, making it easier to track spending and have budget visibility.
RAND recommendations	Encourage greater understanding of mission, roles, and responsibilities.	Develop a standardized briefing format that connects funds across IPPBE phases and communicates how resource decisions advance NGA's strategic goals.	Redefine the budget cycle as a year-round process, allowing for reprioritization and change to take time to enforce, and placing greater emphasis on effective planning and programming to enhance the budgeting phase.

foster a culture where our people maximize the value of data across the IC and have the tools and abilities to effectively use it. In a data-driven culture, data is the concern of every employee, not just data architects, scientists, and providers; it further requires placing data sharing at the center of all forms of decision-making.¹⁶

While IC-ITE does not serve as a repository for acquisition-related information for individual agencies, the factors that contributed toward its creation can serve as a best practice for ensuring visibility of, and access to databases that store acquisition information. The lack of database integration among, or interoperability between systems can cause siloed IPPBE efforts among agencies. In addition, service components might use systems and databases that do not integrate well with IC program-tracking systems. This section briefly reviews best practices before concluding with final observations from the literature.

The Institute for Defense Analyses (IDA) has addressed the issue of IT acquisition integration across several reports. One report analyzed the effects of IT policies and practices on acquisition program management, finding that, within DoD, acquisition program implementation is often hindered by a set of technical factors associated with contracts, management of programs, policy, and personnel.¹⁷ IDA's IT-specific recommendations include (1) using automated collaboration processes and decision support tools to track obligations and disbursements and keep spending plans current" and (2) by ensuring that "contracting support is tightly linked with program management to establish effective working relationships, minimize contracting delays, and create a common understanding of timelines, priorities, and requirements."¹⁸ IDA concluded that many of the automated program management tools that are already in use in some program offices "appear to be particularly helpful in achieving unity of effort."¹⁹

CRS has traced the proliferation of federally managed acquisition systems and associated shortcomings in "accuracy, completeness, and timeliness."²⁰ CRS noted that, "policies, system limitations, and regulations can be sources of seemingly inaccurate, or incomplete, data; lead to unusual, or anomalous, results; or hamper transparency" when relaying information to stakeholders—particularly Congress.²¹ CRS found that increased acquisition database transparency can create "informed citizenry," enhance "policy planning and decisionmaking,"

¹⁶ ODNI, undated b, p. 1; ICD 501, "Discovery and Dissemination or Retrieval of Information within the Intelligence Community," McLean, Va.: Office of the Director of National Intelligence, January 21, 2009.

¹⁷ Kathleen M. Conley, James R. Dominy, R. Royce Kneese, Jr., Jay Mandelbaum, and Susan K. Whitehead, *Implications of DOD Funds Execution Policy for Acquisition Program Management*, Alexandria, Va.: Institute for Defense Analyses, August 2014, pp. vii–viii.

¹⁸ Conley et al., 2014, pp. vii–viii, which further states that "these tools, when tied to enterprise resource planning systems, can help reconcile spending plans with execution."

¹⁹ Conley et al., 2014.

²⁰ For example, the Electronic Subcontracting Reporting System, Federal Business Opportunities, Federal Funding Accountability and Transparency Act (FFATA) Portal, Federal Procurement Data System–Next Generation, Federal Awardee Performance and Integrity Information System, FFATA Sub-Award Reporting System, Interagency Contract Directory, Past Performance Information Retrieval System, System for Award Management (SAM), USAspending.gov, and Wage Determinations Online (this has been folded into SAM). See L. Elaine Halchin, *Transforming Government Acquisition Systems: Overview and Selected Issues*, Washington, D.C.: Congressional Research Service, R43111, June 20, 2013.

²¹ Halchin, 2013, p. 12.

and foster accountability.²² CRS, however, noted the importance of subject-matter expertise in granting user access; without “sufficient knowledge of government procurement and expertise in using the government’s online acquisition systems, users may face challenges identifying which system(s) can be used meet their needs; understanding the capabilities and limitations of the different systems; determining how to access, or find, the data or information they seek; and understanding how to analyze and interpret the data or information they obtain.”²³

In 2017, OSD asked RAND researchers to identify how existing DoD data could assist OSD leadership by documenting where “data reside, who can access the data, and who owns the information” among 21 disparate information systems.²⁴ User population access to each of these information systems ranged from 100 to 400,000 personnel. The authors found two key strengths among DoD acquisition platforms. First, high levels of standardization and collection of “acquisition-related information in one place where data can be input, accessed, and analyzed by those needing it” improved acquisition efficiency.²⁵ Because a database can only be as good as its data quality, having controls built into systems to “ensure that key data elements are entered, edited, and checked against historical and other data” can aid in accurate retrieval and dissemination when needed.²⁶ DoD, however, also has faced several challenges in working to integrate its various systems. For example, verifying data accuracy, updating system software, and assuring access to valid stakeholders have impeded some aspects of the PPBE process.²⁷

²² Halchin, 2013, p. 17.

²³ Halchin, 2013, p. 17.

²⁴ Megan McKernan, Nancy Y. Moore, Kathryn Connor, Mary E. Chenoweth, Jeffrey A. Drezner, James Dryden, Clifford A. Grammich, Judith D. Mele, Walter Nelson, Rebeca Orrie, Douglas Shontz, and Anita Szafran, *Issues with Access to Acquisition Data and Information in the Department of Defense: Doing Data Right in Weapon System Acquisition*, Santa Monica, Calif.: RAND Corporation, RR-1534-OSD, 2017. Also see Megan McKernan, Jessie Riposo, Jeffrey A. Drezner, Geoffrey McGovern, Douglas Shontz, and Clifford A. Grammich, *Issues with Access to Acquisition Data and Information in the Department of Defense: A Closer Look at the Origins and Implementation of Controlled Unclassified Information Labels and Security Policy*, Santa Monica, Calif.: RAND Corporation, RR-1476-OSD, 2016.

²⁵ For DoD needing to update software systems, see McKernan et al., 2017, p. xi. RAND conducted similar research for the Navy to understand how best to support data entry for situational awareness in command and control systems. See Bradley Wilson, Isaac R. Porche III, Mel Eisman, Michael Nixon, Shane Tierney, John M. Yurchak, Kim Kendall, James Dryden, and Sean Critelli, *Maritime Tactical Command and Control Analysis of Alternatives*, Santa Monica, Calif.: RAND Corporation, RR-1383-NAVY, 2016.

²⁶ McKernan et al., 2017, pp. xi–xii.

²⁷ RAND suggested that DoD could improve its acquisition database programs by formalizing data governance functions, improving the quality and analytic value of its data, improving analytical capability, and focusing on developing and training workers to use and improve data. See McKernan et al., 2017, p. xi.

Systems and Data

Finding: NGA experiences data management, interoperability, and data access and visibility challenges.

Data management: Data input for the current systems of record is time-intensive and arduous and has been cited as a reason that experienced financial analysts have left NGA FM. Inputs into the various databases are of varying quality and, at times, are duplicative, out of date, or inaccurate.

Interoperability: Interviewees identified nine different systems that are used to varying degrees in different phases of the IPPBE process. Tools in the FM suite (PRISM, the Organization Requirements and Budgeting Information Tool [ORBIT], GEO-F) are generally interoperable. Some senior employees, however, think that some NGA systems are not interoperable, which causes duplication in the amount of effort required to understand, input, and update data. As an example, FM personnel perceive that ORBIT cannot ingest GEO-F data without manually editing the database.

Since our research was completed for this project, NGA has been maturing these tools, making improvements and phasing out individual component's home-grown tools to create a centralized suite of tools to support standardized and centralized business processes.^a The business processes, integration, and adoption of the suite of tools need unity of effort across the IPPBE phases, especially between the major stakeholders: PDs, program managers, FM, and NGA's Office of Contract Services (OCS) for effective interoperability. Additionally, there is a need to clearly define the lanes of responsibility for all parties within the IPPBE process.

Data Access and Visibility: In terms of data visibility, only FM has full visibility of GEO-F data unless it is input into ORBIT and then IPPBE participants can access read-only data on that system. Participants in the IPPBE process do not have full access to all the available data concerning the phases of the budget cycle.

Systems of record include^b

- **GEO-F** is NGA's version of Momentum. It is the accounting system of record that supports all agency financial and accounting business processes. Data from GEO-F are available to members operating in the IPPBE process via GEAR reports and the NGA CAPE.
- **ORBIT** is an IBM Planning Analytics requirements and budget management system customized for NGA. It has been integrated into IC components and receives budget and execution data from the GEO-F accounting system.
- **PeopleSoft** is joined to methods for tracking time spent on activities, training, and other measures to have data for performance measures.
- **PRISM** is a contract system from OCS.
- **IRIS** is a DNI system into which FM manually inputs evaluation data (i.e., check profiles against areas of concern from oversight) at the end of the programming phase.

	Low Leadership Visibility	Low Traceability of Funds	Low Internal Visibility
Conditions	Data management for systems requires manual inputs, which is a long and arduous process.	FM has exclusive access to GEO-F; people outside FM can access ORBIT read-only data.	ORBIT takes in the data from GEO-F. NGA has previous plans to move to development operations and update software. So far, this has not been completed.
Conditions	Data management for systems requires manual inputs, which is a long and arduous process.	FM has exclusive access to GEO-F; people outside FM can access ORBIT read-only data.	ORBIT takes in the data from GEO-F. NGA has previous plans to move to development operations and update software. So far, this has not been completed.
Causes	FM does not input contracting data into GEO-F PRISM but provides reports to the KCs to trace money. Inputs into ORBIT are not always high-quality data, which influences impact statements.	A number of individuals involved in the IPPBE process do not have access to ORBIT data. The issue of budget visibility, both internally at NGA and externally for Congress, is exacerbated by lack of access to databases and some interoperability limitations with existing systems.	ORBIT cannot cleanly ingest GEO-F data, requiring manual field editing from FM personnel. Many technologies that both source and analysis need but are being pursued independently.

Systems and Data—Continued

	Low Leadership Visibility	Low Traceability of Funds	Low Internal Visibility
Effects	Old and new information is still difficult to connect, and updates are not readily apparent. Loss of qualified financial analysts who do not want to “feed the ORBIT beast.”	Congress lacks confidence in NGA because of the difficulty in tracing spending.	Disconnects between databases challenge the ability to connect data. Identifying redundancies and gaps is difficult.
NGA Resolutions Implemented	Development of the ORBIT system, which many see as helping program decisions. Introduction of GeoSCOUT, which many interviewees noted as unsuccessful. NGA is in the process of modernizing its requisition system.		
RAND Recommendations	Develop data management protocols processes for ensuring that data inputs are consistently of high quality.	Provide ORBIT access to those responsible for all applicable portions of the IPPBE process.	NGA is in the process of modernizing its requisition system. To support a seamless transition of data to new system, a transition plan should be developed to outline the new system’s integration with existing systems, standards for data input, management, and updating, and appropriate procedures for transferring preexisting data into the new system.

^a For example, while ORBIT ingests data from GEO-F, all program data must be reentered into the Integrated Risk Information (IRIS) system prior to submission to ODNI, which has been reported to be an extremely tedious and time-consuming process.

^b We are aware of additional NGA systems that manage large personnel services contracts to provide SME support to NGA missions (e.g., Emerald and Mojave) and a data management and information integration system (e.g., GeoSCOUT), the latter of which we understand is no longer in use at NGA.

Roles and Relationships

Overview

Roles and responsibilities for various aspects of the IPPBE process at NGA have evolved and shifted across the three resource management eras (see Table 5.1). During the course of this research, NGA was making decisions about a new structure that more clearly defines the roles and responsibilities for individual phases of the IPPBE process.¹ This new structure, which was continuing to be developed at the time of this writing, is specifically intended to address issues arising from ambiguity in the roles and responsibilities that affect accountability and transparency.

Frequent Stakeholder Input and Information Sharing Are Critical Throughout All Phases of IPPBE

Visibility and transparency among stakeholders throughout IPPBE process—especially in the planning and programming phase—serve as another key feature of the literature. Barriers to information sharing can cause a mismatch between strategic objectives, induce errors in translating the objectives into lower-level program investment, and result in execution delays toward the end of the IPPBE process.

Involving key stakeholders throughout the IPPBE process has been shown to both foster a common understanding of the mission and allow greater situational awareness during periods of rapidly emerging requirements. A 1996 RAND report analyzing the U.S. Forces, Korea in PPBS deliberations and decisions found that using specific strategy-to-task frameworks can help decisionmakers address resource issues in a systematic and reproducible way.² This framework approach allowed participants to share a common understanding of priorities, definitions of key terms, concepts, and overall mission objectives. This also involved having Army leadership explain its interpretation of national objectives to create a common reference point for Army program managers.

RAND conducted similar research for the U.S. Navy in 2009 to evaluate the participation of stakeholders within the PPBE system. The objectives of that work were to identify and

¹ Because these decisions were being made as of this writing, we have limited insight into the nature and scope of changes made.

² John Y. Schrader, Leslie Lewis, William Schwabe, C. Robert Roll, and Ralph Suarez. *USFK Strategy-to-Task Resource Management: A Framework for Resource Decisionmaking*. Santa Monica, Calif.: RAND Corporation, MR-654-USFK, 1996.

Table 5.1
National Geospatial-Intelligence Agency IPPBE Roles and Primary Responsibilities Across Resource Management Eras

IPPBE Phase	Pre-Portfolio Era	Portfolio Era	AD/RD Era	[TBD] "Post-AD/RD Era"
Planning	Components have equal voice.	Portfolio Managers dual-hatted as component directors.	- Portfolio managers no longer dual-hatted. - Deputies Council provides initial validation and prioritization of mission needs.	- ADs are responsible for the planning phase. - PD provides support.
Programming	Program build process is stove-piped at the component level (not a top-down programming process).	- ORBIT - Not all who need access have access (even read only). - FM has strategic responsibility for program build.	- RDs work with ADs to define program budget requirements and align resources to strategic outputs or outcomes. - AD for Capabilities validates corporate needs. - AD for Enterprise exercises operational control of GEOINT enterprise resources. - AD for Operations validates and prioritizes mission needs. - AD for Support exercises operational control over human resources and installation security.	- PDs—formerly the RDs—are responsible for the programming phase. - The Financial Management Resource Office (FMR) owns much of the program management responsibilities, which remain under the FM umbrella.
Budgeting/Execution	Leaders lack budget visibility.	- Components were directed to use GEO-F. - Not all who need access have access (even read only).	- RDs have program budget authority and responsibility; advise ADs on budgetary implications. - CFE provides recommendations for justifying and allocating current and future-year resources; submits Intelligence Program Budget Submission to ODNI and POM to USD(I&S). - FMR generates, manages, and reports authoritative resource data. - Financial Management, Resource, Program Planning and Analysis (FMRP) ensures AD/RD awareness of resource effects.	- FMR will be responsible for the budgeting. - The Financial Management Matrix (FMM) office is responsible for execution.

Table 5.1—Continued

IPPBE Phase	Pre–Portfolio Era	Portfolio Era	AD/RD Era	[TBD] “Post-AD/RD Era”
Evaluation	Dollars are executed at the component level.		- Dollars are executed at the component level. - FM responsibilities have evolved to include current-year execution responsibilities. - NGA CAPE conducts annual program build assessment, evaluating policy, processes, and outcomes.	FMR is responsible for evaluation and controls.

SOURCE: RAND analysis and NGA Financial Management Office, “NGA Program Build Standard Operating Procedure,” January 28, 2020, Not available to the general public.

NOTE: The “post-AD/RD era” is still in development, and inputs in this column are notional and limited by RAND insight into ongoing NGA decisionmaking about redistributing and defining roles and responsibilities for each phase of the IPPBE process.

describe current participation of organizations in PPBE and to identify and evaluate potential alternatives for participation.³ This process included assessing the potential costs, benefits, and other considerations important for evaluating these alternatives using as metrics; the total amount of workload required to execute an alternative; potential costs and benefits of alternatives; effects on alignment of the phases within PPBE; how best to achieve buy-in; and the production of a POM. The RAND researchers found that increased stakeholder interaction increased the “identification of cost and risk trade-offs,” which “helped to determine a better allocation of resources.”⁴

Organizations should also ensure (to the greatest extent possible) that stakeholders have the functional and organization experience to improve PPBE inputs.⁵ A recent GAO report assessing DoD processes and procedures for certifying and training personnel to provide input into acquisition programs found that a lack of DoD-wide certifications has led some services to create their own training programs, resulting in a lack of training standardization across the defense community.⁶

Best practices in the private sector might appear to offer important insight for program managers in the defense and intelligence communities, but this might not be the case. As GAO points out, rarely do these communities have the ability (budget or authority) to adopt commercial practices in IPPBE approaches.⁷ GAO also found that large private-sector organizations ensure that “technologies will be relevant in the marketplace by engaging a wide range of internal stakeholders” and that such organizations “reported that they gain leadership buy-in by prototyping technologies before committing to further development and product integration.” Regarding the government, GAO explains that, while DoD does have some ability to balance the incremental and disruptive innovation of science and technology (S&T) within IPPBE, “projects are planned up to 2 years in advance, which can slow innovation and limit lab directors’ autonomy as compared to companies.”⁸ GAO recommended that, given the limitations, DoD should work toward defining and assessing the “mix of innovation investments and

³ Jessie Riposo, Irv Blickstein, John A. Friel, and Kindle Fell, *Navy Enterprises: Evaluating Their Role in Planning, Programming, Budgeting and Execution (PPBE)*, Santa Monica, Calif.: RAND Corporation, MG-794-NAVY, 2009.

⁴ This report also noted that the

biggest benefit of the Navy Enterprise construct from a PPBE perspective has been the increased communication between resource sponsors, warfighters, and providers, which has helped the Navy to better assess cost and risk trade-offs for resource allocation decisions. However, the additional workload borne by the enterprises and additional complexity brought into the PPBE process could be greater than the benefit. (Riposo, et al., 2009, p. 34)

⁵ RAND also conducted research for the Air Force Installation and Mission Support Center (AFIMSC) to develop a “vision for analytical capabilities that will enhance resource requirements and allocation decisions across the PPBE time horizon,” finding that “the current system for identifying” mission “requirements is rarely output-focused” (Patrick Mills, Robert S. Tripp, James A. Leftwich, John G. Drew, Jerry M. Sollinger, and Robert G. DeFeo, *Support to the Air Force Installation and Mission Support Center: Enabling AFIMSC’s Role in Agile Combat Support Planning, Execution, Monitoring, and Control*, Santa Monica, Calif.: RAND Corporation, RR-1555-AF, 2017).

⁶ The GAO report also noted the need for a career field for intelligence support to acquisition, which can help bring about a certification program. GAO, *Additional Steps Could Better Integrate Intelligence Input into DoD’s Acquisition of Major Weapon Systems*, Washington, D.C., GAO-17-10, November 2016b.

⁷ GAO, 2017a.

⁸ This report assessed S&T acquisition within Amazon, Dow Chemical Company, Honeywell International, IBM, General Motors, Qualcomm, Siemens AG, and Valvoline. See GAO, 2017a.

define, in policy or guidance, an S&T management framework that comprehensively employs leading commercial practices.”⁹

Industry is well populated with strategy execution management software. Some private-sector firms have created project planning aids that have assisted programming function efficiency for federal agencies, including the Defense Health Agency, the Joint Chiefs of Staff, and DAF found that engaging all stakeholders in a transparent and more efficient planning process is a key tenet of the PPBE process. Engaging stakeholders throughout the acquisition process reduces risk and improves mission outcomes through collaboration and transparency. One key recommendation suggests having a decision process that starts “with aligning interests across the enterprise,” which would require stakeholder engagement at a variety of organizational levels.¹⁰ Such buy-in is “highly consequential to the organization, and important for garnering the long-term support that key investments need in order to execute properly.”¹¹ Achieving effective buy-in supports perceived organizational credibility, efficiency, and transparency. Credibility “relates to the ability of a decisionmaker to be able to clearly explain why a decision is being made”; efficiency entails the “specific tools to help analysts save time in the detailed tasks that must be undertaken in support of a decision”;¹² and transparency addresses the ability of an organization to overcome the “limits” to sharing information.¹³ Decision Lens adds that, until an organization achieves transparency with involved stakeholders, the organization cannot establish a “true enterprise process.”¹⁴

⁹ GAO, 2017a.

¹⁰ The white paper notes that, “If this weren’t difficult enough, it gets harder to do as you progress up the organizational hierarchy and more senior officials are advocating, often in an entrenched manner, for their specific programs. It is a natural byproduct of the massive bureaucracy that exists” (Decision Lens, “Rapid Planning Methodology for PPBE,” Arlington, Va., 2019).

¹¹ Decision Lens, 2019, p. 6.

¹² Decision Lens suggests that, “common challenges in this area are the difficulty in managing (aggregating, updating, validating, etc.) data via spreadsheets and PowerPoint. These tools have their benefits—but they are not meant for dynamic updating of data in a collaborative manner” (Decision Lens, 2019, p. 6).

¹³ Transparency issues commonly relate to issues regarding the security or sensitivity of data and budget information. But those should be limits, primarily, to external sharing of information—not internal. Other common drivers of this reaction relate more to the desire by managers and leaders to protect certain decisions which may not exhibit the credibility or rigor that is generally desirable. Of all the aspects of change that are required to institute an improved decision-making process, this could be the most difficult dynamic to overcome. (Decision Lens, 2019, p. 6)

¹⁴ Decision Lens, 2019, p. 6.

Roles and Responsibilities

Finding: Roles and responsibilities in the IPPBE process are not clearly defined. Lack of guidance and shifting organizational priorities have strained interpersonal relationships and challenged NGA's ability to conduct an effective and efficient IPPBE process.

The transitions between eras in NGA have resulted in the creation or shifting of several roles within the organization. A key point of friction in the IPPBE process is the lack of clarity in role definition and limited understanding of responsibility, accountability, and authority for each actor or office during the different phases. The lack of clear charter or guidance for roles has allowed individuals to take the initiative to define their positions, potentially exacerbating interpersonal conflicts and friction because of a lack of sufficient internal governance, oversight, or guidance. There is a clear need for guidelines and charters defining the scope of each of the relevant positions, including their roles, responsibilities, authorities, decisionmaking authorities, and the appropriate relationships with other relevant actors in each phase of the IPPBE process.

In the current structure, the broad roles and responsibilities are as follows:

- **ADs** initially dealt with financials and front office guidance but this role expanded to take on management of day-to-day operations.
- **RDs** were responsible for funds and synchronization; however, this position has no official charter or guidance
- **FM** provides guidance for compliance with oversight.
- **CFE** is the ultimate investment and divestment decision authority.
- **KCs** are the administrators responsible for fund realignment. KCs have a "shadow staff" who work in coordination with FM to move funds.

The conditions, causes, and effects of lack of clarity and definition of roles and responsibilities include lack of clear definition of roles, shifting organizational priorities, and negative interpersonal relationships.

It is important to note here that NGA is currently developing and discussing a new construct in which these roles and responsibilities might be shifted and clarified. Any shifts could correct, exacerbate, or have no effect on the findings discussed in the table.

	Lack of Clear Role Definition	Shifting Organizational Priorities	Negative Interpersonal Relationships
Conditions	The lack of clear definition of roles and responsibilities poses several challenges for coordination.	NGA priorities shift regularly because of new leadership and the interdisciplinary and innovative nature of the organization.	Negative interpersonal relationships have historically undermined coordination.
Causes	AD and RD responsibilities were never clearly defined, so roles and responsibilities varied based on personalities. RD and FM roles and responsibilities conflict because of the lack of clear role differentiation.	Changes to the front office made by new directors require regular adaptation that does not always align with previously existing processes and preferences.	Interpersonal relationships and lack of internal coordination create challenges to integration and communication.
Effects	Roles and responsibilities are unclear across the entire IPPBE process, creating significant confusion and friction between responsible parties.	Shifting NGA priorities exacerbate its struggles to deliver budgeting decisions in an agile way.	Strained interpersonal relationships have led to little sense of unity, harmony, or common priorities.
NGA resolutions implemented	Reorganized with the RDs, so now FM has a group that supports each RD. There is limited evidence that standing up the ADs and RDs improved NGA's ability to manage resources.	Creation of the portfolio era—all components were combined into five portfolios to consolidate resource authority.	No NGA resolutions implemented.
RAND recommendations	Develop clear guidelines concerning the roles, responsibilities, and authorities of ADs, RDs, KCs, and FM and the relationships among them.		

Oversight and Accountability

Overview

Ensuring that NGA's mission programs are tracked, measured, and brought into compliance with internal guidance and external congressional mandates enables NGA leadership to make well-informed program investments and divestments. This chapter briefly surveys the importance of developing metrics to aid programmatic decisionmaking and best practices in metric design. The chapter also summarizes interview findings that suggest that an increased focus on metric development would greatly assist future FYDP planning.

Programming Should Include Measures of Performance and Effectiveness

Measures of performance and measures of effectiveness can reveal when a program or portfolio is achieving success (required for congressional budget justifications) and can also serve as a barometer for course correction in an era of rapidly emerging requirements and shifting strategic priorities. This section examines how well-defined metrics can increase the efficacy of organizational processes. Findings from the literature suggest that processes and mechanisms that do not connect program performance to goals, incorporate customer feedback, or emphasize mission outcomes could lead to poor investment and divestment decisions in subsequent processes.

One GAO report that focused on assessing DoD resource decisionmaking examined progress toward implementing an inclusive risk management framework with a specific focus on investment decisions to assist senior decisionmakers.¹ GAO found that, while DoD had taken positive steps in executing its performance framework (e.g., such as outlining risk areas and performance goals), the framework developed was still unable to capture results or monitor risk across specific PPBE areas, leading to issues in connecting performance to goal achievement.² The report identified four enduring organizational issues that are likely transferrable to other organizations with similar mission sets: (1) "overcoming cultural resistance" to "transformational change"; (2) sustaining "leadership and clear accountability" for the transformation; (3) "providing implementation goals and timelines to gauge progress in transforming" the

¹ GAO, *Additional Actions Needed to Enhance DOD's Risk-Based Approach for Making Resource Decisions*, Washington, D.C., GAO-06-13, November 2005, p. 2.

² GAO stated that, "Without better measures, clear linkages, and greater transparency, DOD will be unable to fully measure progress in achieving strategic goals or demonstrate . . . how it considered risks, and made trade-off decisions." See GAO, 2005, p. 3.

desired culture; and (4) integrating a framework that addresses risk and incorporates “decision support processes” and “reform initiatives into a . . . unified management approach.”³ Building a metrics-based organizational culture could help program managers avoid incongruities between programs and resources.

Building metrics into planning and budgeting cost estimates can also advance program management and implementation. Embedding metrics in acquisition cost estimates could facilitate programmatic funding decisions. Because cost estimates enable efficient resource distribution among competing programs, having an ability to trace progress increases the likelihood that a program will succeed.⁴ GAO suggests that, when cost estimates are comprehensive, well-documented, accurate, and credible, managers can avoid “cost overruns and unmet performance targets.”⁵ Best practices of each cost estimate characteristic are described in the rest of this chapter.⁶ GAO recently released a metrics best-practices report and appears in Table 6.1.

Federally funded research and development centers, such as those RAND operates, have outlined several best practices and lessons learned for acquisition program metrics throughout DoD and the IC. One RAND effort seeking to improve the way USCG measures its operational performance found three critical factors that all measures should include: metrics that are *valid* (e.g., the extent to which the metric captures the outcome, accomplishment, or activity being assessed), *reliable* (how consistently measurements can be made), and *feasible* (how easily the measurement can be made).⁷ While these features do not specifically focus on the acquisition process, the use of such metrics can greatly assist program managers in developing effective program measurement.⁸

MITRE’s Acquisition Program Planning Center suggests that data derived from outcome-based metrics enables key decisions and knowledge points for program managers.⁹ The center has suggested that incorporating metrics into the programming phase can create standards for contract incentive structures to reach outcomes and validate investment and divestment

³ GAO, 2005, p. 4.

⁴ GAO, *Cost Estimating and Assessment GUIDE: Best Practices for Developing and Managing Program Costs*, Washington, D.C., GAO-20-195G, March 2020a, p. 8.

⁵ GAO, 2020a, p. 31.

⁶ GAO also examined the importance of metrics to assist DoD development of measures to refine the oversight and assimilation of ISR specifications, the challenges associated with executing these measures, and the progress and possible correlation of specific emerging ISR programs as part of DoD’s joint capability portfolio management concept. See Davi M. D’Agostino, Sharon L. Pickup, and Michael J. Sullivan, “Preliminary Observations on DoD’s Approach to Managing Requirements for New Systems, Existing Assets, and Systems Development,” testimony before the Subcommittee on Air and Land Forces, Committee on Armed Services, U.S. House of Representatives, Washington, D.C.: U.S. Government Accountability Office, GAO-07-596T, April 2007, p. 3.

⁷ Scott Savitz, Henry H. Willis, Aaron C. Davenport, Martina Melliand, William Sasser, Elizabeth Tencza, Dulani Woods, *Enhancing U.S. Coast Guard Metrics*, Santa Monica, Calif.: RAND Corporation, RR-1173-USCG, 2015.

⁸ For more on metrics development, see Michael Edward G. Keating, John Wallace, Bradley DeBlois, and Ilana Blum, *Metrics to Compare Aircraft Operating and Support Costs in the Department of Defense*, Santa Monica, Calif.: RAND Corporation, RR-1178-OSD, 2015; Marjory S. Blumenthal, Jirka Taylor, Erin N. Leidy, Brent Anderson, Diana Gehlhaus, John Bordeaux, and Michael G. Shanley, *Research-Portfolio Performance Metrics: Rapid Review*, Santa Monica, Calif.: RAND Corporation, RR-2370-OSD, 2019; Miriam Matthews, Christopher Paul, David Schulker, and David Stebbins, *Frameworks for Assessing USEUCOM Efforts to Inform, Influence, and Persuade*, Santa Monica, Calif.: RAND Corporation, RR-2998-EUCOM, 2020.

⁹ MITRE Corporation, “Acquisition Program Planning,” webpage, undated.

Table 6.1
Best Practices for Developing and Managing Program Costs

Characteristics	Best Practices
Comprehensive	• Includes all life-cycle costs • Is based on a technical baseline description that completely defines the program, reflects the current schedule, and is technically reasonable • Is based on a work breakdown structure that is product-oriented and traceable to the statement of work and that an appropriate level of detail to ensure that cost elements are neither omitted nor double counted
Well-documented	• Shows the source data used, the reliability of the data, and the estimating methodology used to derive each element's cost • Describes how the estimate was developed so that a cost analyst unfamiliar with the program could understand what was done and replicate it • Discusses the technical baseline description, and the data in the technical baseline are consistent with the cost estimate • Provides evidence that the cost estimate was reviewed and accepted by management
Accurate	• Is based on a model developed by estimating each work breakdown structure element using the best methodology from the data collected • Is adjusted properly for inflation • Contains few, if any, minor mistakes • Is regularly updated to ensure that it reflects program changes and actual costs • Documents, explains, and reviews variances between planned and actual costs • Is based on historical record of cost estimating and actual experiences from other comparable programs
Credible	• Includes a sensitivity analysis that identifies a range of possible costs based on varying major assumptions, parameters, and data inputs • Includes a risk and uncertainty analysis that quantifies the imperfectly understood risks and identifies the effects of changing key cost driver assumptions and factors • Employs cross-checks—or alternative methodologies—on major cost elements to validate results • Is compared with an ICE that is conducted by a group outside the acquiring organization to determine whether other estimating methods produce similar results

SOURCE: Adapted from GAO, 2020a, pp. 32–33.

decisions during acquisition management process and are a way of organizing an acquisition based on the “purpose and outcome desired, instead of the process by which the work is to be performed.”¹⁰

¹⁰ MITRE Corporation, undated.

Oversight and Accountability

Finding: Inconsistent external and internal oversight and accountability challenge NGA's ability to comply with external controls and internal processes and timelines.

The lack of guidance discussed in Chapter Three has had a few critical effects on NGA's ability to comply with oversight and controls. NGA has struggled to provide consistent briefings to Congress or to respond to questions consistently. While the introduction of the oversight monitor helped identify and correct inconsistencies prior to submission, the internal timeline for IPPBE has not always given the monitor adequate time to review documents and correct issues, leading to late submissions to ODNI and Congress. Inconsistency before Congress has decreased NGA's ability to successfully defend budget requests and has undermined external confidence in NGA's financial management.

In terms of internal accountability, prior efforts to establish governance structures have had mixed success. While the governance structures exist, members of the boards often lack relevant financial experience; therefore, the boards are frequently bypassed. Lack of role definition has created disjuncture between phases and between offices and individuals, leading to a lack of effective communication, inability to meet and enforce timelines, and poor perception of the process both internally and externally. In addition, the timeline for the IPPBE phases challenges internal relationships and often results in late budget submissions to Congress. Fluctuating IPPBE processes have confused internal and external actors in the process and undermined the development of a justifiable budget within the controls set by external oversight.

	Oversight of IPPBE Phases	Oversight Monitor	Internal-External Interfacing	Internal Disconnects
Conditions	Oversight and accountability are higher in the budgeting phase of the IPPBE process than in other phases. Programming phase outputs have, at times, not met the mandatory controls put in place.	The oversight monitor must review all information passed between NGA and Congress. The oversight monitor holds NGA accountable for inconsistencies in submissions and briefings to Congress and identifies issues in internal coordination.	FMR manages the interface between internal processes and external oversight, which are often unclear and overlapping. FMR is often challenged to present a unified briefing to DNI. FM develops CJBs with limited internal coordination.	Internally, there are disconnects between the ADs, RDs, and KCs concerning decisionmaking, the movement of funds, and the conduct and timeline for phases of the IPPBE process.
Causes	NGA, OMB, and Congress do not always communicate effectively about NGA's budget. There is a perception of competition with other agencies for Congress' attention and funding.	The oversight monitor within NGA is helpful but is frequently challenged by the tight timeline for the phases.	Internal disconnects and lack of transparency have complicated and decentralized many processes and enabled the lack of linkages between IPPBE phases. FM has the ability but not the authority to enforce the timeline.	There are few repercussions if required documents or decisions are not produced in accordance with the previously determined schedule. Frequent terminology changes confuse the CFO, KC directors, and challenge Congress and the ODNI to keep up. ^a
Effects	NGA has a limited ability to consistently respond to Congress, and inconsistent briefings lead to pressure to divest.	The challenging IPPBE timeline and late submission to the oversight monitor often lead to late budget submissions.	The lack of transparency in decisionmaking, lack of team identity among RDs and ADs, and frequent infighting undermine internal accountability.	

Oversight and Accountability—Continued				
	Oversight of IPPBE Phases	Oversight Monitor	Internal-External Interfacing	Internal Disconnects
NGA resolution(s) implemented	The AD/RD construct and introduction of oversight monitor helped improve consistency in compliance with congressional oversight.	Moving the KCs out of the responsibility of the ADs was seen as a successful solution to previous overtaxing of ADs.		
RAND recommendations	Develop a clear understanding of internal and external controls and how they relate to each other to mitigate confusion. Hold individuals accountable for their required tasks, and develop a culture of accountability in which all members of the office understand their contributions to NGA's outward-facing submissions and image.	Give CFE ultimate decision authority over the IPPBE process, and develop an outcome-based assessment with the support of the director.		
^a This issue could be compounded by recent decisions to better define roles and responsibilities for the IPPBE process and by changing the name of RDs to PDs.				

Findings, Recommendations, and Conclusion

Overview

In this chapter, we condense our cumulative research findings from our research and analysis. This chapter serves as a consolidated snapshot for NGA program managers and organizational leadership because it covers main findings, offers best practices emerging from our document review, and suggests areas for increased attention as acquisition processes at NGA move forward. We also understand that these findings and recommendations arrive amid an internal restructuring of the roles and responsibilities of program personnel under the AD/RD construct. This chapter, however, could still provide value when programming for current and future GEOINT superiority.

How to Read the Process Maps

See Figure 7.1 for a high-level process map for an example framework of conditions, causes, effects, resolutions, and proposed actions (recommendations) across the three NGA resource management eras and into a to-be, future state.

For all figures, bold purple lines indicate the effects that our recommendations intend to address, and bold purple lines to NGA resolutions indicate instances in which our recommendations can enhance existing NGA resolutions. Dotted lines (in subsequent figures) indicate instances in which NGA resolutions partially resolved effects or partially addressed their cause(s) and/or condition(s)—represented blue and navy boxes, respectively. If no line connects an NGA implemented resolution to a condition, cause, or effect, then our analysis did not identify a substantive resolution outcome. We observed that some effects (represented in yellow boxes) compounded into new effects in subsequent eras if the outcome of an NGA-implemented resolution (represented in green boxes) created unintended or undesired effects. RAND recommendations (represented in purple boxes) address how these effects could be mitigated if implemented and are intended to guide future programmatic policy decisions.

Five major themes emerged from our analysis of the programming phase of the IPPBE process at NGA: process, guidance, budget visibility, roles and recommendations, and oversight and accountability; see Figure 7.2 for the process map.

Figure 7.1
Example Process Map Across Three National Geospatial-Intelligence Agency Financial Resource Management Eras

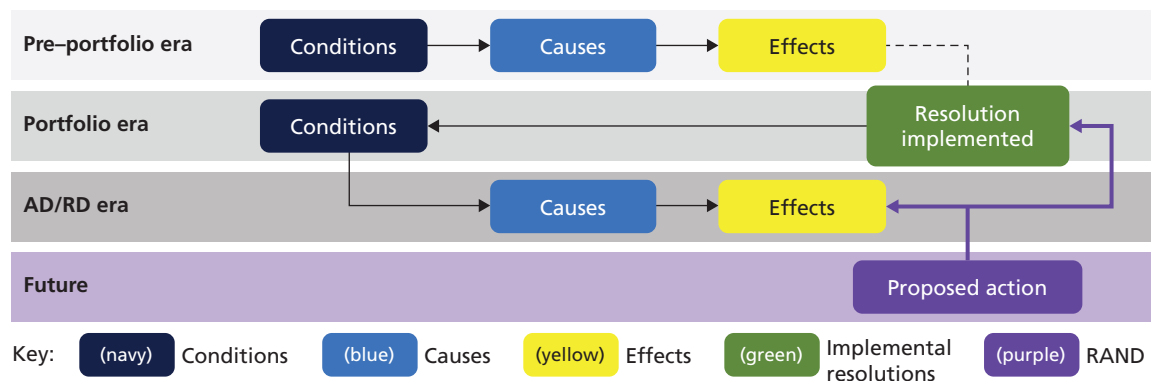
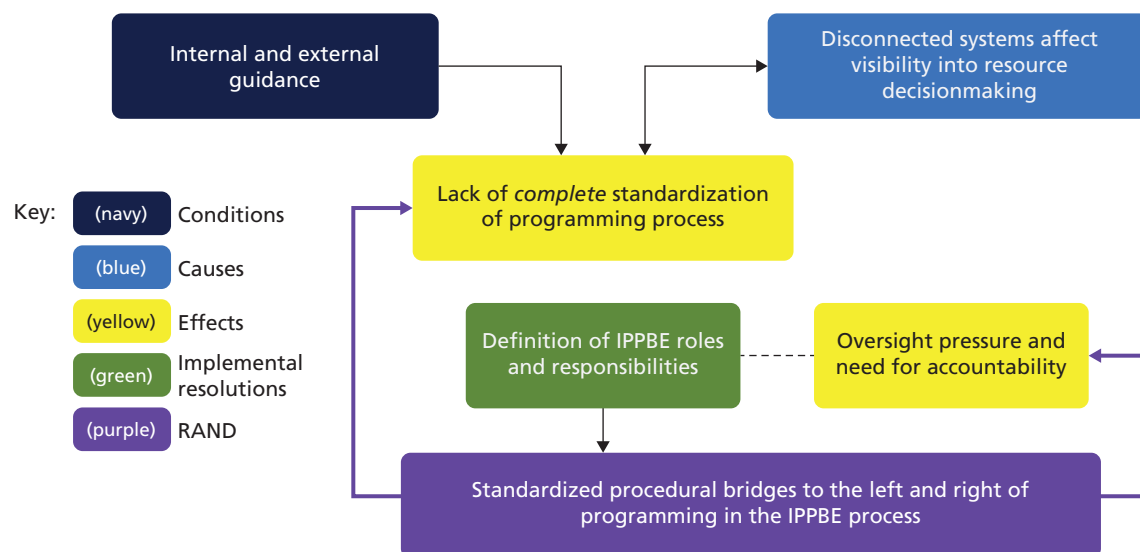


Figure 7.2
Thematic Analysis of Programming Phase at the National Geospatial-Intelligence Agency



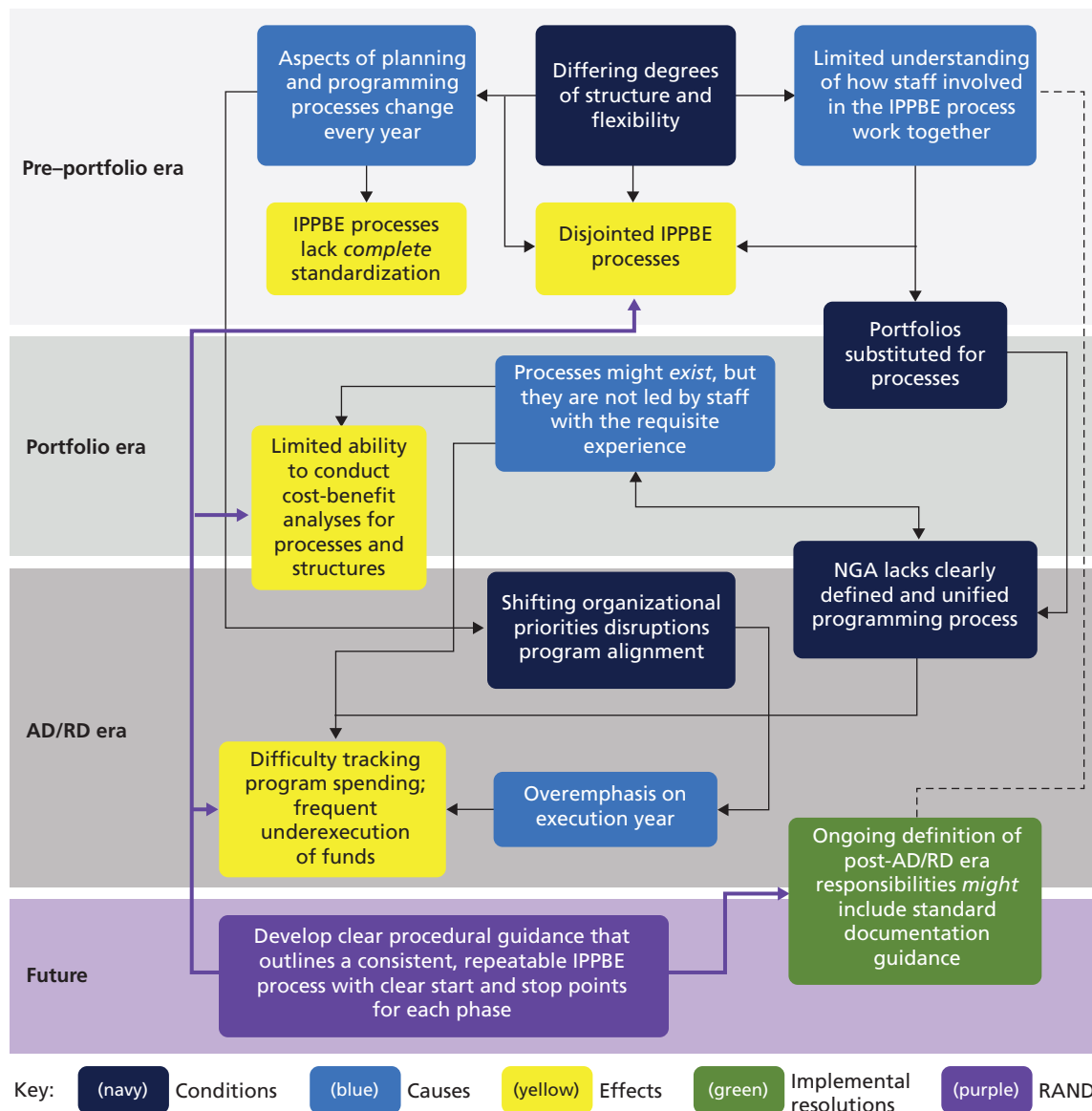
Findings and Recommendations

Procedural Documentation for the Programming Phase

Finding

The programming phase should not be understood as an isolated process but should have its own procedural documents. The planning phase can set the direction for programmatic decisions, and programmatic decisions directly affect budgetary processes. Best practices suggest that a continuous, transparent information exchange between stakeholders at both levels is critical to an effective IPPBE process. See Figure 7.3 for the process map.

Figure 7.3
Phases of the IPPBE Process Across National Geospatial-Intelligence Agency Financial Management Eras



Recommendation

- Develop guidance and codify documentation that outline a consistent, repeatable IPPBE process with clear roles, responsibilities, and starting and stopping points for each phase.

Need for a Clearly Defined and Standardized Planning Process

Finding

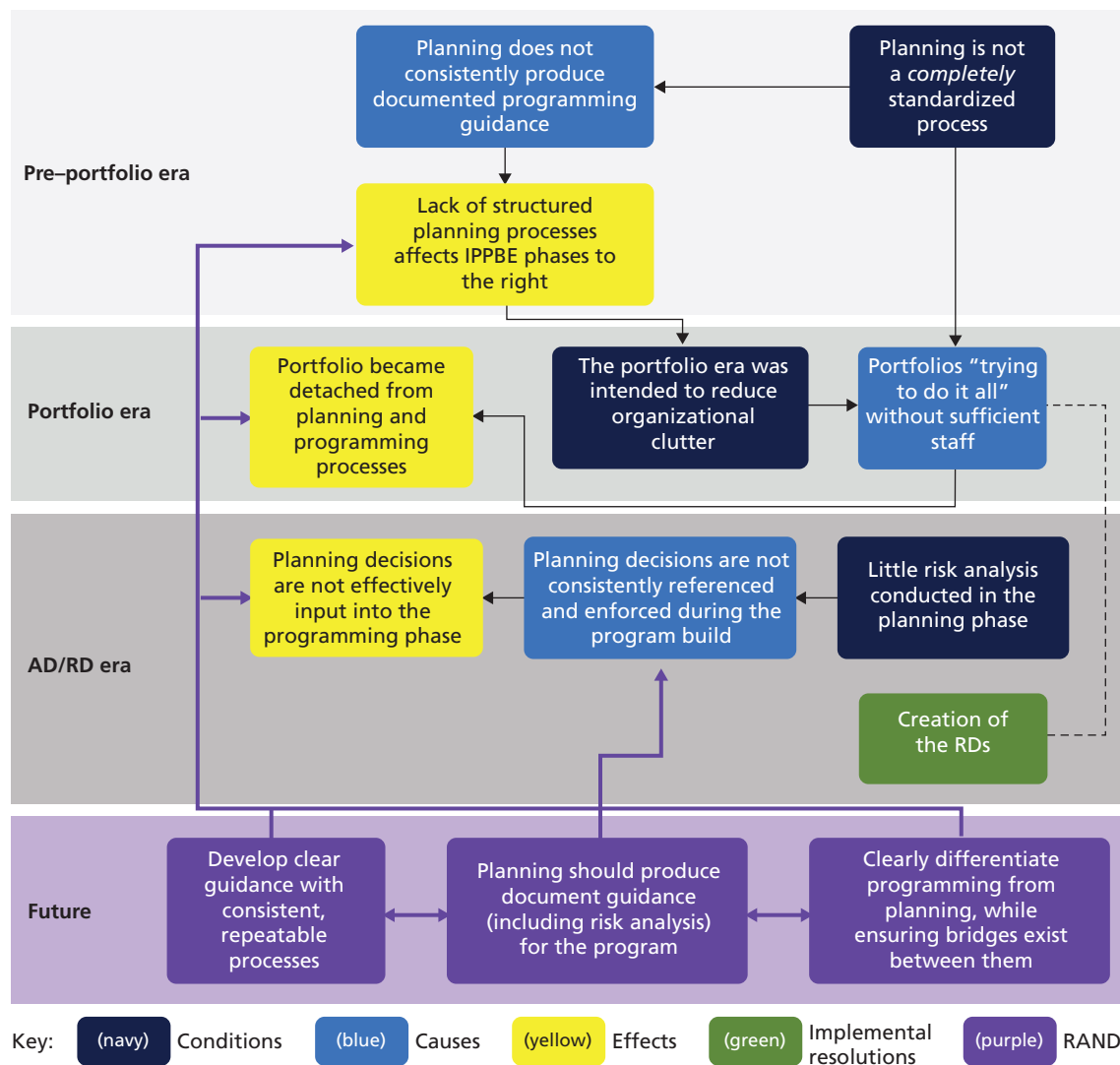
Several DoD and IC elements, including NGA, have struggled to establish clearly defined, standardized planning processes. A standardized planning process could provide numerous benefits across the IPPBE process. Because planning has less time and effort available, plan-

ning decisions do not consistently influence the program build. Interviewees also noted, however, that NGA is in the process of developing more-deliberate processes. See Figure 7.4 for the process map.

Recommendations

- At the end of the planning phase, produce documented guidance (including risk analysis) for the program build.
- Clearly differentiate the programming phase from the planning phase and include AoAs, major issue studies, and further consideration of risks and divestments.
- Develop clear guidance documents that outline a consistent, repeatable IPPBE process with clear roles and responsibilities and starting and stopping points for each phase (as suggested for the previous finding).

Figure 7.4
Planning Process Standardization Across National Geospatial-Intelligence Agency Financial Management Eras



External Guidance and Requirements

Finding

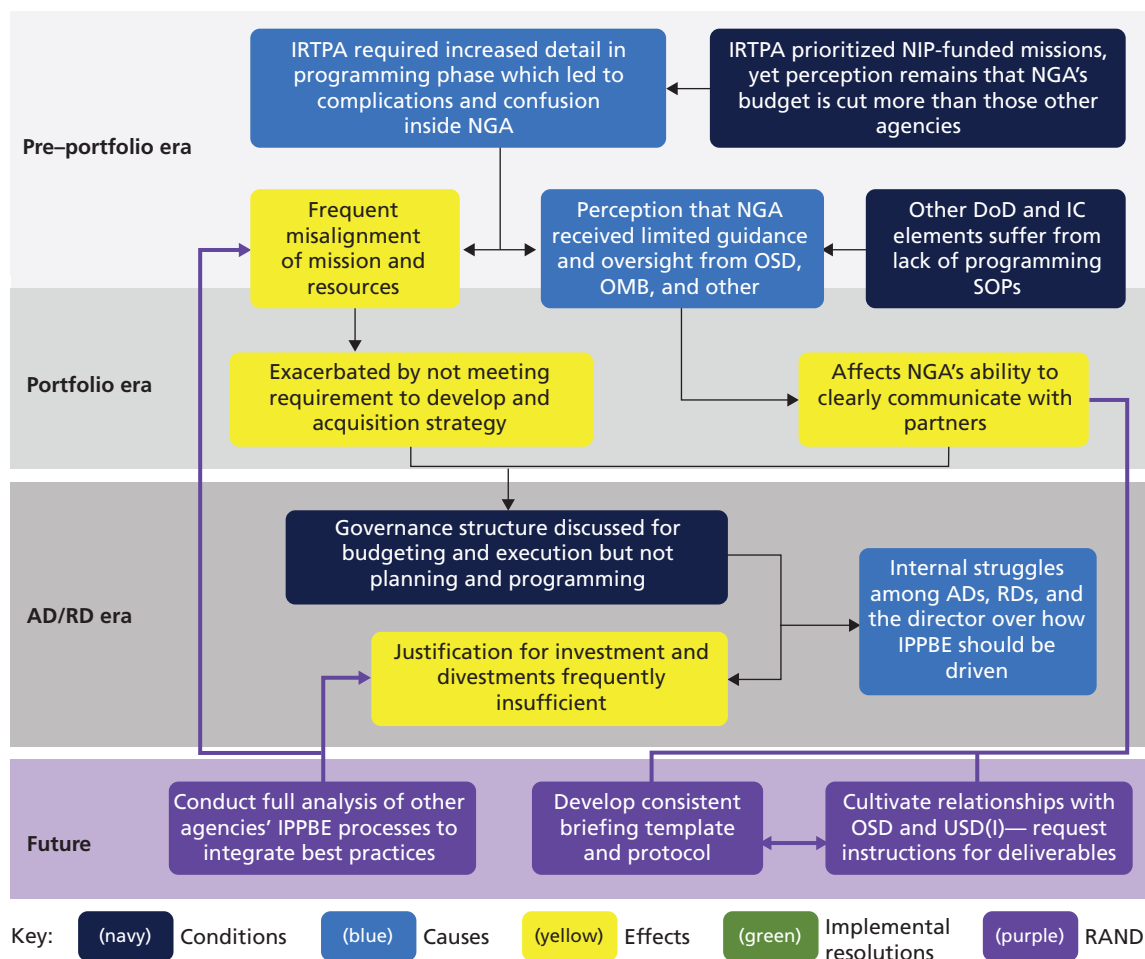
There is a lack of external guidance and requirements, and there are few internal governance structures. With regard to programming, external guidance that clearly communicates expectations for NIP- and MIP-funded IPPBE processes would benefit NGA by setting standards and by imparting best practices and lessons learned from other departments and agencies. See Figure 7.5 for the process map.

Recommendations

- Cultivate relationships with OSD, USD(I&S), and ONDI and request instructions for deliverables.
- Develop a consistent briefing protocol for interactions with Congress.
- Conduct a full analysis of other agencies' processes to integrate best practices and lessons learned. Emulate the success of NSA and NRO in articulating strategic vision, cost, schedule, and performance metrics when communicating with Congress.

Figure 7.5

External Guidance Across National Geospatial-Intelligence Agency Financial Management Eras



Need for Consistent Guidance

Finding

While some guidance for the programming phase exists within NGA, the guidance is insufficient and is frequently changed by incoming leadership, making it less than useful. Internal perceptions of the programming process suggest a lack of transparency in resource decisionmaking, and challenging timelines negatively affect NGA's ability to prioritize investments. NGA would benefit from a consistently conducted process within the organization. See Figures 7.6 and 7.7 for the process maps.

Recommendations

- Develop clear, consistent guidance documents for the programming phase that provide explicit instructions for aligning the program build with planning decision documents and the NGA mission and strategic goals. Develop guidance in coordination with NGA CAPE, the CFO, and the AD/PDs.
- Strengthen program management reviews, and develop mission performance teams.
- Clearly define conditions for success, build integration, and improve mission-resource alignment.

Figure 7.6
Internal IPPBE Guidance and Perceptions Across National Geospatial-Intelligence Agency Financial Management Eras

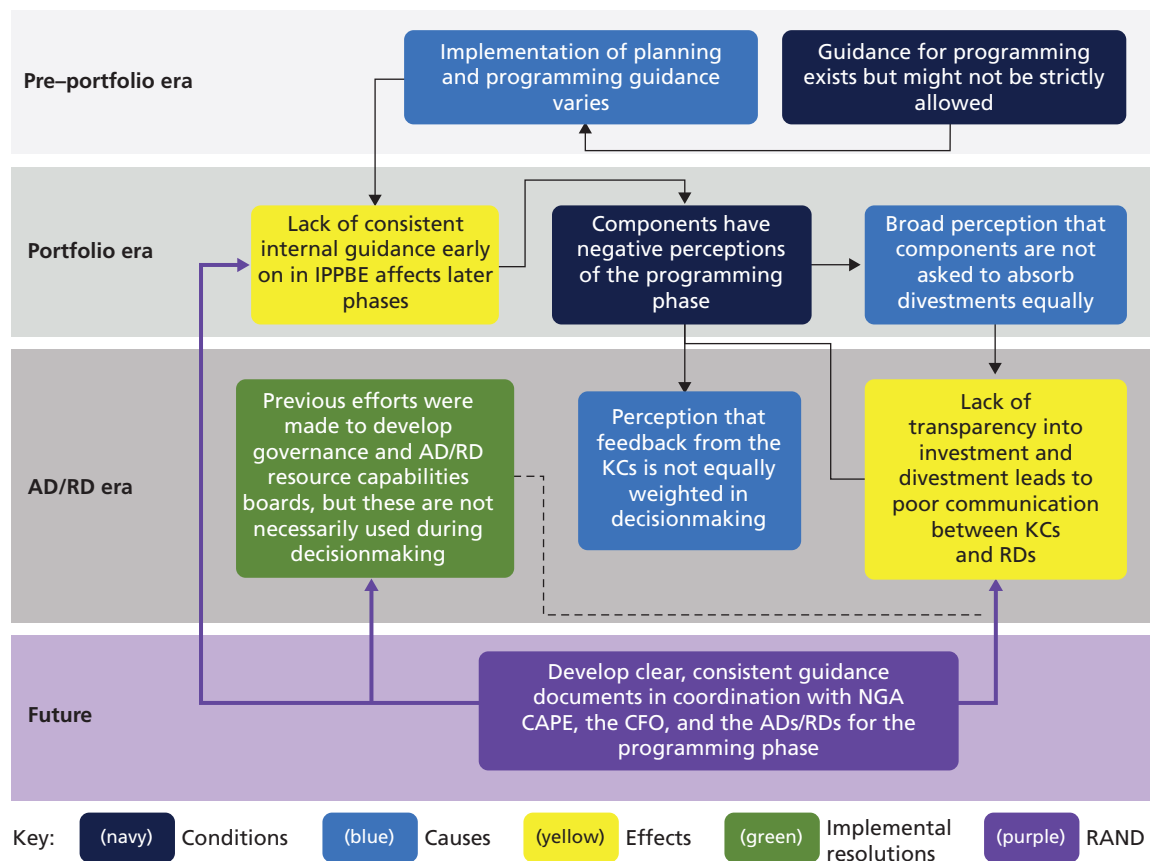
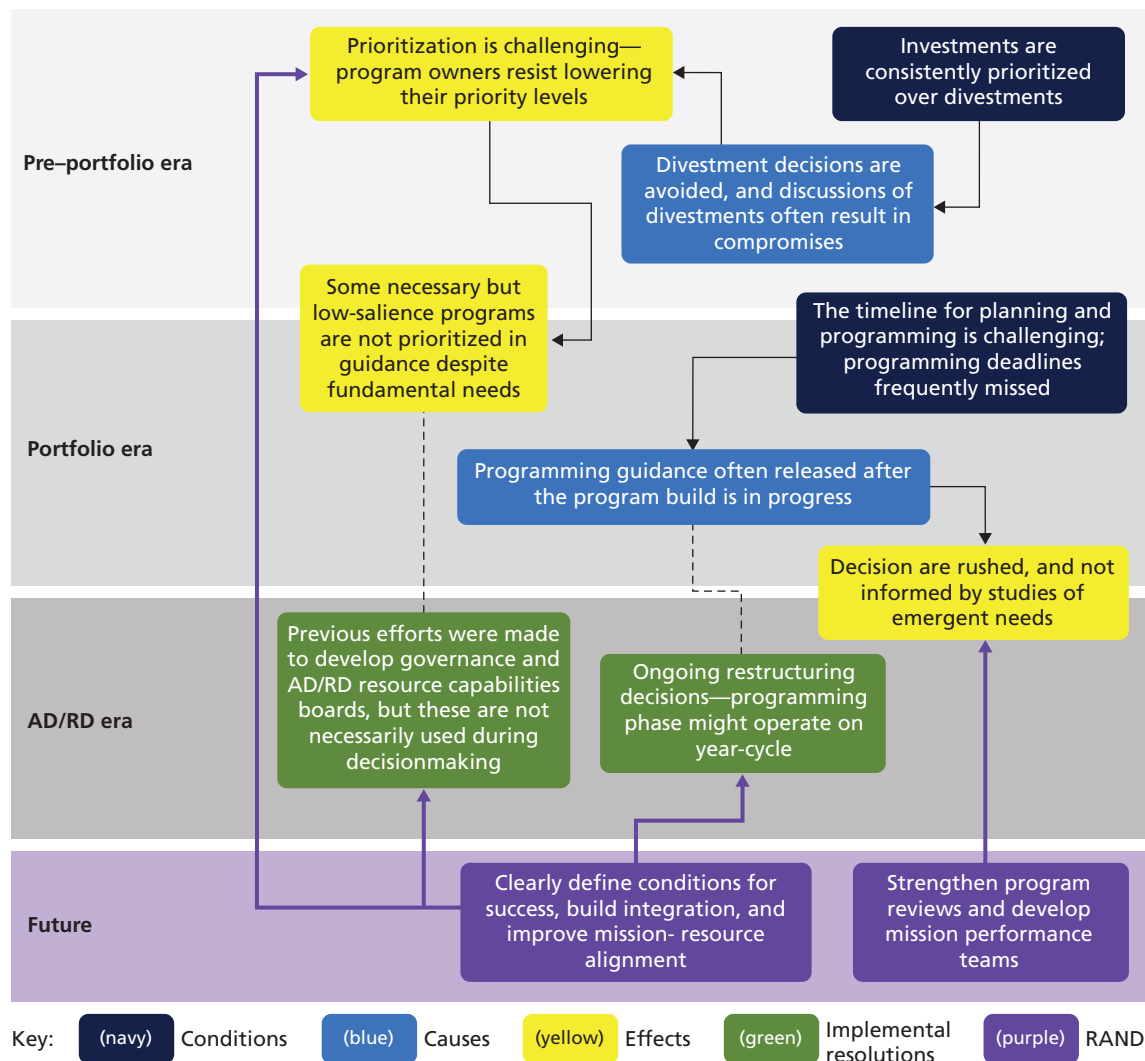


Figure 7.7
Internal Prioritization and Timelines Across National Geospatial-Intelligence Agency Financial Management Eras



Visibility into the Budget Process

Finding

NGA faces challenges in leadership visibility into the budget process, difficulty tracing funds across the IPPBE process, and understaffing—all of which affect the agency's ability to execute funds. At the end of this research, we learned that decisions were actively being made to hold FM accountable for the budget process and that few FM staff had been allotted to the ADs and RDs accountable for the planning and programming phases, respectively. See Figure 7.8 for the process map.

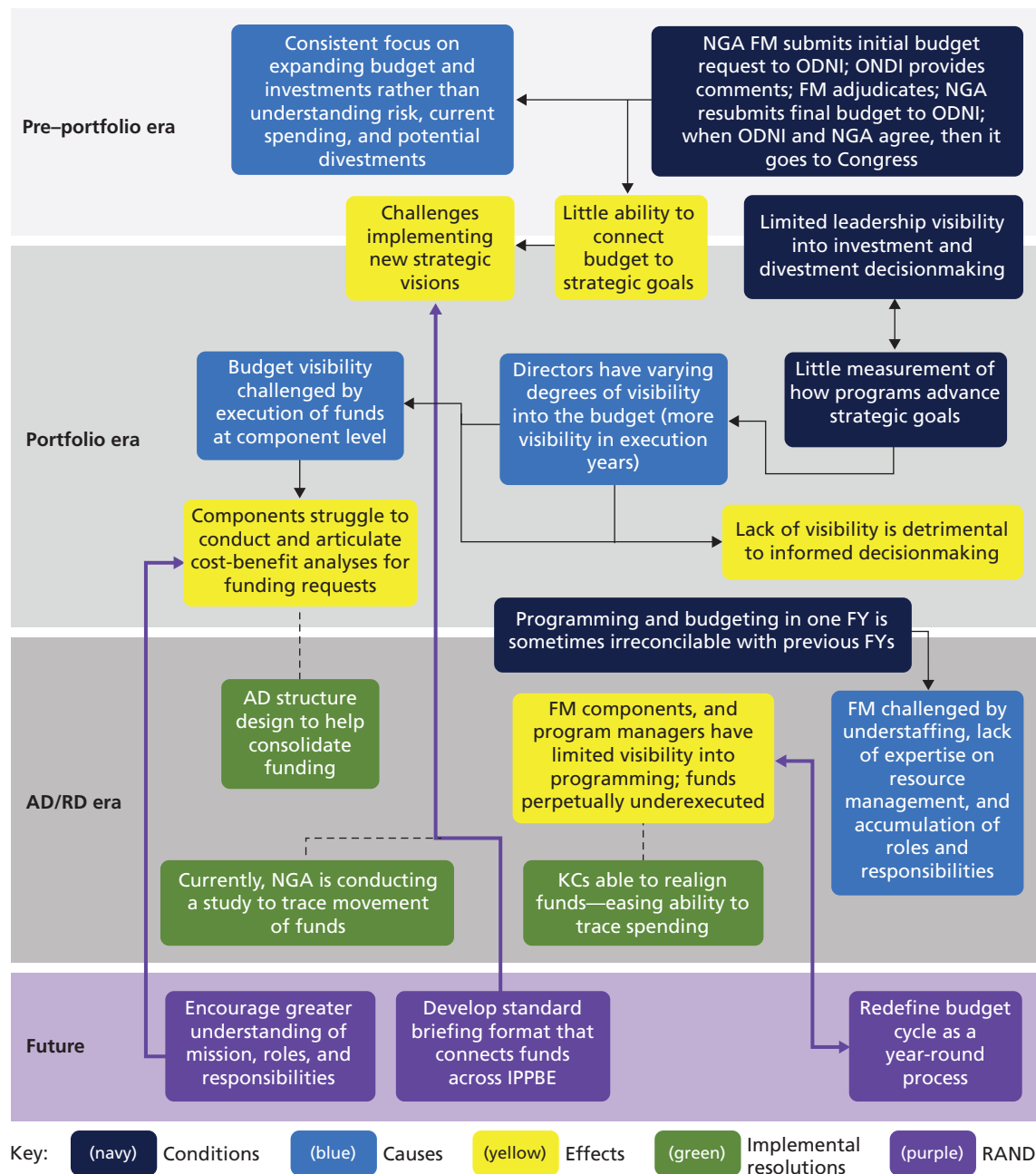
Recommendations

- Encourage greater understanding of mission, roles, and responsibilities.
- Develop a standardized briefing format that connects funds across IPPBE phases and communicates how resource decisions advance NGA's strategic goals.

- Redefine the budget cycle as a year-round process, allowing for reprioritization and change taking time to enforce and increasing emphasis on effective planning and programming to enhance the budgeting phase.

Figure 7.8

Budget Visibility Across National Geospatial-Intelligence Agency Financial Management Eras



Challenges to Be Addressed

Finding

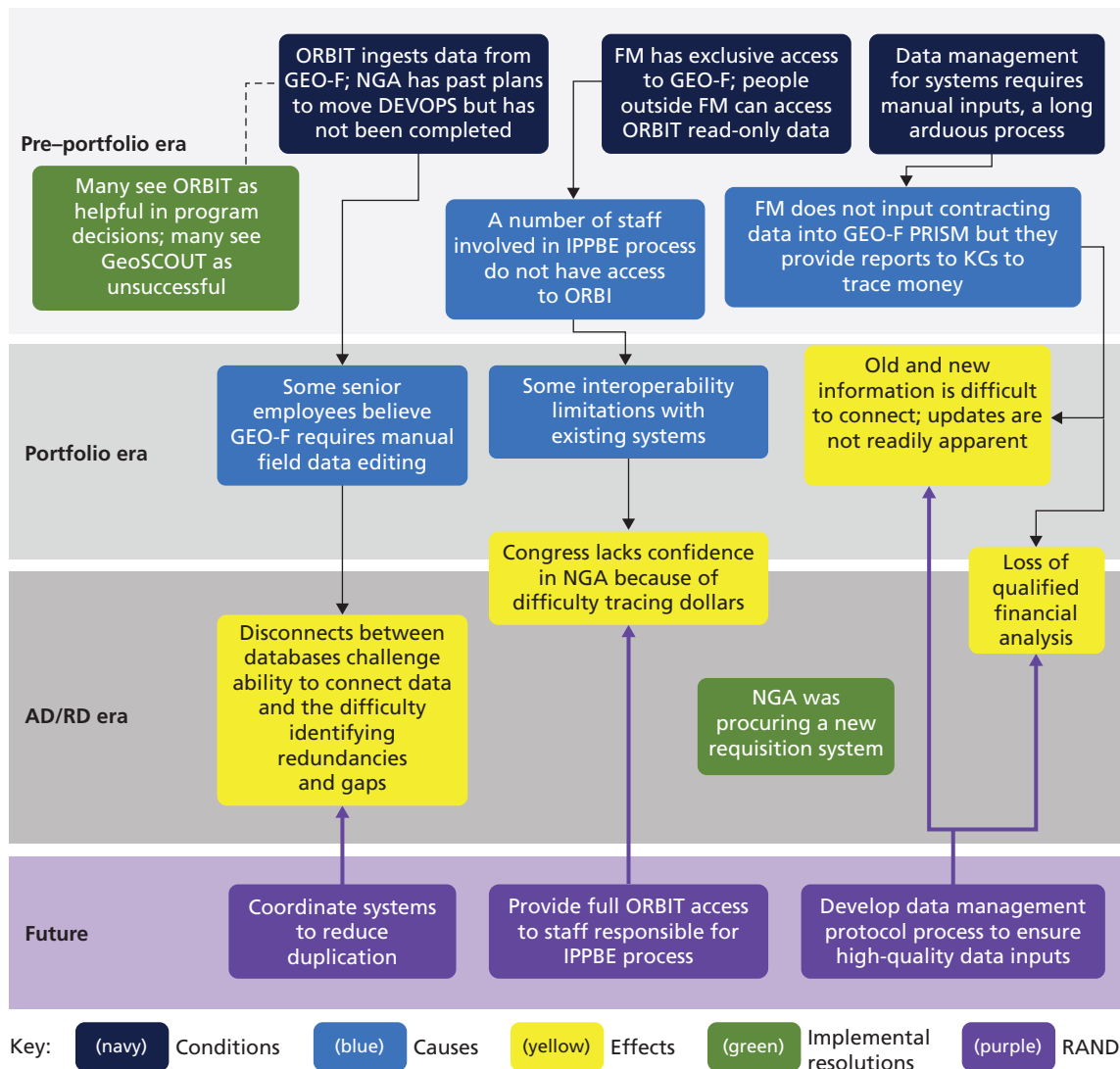
NGA experiences data management, interoperability, and data access and visibility challenges. NGA lacks measures of performance and measures of effectiveness for the programming process. See Figure 7.9 for the process map.

Recommendations

- Develop data management protocols processes to ensure that data inputs consistently have high quality.
- Provide ORBIT access to those responsible for all portions of the IPPBE process.
- NGA is in the process of modernizing its requisition system. Develop a transition plan to support the seamless transition of data to the proposed, modernized requisition system; outline how the system will integrate with all related existing systems; set standards for

Figure 7.9

Systems and Data Across National Geospatial-Intelligence Agency Financial Management Eras



data input, management, and updating; and develop appropriate procedures for transferring existing data into the system.

Roles Within the Organization

Finding

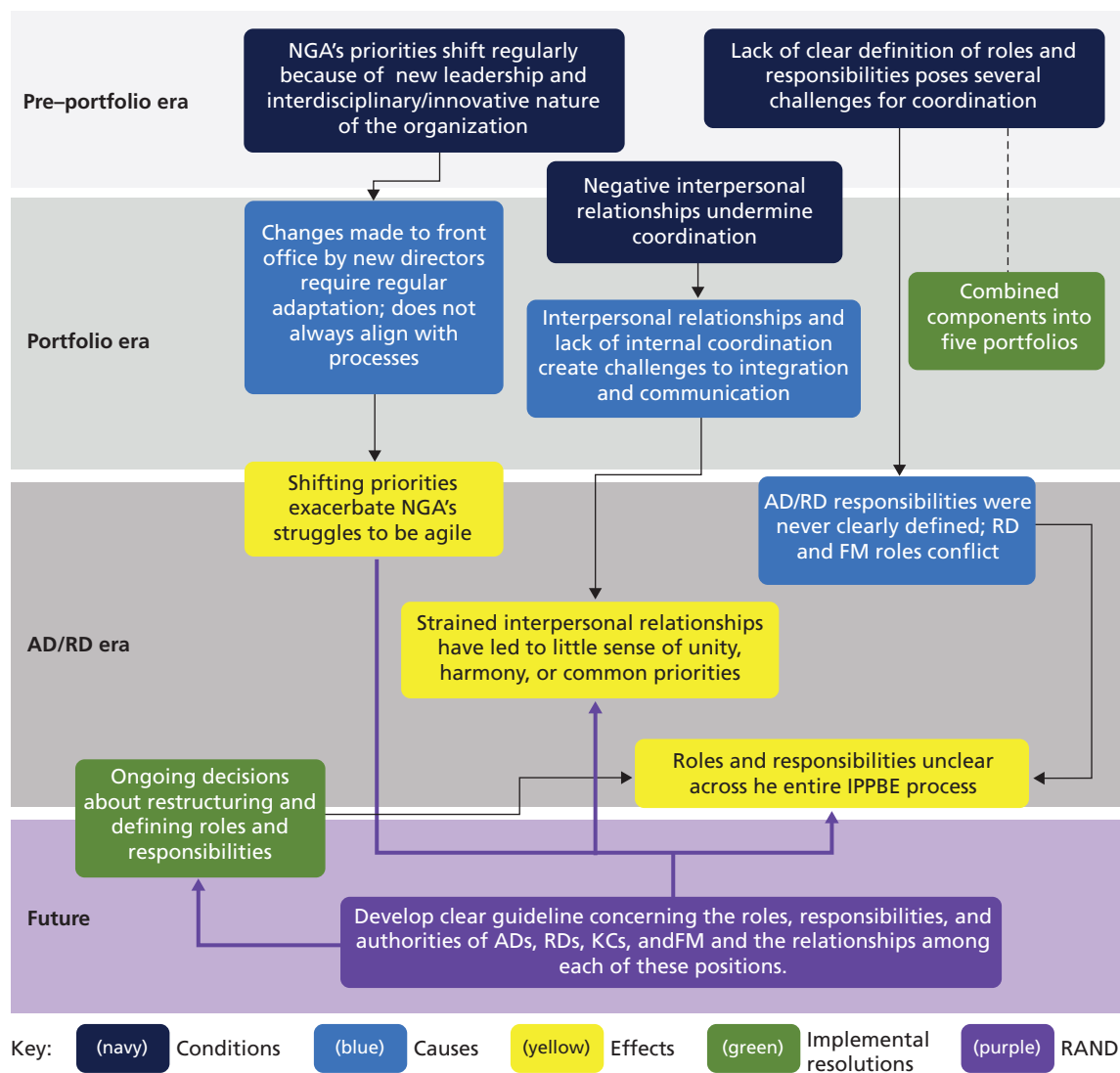
The transitions between eras in NGA have resulted in the creation or shifting of several roles within the organization. See Figure 7.10 for the process map.

Recommendation

- Develop clear guidelines concerning the roles, responsibilities, and authorities of ADs, RDs, KCs, and FM and the relationships between each of these positions. *As of this writ-*

Figure 7.10

Roles and Responsibilities Across National Geospatial-Intelligence Agency Financial Management Eras



ing, decisions were being made within NGA about how to restructure roles and responsibilities for each phase of the IPPBE process.

Reporting to Congress and Other Stakeholders

Finding

NGA has struggled to provide consistent briefings to Congress and to respond consistently to questions; accountability for contributions to the IPPBE process is lacking. See Figure 7.11 for the process map.

Recommendations

- Give the CFE ultimate decision authority, and develop an outcome-based assessment with the support of the director and deputy director.
- Hold individuals accountable for their required tasks, and develop a culture of accountability in which all members of the office understand their contributions to NGA's outward-facing submissions and image.
- To mitigate confusion, develop a clear understanding of internal and external controls and how they relate to each other.

Conclusion

NGA is not alone in its ongoing effort to modernize its IPPBE structure to make it more efficient and effective. Information gained from both the literature review and interviews highlights multiple acquisition restructuring periods across DoD, the service components, and the IC that were undertaken to try to create and implement seamless transitions between PPBE and IPPBE process phases. While NGA has conducted several previous internal studies to identify areas for IPPBE process improvement, our research is the first to synthesize findings between external literature and findings gleaned from structured SME interviews to highlight crucial program process issues for NGA leadership to absorb and address in any future IPPBE restructuring phase.

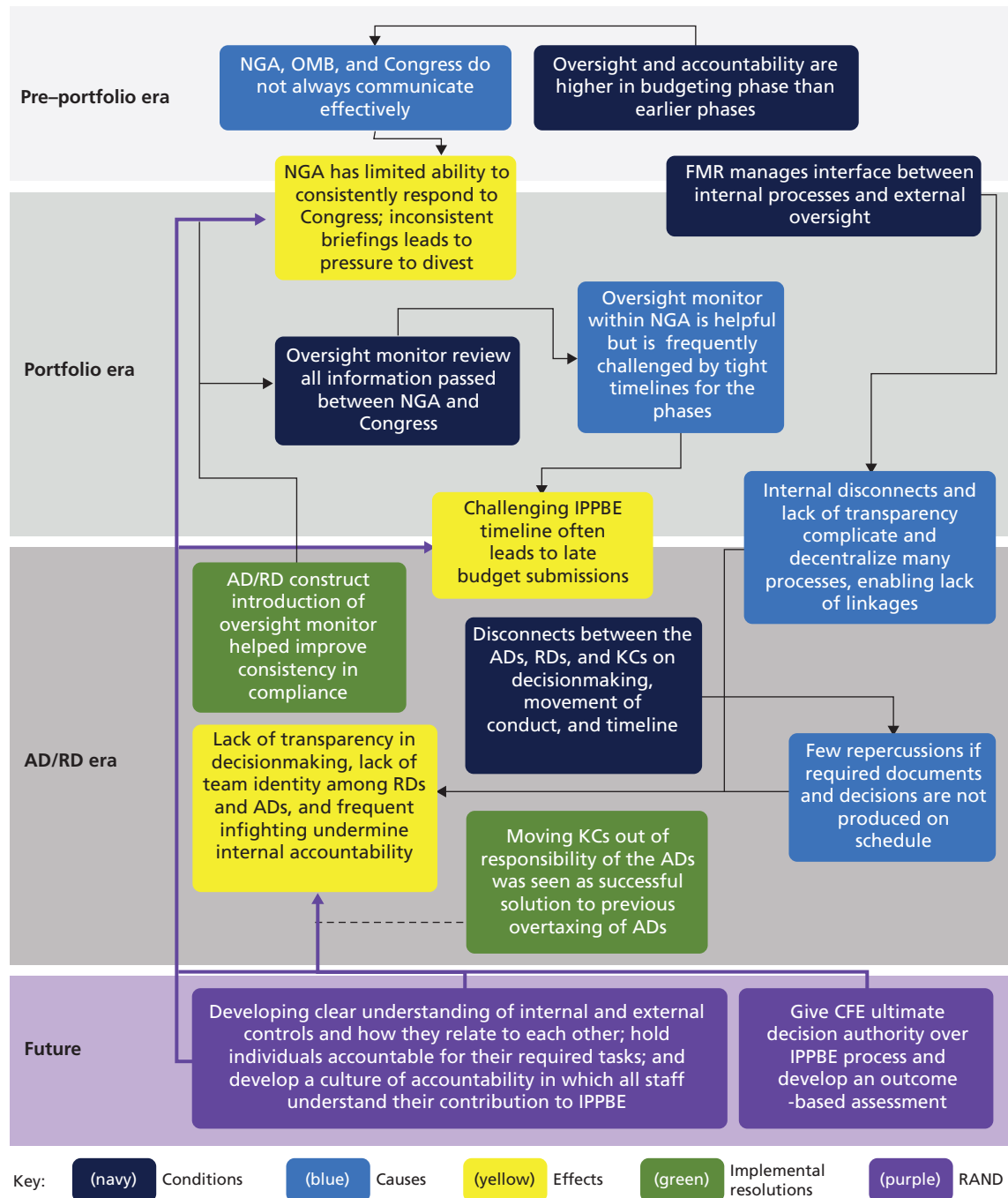
The pre-portfolio era at NGA was the first major attempt to reconcile long-standing issues across the IPPBE process, leading to the creation of data repositories, efforts to develop metrics that could assist business processes, and efforts to increase senior leadership engagement with service components to ensure equal representation in program priorities. Structural changes implemented during this period, however, led to decreased leadership budget visibility because information stovepipes developed across components.

The NGA portfolio era was a reaction to some of the challenges encountered in the pre-portfolio era. This new construct created several new organizational challenges. Portfolio managers were dual-hatted as component directors, which overburdened managerial workflow processes. In addition, internal IT-acquisition solutions, such as ORBIT and GEO-F, inherently decreased program process visibility, given the strict built-in user access constraints.

The AD/RD era at NGA addressed some of the programming problems created under the pre-portfolio and portfolio eras, but it, too, created new organizational challenges that were exacerbated by external COVID-19 challenges. Key challenges included a lack of transparency across investment and divestment decisions leading to difficulties in congressional justifications. The AD/RD era, however, saw the organizational restructuring of portfolio

managers to remove the dual-hat function of portfolio managers, instituted a council of deputies to provide initial validation and prioritization of mission needs, subordinated RDs to ADs to assist with defining program budget requirements, and successfully aligned resources to strategic outputs and outcomes.

Figure 7.11
Oversight and Accountability Across National Geospatial-Intelligence Agency Financial Management Eras



NGA is now entering a fourth period of acquisition restructuring that is intended to improve on how the planning and programming phases are managed. ADs will become responsible for the planning phase and will be supported by the PDs. The PDs (some of whom were former RDs) will gain primary responsibilities for the programming phase, while FM staff from FMR and FMM will retain responsibility for budgeting, execution, and evaluation. Incorporating research findings from this research will prepare NGA for continued GEOINT mission excellence in this new era.

Ideas for Future Research

In addition to the observations noted in the findings, recommendations, and conclusions presented throughout this report, we suggest that the planning, budgeting and execution, and evaluation phases would merit further research that would yield additional relevant results across the IPPBE spectrum.

Planning

Planning outputs serve as the baseline for the entire IPPBE process. Therefore, the planning phase might be the most important aspect of the NGA acquisition process because it relays the NGA director's strategic plans and objectives. Our literature review and interviews provided limited visibility into the planning process but served as necessary indicators to suggest that a focused planning process effort would reveal other important insights for NGA leadership consideration.

Budgeting and Evaluation

The budgeting and evaluation phases are ones the most visible externally. This makes it necessary for the implementation in both phases to be in strict compliance with public law, congressional mandates, and ODNI-issued policy. Although this research provided some initial observations on this phase (as a secondary priority), additional research would greatly assist FM and the CFE in determining how best to derive the greatest benefit from the newly designed programming era.

Evaluation Metrics

We conducted several interviews that signaled high demand for the development of formal measures of performance and effectiveness. Although we did not focus on any of the metrics currently in place within the NGA acquisition process, we noted that at least some of the metrics currently deployed are binary—was a program entered into ORBIT or not?—rather than systematically tying a program to a mission end state through a logic model with an accompanying theory of change. Understanding the various stakeholder needs across IPPBE processes could help NGA leadership detect when programs are off track quickly. This could be beneficial when relaying NGA's strategy to Congress during restrained budget environments.

U.S. Army Case Study

In this appendix, we present a case study based on programming issues the U.S. Army faced in the 1990s. This case study, derived from RAND Arroyo Center research, presents several issues that are similar to those NGA has recently experienced:

1. a “[l]imited audit trail of decisions and challenges to perceived organizational prerogatives”
2. a “[l]ack of consistency across” program objectives and tasks
3. difficulties in linking strategic direction to program planning efforts
4. stakeholder engagement (participation of the Army secretary and major commands)
5. coordination efforts with other phases of the PPBES process.¹

RAND Arroyo Center conducted research in the late 1990s to assist the efforts of the director of the U.S. Army’s Program Analysis and Evaluation (PA&E) directorate to “improve the Army’s Program Objective Memorandum (POM) development process.”² Much like the NGA acquisition process, the Army’s organization of its acquisition portfolio has undergone at least two periods of revision, including a pre-1996 phase and a post-1996 phase.

The Army uses the programming phase to allocate funding for strategic requirements. In the pre-1996 period, the Army used both DoD PPBS and its internal PPBES process to achieve these objectives. Programming, planning, and execution were centralized within Army major commands until 2007, when these responsibilities shifted to combatant command elements.³ The Army’s use of POMs is intended to inform OSD policymakers on how the Army plans to

¹ Leslie Lewis, Roger Allen Brown, and John Y. Schrader, *Improving the Army Planning, Programming, Budgeting, and Execution System [PPBES]: The Programming Phase*, Santa Monica, Calif.: RAND Corporation, MR-934-A, 1999, p. xvi.

² The research had three objectives: “to (1) enhance the Army’s ability to view the totality of its resources, (2) improve its resource decision process, and (3) justify those choices within the Army and to the external community, including the Office of the Secretary of Defense (OSD), the Chairman of the Joint Chiefs of Staff (CJCS), and Congress” (Lewis, Brown, and Schrader, 1999, p. iii).

³ RAND noted,

The programming function and related decisionmaking are centralized within the Army Headquarters staff but allow inputs from Major Commands . . . , which are the principal field operating agencies, and from Program Executive Officers . . . , who are the materiel developers. The Assistant Secretary of the Army (Financial Management and Comptroller) . . . provides oversight for the entire PPBES, and the DPA&E [Army Director of Program Analysis and Evaluation] is responsible for the programming phase of the process. Several formal and informal organizations within Army Headquarters assist DPA&E in developing and reviewing requirements, allocating resources, and helping the Army leadership make the resource decisions that result in the POM. The POM is the official documentation of Army resource decisions and is the primary input to the DoD program review and issue cycle process. (Lewis, Brown, and Schrader, 1999, p. 3)

allocate program funding. RAND's research highlighted several issues with this process in the pre-1996 era. For example, RAND found that the Army POM process was not "adequately resourced" to achieve its stated objectives and that "resources had not been effectively balanced across high-priority requirements."⁴ In addition, the "lack of visibility of programming choices at various levels of the program hierarchy and throughout the programming process" was an enduring issue that necessitated an organizational change.⁵

RAND noted several issues in the Army organizational programming phase in the pre-1996 era that have relevance to the current themes from our literature survey. In FY 1996, the Secretary of the Army began issuing a series of recommendations to address the issues noted in the RAND report. One key organizational change included the establishment of the Army Review Board (ARB) to perform ongoing active reviews of program decisions and increase decisionmaker visibility across the PPBES process.⁶ While the creation of the ARB increased civilian visibility into the programming process, the elimination of the Army's Select Committee "reduced the direct involvement in resource matters of several senior military staff principals including the deputy and assistant chiefs of staff except for the DCSOPS [Deputy Chief of Staff for Operations and Plans]."⁷ Thus, the creation of the ARB eliminated some of the process issues the secretariat had identified but also created new ones. The additional absence of visibility into the POM process created under the ARB construct led to a "lack of knowledge of specific resource changes at the detailed MDEP [Management Decision Packages] level and an absence of discussion, review, or debate in the formal organs for programming."⁸ This also meant that the new process "did not have outputs linked to the requirements of the joint warfighting environment and to the national security goals."⁹

The RAND authors suggested several improvements, including a repeatable resourcing framework to assess and program Army activities. The goal of the framework was to provide an efficient mechanism for the Army to measure programming progress toward strategic objectives and as an aid to bolster long-range strategic planning investment decisions "based on objectives and assessments of needed capabilities that look beyond the POM years."¹⁰ RAND has also supported PA&E in 1997 in developing Army Strategic Planning Guidance in the planning phase to support the program phase. The framework's linkage of "functions to mission areas" improved Army assessment capabilities understanding of the "total demand against available resources," while simultaneously enhancing the Army's "ability to perform hierarchical trade-off analyses and build options in a disciplined and repeatable manner."¹¹

Also see Army Regulation 10-87, *Army Commands, Army Service Component Commands, and Direct Reporting Units*, Washington, D.C.: Headquarters Department of the Army, December 11, 2017.

⁴ Lewis, Brown, and Schrader, 1999, p. xii.

⁵ Lewis, Brown, and Schrader, 1999, p. xii.

⁶ The founding of the ARB replaced the formerly established Select Committee, which had acted as more of a repository of information rather than a "true deliberative body." See Lewis, Brown, and Schrader, 1999, p. 7.

⁷ Lewis, Brown, and Schrader, 1999, p. 7.

⁸ Lewis, Brown, and Schrader, 1999, p. 11.

⁹ Lewis, Brown, and Schrader, 1999, p. 12.

¹⁰ Lewis, Brown, and Schrader, 1999, p. 28.

¹¹ Lewis, Brown, and Schrader, 1999, p. xiv.

Abbreviations

AD	associate director
ADNI	Assistant Director of National Intelligence
AI	artificial intelligence
AoA	Analysis of Alternatives
ARB	Army Review Board
CAPE	Office of Corporate Assessment and Program Evaluation
CBJB	congressional budget justification book
CBP	U.S. Customs and Border Patrol
CCP	Consolidated Cryptologic Program
ICCR	Intelligence Community capability requirements
CFE	Chief Financial Executive
CFO	Chief Financial Officer
CIA	Central Intelligence Agency
CIG	Consolidated Intelligence Guidance
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CP&A	Capability Planning and Analysis
CRS	Congressional Research Service
DAF	Department of the Air Force
DHS	U.S. Department of Homeland Security
DIA	Defense Intelligence Agency
DNI	Director of National Intelligence
DoD	U.S. Department of Defense
DoDD	Department of Defense Directive
DoE	U.S. Department of Energy

DOTMLPF-P	doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy
FM	financial management
FMM	Financial Management Matrix
FMR	Financial Management Resource Office
FMRP	Financial Management, Resource, Program Planning and Analysis
FTE	full-time equivalent
FY	fiscal year
FYDP	Future Years Defense Program
GAO	U.S. Government Accountability Office
GDIP	General Defense Intelligence Program
GEO-F	GEOINT financials
GEOINT	geospatial intelligence
GeoSCOUT	NGA contract vehicle (application name)
IC	Intelligence Community
ICAM	Intelligence Community Acquisition Model
ICCR	Intelligence Community Capability Requirements
ICD	Intelligence Community Directive
IC-ITE	Intelligence Community Information Technology Enterprise
IC-SEM	Intelligence Community Strategic Enterprise Management System
ICE	independent cost estimate
IDA	Institute for Defense Analyses
IG	inspector general
IPPBE	Intelligence Planning, Programming, Budgeting, and Evaluation
IRTPA	Intelligence Reform and Terrorism Prevention Act
ISR	intelligence, surveillance, reconnaissance
IT	information technology
KC	key component
MIP	Military Intelligence Program
NGA	National Geospatial-Intelligence Agency
NGP	National Geospatial-Intelligence Program

NIP	National Intelligence Program
NNSA	National Nuclear Security Administration
NRC	National Research Council
NRO	National Reconnaissance Office
NRP	National Reconnaissance Program
NSA	National Security Agency
NSG	National System for Geospatial Intelligence
OCS	Office of Contract Services
ODNI	Office of the Director of National Intelligence
OMB	Office of Management and Budget
ORBIT	Organization Requirements and Budgeting Information Tool
OSD	Office of the Secretary of Defense
PA&E	Program Analysis and Evaluation Directorate
PB	Program Build
PD	programming deputy
POM	program objective memorandum
PPBE	Planning, Programming, Budgeting and Execution, Evaluation; [pre-2020 definition] Planning, Programming, Budgeting, Execution
PPBES	Planning, Programming, Budgeting, and Execution System
PPBS	Planning, Programming and Budgeting System
RD	resource deputy
S&T	science and technology
SME	subject-matter expert
SOP	standard operating procedure
SRA	Systems & Resource Analyses
USAF	U.S. Air Force
USCG	U.S. Coast Guard
USD(I)	Undersecretary of Defense for Intelligence
USD(I&S)	Undersecretary of Defense for Intelligence and Security

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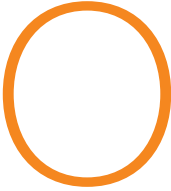
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ver the past decade, the National Geospatial-Intelligence Agency (NGA) has evolved its programming organization multiple times, along with the process it uses for managing its resource investments. Each of these iterations was done to address challenges and inefficiencies. NGA is now considering additional steps to improve its process and is seeking to improve its practices through internal improvements, such as gaining an understanding of how previous changes affected the overall effectiveness of its resource management process, and what can be learned from other organizations. NGA is now entering a fourth period of acquisition restructuring that is intended to improve on how the planning and programming phases are managed.

NGA asked the RAND Corporation to review the programming phase of the Intelligence Planning, Programming, Budgeting, and Evaluation (IPPB) process. The authors looked at three organizational eras (pre-2013, 2013–2018, and 2018 to the present) to determine the conditions, causes, and effects of performance and effectiveness generally and of previous changes to this phase of NGA IPPB for each era.

NGA is not alone in its ongoing effort to modernize its IPPB structure to improve efficiency and effectiveness. Although NGA has conducted several previous internal studies to identify areas for IPPB process improvement, this research is the first to synthesize findings between external literature and findings gleaned from structured subject-matter expert interviews to highlight crucial program-process issues for NGA leadership to absorb and address in any future IPPB restructuring phase.

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