ACQUISITION INNOVATION RESEARCH CENTER

Improving Defense Outcomes Through Improved Interfaces Between PPBE, Acquisition, and Requirements

EXECUTIVE SUMMARY AND REPORT

DECEMBER 2023

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Commission on Planning, Programming, Budgeting, and Execution (PPBE) Reform
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ACRONYMS AND ABBREVIATIONS

AI	Artificial Intelligence
AIRC	Acquisition Innovation Research Center
ALOC	Air Lines of Communications
BTR	Below Threshold Reprogramming
CAE	Component Acquisition Executive
CCDR	Combatant Commander
CCMD	Combatant Command
CDAO	Chief Data and Artificial Intelligence Officer
CFT	Cross-Functional Team
CONUS	Continental U.S.
CR	Continuing Resolution
DAE	Defense Acquisition Executive
DAF	Department of the Air Force
DAS	Defense Acquisition System
DASN	Deputy Assistant Secretary of the Navy
DAU	Defense Acquisition University
DAWDA	Department of Defense Acquisition Workforce Development Account
DAWDF	Department of Defense Acquisition Workforce Development Fund
DCMA	Defense Contract Management Agency
DCTC	Defense Civilian Training Corps
DEPSECDEF	Deputy Secretary of Defense
DLA	Defense Logistics Agency
DPG	Defense Planning Guidance
DoD	Department of Defense
FYDP	Future Years Defense Program
IPT	Integrated Product Team
IR&D	Internal Research and Development
JCIDS	Joint Capabilities Integration and Development System
JEONS	Joint Emerging Operational Needs Statement
JROC	Joint Requirements Oversight Council

LLM	Large Language Model
LRASM	Long-Range Anti-Ship Missile
MAJCOM	Major Command
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program
ML	Machine Learning
MRL	Manufacturing Readiness Level
MTA	Middle Tier of Acquisition
NMS	National Military Strategy
NLP	Natural Language Processing
NSS	National Security Strategy
OMB	Office of Management and Budget
PEO	Program Executive Office
pLEO	Proliferated Low Earth Orbit
PM	Program Manager
POM	Program Objective Memorandum
PPBE	Planning, Programming, Budgeting, and Execution
R&D	Research & Development
RCO	Rapid Capabilities Office
RDT&E	Research, Development, Test, and Evaluation
S&T	Science and Technology
SAE	Senior Acquisition Official
SBIR	Small Budget Innovative Research
SDA	Space Development Agency
SSEB	Source Selection Evaluation Board
SYSCOM	Systems Command
TRL	Technology Readiness Level
VoD	Valley of Death

EXECUTIVE SUMMARY

The Planning, Programming, Budgeting, and Execution (PPBE) system, in its present state, is struggling to adapt to changing geopolitical developments, technological advancements, and the necessary agility required to uphold the nation's competitive edge. This challenge is compounded by escalating global threats and the rapid advancement of adversaries' military capabilities. The Acquisition Innovation Research Center (AIRC) formed an Integration Research Panel to support the PPBE Reform Commission focusing on the challenges and opportunities in integrating the requirements, acquisition, and PPBE systems within the Department of Defense (DoD). Keeping decisions from these three systems synchronized is problematic since the requirements and acquisition systems operate on an event-driven basis with associated flexibility, while the PPBE system follows a rigid, calendar-driven approach. The panel received not-for-attribution inputs from 50 leaders in DoD, industry, and academia and documented these as well as three use case examples in the first portion of a final report. The remainder of this report summarizes findings and recommendations based on the panel's assessment.

INTEGRATION PROBLEMS IN THE DOD

We found that key challenges are faced by each of the three core functions:

- The primary goal of the **PPBE process** is to align resources with strategic priorities. However, problems often arise when translating strategic objectives into actionable budgets and resource allocation plans given the increasing tempo of operational and strategic changes driven by ever more rapid technological growth. These issues often result in misaligned funding priorities, wasted resources, and delays in critical projects. The **DoD requirements process, Joint Capabilities Integration and Development System (JCIDS)**, is responsible for defining what capabilities are needed to meet national security objectives. The development of requirements involves input from various stakeholders, including combatant commanders, acquisition professionals, and technologists. Integration problems occur when requirements are not effectively communicated, are not sufficiently developed in a timely manner, or when requirements are not supported by technology or aligned with available resources and budget constraints, leading to unrealistic demands.

- The **DoD acquisition process** is responsible for procuring and delivering the capabilities described by the requirements process. Integration problems in this phase often manifest as cost overruns, schedule delays, and unmet performance expectations. The lack of synchronized communication among acquisition teams, requirements officers, and budgeting personnel can result in significant inefficiencies. Resolving integration issues typically falls to the acquisition Program Executive Officer (PEO) or Program Manager (PM).

The effectiveness of the three decision support systems hinges on their capacity to integrate in a way that ensures the delivery of the right capabilities at the right time. Consequently, enhancing integration and synchronization among these systems is of paramount importance to DoD. Our panel examined the seams and integration problems among these three systems. Our findings and recommendations are summarized as follows:

PPBE / ACQUISITION SEAM

PPBE is calendar driven, while Acquisition is requirements- and activity-driven. Changes in deliverables and events (e.g., test results) often require execution year flexibility, but existing processes require senior intervention and heroic efforts to accommodate changes that were not programmed years in advance (e.g., transitioning the Long-Range Anti-Ship Missile (LRASM) from a successful prototype to a program of record). PEOs have limited ability to adjust resources within their portfolios, even though Congress has authorized new acquisition authorities to enable flexibility and speed. This inhibits acquisition agility and hinders our ability to keep pace with new technology, especially commercial technologies available now to competitors and adversaries. Programs with incremental/spiral development and modular open architecture strategies (e.g., Space Development Agency (SDA)) are better able to accommodate PPBE changes by incorporating upgrades to later iterations. The changes recommended by the PPBE Reform Commission will go a long way toward providing the needed flexibility. To develop additional recommendations, the panel reviewed issues in time-based synchronization, availability of data to support decisions, pulling important technologies across the "Valley of Death," and establishing transparency and trust. These are documented further in the report and form the basis for the following recommendations.

Recommendations

- We endorse the Commission's Interim Report recommendations that will provide much needed flexibility, especially the recommendations on:
  - » Colors of money (a different approach)
  - » Modify thresholds for Below Threshold Reprogrammings (BTRs)
  - » Modify internal DoD reprogramming requirements
  - » Modify availability of appropriations
  - » Mitigate problems caused by Continuing Resolutions
  - » RDT&E Budget Activities consolidation
  - » Transform the budget structure
  - » Systematic review and consolidation of budget line items
  - » Improve understanding of private sector practices
- To build more flexibility in developing, producing, and sustaining warfighting capabilities, DoD should structure the Program Objective Memorandum (POM) and budget to group resources for like-capabilities into PEO-managed portfolios with tradeoff authority while including appropriate controls.
- To reduce the time for integration from a PPBE perspective, DoD should define clear roles and responsibility (who can say "yes," and more importantly, limiting who can say "no" to approvals) and avoid the drive for consensus through staff action by elevating issues to decision makers in a timely manner. For example, on the acquisition side, it is recognized that the top line for every program is a prioritization function that comes out of a larger PPBE process. Once that top line decision is made, the policy should clearly state that:

  - only the PEO has approval authority over the PM from program perspectives; all others are advisory to the PM and PEO but cannot nonconcur;
  - only the Component Acquisition Executive (CAE) has approval authority over the PEO; all others are advisory to the PM and PEO but cannot nonconcur;
  - only the Defense Acquisition Executive (DAE) has approval authority over the CAE; all others are advisory to the PM and PEO but cannot nonconcur;
  - the Milestone Decision Authority (MDA) is the main stopping point for approvals up the acquisition chain-of-command; the policy clearly states that "For MDAPs, it is DoD policy to budget to the DCAPE ICE unless an alternative estimate is specifically approved by the MDA"—thus, no others have an ability to say "no"; and
  - those above the MDA in the acquisition chain-of-command can intervene in oversight, but this should be minimized.

- DoD should link the concept of affordability in PPBE (DoDD 7045.14, Enclosure 3) to the affordability analysis called for and defined in the acquisition community (DoDI 5000.85, Section 3, and underlying processes). Affordability analysis results should be provided with all JCIDS requirements validations.

- To improve transparency and information sharing, DoD should prioritize implementation of information technology systems that are intuitive for building transparency and trust, including developing capabilities to use large language models (LLMs), natural language processing (NLP), and machine learning (ML) to make PPBE (including justification books) more timely, accurate, accessible, and transparent for authorized users. There are nascent capabilities in Advana, and other AIRC research for the Commission explored how these evolving capabilities could be applied to improve information sharing and cognizance (especially from portfolio and mission views), but continued R&D is recommended for this promising approach.

- If more aggressive PPBE reform is possible, the DPG could specify that tradeoffs in funding validated requirements be within a major funding category (RDT&E/Procurement, Personnel, and Operations and Maintenance) rather than across these categories to ensure that the investment accounts (future capability) are not used to fund current capability.

REQUIREMENTS / PPBE SEAM

There is a major disconnect between the formal DoD requirements process and the PPBE process at every level below the Defense Planning Guidance (DPG). Given that every material product is generated by requirements, this represents a critical failure. The Joint Requirements Oversight Council (JROC) validates Combatant Command (CCMD) and Service requirements but has little or no influence over PPBE priorities, which are set in the programming processes. Combatant Commanders (CCDRs) feel that their priorities are subordinate to Service priorities with no forum for resolution. Industry is expected to invest in production capacity but faces risk due to unknown DoD production requirements. Integrating the DoD Requirements process more effectively with PPBE and Acquisition will require increased use of Cross Functional Teams (CFTs), more CCMD influence on resources, more emphasis on affordability analyses, and professional development in the requirements community.

Recommendations

- DoD should empower the JROC to assign a validated CCMD Joint Emerging Operational Need Statement (JEONS) to a Service or Agency as a "must fund" priority, with the Deputy Secretary of Defense (DEPSECDEF) visibility of the resulting resource decisions. Require that CCMDs prioritize their requirements as part of the JROC requirements validation process, and that requirement lists be matched to and reconciled with Service Budget requests in the PPBE process by DEPSECDEF.

- The Joint Staff and DoD should give CCDR-provided scenarios, exercise, and wargaming results weight equal to that given to the Military Services and Joint Staff inputs as the basis for the annual Capability Gap Analysis of the Future Years Defense Program (FYDP).

- DoD should provide Service affordability analysis along with requirements that are reviewed and approved by the JROC. This will provide the JROC with the Service's sense of priorities and affordability with respect to the materiel item in question. Affordability analysis is required at Milestone A and thus is available for CDD validation (see DoDI 5000.85).

- To provide Industry more visibility into DoD requirements, especially with respect to production capacity, DoD should include in budget justification documents provided publicly with the President's budget request both a threshold [minimum] and an objective [stretch goal] level for annual procurement quantities. DoD acquisition programs should reflect these requirements with contract options to the objective level and termination liability clauses applicable below the threshold level. In addition, DoD should provide cleared defense contractors with controlled access to validated mission needs and requirements statements (at the CUI and classified levels) to help with industry's planning for Internal Research and Development (IR&D), staffing, and infrastructure investments and investment hedges.

- DoD should provide Industry (along with Congress) data and information from the President's Budget justification books in structured machine-readable formats. (This will also facilitate improved data analytics and portfolio views discussed in other AIRC reports to the PPBE Commission.)

- DoD should give investments in staffing, training, and career development of the Joint Staff and Military Service requirements community higher PPBE priority, as has been done successfully in Defense Acquisition Workforce improvement investments. This would:

  - Professionalize the requirements generation, determination, validation, and management process. Develop entry- and mid-career training programs along with career-enhancing recognition for those who successfully participate in the process to improve collaborative decision processes among the user, PPBE, and acquisition communities.
  - Establish a DoD Requirements Workforce Development Account (DRWDA) analogous to the DoD Acquisition Workforce Development Account (DAWDA) and the similar funds (DAWDFs) for the three military departments.
  - Fund a segment of the Defense Civilian Training Corps (DCTC) focused on requirements management for training and orientation of undergraduates as an improved civilian pipeline into the Requirements Community (generally) and the interface with PPBE.

REQUIREMENTS / ACQUISITION SEAM

We recognize that this seam is outside the scope of the PPBE Reform Commission, however it represents a key failure point through decades of 'reforms' because each element was treated as a silo, with little understanding of the secondary consequences of decisions across the seam. We found that integration needs improvement and are providing recommendations for future consideration. The current JCIDS process is widely criticized as too slow and bureaucratic to keep pace with technology or threats and is based on a waterfall model rather than the highly iterative and collaborative agile development process used in industry. Successful programs have used CFTs for collaboration and iteration among requirement developers and system engineers, often with user representatives embedded in the program office (e.g., B-21) to better balance documenting needs and requirements with deliverables to yield more timely delivery of operationally relevant capabilities. In light of acquisition reform and PPBE reform initiatives, we found that reform of the requirements process is needed to achieve the agility DoD and Congress demand. A key theme in improving this seam is a focus on organizational roles and responsibilities.

Recommendations

- We agree with the FY 2024 NDAA section 811 direction to modernize the defense requirements process. We recommend starting now on such reforms, to include:
  - » Forming a JS-led CFT with OSD and Service stakeholders to reform the system, specifically the boundary between Requirements (JCIDS) and Acquisition (Defense Acquisition System (DAS)).
  - » Developing a more agile, collaborative, and iterative process for the integration and transition of requirements to the systems engineering process.
  - » Developing a capability needs and requirements framework and pathways that are aligned to the Department's Adaptive Acquisition Framework pathways, and that include aligning the Department's science and technology (S&T) processes to emphasize products that address capability requirements.
  - » Developing a process to rapidly validate the military utility of commercial solutions to meet capability needs or opportunities.
  - » Developing a mission engineering approach for defining enduring requirements in a set of capability portfolios, with a set of mission impact measures that capability deliveries must seek to continuously improve.
  - » Assessing best practices to ensure that the requirements process for software, artificial intelligence, data, and related capability areas enable a more rapid, dynamic, and iterative approach than used for hardware systems.
- In addition, we recommend that the reforms of the DoD Requirements process include designating a single organization or entity directly responsible for overseeing and driving the development of joint capabilities.

TOPICS FOR FURTHER RESEARCH

The panel identified several promising ideas and potential recommendations that require more research or prototyping before they can be finalized. We offer these for consideration in follow-on efforts that DoD might sponsor.

1. PPBE / Acquisition Seam

- Existing technology can be used for a rapid prototype of an LLM-enabled approach to J-books. Commercial offerings allow DoD to select whatever LLM is best suited (and replace it when something better is available), use controlled DoD data sources for training the model, guarantee factual accuracy and citable sources without risk of hallucinations, and demonstrate the utility of the system in responding to complex natural language queries. We believe a spiral prototype interacting with users can validate key aspects of the system well within a year. We recommend such a prototype be considered for SBIR funding or other source of FY 2024 funds.
- Budget execution reviews could move from calendar-based Comptroller sweeps of unobligated funds to acquisition managers setting an event-based obligation schedule for each program when funds are appropriated, and DoD and Service Comptrollers measuring obligation status against these schedules. Congress could maintain oversight through a data management infrastructure that permits near real-time monitoring of execution status. Needed research includes further investigation of historical obligation patterns on acquisition programs compared to the normal linear execution model.

- Given that sustainment costs historically exceed procurement costs, more emphasis and visibility is warranted on sustainability concerns as a factor of total program cost during development. One idea is to fence investment funds for reducing lifecycle (sustainment) costs, perhaps by designating them as RDT&E BA 7 and allowing them to be used in early development to reduce future sustainment costs (as if the system already existed and we were working to address sustainment issues). Further study is needed to get stakeholder views and apply reliability growth models and cost models to assess the potential effects of such a recommendation.

2. Requirements / PPBE Seam

- DoD could ask the geographic CCMDs to propose regional equivalents to the European Deterrence Initiative (a good example) for consideration in future planning and programming. The CCMDs and associated Service funding lines would have to prioritize within available dollars and then engage in the program and budget review processes for additional resources, if required. The CCMDs should use the capability in the Services/Agencies to execute the funds for the CCMD priorities rather than duplicate program offices, contracting, etc. That gives the CCMDs more flexibility than waiting to the end of the POM to see how their IPLs stacked up for funding. It also incentivizes the Services for meeting CCMD IPL requirements with increased funding. If a more radical approach is possible, geographic CCMDs might be given substantial control over funds for Joint emerging needs. Research is needed to develop a method of cross-CCMD coordination to avoid duplication of capability development efforts, to get stakeholder views, and to provide cost estimates. A CFT with CCMD, Service, OSD, and JS representation would be needed.

- To better inform industry on production capacity planning, DoD could provide access to Defense Contract Management Agency (DCMA) and Defense Logistics Agency (DLA) supply chain insights to better recognize, plan, and fund for supply chain risks and production capacity issues on highest priority, cross-program parts, and end-of-life procurement needs. This would need further research regarding protection of proprietary interests and analysis of the differences between production and sustainment supply chains.

1. INTRODUCTION

The Planning, Programming, Budgeting, and Execution (PPBE) system is an essential element to the national security of the United States (U.S.): in essence, it is a weapon system vital to national defense. However, this weapon system has faltered increasingly in its ability to operate at scale with the requisite velocity and flexibility to maintain our rapidly eroding competitive technological edge. Our adversaries are outpacing the U.S. in the development and deployment of military capabilities, rendering them more adept at evolving their military prowess. The threats to the global order are real and accelerating. The democratization of technologies and global access to talent created conditions for the rapid acceleration of defense capabilities. Commercial adoption is outpacing adoption in the defense sector. Increasingly, single domain approaches (land, sea, air, cyber, and space) no longer work, putting a premium on the ability to integrate across different domains at speed. The pace of threat, of technological development, and new concepts for integration put additional stresses on the Department of Defense's (DoD) three decision support systems for delivering capabilities, i.e., the requirements, acquisition, and PPBE systems. While there have been numerous calls for change within these systems for decades, this report informs the issues and opportunities presented by the integration of these three decision support systems from a PPBE perspective. The dynamism of the three decision support systems hinges on their capacity to integrate in time to allocate resources for the requirement and acquisition process to deliver the right capabilities at the right time. Consequently, enhancing integration and synchronization among these systems is of paramount importance to the DoD.

Chapter 2 of this report contains two scenarios highlighting the importance of PPBE decisions today in generating future capabilities, and PPBE's relationship to deterrence. Chapters 3 through 5 describe the relationships among the three decision support systems. Chapter 6 offers some thoughts on implementing recommendations given that all these systems have had numerous studies recommending changes for decades. Chapter 7 includes a list of all recommendations and topics for further research. Appendices A and B list the panel members and summarize the study methodology and input sessions. Appendices C through E present three use cases, highlighting different aspects, challenges, and solutions to the integration of the three decision support systems, with emphasis on the PPBE system.

2. ENHANCING INTEGRATION AND SYNCHRONIZATION: WHY IT MATTERS

TWO FUTURE SCENARIOS SET IN 2027

Sample Scenario A: Demonstrating the challenge presented by PPBE and time.

Consider an example scenario set in mid-July 2027 in which two simultaneous natural disasters in the U.S. draw national and international attention: a Category 4 hurricane strikes Florida's Gulf Coast near Tampa and a rapidly moving series of wildfires in the Pacific northwest is in its third week and only 10% contained. While media attention is riveted on the 2028 Presidential election and these natural disasters, a U.S. peer competitor conducts a surprise limited objective strike on U.S. forward deployed forces, resulting in 3,000 casualties, including 900 killed in action as a result of three separate barracks struck by adversary long-range precision fires. This unprecedented action was coordinated with a regional hegemon. Also targeted were U.S. and coalition naval and air forces, severely degrading air and missile defenses in the theater of operation. This was preceded by two weeks of satellite interference and selected U.S. homeland cyber-attacks on financial institutions and the electrical grid in the vicinity of the two natural disasters. More than 5,000 enemy special forces troops attacked Coalition C2 and logistics hubs on the heels of what was deemed a major adversary training exercise.

The U.S. Government (in Executive and Legislative organizations and agencies) convenes in emergency sessions. The National Security Council's top priorities include a status assessment across departments, a worldwide readiness assessment of military forces, and consultation with allies and partners. U.S. military forces (including the nuclear Triad) are put on heightened alert, National Guard and Reserve units in the continental U.S. (CONUS) are alerted for potential mobilization, and space and cyber operations are implemented underway. While airfields and ports were severely damaged across the theater, a large portion of the theater surface fleet was engaged in a coalition Joint exercise, with minimal losses. The forward deployed U.S. Air Force does not fare as well, with 15% loss of aircraft and more importantly, the intentional targeting of ammunition bunkers and fuel sites constrains the longer-range strike capability of those friendly forces. Emergency runway repairs are initiated immediately to allow air operations. The Civilian Reserve Air Fleet is activated to facilitate the movement of units and materiel to the theater. A large portion of U.S. Air Force fighter assets are repositioned but were allocated to keeping open the air lines of communication (ALOCs) after the early loss of three C-17 aircraft. U.S. and coalition ground forces engage in major combat operations with the regional hegemon, while the peer competitor makes no effort to hide major troop movements to multiple ports of embarkation.

Five years prior in 2022, the Russia-Ukraine conflict and the COVID pandemic had exposed a very efficient but fragile U.S. Defense Industrial Base, especially for munitions. While some critical supply chains could be traced to foreign sources, small businesses that provided vital capabilities struggled with inflation pressures and mergers and acquisitions had significantly reduced the number of manufacturing sources for military-only production. The 2023 Israeli-Hamas war put an additional strain on the amount of munitions the U.S. retained in war reserves. The Services, the Joint Staff, and OSD (in conjunction with the Combatant Commands (CCMDs)) conducted multiple war games and analyses to determine future wartime munitions requirements. With the resolution of conflict in Ukraine in 2024, the gaps and solutions previously identified and included in the February 2024 and 2025 Presidential Budget Submissions were no longer funded due to a different strategic context and/or higher priorities. In addition, the requirements process had not generated a demand signal to the acquisition process for better energetics, less weight, improved precision munitions, etc., although the Joint Warfighting Concept (Contested Logistics and Joint Fires) clearly identified the gaps and potential solutions. As a result, Research and Development (R&D) into new energetics did not result in new formulations for munitions and most of that work ended in the Valley of Death (VoD) due to lack of defined requirements and funding. Due to the demands in 2023, modest munitions manufacturing investments for existing munitions were started by private industry and government spending was spread across the Five-Year Defense Program.

Due to the PPBE system's calendar-driven approach, most improvements would take up to two years to implement, including for funding to be planned, programmed, and executed, and to train the requisite work force. In 2027, a Joint Resolution in the U.S. Congress provided funding due to the crises, but no additional time. The PPBE process sustained a 2024 baseline for munitions with the expectation that there would be "surge" capabilities or that the commercial sector could make up the shortfall. Neither assumption is valid, and the cycle of "today we have the time, but no funds, and when the crisis hits, we have the funds but have no time" is repeated. As a result, the use of certain munitions is constrained until the heroic efforts of senior leaders can adjust the priorities and the PPBE system to act within months instead of within years to deliver critical munitions.

Sample Scenario B: Demonstrating the relationship of PPBE and deterrence.

Consider an example scenario set in mid-July 2027 where while media attention is riveted on the 2028 Presidential election and the economy, a U.S. peer competitor deals with a series of domestic economic setbacks. This adversely affects world economies, but the U.S. economy (while relatively flat) is resilient enough to keep both inflation pressures and unemployment below 5%. Pundits (and others) continue to highlight the U.S. national debt and interest payments, as it has been a talking point in recent Presidential election debates.

Meanwhile, the leaders of the peer competitor consider economic, military, and diplomatic options to regain their standing on the world stage. In the U.S., a U.S. Army Lieutenant Colonel at the National War College researching a paper on "deterrence" (with a draft title of "Production is Deterrence") finds excerpts from an Under Secretary of Defense (Acquisition and Sustainment) at a September 26, 2023 CSIS Forum (a Washington, DC think tank), as summarized by Jim McAleese. Key points include insight on the PPBE process:

> **Planning** – DoD must review the specific munitions requirements for a sustained China fight. Production is critical to field lethal combat-mass at-scale: "Hot production lines are deterrence."
>
> **Programming** – DoD has previously minimized "hardcore development." DoD must field technology-overmatch advances in lethality. [The ~$140B of 2023 DoD Research, Development, Test, and Evaluation (RDT&E) must then transition into the ~$164B of 2023 DoD Procurement production].
>
> **Budget Execution** – While DoD is currently at minimal rates of munitions production, the Ukraine war focused DoD on increasing munitions production-capacity. There is limited overlap in the types of munitions required for the China fight. There is potential overlap with the long-lead items in missile components, such as ball bearings, rocket motors, seekers, and electronic components. The primary objective of 2024 DoD missile multi-year-contracts is to ensure deep magazines to deter the China fight, as well as cost-savings, and DoD must then budget to this objective.
>
> Major RDT&E funding increases must be geared toward preparing for production. "Production is what matters, everything else follows from that." For the China fight, the critical question is whether it (the system/munition) is still in production, and how quickly it can be ramped-up.

The Lieutenant Colonel reviews the Presidential Budget submissions from 2024 through 2027 and notes modest increases in overall DoD funding as well as a change in priorities, particularly with increased research and development in energetics, solid rocket motors, and warheads. This results in increased missile production and the long-range conventional fire capabilities of all U.S. armed services.

In the peer competitor capital, a new, young, and energetic cadre of military leadership advocates for military action, particularly as their leader told them earlier in the decade to be “ready” by 2027. While military action will damage economic infrastructure in adjacent territories, the addition of computer chip production will augment the nation’s flagging economy. The military had been watching the impact of a U.S.-led high capability chip embargo for the preceding four years. After assessing military options for an invasion, the leadership determines that a surprise military attack is not in their best interest. The U.S. and other allied nations have enough long-range fire and production capability to make it unfeasible to conduct an attack without unacceptable risk. Priority is given to restructuring the economy while maintaining the readiness of a robust military capability.

3. PPBE / ACQUISITION SEAM

VIEWING THIS SEAM THROUGH THE LENS OF TIME

PPBE is calendar driven, but both requirements and acquisition (processes dependent on PPBE) are activity driven. The issue is important because both requirements and acquisition have pathways and processes that have evolved to operate much more rapidly than the annual cycle of PPBE, especially for urgent needs and emerging technologies. This disconnect causes delays and missed opportunities in the effort to develop and deliver timely capabilities to the warfighters.[1]

The Joint Capabilities Integration and Development System (JCIDS) process drives requirements generation and ideally seeks to generate required capabilities as rapidly as possible. This impacts the need for resources on a continuous yet unscheduled basis to support analysis, documentation, and ultimately, requirement approval. The result is an inefficient and ineffective system of operating under an annual cycle in which requirements developers must estimate what operational analysis (e.g., wargames, warfighter forums, experimentation, conflict research) must be completed (and consider that such analysis is historically underfunded) while the Science and Technology (S&T) community must simultaneously project research costs without incremental knowledge gained from operational analysis.

Once a requirement is approved, the effort shifts to the Defense Acquisition System (DAS), which may occur anytime during a calendar year. Program Managers (PMs) need to be able to rapidly initiate resource-dependent activities such as Integrated Product Teams (IPTs), contract generation, Source Selection Evaluation Boards (SSEBs), and contract awards – all of which are constrained by the annual cycle of when PPBE inputs can be made and when appropriations are subsequently issued.

Given the dynamic nature of modernization efforts (unlike, for example, Personnel or Infrastructure), there is a need to assign each element of PPBE its own discrete tempo, based on the probability of change within its products. The panel's observations are as follows:

> **Planning** – Remains on an annual basis because it considers large groupings of resources in distant years. The inputs for this portion of the cycle are generally documents such as the Defense Planning Guidance (DPG), National Defense Strategy (NDS), National Military Strategy (NMS), or the National Security Strategy (NSS), all of which look broadly and often at time horizons three to thirty years ahead. Critical within this phase is understanding the types of experimentation and testing that might be needed to fully implement novel technologies into the force so that resource demands can be identified.
>
> **Programming** – Remains on an annual basis because while its focus is not as deep as Planning, Programming seeks to organize resources into logical groupings and a higher confidence interval is placed on the expected needs. This phase requires DoD and the Services to begin aligning resource needs to support anticipated demands roughly three years hence. However, it is unrealistic at this point to expect to know in detail (e.g., at the platform or system level) the solutions necessary to meet future capabilities. Thus, modernization programming should focus on groupings of capabilities that would capture aspects such as technology development and maturation and operational experimentation to more fully understand the required capabilities at organizational and platform levels. At the same time, programming must provide appropriate oversight by placing capabilities within context and with prioritization.

[1] AEI Report, Greenwalt. Competing in Time. Available at https://www.aei.org/wp-content/uploads/2021/02/Greenwalt_Competing-in-Time.pdf

Budgeting – Moves to a semi-annual basis through a systematic mid-year review effort that provides a standard methodology for adjusting resources based on external factors and also on "fact of life" activities in emerging and established programs based on changes to requirements or technologies. This phase has two discrete sub-elements, with the first portion focusing on the traditional assembly of budget documents that address individual program element level of detail while the second focuses on realignment of resources based on fact of life adjustments.

Execution – Moves from calendar-based Comptroller sweeps of unobligated funds to acquisition managers setting an event-based obligation schedule for each program when funds are appropriated, and DoD and Service Comptrollers measuring obligation status against these schedules. Congress should maintain oversight through a data management infrastructure that permits real-time monitoring of resources by Congress.

VIEWING THIS SEAM THROUGH THE LENS OF DATA

The current PPBE process is labor-intensive, requiring the manual collection, manipulation, and transfer of data among multiple discrete data management systems, which induces error and "time drag" on providing accurate and timely information to both DoD decision makers at multiple echelons and oversight bodies such as Congress. The panel's observations are as follows:

- Data must be collected/generated across DoD; however, there is no single authoritative data form or repository within the enterprise. DoD should, within two years, fully implement a data management system that permits all non-SAP program data to be automatically collated, aggregated, and displayed to users whose roles require specific types of access (and such access would be controlled and monitored at the enterprise level, improving oversight of both who is using the information and whether informed decisions are being made).

- When information is required, whether for decision at any level or for responding to queries, human judgment/assessment/interpretation of various databases is often needed to find different elements of data and to place information in context. These manual processes reduce the ability of all users, from program managers and requirements developers to members of Congress, seeking to fulfill their oversight function to have timely and accurate information.

- Compiled data is submitted to decision makers and/or overseers often as discretely generated briefings or paper documents and in many cases, results in questions that require successive returns to those various data sources for information and repetitive regeneration of documents (and multiple stops along the bureaucratic way).

- The current process is dependent on scheduling calendars for appropriate senior leadership (multiple personnel at multiple levels for each decision), which adds further lag to the system. Additionally, the need to then coordinate with four Congressional Committees for both initial inputs and adjustments in execution, using paper-based inputs and interactions, is inefficient and ineffective in an era of rapidly changing technologies and threats.

Program and Budget Reviews constructs and formats must be revamped completely to incentivize the maximum use of collaboration across government, and in some cases industry/academic partners, to reduce latency of data and improve transparency and trust within the communities of interest for program efforts. *The idea that "time is money" is as appropriate for DoD as it is for industry.*

Inherent in implementing this effort to improve efficiency and effectiveness is the need to rapidly and fully adopt a data management framework that gathers existing data from across all elements within the enterprise, establishes logical and easily accessible databases, uses data visualization that allows appropriate individuals transparent real-time access to information in a usable format, and provides a venue for both DoD-internal and Congressional oversight. DoD will not achieve timely and adequate management of the delivery of modernized systems (whether hardware or software) without a viable comprehensive data management construct.

As an input to panel deliberations, the Hudson Institute report "Competing in Time: Ensuring Capability Advantage and Mission Success through Adaptable Resource Allocation" was reviewed. The panel agrees with the conclusion of this comprehensive analysis that states time-based competition with our potential adversaries requires a holistic change in our resource allocation process.

THE SEAM CALLED THE "VALLEY OF DEATH" (VOD)

In meeting DoD's requirements, most companies, large and small (particularly technology-based companies), face a series of challenges in attracting funding to take a capability from concept to prototype to initial production to full rate production. In the private sector, gaps in this progression due to shortfalls in capital investment or break-even revenue generation are called the Valley of Death (VoD). Such gaps can often result in the death of a startup company and worse yet, the loss of the realization of the capability being pursued. DoD is losing opportunities for the adoption of new technologies because smaller non-traditional companies cannot wait on an annual funding cycle.

DoD has adopted the VoD term to refer to the failure of an innovative technology to transition from the S&T base or commercial source into a program of record or in the case of smaller value development efforts, full rate production. There are many possible reasons for such failures, including:

- Inadequate Technology Maturity: Technology Readiness Levels (TRLs) are used to characterize technology maturity on a scale from 1 to 9. Typically, DoD S&T funds a technology up to about TRL 4. If resources are available, an engineering center or contractor may then take the technology to TRL 5-6, while low risk transition to a program of record requires TRL 7 or 8. So either S&T, an engineering center or the program of record needs to find resources to invest in technology maturation.

- Inadequate Scale-up Maturity: Scale-up maturity is characterized by Manufacturing Readiness Levels (MRLs) on a scale similar to TRLs. It is possible for a technology to have successful test and evaluation results, but a low MRL based on building a few systems in a lab without existing commercial infrastructure or supply chains, an unacceptable risk to a program of record that needs to be scaled up to serial production.

- High Cost: The unit cost of the innovative technology may exceed what the program of record can afford to insert, which is sometimes a result of inadequate commercial infrastructure for serial production.

- Change in Requirement (or lack of requirement): A change in threat or operational need may occur or for innovations that are technology-push, there may be no formal validated requirement. Without a documented requirement, acquisition cannot be started.

- Schedule Misalignment: The program of record may have an insertion window that the innovative technology misses, which means a delay of a year based on PPBE cycle.

- PPBE Misalignment: Fixing any of the preceding problems requires advance planning of a funding wedge, but the need may not be apparent until the budget year or execution year when funding flexibility is very limited.

The last point is frequently mentioned in the context of the Small Business Innovative Research (SBIR) program. SBIR budgets across DoD total about $2 billion (about $6 per person in the U.S.) per year for Phase I (feasibility) and Phase II (development) awards. Most SBIR Phase II projects fail to transition to Phase III (commercialization). In the PPBE process, unless an acquisition program has programmed in advance for transition, a successful SBIR prototype faces at least a one-year gap to the nearest Program Objective Memorandum (POM) cycle that can carry the technology forward. Since SBIR is managed by the technology community, advanced programming by acquisition managers is the exception rather than the rule. The Navy SBIR program mitigates this by allowing PEOs and SYSCOMs to define many of the SBIR solicitation topics, thereby creating a "pull" that leads to higher Phase III transition rates than the other Services. Other recommendations, by the Section 809 Panel among others, suggest increasing the SBIR "tax" on programs, thus incentivizing PMs to use their "tax dollars" to move a project to Phase III and ease the transition to Congressional funding of programs of record.

It is ineffective to look for examples of PPBE slowness driving a technology into the VoD since it is always a matter of priorities and available appropriations. There are many examples of intervention by senior leaders and heroic efforts to reprogram funds to pull a technology across the valley, sometimes to meet an urgent need (like the MRAP program) and sometimes to provide a strategically important capability (like the Long-Range Anti-Ship Missile (LRASM)). There are also examples of programs that are structured in advance to include transition agreements and funding (such as the Future Naval Capabilities program). And there are examples of small 6.4 program elements that have budget year flexibility to serve as bridge funding while the program of record arranges outyear funding. However, finding examples of transition failures caused by PPBE is attempting to prove a negative: the PPBE process is intended to fund the highest priorities, and the argument is that any technology that lands in the VoD simply did not have the priority to make the cut. It should be noted that it takes a very high priority to instigate reprogramming that will "break" existing programs. If innovating to keep pace with potential adversaries is a priority, then maintaining BA 6.4 PEs with flexible bridge funding would be less disruptive than reprogramming. This is consistent with the recommendation of the Defense Innovation Board[2] to create "oasis" funding to bridge companies across the VoD.

VIEWING THIS SEAM THROUGH THE LENS OF TRUST AND TRANSPARENCY

Trust is a uniquely human dynamic. A critical component to trust is transparency. The panel's work suggests that an indispensable element to establish transparency and trust within any complex system is direct, timely access to comprehensive and accurate data by the appropriate people. While data pertaining to requirements and acquisition processes has largely been made transparent and accessible (albeit in multiple systems that often lack data portability), there remains a significant challenge in ensuring the transparency and accuracy of data within the PPBE processes. This opacity is predominantly attributed to issues that manifest in three distinct areas, each presenting its own set of challenges and complexities.

The first of these areas of concern relates to the complex journey that data undergoes as it moves both horizontally and vertically through various nodes of the decision-making hierarchies (JCIDS and DAS, with each element often having its own software) within DoD and ultimately reaches Congress (which remains hard copy/paper-dependent). This intricate process of data transformation is often likened to an "information diode," referring to a unidirectional flow of information, much like a one-way valve, and vividly illustrates the challenge at hand.

[2] Defense Industrial Board, 2023. Terraforming the Valley of Death. Available at /https://innovation.defense.gov/Portals/63/DIB_Terraforming%20the%20Valley%20of%20Death_230717_1.pdf

Data originating from the Services, CCMDs, and various agencies must traverse a convoluted path as it progresses from initial planning and programming stages to budgeting and execution phases. At each stage, the data is manually accessed, manually cross-referenced to operational service capability gaps (if not from a service), aggregated (generally in parts, rather than in whole), transformed (creating "new" data), and refined (creating more "new" data) to meet the specific data demands and formats of the respective entities involved—first within DoD, then the Office of Management and Budget (OMB), and finally, Congress. In essence, the information diode tends to limit understanding, and corrections within the process are prone to error at multiple points that may not be quickly or easily identified.

Commercial technology exists today to address this data issue, for example, providing visibility to financial systems. Banking and investment firms require this level of visibility to ensure compliance through transparency to outside auditors such as the SEC or FDIC. This level of transparency incorporates necessary feedback loops to provide options for timely decisions at a scale that is not possible today within PPBE's processes.

The second formidable challenge lies in the pervasiveness of data silos, in which information is compartmentalized and opaque. The gravity of this challenge became so pronounced that the Deputy Secretary of Defense (DEPSECDEF) took decisive action, enacting policies and issuing directives that bestowed upon the Chief Data and Artificial Intelligence Officer (CDAO) the authority to collect and oversee data-related matters. The extensive nature of this challenge for PPBE was meticulously examined in Chapter 7 of the Commission's interim report (PPBE Reform Commission Interim Report, 2023), underscoring its critical significance.

In the pursuit of leveraging data as a catalyst for transparency and trust, two contrasting arguments emerge, each offering a unique perspective on the matter. The first argument posits that unrestricted access to all available data can profoundly enhance transparency and trust. By making data visible to all stakeholders, spanning the three distinct decision-making systems and extending to Congress, this approach aims to create a shared understanding and alignment of information. It cultivates an environment where decision-makers can operate with a collective common knowledge base, ideally reducing the likelihood of misunderstandings and mistrust that today often stem from information asymmetry.

Conversely, the second argument contends that such a high degree of transparency could inadvertently lead to micromanagement and an unending deluge of inquiries concerning the purpose and outcomes of various activities. This argument highlights the need for a delicate equilibrium in data disclosure, particularly to avoid overwhelming decision makers with excessive granular information that might hinder their ability to focus on strategic objectives.

Navigating a balanced path between these two arguments requires a pragmatic approach characterized by the thoughtful implementation of access controls and data visualization. Under this approach, data access is judiciously granted to individuals and teams with direct ***responsibility*** and ***authority*** for making critical decisions. By tailoring data access to align with specific roles and responsibilities, this middle ground ensures that those entrusted with decision making possess the necessary information through coherent real-time data visualization from a system (not PowerPoint charts) without being inundated with extraneous details that may distract from or obscure critical information. In essence, this approach acknowledges that transparency is essential and must be tempered with discretion and relevance to strike the optimal balance between information availability and operational tempo.

The third area of concern centers around the allocation of decision rights and the establishment of clear ***accountability*** within the complex decision-making landscape. Across the spectrum of decision processes and reviews within the system, there is a compelling need for enhanced clarity in defining who holds the authority to make critical decisions and how those individuals are accountable for the outcomes of their decisions. This challenge extends its reach into multiple facets of the organizational hierarchy, encompassing everything from strategic planning and resource allocation to program execution and evaluation.

In addressing this challenge, several considerations come into play. Firstly, delineating decision rights ensures that specific individuals or entities with the requisite expertise and knowledge are empowered to make recommendations or decisions aligned with their specific roles and responsibilities. This approach fosters efficiency and prevents bottlenecks in decision-making processes, enabling timely responses to evolving circumstances.

For example, the perennial conflict between the Contracting and Program Management chains regarding authority and inclusion within the decision-making process was also part of the Section 809 Panel discussions. Ultimately, the panel agreed that leadership and responsibility were context dependent. While teams at various levels should continue advising decision makers, their operation should not delay the decision-making process with additional "sign offs," i.e., each team must not function in isolation within the process. If a PM disagrees with a contract type, they should discuss this with the contracting officer. If the issue remains unresolved, it should be elevated to the next level for resolution. There is a tendency to spend excessive time attempting to build consensus when the decision maker should simply consider all inputs, make a decision, and proceed. In major programs, the contract-type decision was often a collective corporate decision related to the overall PPBE process.

In addition, establishing robust accountability mechanisms is essential to ensure that decisions have tangible consequences, whether they lead to success or require corrective actions. Accountability serves as a safeguard against a lack of ownership or diffusion of responsibility, thereby reinforcing a culture of responsibility and commitment to the outcomes of decisions.

Achieving clarity in decision rights and accountability is instrumental in enhancing transparency and trust among stakeholders, and by extension the broader community and public. When all parties understand who is accountable for specific decisions and their associated consequences, it fosters confidence in the decision-making process and encourages collaboration and cooperation.

To tackle this multifaceted challenge effectively, the framework must be adaptive and allow for flexibility in response to changing circumstances while maintaining a coherent and structured decision-making ecosystem. By addressing the challenge of decision rights and accountability comprehensively, organizations can bolster their capacity to make informed decisions, enhance operational efficiency, and cultivate a culture of transparency and trust.

PPBE / ACQUISITION SEAM SUMMARY AND RECOMMENDATIONS

PPBE is calendar driven, while Acquisition is requirements- and event-driven. Changes in requirements and events (e.g., test results) often require execution-year flexibility, but applying existing flexibilities requires senior intervention and heroic efforts (e.g., LRASM). There are frequent iterations between PPBE and Acquisition, yet PEOs have limited ability to adjust resources within their portfolios. This inhibits acquisition agility and the ability to keep pace with new technology, especially commercial technology available to adversaries, even though Congress has authorized new acquisition authorities to enable flexibility and speed. Programs with incremental/spiral development and modular open architecture strategies (e.g., SDA) are better able to accommodate PPBE changes by deferring decisions to later iterations. The panel's recommendations are as follows:

- We endorse the Commission's Interim Report recommendations. They will provide much needed flexibility, especially the following recommendations:
    - » Colors of money (a different approach)
    - » Modify thresholds for Below Threshold Reprogrammings (BTRs)
    - » Modify internal DoD reprogramming requirements
    - » Modify availability of appropriations
    - » Mitigate problems caused by Continuing Resolutions

  - » RDT&E Budget Activities consolidation
  - » Transform the budget structure
  - » Systematic review and consolidation of budget line items
  - » Improve understanding of private sector practices

- To build more flexibility in developing, producing, and sustaining warfighting capabilities, DoD should structure the POM and budget to group resources for like-capabilities into PEO-managed portfolios with tradeoff authority while including appropriate controls.

- To reduce the time for integration from a PPBE perspective, DoD should define clear roles and responsibility (who can say "yes," and more importantly, limiting who can say "no" to approvals) and avoid the drive for consensus through staff action by elevating issues to decision makers in a timely manner; For example, on the acquisition side, it is recognized that the top line for every program is a prioritization function that comes out of a larger PPBE process. Once that top line decision is made, the policy should clearly state that:

  - » only the PEO has approval authority over the PM from program perspectives; all others are advisory to the PM and PEO but cannot nonconcur;
  - » only the Component Acquisition Executive (CAE) has approval authority over the PEO; all others are advisory to the PM and PEO but cannot nonconcur;
  - » only the Defense Acquisition Executive (DAE) has approval authority over the CAE; all others are advisory to the PM and PEO but cannot nonconcur;
  - » the Milestone Decision Authority (MDA) is the main stopping point for approvals up the acquisition chain-of-command; the policy clearly states that "For MDAPs, it is DoD policy to budget to the DCAPE ICE unless an alternative estimate is specifically approved by the MDA"—thus, no others have an ability to say "no"; and
  - » those above the MDA in the acquisition chain-of-command can intervene in oversight, but this should be minimized.

- DoD should link the concept of affordability in PPBE (DoDD 7045.14, Enclosure 3) to the affordability analysis called for and defined in the acquisition community (DoDI 5000.85, Section 3, and underlying processes). Affordability analysis results should be provided to inform all JCIDS requirements validations.

- To improve transparency and information sharing, DoD should prioritize implementation of information technology systems that are intuitive for building transparency and trust, including developing capabilities to use large language models (LLMs), natural language processing (NLP), and machine learning (ML) to make PPBE (including justification books) more timely, accurate, accessible, and transparent for authorized users. There are nascent capabilities in Advana using these technologies, and other AIRC research for the Commission explored how these evolving capabilities could be applied to improve information sharing and cognizance (especially from portfolio and mission views), but continued R&D is recommended for these promising approaches.

- If more aggressive PPBE reform is possible, the DPG could specify that tradeoffs in funding validated requirements be within a major funding category (RDT&E/Procurement, Personnel, and Operations and Maintenance) rather than across these categories to ensure that the investment accounts (future capability) are not used to fund current capability.

4. REQUIREMENTS / PPBE SEAM

There is a major disconnect between the formal DoD requirements process and the PPBE process at every level below the DPG.

VIEWING THIS SEAM THROUGH THE LENS OF ORGANIZATIONAL DESIGN

There has been growing tension with the delivery of capabilities among the CCMDs, Services, and Agencies. While the requirements process is ultimately intended to support the CCMDs, the Services are statutorily directed to develop capability for those in their specific domains. Hence, there have always been challenges in the development and integration of capabilities from the Services (and Agencies) to support the CCMDs. While one of the roles of the Joint Requirements Oversight Council (JROC) is joint capability development, the JROC itself does not have PPBE authorities.

The other tension within organizational design is the integration of commercial industry. The PPBE process is designed on a five-year plan/program supported with annual appropriations. By contrast, capital markets drive industry behavior with publicly traded companies focused on quarterly reports and annual forecasts. There are similar short-term pressures on companies supported through private equity firms, venture capital firms, or home offices. Given the pace of technologies, especially with the ever-increasing role of software in capabilities, industry lacks visibility and confidence in the DoD requirements process, which creates a business risk to the point that businesses factor this risk into price. The premium can be as much as 30 percent, directly impacting the top lines of the modernization portfolios and by extension the PPBE process. This is especially problematic for advanced manufacturing facilities and long lead time supplies of materials. The organization design of the PPBE processes is very challenging (even antithetical) to commercial companies that operate in the dynamism of the capital markets.

The 9/11 Commission underscored the formidable challenges inherent in achieving effective integration across the U.S. Government over time. Subsequently, novel organizational frameworks were devised to enhance integration in both operational and institutional contexts. There was a particular focus on organizational cohesion using a team of teams approach, enabling the swift execution of operational missions involving multiple entities and leaders operating under specific authorities and accountability.

Institutionally, a Cross-Functional Team (CFT) construct has proven highly successful in fostering integration on a large scale between the requirements and acquisition elements, providing enhanced efficiency and effectiveness within the current PPBE construct. While DoD might find CFTs too unwieldy for widespread adoption across the Department, deploying CFT organizational structures strategically on the most critical (whether time or technology based) programs, featuring empowered leaders from all three decision-making systems and including appropriate Congressional representation to enable appropriate involved oversight, presents a promising solution to integration challenges. The USAF's B-21 program provides a prime exemplar of this approach, including integration with industry. However, it is crucial to recognize that the concept of targeted CFTs is not a standalone remedy but rather the initial building block of a comprehensive architectural solution. This broader architecture necessitates the implementation of tools designed to cultivate transparency and trust among all stakeholders.

VIEWING THIS SEAM THROUGH THE LENS OF INTEGRATED PRODUCT TEAMS AND CROSS-FUNCTIONAL TEAMS

The DoD faces significant challenges in aligning and synchronizing the three core functions (PPBE, DAS, and JCIDS) efficiently. To address these challenges, we advocate for an increased focus on and use of integrated product teams (IPTs) and CFTs as organizational solutions. The objective is to enhance collaboration, streamline communication, and improve decision making, ultimately leading to more effective defense resource allocation and acquisition processes.

Integrated Product Teams (IPTs)

IPTs are multidisciplinary teams that bring together experts from various functional areas to work collaboratively on a specific project or program. IPTs are designed to foster communication, share expertise, and break down silos within organizations. When applied to the DoD's integration challenges, IPTs can play a pivotal role in improving coordination and decision-making. Benefits of IPTs in DoD include:

- Enhanced Communication: IPTs facilitate regular and open communication among stakeholders from different functional areas, ensuring a shared understanding of goals, constraints, and challenges.
- Cross-Functional Expertise: By assembling experts from various disciplines, IPTs leverage a diverse skill set to address complex integration issues comprehensively.
- Streamlined Decision-Making: IPTs empower members to make decisions collectively, reducing bottlenecks and expediting the resolution of integration problems.
- Accountability: IPTs promote a sense of ownership and accountability among team members, improving project management and execution.

When implementing IPTs in DoD to maximize the effectiveness of IPTs in addressing integration problems, the DoD should consider the following steps:

- Conduct a thorough assessment to identify specific integration problems within the PPBE, requirements, and acquisition processes.
- Create IPTs tailored to address identified challenges.
- Ensure a balance of expertise from planning, requirements, and acquisition domains.
- Provide IPTs with clear objectives, resources, and authority to make decisions within their defined scope.
- Regularly review and assess the performance of IPTs to ensure they effectively address integration problems.

Cross-Functional Teams (CFTs)

CFTs are another organizational solution that can help DoD overcome integration challenges. CFTs are similar to IPTs but operate at a higher organizational level, focusing on strategic alignment and overarching integration goals. Benefits of CFTs in DoD include:

- Strategic Alignment: CFTs ensure that strategic objectives are incorporated into the planning, requirements, and acquisition processes, fostering a holistic approach to integration.
- Enhanced Integration: CFTs can address systemic integration issues and develop long-term solutions to prevent recurring problems.
- Resource Optimization: By examining integration challenges from a broad perspective, CFTs can identify opportunities for resource optimization and cost savings.
- Stakeholder Engagement: CFTs promote engagement with senior leadership and stakeholders, ensuring alignment with overarching strategic goals.
- Leadership by Flag Officers/SESs, with direct lines of communication to DoD/Service Senior Leaders.

When implementing CFTs in DoD to leverage CFTs effectively in addressing integration problems, the DoD should consider the following steps:

- Define Strategic Objectives: Clearly articulate the strategic objectives and integration goals (operational capabilities) that CFTs are tasked with delivering.
- Establish Governance Structures: Create minimalist/streamlined governance structures that provide oversight and accountability for CFTs while allowing them the autonomy to execute their missions.
- Cross-Functional Leadership: Appoint leaders with appropriate operational or institutional expertise to lead CFTs, enhancing the probability of success.
- Resource Allocation: Allocate resources via standalone processes to CFTs that minimize time and effort on bureaucratic needs while supporting their initiatives and projects.

Integration problems among the PPBE process, the DoD requirements process, and the DoD acquisition process have long plagued the Department, resulting in inefficiencies, delays, and budget overruns. To address these challenges, the implementation of IPTs and CFTs is recommended. IPTs and CFTs offer DoD a structured approach to enhancing collaboration, streamlining communication, and improving decision-making across these critical functions, including with industry as appropriate. By empowering teams with cross-functional expertise and a shared mission to address integration problems, DoD can better align resources with strategic priorities, improve acquisition outcomes, and enhance national security.

As DoD continues to evolve and adapt to changing threats and technologies, the effective implementation of IPTs and CFTs will be essential to overcome integration challenges and ensure the readiness and effectiveness of the nation's defense capabilities. Benefits of organizing around implementation of CFTs and IPTs include:

- Enhanced Collaboration: CFTs and IPTs bring together experts from different functional areas, fostering collaboration and knowledge sharing. This can lead to better problem-solving and innovative solutions, particularly for complex defense projects.
- Streamlined Communication: These teams promote open and regular communication among stakeholders, reducing misunderstandings and ensuring that everyone is aligned with project goals. This is critical in defense, where clarity and precision are essential.
- Faster Decision Making: CFTs and IPTs often have the authority to make decisions at their level, reducing the need for bureaucratic approvals. This agility can accelerate the development and deployment of defense systems.
- Risk Mitigation: By involving experts from various domains early in the process, these teams can identify and address potential risks and challenges proactively. This can help prevent costly setbacks and delays.
- Cost Efficiency: With a focus on integrated solutions and streamlined processes, CFTs and IPTs can help control costs by avoiding redundancy and optimizing resource allocation.
- Accountability: Each team member typically has defined roles and responsibilities, making it easier to track progress and assign accountability. This ensures that projects stay on schedule and within budget.
- Adaptability: In rapidly evolving defense environments, CFTs and IPTs can adapt quickly to changing requirements and emerging threats, ensuring that the defense systems remain effective and up-to-date.
- Quality Assurance: The collaborative nature of these teams can lead to a higher level of quality control, as experts from different fields can review and validate each other's work, reducing the likelihood of errors.
- Stakeholder Involvement: CFTs and IPTs often include representatives from end-users and other stakeholders. This ensures that the final product or solution meets the actual needs and requirements of those who will use it.
- Innovation: By fostering a culture of collaboration and innovation, these teams can accelerate the development of leading-edge technologies, systems, and strategies that give the Department a competitive advantage over adversaries.
- Operational Value: The preceding ten elements, when properly implemented, yield enhanced capabilities for DoD/the Services through better solutions on faster timelines.

REQUIREMENTS / PPBE SEAM SUMMARY AND RECOMMENDATIONS

There is a major disconnect between the formal DoD requirements process and the PPBE process at every level below the DPG. The JROC validates joint capability development but has little or no influence over PPBE priorities, which are set in the Service programming process. Combat Commanders (CCDRs) feel that their priorities are subordinate to Service priorities with no forum for resolution. Industry needs more visibility into requirements in order to construct advanced manufacturing facilities, establish supply chains for long lead-time parts, or access advanced materials. This necessitates significantly earlier commitments from DoD than currently exist within PPBE or acquisition contracts. Better government fidelity on requirements up to a threshold level (with options via spiral development to an objective level) covered by terminations clauses in contracts reduces industry risk and by extension, risk-premium pricing. The requirements process is the most under-resourced decision-making system. The lack of technology maturation and fidelity on production numbers through experimentation, simulation, and user touch points, combined with the lack of concepts and use cases informed by the Services and CCMDs, creates unstable and unsettled requirements. The key theme in improving this seam is a focus on organizational roles and responsibilities. The panel's recommendations are as follows:

- DoD should empower the JROC to assign a validated CCMD Joint Emerging Operational Need Statement (JEONS) to a Service or Agency as a "must fund" priority, with DEPSECDEF visibility of the resulting resource decisions. Require that CCMDs prioritize their requirements as part of the JROC requirements validation process, and that requirement lists be matched to and reconciled with Service Budget requests in the PPBE process by DEPSECDEF.

- The Joint Staff and DoD should give CCDR-provided scenarios, exercise, and wargaming results weight equal to that given to the Military Services and Joint Staff inputs as the basis for the annual Capability Gap Analysis of the Future Years Defense Program (FYDP).

- DoD should provide Service affordability analysis along with requirements that are reviewed and approved by the JROC. This will provide the JROC with the Service's sense of priorities and affordability with respect to the materiel item in question. Affordability analysis is required at Milestone A and thus is available for CDD validation (see DoDI 5000.85).

- To provide Industry more visibility into DoD requirements, especially with respect to production capacity, DoD should include in budget justification documents provided publicly with the President's budget request both a threshold [minimum] and an objective [stretch goal] level for annual procurement quantities. DoD acquisition programs should reflect these requirements with contract options to the objective level and termination liability clauses applicable below the threshold level. In addition, DoD should provide cleared defense contractors with controlled access to validated mission needs and requirements statements (at the CUI and classified levels) to help with industry's planning for Internal Research and Development (IR&D), staffing, and infrastructure investments and investment hedges.

- DoD should provide Industry (along with Congress) data and information from the President's Budget justification books in structured machine-readable formats. (This will also facilitate improved data analytics and portfolio views discussed in other AIRC reports to the PPBE Commission.)

- DoD should give investments in staffing, training, and career development of the Joint Staff and Military Service requirements community higher PPBE priority, as has been done successfully in Defense Acquisition Workforce improvement investments. This would:
    - » Professionalize the requirements generation, determination, validation, and management process. Develop entry- and mid-career training programs along with career-enhancing recognition for those who successfully participate in the process to improve collaborative decision processes among the user, PPBE, and acquisition communities.
    - » Establish a DoD Requirements Workforce Development Account (DRWDA) analogous to the DoD Acquisition Workforce Development Account (DAWDA) and the similar funds (DAWDFs) for the three military departments.
    - » Fund a segment of the Defense Civilian Training Corps (DCTC) focused on requirements management for training and orientation of undergraduates as an improved civilian pipeline into the Requirements Community (generally) and the interface with PPBE.[3]

[3] See 10 U.S. Code, Chapter 113, for the statutory establishment of DCTC. Initial DCTC training focuses on acquisition but could be expanded to add an optional specialty focus on requirements management.

5. REQUIREMENTS / ACQUISITION SEAM

We recognize that this seam is outside the scope of the PPBE Reform Commission. We found that it needs improvement and provide recommendations for future consideration. The current JCIDS process develops and validates acquisition requirements. It is widely criticized as too slow and bureaucratic to keep pace with technology or threat in cases where time matters and is based on a waterfall model rather than the highly iterative and collaborative agile development process used in industry. The adaptive acquisition framework provides pathways for Middle Tier of Acquisition (MTA) and software development that are exempt from the JCIDS process and are being used successfully by DoD Components to develop and deliver new capabilities. Successful programs have used cross-functional teams for collaboration and iteration among requirement developers and system engineers, often with user representatives embedded in the program office (e.g., B-21). In light of acquisition reform and PPBE reform initiatives, we found that reform of the requirements process is needed to achieve the agility DoD needs. The panel's recommendations are as follows:

- We agree with the current Senate version of the FY 2024 NDAA direction to reform the DoD requirements system. We recommend starting now on such reforms, to include:
    - » Forming a JS-led CFT with OSD and Service stakeholders to reform the system, specifically the boundary between Requirements (JCIDS) and Acquisition (Defense Acquisition System (DAS)).
    - » Developing a more agile, collaborative, and iterative process for the integration and transition of requirements to the systems engineering process.
    - » Developing a capability needs and requirements framework and pathways that are aligned to the Department's Adaptive Acquisition Framework pathways, and that include aligning the Department's S&T processes to emphasize products that address capability requirements.
    - » Developing a process to rapidly validate the military utility of commercial solutions to meet capability needs or opportunities.
    - » Developing a mission engineering approach for defining enduring requirements in a set of capability portfolios, with a set of mission impact measures that capability deliveries must seek to continuously improve.
    - » Assessing best practices to ensure that the requirements process for software, artificial intelligence, data, and related capability areas enable a more rapid, dynamic, and iterative approach than used for hardware systems.
- In addition, we recommend that the reforms of the DoD Requirements process include designating a single organization or entity directly responsible for overseeing and driving the development of joint capabilities.

6. THOUGHTS ON IMPLEMENTING – INTEGRATION AND CREATING A CONTINUOUS IMPROVEMENT CULTURE

INTEGRATION – AN EXAMPLE OF TODAY'S BEST PRACTICES

The requirements, PPBE, and Acquisition processes have separate "process owners": VCJCS, USD(C)[4], and USD(A&S), respectively. Solving integration problems for acquisition purposes, therefore, typically falls to the PEO and PM with little help from the organizations above them. There are Service champions, such as the Deputy Assistant Secretary of the Navy (DASN) positions (e.g., DASN(Ships) or DASN(Air)) who facilitate the resolution of significant integration problems, but the routine integration tasks are handled at the program level. PEOs and PMs have become adept at using existing flexibilities and authorities to the maximum in resolving disconnects.

A good example is the Space Development Agency (SDA), a direct reporting unit of the U.S. Space Force. The SDA mission is to deliver needed space-based capabilities to the joint warfighter to support terrestrial missions through development, fielding, and operation of a proliferated low Earth orbit (pLEO) constellation of satellites. This Proliferated Warfighter Space Architecture (PWSA) program uses a spiral development strategy that is launching satellites in five tranches, with a new tranche every two years. Tranche 0 (FY22) satellites are successfully in orbit, and the program is on pace to deliver capabilities on schedule at a price point once deemed unachievable. This has been achieved through integration across the seams in the DoD decision systems:

- Acquisition uses the MTA pathway to go fast using Other Transaction Agreements (111 days from solicitation to contract award) for all but the ground segment of the system. An open architecture, a pool of qualified contractors, and competitive awards for each tranche keeps a warm base of innovation available. This process capitalizes on affordable, commercially available launch vehicles produced and launched by SpaceX. Spiral development allows adding capability as the threat evolves and provides flexibility to defer features to future tranches if they fall behind schedule or require additional investment. The limitations of MTAs, such as five years to fielding, fit comfortably within this program.

- PPBE provides funding in a single RDT&E appropriation that is used for both development and fielding. Changes in funding can be addressed by deferring or accelerating features in a tranche.

- MTA authority exempts the program from the JCIDS process, so requirements are approved by an SDA flag/SES Warfighter Council that meets semi-annually and is supported by monthly working groups. The Council includes representatives from the Services, CCMDs, S&T community, OSD, and other stakeholders. Requirements are directly reflected in the solicitations for each tranche.

This strategy has been highly effective to date in delivering initial capability to the warfighter. It is a delicate balance: Any changes in acquisition authorities, PPBE requirements to change to procurement funding, or assertion of JCIDS process compliance could reduce SDA flexibility and slow the pace of capability delivery to the joint warfighter. Nonetheless, SDA has shown that integration of requirements, PPBE, and acquisition can be made to work. The changes recommended by the PPBE Reform Commission and our panel would make it easier for all programs to achieve similar results.

[4] While each PPBE Phase has an owner, the USD(C)'s Program/Budget organization oversees the PPBE process.

CREATING A CONTINUOUS IMPROVEMENT CULTURE

The volume of information that has been compiled under the title of "Acquisition Reform" since the 1986 Goldwater-Nichols Department of Defense Reorganization Act is overwhelming. Notwithstanding the decades of documents, a back-to-basics approach is needed to continuously improve every aspect of the Department's Big A (requirements, resources, acquisition). Senior leadership must agree on the framework of behaviors needed to continuously improve every aspect of DoD, every day. If a framework identifies more than 3 to 5 key points, then the framework developers have not effectively summarized the big ideas they are trying to communicate to others to effect true transformational change that extends beyond individual leaders' tenure. In his book *Leading the Lean Enterprise Transformation*, George Koenigsaecker outlines what it takes to build a continuous improvement culture.[5] The simple list of three drivers is as follows:

1. **A DRIVE for continuous improvement.**

2. **A DRIVE for mentoring and learning.**

3. **A DRIVE for disciplined execution.**

Capitalizing the word *DRIVE* emphasizes that each behavior requires 10× the normal or usual level of interest and commitment. The first behavior—the focus on continuous improvement, in both process and results—is exhibited by well-known successful transformational leaders. It is captured by the Lexus slogan about the "relentless pursuit of perfection." It is the *goal* of the behavior that is to be encouraged and developed.

The second behavior—a DRIVE for mentoring and learning—is seen in all successful cultures and is encouraged from the top. The relentless pursuit of mentoring means that an effective leader or manager in any organization must demonstrate an ability to mentor others and continuously learn.

The third behavior—a DRIVE for disciplined execution—highlights that continuous improvement done well is demanding work and takes continued follow-up to ensure that the continuous improvement practices are both sustained and growing. "Inspect what you expect" cannot be emphasized enough: Too many otherwise good continuous improvement efforts fail because senior leadership did not spend the time or focus enough to really learn themselves to then know if their organizations were building the new practices and behaviors.

The concept and practice of continuous improvement and the power of respect for people are the core principles. Every individual, in every organization, must be chartered with discovering the best way of doing everything, and every process employed in DoD should be treated as purely experimental. In his book *The High Velocity Edge,* Steven Spear describes the four capabilities of high-velocity organizations.[6]

[5] George Koenigsaecker. (2012). *Leading the Lean Enterprise Transformation* (2nd ed.). McGraw-Hill.
[1]Technology changes can be a threat or an opportunity. Sometimes the Department must change technologies due to a change in the industrial base. For example, the emergence of LED light bulbs causes the industrial base to exit the tungsten wire business because manufacturers no longer needed tungsten wire to manufacture incandescent light bulbs. Tungsten wire is a critical component of traveling wave tubes which are still used in some major weapons systems.

[6] Steven J. Spear. 2009. *The High-Velocity Edge: How Market Leaders Leverage Operational Excellence to Beat the Competition.* 2nd ed. McGraw-Hill.

1. **Specifying Design to Capture Existing Knowledge and Building in Tests to Reveal Problems**

    - Specify expected outcomes.
    - Identify who is responsible for what work and in what order.
    - Specify how products, services, and information will flow from the person performing one step to the person performing the next step.
    - Specify what methods will be used to accomplish each piece of work.

2. **Swarming and Solving Problems to Build New Knowledge**

    - Diagnose and treat those problems before they have a chance to spread.
    - Fix the problem while gaining a deeper knowledge of how the processes work.

3. **Sharing New Knowledge throughout the Organization**

    - Contain problems and propagate discoveries.
    - Leverage the multiplier effect of the cumulative experience of everyone in the organization.

4. **Leading by Developing the First Three Capabilities**

    - Ensure organizations become ever more self-diagnosing and self-improving.
    - Possess skill at detecting problems, solving them, and multiplying the effect by making the solutions available throughout the organization.

The result of continuously reviewing work is to define each step as either *value-adding work* or *non-value-adding work*. Value-adding steps *transform* something, either material in a production process or data in an administrative process. Non-value-adding steps, on the other hand, tend to move things around, involve rework, and don't contribute to warfighter capability outcomes.

There are endless lists of studies and recommendations on what should be done to improve Acquisition in DoD. Many of the initiatives/programs currently underway have helped to align the DoD stakeholders around key areas of focus that will transcend the title of the initiative or the leader who championed it. We recommend elevating our perspective to look at the framework for how DoD should continuously improve and recognize the capabilities required for high performing organizations. We offer four specific recommendations:

1. **Requirements**—Training the requirements community is a development precipitated by the 2007 NDAA. There are approximately two weeks of training offered by the Defense Acquisition University (DAU) (one week online and one week in residence) that lead to certification for the requirements community. We recommend completing the coding of requirements billets across DoD, and then ensuring that the individuals filling those billets have the requisite training. This can be done for the Acquisition workforce through the DoD and Service DACMs.

2. **Alignment of stakeholders (Requirements, Resources, and Acquisition)** at every level for acquisition programs, not just at the most senior levels of the Department, is necessary to create the transparency required to ensure continuous process improvement and knowledge sharing. Transparency builds trust and fosters teamwork.

3. **Responsibility, Accountability, and Authority**—Individuals involved in the review or approval of a program should possess all three of these traits and capabilities in order to have a vote. There are many levels of review, and at every level there are people on the various staffs who do not add value toward transforming something in a material or administrative process. There is a short chain of command for PMs in DoD—PM-PEO-SAE-DAE—that all have the requisite responsibility, accountability, and authority. This acquisition chain of command is the ideal way to leverage IPTs and CFTs, and that short chain of command should be duplicated for the requirements and resourcing communities. This reinforces the recommendation on stakeholder alignment.

4. **Align on key metrics that are true enterprise-level metrics for each DoD process**—Improvement targets should be >10% per year for each metric area, and improvements should be expected in all four metric areas. All metrics can be grouped into four categories:

    - Quality improvement
    - Delivery/lead time/flow improvement
    - Cost/productivity improvement
    - Human development

7. RECOMMENDATIONS

7.1 PPBE / ACQUISITION SEAM RECOMMENDATIONS

- We endorse the Commission's Interim Report recommendations that will provide much needed flexibility, especially the recommendations on:
    - » Colors of money (a different approach)
    - » Modify thresholds for Below Threshold Reprogrammings (BTRs)
    - » Modify internal DoD reprogramming requirements
    - » Modify availability of appropriations
    - » Mitigate problems caused by Continuing Resolutions
    - » RDT&E Budget Activities consolidation
    - » Transform the budget structure
    - » Systematic review and consolidation of budget line items
    - » Improve understanding of private sector practices
- To build more flexibility in developing, producing, and sustaining warfighting capabilities, DoD should structure the POM and budget to group resources for like capabilities into PEO-managed portfolios with tradeoff authority and including appropriate controls.
- To reduce the time for integration from a PPBE perspective, DoD should define clear roles and responsibilities (who can say "yes," and more importantly, who can say "no" to approvals); avoid the drive for consensus through staff action by elevating issues to decision makers in a timely manner; and implement information technology systems that are intuitive for building transparency and trust. For example, on the acquisition side, it is recognized that the top line for every program is a prioritization function that comes out of a larger PPBE process. Once that top line decision is made, the policy should clearly state that:
    - » only the PEO has approval authority over the PM from program perspectives; all others are advisory to the PM and PEO but cannot nonconcur;
    - » only the CAE has approval authority over the PEO; all others are advisory to the PM and PEO but cannot nonconcur;
    - » only the DAE has approval authority over the CAE; all others are advisory to the PM and PEO but cannot nonconcur;
    - » the MDA is the main stopping point for approvals up the acquisition chain-of-command; the policy clearly states that "For MDAPs, it is DoD policy to budget to the DCAPE ICE unless an alternative estimate is specifically approved by the MDA"—thus, no others have an ability to say "no"; and
    - » those above the MDA in the acquisition chain-of-command can intervene in oversight, but this should be minimized.
- DoD should link the concept of affordability in PPBE (DoDD 7045.14, Enclosure 3) to the affordability analysis called for and defined in the acquisition community (DoDI 5000.85, Section 3, and underlying processes). Affordability analysis results should be provided to inform all JCIDS requirements validations.

- To improve transparency and information sharing, DoD should prioritize implementation of information technology systems that are intuitive for building transparency and trust, including developing capabilities to use LLMs, NLP, and ML to make PPBE (including justification books) more timely, accurate, accessible, and transparent for authorized users. There are nascent capabilities in Advana, and other AIRC research for the Commission explored how these evolving capabilities could be applied to improve information sharing and cognizance (especially from portfolio and mission views), but continued R&D is recommended for this promising approach.

- If more aggressive PPBE reform is possible, the DPG could specify that tradeoffs in funding validated requirements be within a major funding category (RDT&E/Procurement, Personnel, and Operations and Maintenance) rather than across these categories to ensure that the investment accounts (future capability) are not used to fund current capability once top lines have been set.

7.2 REQUIREMENTS / PPBE SEAM RECOMMENDATIONS

- DoD should empower the JROC to assign a validated CCMD JEONS to a Service or Agency as a "must fund" priority, with DEPSECDEF visibility of the resulting resource decisions. Require that CCMDs prioritize their requirements as part of the JROC requirements validation process, and that requirement lists be matched to and reconciled with Service Budget requests in the PPBE process by DEPSECDEF.

- The Joint Staff and DoD should give CCDR-provided scenarios, exercise, and wargaming results weight equal to that given to the Military Services and Joint Staff inputs as the basis for the annual Capability Gap Analysis of the FYDP.

- DoD should provide Service affordability analysis along with requirements that are reviewed and approved by the JROC. This will provide the JROC with the Service's sense of priorities and affordability with respect to the materiel item in question. Affordability analysis is required at Milestone A and thus is available for CDD validation (see DoDI 5000.85).

- To provide Industry more visibility into DoD requirements, especially with respect to production capacity, DoD should include in budget justification documents provided publicly with the President's budget request both a threshold [minimum] and an objective [stretch goal] level for annual procurement quantities. DoD acquisition programs should reflect these requirements with contract options to the objective level and termination liability clauses applicable below the threshold level. In addition, DoD should provide cleared defense contractors with controlled access to validated mission needs and requirements statements (at the CUI and classified levels) to help with industry's planning for IR&D, staffing, and infrastructure investments and investment hedges.

- DoD should provide Industry (along with Congress) with data and information from the President's Budget justification books in structured machine-readable formats. (This will also facilitate improved data analytics and portfolio views discussed in other AIRC reports to the PPBE Commission.)

- DoD should give investments in staffing, training, and career development of the Joint Staff and Military Service requirements community higher PPBE priority, as has been done successfully in Defense Acquisition Workforce improvement investments. This would:

    - » Professionalize the requirements generation, determination, validation, and management process. Develop entry- and mid-career training programs along with career-enhancing recognition for those who successfully participate in the process to improve collaborative decision processes between the user, PPBE, and acquisition communities.

- » Establish a DoD Requirements Workforce Development Account (DRWDA) analogous to the DoD Acquisition Workforce Development Account (DAWDA) and the similar funds (DAWDFs) for the three military departments.
- » Fund a segment of the Defense Civilian Training Corps (DCTC) focused on requirements management for training and orientation of undergraduates as an improved civilian pipeline into the Requirements Community (generally) and the interface with PPBE.[7]

7.3 REQUIREMENTS / ACQUISITION SEAM RECOMMENDATIONS

- We agree with the FY 2024 NDAA section 811 direction to modernize the defense requirements process. We recommend starting now on such reforms, to include:
  - » Forming a JS-led CFT with OSD and Service stakeholders to reform the system, specifically the boundary between Requirements (JCIDS) and Acquisition (DAS).
  - » Developing a more agile, collaborative, and iterative process for the integration and transition of requirements to the systems engineering process.
  - » Developing a capability needs and requirements framework and pathways that are aligned to the Department's Adaptive Acquisition Framework pathways, and that include aligning the Department's S&T processes to emphasize products that address capability requirements.
  - » Developing a process to rapidly validate the military utility of commercial solutions to meet capability needs or opportunities.
  - » Developing a mission engineering approach for defining enduring requirements in a set of capability portfolios, with a set of mission impact measures that capability deliveries must seek to continuously improve.
  - » Assessing best practices to ensure that requirements process for software, artificial intelligence, data, and related capability areas enable a more rapid, dynamic, and iterative approach than used for hardware systems.
- In addition, we recommend that the reforms of the DoD Requirements process include designating a single organization or entity directly responsible for overseeing and driving the development of joint capabilities.

[7] See 10 U.S. Code, Chapter 113, for the statutory establishment of DCTC. Initial DCTC training focuses on acquisition but could be expanded to add an optional specialty focus on requirements management.

8. TOPICS FOR FURTHER RESEARCH

The panel identified several promising ideas and potential recommendations that require more research or prototyping before they can be finalized. We offer these for consideration in follow-on efforts that DoD might sponsor:

1. PPBE / ACQUISITION SEAM

- Existing technology can be used for a rapid prototype of an LLM-enabled approach to J-books. Commercial offerings allow DoD to select whatever LLM is best suited (and replace it when something better is available), use controlled DoD data sources for training the model, guarantee factual accuracy and citable sources without risk of hallucinations, and demonstrate the utility of the system in responding to complex natural language queries. We believe a spiral prototype interacting with users can validate key aspects of the system well within a year. We recommend such a prototype be considered for SBIR funding or other source of FY 2024 funds.

- Budget execution reviews could move from calendar-based Comptroller sweeps of unobligated funds to acquisition managers setting an event-based obligation schedule for each program when funds are appropriated, and DoD and Service Comptrollers measuring obligation status against these schedules. Congress could maintain oversight through a data management infrastructure that permits near real-time monitoring of execution status. Needed research includes further investigation of historical obligation patterns on acquisition programs compared to the normal linear execution model.

- Given that sustainment costs historically exceed procurement costs, more emphasis and visibility is warranted on sustainability concerns as a factor of total program cost during development. One idea is to fence investment funds for reducing lifecycle (sustainment) costs, perhaps by designating them as RDT&E BA 7 and allowing them to be used in early development to reduce future sustainment costs (as if the system already existed and we were working to address sustainment issues). Further study is needed to get stakeholder views and apply reliability growth models and cost models to assess the potential effects of such a recommendation.

2. REQUIREMENTS / PPBE SEAM

- DoD could ask the geographic CCMDs to propose regional equivalents to the European Deterrence Initiative (a good example) for consideration in future planning and programming. The CCMDs and associated Service funding lines would have to prioritize within available dollars and then engage in the program and budget review processes for additional resources, if required. The CCMDs should use the capability in the Services/Agencies to execute the funds for the CCMD priorities rather than duplicate program offices, contracting, etc. That gives the CCMDs more flexibility than waiting to the end of the POM to see how their IPLs stacked up for funding. It also incentivizes the Services for meeting CCMD IPL requirements with increased funding. If a more radical approach is possible, geographic CCMDs might be given substantial control over funds for Joint emerging needs. Research is needed to develop a method of cross-CCMD coordination to avoid duplication of capability development efforts, to get stakeholder views, and to provide cost estimates. A CFT with CCMD, Service, OSD, and JS representation would be needed.

- To better inform industry on production capacity planning, DoD could provide access to Defense Contract Management Agency (DCMA) and Defense Logistics Agency (DLA) supply chain insights to better recognize, plan, and fund for supply chain risks and production capacity issues on highest priority, cross-program parts, and end-of-life procurement needs. This would need further research regarding protection of proprietary interests and analysis of the differences between production and sustainment supply chains.

APPENDIX A. PANEL MEMBERS

INTEGRATION RESEARCH PANEL MEMBERS

- **Chair:** LTG (ret.) Ed Cardon, *former CG, Army Cyber Command; Director, Army Futures Command (AFC) Task Force*
- **Co-Chair:** SES (ret.) Dave Drabkin, Esq., *AIRC Fellow, former 809 Panel Chair*
- **Member:** LTG (ret.) Wendy Masiello, *AF, former Director DCMA, AF DAS(Contracting)*
- **Member:** LTG (ret.) N. Ross Thompson III, *former Army, former SrMilDep to ASA(ALT)*
- **Member:** MG (ret.) Robert M. "Bo" Dyess, *former Army, Requirements Integration, ARCIC*
- **Member:** COL & HQE (ret.) Mike Smith, *Requirements/S&T/PM experience, Original AFC TF*
- **Member:** SES (ret.) Elliott Branch, *former Navy, DASN(Acquisition & Procurement)*
- **AIRC Member:** SES (ret.) Michael McGrath, *former Navy, DASN(RDT&E)*

APPENDIX B. METHODOLOGY

The PPBE Integration Research Panel was formed by the AIRC and tasked with exploring the opportunities and challenges with integration and coordination across all three decision making processes with a specific focus on the PPBE process. In developing recommendations, the panel relied on meetings with outside experts, both in and out of government, and on the deep experience of its members.

The panel met with 50 subject matter experts across DoD, Services, industry, and academia to discuss if there are better ways to integrate across requirements, acquisition, and PPBE decision making processes to deliver better capability outcomes with a specific focus on PPBE. The individuals providing their inputs were free to take the discussion in any direction they chose. The input session meeting lasted between 30 to 60 minutes, conducted by a minimum of two panel members on a not-for-attribution basis.

The questions for discussion included:

1. What are the specific pain points with integration? Which of these pain points might be self-inflicted? What must be protected from breaking when PPBE reform rolls out? Do you have any specific examples we might investigate?

2. Most would agree integration is an issue. What are some ideas to help improve integration, especially from a PPBE perspective?

3. There is an assumption that many of the issues related to integration are data-related. There are some who think better access and transparency to data in general will lead to better integration across all stakeholders, although more access to data often invites more oversight requests to provide insight. What is your perspective on current and future data access and transparency needs?

4. What other questions should we have asked? Who else should we talk to?

SUMMARY OF COMMENTS FOR THE PPBE REFORM COMMISSION

The input session meeting notes were collected and cleaned on a not-for-attribution basis. This compilation provided useful background and stimulus to the panel as we addressed issues at the seams in the three DoD decision systems. To provide the PPBE Reform Commission a summary of the sentiments expressed in our input sessions, a qualitative data analysis was conducted based on the notes to find common themes and gaps. The frequency analysis of the topics raised during the meetings was summarized in the following graphics. This provided an insight into the total number of issues mentioned (negative) or successes mentioned (positive) based on the key topics such as the overall PPBE, planning, programming, budgeting, and execution.

Qualitative research is conducted to recognize patterns and gain meaningful insights. In any qualitative study, there are threats to the validity of the research. The input sessions were conducted by two panel members and both members would compile and compare their notes before finalizing them. This was an attempt to minimize threats to descriptive validity. To minimize bias, the panel identified 92 individuals with past/present experience in the various aspects of the PPBE process in both the civilian and military sectors. The panel was able to contact 68 individuals but was only able to schedule and conduct 50 input sessions. This was an attempt to get a broad spectrum of opinions.

The following are direct examples from the qualitative data analysis (QDA)[8] process. Consider the following comment seen in one of the input sessions: "reprogramming is a problem." This comment would be grouped under the key topic, programming. Additionally, given that it speaks to an issue in programming, it is classified as a negative observation, which can be seen on the left-hand side of the graphical representation. Examine the following comment: "PPBE generally works well given the constraints." This comment would fall under the overall topic of PPBE and be classified as a positive observation, which would be seen on the right-hand side of the graphical representation. It is important to note that this systematic categorization approach was employed for all comments derived from the input sessions.

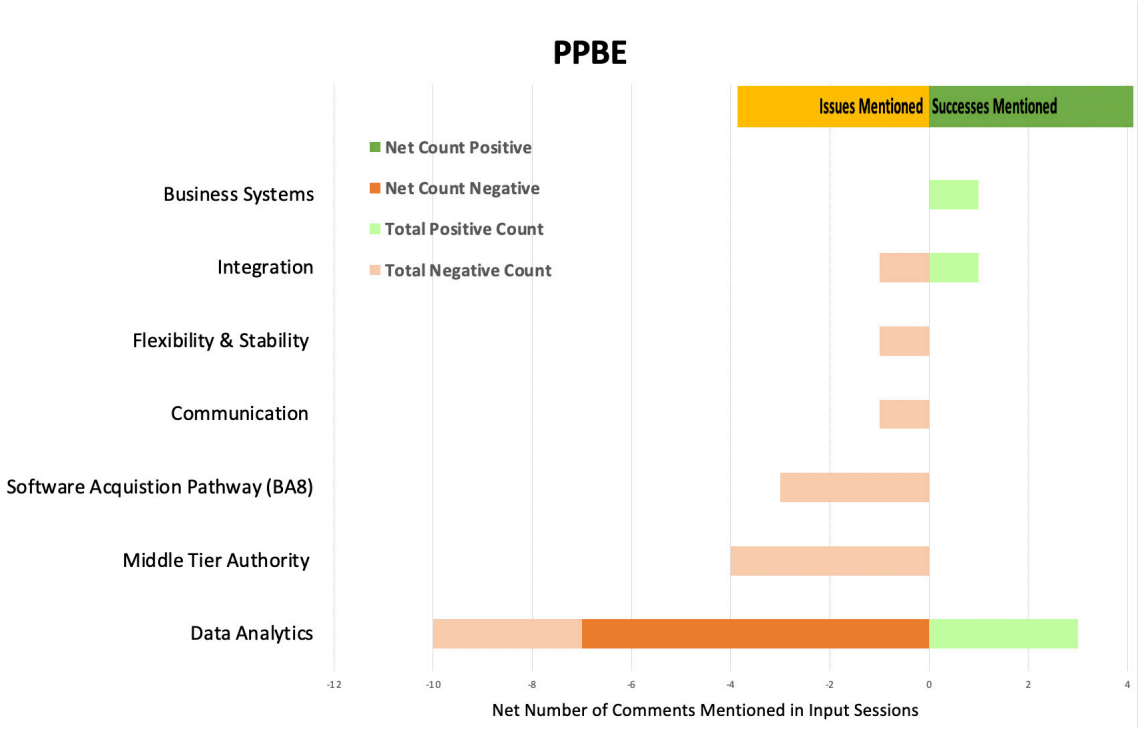

Figure 1. Categorization of Comments from the Input Session on the Overall PPBE

The input sessions' comments that generally represented PPBE are mostly categorized as issues, resulting in a heavier negative side compared to successes mentioned. It can be concluded that the general consensus about PPBE is negative. The following are some comments regarding the overall PPBE mentioned in the input sessions:

- PPBE is NOT a 21st century process.
- PPBE is a good, rational, logical system – just designed for a bi-polar world and not for the current environment.
- PPBE generally works well given the constraints.

[8] For background information on QDA: https://en.wikipedia.org/wiki/Qualitative_research

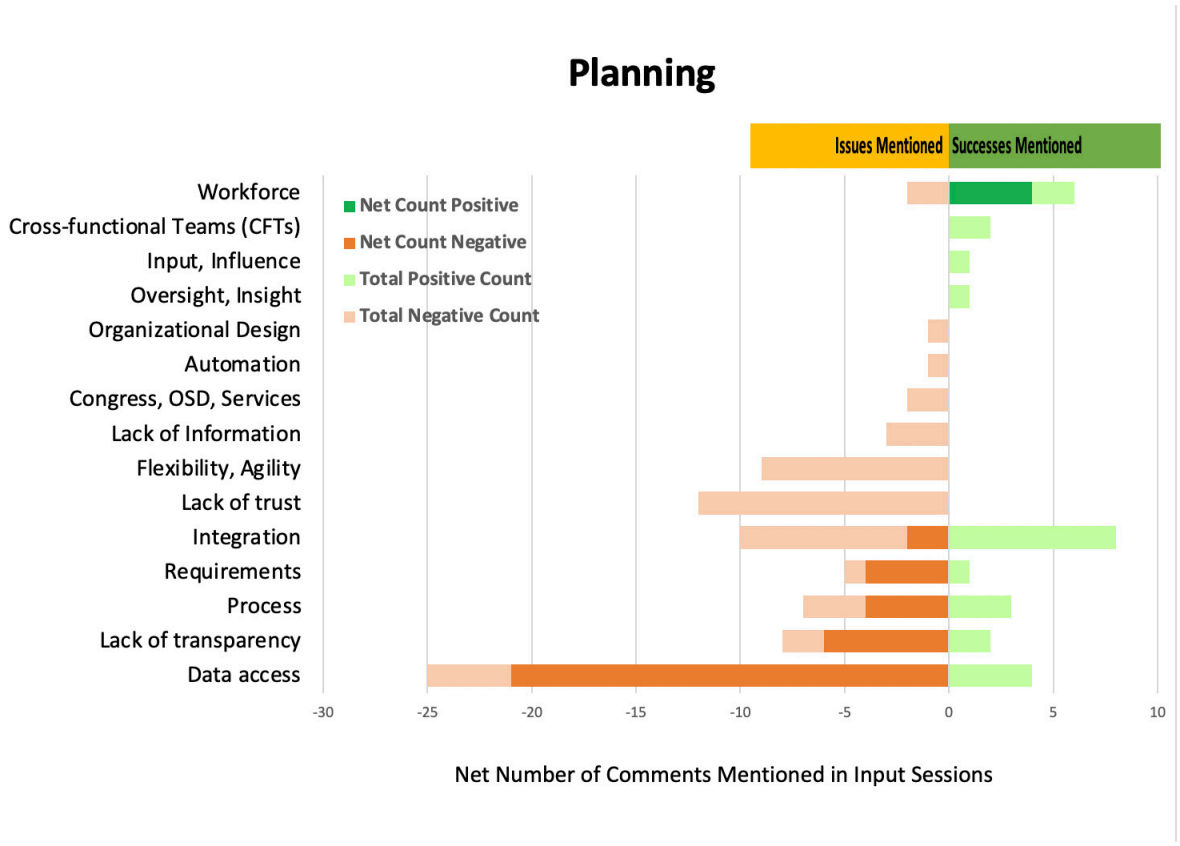

Figure 2. Categorization of Comments from the Input Session on Planning

While both negative and positive counts can be seen in the preceding graphic, there seems to be more issues mentioned compared to successes. It is crucial to recognize the significant net negative count value for Data Access. Issues mentioned in Data Access greatly outweigh the successes mentioned, making it an important topic within planning that needs to be considered. The following are some comments regarding planning mentioned in the input sessions:

- Lack of fidelity/granularity during initial planning impacts Acquisition efforts because the detail required for actual PORs may not be available until after significant research and development.
- We have a “Plan to Plan” but we don’t have a “Plan to Decide.”
- Lack of data availability/transparency hinders decision making.

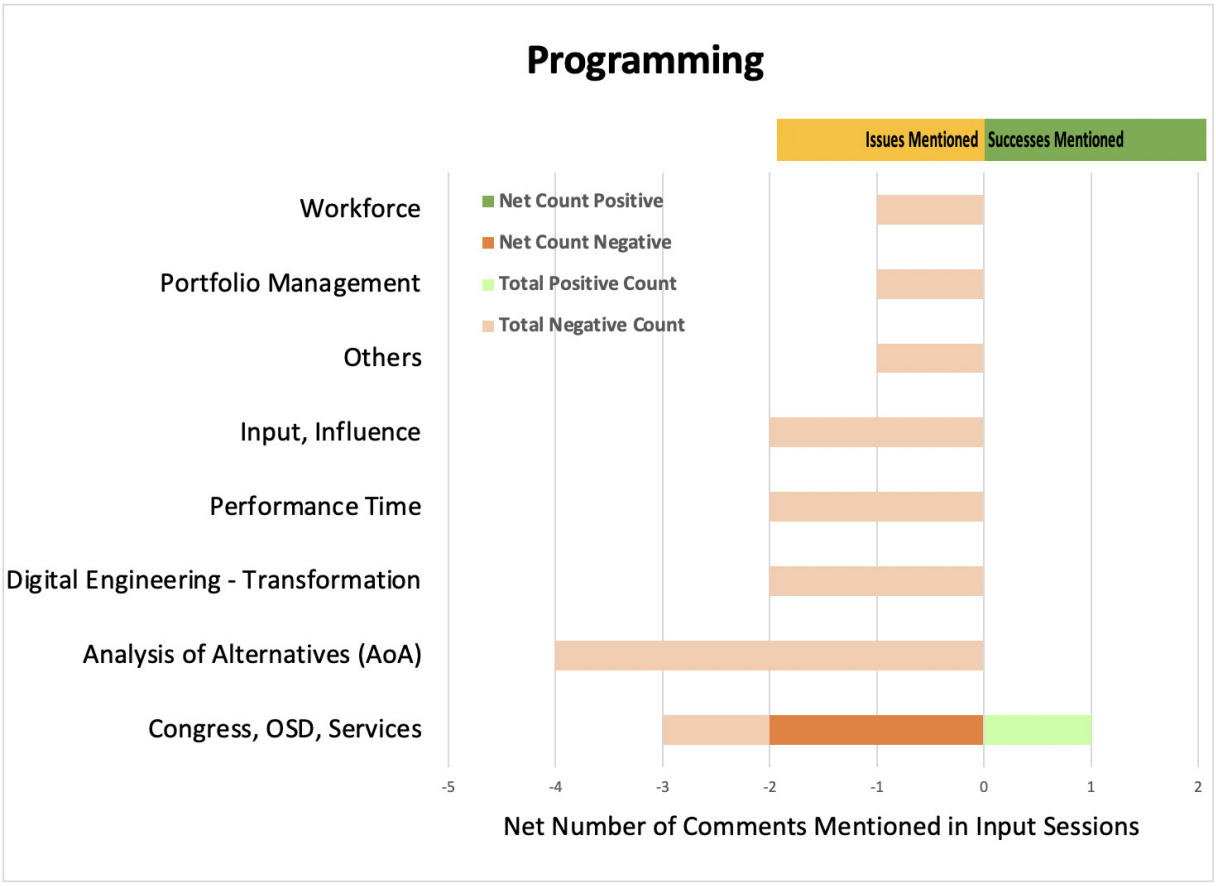

Figure 3. Categorization of Comments from the Input Session on Programming

Almost entirely, the comments analyzed under programming are categorized as issues. This demonstrates the input sessions' comments, collectively, viewed programming as a topic that requires significant changes. The following are some comments regarding programming mentioned in the input sessions:

- Programming is massive with too much Service process. The Service programming process is overdesigned and unduly drives the process for strategy and acquisition.
- Program execution is a continuum, not a series of discrete budget executions.
- The reprogramming process is broken – almost impossible to get actions through four committees in a timely fashion.

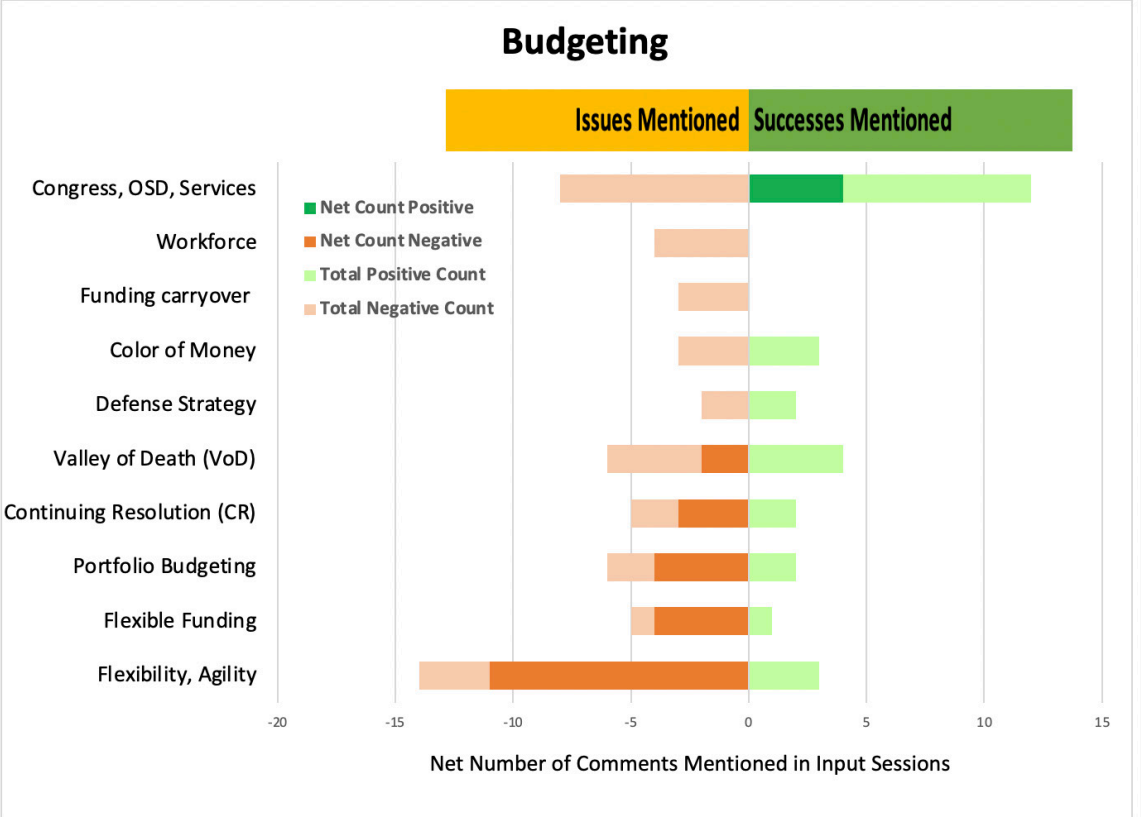

Figure 4. Categorization of Comments from the Input Session on Budgeting

Issues within VoD, Continuing Resolution, Portfolio Budgeting, Flexible Funding, and Flexibility significantly outweigh the successes mentioned, as seen through the net count negative values on the left-hand side of the graph. Successes mentioned were larger with the topic of Congress, OSD, and Services compared to the issues mentioned. Due to the significantly greater number of issues mentioned, it is important to note issues mentioned in budgeting need to be addressed. The following are some comments regarding budgeting mentioned in the input sessions:

- Budget issue paper process leads to 3-star meetings where decisions are made with insufficient information. Not an adequate process.
- Do not need more funding – need to better leverage funding that we have.
- It's the volatility of budgets, not the performance of the industrial base. We don't stabilize the budget. Change spending model – in acquisition, budget and numbers are not stable.
- No streamlined approach to changes once budget is submitted.
- Only $4B in General Transfer Authority (GTA) out of an $855B budget!

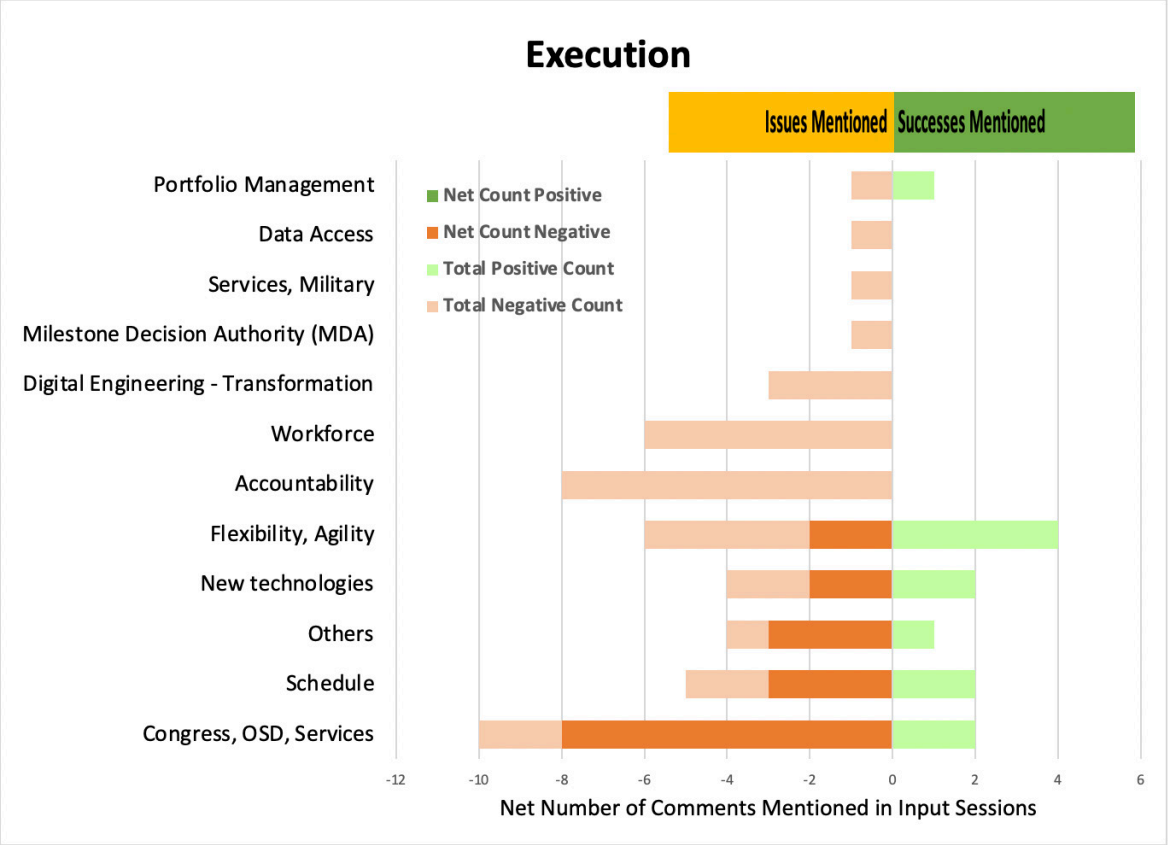

Figure 5. Categorization of Comments from the Input Session on Execution

Most values in this graphical representation fall into the left-hand side. Topics raised within execution largely deal with issues as there are only a few successes mentioned in Portfolio Management, Flexibility, New Technologies, Others, Schedule, and Congress, OSD, and Services. This demonstrates the need to reevaluate execution and resolve the issues mentioned within each category. The following are some comments regarding execution mentioned in the input sessions:

- There seems to be success in moving away from program execution at the platform/system level to looking more holistically at full system value (used the phrase “closing the kill chain”).
- Pain point: system is too slow.
- Difficult to plan and execute innovative research on a timeline.
- Willingness to execute is a risk tolerance.
- Need to speed/streamline the production of Congressional Marks and the responses.
- Too many involved are not accountable for results.

APPENDIX C. MUNITIONS USE CASE

Munitions are often used as "bill payers" in the PPBE process. "Keep the production lines open but adjust the production amounts." This happens at the service level, at OSD, and on Capitol Hill and primarily in the Programming and Budget Execution part of PPBE.

Excerpts (in italics) from Dr. Bill LaPlante USD (Acquisition and Sustainment) on 26 September 2023 CSIS Forum, as summarized by Jim McAleese.

Planning - *DoD must review the specific munitions requirements for a sustained China fight. What matters is production to field lethal combat-mass at-scale. "Hot production lines are deterrence."*

Programming - *DoD has previously minimized "hardcore development." DoD must field technology-overmatch advances in lethality. [The ~$140B of 2023 DoD RDT&E must then transition into the ~$164B of 2023 DoD Procurement production.]*

Budget Execution - *While DoD is currently at minimal rates of munitions production; the Ukraine war has focused DoD on increasing munitions production-capacity. There is limited overlap in the types of munitions required for the China fight. There is potential overlap with the long leaditems in missile components, such as ball bearings, rocket motors, seekers, and electronic components.*

Primary objective of 2024 DoD missile multi-year-contracts is to ensure deep magazines to deter the China fight, as well as cost-savings. DoD must then budget to that.

Major RDT&E funding increases must be geared toward preparing for production.

"Production is what matters, everything else follows from that." For the China fight, the critical question is whether it (the system/munition) is still in production, and how quickly it can be ramped-up.

The U.S. Army is DoD's Executive Agent for energetics and has an Organic Industrial Base (OIB) and is aligned with the commercial Defense Industrial Base (DIB). While much of this use case relates to Army actions, the implications are DoD-wide. There are systemic issues with supply chain fragility and there are current struggles to ramp up production of munitions. This state of affairs has been obscured for years by faulty planning assumptions, peacetime requirements, and complex chains of authority within the U.S. Army, the other Services, Agencies, and OSD. Recent responses to crises such as the war in Ukraine and COVID-19 have revealed much fragility. DoD lacks the surge capacity for several systems it procures, made evident by a decline in general capacity over the past thirty years. Over fifty mergers and acquisitions within the DIB have left five primes in control of the market, while inconsistent funding has discouraged industry investments. Twenty years of fighting low intensity conflicts have eroded inventories and provided false confidence in the ability of industry to meet production needs.

This use case provides multiple preliminary observations regarding munitions requirements, governance, sustainable procurement, capital investment, and contracting, all rooted in the PPBE process. Defense-wide efforts on munitions procurement are impacted by munitions requirements, governance, and contracting. Formal processes are in place to establish munitions requirements, but senior leaders have little visibility of risks or tradeoffs once funding decisions are made. Munitions must also compete for modernization funds, which historically are then cut to pay other bills, based on an assumed ability of the DIB to surge capacity. The Army typically has no single authority that oversees end-to-end enterprise munitions matters, such as quantity and lethality requirements, the monitoring and mitigating of low demand signals to the OIB and DIB, the definition and establishment of minimum sustaining rates, the elimination of single points of failure, or the adjudication of disputes between munitions managers. Further, the Single Manager for Conventional Ammunition (SMCA) authorities are limited in scope to conventional munitions and are dispersed among the Army's ASA(ALT), JPEO Ammunition, and Army Material Command. Industry partners uniformly complained of slowness of contracting and delayed investment decisions, while smaller businesses have been squeezed by inflation concerns. Contracting personnel's incentives do not align with their Ammunition Program Manager customers, and the complexity of the Federal Acquisition Regulation (FAR)/Defense Federal Acquisition Regulation (DFAR) arrangements creates inefficiency. Army-run facilities not only support Army munitions requirements and surge demands but also those of its sister Services. Managing these competing demands has generally not been a problem even when requirements increased over the past 20 years of counterinsurgency and counterterrorism (COIN and CT) operations.

Industrial concerns and constraints are focused on the issues of sustainable procurement and capital investment. For sustainable procurement, consistent DoD requirements, lacking in the past, are necessary to build and sustain surge capabilities. Multiyear contracts with increased caps and minimum sustaining rates would incentivize industry investment, as well as mitigate single points of failure. S&T and R&D could be better leveraged across the complex to reduce reliance on foreign sources of raw materials. In terms of capital investment, there has been a decades-long signal from the government to industry to put cost control and efficiency above all else, continuously sacrificing surge capacity and deterring modernizing industrial facilities with advanced manufacturing techniques. While major investments are underway, further investment is needed as the industry is reluctant to assume risk and try new methods and programs, such as new energetics programs.

Current progress is underway but remains slow. The U.S. Army has initiated a 15-year modernization plan for the aging facilities that make up the OIB, allocating $0.5 billion in 2023, and proposing $2.5 billion in FY24-28. However, challenges remain, including over one hundred single points of failure throughout the supply chain, continued reliance on foreign sources of key raw materials, failure to address future needs, and no risk mitigation plans for stockpiling or developing alternatives for critical materials.

There are several areas where DoD can improve efforts in the near term. The U.S. Army could create a single authority reporting to the Army Acquisition Executive to oversee resourcing including other considerations, such as capital investment and execution. The U.S. Army could also examine initiatives to strengthen unity of command, with the aim of simplifying control of munitions procurement and defining the roles of the PEOs and the Joint Munitions Command. Although the process of calculating munitions requirements, in numbers and types, is well defined, the Army lacks a single entity to establish requirements for new enhancements in lethality and range. This directly contributed to the decades-long inability to transition new energetics and capabilities from S&T to production. DoD could additionally focus efforts on analyzing future strategic munitions needs, to better prioritize availability for critical munitions with long lead times. This could be addressed through the use of larger (>$500 million) funding caps on multiyear procurement deals to develop minimum sustaining rates for munitions. The Army should seek Congressional approval for the purchase of long lead items for critical munitions. This stockage would help jumpstart a surge in production in the future. The U.S. Army could move to expand the use of cheaper and more "attritable" munitions (munitions with shorter, limited lifetimes), which could be readily used for training or sale to foreign militaries. Lastly, DoD could fund a flexible pilot plant line to explore methods of developing new explosive synthesis, jumpstart the adoption of new manufacturing technology, and ultimately create a model that would lessen reliance on foreign sources.

Follow-on reviews are recommended, including streamlining the FAR/DFARS to enhance contracting responsiveness, evaluating changes to government-owned, contractor-operated (GOCO) plant operations as a model for the future manufacturing within the OIB, and exploring the application of advanced manufacturing techniques within the OIB and DIB. Implementing these recommendations will be crucial in improving DoD's munitions production effort, ensuring readiness and strengthening both the commercial and organic industrial bases.

To be clear, these recommendations appear to mitigate much of the production risk exposed by demands stemming from the Ukraine conflict as we are aware of it today. However, the industrial base (organic and commercial) may be incapable of meeting the munitions demand created by a potential future fight against a peer adversary. Recently publicized CSIS analysis of a U.S. conflict with China exposes significant shortfalls that go beyond these recommendations. The main source of this munitions use case came from a September 2023 Army Science Board Study, "Surge Capacity in the Defense Munitions Industrial Base, Final report."

APPENDIX D. GENERATIVE AI USE CASE

In November 2022 (1 QTR, 2023), an LLM called ChatGPT captured the imagination of millions of Americans. In the competitive business environment, most every commercial company is assessing Generative Artifical Intelligence (AI) for its business value and competitive advantage. The advances in data, compute, and AI models continue to rapidly develop and iterate with new LLMs continuing to emerge at a rapid pace. At the same time, there is public transparency with respect to the problems with this technology such as hallucinations (factual errors, misidentified patterns, etc.), leakage of data, access controls, data issues, etc. However, even with all the issues and an unsettled regulatory environment, progress continues at a rapid given that generative AI is in its nascent stages of development and usage.

Adoption by the commercial sector is rapid for use cases because the user interface allows anyone to use generative AI with little or no formal training or technical know-how. This accelerates the adoption across a wide range of disciplines. This adoption is not limited to the public sector – it has wide applicability to DoD. The vast amounts of data within DoD's business systems, support systems, finance systems, intelligence systems, etc. could be queried by generative AI at speed to answer questions at a pace that no human can match. This technology also applies to warfighting systems and processes.

However, DoD is moving much slower than the commercial sector, thus falling farther and farther behind. The commercial sector has already pivoted billions of dollars and resources to take advantage of this technology. However, DoD's ability to adopt a new technology like generative AI at scale is limited by different aspects of the three decision making systems. The integration of the requirements, acquisition, and PPBE processes to deliver a capability at scale cannot keep pace with the private sector without extraordinary effort and senior leader involvement.

Why?

The first issue is that in November 2022 (1 QTR, 2023), the 2023 budget processes by DoD were already locked; any serious effort to pivot would require reprogramming.

Furthermore, by November 2022, the components of DoD and lockstep calendar processes already defined the 2024 program: the program was already in the throes of approval for DoD and subsequently, OMB and the Congress. The PPBE process timelines work against large scale funding in 2023 and 2024 for generative AI. In addition, there will be a set of questions generated that will slow any large adjustments. Some examples of questions include:

- Is there a validated requirement (this can take weeks, months and sometimes years)?
- What is the acquisition strategy? Some questions that could arise are:
  - Is this a service?
  - Is it software?
  - Should it be a program or a contract?
  - Is this a new start?
  - How should generative AI be tested?
  - Will this go on the network?
  - What are the security classifications?
  - Is this an RDT&E project?
  - What are the legal issues?
  - What is the Department's liability?

All of these questions take time to answer inside the current processes as the requirements are not well defined, and the acquisition model is also ill-defined because it is a "new" technology.

Even if these questions were answered, the next step is finding the funding, which is really reprogramming for both FY23 (already passed) and FY24 (pending Congressional approval). While DoD can ask for reprogramming, there is still no requirement for generative AI yet to justify the reprogramming effort. And while Congress has given DoD the necessary authority for rapid acquisition, LLM capability development is stalled by a lack of requirements and funds to develop those requirements at speed and scale on par with developments in the commercial sector. In this case, the funds required to develop LLM requirements are not insignificant in terms of data, technical expertise, compute, etc. required for experimentation, simulations, etc.

This use case is meant to be an example of the challenges that DoD faces when trying to rapidly integrate emerging technologies. Even if the requirements and acquisition processes were rapidly executed through heroic means, the Department must then work through a calendar-based PPBE system that lacks the flexibility to rapidly adjust without heroic efforts. And this is only one of many emerging technologies that represent the capabilities needed for the changing character of future war.

APPENDIX E. B-21 USE CASE

The Department of the Air Force's (DAF) Rapid Capabilities Office (RCO) is often held as a gold standard of acquisition performance. That performance standard was one reason the Air Force assigned its next generation bomber, the B-21, to the RCO for execution. Salient characteristics of the RCO and its B-21 program linking the PPBE process with requirements and acquisition include designated priority program, trust, and talent.

REQUIREMENT IS DAF PRIORITY

RCO is assigned DAF priority programs, and the B-21 benefits from this designation. Priority designation results in funding protection, priority resource allocation, and access to decision makers.

Funding protection on RCO programs enables the RCO Director to manage unobligated funds within the RCO portfolio consistent with risk profiles. All funds are managed consistent with funds management rules, but priority programs assigned to RCO such as the B-21 are protected from outside budget drills. As risk profiles are reduced during acquisition, RCO works with programmers to set realistic out-year budget profiles. During execution years, RCO works with FM to identify available funds it might be able to "donate" to other DAF needs as determined by DAF leadership.

RCO operates a very lean program office. The B-21 program office, for example, has less than 20 people. As a result, when RCO programs need resources, they are rapidly assigned, and major command (MAJCOM) users often embed members on the program team. For example, the B-21 program has Global Strike pilots, maintainers, and logisticians working side-by-side with the acquisition professionals in program offices.

As a priority program, when issues arise, decision makers make time for B-21 discussions. The B-21 program has access to Congress, OMB, the SECAF, both DAF Service Chiefs, and Senior Acquisition Officials (SAEs). Proximity in the DC area helps to connect directly and establish and maintain good functional relations, but access helps keep problems small.

TRUST

Priority program designation is a privilege and it is enabled by trust. That trust is earned with facts, first-hand knowledge, and good relationships. RCO established an internal culture and expectations that engender trust from its stakeholders. This trust affords RCO flexibility in its decisions when managing risks.

RCO presents and operates on facts, not opinion, and shares those facts with others, earning trust and autonomy. Of note is the "let us show you" approach RCO has with stakeholders like Congress and OMB. Rather than feeling challenged by questions from such groups, RCO helps them understand what is going on and why.

Transparency from first-hand knowledge along with good communication skills earns the confidence of decision makers and those who control resources. By necessity, RCO and B-21 leaders are very involved in the acquisition process and thus can speak from experience, having often witnessed acquisition decision points like testing. Trust is quickly earned by people who know what they are talking about, and RCO's short chain from workers to RCO to senior leaders keeps the facts straight.

RCO establishes strong relationships with its user community and CCMDs through routine engagement and user presence in the program offices. Regular meetings with Global Strike, for instance, keep the RCO current on evolving needs. Global Strike pilots, maintainers, and logisticians co-located in the program office enable timely lock-down of performance requirements that may have been uncertain at contract award. The relationships that evolve from co-location build trust during contract performance, especially when requirements must be settled. One of the B-21 program tools is to keep its users focused on what is truly possible as defined by the laws of physics rather than clinging to a wish list of hopeful ideas and unrealizable early expectations.

Trust is earned by the B-21 program when they embrace stakeholder questions as learning opportunities rather than challenges, by sharing program information and facts learned through first-hand knowledge and experience, and building strong relationships with its user community by helping it understand true options versus desires. The ability to employ such techniques starts with talent and experience.

TALENT

The B-21 program, like all RCO, is staffed with remarkable talent aligned in multifunctional teams. Each member, both military and civilian, is hand-picked. They come to the organization with functional expertise, a collaborative and innovation-friendly style, and are coached on effective communications.

Operated as a multi-functional, the B-21 program is also selectively staffed. With less than 20 people assigned to the program, each person is depended on for the functional skills they bring to the team. What sets these teams apart is not just the experiences they bring, but the continual learning they demonstrate daily to bring their personal best to the program every day. They learn from each other and value each person's contribution to the team, which allows trust and expediency in team decision making and risk acceptance.

Key members in the multifunctional team come from the user community, and those in the B-21 program are exceptional. Global Strike (GS) Command representatives (pilots, maintainers, and logisticians) are assigned full-time and co-located at three B-21 program locations around the country. They understand the operational community and contribute daily to shaping the B-21 program. What sets these user representatives apart from others is the number and quality of assigned talent as measured by the positions those representatives earn when returning to Global Strike. For example, to date, all Global Strike pilots left the B-21 program for Wing command positions in Global Strike. This level of user support is unusual even within GS. Major commands often state staffing constraints preclude assigning full-time resources to programs, much less high value members. To illustrate, although Global Strike assigns high talent to B-21, the same is not true for Sentinel.

Functional expertise and collaborative styles are good, but telling the story well is the key to success. The RCO sets a priority in earning and maintaining trust with its users and stakeholders and values succinct and meaningful communication. As such, the B-21 program team develops communication skills that instill a leader with confidence in 15 minutes.

TAKEAWAYS

This B-21 user story offers ways to improve program performance from requirements determination to acquisition in partnership with the PPBE process. These tools include designating a program as a Service priority for resourcing and access to decision makers, building trust through transparency and relationship, and employing multi-functional program teams staffed by talented resources including requirements owners. The practical matter is that not every program can be afforded a top-priority designation nor have ready access to decision makers. Nevertheless, expectations, if set by an external body, which could influence and prioritize Service behaviors and resource commitments at some level include:

- Afford PEOs more funding flexibility among their portfolio programs while establishing accountability for success and transparency along the way.
- Consider smaller program teams driving more direct involvement in program execution, thus increasing direct knowledge of progress and issues when engaging with stakeholders.
- Encourage multifunctional program offices to streamline acquisition processes and decisions.
- Co-locate user support with acquisition teams to accelerate requirements trades during the development and even production processes. User support might include operators, maintainers, logisticians, or other key non-traditional acquisition team members.
- Give CCMDs a voice in the requirements process at some level. While Services have responsibility to organize, train, and equip, today's technologies enable connectivity and common solutions accelerating threat visualization and proliferating response options for decision makers. Services can no longer operate in stovepipes, yet they still plan, program, budget, and acquire in stovepipes. CCMDs need a voice in that interconnected realm of conflict today.

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[1]Technology changes can be a threat or an opportunity. Sometimes the Department must change technologies due to a change in the industrial base. For example, the emergence of LED light bulbs causes the industrial base to exit the tungsten wire business because manufacturers no longer needed tungsten wire to manufacture incandescent light bulbs. Tungsten wire is a critical component of traveling wave tubes which are still used in some major weapons systems.

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