# Guidehouse
Outwit *Complexity*

Agile Naval Forces

Introduction

Nations have historically struggled with resource limitations as they sought to advance comprehensive security strategies. How any nation prevails through history depends on their agility in adapting to their evolving security environment, successfully leading change and conserving precious resources.

This paper encapsulates earlier works, "Agile Defense" (2011), and its sequel, "Agile Defense: Sustainable Cost Reduction on the Path to Greater Agility" (2014). It continues the discourse on the imperative of institutional and operational agility, with a focus on the U.S. Navy and Marine Corps. This update reflects shifting priorities in the emerging threat environment of 2020, though the common threads that define, strengthen and operationalize agility persist: adaptability, innovation, collaboration, visibility, and velocity.

Figure 1: The Five Characteristic Threads of Agility
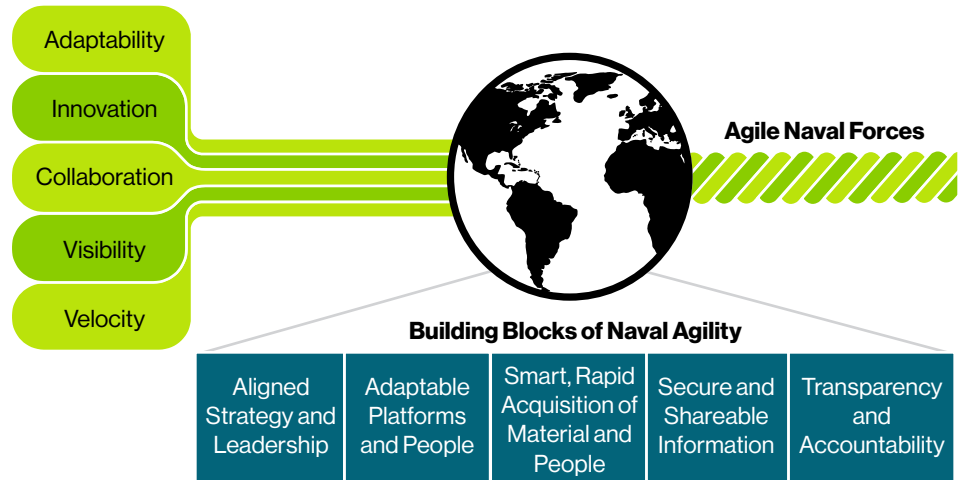
Our goal is to highlight the challenges facing our United States Naval Forces and to explain our views on the most compelling way forward to address those challenges. This point of view builds on our leading knowledge of the government defense environment from working with defense organizations across the world, and further draws on specific insights gathered through interviews with senior Naval officials.

In short, Navy and Marine Corps leaders must move forward in achieving a culture of agility, accountability, and enhanced lethality to address the requirements of the modern security landscape and the challenges presented by an alarming array of actors in that environment.

Bryan Miller

Principal, Naval Forces Team

Table of contents

An Enduring Thread of Naval Agility – Past and Future

The legacy of today's U.S. Naval Forces was born out of necessity. Sailors and Marines came together when the Continental Congress raised two battalions of Marines for service as landing forces for the recently formed Continental Navy. In a matter of weeks, those forces conducted their first operations against the British in the Bahamas. Then it was the vision of the Constitution framers that gave Congress the power to provide and maintain a Navy. Our maritime nation, set between the world's two largest oceans, has always needed a force available to serve on the seas with great precision and agility.

Naval technology and tactics changed out of necessity too. Sail power gave way to steam. The 1844 "Peacemaker Accident" on the USS Princeton, when a cannon exploded and killed several visiting dignitaries, laid the seeds for more scientific ordnance technology, led by a young naval engineer named John A. Dahlgren. The Princeton's design engineer, John Ericcson, later designed the Monitor Class, an ironclad warship with angular designs to make projectiles skip off its hull, and that kind of angular design would evolve into the stealth design of the USS Zumwalt (DDG 1000).

Our American Naval Forces, made up of the U.S. Navy and U.S. Marines, can can be characterized by Agile response to emerging threats, and it was innovative ideas from more junior officers, championed by senior officers, that carried the day. As described above with Dahlgren, he was only a lieutenant when he started his journey in ordnance. Similarly, a young Marine Corps major wrote a prophetic thesis that laid the groundwork for modern amphibious warfare that helped win the war in the Pacific in WW II. Major Earl Hancock "Pete" Ellis wrote "Advanced Base Operations in Micronesia", which captured the imagination of the Marine Corps, which tested his idea in wargames and training operations. It was a young Lieutenant "Deke" Parsons, a radar pioneer in the 1920s, who later led the development of radio frequency proximity fuses for ordnance used against Japanese air forces; he would rise through the ranks and be a key partner in the development and operations of nuclear weapons.

Post-WWII missile technology affected airplane and weapon designs in the 1950s leading to a need to reorganize. Reorganization changed Naval Bureaus to System Commands and systems engineering became the vogue in engineering schools. That was about the time a young Lieutenant Wayne E. Meyer online was learning all about guided-missile technology. Just as Admiral Hyman Rickover ensured holistic submarine design with nuclear power, Meyer rose through the ranks in a similar fashion as a naval engineer. He convinced the Navy to design warships in a universal manner with the marriage of the combat system design to the hull, mechanical, and electrical designs of our Aegis Class ship; unquestionably the leading design of warships for nearly 50 years.

History shows us that as American Naval Forces adapt to the social and technological changes of the day, their success has been a function of flexibility and the willingness to improve processes with the agility to meet the immediate and urgent needs of sailors and marines. Valuing agility, and achieving it, however, are two different things. Achieving agility requires leadership engaged on a daily bases, widely internalized common vision, a change-oriented culture, a well-communicated plan for change, and the very hard work of empowered and engaged junior leaders to implement. As we have stated in earlier versions of our work on agile defense, the emerging security environment is no less complex or competitive, and the consequences of failure only become greater. Today's Naval Forces have a similar mandate: Become more agile or find yourself at risk. Preparing to defend one's nation, and one's allies, from these challenges requires far more capable and adaptable strategies—and organizations to execute them.

Why Naval Agility Matters

This paper applies our tenets of "Agile Defense" to the challenges and opportunities confronting Naval Forces. Those forces, through the lens of agility, need to accomplish the following:

- Deliver on the vision and requirements of the National Defense Strategy, a Design for Maintaining Maritime Superiority, and Littoral Operations in a Contested Environment

- Be a ready force with leading warfighting capabilities to prevail against any foe

- Be threat-oriented and forward-looking for emergent challenges and opportunities

- Be a transparent steward of the Nation's resources provided to the Department

A Design for Maintaining Maritime Superiority launched the Navy on its current direction by highlighting three major and interrelated global forces that are "increasingly used, increasingly stressed, increasingly important, and increasingly contested." These three forces are (1) the forces at play in the maritime system; (2) the force of the information system; and (3) the force of technology entering the environment. The interplay between these forces has profound implications for the U.S. Navy. The Marine Corps, subsequent complementary publication of Littoral Operations in a Contested Environment further elaborates with the development of "a unified framework for Navy-Marine Corps innovation." The most recent National Defense Strategy continues by focusing naval forces on long-term strategic competition, the threat of rapid dispersion of technologies, and increasingly complex operating environments. Department of the Navy leadership is clear in its public communications regarding its commitment and focus in achieving increased Naval Agility.

As stated in A Design for Maritime Superiority, "We will not be able to 'buy' our way out of the challenges that we face. Navy and Marine Corps leaders need support from industry which supports this renewed emphasis on fighting for and gaining sea control, developing and fielding capabilities for 'fighting to the fight' or ensuring that forward deployed forces prevail in the fight 'from the inside out'."

"

A more lethal, resilient, and rapidly innovating Joint Force, combined with a robust constellation of allies and partners, will sustain American influence and ensure favorable balances of power that safeguard the free and open international order. Collectively, our force posture, alliance and partnership architecture, and Department modernization will provide the capabilities and agility required to prevail in conflict and preserve peace through strength."
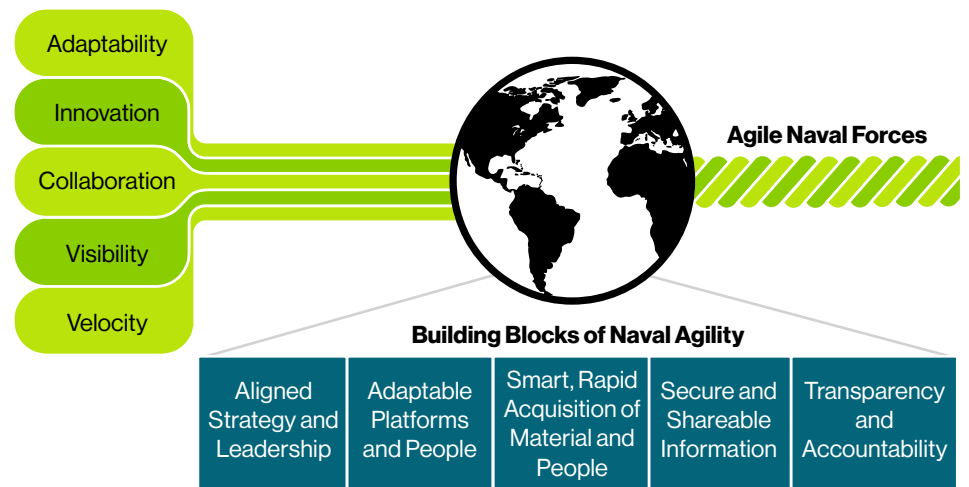
National Defense Strategy
2017

Naval Agility Defined

What is Naval Agility?

It is clear that Navy and Marine Corps leaders face a daunting challenge in trying to balance resource constraints with the demand for more agile organizational capabilities. Agility is especially relevant to the Department of the Navy because of the high-risk and fluid portfolio of threats. While we define agility as "perpetual awareness and the ability to be decisive and take action in an expedient and well-coordinated manner," other definitions may apply and be as effective in describing this organizational imperative.

Many of the most effective private sector organizations have adopted agility as a key strategic imperative in order to survive in hyper-competitive commercial markets. These organizations purposefully seek to reinforce their core agility characteristics when making resource trade-offs. They also tend toward leaner and flatter organizational structures that "de-layer" costs and assign capital to its highest and most effective use.

Figure 2: The Five Characteristic Threads of Agility

Adaptability
Innovation
Collaboration
Visibility
Velocity

Agile Naval Forces

Building Blocks of Naval Agility

Aligned Strategy and Leadership	Adaptable Platforms and People	Smart, Rapid Acquisition of Material and People	Secure and Shareable Information	Transparency and Accountability

Defense and security organizations must adopt a similar posture, but it will become increasingly difficult for them to do so without disciplined, agile processes that can react to volatile budget authorities that often reflect political realities over strategic ones as well as emergent threats. The challenge is for these organizations to cut costs and organizational impediments judiciously and in a manner that sustains organizational agility threads in proper equilibrium. Leaders at all levels must be mindful of these characteristic threads that drive agile behaviors and outcomes.

Building Blocks of Naval Agility

Naval Leaders must operate within larger Department of Defense (DoD) and Interagency processes, including the Planning, Programming, and Budgeting Execution (PPBE) process, the Joint Capabilities Integration and Development System (JCIDS), Defense Planning Guidance (DPG), and many more. Nevertheless, they have access to existing organizations, processes, and policies that can form the basis for an Agile Naval Force. As described in our earlier publications on Agile Defense and based on our interviews with successful Defense leaders, we

believe there are five critical building blocks for an agile defense organization that can be applied to the development of Agile Naval Forces. It has been our observation that effective leaders use these building blocks as a base as they pursue simultaneous enhancement of agility characteristics that weave through, and characterize, their organization. More importantly, these successful leaders establish a culture within their commands and units that rewards continuous improvement, risk-taking, and the appreciation of dynamic change in the national security environment that they must address. Similar building blocks exist within most naval organizations and these building blocks must become the cornerstone of organizational trust as the transformation towards greater agility takes place.

Adaptable Platforms and People

As we see in our commercial clients, the most successful companies emphasize management that adapts quickly to changing circumstances, and encourages and rewards people who develop flexible skills that can be applied to leading these businesses through necessary change. Platforms in this context means plans and policy and must have greater agility against a wide range of mission sets.

Transparency and Accountability

Transparency and accountability contribute to greater agility by fostering expedited "agreement on the facts" across various levels of the organization. Leadership alignment is far easier to achieve in such organizations, as trust and a level of shared understanding exists to support strategic, operational and tactical decisions. An internal audit function with strong capabilities and effective leadership can progress a long way toward a highly valued, trusted advisor to stakeholders (e.g., Congress and Fleet Operators). Unwillingness to share information breaks down trust. Private sector companies, particularly those in manufacturing, who broadly share and graphically display key performance metrics, are far more adept at aligning teams around a common goal. Reaching common goals lead to organizational success.

Smart, Rapid Acquisition of Material and People

Defense organizations need an established alternative, tailorable process by which an urgent requirement can be met through rapid, smart acquisition; one that is not burdened by bureaucratic gates. Careful risk management will be key to ensure accelerated processes meet legislative and public scrutiny. It is equally important that naval organizations rapidly adjust their human resource requirements. In the in the 21st Century they must learn or they will find themselves unarmed in terms of weapons and human capital investment.

Aligned Strategy and Leadership

Leadership alignment is often hindered by traditional bureaucratic inertia that resists change and inhibits measurement of, and effective rewards for, the intended results. This often manifests itself in a strategic misalignment between the commander's drive or action and the back office activities that directly or indirectly impact those actions. Effective "agile-minded" leaders recognize and attack this problem through well-developed performance management systems that measure not simply those metrics that are available, but those things that matter. Effective, "agile-minded" leaders ignore discrete, independent parameters and focus on the development of systemic performance management measures aligned on holistic enterprise performance.

Secure and Shareable Information

Defense organizations must always work at becoming better at sharing information internally— and across a broad spectrum of other players, to include other government agencies, alliances, and to some extent, private sector industry, as appropriate. Organizational turnover necessitates the need for standards that cannot be impacted by organizational turnover. Furthermore, changing security needs challenge information sharing requirements. Defense organizations must learn to balance information security with the absolute requirement to share and collaborate in a meaningful way.

The 5 Characteristic Threads of Agility

Essentially, agility at an organizational level is the strategic mix of standardization and flexibility, targeted at those organizational pressure points where they are not only needed today, but will most likely be needed tomorrow. Timing and timeliness is an essential component of agility — timely understanding, timely decisions, and timely action. We believe that there are five characteristics of an agile organization. We identify these characteristics as "threads" because of how they "weave" their way through the key elements of an organization in a complementary fashion—strengthening each other the more tightly integrated they are. Leaders must weave these threads together at the strategic, operational, and tactical levels within the Navy and Marine Corps. This approach breaks down stovepipes and barriers to innovation and effective action.

In agile organizations, the threads function to produce highly effective organizational responses that anticipate and mitigate a broad range of tactical and strategic challenges:

- **Adaptability.** The ability to adjust and meet changing mission requirements;
- **Innovation.** The ability to generate and apply new ideas, methodologies, and technologies;
- **Collaboration.** The ability to leverage internal and external knowledge and resources to enhance the mission;
- **Visibility.** The ability to create and maintain transparency to enhance fact-based decision-making;
- **Velocity.** The ability to recognize and respond with the requisite tempo to new circumstances and events.

Woven together across an organization, a command, or an enterprise, these threads increase the strategic alignment of the organization. A stronger understanding of one's environment, the effective marshalling of resources, and their agile employment in the service of statecraft has always been "the certain recipe of success" for a nation's military.

Critical Initiatives for Agility

The U.S. Navy and Marine Corps have tremendous capability and capacity that can enable the Agile organizational building blocks. Below are selected critical initiatives that enhance existing building blocks and can move Naval Forces toward a more agile set of required capabilities. These initiatives are tactical actions that Naval leaders can take to quickly improve the agility of their organization.

Figure 3

Design for Agility	• Governance Strategy • Enterprise Risk Management (ERM) • Data Analytics Strategy • Business Process Reengineering (BPR) • Studies and Analysis • Program Portfolio Management
Supply Chain Strategy	• Supply Chain Illumination • Open Source Due Diligence • Industrial Base Analysis • Strategic Sourcing
Readiness and Affordability	• Design for Affordability (DFA) • Total Ownership Cost Reduction (TOCR) • Industrial Base Analysis • Strategic Sourcing
Business Financial Management	• Auditability and Finacial Improvement • Planning, Programming, and Budget Execution (PPBE) • Cost Estimation • Asset Visibility and Accountability
Business Systems	• Business Systems Strategy and Rationalization • Business Systems Modernization • Risk Management Framework (RMF) Strategy and Implementation

Design for Agility

The Department of the Navy has sailors and marines deployed every day of the year to maintain security and safe navigation of the open oceans, deliver power projection, and be in position to respond to international conflicts. This reality demands agility. Designing for agility requires a comprehensive approach to governance, ERM, program/portfolio management, data analytics, and include the flexibility to conduct necessary studies and provide objective analyses. In order to achieve success and meet the mission and vision of the Navy and Marine Corps, agility enables the Naval Forces to adapt to emergent opportunities and threats.

As the National Defense Strategy states, we must be "strategically predictable, but operationally unpredictable." A Design for Agility methodology sets the guidelines and parameters to become more agile in delivering capabilities to the fleet.

From the five building blocks of an Agile organization leaders have a more firm foundation to embark on the journey to greater agility. Without this groundwork, progress is unlikely, and for the most simple of reasons. For Agility to become a meaningful enterprise goal, it must first be understood.

Leaders at all levels, from the deck plates to headquarters, identify key measures of success in conducting their job assignment. The challenge is for each to understand what activities matter and where their individual activities contribute to the larger mission, what actions influence readiness, what decisions leads to progress, and where energy and resources should be most appropriately applied. A successful governance strategy is a function of a clear vision, unmistakable mission guidelines, and clear-cut objectives. Each member of the organization should understand his or her role and impact toward the objectives so that time and energy can be spent on the activities that matter most.

Every command has a governance structure in place; a process from which task accomplishment or readiness is measured. Yet governance structure and strategy can sometimes be misaligned. Commands should evaluate structure/strategy alignment with an assessment of policies and directives that help or hinder objectives and priorities. Policies and directives that hinder objectives should not be considered relevant and aggressive change management should be explored. To determine metric relevance, a measurement standard should be able to reflect actual readiness and the capability of contributing towards the mission objective. Throughout strategic planning, governance should embrace transparency and cross-organization involvement in order to achieve mission success.

Enterprise Risk Management (ERM)

Enterprise Risk Management (ERM) includes the methods and processes used by organizations to manage risks and seize opportunities related to the achievement of their objectives. ERM is measured in research and development, design and construction, procurement and delivery, or generally in all aspects of strategic planning. It should not be confused with Operational Risk Management (ORM). All Department of the Navy (DON) personnel receive targeted ORM training. ERM is a framework that describes an approach to identify, react, analyze, and monitor risks and opportunities that face the enterprise externally and internally.
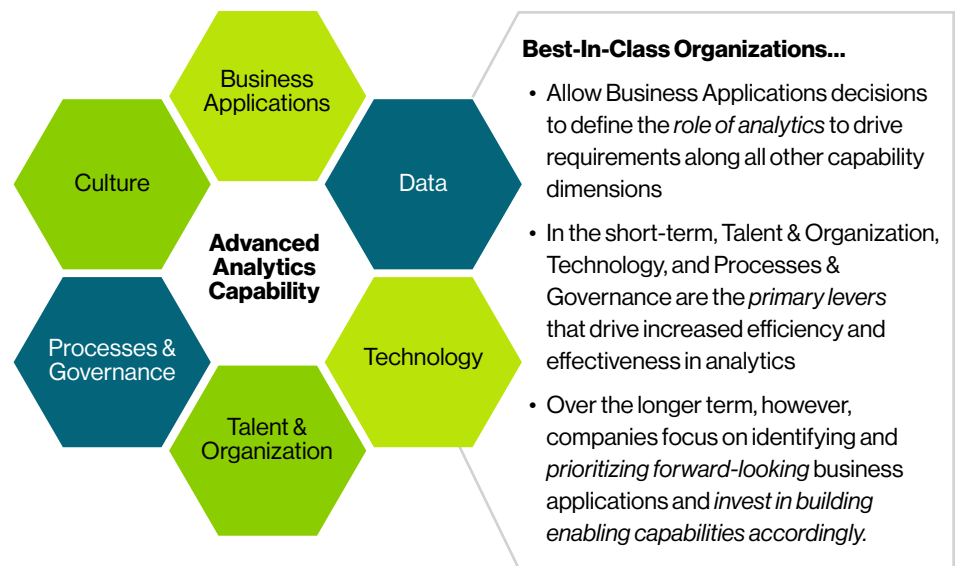
A comprehensive and transparent ERM framework delivers management internal controls with subject matter experts empowered to evaluate how a risk response strategy is working and whether the objectives are being achieved. An agile ERM identifies "risk triggers," courses of actions and the desired outcomes to support timely decision-making. ERM must be based on reliable and transparent data, open communications, and reliable information. Transparency of data and information is key for improved governance and trust in leadership decision-making.

Data Analytics Strategy

The challenge for any data analytics strategy is to balance data appetite with data need (i.e., the minimum necessary data), while accepting the right amount of risk. Too often, analysis can become encumbered with extraneous data not relevant to the original objective. Naval leadership must be confident in the data and information sources from which decisions are made to deliver the right systems, equipment and training opportunities in order to deploy the right forces for any mission. Therefore, the data analytics strategy challenge for naval leaders is to identify the minimal data elements at the right periodicity and not overburden program managers who are required to provide the data while executing the mission. These data requirements must be aligned with and support the questions leaders are trying to answer as well as support the objectives they are trying to achieve.

Readiness optimization may take place through procurement of a new system, modernization of an existing system, assessment or increasing supply chain availability, procurement of new or refurbishing existing capital infrastructure,

Figure 4

Advanced Analytics Capability: Business Applications, Culture, Data, Technology, Talent & Organization, Processes & Governance

Best-In-Class Organizations...

- Allow Business Applications decisions to define the *role of analytics* to drive requirements along all other capability dimensions

- In the short-term, Talent & Organization, Technology, and Processes & Governance are the *primary levers* that drive increased efficiency and effectiveness in analytics

- Over the longer term, however, companies focus on identifying and *prioritizing forward-looking* business applications and *invest in building enabling capabilities accordingly.*

through training of sailors and marines, and/or some combination. The best available data drives the direction to follow, and that data comes from established business systems that drive business/fleet operations. Therefore, an enterprise data analytics strategy is the comprehensive vision of harnessing data-dependent capabilities with a road map that lays out the process of planning or creating strategies and plans for handling the data created, stored, managed and processed by an organization.

Business Process Reengineering (BPR)

Agile organizations must continually invest in both process and systems improvements that ensure the accuracy and timeliness of internal processes to achieve the desired effects while also being economical with resources (people, materials, and time) whether in a tactical environment or garrison. Organizations must be able to rapidly assess and improve their many complex end-to-end business processes to not only achieve standardized procedures across the enterprise, but also to enable the organization to rapidly adapt to emergent technologies and reach economies of scale.

An agile BPR approach allows organizations to rapidly comply with changing policy or emergent mission requirements. Rapidly understanding the need for reengineering,

developing and executing effective approaches, and being able to visualize and demonstrate the achievement of desired outcomes are critical capabilities for success. Early and effective stakeholder engagement, communications, and agreement with reengineering efforts is another critical path to success in executing agile BPR.

Studies and Analyses

Service chiefs of the Navy and Marine Corps have set analytical processes to help determine the long-term force structure necessary to support the National Defense Strategy, and provide guidance to the Department of the Navy. These assessments are intended to meet the needs of the combatant commanders' warfighting requirements.

Through the JCIDS process a database is maintained of studies and analysis relative to capability solutions, along with assessments of Joint Capability Technology Demonstrations and Joint Urgent Operational Need solutions. At System Commands technical and contractual reviews are routinely conducted with cost analyses, program life cycle cost estimates, and integrated logistics assessments. All of these studies inform planning, programming, and budgeting actions that are required to inform annual POM inputs. These studies

and assessment can take on a life of their own with the consequence of collectively slowing the acquisition process and adding undue risk.
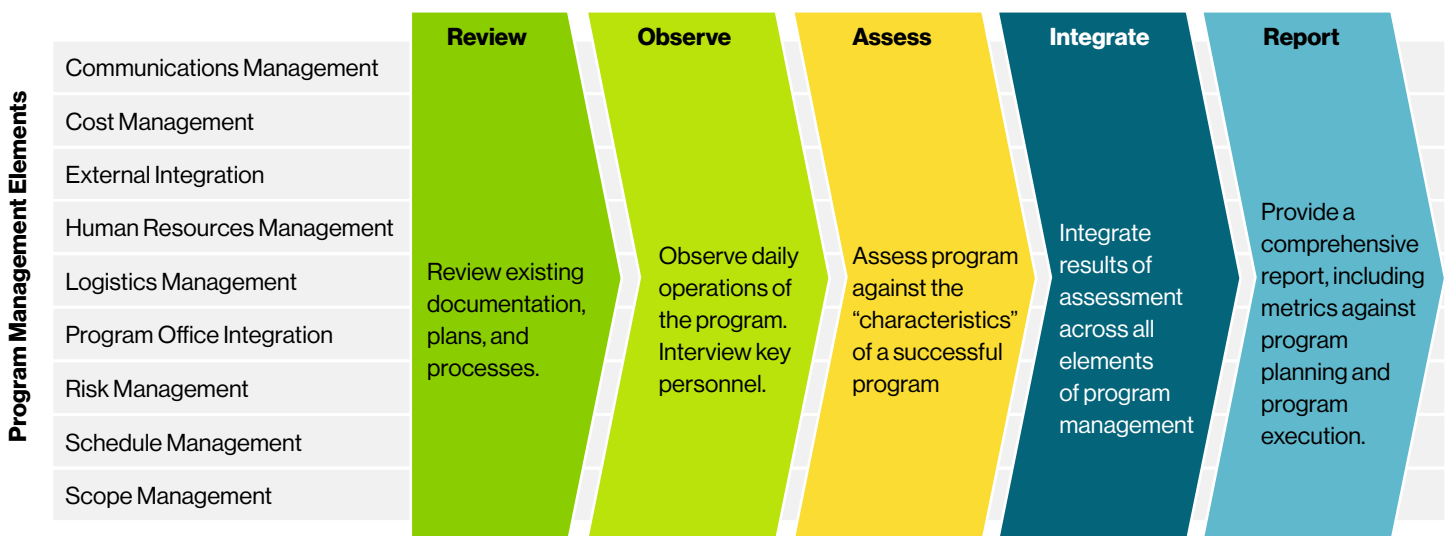
To short-circuit never-ending analyses, previously conducted analyses, once validated for accuracy, should always be leveraged with reports updated rather than started anew.

Program/Portfolio Management

Broad collaboration between fleet operators, engineers, scientists and vendors in a peer group-like fashion should rely solely on data-driven analysis. A tailored program/portfolio governance structure should be simplified at the appropriate level to achieve rapid acquisition unique to each problem set and portfolio of programs designed to solve that problem set.

Decisions should be made at the lowest level allowable to reduce time constraints caused by hierarchal impediments. Empower the work force and hold them accountable to produce the best results. Getting the right people involved, from resource sponsors to the sailors on deck, starts with greater collaboration that can be measured and improved. Metrics have to assess current state to guide future performance using data collected directly from naval labs or from units in the field or at sea. Speed is the outcome of this type of agility.

Figure 5

Program Management Elements	Review	Observe	Assess	Integrate	Report
Communications Management					
Cost Management					
External Integration					
Human Resources Management					Provide a comprehensive report, including metrics against program planning and program execution.
Logistics Management	Review existing documentation, plans, and processes.	Observe daily operations of the program. Interview key personnel.	Assess program against the "characteristics" of a successful program	Integrate results of assessment across all elements of program management	
Program Office Integration					
Risk Management					
Schedule Management					
Scope Management					

Supply Chain Strategy

U.S. Naval Forces face an unprecedented environmen—an enormous, complex ecosystem — that spans the globe for technology and service providers, as well as sources of raw materials. Today's globally interconnected supply chain increases the "supply chain attack surface" that can be targeted by threat actors.

To maintain agility, it is necessary to have visibility into the supply chain beyond first-level suppliers, where visibility becomes more limited at each subsequent tier. Not knowing who "touches" a system at the lower supply tiers increases vulnerability as the ability to identify risks becomes hindered by reduced visibility. Being able to adapt, react, and, more importantly, predict the potential impacts of risks within the supply chain will allow our Naval Forces to maintain their warfighting edge.

 These supply chain risks can be identified through an innovative process described below.

Illuminate and map the supply chain to identify suppliers to lowest tier level possible, followed by a risk rating of these suppliers to determine the degree of research required. Once this is completed, investigate through open source due diligence to identify risks to the supply chain. Based on the results of the research, assess the strategic impact of the potential risk to the supply chain and the mission. Given this visibility, mitigate against the risk by implementing appropriate remedial measures.

Finally, to maintain awareness, monitor the supply chain components and suppliers for potential material changes.

Clearly, supply chain risks exist. It is incumbent for the U.S. Naval Forces to develop a coordinated strategy and a common operating picture, informed by other agencies, to mitigate these risks in an informed manner to remain agile in response to these asymmetric tactics.

Supply Chain Illumination

Key to understanding the risks is the identification of the residents within the supply chain. Supply Chain Illumination is the process by which this becomes possible. Supply Chain Illumination starts with a system, subsystem, or a component's Original Equipment Manufacturer (OEM).

Through various open source databases, including publicly available and licensed (subscription), the OEM's suppliers can be identified. Once these "2nd tier" suppliers are identified, the process is repeated for each of these suppliers, effectively identifying the OEM's "3rd tier suppliers." Through these databases, it is possible to identify suppliers down through the 5th, 6th, or even 7th tier. This "map" provides insight into the companies that comprise the supply chain for that system, subsystem, or component. Once this map is completed, various types of analysis can be conducted, including Open Source Due Diligence, Industrial Base Analysis, or Strategic Sourcing.
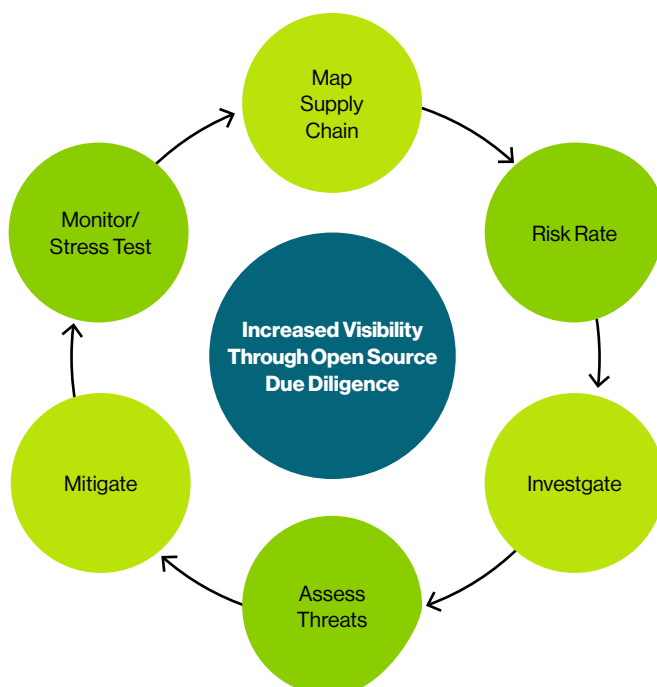
Open Source Due Diligence

Open Source Due Diligence is the process by which a detailed analysis of a supplier is conducted. Depending on the purpose of the analysis, various open source databases, both public and licensed, are available to provide insight. Examples of the types of information that can be found include: track record and public professional reputation of the supplier; past and present key commercial interests and business activities; key business partners and networks; allegations of disputes or litigation; touch points or relationships with foreign governments; association with politically exposed persons or international sanctions; civil, regulatory, or criminal investigations; and involvement with illegal or unethical business practices.

Findings as a result of Open Source Due Diligence can provide insight into supply chain risks, supply base vulnerabilities, supply chain inefficiencies, and opportunities to reduce supply chain complexity and cost. Once identified, mitigation strategies can be put in place to address the risks, increasing the likelihood of successfully executing the mission, effectively and safely.

Industrial Base Analysis

In addition to identifying supply chain risks through Open Source Due Diligence, the process can also inform an Industrial Base Analysis. Leveraging the information

Figure 6

obtained through the Open Source Due Diligence, insight into the capability, capacity, and gaps within a system's supply chain can be obtained. For example, information regarding the credentials (or lack thereof) of suppliers deep within the supply chain may provide insight into potential quality issues if the supplier is tasked with increasing its throughput. The financial stability of a supplier may provide insight into the potential for a supplier to no longer be viable, thereby adding risk to the supply chain. Through Industrial Base Analysis, the Navy can identify inherent risks deep within the supply chain, and mitigate these risks proactively, rather than reactively.

Strategic Sourcing

Risks identified during an Industrial Base Analysis leads to Strategic Sourcing. This includes the identification of alternate suppliers to maintain the integrity of the supply chain if risks mature to an issue. Beyond alternate sources, identification

of alternate methods to produce the component can be assessed, including Additive Manufacturing. Through the Open Source Due Diligence, insight can also be gained relative to the roll-up of costs through the multiple tier levels of suppliers.

Today, a significant percentage of a weapon system's costs reside with the suppliers, or with the OEM. As such, insight into the cost drivers that reside deep within the supply chain are difficult to ascertain.

As illustrated in Figure 7, much of the industry value has migrated from Prime Integrators to lower tiers of the supply chain (i.e., lower-tier suppliers are making higher profits). Additionally, more than 60% of the cost of a weapon system is overhead—not primarily from Prime Integrators, but rather from the stacked overhead across the supply chain.
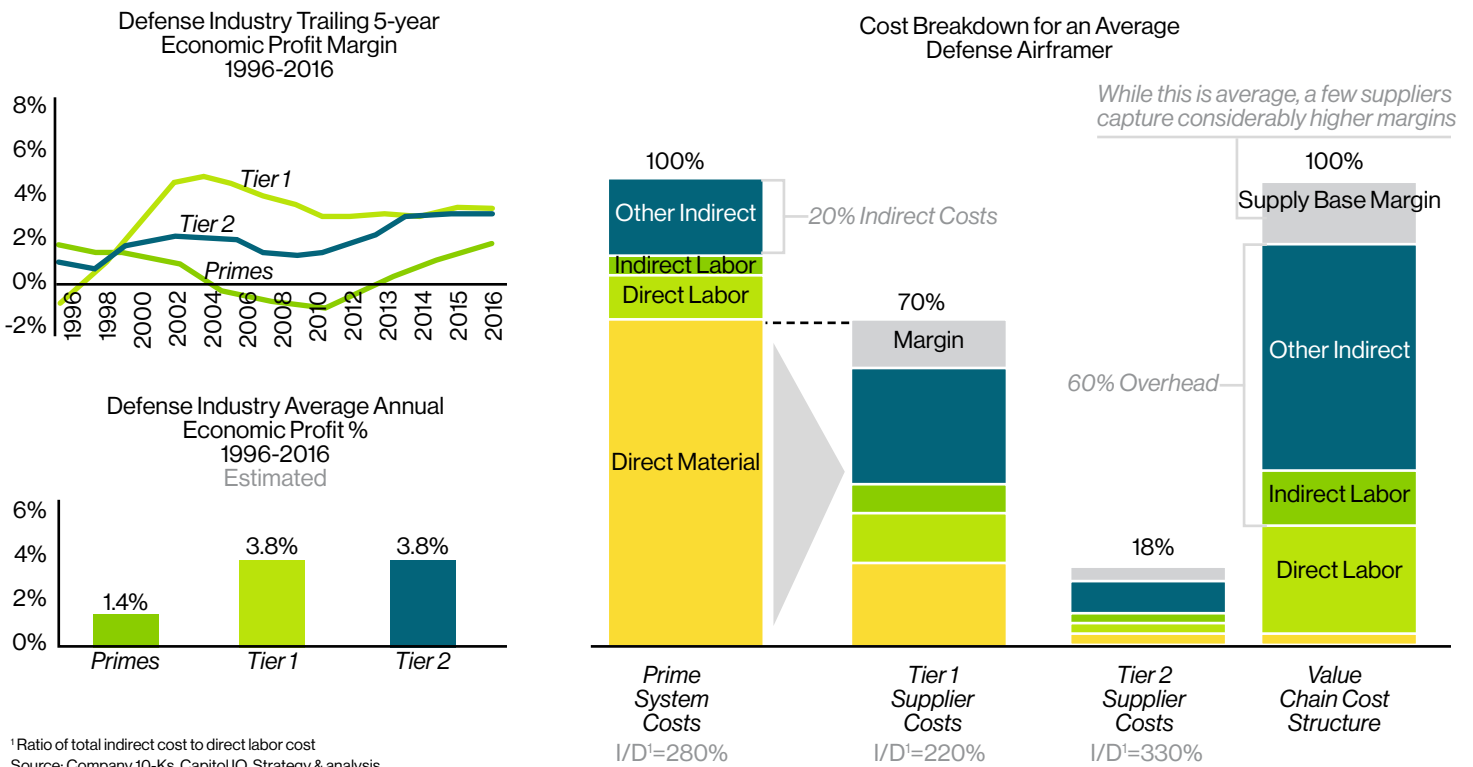
To gain this insight, Open Source Due Diligence in support of Strategic Sourcing

needs to incorporate additional risk categories such as: Strategic Risks to include Geographic, Sole Source/Sourcing Capacity; Market Risks to include Brand, compliance, financial stability of market; Production Risks to include Production capabilities, Ability to scale, Labor availability, Ability to meet current demand; and Performance Risk to include Quality, Geopolitical, Conflict minerals, financial stability of entity, Labor strikes/shortages.

Upon completion of a Strategic Sourcing analysis, the DON can be afforded the opportunity to:

- Improve the acquisition decision-making process
- Identify alternative/secondary suppliers
- Achieve a better understanding of the industrial base and capacity
- Mitigate supply chain risk

Figure 7

Defense Industry Trailing 5-year Economic Profit Margin 1996-2016

Defense Industry Average Annual Economic Profit % 1996-2016 Estimated

Cost Breakdown for an Average Defense Airframer

While this is average, a few suppliers capture considerably higher margins

Prime System Costs I/D[1]=280%
Tier 1 Supplier Costs I/D[1]=220%
Tier 2 Supplier Costs I/D[1]=330%
Value Chain Cost Structure

[1] Ratio of total indirect cost to direct labor cost
Source: Company 10-Ks, Capitol IQ, Strategy & analysis

Readiness and Affordability

America's Sea Services, the U.S. Navy, Marine Corps, and Coast Guard, provide presence around the globe during peacetime and across the full spectrum of conflict—from supporting an ally with humanitarian assistance or disaster relief to deterring or defeating an adversary in kinetic action. The department's responsibility dictates an efficient use of fiscal resources and an approach that adapts to the evolving security environment in any domain, including sea, air, land, space, and cyber-space today and tomorrow.

Sea-services must address the rising costs to sustain operations today while making the investments to succeed in the future. These investments include helping OEM's design tomorrow's weapons systems to reduce future operating costs while helping engineering, maintenance, and supply chain managers reduce the cost of sustainment, improving the readiness of deploying forces, while making the required investments in modernization and lethality. Agile processes must consider designing affordability at the front end; reducing total ownership costs for the life of a system; aggressively looking for cost drivers; and keeping an eye on discovering new risks as a program matures.

Design for Affordability (DFA)

Proven cost-driver methodologies like Inherent, Structural, Systemic, and Realized (ISSR) have been developed to break down costs the following way:
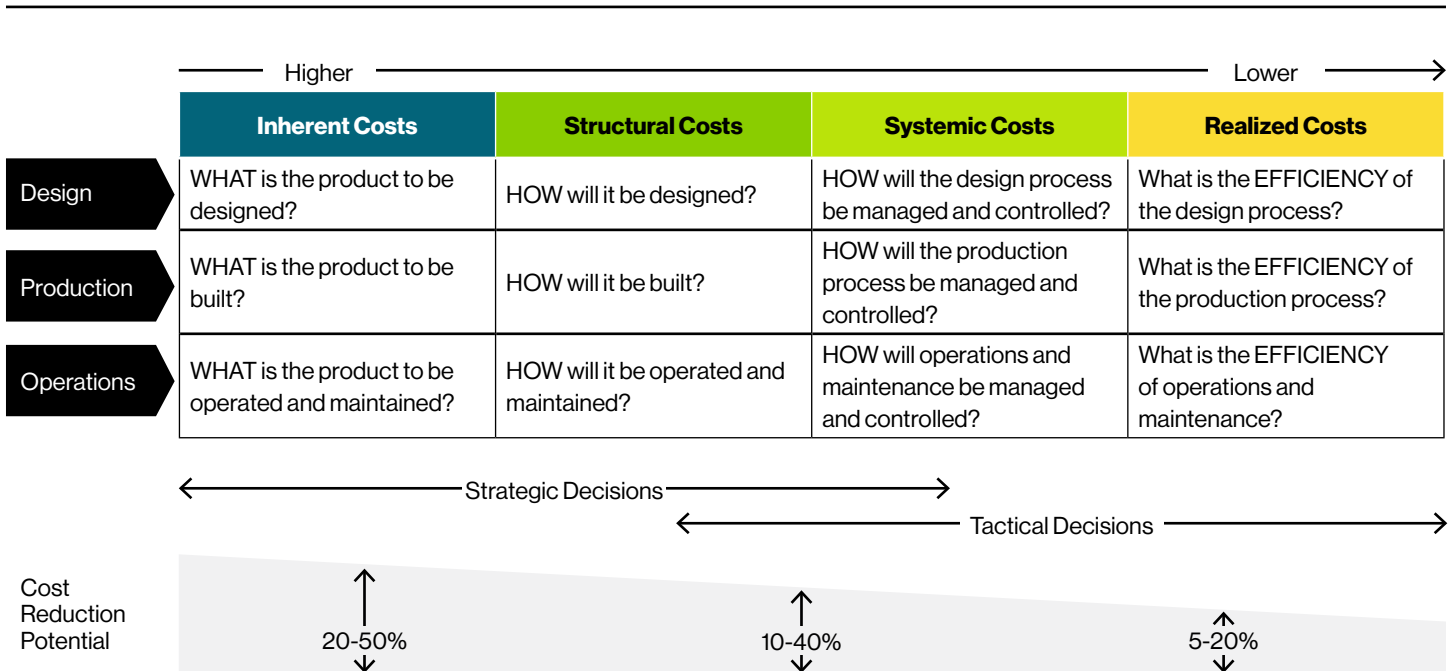
- Inherent costs: How the product is designed
- Structural costs: How the product is made
- Systemic costs: How the production control system is managed
- Realized costs: Efficiency of labor activities

The DfA methodology addresses both material and manufacturing costs by rigorously identifying the drivers of cost and identifying tradeoffs to ensure optimized cost while meeting all requirements and performance objectives. Further, ISSR enables a collaborative approach that includes both government and industry stakeholders, ensuring that all cost-cutting measures have been explored and vetted for the maximum benefit to the platform and government program.

Reduction of Total Ownership Cost (TOC)

Agile Naval Forces need to look at life cycle costs through an auditor's lens to manage requirements creep and fight to lower costs wherever that makes sense. Where DFA drives design tradeoffs and choices about affordable priorities, TOC focuses on controlling the cost of the actual work that is being done or expected to be done throughout a system life cycle. Balancing

Figure 8

	Inherent Costs	Structural Costs	Systemic Costs	Realized Costs
Design	WHAT is the product to be designed?	HOW will it be designed?	HOW will the design process be managed and controlled?	What is the EFFICIENCY of the design process?
Production	WHAT is the product to be built?	HOW will it be built?	HOW will the production process be managed and controlled?	What is the EFFICIENCY of the production process?
Operations	WHAT is the product to be operated and maintained?	HOW will it be operated and maintained?	HOW will operations and maintenance be managed and controlled?	What is the EFFICIENCY of operations and maintenance?

Higher → Lower

Strategic Decisions — Tactical Decisions

Cost Reduction Potential: 20-50% / 10-40% / 5-20%

technology against manpower requirements is a dynamic event that all systems experience throughout the life cycle. Agile organizations are forever challenging program assumptions embedded in cost estimate analyses to inform decisions and negotiations. This active mindset to challenge high costs will deliver better value and control cost growth.

Component Find Fix Team/Component Level Diagnostics

A Component Find Fix Team (CFFT) has the goal to identify engineering, maintenance, and supply chain deficiencies for individual components that drive high cost and low readiness across the naval enterprise.

An agile organization can execute a repeatable four-phased methodology known as Component Level Diagnostics (CLD). The CLD methodology seeks to exhaustively identify root causes of sustainment issues using 12 Integrated Product Support (IPS) Elements. This methodology develops holistic, effective, efficient, cross-functional solutions to address shortfalls:

- **Phase I.** Identify the top degraders of readiness by acquiring data from authoritative sources, analyze key supply chain and maintenance metrics, and map the physical flow of maintenance, repair, and overhaul activities throughout the end-to-end supply chain.

- **Phase II.** Create a Fact Pack for each item in order to identify improvement opportunities; then execute an extensive series of site visits to organization (unit), intermediate, and depot maintenance activities in order to interview actors involved in every stage of supply and repair processes. Then arrange findings from site visits by IPS Element to better isolate the right processes driving the underlying performance problems and issues.

- **Phase III.** Couple information collected in the Fact Packs with technical expertise of leading functional practices and domain knowledge of DoD operations to create an Opportunity Analysis for each component investigated. The Opportunity Analysis will provide a Cost Benefit Analysis for each improvement opportunity, including any relevant assumptions and all leveraged raw data sources.

- **Phase IV.** Create an Implementation Road map that describes an optimized path forward to implement improvement opportunities for each of the individual components and identify broader systemic issues encountered across the Fleet that warrant further investigation. Use these Implementation Road maps to track the completion of action items and report monthly status to the Naval Enterprise Executive Leadership Councils (ELCs) (e.g., Engineering, Maintenance, and Supply Chain). The combination of effective program management, active tracking of outstanding actions, and regular communication with senior leadership, allows CFFT to expeditiously capture benefits of the improvement opportunities identified.

Independent, Integrated Program Review (I2PR)

Transparency comes by independent reviews that lead to better accountability and operational transformation. An Independent, Integrated Program Review (I2PR) — a rapid assessment of program risks that can be utilized across virtually any kind of program — provides senior program officials the kind of independent, objective insight into program risks to support timely decision-making on how to mitigate risk priorities that are identified in the review. Using this kind systematic approach delivers organizational agility. To review, observe, assess, integrate and report findings of a chosen program's

likelihood of successfully executing and delivering its intended outcomes and benefits, agile organizations use I2PR benchmarks as a measure of successful program characteristics. Upon completion of an I2PR, program leadership has at their disposal: (1) dashboard visualization into the health of the program, and the ability to drill into any risks identified; and (2) insight into relevant courses of action(s) to remediate challenges and maximize program success.

Business Financial Management

In the public sector, financial accountability is a function of the relationship between members of government and lawmakers representing the citizens/taxpayers. Government organizations require reliable data for their financial and budget processes, and the culture of agility and accountability comes from management-driven processes, such as financial reporting and cost methodologies. Unreliable data derived from faulty financial reports hinders an organization's ability to meet Agile goals and successfully complete missions. For a financial management team to achieve a culture of agility, data accuracy, reduced waste and improved data that will drive rapid and informed decisions, they need to take steps throughout the funding life cycle that allows transparency for each dollar spent to determine the impact these funds have in supporting the warfighter.

Auditability and Financial Improvement

An organization's financial management and audit posture is a function of its systemic financial management process and internal controls. When internal controls are found lacking, information becomes unreliable, thus impairing decision-making, visibility, and overall agility.

For any agile organization, achieving broad transparency and accountability continues to be a significant challenge and a regular review process is a necessary quality to achieve a clean audit opinion. To address this challenge, agile organizations continually invest in both process and system improvements that ensure the accuracy and timeliness of financial information is made available to defense decision-makers.

A Strategic Audit and Sustainment Approach will lead to a satisfactory audit opinion, energize innovation and collaboration, improve visibility and enable agility across the organization. This strategy should evaluate such factors as leadership priorities, financial management business process, current remediation efforts, best practices, and accomplishment capability. Additionally, to accelerate agility, agile leaders seek out opportunities to leverage efficiencies and avoid duplication of efforts, such as the overlap of cybersecurity and application control requirements. Most importantly for success, every approach should address the end-to-end business processes, internal control environment, and financial system modernization. The alternative is a "whack-a-mole" approach that solely focuses on deficiency remediation, which will reappear annually due to scope increase throughout the audit cycle. Effective financial management is vital to achieving the DON's goal to be an agile naval organization.

Planning, Programming, and Budgeting Execution (PPBE)

Data-driven, mission-oriented PPBE decision-making processes that are more agile, accurate, and responsive will improve the distribution and alignment of available resources in a time-and-budget-constrained environment. The federal budget cycle, regulations, and processes limit the ability to respond quickly, and have proven to slow the speed at which defense organizations operate. It is interesting that the Government Accountability Office has issued reports that have highlighted the negative impact the PPBE process and cycle has on the DON and cited it as a factor for declining ship conditions and worsening trends in readiness, increased deployment lengths, and reduced or deferred maintenance.

To create an agile, systematic, process-oriented, and data-driven approach that is timely, transparent, auditable, and attributable to support the full spectrum of the PPBE processes, the best agile organizations fully integrate all stakeholders to strengthen collaboration and visibility for everyone in the PPBE process. An agile PPBE decision-making process can result in warfighting wholeness and unified enterprise contributions; compliance with strategic guidance; closing of capability gaps, and removal of overmatches and budgets that are reasonable leading to executable programs.

Cost Estimation

Financial Management can be impaired by decentralization; a lack of accurate historical and actual cost data; estimated cost inflation for vessels and aircraft under construction; and a lack of technical financial management skill sets within the department. It is essential for agile organizations to introduce reliable cost estimation models that align to well-documented processes and effective internal controls resulting in reliable data for budget and audit determinations. Financial management problems will contribute to inconsistent and unreliable reports to Congress on weapon system's operating and support costs, limiting the visibility that Congress needs to effectively oversee weapon system programs and make cost-effective choices.

An agile Navy must implement processes that produce the most accurate cost estimates, providing leadership with the tools they need to make informed programmatic investment decisions. Organizational agility also mandates limited rounds of approvals by executive leadership.

The DON cost community impacts decisions within every functional area of the organization – PPBE, acquisition, asset life cycle, and ultimately operations and the warfighter capability to operate in an agile environment. Cost estimations are the driving force of data when naval leaders decide to acquire the ships, submarines, aircraft, weapons, and technology necessary to achieve DON strategic objectives. Agility requires visibility, collaboration, and innovation, as mirrored in the need for the cost community within the DON to develop sound cost estimation methodologies and models that continuously advance.

Asset Visibility and Accountability

All U.S. citizens demand fiscal accountability from their government. Congressional oversight and executive focus on sound business management has resulted in significant urgency for the DOD to obtain a clean financial statement audit opinion. Due to the cost associated with acquiring, maintaining, and disposing of physical assets— ships, aircraft, real property, ordnance, etc. —Asset Visibility and Accountability is the most significant element to enable a clean audit opinion.

For a sustainable environment, an agile organization must establish a comprehensive internal control program over its asset life cycle — acquisition through disposal. This requires that organization to first understand and document the asset life cycle, and then examine its process to identify gaps that can create lapses in accountability. In many cases, preventing these gaps means linking activities already performed by different elements of organization — invoice payments into a Construction in Process balance, inventory results into accounting record updates, and other measures. A modern, control-based asset accounting framework will drive sustained accountability.

Business Systems

Moore's Law has confounded every business, as one IT system after another is quickly made obsolete. Large organizations are especially challenged, as budgets cannot support across-the-board IT system refresh efforts. Whether it is maintaining legacy systems throughout the rest of their life, deploying new advanced systems, integrating the two into effective enterprisewide solutions, or all of the above, business systems will continue to be outpaced by technology advancements. A well-informed approach to these business systems can materially contribute to the achievements of agility or be a constraint limiting the ability of the Naval Services to be prepared for the future or even fully effective today.

Business Systems Strategy and Rationalization

A more flexible approach to IT development, fittingly titled "Agile Development," has been adopted in recent years. "Agile Development" emphasizes continuous collaboration and recurring requirements reviews between operational units and IT, while planning and executing smaller work packages. With the continuous pressure to reduce costs, while maintaining and improving performance, agile organizations must adopt IT approaches like "Agile Development" in order to produce functioning applications that are delivered on time, and at or under cost.

One size does not fit all, but in agile IT solutions interoperability, modular architecture, and "open" interface controls are Key Performance Parameters that should drive the overall solution.

Business Systems Modernization

Agile organizations understand the power of open design. For Business Systems Modernization, new systems should embrace modular architecture that permits successful validation and verification tests to ensure "openness" and use widely supported and consensus-based standards for their key interfaces. Legacy systems that were not designed for affordability should be replaced as soon as fiscally possible with an eye towards agile development for the future. Through modular architecture, agile acquisition and engineering communities are enabled to:

- Employ evolutionary acquisition and spiral development
- Develop an integrated road map for system design and development
- Execute affordable plans

The U. S. Navy Digital Framework outlines the vision, goals, and focus areas for a digital Navy, as well as describes the roles and responsibilities of Navy stakeholders invested in this challenge. These goals were informed by Defense Department mandates.

Risk Management Framework (RMF) Strategy and Implementation

The U. S. Navy Digital Framework outlines the vision, goals, and focus areas for a digital Navy, as well as describes the roles and responsibilities of Navy stakeholders invested in this challenge. These goals were informed by Defense Department mandates.

We understand that as operating environments evolve into increasingly complex digital settings, agile organizations must be able to keep pace with information management in support of decision-making, while balancing speed and security. Big data processing and powerful software analytics will transform how information is collected and shared. These new improvements will both provide opportunities and identify challenges in the cybersecurity environment.

Today's agile Naval Force is in the midst of change with DoD Instruction 8510.01. It mandates the transition from the DoD Information Assurance Certification and Accreditation Process to the DoD RMF. This new policy adopted a risk-focused security approach developed by the National Institute of Standards and Technology. Services have responded with greater investment to identify and protect each of its domains, detect vulnerabilities, and react and restore critical mission assets in the event of a cyber-attack. As organizations move to transition their systems under RMF today, they are faced with some conflicting guidance, decentralized governance, and limited availability of needed training, which is in direct conflict with the requirements necessary to become an agile force.

Agile organizations must appropriately allocate and properly align project plans to comply with RMF and Federal Information System Controls Audit Manual guidance. This challenge must overcome pressing deadlines to remediate open RMF audit findings, identify potential cybersecurity vulnerabilities, and move to commercial cloud environments.

Such an approach maintains an internal audit function responsible for the evaluation of risk management, control, and governance, and ensures regulatory compliance. It also aligns and prioritizes Navy security initiatives to enable strategic objectives while defining an enterprise-wide statement of risk appetite that serves to guide naval organizations and risk managers on a daily basis.

A critical piece of this approach is to develop a governance and committee structure that enables the effective and efficient escalation of risk issues from individual organizations. It should preserve an independent, internal risk management function. The outcome should be risk management processes that enable active and timely identification and monitoring of current and emerging risk exposures across the department.

Conclusion

Defense organizations continue to apply short-term approaches to solve current issues and budgetary constraints. Such actions include organizational alignments that do not integrate strategy with performance expectations, sometimes delaying necessary modernization, and allowing outdated legacy systems and processes to continue. Such short-term views have degraded organizational performance at a time when national security challenges are growing in complexity and scale. Worse, non-strategic decisions may "lock" leaders into organizational approaches or technological solutions that cannot be corrected in time to enable success on the battlefield.

In the mid-1930's, the Italian Air Force made major commitments to aircraft procurements during a time of rapid technological development within military aviation. Having "locked-in" certain critical designs and operational concepts, the Italian Air Force lost the agility to inject new technologies and capabilities into their newly acquired airframes. By the outbreak of World War II, the Italian Air Force was already behind its competitors and remained in that condition throughout the war.

Change initiatives must complement and strengthen the key threads of organizational agility if they are to have a net positive impact over a sustained period. Strengthening the agility threads must be an aspiration, and a mandate, for all defense organizations if they are to be successful in protecting their citizens, and contribute to a safer world.

This paper has identified several areas where properly structured program efficiencies can lead to greater organizational agility. Our focus in this paper was on Naval Forces, the Navy and Marine Corps team. Successful naval organizations of the future will be those that pay as much attention to long-term sustained improvement as to short-term steps that meet budget goals.

It should be understood that these concurrent objectives are eminently possible if the approaches outlined in this paper are followed. Naval leaders should embrace these approaches to meet the maritime security challenges that continue to expand in both their complexity and potential to disrupt society.