NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

MBA PROFESSIONAL PROJECT

ANALYSIS OF THE NAVY'S PLANNED AND EXECUTED BUDGETS AND THEIR EFFECT ON SUPPLY MANAGEMENT

June 2019

By: **Wanda I. Colon**
Zach C. Manriquez

Advisor: **Ryan S. Sullivan**
Co-Advisor: **Amilcar A. Menichini**

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REPORT DOCUMENTATION PAGE			*Form Approved OMB No. 0704-0188*

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** June 2019	**3. REPORT TYPE AND DATES COVERED** MBA Professional Project

4. TITLE AND SUBTITLE
ANALYSIS OF THE NAVY'S PLANNED AND EXECUTED BUDGETS AND THEIR EFFECT ON SUPPLY MANAGEMENT

5. FUNDING NUMBERS

6. AUTHOR(S) Wanda I. Colon and Zach C. Manriquez

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey, CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
NAVSUP HQ , Mechanicsburg

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release. Distribution is unlimited.

12b. DISTRIBUTION CODE
A

13. ABSTRACT (maximum 200 words)

The Department of Defense (DoD) budget is the end product of the Planning, Programming, Budgeting, and Execution process, which is submitted to Congress two years in advance of execution. Thus, the DoD will always demonstrate a monetary difference between the planning and execution phases. A significant difference between the planning and execution affects providers such as Naval Supply Systems Command (NAVSUP), which is responsible for the managing and financing of materiel. From 2007 to 2017, there has been an average budget difference of $3.1B for Operation and Maintenance, Navy appropriation. NAVSUP receives the DoD budget requirements from resource sponsors and budget submitting offices (BSOs) and determines how to invest by utilizing an inflation category code (ICC) such as Consumable parts (412) and Repairable parts (503). This study analyzed the budget differences for ICC 412 and 503 from 2007–2017; it demonstrated which budget line items (BLIs) and BSOs had the most significant contribution to these differences. For ICC 412 and 503, our analysis showed the most significant differences were observed in the years 2007–2011 and 2014–2017, and that the BLIs Mission and Other Flight Operations (1A1A) and Mission and Other Ship Operations (1B1B) demonstrated the most significant budget differences. It was also determined that BSO for Commander, U.S. Fleet Forces, and Commander, U.S. Pacific Fleet had the most significant impact on the budget differences for these BLIs.

14. SUBJECT TERMS
defense budget, PBIS, NWCF, PPBE, POM, budget difference, budget line item, supply management, revolving account, budget submitting office, operation and maintenance appropriation

15. NUMBER OF PAGES
81

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

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Wanda I. Colon, Lieutenant, United States Navy
Zach C. Manriquez, Lieutenant Commander, United States Navy

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

from the

NAVAL POSTGRADUATE SCHOOL
June 2019

Approved by: Ryan S. Sullivan
Advisor

Amilcar A. Menichini
Co-Advisor

Don E. Summers
Academic Associate, Graduate School of Business and Public Policy

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ABSTRACT

The Department of Defense (DoD) budget is the end product of the Planning, Programming, Budgeting, and Execution process, which is submitted to Congress two years in advance of execution. Thus, the DoD will always demonstrate a monetary difference between the planning and execution phases. A significant difference between the planning and execution affects providers such as Naval Supply Systems Command (NAVSUP), which is responsible for the managing and financing of materiel. From 2007 to 2017, there has been an average budget difference of $3.1B for Operation and Maintenance, Navy appropriation. NAVSUP receives the DoD budget requirements from resource sponsors and budget submitting offices (BSOs) and determines how to invest by utilizing an inflation category code (ICC) such as Consumable parts (412) and Repairable parts (503). This study analyzed the budget differences for ICC 412 and 503 from 2007–2017; it demonstrated which budget line items (BLIs) and BSOs had the most significant contribution to these differences. For ICC 412 and 503, our analysis showed the most significant differences were observed in the years 2007–2011 and 2014–2017, and that the BLIs Mission and Other Flight Operations (1A1A) and Mission and Other Ship Operations (1B1B) demonstrated the most significant budget differences. It was also determined that BSO for Commander, U.S. Fleet Forces, and Commander, U.S. Pacific Fleet had the most significant impact on the budget differences for these BLIs.

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LIST OF ACRONYMS AND ABBREVIATIONS

1A1A	Mission and Other Flight Operations
1A2A	Fleet Air Training
1B1B	Mission and Other Ship Operations
3C5L	Junior ROTC
AG	activity group
APN	aircraft procurement, Navy
BES	Budget Estimate Submission
BLI	budget line item
BOCS	budgetary object classification system
BSO	budget submitting offices
BSO (23)	Naval Supply Systems Command
BSO (60)	Commander, U.S. Fleet Forces
BSO (70)	Commander, U.S. Pacific Fleet
BUSANDA	Bureau of Supplies and Accounts
BY	budgeted year
BY1	budgeted year one
CJCS	Chairman of the Joint Chiefs of Staff
CNO	Chief of Naval Operations
CPA	Chairman's Program Assessment
CR	continuing resolution
CY	current year
DCNO	Deputy Chief of Naval Operations
DoD	Department of Defense
DoN	Department of the Navy
DPG	Defense Planning Guidance
DT&E	development, test, and evaluation
FMB	Office of Budget
FMPM	Financial Management Policy Manual
FYDP	Future Years Defense Program
HSC	Hardware Systems Command

ICC	inflation category code
ICC 412	Navy Managed Supplies and Materials
ICC 503	Navy Fund Equipment
IOT&E	initial operational test and evaluation
MCN	military construction, Navy
MPN	military personnel, Navy
N80	Office of the Chief of Naval Operations, Programming Division
NAVADMIN	Naval Administrative Message
NAVSUP	Naval Supply Systems Command
NDS	national defense strategy
NSS	national security strategy
NWCF	Navy Working Capital Fund
O&M,N	operation and maintenance, Navy
OCO	Overseas Contingency Operation
OMB	Office of Management and Budget
OPNAV	Office of the Chief of Naval Operations
OPTEMPO	operating tempo
OSD	Office of the Secretary of Defense
OUSD(C)	Office of the Under Secretary of Defense (Comptroller)
PBIS	Program Budget Information System
POM	program objective memorandum
PPBE	Planning, Programming, Budgeting, and Execution
PPBS	Planning, Programming, and Budgeting System
PY	prior year
QDR	Quadrennial Defense Review
RDT&E	research, development, test, and evaluation
RDT&E,N	research, development, test, and evaluation, Navy
RMD	Resource Management Decision
RPN	reserve personnel, Navy
SCN	ship building and conversion, Navy
SecDef	Secretary of Defense
SM	supply management

SPP	Sponsor Program Proposals
USD(C)/CFO	Under Secretary of Defense (Comptroller)/Chief Financial Officer
WCF	Working Capital Fund
WPN	weapons procurement, Navy

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ACKNOWLEDGMENTS

Foremost, we would like to thank God for giving us the knowledge and patience to be able to complete this important milestone. We would like to thank our families and friends for all their encouragement and support; we could not have done it with you. We would like to thank our thesis advisors, Dr. Ryan Sullivan and Dr. Amilcar Menichini. Their guidance and expertise were greatly appreciated and made the thesis writing process less stressful than anticipated. We would also like to thank Dr. Gregory Mislick and Dr. Philip Candreva for their insights into their respective fields, which helped us shape this thesis. We would like to thank CDR Charles Mielkie from NAVSUP HQ for his invaluable knowledge in the PPBE process and mentorship and for ensuring we stayed true to our thesis topic. We would like to thank the Acquisition Research Program (ARP), especially Nadia Greer and Jochele Benson, for setting the milestones and ensuring we achieve them ahead of schedule. Finally, we would like to thank the coaches at the Graduate Writing Center, specifically Colette O'Connor, and the processors at the Thesis Processing Office, specifically Rebecca Pieken, for their outstanding patience and for ultimately making our thesis comprehensive.

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I. INTRODUCTION

The Naval Supply Systems Command's (NAVSUP) mission is to ensure supplies are readily available to support the warfighting team. In order to achieve this mission, NAVSUP depends on demand signals provided by the fleet or its customers during the planning phase of the Department of Defense's (DoD) budget cycle. Inventory levels are generated utilizing forecasting models, historical data and demand signals. NAVSUP has seen throughout the last 11 years a trend in budget differences between what was planned and what was actually executed. This budget difference affects NAVSUP's material readiness capability. At the conception of this research NAVSUP speculated a budget difference of $1.4B for any given fiscal year and was uncertain whether it was generated by one single or multiple commands.

Obligation authority is given to NAVSUP by Congress to incur in contracts a lead time in advance of the customers' requirements via the Navy Working Capital Fund (NWCF). NWCF is utilized to finance inventories of supplies or services. As Candreva (2017) points out in his book, *National Defense Budgeting and Financial Management: Policy and Practice*, the majority of the NWCF is reimbursed through sales from its customer base through various defense appropriations (Candreva, 2017). The supply management (SM) activity is one of the primary areas involved in the funding of inventories or materials.

This research paper examines which appropriation has the highest significant budget difference between NWCF-SM Obligation authority and the funding appropriated by the customers during the execution phase of the DoD's budget cycle. In addition, this research analyzed the following questions: What are the changes that affect the customer's funding between the planning and execution phases, and what are the reasons for these changes (e.g., facts of life, schedule changes, funds reallocation to higher priority programs)? If there is a statistical relationship between the budget differences and marks issued by Office of the Secretary of Defense (OSD), can the statistical relationship be used to provide recommendation to the Office of the Chief of Naval Operations (OPNAV) and the Office of Budget (FMB) to lock appropriate customer accounts within the NWCF-SM

budget horizon of two years. This is the first time Operation and Maintenance, Navy (O&M,N) budget differences have been analyzed in order to understand how they are generated and their effects on supply management.

To conduct the analysis for this research, budget differences for each appropriation was calculated by gathering historical data from the Program Budget Information System (PBIS). The historical data was broken into three different phases:

- Phase 1: funding anticipated using the requirements identified in the Program Objective Memorandum (POM)
- Phase 2: the dollar amount NWCF-SM invested in fulfilling the requirements defined in the POM
- Phase 3: the dollar amount the customer pays to receive the requirements

Once data was collected, the appropriations that demonstrated the most significant difference between the dollar value initially budgeted and actual dollar value executed were identified.

Using the data from PBIS, it is concluded that in six out of the 11 years reviewed in this analysis, the NWCF-SM has experienced a surge in demand from the customers during the execution phase of the budget cycle, decreasing overall NAVSUP's net effectiveness and possibly an increase in the cost of material (PBIS, 2015). This surge is caused by the misalignment between the delivery of the material from repair or procurement lead time, and the customers or fleet demand. This misalignment impacts the fleet's material readiness and the Department of Defense's (DoD) mission readiness. This study also discusses which budgeting submission offices (BSO) generated the greatest contribution to the budget difference effecting supply management. By identifying which BSO is the greatest budget difference contributor, NAVSUP has opportunities to further increase collaboration with these BSOs, which can increase supply readiness to the fleet.

II. THE PLANNING, PROGRAMMING, BUDGETING, AND EXECUTION PROCESS AND THE NAVY WORKING CAPITAL FUND

The purpose of this chapter is to introduce the reader to the process of how the defense budget is developed, the different key players who influence the process, and how they coordinate to create the final product, the president's budget. This chapter also discusses the history and the operations of the NWCF-SM, and how NAVSUP plays a role in absorbing the repair and procurement lead time to ensure the fleet has the right mix of repair parts when they are needed.

A. THE PLANNING, PROGRAMMING, BUDGETING, AND EXECUTION PROCESS

The Planning, Programming, Budgeting, and Execution (PPBE) process is the tool used by the DoD to rationally allocate resources based on priorities identified in the *National Security Strategy* (NSS) and the *National Defense Strategy* (NDS). If this process is done correctly, it would ensure programs and requirements are funded to adequate levels. In addition, this process allows for prioritization to ensure the proper allocation is achieved among forces, manpower, material, and support within fiscal constraints.

The PPBE process was first introduced by former Secretary of Defense (SecDef) Robert McNamara and Comptrollers Charles Hitch and Robert Anthony as the Planning, Programming, and Budgeting System (PPBS). As discussed by McCaffrey and Jones (2004) in the *Reform of Program Budgeting in the Department of Defense,* the PPBS was implemented as an analysis and planning tool based on various plans and programs to achieve the goal of allocating the correct funding for the manning, training, and equipping of the military, and the operation and support of the defense system to support the NSS and NDS. They also note that, each service has its own system analysts, who use the system to document, justify, and allocate their own department resources. In addition, Candreva (2017) mentions that during this time, the control of the process was held at the OSD level (Candreva, 2017). McCaffery and Jones (2004) also explain that, in 1969 the Laird Reform changed the control of the PPBS process from the OSD level to the military department

secretaries. They mention that in 1986, under the Goldwater–Nichols Act, the Chairman of the Joint Chiefs of Staff (CJCS) was given more power as the chief military advisor to OSD and the president. Thus, a bigger staff was needed by the CJCS to engage in critical phases in the PPBS process (McCaffery & Jones, 2004). In addition, they note that in 2003, Secretary of Defense Donald Rumsfeld redefined the process by adding the Future Years Defense Program (FYDP) and the Defense Planning Guidance (DPG) and eliminating the one-year budgeting review; Rumsfeld also changed the process into the PPBE process. He believed he could accelerate the cycle by having the SecDef and the secretary's staff engage in the decision-making process quicker with the implementation of these two programs (McCaffery & Jones, 2004).

As mentioned by McCaffery and Jones (2004), in 2012, the DoD changed the programming and budget process. For each year, the department develops a single-year budget. Additionally, a five-year program/budget review is conducted, to provide greater reliability across budgets (McCaffery & Jones, 2004). The result of this process is a budget aligned with the various programs suggested by the different services and the defense agencies identified in the POM.

The PPBE process is divided into four phases, as shown in Figure 1. These phases do not happen sequentially but do overlap.

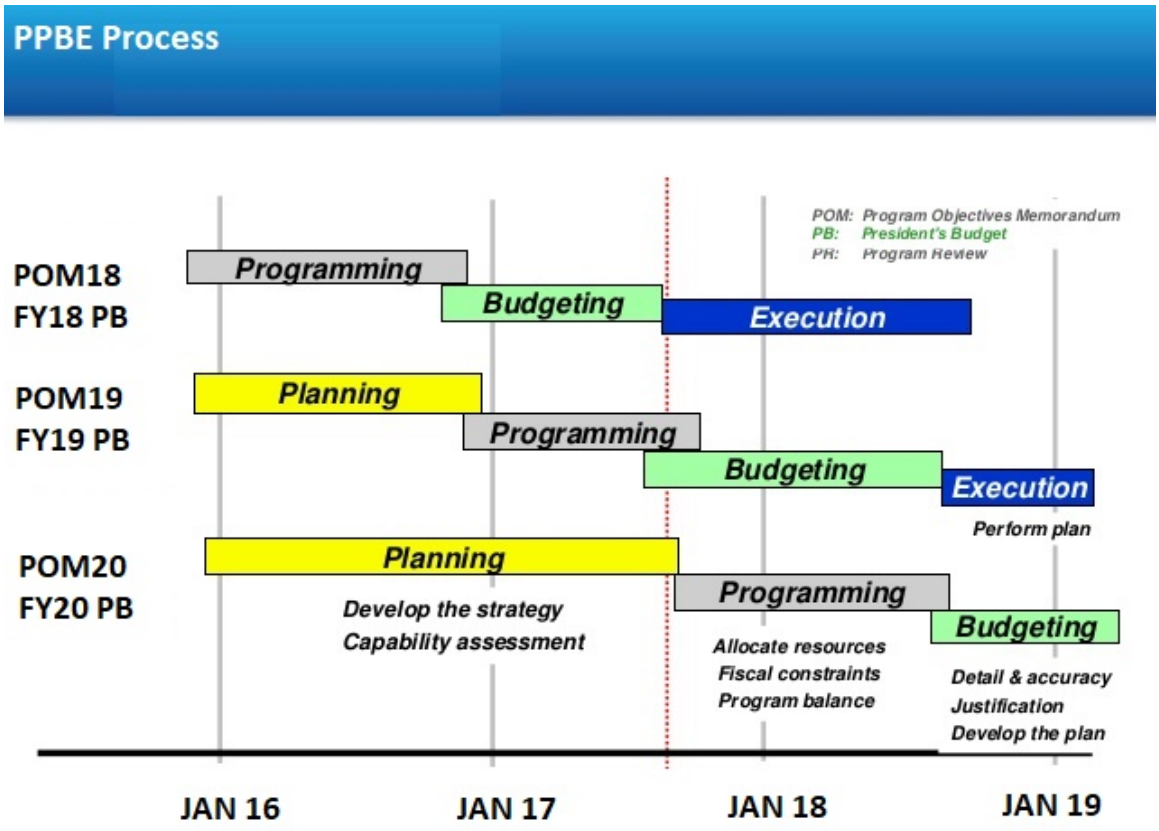

Figure 1. Planning, Programming, Budgeting, and Execution Process. Adapted from Mistral Inc. (2013).

1. Planning Phase

In the planning phase, the NSS and the NDS are analyzed to identify the capabilities required to support these strategic documents. Every year, the SecDef issues the DPG in the late spring/early summer to provide guidance to the DoD planners regarding the development of the force structure to support the NSS and the NDS. The DPG also identifies the fiscal constraints that might impact the programming and budgeting phase. At the beginning of each four-year administration, a Quadrennial Defense Review (QDR) is generated. The purpose of this review is to evaluate Defense assumptions and strategies, and how these will support the initiatives and goals for the administration (Office of the Assistant Secretary of the Navy, Financial Management and Comptroller [OASN(FM&C)], 2016). The Future Year Defense

Plan is part of the guidance issued by the SecDef to the different services to assist with the planning and preparing of the POM.

2. Programming Phase

The programming phase begins with each military component developing a POM to address how it plans to allocate resources to meet the priorities specified in the various guidance (e.g., President's National Defense Strategy, Chief of Naval Operations [Sponsor Program Proposals] Planning Guidance, and Office of Management and Budget's [OMB] Fiscal Guidance). To develop the POM, each service must analyze their current capabilities and those needed to support the provided strategic guidance and identify shortfalls and overmatches. Each military component identifies gaps in its capabilities and analyzes all the alternative material solutions available that satisfy the gaps; these are included in the POM as programs. This process is not conducted every year, hence, "The POM is developed in the even-numbered years and reviewed in odd-numbered years" (McCaffery & Jones, 2004, p. 151). McCaffrey and Jones (2004) explain that the JCS reviews the POM from each military component, to ensure its adherence to the various guidance. Once JCS gives approval of the POM, the Chairman's Program Assessment (CPA) is issued by the CJCS to SecDef. The CPA then becomes SecDef's assessment of the adequacy and risk in the POMs for each military component and defense agency (McCaffery & Jones, 2004).

3. Budgeting Phase

This phase begins with the approval of all the programs found in each of the military component's and defense agency's POMs. The primary purpose of this phase is to scrutinize the first one or two years of the POM to allocate resources adequately and to produce a DoD budget request that can be defended effectively before Congress. The *Department of the Navy (DoN) Budget Guidance Manual* points out that each DoD component submits its POM in addition to its proposed budget estimate as part of its Budget Estimate Submission (BES) to the OSD. The BES for each military component is reviewed by the OSD in collaboration with OMB to ensure the budget is defendable and executable within the financial constraints. The manual also explains that the focus is primarily on the budget year perspective and consists of the best pricing, an achievable

schedule, dollar and manpower balance, consistency within guidance and the timely execution of funds (OASN[FM&C], 2016). Once OSD completes the review, "the final defense budget is sent to OMB to become part of the President's budget" (McCaffery & Jones, 2004, p. 153). Congress requires the Presidential Budget to be submitted on the first Monday in February of each year (Macdonald, 2013).

4. Execution Phase

As mentioned in the *Department of the Navy (DoN) Budget Guidance Manual*, this phase consists of the process of managing the budget authority once it is appropriated. The execution phase begins with Congress issuing an authorization bill, which authorizes an agency to carry out a program and, in some cases, places a limit on the amount that can be appropriated for the program. Congress also signs an appropriation bill, which contains budget authority that allows the government to incur financial obligations for the programs identified in the approved budget. The manual explains that most budgetary resources are made available by apportionment from the OMB to the different military components and defense agencies. These apportionments are made by time period or by activity to ensure the effective use of available funds and to preclude the need for additional appropriations (OASN[FM&C], 2016).

B. PPBE PROCESS IN THE DEPARTMENT OF THE NAVY

Candreva (2017) notes that the DoD PPBE process guides the PPBE process in the DoN. OPNAV Code N8 runs the PPBE process for the Navy. Each of the assistants of N8 assist in the different phases of the PPBE process: planning (N81), programming (N80), and budgeting and execution (N82). While the N8 may run the PPBE process for the Navy, it is not responsible for determining the content of the Navy budget; that task is a collaboration between the Deputy Chiefs of Naval Operations (DCNO), the fleets, and the BSOs (Candreva, 2017).

C. PROGRAM OBJECTIVE MEMORANDUM

As discussed by Candreva (2017), the POM provides information about all the programs for the Navy in a six-year period. The POM focuses on the current and the

requested funding stream within a five-year period: the items, objects, enhancements, and capabilities that are being requested; the anticipated outcome of the funding; and the risks imposed if these are not funded. This process reflects the Future Years Defense Program (Candreva, 2017). He also notes that the POM is developed during the programming phase, which begins each September, with reviews of intelligence, strategy, warfare areas, and support tasks. The POM includes an analysis of the mission, objectives, and alternative methods to achieve a set goal and the allocation of resources. As discussed in the report published by RAND*, Navy Planning, Programming, Budgeting, and Execution: A Reference Guide for Senior Leaders, Managers, and Action Officers*, Office of the Chief of Naval Operations, Programming Division (N80) is the primary department code involved in the Navy POM development process, with guidance from the CNO through the DCNOs. The report also states that N80 uses the Sponsor Program Proposal (SPP), developed by the resource sponsors, as a basis to create the POM. The SPPs are submitted to N80 in the form of changes to the FYDP, which is based on the previous president's budget (Blickerstein, Yurchak, Martin, Sollinger & Tremblay, 2016).

According to the Naval Administrative Message (NAVADMIN), *POM Process Reorganization and OPNAV Staff Realignment,* in October 2016, the CNO realigned the POM development process to create a culture of collaboration and transparency among the key stakeholders that facilitates decision-making. Strategic guidance and priorities are provided through the CNO Guidance for Development early in the POM cycle, to enable the determination of resourcing decisions and priorities. The NAVADMIN also states that to assist in integrating all the players in the POM development, three overlapping phases were created in which there are supported and supporting players. The NAVADMIN states further that with the POM process beginning three months earlier; prior year POMs will be used by resource sponsors, and that these resource sponsors will no longer require the baselines and SPPs. The goal of this new process is described by the CNO as "The end product of the POM development process will be a strategy-based, fiscally balanced, and defendable Navy Program for submission to the OSD which appropriately implements OSD fiscal and programming guidance provided" (Chief of Naval Operations, 2016).

D. APPROPRIATION

As stated in the *Financial Management Policy Manual* (FMPM), an appropriation is defined as, "the authority provided by an act of Congress to incur obligations to make payments from the Treasury for specific amounts and within specific timeframes" (OASN[FM&B], 2019, p. 1–1). The DoD receives appropriations from Congress, which then is distributed among the various defense agencies and services. (OASN[FM&B], 2019).

An appropriation provides details on what the funds are used for. The DoN has five types of appropriations: Military Construction, Navy (MCN); Military Personnel, Navy (MPN) Operation and Maintenance, Navy (O&M,N); Procurement; and Research, Development, Test, and Evaluation, Navy (RDT&E,N) (OASN[FM&B], 2019).

1. Military Construction, Navy

- The MCN includes projects for construction on land that is not in the inventory of the DoD, by acquiring, constructing, converting, rehabilitating, or installing permanent or temporary public works, including land acquisition, site preparation, appurtenance, utilities, and equipment. Construction also includes the addition, expansion, extension, alteration, conversion or replacement of an existing real property facility or the relocation of a real property. (OASN[FM&B], 2019)

2. Military Personnel, Navy

- The MPN appropriation provides annual resources necessary to compensate active duty Navy military personnel required to staff approved force structure and support infrastructure, including those officers and enlisted personnel within the individual accounts: students, trainees, transients, patients, prisoners, holdees and midshipmen. (OASN[FM&B], 2019)

3. Operation and Maintenance, Navy

- The O&M,N appropriation finances the day-to-day cost of operating naval forces, including fuel, supplies, and maintenance of ships, Navy and Marine Corps aircrafts, related weapons systems, and support establishment ashore. (OASN[FM&B], 2019)

4. Procurement

- The procurement appropriation is divided into four categories: Aircraft Procurement, Navy (APN); Ship Building and Conversion, Navy (SCN); Weapons Procurement, Navy (WPN); and Other Procurement, Navy (OPN). (OASN[FM&B], 2019)

a. Aircraft Procurement, Navy

- The APN appropriation finances the procurement of Navy and Marine Corps aircraft and provides for related supporting programs. Supporting programs include equipment for modification of in-service aircraft; aircraft spare parts; ground support and training equipment; and industrial facilities and tools. (OASN[FM&B], 2019)

b. Ship Building and Conversion, Navy

- The SCN appropriation finances the construction of new ships and conversion of existing ships, including all hulls, mechanical and electrical equipment, electronics, guns, torpedo and missile launching systems, and communications systems. (OASN[FM&B], 2019)

c. Weapons Procurement, Navy

- The WPN appropriation finances the procurement of missiles, torpedoes, guns, and supporting equipment for naval forces and Marine air forces. (OASN[FM&B], 2019)

d. Other Procurement, Navy

- The OPN appropriation finances the procurement, production, and modernization of equipment not otherwise provided for. Such equipment ranges from the latest electronic sensors required to update the naval forces, trucks training equipment, and spare parts. This equipment is an integral part of programs to improve the fleet and shore establishment by maintaining or expanding existing capabilities or replacing ineffective units. (OASN[FM&B], 2019)

5. Research, Development, Test, and Evaluation, Navy

- This appropriation finances research, development, test, and evaluation (RDT&E) efforts performed by contractors and government installations to develop equipment, material, or computer application software; Development, Test, and Evaluation (DT&E); and its Initial Operational Test and Evaluation (IOT&E). These efforts may include purchases of end items, weapons, equipment,

components and materials as well as performance of services. (OASN[FM&B], 2019).

E. DEFENSE FINANCIAL MANAGEMENT REGULATIONS

This section discusses the history of the DoD's financial management regulations and emphasizes on the type of funding that NAVSUP utilizes when making purchases that support the fleet. Details are provided to explain the depth of these regulations and to emphasize which volume will be most applicable to NAVSUP.

1. History

The *Department of Defense Financial Management Regulation* (FMR), DoD 7000.14-R (DoD, 2017), is the leading instruction that provides the procedures, regulations, and policy for DoD activities. The FMR states that the Under Secretary of Defense (Comptroller)/Chief Financial Officer (USD(C)/CFO) is the point of contact who has the authority to issue this financial management regulation. The FMR has a total of 15 volumes, but the most relevant portion to NAVSUP is volume 11B, which is Reimbursable Operations, Policy and Procedures-Working Capital Funds (WCF) because it details the functions of WCF activities, financial management directives, function, and systems **(**DoD, 2017).

F. THE NAVAL SUPPLY SYSTEMS COMMAND

This section explains the mission of NAVSUP and gives a brief history of its origins in the DoD. It also discusses NAVSUP's mission of SM. NAVSUP's SM is what keeps the fleet stocked with the appropriate amount of parts to maintain mission readiness. NAVSUP adequately supports the SM mission by applying a multitude of processes.

1. Mission

Hanely (2009) in the article, "NAVSUP FLC Pearl Harbor Hosts NAVSUP Assistant Commander for Financial Management and Comptroller" writes that, on May 1, 1966, NAVSUP was created, as a realignment from the Bureau of Supplies and Accounts (BUSANDA). He also explains that the intent for this change was to back up the Chief of Naval Material Command, which was the latest creation in major Navy commands and had

only been around for a year. Hanley (2009) in the article emphasizes that NAVSUP has the mission to provide material readiness through supplies, and services that support the joint warfighting team. Dortch (2016) in the article "Naval Systems Command Celebrates 50th Anniversary" explains that a continuous task for NAVSUP is to provide a centralized inventory location that enhances the supply chain effectiveness. (Dortch, 2016).

2. Supply Management

As noted in the "NAVSUP Navy Working Capital Fund Supply Management" presentation by Spencer (2017), within the many missions of NAVSUP, one area of focus is SM. SM performs inventory oversight that results in the sale of repairable and consumable parts to various customers. He also mentions that SM plays a critical role in the availability of the proper equipment, spare inventory, and adequate training in support of the operating forces. Spencer also comments that included in the price of the items being sold by NAVSUP is the cost recovery rate. The cost recovery rate is used to recover the funds used to purchase the parts or services and operating costs (Spencer, 2017). The payment loop is completed when material is delivered, or services are provided and payment is made by the customers utilizing the appropriate obligations (OASN[FM&B], 2018).

3. NAVSUP Logistics Efficiencies

In the article written for the Navy Supply Corps Newsletter, "Employing Supply Chain Analytics for Logistics Efficiencies," Gabel (2018) states that NAVSUP uses demand signals from the fleet and their associated weapons systems to determine the inventory levels to maintain and how much to invest in. Gabel goes on to add that NAVSUP uses information technology systems to integrate the various programs within the DoN, which strengthen the NAVSUP supply chain (Gabel, 2018).

During the programming phase, the requirements needed are submitted to a customer-provider such as NAVSUP. The role of NAVSUP is to take the requirement from the fleet and ensure that adequate stock is on-hand on time. As discussed in the *Department of the Navy Fiscal Year (FY) 2018, Budget Estimates. Justifications of Estimates Navy Working Capital Fund*, "NAVSUP uses a lead-time of one year for maritime delivery and two years

for aviation" (OASN[FM&B)], 2018). When the fleet is in the execution portion of the budget cycle and appropriations have been approved by Congress, the cycle for the NWCF begins.

G. THE NAVAL WORKING CAPITAL FUND

As Candreva (2017) points out in the book *National Defense Budgeting and Financial Management: Policy and Practice*, the NWCF is part of the overarching WCF that the U.S. government utilizes. The NWCF has been in establishment since the 1800s and is one of the many WCFs the DoD utilizes. Candreva (2017) goes on to say that when a revolving fund is utilized by the DoD, all income is from the applicable command and is available to fund ongoing operations without any limitations per fiscal year (Candreva, 2017). Since NAVSUP utilizes revolving funds, it accepts job orders from customers. NAVSUP uses the revolving funds to finance their operating cost and the cost of the part or service offered. Candreva (2017) also explains that, once the job order is completed, the customer is billed, and payment is submitted by the customer, utilizing Congress-approved appropriations. Payment received from the customer is used to reimburse the revolving funds. He mentions that the WCF is a strategy that is like the strategies in the private financial sector, such as resource management, cost accounting, cost allocation, and any kind of customer-provider relationship that incorporates contracts. In addition, Candreva (2017) states that the WCFs are aligned to a particular business in which budget authority is made up from goods sold and customers that reimburse costs with funds that are appropriated. He explains that it is possible for a command to gain a multitude of various funding from different sources, and some of that funding must be combined to pay for things such as overhead and indirect expenses. He adds that it is apparent that it is a buyer-seller relationship since the seller will recover the cost of services or the cost of the goods. Costs can include all indirect and overhead costs, and the seller will maintain a financial ledger that is commercial in appearance (e.g., income statements, balance sheets, depreciated capital assets, etc.). Candreva (2017) clarifies that pricing is an area in which WCF differs from the private financial sector: Pricing is based on a fully allocated cost model and not by pressures from the stock market, there are no associated pressures with generating profits for a firm, and the charged amount to the customers will not vary throughout the year.

1. How It Operates (Process)

A customer receives an appropriation to finance a program. The customer decides to use the services of a WCF activity and initiates a reimbursable order. That order, once accepted, becomes a budget authority for the WCF activity to be used to cover the full cost of delivering the service.

According to Candreva (2017), the WCF activity sets up unique job order numbers to account for each customer's order, direct material, and labor cost charged for each job order. He explains that as a worker bills for time on the job or buys supplies for the job, the WCF activity earns the budget authority on the funding document. In addition, he states that the hourly rate charged must be higher than just the employee's salary and benefits because the WCF receives no appropriation for overhead expenses such as electricity, janitorial, and non-billable labor (a secretary or the comptroller who does not work directly for a customer). Therefore, for each hour charged for the work, a portion of the earned revenue passes through and pays the employee, but the remainder goes into the WCF (the tank), where it loses its identity as a type of appropriation. Candreva (2017) goes on to say that indirect material, labor, and general and administrative expenses (overhead) are all charged to overhead accounts and are paid using the WCF. He continues to discuss that the financial incentive of the WCF commander is to fully recover all costs, otherwise known as breaking even. Since the command starts with a corpus of funding (represented by the tank), full cost recovery means the level of the tank does not rise or fall. A rising tank means that the command is recovering more than its costs; a falling tank level means that it is not recovering enough (Candreva, 2017).

Candreva (2017) states further that if the rates are too high (or costs were underestimated), the activity may recover more revenue than its costs, and the fund grows. If the rates are too low (or costs are not contained), the activity may not recover all costs, and the fund shrinks. He clarifies that a tank that rises in a year will be drained by lowering rates charged to customers in the future. The command does not change its rate in the middle of the year to protect the interests of the paying customers. The intent of the stabilized rate is to make sure the mission-funded programs achieve its goals and the cost risk is shifted to the WCF (Candreva, 2017).

2. Revolving Funds (Groups)

The Office of the Under Secretary of Defense (Comptroller) (OUSD(C)), describes in the *Department of the Navy, Navy Working Capital Fund Annual Report* that, revolving funds are divided into two categories: stock funds and industrial funds. The OUSD (C), states that stock funds are to be used when, "making volume purchases of spare parts and other goods from commercial sources." (Office of Under the Secretary of Defense Comptroller (OUSD(C), 2000, p.6). The inventory is stored until sold to the fleet at a marked-up price to include a surcharge. The OUSD(C) continues stating that, "Industrial funds are used to provide the operating forces with industrial and commercial goods and services, such as depot-level maintenance." (OUSD(C), 2000, p. 6). Overhead and material costs are included in the price offered to the operating forces for any services and goods whether industrial or commercial based (OUSD(C), 2000).

H. THE BUDGET SUBMITTING OFFICE

As mentioned in the *Department of the Navy (DoN) Budget Guidance Manual,* the BSOs are the offices responsible for the preparation and submission of the BES up to Office of Budget for the DoN and OSD/OMB. BSOs are also responsible for preparing and providing answers to questions from the congressional committees to justify their budget submissions. These offices shown in Table 1 are responsible for verifying that subordinate offices submit required documents in time to meet the set deadlines. They also ensure BESs are within the scope of the program, and that these comply with fiscal, and policy guidance stipulated during the POM development, decisions made during the DoN review and with the Resource Management Decisions (RMD) before the president's budget submission. The manual goes on to explain that BSOs are responsible for the proper pricing of budget estimates, including price escalation information; for reviewing budget adjustments made by FMB, the OSD/ OMB, and congressional committees. The BSO also prepare reclamas or appeals if required, in accordance with the guidance and schedules established by FMB (OASN[FM&C], 2016).

Table 1. Budget Submission Office Listing.
Adapted from Department of the Navy (2017).

BSO Code	Command
0	Undistributed
11	Director, Field Support Activity
12	Secretariat Comptroller Division (FMB7)
15	Naval Intelligence Activity
17	FMB/CNO (Office of Budget/Fiscal Management Division)
18	Chief, Bureau of Medicine and Surgery
19	Commander, Naval Air Systems Command
22	Chief of Naval Personnel
23	Commander, Naval Supply Systems Command
24	Commander, Naval Sea Systems Command
25	Commander, Naval Facilities Engineering Command
30	Director, Strategic Systems Program
39	Commander, Space and Naval Warfare Systems Command
41	Director, Navy Systems Management Activity
52	Commander, Navy Installations
60	Commander, U.S. Fleet Forces Installations
62	Commander, Naval Education and Training Command
68	Chief of Naval Operations
69	Commander, Naval Security Group Command
70	Commander, U.S. Pacific Fleet
N	ITR OSD

As explained in the report published by RAND, collaboration among the key stakeholders is critical in generating the DoN's budget. Inputs are submitted by the resource sponsors, BSOs, N80, and FMB. Resource sponsors and N80 work together to determine the allocation of resources to ensure the right balance is achieved throughout the various programs based on the required resources over time. The report goes on further to state that BSOs are more engaged with the fleet therefore their estimates are based on how programmed resources are executed while taking in consideration fleet issues and maintenance. BSOs play a greater role in the proposed budgets for the APN, O&M,N, OPN, SCN, and WPN appropriations because they are more engaged with the fleet, and what is occurring in those arenas. (Blickerstein et al., 2016).

III. DATA COLLECTION AND PROCESSING

The purpose of this chapter is to introduce the reader to the process used in this study to gather the data required to determine the differences between the actual and budgeted totals for the various appropriations, as well as which BLI and which BSO have the most significant impact on the budget difference. This chapter also discusses how the budget difference was calculated and how the BLIs and BSOs were identified.

A. INTRODUCTION

This project examines the obligation authority granted by Congress for the NWCF-SM and the funding appropriated to the customers during the execution phase of the PPBE process. As noted in the *Department of the Navy Fiscal Year (FY) 2018 Budget Estimates. Justification of Estimates, Navy Working Capital Fund*, the obligation authority is based on future demand signals received from customers. NAVSUP uses the obligation authority to incur in contracts, a lead-time in advance of the customers' requirements (OASN[FM&B)], 2018). Macdonald (2013) comments in "The Navy Working Capital Fund Budget & Execution Cycle" article that, the budget phase is intricate and can go through various versions within the Navy, as it passes through OSD and finally through Congress (Macdonald, 2013). There will always be a difference between the funding obligation authority granted to the NWCF-SM and that appropriated by the customer. This is due to priority changes, leadership changes, mission changes, continuing resolutions (CR), and/or unforeseen events, such as natural disasters or collisions.

The report *Department of the Navy Fiscal Year (FY) 2018 Budget Estimates. Justification of Estimates, Navy Working Capital Fund* explains that NAVSUP BSO (23) estimates the required demand for supplies using various forecasting models, demand signals from the fleet/customer-base, inputs OPNAV program resource sponsors and Hardware System Command (HSC). NAVSUP BSO (23) then obligates funds ahead of anticipated customers' needs for the procurement and repair of ships and aviation parts as well as ship and aviation consumables (OASN[FM&B)], 2018. Any changes in the

assumptions used to create the estimates invalidate the estimates, therefore impacting the NWCF-SM funding.

This study reviews historical budget proposals in the PBIS and DoD budgets, as well as the presidential budget reports to isolate which appropriation category demonstrates the highest difference between the proposed budget and the actual executed budget in addition to identifying if the problem lies within a specific BSO.

B. DATA GATHERING

As presented in the *Program Budget Information System (PBIS) User's Guide*, PBIS is the system of record for planning and budgeting for the Navy. It supports a seamless transition between the different phases of the PPBE process. PBIS operates using an Oracle database, which is then accessed by users using a front-end web-based application. The user's guide points out that PBIS is used for programming the POM and budgeting as well as tracking execution data and analyzing the Navy's budget history. The system is used to provide detailed budget information which can be separated by fields such as appropriation, budget activity, and RMD for the OSD/OMB submission. The user' guide adds that all BSOs must submit Budgetary Object Classification System (BOCS) data for each appropriation for which they obligate funds and for which they submit budget justification (CACI International, 2015). Using PBIS, data was collected to include budgeted totals one and two-year in advance and actual totals for fiscal years (FY) 2007–2017. Since NAVSUP BSO (23) awards contracts and repair orders using NWCF-SM obligation authority one-two years in advance of the anticipated appropriated customer demand, the focus was on the budgeted funding requests for one and two-year in advance time frames.

The data consisted of reports for each year stipulated for the O&M,N and the procurement appropriations (APN, OPN, SCN, and WPN). Each appropriation report was then broken down into various BLIs and inflation category codes (ICC), as well as the BSOs providing the estimations. The reports also detailed the current year (CY) and budgeted year (BY) proposed totals as well as the prior year (PY) actual total values for each appropriation.

The *Department of the Navy (DoN) Budget Guidance Manual* defines the different fiscal years used in the PPBE process as PY, CY, and Budget Year One (BY1). PY data is based upon enacted appropriations, supplementals, and reprogramming action approved. Data is actual account information or actual dollar value as of November of each year. In addition, the manual explains that CY totals are based upon the amount appropriated by Congress adjusted for any proposed above or below threshold reprogramming actions, supplementals, rescission, transfers, or fact-of-life changes. The manual also explains that BY1 is broken down into three different submission processes:

- DoN submission: The Secretary of the Navy approves the POM or SPPs which are used to create the budget estimates for BY1. Approved programs will be fully funded using budget quality estimates. Pricing and program changes from the POM and from the president's budget for BY1 will be clearly identified and fully justified.
- OSD/OMB submission: Budget estimates for BY1 are based on guidance provided by OUSD(C), such as adjustments for pricing, feasibility, fact-of-life, and other adjustments made during the DoN review.
- President's Budget submission: Budget estimates for BY1 are based on the amounts approved by the president and by the SecDef as reflected in the RMDs. (OASN[FM&C], 2016)

The *Department of the Navy (DoN) Budget Guidance Manual* notes that the standard prices for DoN-managed items used to develop supply activity group sales projections are based on the latest actual prices, adjusted for inflation under the ICC codes (OASN[FM&C], 2016). Items managed by NAVSUP fall under ICC 412 (Navy Managed Supplies and Materials) and 503 (Navy Fund Equipment) OASN[FM&B], 2007)

In the data set, the BLIs that were analyzed were under the O&M,N appropriation and had a significant dollar and percentage difference between the proposed and actual budget totals for fiscal years 2007–2017. There was a range of approximately 60 various BLIs that were identified under the O&M,N appropriation. Some BLIs had greater significance due to the dollar difference associated with the BLI. For example, a BLI such as Fleet Air Training (1A2A) might have multiple BSOs associated with it that equate to millions of dollars, therefore contributing to a higher percentage difference since it is a bigger program. The inverse could occur with a BLI such as Junior ROTC (3C5L), which

is a smaller program with only one BSO. While Junior ROTC is a significant and meaningful program, it is not a multimillion-dollar program such as Fleet Air Training.

Additionally, there was another parameter other than dollar value and percentage difference that helped make the data more specific. The ICC was used to narrow down the data that was collected from PBIS. According to the PBIS user's guide, ICCs are "employed to divide object class code data by inflation categories generated by OSD" (CACI International, 2015, p. 8). The reason why NAVSUP is concerned with the 412 and 503 ICCs is because these are the ICC's used by NAVSUP to finance the Navy-managed material. The 412 and 503 ICC's fall under the O&M,N appropriation which is used to reimburse the NWCF-SM. For example, if Commander, U.S. Fleet Forces Command (USFF) wants to ensure that parts are on the shelf, they budget funds in 412 and 503 ICC lines of their O&M,N budget to indicate an intention to execute funds for this material with NAVSUP. NAVSUP would utilize the NWCF-SM to procure the material. USFF would pay NAVSUP utilizing the approved O&M,N appropriation.

By looking at a combination of the BLIs and ICCs, it can be determined quite quickly which entity is the biggest customer for NAVSUP, but even more specifically, which customer has a wider budget difference from dollar and percentage standpoints.

C. BUDGET DIFFERENCE ANALYSIS

When gathering data from PBIS for each appropriation, it is apparent that there is a difference between the planned and executed dollar amounts as shown in Figure 2. To determine what BLIs and BSOs had the most significant impact, a budget difference analysis was conducted for the total dollar values for the different appropriations that are associated with supply management for the years 2007–2017. A budget difference is a difference between the total amount budgeted or planned, and the actual amount incurred during the execution phase. The budget amount total, otherwise known as BY, is the baseline, which is submitted in the president's budget for the given fiscal year. The actual dollar amounts executed, otherwise known as PY, is subtracted from the BY to calculate the budget difference. If the value of the difference is negative, that indicates the president's budget was underbudgeted, and less money was expended during the execution phase than

what was budgeted. If the value of the difference is positive, that indicates the president's budget was overbudgeted, and more money was expended during the execution phase than what was budgeted.

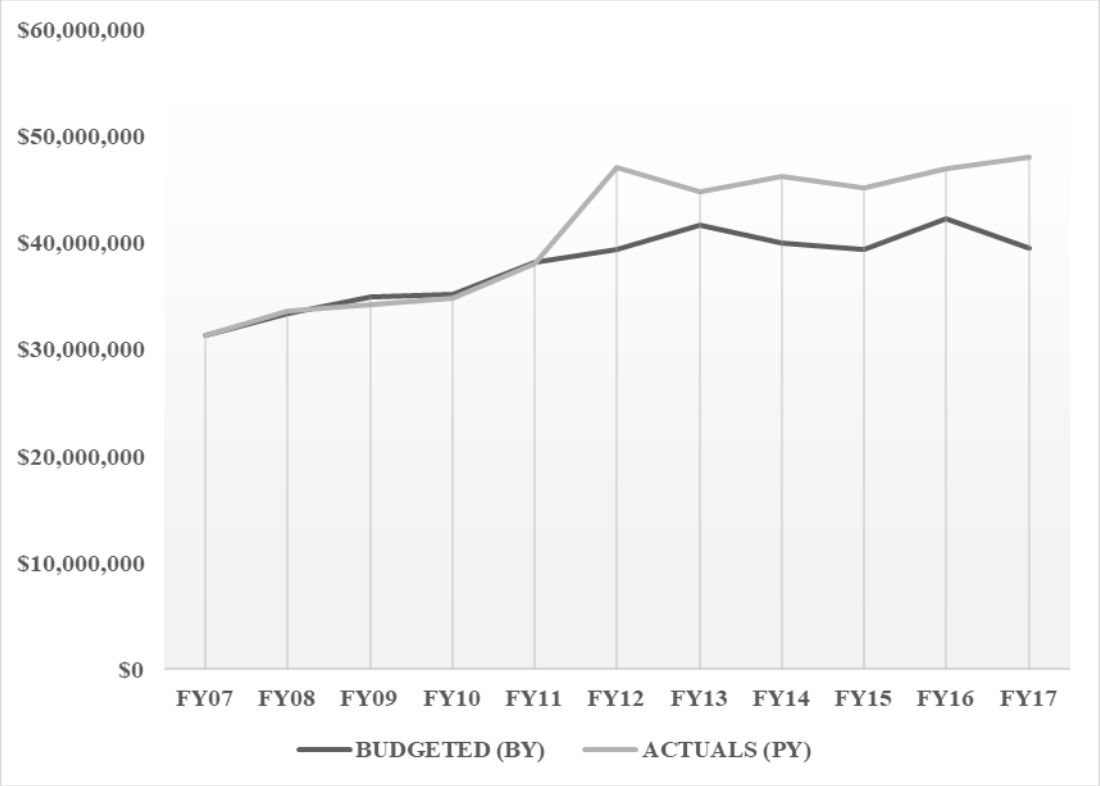

Figure 2. Budgeted (BY) vs. Actuals (PY), Operation and Maintenance, Navy ($ in Thousands). Adapted from PBIS (2015).

The average budget difference for the different appropriations analyzed was as followed: APN $723.475M; OPN $181.808M; SCN $696.309M, WPN $3.271M, and O&M,N $3.1B, as shown in Table 2 (Program Budget Information System [PBIS], 2015). Therefore, since O&M,N had a budget difference of $3.1B, this shows it was the highest contributor and would involve further analysis which will be discussed in this chapter.

Table 2. Descriptive Statistics for Appropriation Accounts.
Adapted from PBIS (2015).

Descriptive Statistics ($ in Thousands)										
	Mean		Median		Standard Deviation		Minimum		Maximum	
SCN	$696,309	4.38%	$289,354	2.27%	$1,001,703	6.52%	-$478,671	-4.04%	$2,106,841	12.69%
OPN	$181,808	2.53%	$13,210	0.24%	$646,385	10.30%	-$620,652	-11.17%	$1,414,231	20.54%
APN	$723,476	5.83%	$1,053,565	7.69%	$1,546,938	10.66%	$1,479,269	-8.25%	$2,994,254	23.49%
WPN	$3,271	0.09%	-$66,937	2.17%	$241,763	7.70%	-$345,533	-10.70%	$342,367	11.82%
O&M,N	$3,170,122	7.88%	$3,181,503	7.64%	$3,502,380	8.87%	-$690,816	-1.98%	$8,438,150	21.37%

1. O&M,N Budget Difference Analysis

The O&M,N appropriation funds the daily operating cost of the naval fleet (OASN[FM&B], 2019). To calculate the budget difference, data was obtained and analyzed from the BOCS report in PBIS for the budgeted and actuals totals for fiscal years 2007 to 2017. The budget difference was computed for each fiscal year, as shown in Table 3 (PBIS, 2015).

Table 3. Analysis of Budget Difference for Operation and Maintenance, Navy ($ in Thousands). Adapted from PBIS (2015).

YEAR	BUDGETED (BY)	APPROPRIATED (CY)	ACTUALS (PY)	DIFF BTWN BY AND CY		DIFF BTWN CY AND PY		DIFF BTWN BY AND PY*	
FY07	$31,330,942	$30,805,478	$31,233,818	-$525,464	-1.68%	$428,340	1.39%	**-$97,124**	**-0.31%**
FY08	$33,334,690	$33,022,299	$33,502,088	-$312,391	-0.94%	$479,789	1.45%	**$167,398**	**0.50%**
FY09	$34,857,111	$33,475,813	$34,166,295	-$1,381,298	-3.96%	$690,482	2.06%	**-$690,816**	**-1.98%**
FY10	$35,070,346	$34,670,737	$34,802,961	-$399,609	-1.14%	$132,224	0.38%	**-$267,385**	**-0.76%**
FY11	$38,134,308	$38,134,308	$38,029,776	$0	0.00%	-$104,532	-0.27%	**-$104,532**	**-0.27%**
FY12	$39,364,688	$38,120,821	$46,979,773	-$1,243,867	-3.16%	$8,858,952	23.24%	**$7,615,085**	**19.34%**
FY13	$41,606,943	$38,354,120	$44,788,446	-$3,252,823	-7.82%	$6,434,326	16.78%	**$3,181,503**	**7.65%**
FY14	$39,945,237	$44,314,536	$46,112,690	$4,369,299	10.94%	$1,798,154	4.06%	**$6,167,453**	**15.44%**
FY15	$39,316,857	$43,805,865	$45,068,219	$4,489,008	11.42%	$1,262,354	2.88%	**$5,751,362**	**14.63%**
FY16	$42,200,756	$45,951,699	$46,911,007	$3,750,943	8.89%	$959,308	2.09%	**$4,710,251**	**11.16%**
FY17	$39,483,581	$40,446,245	$47,921,731	$962,664	2.44%	$7,475,486	18.48%	**$8,438,150**	**21.37%**
Mean	$37,695,042	$38,281,993	$40,865,164	$586,951	1.36%	$2,583,171	6.59%	**$3,170,122**	**7.89%**
Median	$39,316,857	$38,134,308	$44,788,446	-$312,391	-0.94%	$959,308	2.09%	**$3,181,503**	**7.65%**

*Utilizing the data from Table 3, the average for the O&M,N budget difference is $3.170B.

For fiscal years 2007 and 2009 through 2011, the O&M,N budget was under budget, meaning the actual expenditure was less than expected. For fiscal years 2008 and 2012 through 2017, the O&M,N budget was over budget, meaning the actual expenditure was more than expected (PBIS, 2015).

The O&M,N appropriation is broken down into budget activities: Operating Forces, Mobilization, Training and Recruiting, and Administration and Service-wide Support. Each budget activity is further broken down into functions known as an activity group (AG) (OASN[FM&B], 2019). Each AG can then be further divided into budget line item (BLI).

2. BLI Budget Difference

Since the purpose of this study is to analyze the budget differences for ICCs 412 and 503, only the BLIs that showed a consistent trend of having the ICC 412 and 503 were considered. The determined BLIs are shown in Table 4 (OASN[FM&B], 2018).

Table 4. List of Determined Budget Lines Items. Adapted from OASN[FM&B], 2018).

Budget Activity 1- Operating Forces	
Budget Line Items	
Mission and Other Flight Operations	1A1A
Fleet Air Training	1A2A
Mission and Other Ship Operations	1B1B
Ship Operational Support and Training	1B2B
Combat Communications	1C1C
Equipment Maintenance	1C7C
Fleet Ballistic Missile	1D2D
Other Weapons Systems Support	1D7D
Budget Activity 2 – Mobilization	
Budget Line Items	
Ship Activation/Inactivation	2B2G
Expeditionary Health Services Systems	2C1H
Budget Activity 3 - Training and Recruiting	
Budget Line Items	
Specialized Skill Training	3B1K
Flight Training	3B2K

Budget Activity 4 - Administration and Service-wide Activities	
Budget Line Items	
Military Manpower & Personnel Mgt	4A4M
Other Personnel Support	4A5M
Service-wide Communications	4A6M

To calculate the BLI budget difference, data was obtained and analyzed utilizing the BOCS reports from PBIS that contained information on budgeted and actuals for fiscal years 2007 to 2017 as shown in Table 5 (PBIS, 2015). This process was replicated for all the determined BLIs.

Table 5. Yearly Comparison for BLI 1A1A. Adapted from PBIS (2015).

FY	BUDGETED (BY)	APPROPRIATED (CY)	ACTUALS (PY)	DIFF BTWN BY AND CY		DIFF BTWN CY AND PY		DIFF BTWN BY AND PY*	
FY07	$3,587,708	$3,397,117	$3,383,871	-$190,591	-5.31%	-$13,246	-0.39%	**-$203,837**	**-5.68%**
FY08	$3,607,384	$3,478,075	$3,471,496	-$129,309	-3.58%	-$6,579	-0.19%	**-$135,888**	**-3.77%**
FY09	$3,868,901	$3,490,183	$3,466,928	-$378,718	-9.79%	-$23,255	-0.67%	**-$401,973**	**-10.39%**
FY10	$3,814,000	$3,708,026	$3,563,544	-$105,974	-2.78%	-$144,482	-3.90%	**-$250,456**	**-6.57%**
FY11	$4,429,832	$4,429,832	$4,150,736	$0	0.00%	-$279,096	-6.30%	**-$279,096**	**-6.30%**
FY12	$4,762,887	$4,475,451	$5,513,964	-$287,436	-6.03%	$1,038,513	23.20%	**$751,077**	**15.77%**
FY13	$4,918,144	$4,918,144	$5,344,863	$0	0.00%	$426,719	8.68%	**$426,719**	**8.68%**
FY14	$4,952,522	$5,712,629	$4,972,221	$760,107	15.35%	-$740,408	-12.96%	**$19,699**	**0.40%**
FY15	$4,947,202	$5,306,012	$5,175,093	$358,810	7.25%	-$130,919	-2.47%	**$227,891**	**4.61%**
FY16	$4,940,365	$4,811,827	$4,999,243	-$128,538	-2.60%	$187,416	3.89%	**$58,878**	**1.19%**
FY17	$4,094,765	$4,502,269	$5,172,512	$407,504	9.95%	$670,243	14.89%	**$1,077,747**	**26.32%**
Mean	4356701	4384506	4474043	27805	0.22%	89537	2.16%	117342	2.21%
Median	4429832	4475451	4972221	-105974	-2.60%	-13246	-0.39%	19699	0.40%

The BLI that generated the most significant budget difference was determined by calculating the budget difference for each BLI. The BLI's that demonstrated the greatest budget difference are shown Table 6 (PBIS, 2015). A table with the budget differences for all the determined BLIs can be found in the appendix.

Table 6. Budget Difference for Determined Budget Line Items. Adapted from PBIS (2015).

BLIs ($ in Thousands)						
Year	**1A1A**		**1A2A**		**1B1B**	
FY07	-$203,837	-5.68%	-$26,728	-3.09%	$,4609	0.15%
FY08	-$135,888	-3.77%	-$3,845	-0.41%	-$119,468	-3.45%
FY09	-$401,973	-10.39%	-$58,637	-6.06%	-$539,253	-15.24%
FY10	-$250,456	-6.57%	$780	0.65%	-$72,411	-2.18%
FY11	-$279,096	-6.30%	$1,615,601	1986.11%	-$81,276	-2.20%
FY12	$751,077	15.77%	$33,404	1.89%	$1,393,669	36.48%
FY13	$426,719	8.68%	-$39,648	-2.10%	$538,352	11.49%
FY14	$19,699	0.40%	-$79,821	-4.37%	$1,161,102	29.89%
FY15	$227,891	4.61%	$39,896	2.42%	$1,149,789	29.98%
FY16	$58,878	1.19%	-$216,084	-11.80%	$702,749	16.39%
FY17	$1,077,747	26.32%	$53,657	3.12%	$1,279,626	36.42%

BLIs ($ in Thousands)						
Year	**1C1C**		**3B2K**		**4A6M**	
FY07	$199,989	62.87%	-$7,861	-1.85%	-$242,383	-30.35%
FY08	-$4,346	-0.77%	-$7,309	-1.54%	-$59,127	-10.21%
FY09	$8,150	1.29%	-$26,479	-5.13%	-$26,416	-6.94%
FY10	$13,000	2.16%	$80,847	6.37%	$109,631	37.59%
FY11	$25,007	4.07%	-$1,529,092	-99.41%	$126,655	37.00%
FY12	$128,118	21.95%	-$321	-3.55%	$18,263	3.41%
FY13	$89,745	14.48%	$1,693	31.03%	-$52,410	-14.43%
FY14	$120,484	17.18%	-$1,159	-12.47%	$8,213	2.59%
FY15	$84,834	11.97%	-$292	-3.54%	$12,881	3.79%
FY16	$53,763	7.63%	-$293	-3.59%	$29,104	8.68%
FY17	$81,300	14.55%	$3,862	72.73%	$207,760	149.00%

To identify which BLI had the most significant budget difference per fiscal year, a descriptive analysis was conducted for each year, as shown in Table 7 (PBIS, 2015). The descriptive analysis of the budget difference provides a summary of the standard variation for each year. The BLI outliers were identified by using low and high parameters. Any BLI that fell outside of these parameters were considered outliers and required further analysis. These outliers are discussed in subsequent chapters.

Table 7. Descriptive Statistics for Determined Budget Line Items. Adapted from PBIS (2015).

	Fiscal Year ($ in Thousands)										
Descriptive Statistics	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Mean	-$23,508	-$25,975	-$71,496	-$7,779	-$9,089	$157,605	$52,113	$83,361	$94,892	$43,632	$173,439
Standard Error	$25,489	$11,626	$42,786	$20,527	$155,064	$101,335	$46,780	$77,741	$77,399	$49,861	$107,121
Median	-$9,424	-$7,309	-$7,772	$5,386	-$387	$10,123	-$18,616	$173	$2,588	$2,304	$7,480
Standard Deviation	$98,719	$45,029	$165,710	$79,502	$600,560	$392,469	$181,177	$301,091	$299,764	$193,110	$414,879
Range	$442,372	$152,515	$566,915	$360,087	$3,144,693	$1,425,518	$610,238	$1,240,923	$1,215,977	$918,833	$1,348,426
Minimum	-$242,383	-$135,888	-$539,253	-$250,456	-$1,529,092	-$31,849	-$71,886	-$79,821	-$66,188	-$216,084	-$68,800
Maximum	$199,989	$16,627	$27,662	$109,631	$1,615,601	$1,393,669	$538,352	$1,161,102	$1,149,789	$702,749	$1,279,626
Sum	-$352,627	-$389,622	-$1,072,437	-$116,686	-$136,329	$2,364,079	$781,695	$1,250,414	$1,423,387	$654,474	$2,601,587
Low Limit*	-$122,227	-$71,003	-$237,206	-$87,281	-$609,648	-$234,863	-$129,064	-$217,730	-$204,872	-$149,478	-$241,440
High Limit**	$75,210	$19,054	$94,214	$71,723	$591,471	$550,074	$233,290	$384,452	$394,657	$236,741	$588,318

* Low value was the computed difference between the mean and one standard deviation.

** High value was the computed sum of the mean and one standard deviation.

Utilizing the low and high range described previously, the BLIs considered outliers, requiring further analysis, are shown in Table 8 (PBIS, 2015).

Table 8. Budget Line Item Outliers. Adapted from PBIS (2015).

BUDGET LINE ITEMS ($ in Thousands)			
FY07	**1A1A**	**1C1C**	**4A6M**
	-$203,837	$199,989	-$242,383
FY08	**1A1A**	**1B1B**	
	-$135,888	-$119,468	
FY09	**1A1A**	**1B1B**	
	-$401,973	-$539,253	
FY10	**1A1A**	**3B2K**	**4A6M**
	-$250,456	$80,847	$109,631
FY11	**1A2A**	**3B2K**	
	$1,615,601	-$1,529,092	
FY12	**1A1A**	**1B1B**	
	$751,077	$1,393,669	
FY13	**1A1A**	**1B1B**	
	$426,719	$538,352	
FY14	**1B1B**		
	$1,161,102		
FY15	**1B1B**		
	$1,149,789		
FY16	**1A2A**	**1B1B**	
	-$216,084	$702,749	
FY17	**1A1A**	**1B1B**	
	$1,077,747	$1,279,626	

Average Budget Difference for Determined Budget Line Items.

D. INFLATION CATEGORY CODE ANALYSIS

All the BLI's deemed as outliers were broken down into ICCs. The focus on this study was on ICCs 412 and 503, therefore only the BLI's associated with these ICCs were analyzed. Subsequently, the ICCs 412 and 503 were divided into their respective BSOs to see which BSO contributed most to the budget difference. An example of how this analysis was conducted is shown in Table 9 (PBIS, 2015).

Table 9. Inflation Category Codes 412 and 503 Analysis.
Adapted from PBIS (2015).

FY 2017 1B1B							Difference Between Budgeted and Actuals
ICC	BSO	Budgeted	BSO	Appropriated	BSO	Actuals	
412	60	$9,449	60	$17,278	60	$51,762	$42,313
	70	$40,582	70	$48,109	70	$144,783	$104,201
503	60	$77,419	60	$100,511	60	$288,867	$211,448
	70	$82,531	70	$147,727	70	$177,809	$95,278

After concluding the analysis for the BLIs identified, the BSOs that continually generated the highest budget differences were Commander, U.S. Fleet Forces (60), and Commander, U.S. Pacific Fleet (70) (PBIS, 2015). This would be expected, as these are the BSOs to the operational fleet that are the overall largest appropriated customers of the 412 and 503 ICCs.

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IV. DATA ANALYSIS

The purpose of this chapter is to analyze the BLIs that demonstrated the most significant budget difference for years 2007–2014, which were the BLI for Mission and Other Flight Operations (1A1A), and the BLI for Mission and Other Ship Operations (1B1B). To conduct this analysis, the Budget Estimates Justification of Estimates Reports were utilized to collect the performance criteria used to determine the estimated dollar values submitted to Congress as the proposed budget. These reports were also used to obtain the actual performance criteria that generated the actual dollar values during the execution phase.

A. BLI 1A1A

The *Department of the Navy Fiscal Year (FY) 2008/2009 Budget Estimates. Justification of Estimates, February 2007, Operation and Maintenance, Navy* report explains that the Mission and Other Flight Operations sub-activity group provides funding for the flying hours programmed for the Navy and Marine Corps aviation force. The flying hours program is used to maintain the mission readiness of the Navy and Marine Corps aviation force ensuring they are ready to perform their essential tasks to support national objectives. This report also notes that this sub-activity group also provides funding for the transportation of the support equipment, support staff and personnel as well as the training systems, that aid in training and the accomplishment of set primary missions. (OASN[FM&B], 2007).

As shown in Figure 3, the 1A1A has demonstrated a budget difference for all the years from 2007–2017, but the greatest budget difference were seen for fiscal years 2007–2010, 2012–2013, and 2017 for which the budget difference was above the low and high parameters computed in the BLI budget difference analysis section. (PBIS, 2015)

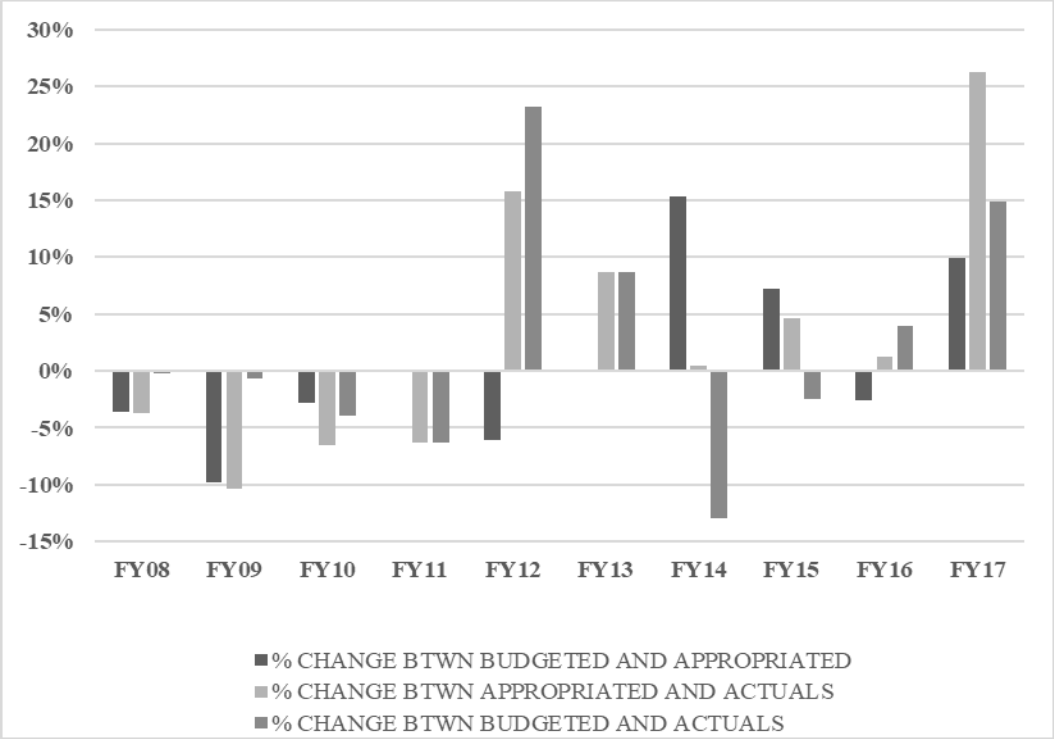

Figure 3. Percentage Change for 1A1A. Adapted from PBIS (2015).

For 2007, the 1A1A budget was -5.68% under budget, where the actual expenditure of $3,338,871K was less than the planned $3,587,708K, as shown in Table 10 (PBIS, 2015)

The estimates for FY 2007 include a force structure of 10 active carrier air wings, 2,132 crews, and 1,550 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 588,606 flight hours (OASN[FM&B], 2006).

According to the *Department of the Navy Fiscal Year (FY) 2009 Budget Estimates. Justifications of Estimates, February 2008, Operation and Maintenance, Navy* (OASN[FM&B], 2008), the actuals for FY 2007 include a force structure of 10 active carrier air wings, 2,144 crews, and 1,546 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 733,066 flight hours (OASN[FM&B], 2008).

Table 10. Yearly Comparison for BLI 1A1A ($ in Thousands). Adapted from PBIS (2015).

FY	BUDGETED (BY)	APPROPRIATED (CY)	ACTUALS (PY)	DIFF BTWN BY AND CY		DIFF BTWN CY AND PY		DIFF BTWN BY AND PY*	
FY07	$3,587,708	$3,397,117	$3,383,871	-$190,591	-5.31%	-$13,246	-0.39%	**-$203,837**	**-5.68%**
FY08	$3,607,384	$3,478,075	$3,471,496	-$129,309	-3.58%	-$6,579	-0.19%	**-$135,888**	**-3.77%**
FY09	$3,868,901	$3,490,183	$3,466,928	-$378,718	-9.79%	-$23,255	-0.67%	**-$401,973**	**-10.39%**
FY10	$3,814,000	$3,708,026	$3,563,544	-$105,974	-2.78%	-$144,482	-3.90%	**-$250,456**	**-6.57%**
FY11	$4,429,832	$4,429,832	$4,150,736	$0	0.00%	-$279,096	-6.30%	**-$279,096**	**-6.30%**
FY12	$4,762,887	$4,475,451	$5,513,964	-$287,436	-6.03%	$1,038,513	23.20%	**$751,077**	**15.77%**
FY13	$4,918,144	$4,918,144	$5,344,863	$0	0.00%	$426,719	8.68%	**$426,719**	**8.68%**
FY14	$4,952,522	$5,712,629	$4,972,221	$760,107	15.35%	-$740,408	-12.96%	**$19,699**	**0.40%**
FY15	$4,947,202	$5,306,012	$5,175,093	$358,810	7.25%	-$130,919	-2.47%	**$227,891**	**4.61%**
FY16	$4,940,365	$4,811,827	$4,999,243	-$128,538	-2.60%	$187,416	3.89%	**$58,878**	**1.19%**
FY17	$4,094,765	$4,502,269	$5,172,512	$407,504	9.95%	$670,243	14.89%	**$1,077,747**	**26.32%**
Mean	$4,356,701	$4,384,506	$4,474,043	$27,805	0.22%	$89,537	2.16%	**$117,342**	**2.21%**
Median	$4,429,832	$4,475,451	$4,972,221	-$105,974	-2.60%	-$13,246	-0.39%	**$19,699**	**0.40%**

*Analyzing the data in Table 10, the median budget difference for 1A1A is $19.7M.

Utilizing the data shown in Figure 4, the BSO that had the greatest contribution to the budget difference for ICC 412 was Commander, U.S. Fleet Forces (60), and for ICC 503, it was Commander, U.S. Pacific Fleet (70) (PBIS, 2015).

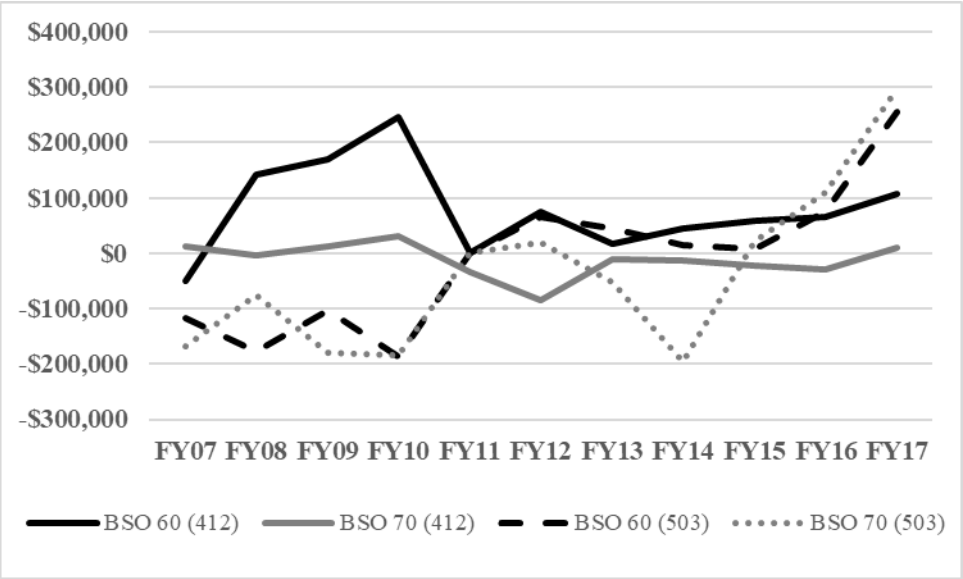

Figure 4. 1A1A Budget Difference for Inflation Category Codes 412 and 503 ($ in Thousands). Adapted from PBIS (2015).

For 2008, the 1A1A budget was -3.77% under budget, where the actual expenditure of $3,471,496K was less than the planned $3,607,384K, as shown in Table 10 (PBIS, 2015).

The estimates for FY 2008 include a force structure of 10 active carrier air wings, 2,116 crews, and 1,535 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 598,143 flight hours. (OASN[FM&B], 2007)

According to the *Department of the Navy Fiscal Year (FY) 2010 Budget Estimates. Justifications of Estimates, May 2009, Operation and Maintenance, Navy* (OASN[FM&B], 2009), the actuals for FY 2008 include a force structure of 10 active carrier air wings, 2,120 crews, and 1,627 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 696,168 flight hours (OASN[FM&B], 2009).

Utilizing the data shown in Figure 4, the BSO that had the greatest contribution to the budget difference for ICC 412 and 503 was Commander, U.S. Fleet Forces (60) (PBIS, 2015).

For 2009, the 1A1A budget was -10.39% under budget, where the actual expenditure of $3,466,928K was less than the planned $3,868,901K, as shown in Table 10 (PBIS, 2015).

The estimates for FY 2009 include a force structure of 10 active carrier air wings, 2,119 crews, and 1,607 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 608,740 flight hours (OASN[FM&B], 2008).

According to the *Department of the Navy Fiscal Year (FY) 2011 Budget Estimates. Justifications of Estimates, February 2010, Operation and Maintenance, Navy* (OASN[FM&B], 2010), the actuals for FY 2008 include a force structure of 10 active carrier air wings, 2,163 crews, and 1,843 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 648,072 flight hours (OASN[FM&B], 2010).

Utilizing the data shown in Figure 4, the BSO that had the greatest contribution to the budget difference for ICC 412 was Commander, U.S. Fleet Forces (60), and for ICC 503, it was Commander, U.S. Pacific Fleet (70) (PBIS, 2015).

For 2010, the 1A1A budget was -6.57% under budget, where the actual expenditure of $3,563,544K was less than the planned $3,814,000K, as shown in Table 10 (PBIS, 2015).

The estimates for FY 2010 include a force structure of 10 active carrier air wings, 2,215 crews, and 1,850 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 623,933 flight hours (OASN[FM&B], 2009)

According to the *Department of the Navy Fiscal Year (FY) 2012 Budget Estimates. Justifications of Estimates, February 2011, Operation and Maintenance, Navy* (OASN[FM&B], 2011), the actuals for FY 2010 include a force structure of 10 active carrier air wings, 2,288 crews, and 1,835 tactical primary authorized aircraft. The

performance criteria used to calculate the estimates were 675,738 flight hours (OASN[FM&B], 2011).

Utilizing the data shown in Figure 4, the BSO that had the greatest contribution to the budget difference for ICC 412 was Commander, U.S. Fleet Forces (60), and for ICC 503, it was Commander, U.S. Fleet Force (60) (PBIS, 2015).

For FY 2012, the 1A1A budget was 8.67% over budget, where the actual expenditure of $5,344,863K was more than the planned $4,918,144K, as shown in Table 10 (PBIS, 2015).

The estimates for FY 2012 include a force structure of 10 active carrier air wings, 2,414 crews, and 1,907 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 611,284 flight hours. (OASN[FM&B], 2011)

According to *the Department of the Navy Fiscal Year (FY) 2014 Budget Estimates. Justifications of Estimates, April 2013, Operation and Maintenance, Navy* (OASN[FM&B], 2013), the actuals for FY 2012 include a force structure of 10 active carrier air wings, 2,421 crews, and 1,893 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 686,039 flight hours (OASN[FM&B], 2013).

Utilizing the data shown in Figure 4, the BSO that had the greatest contribution to the budget difference for ICC 412 was Commander, U.S. Pacific Fleet (70), and for ICC 503, it was Commander, U.S. Fleet Force (60) (PBIS, 2015).

For FY 2013 the 1A1A budget was 8.67% over budget, where the actual expenditure of $5,344,863K was more than the planned $4,918,144K, as shown in Table 10 (PBIS, 2015)

The estimates for FY 2013 include a force structure of 10 active carrier air wings, 2,354 crews, and 1,913 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 615,086 flight hours (OASN[FM&B], 2012).

According to the *Department of the Navy Fiscal Year (FY) 2015 Budget Estimates. Justifications of Estimates, March 2014, Operation and Maintenance, Navy*

(OASN[FM&B], 2014), the actuals for FY 2013 include a force structure of 10 active carrier air wings, 2,357 crews, and 1,874 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 580,827 flight hours (OASN[FM&B], 2014).

Utilizing the data shown in Figure 4, the BSO that had the greatest contribution to the budget difference for ICC 412 and 503 was Commander, U.S. Fleet Forces (60) (PBIS, 2015).

For FY 2017 the 1A1A budget was 26.32% over budget, where the actual expenditure of $5,172,512K was more than the planned $4,094,765K, as shown in Table 10 (PBIS, 2015).

The estimates for FY 2017 include a force structure of 9 active carrier air wings, 2,480 crews, and 2,007 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 556,518 flight hours (OASN[FM&B]), 2016).

According to the *Department of the Navy Fiscal Year (FY) 2019 Budget Estimates. Justifications of Estimates, February 2018, Operation and Maintenance, Navy* (OASN[FM&B]), 2018), the actuals for FY 2013 include a force structure of 9 active carrier air wings, 2,480 crews, and 1,972 tactical primary authorized aircraft. The performance criteria used to calculate the estimates were 580,827 flight hours (OASN[FM&B]), 2018).

Utilizing the data shown in Figure 4, the BSO that had the greatest contribution to the budget difference for ICC 412 was Commander, U.S. Fleet Forces (60), and for ICC 503, it was Commander, U.S. Pacific Fleet (70) (PBIS, 2015).

B. BLI 1B1B

The *Department of the Navy Fiscal Year (FY) 2008/2009 Budget Estimates. Justification of Estimates, February 2007, Operation and Maintenance, Navy* report explains that the Mission and Other Ship Operations (1B1B) sub-activity group funds operations of the deployed and non-deployed combat-ready warships and its supporting forces. These day-to-day ships operating cost are required to perform missions essential to

support national objectives. The report also notes that this sub-activity funds the training units, pier side and port services, maintenance, and administrative cost (OASN[FM&B], 2019).

As shown in Figure 5, the 1B1B has demonstrated a budget difference for all the years from 2007–2017, but the greatest budget differences were seen for fiscal years 2008–2009, 2012–2017, for which the budget difference was above the low and high parameters computed in the BLI budget difference analysis section (PBIS, 2015).

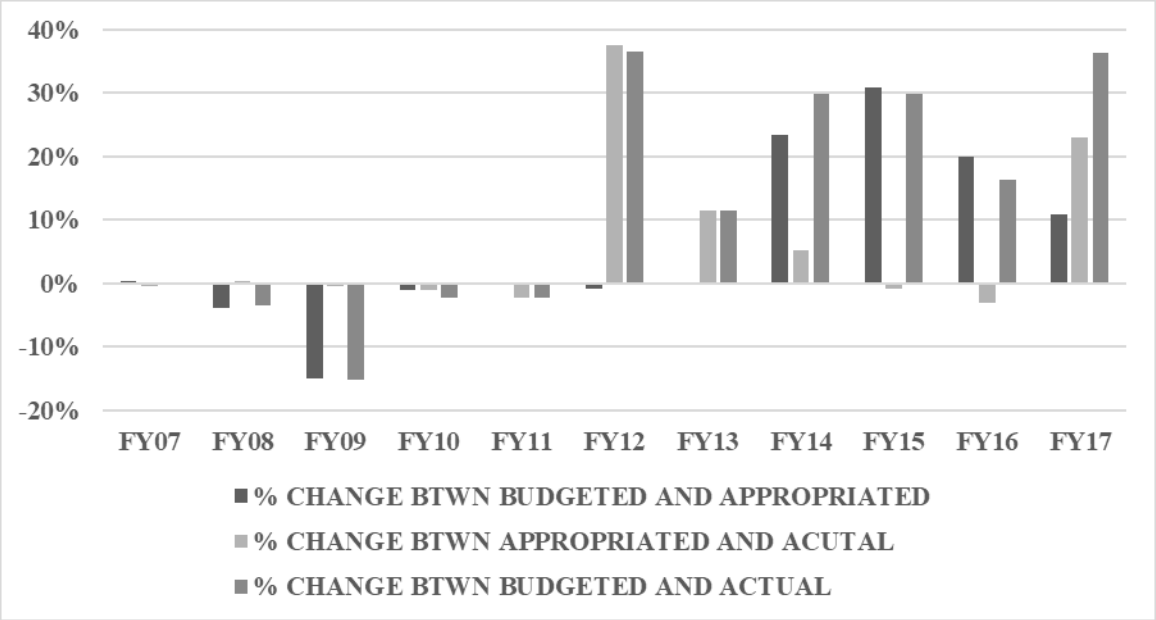

Figure 5. Percentage Change for 1B1B. Adapted from PBIS (2015).

For FY 2008, the 1B1B budget was -3.45% under budget, where the actual expenditure of $3,344,222K was less than the planned $3,463,690K, as shown in Table 11 (PBIS, 2015).

The estimates for FY 2008 include a force structure of 286 battle force ships: 11 aircraft carriers, 111 surface combatants, 32 amphibious ships, 52 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 31 combat logistics ships, 14 mine warfare ships, and 17 support ships. The performance criteria used to

calculate the estimates were 1,727 ship-steaming-days per quarter for deployed units and 3,963 for non-deployed units (OASN[FM&B], 2007).

According to the *Department of the Navy Fiscal Year (FY) 2010 Budget Estimates. Justification of Estimates, May 2009, Operation and Maintenance, Navy* (OASN[FM&B], 2009), the actuals for FY 2008 include a force The force structure of 285 battle force ships: 11 aircraft carriers, 107 surface combatants, 32 amphibious ships, 53 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 30 combat logistics ships, 14 mine warfare ships, and 17 support ships. The actual performance criteria were 2,088 ship-steaming-days per quarter for deployed units and 3,214 for non-deployed units (OASN[FM&B], 2009).

Table 11. Yearly Comparison for 1B1B ($ in Thousands). Adapted from PBIS (2015).

FY	BUDGETED (BY)	APPROPRIATED (CY)	ACTUALS (PY)	DIFF BTWN BY AND CY		DIFF BTW CY AND PY		DIFF BTW BY AND PY*	
FY07	$3,166,923	$3,182,487	$3,171,532	$15,564	0.49%	-$10,955	-0.34%	**$4,609**	**0.15%**
FY08	$3,463,690	$3,330,108	$3,344,222	-$133,582	-3.86%	$14,114	0.42%	**-$119,468**	**-3.45%**
FY09	$3538,113	$3,012,502	$2,998,860	-$525,611	14.86%	-$13,642	-0.45%	**-$539,253**	**15.24%**
FY10	$3,320,222	$3,284,339	$3,247,811	-$35,883	-1.08%	-$36,528	-1.11%	**-$72,411**	**-2.18%**
FY11	$3,696,913	$3,696,913	$3,615,637	$0	0.00%	-$81,276	-2.20%	**-$81,276**	**-2.20%**
FY12	$3,820,186	$3,791,577	$5,213,855	-$28,609	-0.75%	$1,422,278	37.51%	**$1,393,669**	**36.48%**
FY13	$4,686,535	$4,686,535	$5,224,887	$0	0.00%	$538,352	11.49%	**$538,352**	**11.49%**
FY14	$3,884,836	$4,791,581	$5,045,938	$906,745	23.34%	$254,357	5.31%	**$1,161,102**	**29.89%**
FY15	$3,835,372	$5,023,599	$4,985,161	$1,188,227	30.98%	-$38,438	-0.77%	**$1,149,789**	**29.98%**
FY16	$4,287,658	$5,145,195	$4,990,407	$857,537	20.00%	-$154,788	-3.01%	**$702,749**	**16.39%**
FY17	$3,513,083	$3,896,133	$4,792,709	$383,050	10.90%	$896,576	23.01%	**$1,279,626**	**36.42%**
Mean	$3,746,685	$3,985,543	$4,239,184	$238,858	5.92%	$253,641	6.35%	**$492,499**	**12.52%**
Median	$3,696,913	$3,791,577	$4,792,709	$0	5.92%	-$10,955	-0.34%	**$538,352**	**11.49%**

*Analyzing the data from Table 11, the dollar delta median for 1B1B is $538.3M.

Utilizing the data shown in Figure 6, the BSO that had the greatest contribution to the budget difference for ICC 412 was Commander, U.S. Pacific Fleet (70), and for ICC 503, it was Commander, U.S. Fleet Force (60) (PBIS, 2015).

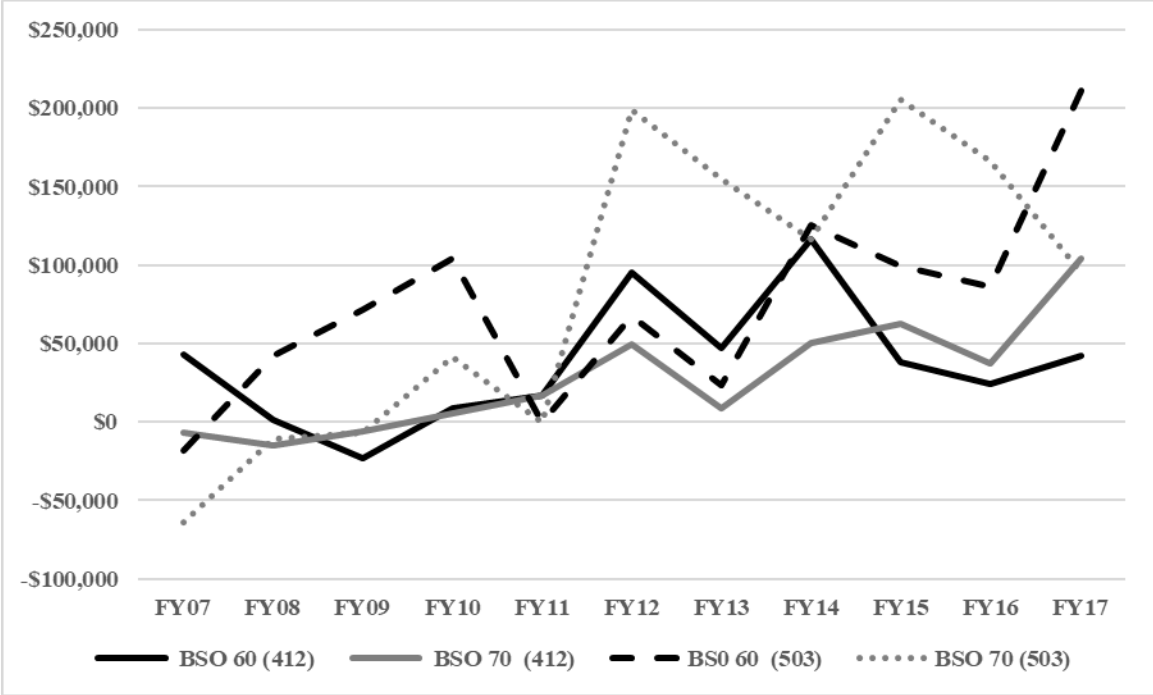

Figure 6. 1B1B Budget Difference for Inflation Category Codes 412 and 503 ($ in Thousands). Adapted from PBIS (2015).

For FY 2009, the 1B1B budget was 15.24% under budget, where the actual expenditure of $2,998,860K was less than the planned $3,538,113K, as shown in Table 11 (PBIS, 2015).

The estimates for FY 2009 include a force structure of 286 battle force ships: 11 aircraft carriers, 111 surface combatants, 31 amphibious ships, 53 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 31 combat logistics ships, 14 mine warfare ships, and 17 support ships. The performance criteria used to calculate the estimates were 1,936 ship-steaming-days per quarter for deployed units and 4,043 for non-deployed units (OASN[FM&B], 2008).

According to the *Department of the Navy Fiscal Year (FY) 2011 Budget Estimates. Justification of Estimates, February 2010, Operation and Maintenance, Navy* (OASN[FM&B], 2010), the actuals for FY 2009 include a force structure of 285 battle force ships: 11 aircraft carriers, 110 surface combatants, 31 amphibious ships, 53 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 31 combat logistics ships, 14 mine warfare ships, and 17 support ships. The actual performance criteria were 4,788 ship-steaming-days per quarter for deployed units and 2,688 for non-deployed units (OASN[FM&B], 2010).

Utilizing the data shown in Figure 6, the BSO that had the greatest contribution to the budget difference for ICC 412 and 503 was Commander, U.S. Fleet Force (60) (PBIS, 2015).

For FY 2012, the 1B1B budget was 36.48% over budget, where the actual expenditure of $5,213,855K was more than the planned $3,820,186K, as shown in Table 11 (PBIS, 2015).

The estimates for FY 2012 include a force structure of 288 battle force ships: 11 aircraft carriers, 111 surface combatants, 30 amphibious ships, 54 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 31 combat logistics ships, 14 mine warfare ships, and 19 support ships. The performance criteria used to calculate the estimates were 3,545 ship-steaming-days per quarter for deployed units and 2,568 for non-deployed units (OASN[FM&B], 2011).

According to the *Department of the Navy Fiscal Year (FY) 2014 Budget Estimates. Justification of Estimates, April 2013, Operation and Maintenance, Navy* (OASN[FM&B], 2013), the actuals for FY 2012 include a force structure of 285 battle force ships: 11 aircraft carriers, 110 surface combatants, 31 amphibious ships, 53 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 31 combat logistics ships, 14 mine warfare ships, and 17 support ships. The actual performance criteria were 4,788 ship-steaming-days per quarter for deployed units and 2,688 for non-deployed units (OASN[FM&B], 2013).

Utilizing the data shown in Figure 6, the BSO that had the greatest contribution to the budget difference for ICC 412 was Commander, U.S. Fleet Force (60), and for ICC 503, it was Commander, U.S. Pacific Fleet (70) (PBIS, 2015).

For FY 2013, the 1B1B budget was 11.49% over budget, where the actual expenditure of $5,224,887K was more than the planned $4,686,535K, as shown in Table 11 (PBIS, 2015).

The estimates for FY 2013 include a force structure of 284 battle force ships: 10 aircraft carriers, 101 surface combatants, 31 amphibious ships, 55 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 32 combat logistics ships, 14 mine warfare ships, and 23 support ships. The performance criteria used to calculate the estimates were 3,832 ship-steaming-days per quarter for deployed units and 3,055 for non-deployed units (OASN[FM&B], 2012).

According to the *Department of the Navy Fiscal Year (FY) 2015 Budget Estimates. Justification of Estimates, March 2014, Operation and Maintenance, Navy* (OASN[FM&B], 2015), actuals for FY 2013 include a force structure of 284 battle force ships: 10 aircraft carriers, 105 surface combatants, 30 amphibious ships, 54 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 32 combat logistics ships, 13 mine warfare ships, and 15 support ships. The actual performance criteria were 5,957 ship-steaming-days per quarter for deployed units and 3,695 for non-deployed units (OASN[FM&B], 2015).

Utilizing the data shown in Figure 6, the BSO that had the greatest contribution to the budget difference for ICC 412 and 503 was Commander, U.S. Fleet Force (60) (PBIS, 2015).

For FY 2014, the 1B1B budget was 29.89% over budget, where the actual expenditure of $5,045,938K was more than the planned $3,884,836K, as shown in Table 11 (PBIS, 2015).

The estimates for FY 2014 include a force structure of 273 battle force ships: 10 aircraft carriers, 92 surface combatants, 29 amphibious ships, 55 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 31 combat logistics ships, 12 mine warfare ships, and 26 support ships. The performance criteria used to calculate the

estimates were 3,127 ship-steaming-days per quarter for deployed units and 1,448 for non-deployed units (OASN[FM&B], 2013).

According to the *Department of the Navy Fiscal Year (FY) 2016 Budget Estimates. Justification of Estimates, February 2015, Operation and Maintenance, Navy* (OASN[FM&B], 2015), actuals for FY 2014 include a force structure of 281 battle force ships: 10 aircraft carriers, 98 surface combatants, 31 amphibious ships, 55 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 30 combat logistics ships, 12 mine warfare ships, and 27 support ships. The actual performance criteria were 3,894 ship-steaming-days per quarter for deployed units and 2,755 for non-deployed units (OASN[FM&B], 2015).

Utilizing the data shown in Figure 6, the BSO that had the greatest contribution to the budget difference for ICC 412 and 503 was Commander, U.S. Fleet Force (60) (PBIS, 2015).

For FY 2015, the 1B1B budget was 29.98% over budget, where the actual expenditure of $4,985,161K was more than the planned $3,835,372K, as shown in Table 11 (PBIS, 2015).

The estimates for FY 2015 include a force structure of 271 battleship force: 10 aircraft carriers, 93 surface combatants, 30 amphibious ships, 54 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 29 combat logistics ships, 8 mine warfare ships, 19 support ships and 10 Non-Battle Force Ships (Patrol Crafts). The performance criteria used to calculate the estimates were 3,453 ship-steaming-days per quarter for deployed units and 2,197 for non-deployed units (OASN[FM&B], 2014).

According to the *Department of the Navy Fiscal Year (FY) 2017 Budget Estimates. Justification of Estimates, February 2016, Operation and Maintenance, Navy* (OASN[FM&B], 2016), actuals for FY 2015 include a force structure of 271 battle force ships: 10 aircraft carriers, 100 surface combatants, 30 amphibious ships, 54 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 30 combat logistics ships, 0 mine warfare ships, and 29 support ships and 0 Non-Battle Forces Ships (Patrol Control) (OASN[FM&B], 2016).

Utilizing the data shown in Figure 6, the BSO that had the greatest contribution to the budget difference for ICC 412 and 503 was Commander, U.S. Pacific Fleet (70) (PBIS, 2015).

For FY 2016, the 1B1B budget was 16.39% over budget, where the actual expenditure of $4,990,407K was more than the planned $4,287,658K, as shown in Table 11 (PBIS, 2015).

The estimates for FY 2016 include a force structure of 282 battleship force: 11 aircraft carriers, 98 surface combatants, 31 amphibious ships, 53 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 29 combat logistics ships,11 mine warfare ships, 31 support ships. The performance criteria used to calculate the estimates were 3,654 ship-steaming-days per quarter for deployed units and 1,980 for non-deployed units (OASN[FM&B], 2015).

According to the *Department of the Navy Fiscal Year (FY) 2018 Budget Estimates. Justification of Estimates, May 2017, Operation and Maintenance, Navy* (OASN[FM&B], 2017), actuals for FY 2016 include a force structure of 275 battle force ships: 10 aircraft carriers, 104 surface combatants, 31 amphibious ships, 52 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 29 combat logistics ships, 0 mine warfare ships, and 31 support ships and 0 Non-Battle Forces Ships (Patrol Control). The actual performance criteria are 3,899 ship-steaming-days per quarter for deployed units and 3,124 for non-deployed units (OASN[FM&B], 2017).

Utilizing the data shown in Figure 6, the BSO that had the greatest contribution to the budget difference for ICC 412 and 503 was Commander, U.S. Pacific Fleet (70), (PBIS, 2015).

For FY 2017 the 1B1B budget was 36.42% over budget, where the actual expenditure of $4,792,709K was more than the planned $3,513,083K, as shown in Table 11 (PBIS, 2015).

The estimates for FY 2017 include a force structure of 287 battleship force: 11 aircraft carriers, 115 surface combatants, 32 amphibious ships, 52 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 29 combat logistics ships, 0 mine warfare ships, 32 support ships. The performance criteria used to calculate

the estimates were 3,526 ship-steaming-days per quarter for deployed units and 2,166 for non-deployed units (OASN[FM&B], 2016).

According to the *Department of the Navy Fiscal Year (FY) 2019 Budget Estimates. Justification of Estimates, February 2018, Operation and Maintenance, Navy* (OASN[FM&B], 2018), actuals for FY 2017 include a force structure of 279 battle force ships: 11 aircraft carriers, 109 surface combatants, 32 amphibious ships, 51 nuclear attack submarines, 14 ballistic missile submarines, 4 missile submarines, 29 combat logistics ships, 0 mine warfare ships, and 30 support ships. The actual performance criteria were 3,938 ship-steaming-days per quarter for deployed units and 2,661 for non-deployed unit (OASN[FM&B], 2018).

Utilizing the data shown in Figure 6, the BSO that had the greatest contribution to the budget difference for ICC 412 was Commander, U.S. Pacific Fleet (70), and for ICC 503, it was Commander, U.S. Fleet Forces (60) (PBIS, 2015).

V. RECOMMENDATIONS AND CONCLUSION

The requirement of submitting a budget to Congress two years in advance of execution impacts the ability of providers such as NAVSUP to conduct their mission properly. NAVSUP's mission is to ensure parts and services are readily available upon the needs of the customers. NAVSUP uses demand signals from customers and forecasting model to determine the quantities to procure in order to have them readily available. The planning cycle of the PPBE process is a crucial stage for NAVSUP since this is where the requirements and demands from the customers are determined, and procured quantities are considered. With the everyday global environment and its constant changes, it is no surprise that there is a difference between the planned and executed budgets, affecting the supply management functions provided by NAVSUP.

The primary purpose of this research was to determine what appropriation had the highest significant budget difference between the NWCF-SM Obligation Authority and the funding appropriated by the customers during the execution phase, significantly impacting NAVSUP's mission and materiel readiness.

A. PRIMARY RESEARCH QUESTION

What appropriations have the highest significant budget difference between the NWCF-SM Obligation Authority and the funding appropriated by the customers during the execution phase?

Since O&M,N had a budget difference of $3.1B (PBIS, 2015), this shows it is the highest contributor. While analyzing the data collected for FY 2007–2017 for the procurement appropriation: SCN, APN, WPN, OPN and O&M,N appropriation, the highest significant budget difference was seen for the O&M,N appropriation, as discussed in Chapter III section C.

B. SECONDARY QUESTIONS

What changes are there in the customers' funding between buy-in and buy-out, and what are the reasons for the changes (e.g., facts of life, schedule changes, funds reallocation to higher priority programs)?

There are various changes that affect the customers' funding between the buy-in and buy-out, variables such as the number flight hours, the size of the battle force, number of tactical primary authorized aircrafts, crew size, number of steaming days, major maintenance phases, and operation tempo (OPTEMPO). These changes are discussed in Chapter IV.

To generate the estimates used during the planning of the budget, certain assumptions are determined for each variable — any changes in the assumptions used to play a role in generating the budget difference. As discussed in Chapter IV, the parameters used to generate the estimates for the BLI 1A1A were the number of tactical primary authorized aircraft and the flight-hours. In FY 2012 the assumption was 611,284 flight-hours would be flown, and 1,907 tactical primary authorized aircraft would be used (OASN[FM&B], 2011), but 686,039 flight-hours were flown and only 1,893 tactical primary authorized aircraft were used (OASN[FM&B], 2013). This change in the assumption from 611,284 (OASN[FM&B], 2011) to 686,039 (OASN[FM&B], 2013) flight-hours impacted the budget for 1A1A for FY2012 and contributed to its overbudget of 8.67% (PBIS, 2015), as discussed in Chapter IV.

Even though CR was not included in the analysis, it does play a role in generating the budget difference. A CR makes long-term planning nearly impossible; this causes an uncertainty in the budget flow. CR is interrupting the flow of funding while being released through continuing appropriation and Omnibus appropriation bills. The DoD has been in at least one CR for all the years analyzed, but the most significant budget differences were seen during the years 2012 and 2017. Per Congressional records (House of Representative 2028, 2016), in 2017 Congress signed a CR in Dec12, 2016 providing Overseas Contingency Operation (OCO) funding and funding for various programs only, in which the DoN could only support overseas contingency operations and the specified programs.

The CR impact the BSOs who were not involved in this type of operations and limited their spending. On May 4, 2017, Congress signed an Omnibus (House of Representatives, 244, 2017), releasing the funding for the DoD and therefore giving the DoN and its BSOs four months to spend on a year's worth of requirements. Other requirements could still be in existence from FY 2016 that were carried over to FY 2017, adding to more requirements that needed to be completed before the end of the fiscal year. Although the previous statement is speculative, FY 2017 was over budget by 21.37% (PBIS, 2015). This is the highest percent and dollar value budget difference among the years researched as reflected in our analysis and discussed in Chapter IV

Is there a statistical relationship between the variances identified in the proposed budget versus the executed budget and marks issued by OSD?

In the analysis portion of this document, it is apparent that there is a statistical relationship among the ICCs, BLIs, and BSOs, but OSD markups do not necessarily contribute. As discussed in Chapter III, the average budget difference between the planned and appropriated budgets was 1.36%, indicating that the highest budget differences did not occur during these two iterations. The highest significant budget difference is seen between what is planned or appropriated and the actual dollar values. Since the OSD markups would be reflected in the appropriation phase, it is inferred that the OSD markup does not impact the budget differences because of the low percentage contributions.

The two major contributors to the budget difference in the analysis were BSOs: Commander, U.S. Fleet Forces (60) and Commander, U.S. Pacific Fleet (70), who have demonstrated repeated occurrences for being over and under budget (PBIS, 2015). Being over or under budget is not deliberately done by the BSOs, since they must be flexible and adapt their spending measures based on guidance received from OSD, which is continuously changing in support of the political environment. For example, a planned budget submitted by BSO (70) a year in advance is approved by Congress, but while executing the budget, two years after submission, the BSO can receive additional guidance from OSD. Additional guidance can be things such as an increase or decrease in force requirements, due to military operations around the world. It could be said that OSD

indirectly affects the DoD budget. Although, this research found no evidence that the budget differences calculated are due to OSD markups.

Can the statistical relationship be used to provide recommendations to OPNAV to lock appropriated customer accounts within the NWCF-SM budget horizon two years?

It is difficult to say if the analysis conducted can be used to determine any regression model to help determine what kind of investment should be used to help support NAVSUP. By taking the mean budget percentage difference calculated for the programs that were the main contributors, one could apply the positive or negative budget percentage difference to NAVSUP's NWCF investments and use that as the new amount for NAVSUP to invest. The problem with this logic is that the mean budget differences are just a snapshot in time for the years consisting of 2007–2017. Operational conflicts such as Operation Enduring Freedom, Operation New Dawn, the various operations in Syria and Yemen have occurred in this timeframe. If events like these happen in the future it is not known to what extent these ships and aircraft will be utilized. Another problem that might significantly impact the DoD budget is when Congress cannot pass a working budget. This impacts how the DoD spends and when approval to spend is allowed, then that is known to skew spending measures for the rest of the FY. Therefore, in events like these applying the mean budget percentage difference calculated will not suffice.

It does not seem realistic for OPNAV to lock any appropriated accounts for customers, since the OPTEMPO and schedule are in constant fluctuation, as seen in Chapter IV. It would be interesting to see what the periodicity that OPNAV communicates with the BSOs regarding changes in OPTEMPO (e.g., flight hours and steaming days). If the periodicity between OPNAV and the BSOs is not frequent, then missed opportunities for a more reliable budget is most likely occurring.

C. RECOMMENDATIONS FOR FURTHER ANALYSIS

1. It is known that NAVSUP uses forecasting models, demand signals from the fleet/customer, and inputs to invest in their repair and consumable parts. Using simulations to compare the percentage NAVSUP uses to forecast in their forecasting models and the mean budget difference

calculated in this research, then it would be worth looking at the difference in these figures, specifically for Commander, U.S. Fleet Forces and Commander, U.S. Pacific Fleet.

2. In our analysis, it was determined that there was at least one CR enacted in all the years analyzed, except FY07 and FY09. FY13 had the most prolonged period of a DoD appropriation not approved by Congress, which consisted of 176 days. Some FYs had multiple CRs, which are known to throttle the budget for BSOs, and it is uncertain how CRs impacts BSOs spending methods. Utilizing regression analysis, a comparison can be made from the number of CRs in any FY and the O&M,N budget. By understanding the correlation between CRs and fluctuations in the budget, it could assist in predicting the spending patterns of the BSOs.

3. This research did not analyze the relationship between OCO and over/ under spending for BSOs. It might be beneficial to calculate and collect data amount of OCO funding and the budget difference calculated in the research analysis, to determine significant statistical relationships.

D. CONCLUSION

The research demonstrated that O&M,N was the most significant contributor for generating budget differences in dollar value and percent, out of all the various appropriation accounts for FY07-17. O&M,N is the appropriation account that is responsible for funding daily operations to the fleet, so it is no surprise that this account is the most significant contributor to the budget difference.

The two programs under O&M,N that were the most significant contributors to budget difference consisted of Mission and Other Flight Hour Operations (1A1A) and Mission and Other Ship Operations (1B1B). These programs were consistently under and over budget during FY07-17 and had the greatest budget difference in dollars and percent.

These programs are more susceptible to changes in the OPTEMPO and schedule, since they are directly linked to the DoN mission.

Once the main contributing programs were identified, two BSOs were determined to be consistently over and under budget. BSOs (60) and (70) were consistently over and under budget during FY07-17. These BSOs are the owners of the assets that make up most forces within DoN. Therefore, if there is a change in operational tasking, this will have a direct impact to the O&M,N appropriation, which will alter the demand of major shipboard and aviation programs, and ultimately change how commands allocate their funding.

E. RECOMMENDATION TO NAVSUP

It is known that NAVSUP invests in their inventory to ensure that parts are readily available when customers require them, but the fluctuation in the DoD budget skews the accuracy of NAVSUP's forecasting. The research analysis presented mean budget differences for O&M,N, and the major programs. Comparing the mean budget difference calculated and the NAVSUP forecasting dollar values, NAVSUP can adjust their forecasting dollar values to account for the budget fluctuation This could help NAVSUP stabilize supply and demand from customers. NAVSUP would need to monitor these mean budget differences carefully and need to re-calculate them on an annual basis.

Since O&M,N has precise guidelines for obligating funding and the time allowed to execute funding, NAVSUP always has to take a calculated assessment in how much is budgeted each year. It appears that if NAVSUP were able to update some of the variables that are used to calculate their estimates on a more regular basis, then that would allow them to adjust the amount of funding that is invested. Implementing this recommendation would assist NAVSUP in improving its inventory readiness.

APPENDIX. BUDGET DIFFERENCES FOR DETERMINED BUDGET LINE ITEMS

BLIs ($ in Thousands)															
1A1A	1A2A	1B1B	1B2B	1C1C	1C7C	1D2D	1D7D	2A1F	2B2G	2C1H	3B1K	3B2K	4A4M	4A5M	4A6M
-$203,837	-$26,728	$4,609	$18,969	$199,989	-$5,312	-$18,610	-$11,785	-$5,043	-$11,147	-$3,404	-$48,654	-$7,861	-$9,424	$12,951	-$242,383
-$135,888	-$3,845	-$119,468	$3,484	-$4,346	-$11,175	-$13,984	-$5,186	$4,511	-$10,754	-$321	-$37,858	-$7,309	$16,627	-$472	-$59,127
-$401,973	-$58,637	-$539,253	$20,000	$8,150	-$7,772	$6,797	-$17,591	-$42,644	-$6,291	-$112	-$46,884	-$26,479	$27,662	-$3,638	-$26,416
-$250,456	$780	-$72,411	$11,753	$13,000	-$10,766	-$39,504	$5,386	-$7,516	$16,587	-$874	$18,386	$80,847	$11,454	-$10,499	$109,631
-$279,096	$1,615,601	-$81,276	-$24,343	$25,007	$0	$14,437	-$9,255	-$10,882	$4,158	-$387	$13,982	-$1,529,092	-$4,083	-$8,637	$126,655
$751,077	$33,404	$1,393,669	-$31,849	$128,118	$10,123	-$16,914	$2,935	-$12,315	$7,908	$26,584	$47,551	-$321	$8,579	-$15,048	$18,263
$426,719	-$39,648	$538,352	$60,713	$89,745	-$37,874	-$71,886	-$18,616	$24,021	-$49,210	-$30,632	$18,503	$1,693	-$37,365	-$16,389	-$52,410
$19,699	-$79,821	$1,161,102	-$15,081	$120,484	$173	-$14,324	-$12,877	-$3,294	$32,591	-$4,039	$45,183	-$1,159	-$13,491	$3,761	$8,213
$227,891	$39,896	$1,149,789	-$37,847	$84,834	$9,808	-$13,105	$2,588	-$126,439	-$66,188	-$27,007	$56,755	-$292	-$6,110	-$10,506	$12,881
$58,878	-$216,084	$702,749	-$14,289	$53,763	$9,056	$37,430	-$7,608	-$4,392	-$15,854	$2,304	$27,594	-$293	-$1,439	-$10,837	$29,104
$1,077,747	$53,657	$1,279,626	-$37,358	$81,300	$29,898	$7,290	$7,692	-$275,970	-$68,800	-$45,404	$7,480	$3,862	$3,741	-$6,904	$207,760

Calculated budget differences for determined budget line items. Adapted from PBIS (2015).

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