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ACQUISITION RESEARCH PROGRAM
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Naval Acquisition in the United States& Russia

June 2023

LCDR Michael S. Marchese, USN
Stanley Chan

Thesis Advisors: Dr. Robert F. Mortlock, Professor
CDR Leanne Riley, Navy

Department of Defense Management

Naval Postgraduate School

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Prepared for the Naval Postgraduate School, Monterey, CA 93943

ACQUISITION RESEARCH PROGRAM
DEPARTMENT OF DEFENSE MANAGEMENT
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ABSTRACT

The purpose of this report is to examine and draw comparisons between the military acquisition processes of the United States and Russia using a case study approach similar to the NPS thesis titled "Comparison of Naval Acquisition Processes Between the United States and Taiwan," written by LCDR Chih-Chieh Liu in 2021. The objective is to research techniques each nation uses to acquire next-generation ballistic submarines, identifying and comparing key efficiencies and deficiencies between the U.S. and Russian Naval acquisition processes to make recommendations to enhance the American Department of Defense. Multiple scholarly articles and reports provided information necessary to conclude that the U.S. places great emphasis on cost control and meeting milestones, whereas Russia focuses on readiness through increasing its size under heavy state control. The U.S. Navy should take multiple steps towards bettering its major acquisition programs, holding the Program Offices accountable to use cutting-edge software to produce actionable data and ensure schedule risk analysis in addition to investing in public shipyards as a top priority to national security. Russia would benefit from increased transparency, investing in public-private partnerships and data analysis, and fostering a culture where stakeholders embrace innovation and do not fear failure. There is great opportunity in future research in this field as it is important to learn from both allies and adversaries.

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ABOUT THE AUTHOR

Lieutenant Commander Michael Marchese is a native of Sugar Loaf, NY. He earned a Bachelor of Business Administration in Marketing from the University of Miami (FL) in 2010 and received his commission through Officer Candidate School, Newport Rhode Island in 2012. LCDR Marchese received his Joint Professional Military Education (JMPE) I through the Air Command and Staff College and his Master of Science in Contract Management from the Naval Postgraduate School in 2023.

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Mr. Chan continued his 1102 experience by working for the Western Region as a Contract Specialist. He served as the liaison and advocate to 3 CMOs on various contractual issues and briefed senior leadership on monthly progress and performance on each CMO.

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We express sincere appreciation to all those involved in providing support throughout this process. We would like to give a special thanks to the Acquisition Research Program and Graduate Writing Center, which both contributed to the success of this capstone applied project. We would also like to extend our sincere appreciation to our advisors, Dr. Robert Mortlock and CDR Leanne Riley, for contributing their time and providing us with valuable insights, guidance, support, and the opportunity to conduct research on a critical and relevant topic. Also, we would like to thank the Naval Supply Systems Command and the Defense Contract Management Agency for providing us with the funding, flexibility, and trust required to obtain a master's degree from the Naval Postgraduate School.

We would like to thank our leadership, colleagues, friends, teammates, and classmates along this journey. Most importantly, we would like to thank our family members, who provided tremendous support along the way. We would not be where we are today without your continuous encouragement and patience.

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LIST OF ACRONYMS AND ABBREVIATIONS

AAF	Adaptive Acquisition Framework
APUC	Average Procurement Unit Cost
CAP	Capstone Applied Project
CBA	Capabilities-Based Assessment
CFO	Chief Financial Officer
DAS	Defense Acquisition System
DCAPE	Director of the Cost Assessment and Program Evaluation
DoD	Department of Defense
DON	Department of the Navy
DPG	Defense Planning Guidance
EMD	Engineering and Manufacturing Development
ICD	Initial Capabilities Document
JCIDS	Joint Capabilities Integration and Development System
KPP	Key Performance Parameter
LRIP	Low-Rate Initial Production
OMB	Office of Management and Budget
P&D	Production and Development
POM	Program Objective Memorandum
PPBE	Planning, Programming, Budgeting, and Execution
R&D	Research and Development
RDT&E	Research, Development, Test, and Evaluation
RDA	Research, Development, and Acquisition
SAR	Selected Acquisition Report
TMRR	Technology Maturation and Risk Reduction
USD(C)	Under Secretary of Defense (Comptroller)

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I. INTRODUCTION

From the Vietnam War until the first Gulf War, the American military's weapon systems had no true equal, despite the Cold War and smaller conflicts throughout that time period. The United States now finds itself in an era of geopolitical great power competition, and U.S. rivals have their sights set on surpassing American capabilities. The United States and Russia's relationship has grown increasingly adversarial. Current events indicate that these two nations will remain contentious and competitive in the coming years. Russia rebuilt its Navy at a rapid pace since the fall of the Soviet Union, faster than the western world anticipated (Hendrix, 2023). It is crucial to compare the acquisition processes of the United States against Russia's methods of procurement within similar military programs, specifically each Navy's newest ballistic submarine. By analyzing and comparing the defense acquisition systems of the United States and Russia, the efficiencies and deficiencies of each system can be utilized to identify best practices, areas of competitive advantages, and leverage points that can all be used to improve America's future wartime advantage.

A. PURPOSE OF RESEARCH

This Capstone Applied Project (CAP) aims to create a framework that can be used to compare the acquisition strengths and weaknesses of the United States and Russia. "Russia is a rogue state with a relatively weak economy but a formidable military that actively seeks to undermine the internal order with force" (Ashby et al., 2021, p. 24). Russia has also rebuilt its military at a rapid pace, with its Navy fleet nearing Cold War numbers (Hendrix, 2023), and this report provides insight derived from best practices and points of failure from each nation in order to make real-world recommendations that will assist current and future U.S. military leaders and acquisition professionals.

1. Primary Research Question: What are the key development and procurement processes and differences used by each nation?
2. Secondary Research Questions:

- What are the key efficiencies and deficiencies of both nations' acquisition processes?

- Can the development and procurement costs for similar programs be effectively compared?
- What are the reasons behind key process efficiencies and deficiencies?
- How does each nation's buying performance differ?
- What are the causes behind these performance variations?

B. PROBLEM STATEMENT

Tensions continue to rise between Russia and the United States, with both countries pursuing advanced weapon systems to best compete on the world stage. Global supply chain issues, minimized defense budgets, high inflation, the invasion of Ukraine, weakened industrial bases, increased sanctions, evolving partnerships, and a heavy reliance on complicated weapon systems have all led to opportunities that must be recognized and then exploited in order to remain relevant in a near-peer strategic environment.

C. METHODOLOGY

This research uses information and data collected from RAND Publications, Government Accountability Office (GAO) publications, Congressional Research Service (CRS) reports, Section 809 Panel recommendations, Navy Program Executive Office (PEO) data, various analyses from different researchers, Department of Defense (DoD) instructions, regulations, and scholarly articles. This research utilizes a case study approach comparing a thorough analysis of the United States and Russia's acquisition processes. The benefit of analyzing the acquisition programs of a specific ship-class and platform between the two countries enables detailed key comparisons along with real-life applications.

D. SCOPE AND LIMITATIONS

Within the DoD, each weapon system is acquired by its own unique acquisition process. To fully grasp how acquisition works within a nation, it is essential to examine the full breadth of cases. Nevertheless, due to a finite amount of time for research, this capstone project specifically focuses on the Navy's next generation ballistic submarines of both the United States and Russia. This report is solely based on publicly accessible

information, as some of the documents in this field of study are classified, which would limit this document's availability to the public.

E. OVERVIEW

This CAP considers the current state of affairs between the U.S. and a near-peer adversary, recognizing the benefit of looking both inward and outward to find the most superior methodologies for advancing our capabilities through defense acquisitions. A total of seven questions were posed with the goal of addressing each by investigating the way in which the Russians and the Americans design, develop, produce, and ultimately employ ballistic submarines. A wide range of resources allowed the authors to explore Defense Acquisition Systems, and in the coming chapters we explain and compare requirements systems, resource allocation systems, and factors affecting the overall acquisition process for both countries. The case study concludes with a detailed account of findings and a conclusion that offers recommendations to the Department of Defense to improve the way it acquires major weapon systems, especially Naval vessels.

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II. BACKGROUND

This chapter introduces the overall concept of a defense acquisition system, specifically within the United States and Russia, providing a high-level overview and comparison of processes and stakeholders between the two countries. The initial analysis looks at how both nations research, design, fund, and ultimately acquire weapon systems. While there are boundless details that can be drawn from available resources to compare and contrast the United States and Russia, this section will focus on the most significant components within each system where key distinctions can be made in the areas of requirements generation, funding and procurement, development stages and milestones, and resource allocation.

Next, the two countries' management structures are further broken down and compared by detailing defense department and agencies' responsibilities within each bureaucracy. Finally, this chapter concludes by laying out the critical differences and similarities between the opposing defense acquisition systems.

A. DEFENSE ACQUISITION SYSTEMS

Marcum (2013) described the Defense Acquisition System (DAS) as a set of procedures the government must manage to "transform internal and external resources into weapon systems" (p.8). According to DoD Directive 5000.01, *Defense Acquisition System*, the system's objective is to "support the National Defense Strategy, through the development of a more lethal force based on U.S. technological innovation and a culture of performance that yields a decisive and sustained U.S. military advantage" (Department of Defense [DoD], 2020, p. 22). Furthermore, the goal of the system is to "acquire products and services that satisfy user needs with measurable and timely improvements to mission capability, material readiness, and operational support, at a fair and reasonable price" (Schwartz, 2013, p. 16), utilizing multiple operating policies to accomplish this heavy lift.

1. U.S. Acquisition System

Within *Management of Defense Acquisition Projects*, Rendon et al. (2019) identified three primary decision support systems used within the DoD's acquisition system, which consist of the following:

- **Joint Capability Integration and Development (JCIDS):** System provides requirements for programs.
- **Defense Acquisition Management:** System supervises the formal process of each acquisition phase through milestones.
- **Planning, Programming, Budgeting, and Execution (PPBE):** System provides resources, specifically funding (Rendon & Snider, 2019).

These three systems are interrelated, each playing a critical role in providing an integrated and effective approach toward strategically identifying, acquiring, and paying for the military's future and current capability to fight and win wars.

Figure 1 identifies the three support systems of the acquisition framework. Within the framework lies both "big A" and "little a" acquisition. The complex framework of three interconnected systems is commonly referred to as "big A," designed to "acquire products and services that satisfy user needs with measurable and timely improvements to mission capability, material readiness, and operational support, at a fair and reasonable price" (DoD, 2020, p. 12). In contrast, "little a" acquisitions cover the pursuits that occur within the DAS (Moran, 2008).

Figure 1. DoD's Defense Acquisition Institution. Source: Department of Defense (Mortlock, 2017).

2. Russia's Acquisition System

"Russian military leaders describe the current military strategy as one of 'active defense.' This concept has a deep history in Soviet military thought, evolving from an operational discussion towards a strategic framework in the late-Soviet period" (Kofman et al., 2021, p. 40). Under President Vladimir Putin, Russia continues to lean on Soviet-era ideologies for guidance, and its defense strategy, specifically its system of acquiring weapon systems, is no different. However, rampant fraud, waste, and abuse stemming from corruption and years of noncompetitive bidding hampered progress. "Corruption in Russia leads to differential treatment of businesses by the government, with businesses that have better connections receiving favorable tax treatment or easier access to government contracts and others being subject to extortion…" (Radin, 2019. p. 25). To increase transparency and efficiency of state-sponsored procurements, Russian legislation was revised in 2014, which led to changes in the procurement process. Table 1 identifies the main differences between the old legislation (94-FZ) and new legislation (44-FZ).

Table 1. Difference between Old and New Legislation Relating to Russian Weapon Acquisitions. Source: Adapted from Pakharukova (2014).

Characteristics	94-FZ	44-FZ
Access to procurement information	Limited access	Unlimited access
Publication of the main stages of procurement	Is to be published at www.zakupki.gov.ru	Is to be published at the unified information system
Control over procurement	No possibility of public control	Possibility of public control
Institute of Customer's contract services	Does not exist	Organization of subdivision responsible for realization of all stages of procurement
Procurement procedure	Open and closed tender; customer can decide the most adequate method of choosing the winner (Articles 27, 39)	Open tender (can be restricted, two-stage); closed tender (can be restricted, two-stage); request for proposal, request for quotation
Procurement planning	No planning	Planning is mandatory
Anti-damping	No anti-damping measures	Contractor has to provide grounds for decreasing the price of the contract for more than 15%
Maximum contract price determination	Is regulated by Article 19.1	Is regulated by Article 22. New indicators for determination of maximum contract price (market analysis, tariff-based method, etc.) are included
Contract amendment	Is possible only by court decision or agreement between the parties	Different ways of contract amendments are possible
Procurement audit	No audit norms	Audit can be performed by Accounts Chambers of the Russian Federation and other control authorities

Aside from the acquisition system, the novel 44-FZ legislation regulates the gamut of Russia's public procurement process which incorporates procurement planning,

contract performance, termination and amendments, procurement monitoring, control, and audit (Pakharukova, 1970). Although Russia does not directly spell out the big "A" acquisition framework in its acquisition system design, the procurement process is similar to the United States' PPBE. Additionally, Russia's Research, Development, and Acquisition (RDA) framework continues to consist of five major stages: "(1) scientific research projects, (2) preliminary design, (3) system development, (4) system adoption, and (5) serial production (Ashby, 2021, p.3). "In the Soviet system, weapon system R7D was guided by the State Armament Program (SAP), a largely classified document that outlined the focus areas of research and the procurement plan for a period of about a decade" (Ashby, 2021, p.4). Considering the recent updates to the Russian public procurement system, Figure 2 provides a graphical representation of steps that must be taken to succeed in that realm.

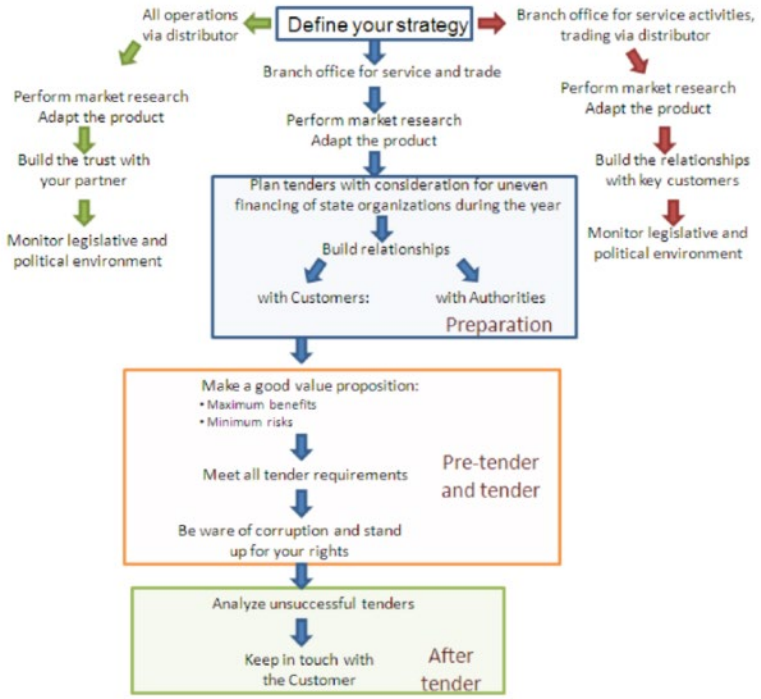

Figure 2. Key Steps to Success in Russian Procurement. Source: Pakharukova (2014).

B. REQUIREMENTS SYSTEM

"Military forces deployed on land, in the air and at sea face an increasing array of threats—whether high-tech or low-cost and improvised. Both state and non-state actors are also developing new ways and means of achieving effect in and through [operational domains]" (Black et al., 2022, p. 1). During the strategic planning process, the United States and Russia identify areas of opportunity where they can leverage current and future technologies to deter or win wars, and the byproducts of this process are defense requirements. Additionally, needs can be driven from the top-down (leadership), the bottom-up (customer), or a mixture of both. For example, these needs are first reviewed during the Capabilities Based Assessment (CBA) within the American system, providing recommendations to pursue solutions to capability gaps. Related to this notion, Mortlock (2016) remarked that "the root causes of the program failures within DoD are not hard to identify" (p. 3), with changing requirements and stringent ruggedization requirements making the top of his list of offenders.

Both countries vigorously identify requirements during generation, and it is critical that each one is well-defined, vetted, budgeted for, and prioritized based on mission needs that align with national goals and strategy. Because of the exploratory nature of these pursuits, frequent modifications may lead to cost overruns, schedule delays, or outright program failures.

1. U.S. Requirements Process

The U.S. DAS is just one of three related support systems that work together to put the right weapon systems in Service members' hands when needed. The other two interacting systems include JCIDS and PPBE. "The term 'big A' refers to this larger framework of three interconnected and interlinked acquisition systems [and] defense acquisition processes increasingly emphasize the importance of understanding problems that arise from interrelationships, interdependencies, and conflicts among these three systems" (Moran, 2008, p. 4).

The requirements generation system of the DAS is the JCIDS. It is "driven primarily by a combination of capability needs and an evolving threat—pointing toward

the need for a responsive acquisition system" (Mortlock, 2021b, p. 1). Despite a tricky balance of a myriad, at times opposing, agendas stemming from multiple threats and limited resources, the JCIDS ultimately aims to serve its customers what they require to protect and defend the United States and its allied partners. Big A acquisition is most effective and responsible to its stakeholders when it understands who its customers are and what weapon systems or tools would serve them best, which is a very complicated endeavor since it includes understanding quality, quantity, timing, and logistic metrics. "Embedded and implied in the purpose and objective of defense acquisition is the concept of delivering products and services specifically of the desired quality. A fundamental principle of quality is an understanding that quality (and thereby value) is defined by the customer" (Mortlock, 2021a, p. 1). Figure 3 displays the DoD Decision Support Systems and how it interacts with each other to support the Big A.

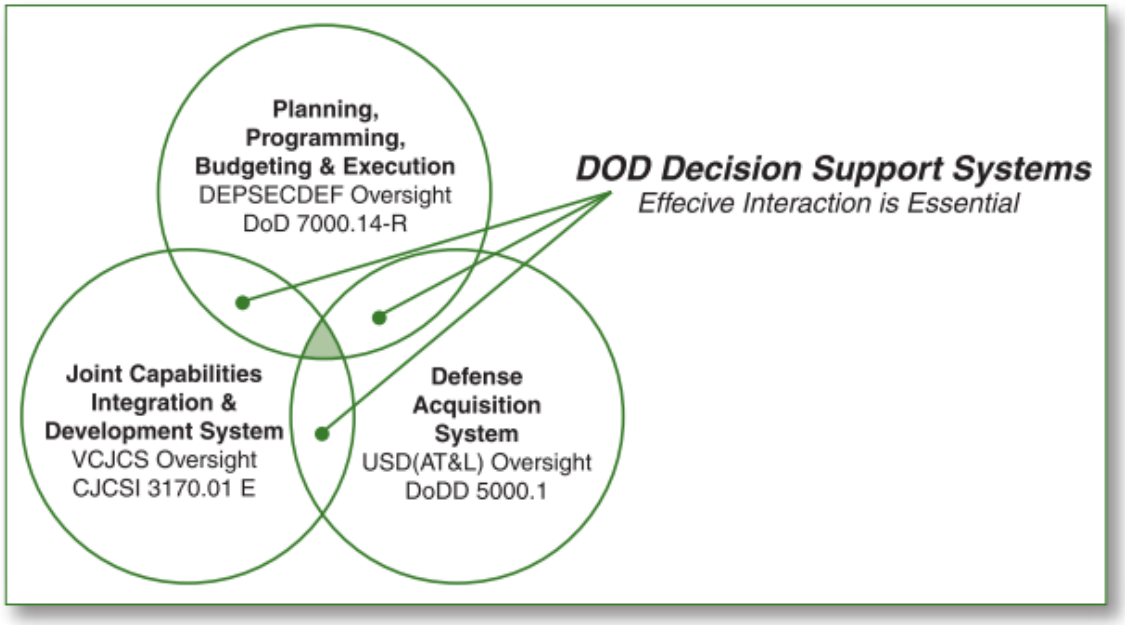

Figure 3. Three Interacting Systems in "Big A" Acquisition. Source: Moran (2008).

To bring the proper amount of quality to the DoD, JCIDS replaced its predecessor, the Requirements Generation System, in 2003. The new approach is set up so that "the sponsoring Service or Agency will enter the JCIDS process with a capabilities-based analysis (CBA) [which] may be initiated by any number of

organizations, to include combatant commands, Functional Capabilities Boards (FCBs), Services, and Defense Agencies" (CJCSI,2018b, p.5). CBA findings serve as the foundation for an Initial Capabilities Document (ICD), which documents joint defense requirements in addition to gaps that the sponsor deems impermissible. "Identification of capability requirements with significant capability gaps typically leads to an ICD that can then drive development of capability solutions that are materiel, non-materiel, or a combination of both" (CJCSI, 2018a, p. 3).

Once a materiel solution is officially recommended, the "JCIDS documents provide the critical link between validated capability requirements and the acquisition of capability solutions through the five Major Capability Acquisition (MCA) phases [which include] Materiel Solution Analysis (MCA), Technology Maturation and Risk Reduction (TMRR), Engineering & Manufacturing Development (EMD), Production & Deployment (P&D), and Operations & Support (O&S)" (CJCSI, 2018, p. 3). Figure 4 illustrates how the "Big A" all works together.

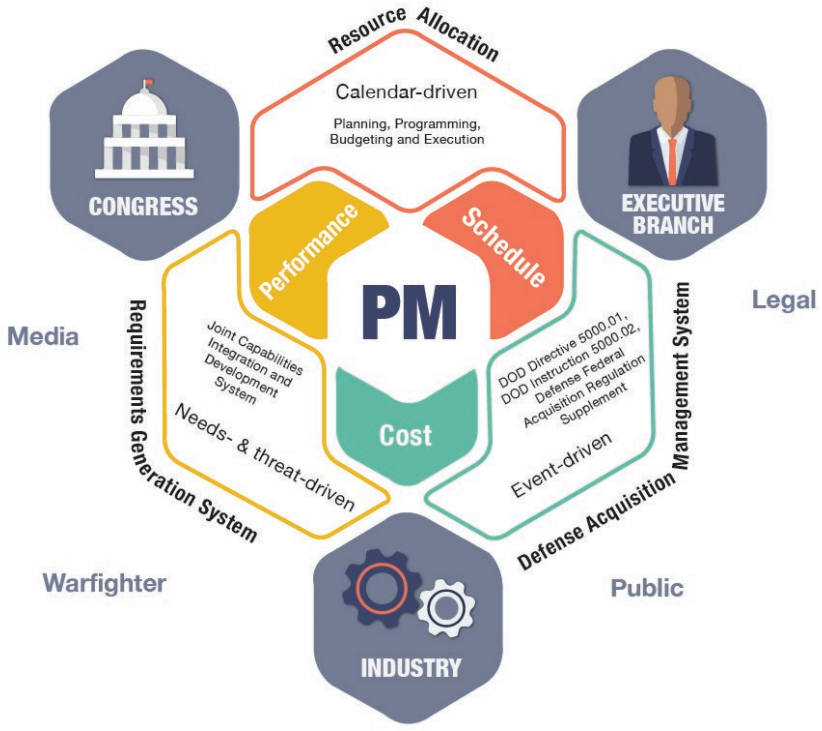

Figure 4. "Big A" Acquisition. Source: Mortlock (2021a).

2. Russia's Requirements Process

In theory, Russia has an established system for generating requirements and choosing which to further pursue. At the highest level, the State Armament Program (SAP), updated approximately every 5 years, "is used as a guideline to form tactical and technical requirements that specify the objectives of different research projects. Subsequently, research institutes and companies are given tactical and technical assignments describing the [future] weapon systems they are tasked to design" (Ashby et al., 2021, p. 3). According to doctrine, government and industry work together to design and then eventually advance promising programs through the stages of development and then implementation and sustainment. Prior to the collapse of the Soviet Union, Russia's "Military-Industrial Commission (MIC) had the final say. If [a] project was approved for continuation, the MIC would also name the primary contractor at this time" (Ashby et al., 2021, p. 3), and the Ministry of Defense would approve adoption and mass production.

Currently, requirements generation differs in practice when compared to what is outlined in national doctrine. As seen with much of modern-day Russian affairs, major defense decisions are reserved for those few people at the height of power and with close ties to the country's president, oligarchs, and connected political officials. These individuals have their hands within the Russian Security Council (RSC) as they previously did with the MIC. The former comprises mostly cabinet ministers and other senior government officials. Its duties "encompass not just military security but also domestic and international security [while] the MIC [under the president's administration] manages relationships between the Russian government and the defense industry" (Ashby et al., 2021, p. 6). Both the RSC and MIC are headed by the Russian president, giving Vladimir Putin ultimate decision-making authority to either support, kill, or create a requirement he deems necessary. The Kremlin has overall control. Figure 5 depicts the first steps in Russia's Defense Research.

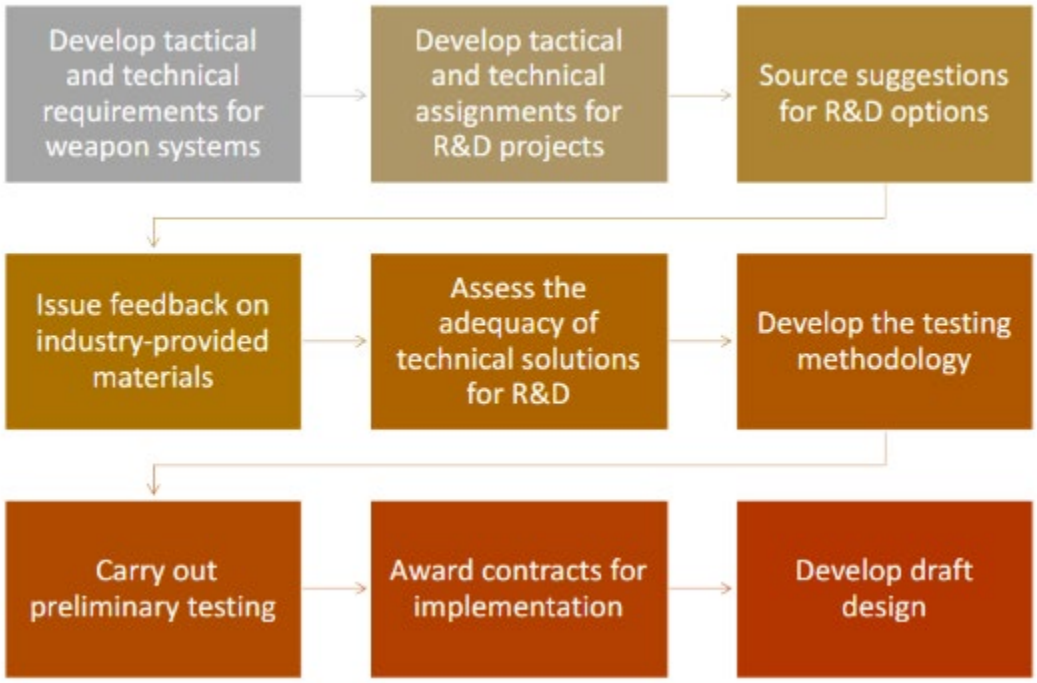

Figure 5. First Steps in Russia's Defense Research. Source: Ashby et al. (2021).

C. RESOURCE ALLOCATION SYSTEM

Now, perhaps more than ever in history, defense spending is a massive expenditure on developed countries' bottom line. The United States and Russia are two of the biggest defense spenders in the world, each placing a heavy emphasis on defense and carrying a heavy burden to fund programs aligned with their national strategy. The allocation of resources is directly influenced by current events, which in recent times includes the war in Ukraine, the COVID-19 pandemic, widespread inflation, the withdrawal from Afghanistan, and rising tensions between the West and China. There is certainly no shortage of crises; therefore, a resource allocation system must be properly established to ensure that taxpayer dollars continue to flow in the direction of national interests and long-term goals. The United States utilizes a robust system within the defense acquisition framework known as the PPBE system. "It serves as the means for prioritizing the allocation of funds, and making decisions about what programs to buy (and what not to buy), in such combinations that best support defense strategy and operational plans" (Rendon et al. 2019). On the other hand, Russia utilizes their State

Defense Order (SDO), and their "long-term defense spending priorities are detailed in State Armament Plans (GPVs), which run in 10-year increments. The newest plan, GPV 2027, calls for total spending of about $330 billion (in 2018 dollars) and 3%–4% of GDP from 2018–2027" (Bowen, 2020, p. 23). Figures 6 and 7 show the comparison of military expenditures and spending between the United States and Russia. To put the numbers into perspective, if the U.S. Defense budget for fiscal year 2024 is approved for the requested $842 billion, the Americans will spend more than double in one year what Russia expects to spend in a decade.

Figure 6. Expenditures as Part of Gross Domestic Product (%). Source: World Bank (n.d.).

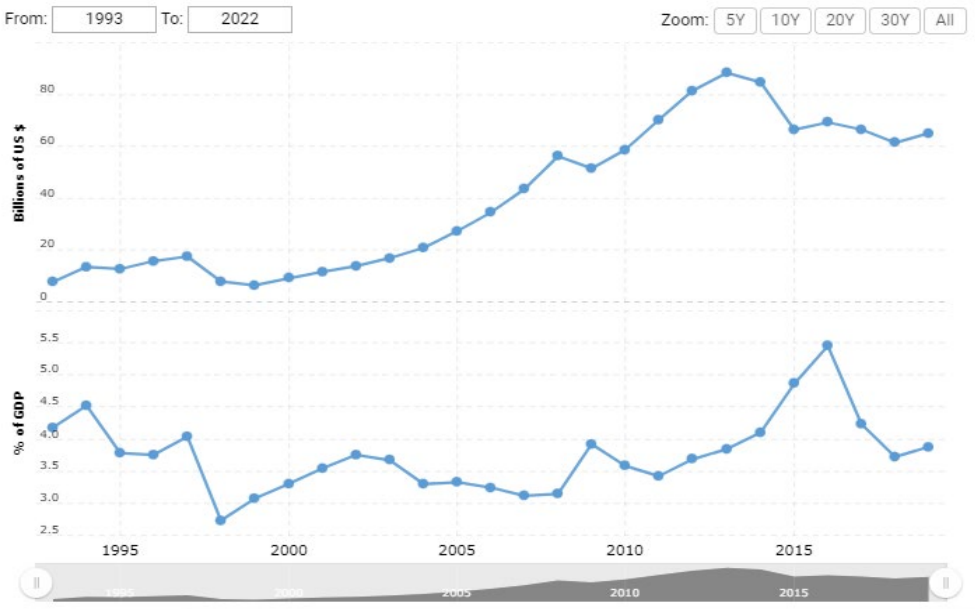

Figure 7. Russian Military Spending Trend. Source: MacroTrends (n.d.).

1. U.S. Resource Allocation System

As Frank Kendall (2017) explained it, "While the development of good ideas is essential to innovation, so too is the need for money to convert those ideas into reality" (p. 20). The PPBE process as shown in Figure 8 is one of the three systems that support the DAS. The PPBE process is focused on financial management and resource allocation for DoD acquisition programs. Established and backed by the Secretary of Defense (SECDEF), it provides priorities and goals and serves as a decision support system for DoD leadership for prioritizing the allocation of funds (Rendon et al., 2019). Key stakeholders are the Office of the Secretary of Defense (OSD), all the Services, and the Joint Chiefs of Staff (JCS), with inputs from the eleven unified combatant commands.

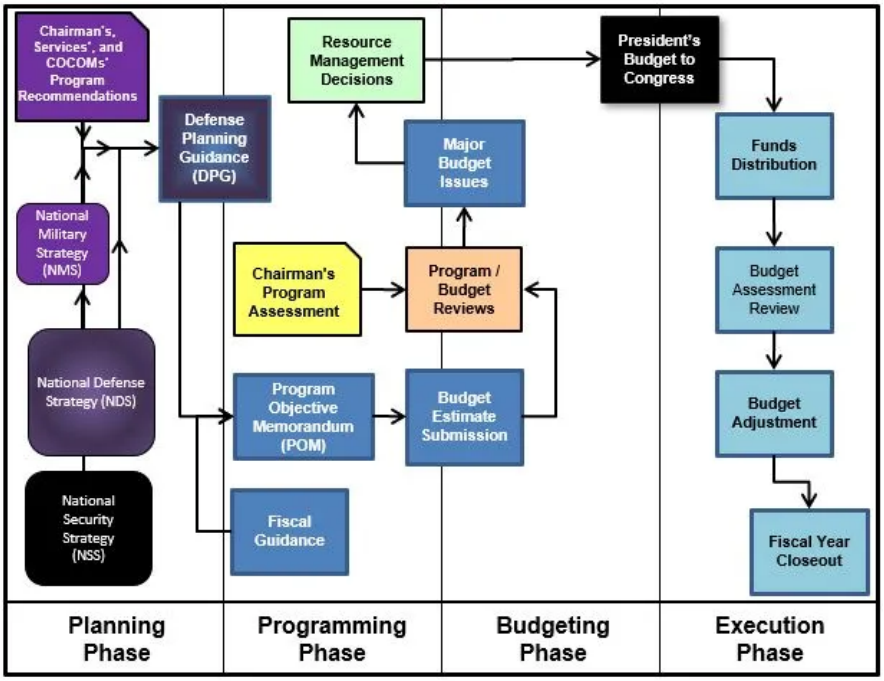

Figure 8. PPBE. Source: DoD (2013).

The first phase of the PPBE process is the planning phase. This phase is led by the Office of the Secretary of Defense (OSD) along with the Joint Staff where the department establishes its strategic direction and priorities (Rendon et al., 2019). They review the National Security Strategy, the National Defense Strategy, and the National Military Strategy to develop the Defense Planning Guidance (DPG) in accordance with national strategy (Rendon et al., 2019). The goal of this phase is to identify any gaps or mismatches between strategy and capabilities and developing programming objectives to address them" (Rendon et al., 2019).

The next PPBE phase is programming, which is spearheaded by the Director of the Cost Assessment and Program Evaluation (DCAPE) Office (Liu, 2021). This is a decisive stage as the DoD stakeholders propose programs aligned with planning, programming, and fiscal guidance aimed at examining the potential impacts of current decisions on the future of the force (Rendon et al., 2019). Once this proposal development is completed, a Program Objective Memorandum (POM) is produced, which encompasses an explanation of each component's financial requirements for approaching fiscal years. Ultimately, the goal of programming is the allocation of

resources among programs over a midrange time horizon is done to achieve the planning objectives in the most effective manner (Rendon et al., 2019).

The third phase of the U.S. PPBE process, budgeting, takes place in tandem with the programming phase. It is led by the Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer (OUSD[C]/CFO), and there are three components consisting of major commands submitting budget estimates, followed by the Service submitting the estimates to the Office of the Secretary Defense (OSD) and the Office of Management and Budget for review. Finally, the President submits the budget estimates to Congress for the enactment of appropriations (Rendon et al., 2019). Most importantly, the goal for the Budgeting phase is to provide reasonable and justifiable programming decisions in a layout that assists the process of congressional enactment (Rendon et al., 2019).

The final PPBE phase is execution. This phase combines "all the actions required to accomplish the programs for which funds were approved" (Rendon & Snider, 2019). The goal is to "implement the policy direction and create desired capabilities" (Rendon & Snider, 2019). The PPBE process is certainly not to be underestimated in its importance to meeting requirements and "the quest for value includes an understanding of (1) the constraints we must live within; (2) a willingness to prioritize our needs and accept less than we might prefer; (3) an understanding of the relative value of the capabilities we could acquire; and (4) an activist approach to controlling costs while we deliver the needed capability" (Kendall, 2017).

2. Russia's Resource Allocation System

Unlike the PPBE system in the United States, an integrated process with built-in checks and balances, major decisions regarding Russian funds allocation and execution are reserved for a small group of the powerful elite. President Vladimir Putin himself (head of both the RSC and the MIC) has final decision authority on their defense spending and how objectives are prioritized. Compared to U.S. counterpart, Russia's defense budgeting process is relatively opaque and undemocratic. While this method does offer certain benefits, it also presents significant drawbacks. For instance, the lack of substantial legislative oversight eliminates opportunities such as diversifying supply

chains across different regions to increase support for specific systems (Ashby et al., 2021). "The influence of individuals, rather than concrete strategic needs or military requirements, drives outcomes, [so] projects can be perpetuated even if the military does not want them" (Ashby et al., 2021, p. 6). The consolidation of Russian decision-making eliminates oversight, which has the benefit of increasing velocity. Multiple levels of bureaucracy that are common in democratic countries' funding execution process do not exist and/or are made irrelevant within the Russian government, and this is both a pro and a con to Russian short-term and long-term strategy, especially considering the size of the investment they are making in their defense. Official figures suggest Russia's expenditures "have ranged between $60 Billion and $65 Billion a year, or roughly 4% of its gross domestic product (GDP). However, the extent of defense spending may be greater if assessed on the basis of purchasing power parity rather than market exchange rates" (Bowen, 2020, p. 1).

Despite the lack of oversight and meaningful governance, there is still a level of guidance achieved by the SDO. "The specifics of Russian defense procurement are determined not by the SAP but by the annual State Defense Order (SDO). The annual SDO is the primary funding mechanism for Research and Development (R&D) and for procurement and modernization" (Ashby et al., 2021, p. 6). As funds often do not meet the original vision outlined in the SAP, a politically sensitive process of rebudgeting becomes necessary once funds inevitably fall short. Furthermore, the Russian parliament plays a miniscule "role in the development of the SDO, a classified document about which only general details are released" (Ashby et al., 2021).

Despite its flaws, the Russian resource allocation system is operating at a level that has enabled it to leverage its weapon systems and forces to build up its capabilities and engage in recent large-scale military campaigns. There are differing opinions on the main focus of Russian authorities, with some asserting that their priority lies in restoring Russia's stature as a major world power. On the other hand, some argue that Russian foreign policy revolves around safeguarding the nation's position as the dominant force in the post-Soviet region and guarding against external meddling in Russia's internal matters (Bowen, 2021a). "Whatever the motivations, most observers agree Russia's national resources and military modernization program, launched in 2008, provide

Russia's leadership the means to conduct a flexible and often aggressive foreign policy, as well as to project force in neighboring countries" (Bowen, 2021a, p. 2).

D. COMPARISON

The structure and the components of the American and Russian defense acquisition systems are quite similar, as both incorporate the same general items. Each reviews requirements, analyzes the allocation of resources, and has bureaucratic management processes. Both systems ultimately produce weapon systems for the defense and offense of their respective countries.

However, the two countries' acquisition frameworks do also differ in multiple ways. Each system is representative of the ideologies and culture of its nation. The American DAS is founded on oversight and scrutiny, which provides integrity but also makes it cumbersome. The U.S. has adapted, though, creating six different pathways within its acquisition framework (referred to as "little a" or the Defense acquisition management system in Figure 1) to allow for more flexibility, as seen in Figure 9 below. In contrast, the Russian system can still be traced back to its Soviet roots, with power centered around select people from the President's inner circle, the MIC and the RSC making the bulk of the decisions. The Russians do not have multiple outline pathways for review and approval; they have President Putin's pathway.

In summary, the acquisition system of the United States was constructed within a democracy, including effective checks and balances, oversight, and built-in rigor for implementation. On the other hand, the Russian defense acquisition system provides its citizens with the perception of a legitimate approval process; however, it is a product of a government run by a leader who essentially controls everything either directly or indirectly. Each system has its pros and cons, and our case study provides an opportunity to explore the effects they have on the procurement of recently procured weapon systems.

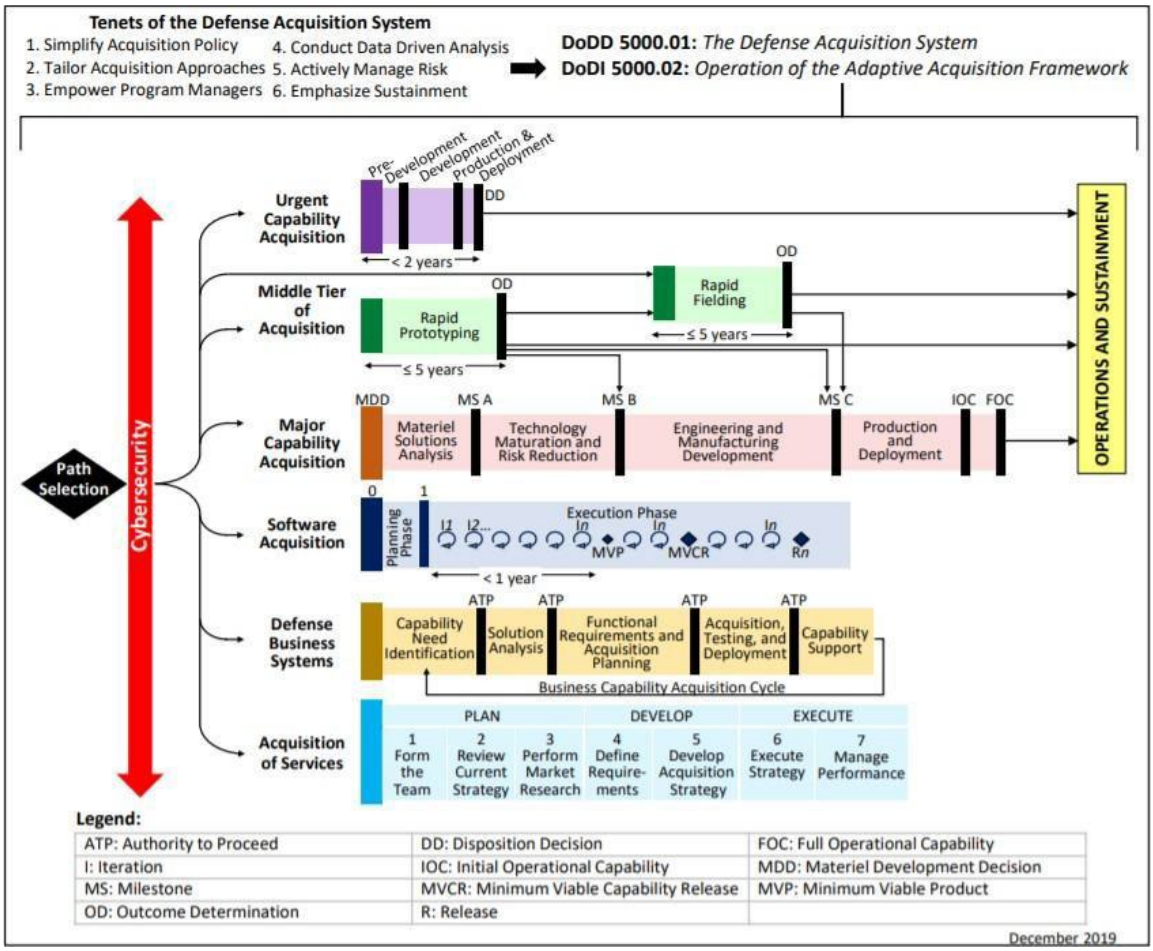

Figure 9. Six Pathways of Adaptive Acquisition Framework. Source: DoD (2020).

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III. LITERATURE REVIEW

This chapter provides a synopsis of the available literature on the defense acquisition processes within the United States and Russia, including existing constraints and opportunities for major acquisitions of Naval ships, specifically ballistic submarines.

A. DEFENSE ACQUISITION SYSTEMS

In accordance with DoD Directive 5000.01, the DAS can be defined as the management process by which the DoD provides effective, affordable, and timely systems to end users (Department of Defense [DoD], 2020, p.25). The United States and Russia each have a complex and lengthy series of steps built into their respective acquisition systems. Likewise, both countries require vast defense budgets to fulfill multiple large-scale requirements. The DoD requested $245.6 billion in acquisition funding, including $133.6 billion for procurement and $112 billion for research, development, test, and evaluation (RDT&E) in Fiscal Year (FY) 2022 (DoD, 2022). On the other hand, Russia's defense spending was approximately 5.5 trillion rubles ($90.9 billion), including an additional 2.8 trillion rubles ($46.3 billion) for security and law enforcement the same year (Luzin, 2022).

Numerous scholarly articles, publications, and government instructions that summarize, analyze, and provide guidance on both nations' acquisition systems exist. U.S.-focused references include RAND Corporation's many useful articles on the topic such as *Getting Defense Acquisition Right* (Kendall, 2017) and NPS reports like "*Enhanced Combat Helmet (ECS) Case Study* (Mortlock, 2017). Russian Defense is also widely covered, and information is made publicly available, but to fully analyze their system, one must understand their culture, history, politics, and deep-rooted motivations. Notably useful to this thesis, the Center for Naval Analyses (CNA) published *Russian Military Strategy: Core Tenets and Operational Concepts* (Kofman et al., 2021), which outlined Russia's approach. Also, RAND Corporation's 2021 paper titled *Defense Acquisition in Russia and China* (Ashby et al., 2021) provides valuable information on two of our most fierce adversaries. Similarly, RAND's *Future of the Russian Military* (Radin, 2019) was equally important to advancing understanding of what Russia's

leadership has in mind for the coming years. Lastly, Russia leans heavily on its Foreign Military Sales (FMS), so much so that its acquisition decisions are based on what it can sell to other countries more so than what it can use for itself (Bowen, 2021). The CRS report, *Russian Arms Sales and Defense Industry* (Bowen, 2021) fully covers how arms sales are a "central element of Russia's foreign policy, closely aligned with the government's strategic objectives and economy". Overall, we utilized the ample information available on both the U.S. and Russian defense acquisition systems, leading to a robust case study on the topic.

B. NAVAL SHIP ACQUISITIONS

We utilized many forms of literature dealing with Naval acquisitions, specifically for the next-generation ballistic submarines. The CRS offered multiple scholarly entries on ship acquisitions, like *Navy Ship Acquisition: Options for Lower-Cost Ship Designs—Issues for Congress* (O'Rourke, 2005) and on ballistic submarines, such as *Navy Columbia (SSBN-826) Class Ballistic Missile Submarine Program: Background and Issues for Congress* (O'Rourke, 2020). There was, unfortunately, less information available on the acquisition process behind the Borei-class SSBN; however, we were able to piece together findings to build the story using general articles about Russian assets.

C. CONCLUSION

This chapter reviewed prior literary works covering acquisition processes in the United States and Russia in addition to limitations and enablers both countries encounter. A defense acquisition system supports a country's "National Defense Strategy, through the development of a more lethal force based on [the country's] technological innovation" (DoD, 2020, p. 4). Efficient acquisition systems are structured to procure weapon systems and services that fulfill the requirements of end users with quantifiable enhancements in capability, readiness, and operational support at justifiable cost to the taxpayer. Additionally, within such a vast system, it is truly astonishing that such a large and complex socioeconomic system is organized in a way that employs hundreds of thousands of scientists, engineer, and other professionals (Rendon et al., 2019). The field of study is indeed large, and the quantity of literary works on the topic is reflective of its

scope. Overall, there is ample information available on the U.S. and Russian defense acquisition systems, specifically for warships, and though many sources overlapped, the redundancy further helped confirm our case study.

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IV. THE CASE STUDY

In this chapter, new construction "Big A" submarine acquisitions are examined through the planning, building, and financial lenses. The United States and Russia's national strategies and means vary drastically from one another, despite individual objectives putting the nations on a potential collision course. Figures 10-12 display the military might and nuclear arsenal of these two world powers. The United States is a maritime nation with a global presence, and it maintains a Navy with a proud history of winning wars at sea and deterring the malicious actions of adversaries. Likewise, the Russian Navy serves as "the armed protection of Russia's interests and the conduct of combat operations in maritime and oceanic theaters of military operations" (Office of Naval Intelligence [ONI], 2015, p. 11). Each utilizes ships, advanced weapon systems, and Sailors to attack and protect from the ocean, though a subtle difference in mission statements shows Russia may be less concerned with freedom of navigation than its American counterpart.

Although there are significant differences between the strategic goals of the two countries, the U.S. Columbia-class submarine and Russian Borei-class submarine share similarities in terms of design, complexity, concept, and mission. Both types of submarines exist to deliver advanced undersea capabilities to their respective fleets. Next-generation ballistic submarines are capable of maximum stealth, efficient weapons loadouts, and sustainability at sea. They are man-made apex predators. Moreover, both ship classes went through lengthy acquisition processes incorporating key decisions on design, schedule, and budget along the way. Therefore, analyzing these two submarines leads to insight on the acquisition systems within each bureaucracy, allowing for well-informed conclusions and recommendations for future process improvement. Figures 17–19 display the military might and nuclear arsenal of two world powers, the United States and Russia.

The acquisition systems of the United States and Russia encompass the processes, policies, and regulations that govern the procurement of goods and services by their respective governments. In the United States, the acquisition system is centralized, with

the Federal Acquisition Regulation (FAR) providing a standardized set of rules and guidelines for procurement. The FAR is designed to promote competition and transparency and to ensure that all acquisitions are conducted in a manner that is fair, reasonable, and timely based on urgency of need. In Russia, the acquisition system is centralized, with the Ministry of Defense in place as the primary agency responsible for procurement. The Russian government has implemented a number of reforms in recent years to increase transparency and competition in procurement, but it continues to face criticism for corruption and lack of transparency in the acquisition process.

While both the United States and Russia have centralized acquisition systems, the U.S. system is generally seen as more transparent and efficient, while the Russian system continues to produce quantities of new and advanced weapon systems amidst criticism for corruption and lack of transparency.

Figure 10. Russian and U.S. Military Numbers. Source: Giles and Monaghan (2014).

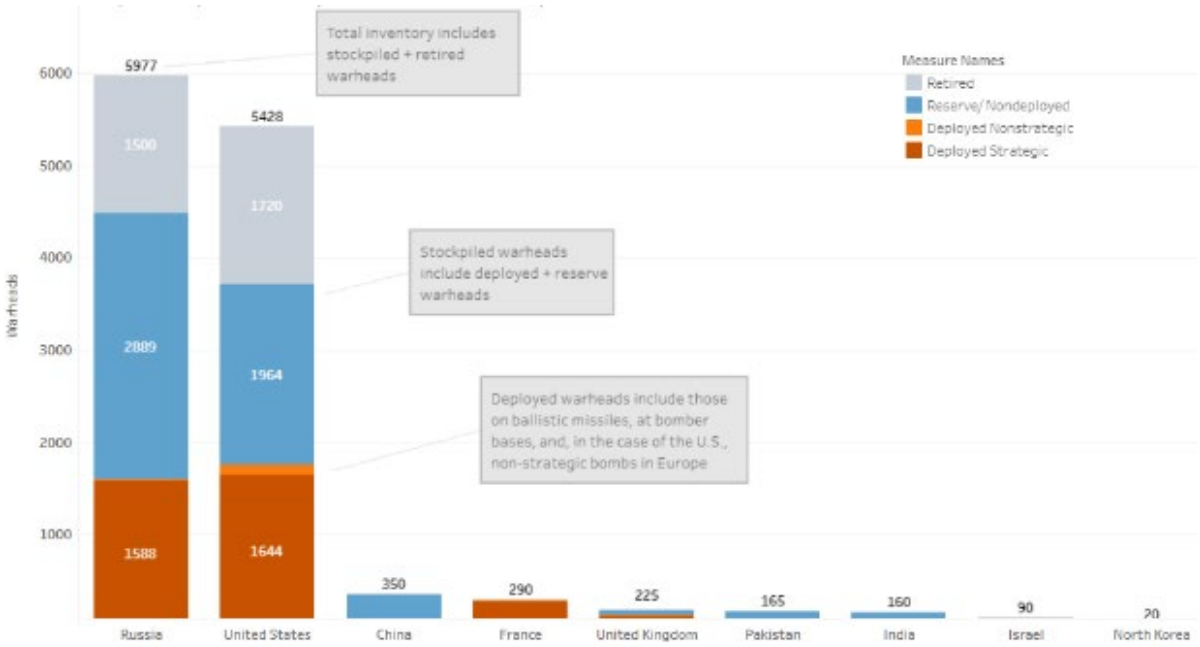


Figure 11. Nuclear Arsenal Numbers. Source: Kristensen and Korda (2022).

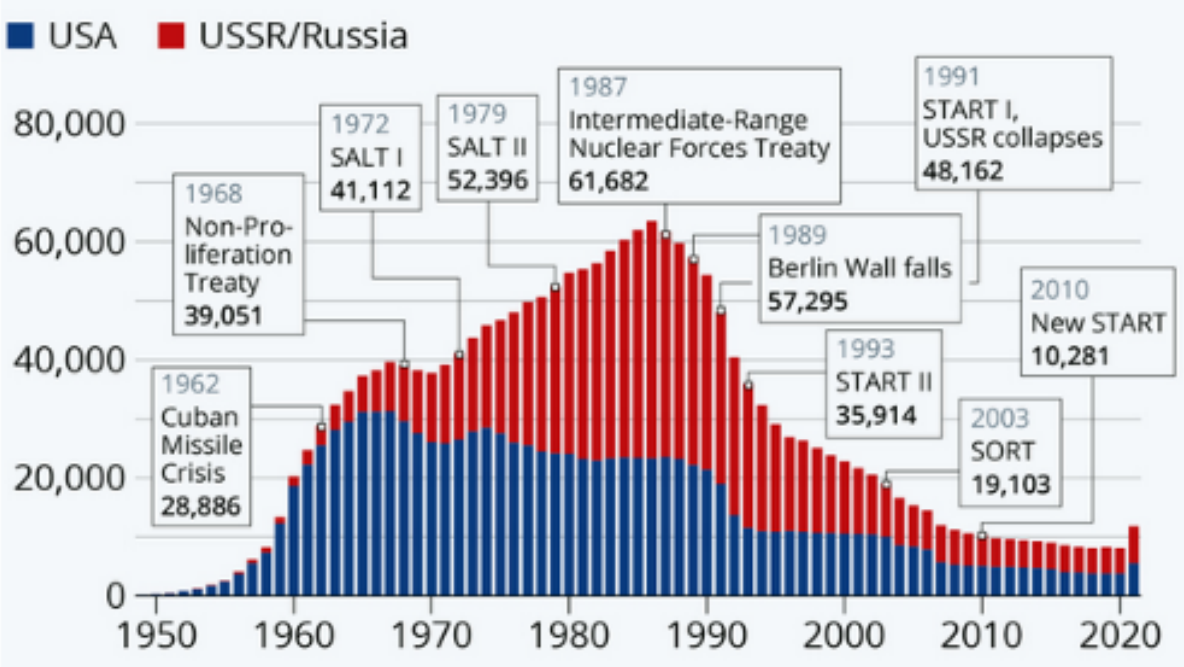


Figure 12. U.S. and Russian Nuclear Arsenals. Source: Armstrong and Richter (2023).

A. U.S. COLUMBIA-CLASS SUBMARINE PROGRAM

The U.S. Navy carries three different classes of submarines in its arsenal and employs each in a unique but equally vital way. The fleet encompasses nuclear-powered attack submarines (SSNs), nuclear-powered cruise missile submarines (SSGNs), and nuclear-powered ballistic missile submarines (SSBNs). SSNs and SSGNs are multi-mission platforms, effective during both peacetime and wartime for intelligence gathering and land attacks but not for strategic deterrence via ballistic weapons (O'Rourke, 2020). In contrast, SSBNs solely deliver a specialized mission of strategic nuclear deterrence. The largest "boats," they are equipped with submarine-launched ballistic missiles (SLBMs), which are large long-range missiles armed with multiple nuclear warheads, to carry out the ultimate message if necessary (O'Rourke, 2020).

According to a CRS report authored by O'Rourke (2020), the Navy's Columbia project (SSBN-826) is a "program to design and build a class of 12 new SSBNs to replace the Navy's current force of 14 aging Ohio-class SSBNs" (p. 16). Measuring 560 feet long and displacing nearly 21K tons, it is the largest submarine ever built by the United States. "Its reactor will not require refueling during the lifetime of [its] planned service, making the ship more cost-effective to operate and maximizing its time on deployment" (O'Rourke, 2020, p. 13). Additionally, the submarine will be capable of carrying Mk-48 torpedoes and an electric drive propulsion system, and features cutting-edge acoustics with highly-advanced sensors throughout the hull, earning its claim of being the most superior submarine ever built (Oakley, 2021). As seen in Figures 13 and 14 below, the United States' new SSBN is a modern marvel, harnessing new technologies to replace the Ohio-class submarine, a warship that has arguably kept the entire world at relative peace for 40 years, and the Columbia-class boats will carry the torch.

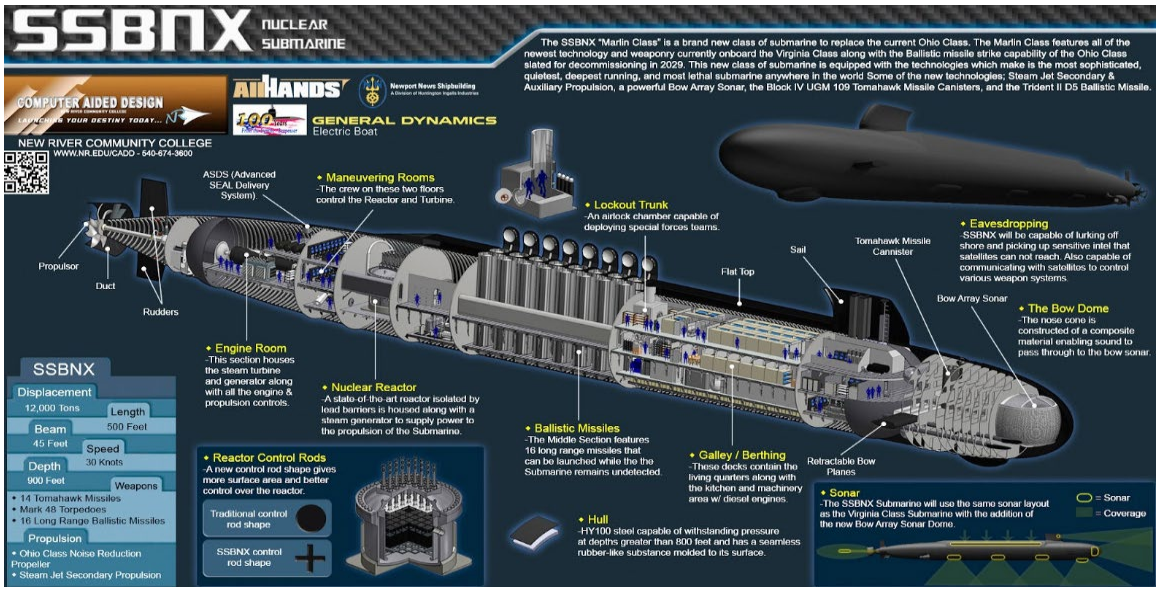
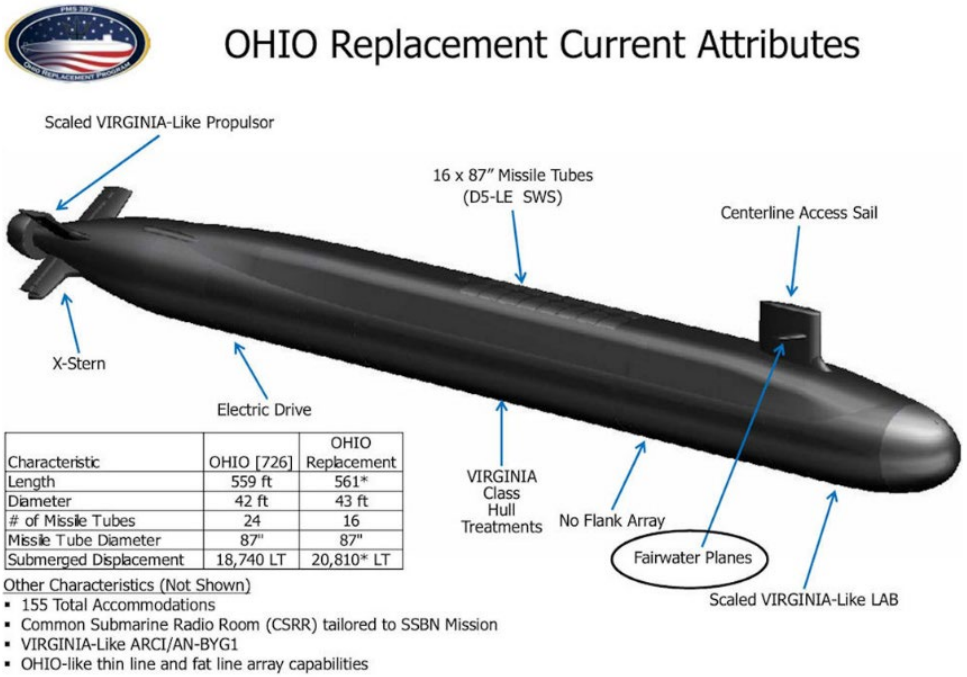


Figure 13. SSBNX Nuclear Submarine. Source: Levy (n.d.).



Characteristic	OHIO [726]	OHIO Replacement
Length	559 ft	561*
Diameter	42 ft	43 ft
# of Missile Tubes	24	16
Missile Tube Diameter	87"	87"
Submerged Displacement	18,740 LT	20,810* LT

Figure 14. Ohio Replacement Current Attributes. Source: Pike (n.d.).

1. Requirements Process

Since September 2013, the U.S. Navy has prioritized the Columbia-class program as their top weapon system. The SSBNs and SLBMs are designed to prevent a nuclear attack on the U.S. by displaying their ability to launch a retaliatory strike. The program also aims to improve capabilities in mine warfare and shallow-water antisubmarine warfare, countering small craft, and fulfilling other tasks such as Maritime Interdiction Operations and Intelligence, Surveillance, and Reconnaissance (Oakley, 2021). The Navy intends to acquire 12 Columbia-class boats to replace the 14 Ohio-class SSBNs, with the first Ohio-class SSBN reaching the end of its 42-year lifespan in 2027. The remaining ships will be retired at a rate of one per year until 2040, with the last ship decommissioning that year (O'Rourke, 2020).

In recognition of the significance of the program, Congress mandated annual reporting on the progress of the Columbia-class in the 2018 National Defense Authorization Act (NDAA). According to GAO Report 21-257, the reviews must cover "key milestones, development events, costs, and performance goals during design and construction" (Oakley, 2021, p.8), as well as the design maturity of the program, the technological preparedness of components such as the integrated power system, nuclear reactor, stern features, and missile system, and the manufacturing readiness levels (Oakley, 2021). Progress is based on the attainment of Key Performance Parameters (KPP), spelled out in the program's Selected Acquisition Report (SAR). The KPPs include multiple costs metrics, readiness and performance standards, crew training capabilities, space, weight, power, and cooling parameters, and the lead ship's delivery and deployment schedule (DON, 2021).

2. Resource Allocation Process

The United States resource allocation system for the Columbia-class submarine ensures that adequate resources are allocated to the development, production, and maintenance of these next-generation submarines. Funding for R&D, procurement of materials, and the recruitment and training of personnel are all included in this system. Resource allocation is done through government appropriations and executed via contracts with private suppliers and organic facilities. The DoD, specifically the Navy,

holds the responsibility for overseeing the allocation of resources for the Columbia-class submarine program, with input from Congress and other various stakeholders. The overall goal is to ensure this costly program remains on track and delivery schedules remain on time and within budget, ultimately meeting the form, fit, and function of the original requirement. In 2012, the Research, Development, Test, and Evaluation (RDT&E) design contract was issued to Electric Boat and RDT&E has cost the American public over $14B to date per budget estimates (DON, 2021), while procurement funding exceeds $115B using 2017 as the base year, and the Average Procurement Unit Cost (APUC) is listed as $7.3B per unit with a threshold maximum of $8.0B (DON, 2021). Furthermore, the acquisition objective is written as the "Lead ship end cost less plans of $6.3B (CY2010) using Navy inflation/deflation indices average follow ship hulls 2-12 end cost of $4.9B (CY2010 using Navy inflation/deflation indices" (DON, 2021, p. 10)

Due to its critical role in maintaining strategic deterrence, the Columbia-class program takes precedence over many national defense initiatives, including attack submarines like the Navy's Virginia-class boats. To reduce rising delays, the shipbuilder has decided to allocate additional staff from the Virginia program to the Columbia program. Additionally, the intention is to continue adding skilled laborers to the Columbia program until delays are minimized, which could result in additional setbacks for the Virginia program. Furthermore, new hires will be onboarded to compensate for the workers transferred from the Virginia-class program (Oakley, 2023). To adequately staff both initiatives, the shipyards must address obstacles to meet their recruitment targets. The difficulties have been acknowledged by the most senior Navy representatives both military and civilians as a result of a difficult hiring scenario, partially due to a low unemployment rate.

3. Acquisition Process

The acquisition process of every weapon system is distinct and may not conform to the standard framework. For instance, ships do not have specific full-scale test models; instead, each ship produced is expected to remain in operation for an extensive period. The acquisition of ships also possesses several other distinctive features such as the extended design and construction duration; impact of industrial, political, and union

factors; simultaneous design and construction; intricate nature; low production quantity and rate; high cost per unit; funding type; and evaluation and testing methods. Figure 15 depicts the hypothetical stages of a ship's acquisition program.

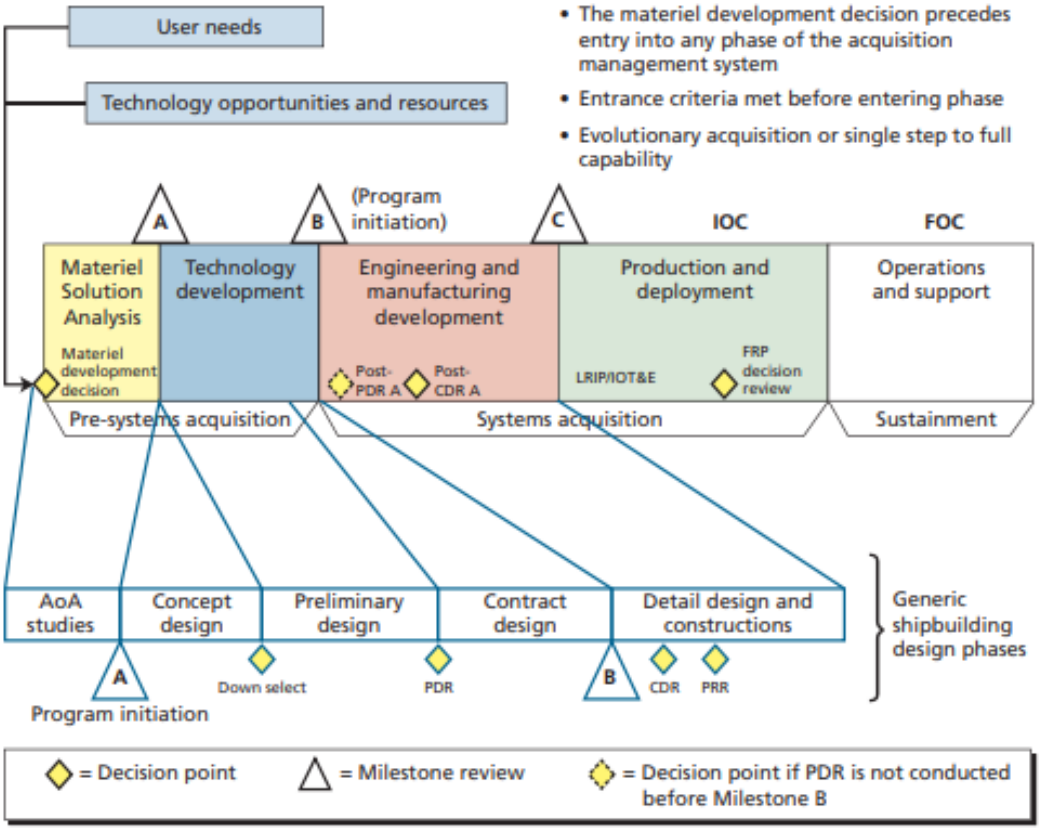


Figure 15. Notional Ship Program Phases. Source: DoD (2015).

Figure 15 illustrates a crucial challenge in using generic models for acquiring ships, as detailed in the DoDI 5000.02 and ship building process. The figure depicts a rudimentary display of the path to producing a Naval vessel, with the upper portion representing the DoD's 5000 process, and the lower part showing where traditional ship development stages align (DoD, 2015, pg. 10). Most of the initial design work is carried out during the technology development phase (Drezner et al., 2011). The Engineering and Manufacturing Development (EMD) phase is when detailed design and construction activities take place. However, due to the complexity and constant updates in designs, phases tend to overlap. For instance, it is challenging to determine the end of preliminary

design and the start of contract design for a significant acquisition. Furthermore, "ship design stages and related contract awards and technical evaluations do not always align with the traditional mode" (Drezner et al., 2011). Submarines are as complex as space stations, so it is understandable that traditional models become less relevant during the early acquisition stages. Nevertheless, Milestone (MS) A and Milestone (MS) B still occur as specific transition points between phases. "MS C, however, has no equivalent in the ship design/build model. Milestone B, instead of Milestone C, signifies the start of initial production by authorizing lead ship construction" (Drezner et al., 2011, p. 15). Unlike other programs, U.S. warship programs can begin manufacturing during the EMD phase after Milestone B, in the form of the lead ship.

The construction and design phases of shipbuilding have developed into a more integrated process, leading to significant crossover between the two stages. This has an impact on monitoring and the implementation of the DoD 5000 guidelines. A basic illustration of the key steps in the ship acquisition process, including the design/build procedure, is presented in Figure 16. This figure also illustrates the common moments for monitoring activities and milestones. The purpose of Figure 16 is to emphasize the intricacy of tasks involved in designing and constructing ships, rather than to contextualize the design/build procedure within the DoDI 5000.02 process (Drezner et al., 2011).

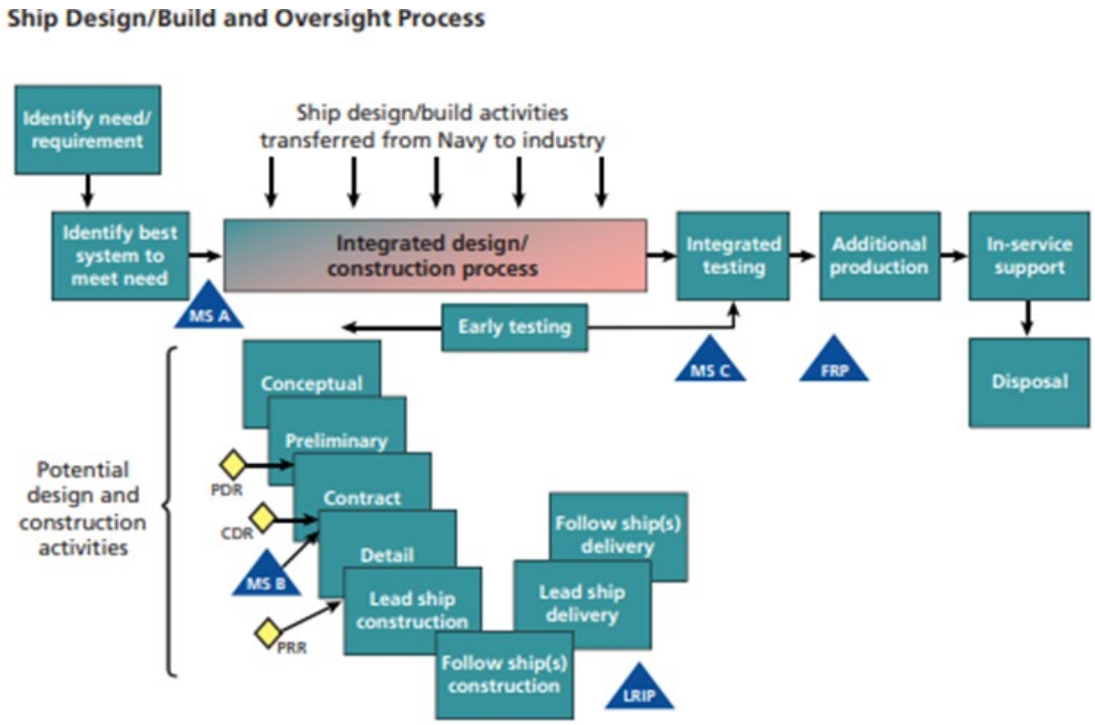


Figure 16. Ship Design/Build Oversight Process. Source: Drezner et al. (2011).

The process of acquiring ships (surface and submarines) by the U.S. Navy starts with identifying a need and evaluating potential weapon systems as solutions. This applies to both ship and non-ship programs. According to the 2008 DoDI 5000.02, a verdict on materiel development may authorize prolonging the exploration of a system solution and proceeding along the process based on concept, technology, and design maturity. The technology development phase begins at Milestone A, and system design work commences (Drezner et al., 2011). The program advances until both are developed enough to "commence the engineering and manufacturing phase (Milestone B) prior to the detailed design and construction contract award, but after the preliminary and critical design reviews. At Milestone B, the authorization for low-rate initial production (LRIP) quantities takes place" (Drezner et al., 2011, p. 29). Follow-on purchases are pursued after the first ship's construction has started. Subsystem testing can start during the design phase, and system-level testing is done long past the first ship's commissioning. Milestone C is reached when testing is close to completion. If additional ships are

needed, a full-rate production decision is made (Drezner et al., 2011). Table 2 illustrates the entire approved schedule for the Columbia program.

Table 2. Columbia Class Approved Schedule of Events. Source: DON (2021).

Schedule Events

Schedule Events					
Events	Development APB Objective	Current APB Development Objective/Threshold		Current Estimate/Actual	Deviation
Milestone A	Dec 2010	Dec 2010	Dec 2010	Dec 2010	
Pre-RFP Release DAB	Dec 2015	Dec 2015	Dec 2015	Dec 2015	
Preliminary Design Review	Apr 2016	Apr 2016	Apr 2016	Apr 2016	
Milestone B	Nov 2016	Jan 2017	Jan 2017	Jan 2017	
Integrated Process and Product Development Contract Award	Jan 2017	Sep 2017	Sep 2017	Sep 2017	
Two Year Advance Procurement Funding Modification	Oct 2018	Sep 2018	Sep 2018	Sep 2018	
Critical Design Review	Apr 2020	Apr 2020	Apr 2020	Apr 2020	
Build 1 Construction Contract Award	Oct 2020	Jun 2020	Jun 2020	Jun 2020	
Lead Ship Authorization / Construction Start	Oct 2020	Oct 2020	Oct 2020	Oct 2020	
Lead Ship Contract Delivery	Apr 2027	Apr 2027	Oct 2027	Apr 2027	
Initial Operational Test and Evaluation Complete	Feb 2029	Feb 2029	Aug 2029	Feb 2029	
Lead Ship First Deployment Start	Apr 2030	Apr 2030	Oct 2030	Apr 2030	
Initial Operational Capability	Apr 2030	Apr 2030	Oct 2030	Apr 2030	

Additionally, as of 2022 the Navy's acquisition community "shall use the Two-Pass Seven Gate Process, when appropriate, to inform decision makers regarding the

optimum balance of affordable protection measures within the available trade-space" (DON, 2022, p. 156). Figure 17 is visual depiction of this newly updated and intricate system of checks and balances over the nation's major acquisition programs. It is a tool of project management that embraces a structured approach to the process aiding programs to be properly strategized, executed, and test & evaluated. Passes refer to the phases that an acquisition program passes through towards completion, and the gates are the built-in decision points that must be greenlit throughout the applicable phases (DON, 2022). The Navy benefits from the intense oversight which this process brings, ensuring weapon systems are properly scrutinized before being turned over to the warfighter.

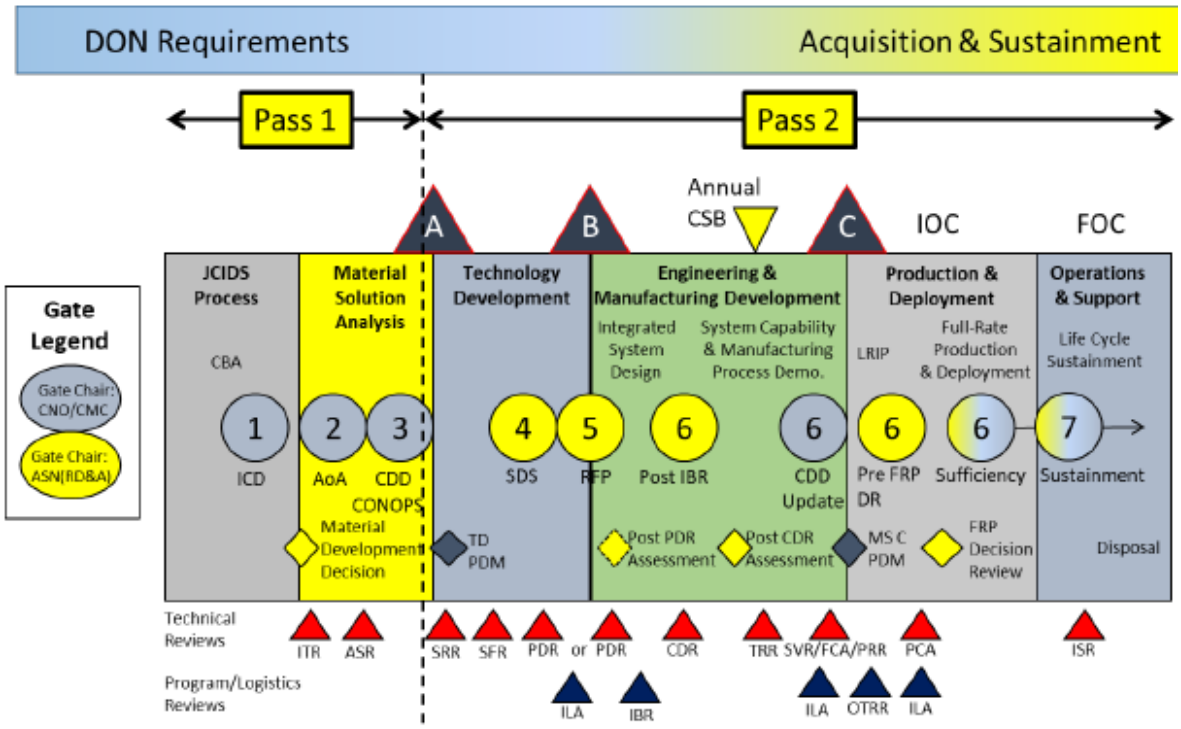


Figure 17. DON Two-Pass Seven Gate Process. Source: DoD. (2022).

B. RUSSIAN BOREI-CLASS SUBMARINE PROGRAM

Russia's Borei-class submarine was first "conceived by the Soviet Union as an answer to America's Trident system" (Makienko, 2014, p. 16), and R&D began on the future fourth-generation submarine design dating back to 1978 in direct competition with the U.S. Ohio-class boats. In 1985, the Russian Communist Party Central Committee and

the Soviet Cabinet of Ministers "authorized Rubin design bureau (the developer of all Soviet SSBNs) to launch the development of Project 955" (Kofman et al., 2021, p.24) in 1990, which would become the Borei-class engineering design. Following multiple setbacks due to the dissolvement of the Soviet Union, the newly formed Russian government eventually pushed forward with SSBN development, making it a top priority and further enabled by the Strategic Offensive Nuclear Reductions Treaty (START-1) signed by both the U.S. and Russia in 1991. By 1996, the first boat in the Borei-class series, the *Yuri Dolgorukiy*, was laid down for construction at the country's Sevmash shipyard in Severodvinsk. It was not an easy road ahead, however, as it took another 16 years for its commissioning, but the Russians recovered and continued to prioritize SSBN construction via multiple SAPs through the 2000s (Makienko, 2014). The program has been an overall success and an outstanding achievement of the Russian defense industry's ability to deliver ambitious requirements set by its political system. It also showcases the strong-willed nation's propensity for strategic deterrence using intercontinental ballistic missiles (ICBM), and a promising future of FMS and cooperation with countries expanding their defenses such as India. Figure 18 showcases the layout of the Borei-II.

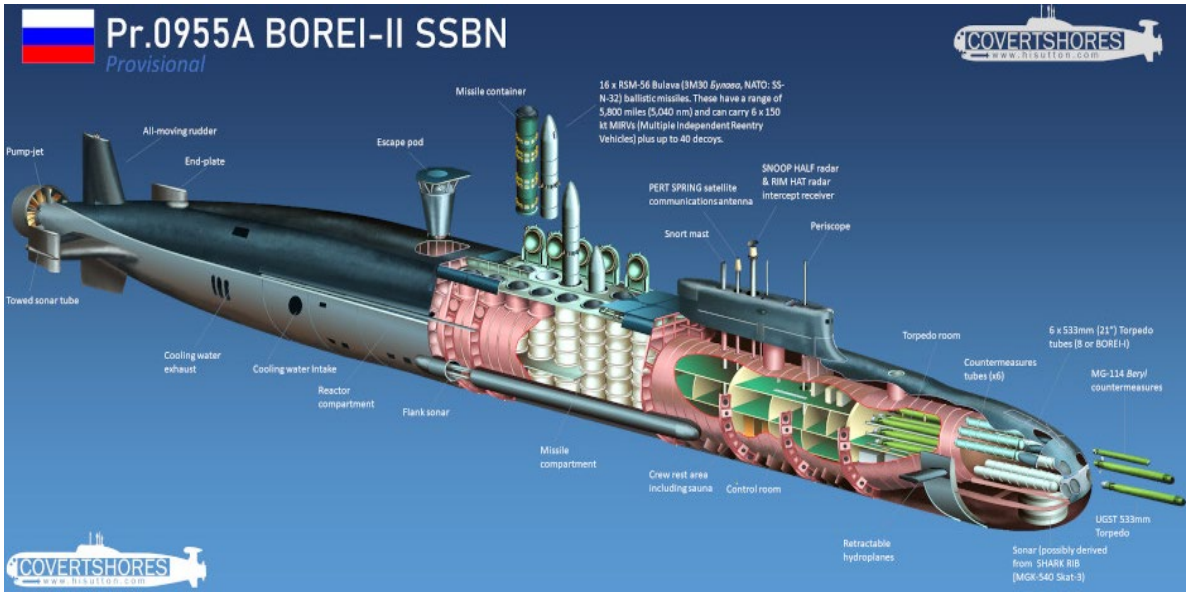


Figure 18. Borei-II SSBN Layout. Source: Sutton (2020).

1. Requirements Process

Russia is notoriously tight-lipped about its defense programs, and most associated technical documents remain classified, especially due to the nature of submarines. However, the development of the Borei-class SSBN can be outlined by understanding Russia's strategic documents and doctrine (i.e., SAP), public threats and propaganda, and aggressive actions towards other countries, like Ukraine. Despite the inherent secrecy dating back to the Cold War, the Kremlin's messaging is clear. The country will continue to ready itself for both defensive and offensive actions against perceived threats, and they have backed their rhetoric with results. "Recently, the commander of U.S. Northern Command, Air Force General Glen VanHerck, stated that Russia has developed capabilities that didn't exist 20 years ago, … very low radar cross-section cruise missiles [and] submarines on par with … [U.S.] submarines" (Kofman et al., 2021, p.60).

The stages of war, according to Russian military doctrine, are military danger, military threat, armed conflict, local war, regional war, and large-scale war (Kofman et al., 2021). The 2014 document titled *Military Doctrine of the Russian Federation* considers political, strategic, and economic factors for ensuring national security, then determines dangers to the state and clarifies the opponents and allies involved. Furthermore, "Military doctrine is meant to rationalize political efforts with available military means to attain security for the state" (Kofman et al., 2021, p.11), whereas military strategy is the set of measures taken by senior members of the state and military to increase defense posture during peacetime and manage forces during wartime. When available military means inevitably fall short, requirements are then aligned to meet the Kremlin's goals, and Russian SSBNs enable the fourth through sixth stages of war generation per Table 2 below.

Russia is often associated with its use of conventional ground forces, recently seen with Ukraine. However, it is the Russian Navy that plays the key role in "strategic defense by creating more capable nuclear-powered ballistic missile submarines that could threaten the United States and its NATO allies with nuclear weapons. The construction of a large number of general-purpose conventional and nuclear-powered submarines together with numerous surface combatants" (ONI, 2015, p. 25) continues to threaten

U.S. and allied Naval forces. And, the development of longer-range ballistic missiles allow submarines like the Borei-class SSBNs to carry them closer to friendly waters and still reach intended targets thousands of miles away.

Despite the lack of documents walking through the requirements process of the Borei-class submarine, Russia's Naval strategy remains focused on nuclear deterrence and layered defense (ONI, 2015). SSBNs will continue to be a prioritized requirement, if even for the mere fact that as long as the U.S. has ballistic submarines so will Russia. One does not have to read through classified SAP documents to reach this conclusion, but only look towards Russia's actions since the end of the Cold War.

Table 3. Borei-II SSBN Layout. Source: Kofman et al. (2021).

Generation of war	Armaments	Scale of armed (military) actions	Goal of war
First	Steel arms	Tactical	Destruction of adversary, possession of his valuables and territory
Second	Gunpowder, smoothbore weapons	Tactical, operational-tactical	Destruction of adversary, possession of his territory or establishment of control over it
Third	Rifled high-capacity weapon with increased rate of fire	Operational-tactical, operational	Destruction of adversary armed forces' groupings, establishment of control over territory and its resources
Fourth	Automatic and reactive weapons, tanks, aviation, navy, transport means, and connections	Operational-strategic	Destruction of armed forces of the adversary, destruction of his economic potential and political system
Fifth	Nuclear weapons and its limited or mass employment	Strategic, [operational-strategic]	Destruction of armed forces of the adversary, destruction of his economy and overthrow of his political system
Sixth	High-precision weapons based on land-air-sea, developed informational-space support	Strategic, operational-strategic, and operational	Conquering or establishing control over world resources of human livelihood, establishment of loyal power in states which have these resources on their territory, control of mass consciousness of peoples and large groups of people

2. Resource Allocation Process

Russia funds its nuclear capabilities and therefore its strategic deterrence mission well. Though many of its weapon systems programs suffered for more funding through years of uncertainty, the Borei-class program has emerged triumphant. Russia has pushed past "early manufacturing problems with the main weapon system, the Bulava SLBM, and there are no longer any technical risks that could conceivably derail the program" (Makienko, 2014). The program has received top priority from the Kremlin, ensuring secure financing that will not be subject to budget cuts in the near future. Even if the Russian economy were to deteriorate and lead to reductions in arms procurement spending, the Borei program and other nuclear-related initiatives would be safeguarded and not impacted by budget cuts (Makienko, 2014).

Russia takes multiple factors into consideration for its resourcing strategy. Global politics, war, the pandemic, inflation, and supply chains are all relevant, but one of the most influential factors is FMS. "Russia's State Armament Program 2–2 (2011), marked the first time in the post-Soviet period that the Russian military received adequate funding to reach [targets], which include a stated goal of 70 percent modern equipment by 2020" (Ashby et al., 2021, p. vi). Russia's approach to reaching this goal has been to focus on building weapons for export and modernizing legacy equipment (Ashby et al., 2021). The Kremlin views FMS as a way to increase cash flow, ease the burden of its own costs to produce modern weapon systems, and build ties with partner countries (i.e., India and China). The Borei-class is not currently a candidate to sell, though "it is understood that the Indian and Russian governments are working on a lease agreement for a Yasen-class submarine, [and] the Indian Navy already operates an Akula-II-class nuclear attack submarine under a ten-year lease agreement, dubbed "Chakra-II" (Chopra, 2015). The downside to Russia's reliance on FMS is that it may not always have its own military's needs as the top priority during resourcing discussions. The schedule for the Russian defense sector to achieve its initial operating capability requirements is comparable to the timing of the United States (Ashby et al., 2021). "Moreover, the high cost of these systems may forestall the Russian military from ever procuring them in more than [just] token quantities" (Ashby et al., 2021, p. 14), leading to production of weapon systems that Russia does not effectively use. Borei-class submarines do not fall

into this category currently, as strategic assets like these are highly regarded and put to use.

Another allocation factor is R&D, which has "undergone a significant transformation in the past decade. As with so much else in contemporary Russia, the du jure aspects of the budgetary and procurement process and the way it operates de facto correlate only loosely" (Ashby et al., 2021, p.4), where powerful people, rather than established institutions, determine where funds are allocated. In fact, in the post-Soviet era Russian defense complex has "cultivated" institutions that primarily exist to manage and direct the personal relationship aspect of allocation. The RSC and the MIC are the two most important.

3. Acquisition Process

The Russian acquisition system, its structure, its people, and its bureaucracy are in place to provide it with the most advanced defense capabilities, just like the United States. The difference is that the Kremlin is the puppet master of the Russian defense industry, doing this directly and through equity shares. "In 2007, [President] Putin created Rostec, a state-owned corporation under the control of Sergei Chemezov; Rostec, with Roskosmos and Rosatom, controls an estimated 80% of companies in the defense sector, including Rosoboronexport, either directly or through equity shares'' (Bowen, 2021a, pg. 4). A few years later, Russia launched a decade-long armament program called GPV-2020, with the goal of modernizing their nation's arsenal. This allowed the sector to reshape and consolidate many of its dying segments, to recruit and build the skilled labor force they required, to import specialized tools, enhance production lines, and revitalize R&D programs that had been on hold since the end of the Cold War (Bowen, 2021b). Largely, GPV-2020 has been a success for the Russian acquisition process. Its defense industry has thrived while producing innovative and formidable major weapon systems across nearly all categories, increasing the country's military capabilities and FMS catalog. The Borei-class submarine is a product of sweeping program resurrections, but first one must grasp the Navy's role in defense to understand the acquisition process of submarines.

The Russian Navy's role within the joint domain has shifted many times in its history, and "the fluctuating fortunes of Naval forces as a whole could be traced in the declared plans for building of capital ships" (Giles & Monaghan, 2014, p. 29). Capital ships, SSBNs, and aircraft carriers are currently well-supported and well-funded despite doubts cast by recent shipbuilding issues, both in new construction and refit programs, and exemplified by delays with the *Alexander Nevsky* Borei-class submarine (K-550). Repeated changes of focus, principally defined by financial concerns, continue to spark the debate over the role of Russia's blue-water Navy since there is "no evident role for long-range power projection in the current military doctrine" (Giles & Monaghan, 2014, p. 29). Recent events in Ukraine, however, have made it apparent that Russia does indeed have its sights on power projection, which bodes well for future SSBN acquisitions.

SAPs dating back to 2007 have enabled the Russian government to build a series of Borei-class submarines. The first keel was laid down in November of 1996, and now six have been commissioned, the most recent being the *Generalissimus Suvorov* (K-553). The improved Project 955A (Borei-A) specifications will be used to build the remaining SSBNs in the series. These vessels will also be equipped with a set of 16 Bulava SLBMs. In late 2009, the first Project 955A boat (and the fourth in the Borei series) began constructions at the Sevmash shipyard. However, the official laying down ceremony was not held until 2012. The completion time for each successive SSBN is decreasing, suggesting that the remaining vessels in the series, from No. 4 or 5 onwards, will likely take no longer than four or five years to launch. (Makienko, 2014). The acquisition process is in full-swing for the Borei-class, though it has been a long road up to this point. Figure 19 displays the six distinct classes of submarines.

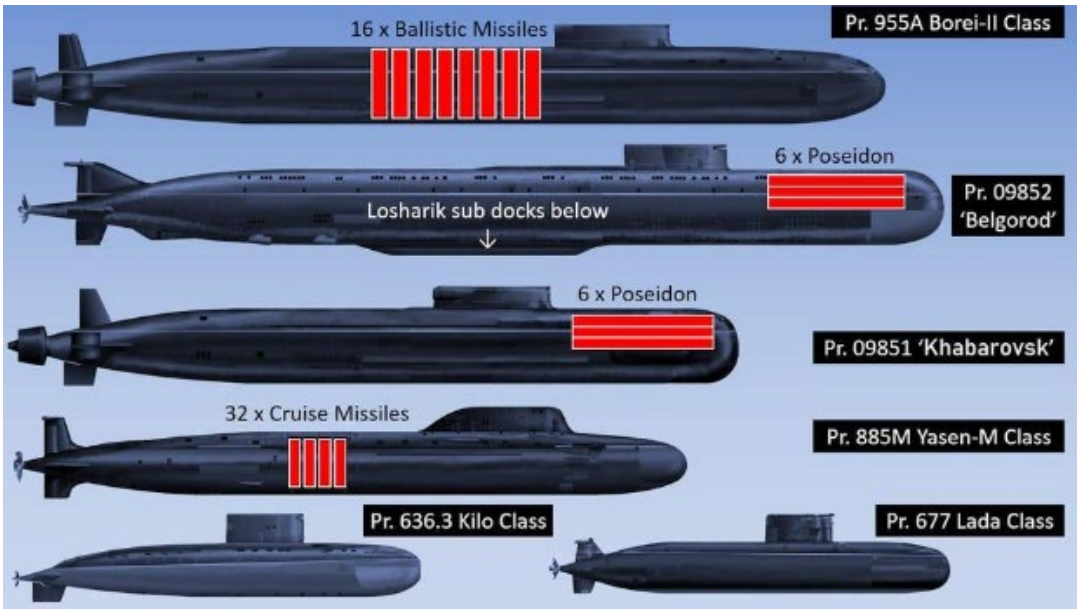


Figure 19. Russian Submarine Projects. Source: Sutton (2020).

C. FINDINGS AND DISCUSSION

A close examination of military acquisition initiatives in the United States and Russia revealed diverse methods and strategies employed by two different nations in achieving similar objectives. The distinctions made, some significant and some minor, could collectively determine the outcome of future conflicts. Further analysis of the programs follows.

1. U.S. Columbia-Class Submarine

The Navy intends to complete the construction of the first Columbia-class submarine, the largest and most intricate submarine in history, more efficiently compared to previous submarines acquired, like the recent Virginia-class. However, the shipbuilder has yet to perform a proper schedule risk analysis on the construction timeline for the namesake submarine. This type of analysis is deemed crucial by the GAO, stated in its leading practices and within DoD guidance, as it helps in identifying and addressing potential risks that could affect the timeline (Oakley, 2023). A lack of statistical analysis pertaining to schedule risks limits overall understanding of how such risks could technically impact the achievement of important program milestones, such as delivery, as

well as the amount of extra time, known as margin, that is required to handle crucial risks and prevent delays.

The construction of the future USS *Columbia* has been underway for over 2 years, but the shipbuilders are encountering difficulties due to design issues, material challenges, and quality control problems. To reduce the impact of these delays, they are assigning additional shipyard personnel and artisans to the project. Given the critical importance of the Columbia-class in maintaining strategic deterrence, it takes priority over most other national defense programs. As a result, when "shipyards lack the physical space to construct both Virginia and Columbia classes simultaneously" (Oakley, 2021, p.22), shipbuilders look to outsource work and storage for the former. Practices like this could lead to delays for the Navy's newest fast-attack submarines. Nevertheless, long-term planning does not fully account for the interdependence of these programs, which could result in further challenges and increased costs down the road. Without a revised long-term plan, the Navy cannot guarantee that its budget requests for future fiscal years will be sufficient to keep both submarine programs on track (Oakley, 2023). This is an example of how faults in one major DoD acquisition can affect the larger enterprise.

The Columbia class submarine program is time-sensitive and of the utmost importance to national security. By implementing a more stringent risk-assessment process, the program would be better-equipped to handle and overcome any challenges to meeting crucial deadlines efficiently and effectively (Oakley, 2023). The Columbia-class program is safeguarded from delays from lack of funding because of its priority allocation for resourcing. However, to obtain a clearer understanding of the costs involved in mitigating shared risks, the Navy requires more actionable data. Increased information analysis would increase the necessary resources that have been requested to achieve milestone goals and facilitate efficient planning for future Naval forces through many lessons learned.

2. Russian Borei-Class Submarine

Russia's newest series of ballistic submarines are designed to replace an aging fleet of SSBNs, and will serve as a key component of Russia's nuclear deterrence. These

submarines are along the most powerful warships this planet has ever seen, displacing 24,000 tons and capable of carrying 16 Bulava ICBMs. The *Yury Dolgoruky* was commissioned in 2013 as the first in its class, and four additional have been constructed as of 2021. Notable for their advanced features, including an enhanced hull design, communications, and navigation, this submarine has been a source of tension between Russia and its Western counterparts (Bowen, 2021b).

Russia's defense industry boasts impressive capabilities in producing advanced systems across most weapons categories. However, certain sectors of the industry grapple with slow production, limited capacity, and quality control issues. Despite a massive state armament program launched in 2011, the industry struggles to produce entirely new designs, with cost overruns, design flaws, and delayed production hindering the creation of new Russian designs. These issues are common in defense industries worldwide (Bowen, 2021a). "Russia's 2014 invasion of Ukraine and the imposition of Western sanctions reinforced an existing tendency of self-sufficiency, with Russia's defense industry attempting to become even more self-reliant" (Bowen, 2021a, p. 6). Though failures are a normal part of the acquisition process, Russia has dealt with a heavy burden of ongoing concerns. The country has dealt with missile-launch setbacks, propulsion problems, and noise issues with its newest submarine. These obstacles have, at times, been painstaking to overcome during the shipbuilding process, with some problems not discovered until sea trials (Bowen, 2021a).

Despite the observed downfalls of Russia's defense industry, it has produced a submarine that can confidently showcase modern stealth technology, powerful nuclear technology, enhanced maneuverability, and an efficient crew size due to automation, improved safety, and successful testing and deployment (Makienko, 2014). The Borei-class submarines represent a significant overall advancement in the next era of submarines and are a viable success for the Russian Navy.

D. SUMMARY

The United States and Russia are each dynamic states, with the ability to produce machines of war in large numbers, but they use different methods due to political, geographic, historic, cultural, and financial influences. Table 4 presents a side-by-side comparison of what two very different approaches to acquiring virtually the same requirement has led to. When comparing, consider the price tag of approximately $7.3B per submarine for the Americans (DON, 2021) and a reported $713M per unit for the Russians (Naval Technology, 2020).

Table 4. Comparison of the Newest U.S. and Russian Ballistic Submarines. Source: Gu & Sussis (2018).

	United States	Russia
Newest SSBN class	Columbia	Borei-II
Improvements	Better nuclear core reactors to sustain ships over more deployments, lifetime savings of $40 billion total	4 additional missiles, more stealthy
Planned fleet size	Construction begins in 2021. First completed by 2027, with 12 additional completed by 2040s.	Plan to have 5 completed by 2025.
Crew size	155	107
Armament	16 Trident missiles, each with 8-12 MIRV warheads	20 Bulava ICBMs, each with 6-10 MIRV warheads
Tonnage	20,810 tons	24,000 tons
Speed	20+ knots (23 mph)	30+ knots (34.5 mph)
Max. depth	450M	450M

V. CONCLUSION

The objective of this CAP is to compare and contrast the defense acquisition systems of the United States and Russia by examining two major programs within each nation with enough similarities to pull from. The benefit of this exploration is that it leads to the discovery of differences between two opposing countries' overarching acquisition systems while also allowing one to extrapolate recommendations for the advancement of the United States. This chapter contains an analysis of acquisition systems using ballistic submarines as the basis for comparison and finalizes with an offering of recommendations and conclusions.

A. THE U.S. DEFENSE ACQUISITION SYSTEM

The American DAS is overseen by multiple entities when discussing submarines, including the Naval Sea Systems Command (NAVSEA) and the Strategic Systems Programs (SSP). The acquisition process incorporates multiple gates, including R&D, engineering and product testing, production, and ultimately deployment. The DAS also involves close collaboration with the private sector via defense contractors, who play a large role in the design and construction of all Naval warships. The U.S. Navy places a high significance on transparency, accountability, timeliness, and cost-effectiveness in its ballistic submarine acquisition process.

Additionally, the U.S. DoD has a firm grasp on its procedures and policies in addition to the organizations involved in oversight and program management. These meticulously written documents designate the key procedures and responsibilities of the organizations involved in and responsible for program management, arranging major milestones, meeting technical reviews, engineering, and evaluations (Drezner et al., 2011).

B. RUSSIAN DEFENSE ACQUISITION SYSTEM

Russia acquires its submarines within a system established and run by the Ministry of Defense, which is the arm of the Kremlin that acquires and maintains the nation's defense equipment and systems. The acquisition process is characterized by a high degree of state control and centralization, focused on the readiness of military

forces. The Russian submarine fleet is considered among the most advanced on Earth because Russia's leaders have placed a strong emphasis on developing and incorporating cutting-edge technology into its undersea programs for many decades.

The Russian system is also designed to boost the country's economy through arms sales. In fact, "Foreign arms sales have become crucial to Russia's defense industry. Arms sales [provide] vital hard currency and [allow] companies to keep production lines open" (Bowen, 2020, p. 7). Therefore, when the government is deciding whether or not to approve a major acquisition project, it strongly considers the viability of FMS for that weapon system. Countries like Algeria, China, Egypt, India, and Vietnam have been recent loyal customers because Russia has exhibited a noteworthy ability to develop and quickly deploy new sizable military equipment such as tanks. Aircrafts, and even submarines (Ashby et al., 2021). They have also marketed themselves as reliable, sturdy, and discounted compared to the Western substitutes, making them very attractive to prospective clients. The downside is that "developing weapon [systems] for export may come at the expense of R&D activities and production of weapon systems that align with Russia's military needs" (Ashby et al., 2021, p. 17).

The Russian defense acquisition system is a complex web of processes involving multiple government organizations and agencies, with a significant amount of oversight and regulation directly from the government and from state-owned defense industry corporations like Rostec. Due to its unfavorable economic forecast, Russia continues to encounter numerous obstacles both internally and externally. "This includes stagnation in the size and talent of its research and development (R&D) workforce, relatively low wages, outdated manufacturing facilities, [and] an import substitution program that is unlikely to remediate all the effects of Western sanctions" (Ashby et al., 2021, p. 7). Despite the listed obstacles Russia faces, the system continues to design, resource, develop, produce, and sustain military hardware.

C. RESEARCH QUESTION SYNOPSIS

Primary Research Question: What are the key development and procurement processes and differences used by each nation?

Response: The United States and Russia have different processes running development and procurement within their Defense programs. First, procurement strategy within the U.S. is generally more competitive, with multiple contractors competing for awards. In contrast, Russia's Defense industry is essentially state-owned with the government having ultimate say over which companies obtain major contracts, so the idea of competition exists, but in reality sources are pre-determined (Moran, 2008). Regarding the development process, American programs undergo rigorous reviews which includes multiple stages of tests and evaluations. This scrutiny ensures weapon systems meet the necessary performance requirements and are ready for deployment once produced. Russia, on the other hand, prioritizes speed and cost savings over quality assurance, resulting in sustainment and performance issues down the road (Oakley, 2021). Pertaining to industry, the Defense industrial base of the U.S. is primarily comprised of private and publicly-traded companies that treats the government as a customer. The Russian industrial base is largely controlled by the Kremlin, which stifles competition and innovation (Oakley, 2021). Next, The U.S. budgets for Defense programs over multiple years, which allows for relatively stable funding and planning within the supply chains. Russia has a 10-year plan for what it expects to spend, but still obligates year-to-year, leading to some instability (O'Rourke, 2020). Lastly, the U.S. is a world leader in technology, and the nation has produced cutting-edge weapon systems because of the culture of innovation it has fostered. Russia has struggled to withstand the fast pace of technology growth since the fall of the Soviet Union, and this has limited its ability to develop and produce advanced weapon systems (O'Rourke, 2020).

Secondary Research Question #1: What are the key efficiencies and deficiencies of both nations' acquisition processes?

Response: The U.S.'s key efficiencies are a robust Defense industrial base, high-value on strategic partnerships between the public and private sector, flexibility recently built into the "little a" acquisition process in addition to multiple types of contracts available to use, and transparency which ensures fair and reasonable contracts on behalf of the taxpayer. Russia benefits from streamlined processes, the Defense industry's close cooperation with government requests, foreign military sales, and a close focus on cost controls. On the other hands, the U.S. suffers from lengthy processes caused by

bureaucracy and complexity of regulations in addition to cost and schedule overruns caused by a multitude of factors. The Russian acquisition process is deficient because of its absence of true competition, its inability to be fully transparent, and its technological challenges caused by a lack of innovation in society.

Secondary Research Question #2: Can the development and procurement costs for similar programs be effectively compared?

Response: The development and procurement costs for programs can be compared, but it is important to take into account the variances between programs and the environmental factors affecting them. Factors to consider include technical differences and the scope of the project (Drezner et al., 2011). Additionally, procurement strategy and economic context must be considered (Oakley, 2021). It is crucial to carefully analyze key details of each program before attempting to compare costs, and in some cases it would just be too difficult to make an apples-to-apples comparison even across relatively similar platforms. It is best to identify best practices to formulate lessons learned, and a lot efficiencies can be gained and costs can be saved on future programs by doing this (O'Rourke, 2020).

Secondary Research Question #3: What are the reasons behind key process efficiencies and deficiencies?

Response: Acquiring major weapons systems is a complex endeavor no matter which country is being discussed. Though it is difficult to compare the processes of the United States and Russia on a one-for-one basis, there are key factors that allow conclusions to be made based on the holistic environment of each. The political environment plays a major role in both the U.S. and Russia. The American procurement process is subject to more ample scrutiny and must be more transparent to all stakeholders due to the country's democratic system. In contrast, Russia's process is more centralized and less transparent, which is a direct reflection on its authoritarian government (Makienko, 2014). Also, the organizational structure of each nations' Defense Acquisition Systems contributes to overall efficiencies and deficiencies. The U.S. system is overseen and managed by multiple agencies including the DoD, General Services Administration, Defense Contract Management Agency, Defense Contract Audit

Agency, and even the Department of Homeland Security, in addition to Congressional influences like the Government Accountability Agency. In comparison. Russia's system is managed by a small number of government and state-influenced corporations (Bowen, 2021). Also, technology improvements provide multiple advantages, the economy affects the health of program funding, and culture can significantly impact the process as well especially when dealing with the prevalence of corruption (Bowen, 2021).

Secondary Research Question #4: How does each nation's buying performance differ?

Response: While both the United States and Russia have government-regulated Defense Acquisition Systems, the U.S. system is generally more transparent and efficient resulting in better long-term buying performance. However, the Russian system continues to produce quantities of new and advanced weapon systems amidst criticism for corruption and a lack of transparency. It is a successful buyer considering the country's circumstances, but less successful when making a direct comparison to the U.S.

Secondary Research Question #5: What are the causes behind these performance variations?

Response: There are multiple factors behind the disparities in performance between the United States and Russia. Requirements generation is the first factor. Well-defined requirements generally lead to smooth acquisitions, whereas vague requirements lead to multiple inefficiencies, delays, and cost overruns (O'Rourke, 2020). Also, competition and various forces in the market play a part because minimal competition can lead to inefficiencies, higher costs, and lagging innovation (Moran, 2008). Additionally, transparency and accountability in the acquisition process can help to ensure that purchases are made in the best interest of the public and end-users. When transparency exists, it builds trust and reduces the potential for corruption and fraud (Moran, 2008). Also, advantageous regulations and proper compliance within the system ensures long-term performance, while countries suffer when they fail to enforce necessary acquisition regulations, leading to delays, fines, waste, and other inefficiencies (Drezner et al., 2011).

D. IMPLICATIONS AND RECOMMENDATIONS

Both the United States and Russia have mature defense acquisition systems. Analyzing ongoing submarine programs throughout this case study pointed out how they each differ in terms of organization, motivation, processes, and priorities. The United States places an overall greater emphasis on cost control and meeting technology and development milestones, whereas Russia's primary objective is on defensive and offensive military readiness and state control. Our findings have led to the following recommendations for the United States to consider to improve its DAS:

1. The Navy should acquire information on the lead and subsequent construction schedules of the Columbia-class submarine in either the shipbuilder's original format or a format that is suitable for use with modernized government scheduling software.
2. The DoD should consider requiring that the Office of the Under Secretary of Defense for Research and Engineering performs an assessment of the construction timeline's potential risks for the initial Columbia-class submarine, fully preparing for the 2023 initial program review. Furthermore, these findings should be presented to Congress with specific actions for the program office.
3. The Navy should make certain that the applicable program office incorporates the schedule risk analysis from the Office of the Under Secretary of Defense for Research and Engineering into their plans for delivering the lead Columbia-class submarine once it has been received and take all necessary steps to address and alleviate any potential risks identified.
4. The Navy should develop a plan for performing schedule risk assessments on future Columbia-class submarines, specifying the individuals responsible for conducting the analysis and the timeline for doing so.
5. It is recommended that the Navy acquire the latest information regarding the integrated enterprise plan of the shipbuilders, which incorporates revised implementation plans and the resources required to mitigate common risks within the nuclear shipbuilding industry.
6. The Navy should guarantee that the next 30-year shipbuilding plan is based on revised planning that takes into account the resources necessary to properly manage and sustain both the Columbia- and Virginia-class programs. This will confirm that the submitted budget is adequate to purchase and build vital submarines for the nation per schedule.
7. The DoD should make investing in public shipyards a top priority, including a renewed focus on training and properly compensating the highly skilled workforce required to build, maintain, and repair warships.

Additionally, below are actions that Russia could take to improve its system of acquiring military weapons. The United States and its allies should take notice if Russia makes earnest efforts in any of the areas listed below, as doing so would strengthen their ability to both defend and offend in the name of Russian national interest:

1. **Increase transparency in procurement processes:** The Russian government could ensure that the acquisition process for Borei-class submarines is more transparent and therefore less burdened by corruption, which ultimately leads to inefficiency. This can be achieved through increased public accountability and the creation of a Russian independent audit commission similar to the U.S. GAO.
2. **Strengthen partnerships with key suppliers:** Developing strong partnerships with key suppliers and encouraging collaboration across multiple supply chains could help improve the speed and efficiency of procurement processes. Recent sanctions by the West showed that Russia will continue to operate despite hardships, and strategic partnerships with countries like India and China would shield it from future Western sanctions.
3. **Invest in technology and research:** Investing in new technologies via a modernized R&D infrastructure could further improve the performance of future weapon systems, including future variants of the Borei-class submarines, also making Russia a more competitive arms dealer in international markets.
4. **Utilize data analysis and modeling:** Utilizing data analysis and modeling to evaluate the cost and performance for interconnected submarine components could help identify areas for improvement and reduce costs.
5. **Streamline bureaucratic processes:** Streamlining bureaucratic processes, reducing red tape and increasing efficiency could help improve the speed and cost-effectiveness of Russian procurement processes. This could be done by distancing some aspects of the Kremlin from their shipbuilders and industry.
6. **Foster a culture of innovation:** Encouraging a culture of innovation and risk-taking could lead to new technologies and solutions being developed for the Borei submarine system. Russians currently live in fear of the Kremlin, specifically President Vladimir Putin, and if the country ceases ruling by fear it could benefit by increased innovation and an increased national pride in inventing new technologies.

E. FUTURE RESEARCH

The acquisition of ships by the United States and Russia is a complex and dynamic process that involves various stages and decision points, such as cost, schedule,

design, construction, and integration of advanced technologies. Both countries have a rich history of shipbuilding, with well-established Naval industries that have contributed to furthering military capabilities and maintaining maritime dominance.

Recently, the focus of shipbuilding in both countries has shifted towards developing modern, high-tech vessels that are equipped with advanced sensors, weapons systems, and communication technologies and are built to employ minimally manned crews. The United States has made significant investments in R&D to create next-generation warships. On the other hand, Russia has also been actively upgrading its Navy, with a focus on building advanced frigates and submarines equipped with cutting-edge technologies to resurrect its Navy from the Soviet era. Additionally, the country has been investing in its shipbuilding industry to increase its competitiveness in the global market and achieve self-sufficiency.

As for future research, both the United States and Russia are likely to continue investing in the development of new technologies and materiel that will improve the efficiency and performance of their shipbuilding processes. This may include research into new propulsion systems, advanced sensors and communication technologies, and innovative materials that can improve the durability and speed of ships. There would also be value in comparing other major weapon systems to further dive into the similarities and differences of Russia and the United States. For example, a comparison of the U.S. F-35 Joint Strike Fighter against Russia's Sukhoi Su-57 next-generation fighter jets would lead to additional conclusions and recommendations to complement the findings we made by researching both countries' newest ballistic submarines.

Overall, the Naval acquisition process of the United States and Russia will continue to be a critical area of focus for both countries, and future research on the subject would allow the U.S and its allies to enhance their military capabilities via the DAS.

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