DEPARTMENT OF THE NAVY
NAVAL SUPPLY SYSTEMS COMMAND
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Ser SUP 04/053
9 May 24

From: Commander, Naval Supply Systems Command (NAVSUP)
To: Naval Postgraduate School GSDM Program Officer

Subj: PROPOSED TOPICS FOR NPS THESIS/CAPSTONE PROJECTS

Ref: (a) SUP 00 MOA 5711 Ser SUP 00/052 of 21 Dec 2020

Encl: (1) List of Thesis Topics as of 18 Apr 24

1. In accordance with reference (a), a list of recommended thesis topics and capstone projects is provided in enclosure (1) for faculty and student research.

2. The following topics are considered high interest items for Naval Supply Systems Command (NAVSUP) and should be given highest priority for research:

a. Improving Maritime operational availability (A_O) measurement and performance by implementing consistent system downtime monitoring.

b. Evaluating the financial viability of capitalizing unit-level Navy ships.

c. Enhanced Shipboard Materiel Handling Equipment (MHE) Inventory Project Calculator

d. Comparative Analysis of Wholesale Inventory Level Setting Methods for Navy Logistics

e. Optimizing COSAL Accuracy for Improved Onboard Spare Parts Availability

f. Developing a wholesale inventory forecasting algorithm using supplemental information

g. Warehouse Automation

h. Develop an Optimal Staffing Model for NAVSUP Warehouse Operations.

3. Supply Corps Officers seeking to pursue a thesis topic or capstone project not in enclosure (1) must receive approval from NAVSUP Headquarters (HQ).

4. Supply Corps Officers are expected to provide an outbrief to NAVSUP HQ. These briefs will be coordinated by the below listed points of contact:

Subj: PROPOSED TOPICS FOR NPS THESIS/CAPSTONE PROJECTS

a. Professor Geraldo Ferrer, Department of Defense Management Program Officer, Email: gferrer@nps.edu; Ph: (831) 905-4432 and

b. CDR James Steele, NAVSUP (SUP 431), james.m.steele58.mil@us.navy.mil, Ph: (717) 605-1110.

5. My point of contact concerning this matter is CAPT James Strauss, Chief of Staff. He may be contacted at (717)-605-6370 or james.h.strauss.mil@us.navy.mil.

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List of Thesis Topics as of 18 Apr 24

1. Improving Maritime operational availability (A_O) measurement and performance by implementing consistent system downtime monitoring.

a. Issue: Readiness Based Sparing (RBS) model refreshes are a critical part of NAVSUP's maritime inventory planning, but the model relies on complex processes with deep expertise needed. A significant driver of the mathematical complexity and delays is due to a lack of live condition data about system uptime and downtime, a key metric for A_O.

b. Background:

(1) The Readiness Based Sparing model is a complex model that aims to achieve a certain operational availability (A_O) by ensuring that ships are optimally stocked before they deploy. Currently, the Navy lacks real-time monitoring of system operational status. Instead, NAVSUP must perform complex calculations with input from multiple organizations.

(2) Additionally, although configuration updates are needed to improve our systems' technology, these configuration updates don't flow directly into the model and require lengthy and manual intervention to collect data.

(3) These challenges contribute to significant delays in RBS refresh rates (including 10+ years between refreshes) and hinders NAVSUP's ability to optimize a ship's Consolidated Shipboard Allowance List (COSAL) at a target A_O.

(4) There is a current Navy initiative to translate the current software – OPUS SIMLOX – into a human readable format that will enable broader use across the Navy functions. However, the mathematical and coordination challenges will remain.

(5) In the private sector, however, companies are increasingly leveraging sensors, particularly Internet of Things (IoT) sensors, to monitor their systems in real-time, ensuring operational efficiency and quick response times. These sensors collect data on aspects of system performance, from temperature to workload capacity, but most critically provide live updates on whether systems are running or facing downtime. This IoT-driven approach enables not just monitoring and valuable data, but also proactive maintenance, minimal downtime, and supports data-driven decisions.

c. Project Actions:

(1) How else could the Navy improve its A_O tracking and improve the Navy's inventory position? Would it be operationally valuable to leverage sensors to improve tracking?

(2) What is the financial cost and benefit to implementing these sensors?

(3) What are the information security implications of deploying technology?

(4) What critical systems would be most valuable to target in a pilot project?

d. NAVSUP HQ POC: CAPT(Sel) Kirk Engler, Email: kirk.a.engler.mil@us.navy.mil; Ph: (717) 605-2872

2. Evaluating the financial viability of capitalizing unit-level Navy ships

a. Issue: The Navy Fleet is currently divided between how onboard inventory is owned and managed as ownership varies by ship type. The onboard inventory for large combatant ships – such as aircraft carriers and amphibious assault ships – is owned as a force-level supply by the Navy Working Capital Fund. Smaller combatant ships' inventory is owned by the ships' command and funded through its Operating Target funds. For these unit-level supply ships, NAVSUP faces obstacles in inventory management and replenishment which challenge the Navy's ability to reach its endurance supply (E_S) targets.

b. Background:

(1) The Navy Working Capital Fund (NWCF) is a self-sustaining revolving fund managed by NAVSUP that finances the provision of goods and services to the Navy, operating on a charge-for-service basis. It aligns fiscal practices with operational requirements and enables the Navy to fund material requirements outside of lengthy appropriations processes.

(2) In 2008, the USS Normandy (previously a unit-level ship) was funded in a pilot project to determine the impact of converting end-use inventories to NWCF inventories. The results were largely positive, as substantiated in previous Navy and NPS research.

(3) Standardizing inventory management has had a proven benefit in industry as it allows the supply function to move stock optimally across locations, improving customer fill-rates as well as delivery times.

(4) These benefits are applicable to the Navy as well, improving our ability to optimize inventory levels (and replenishments) across all ships.

(5) There is value in continuing to pursue capitalization as a mechanism for improving E_S and in researching its potential financial benefits.

c. Project Actions:

(1) What are the financial costs/benefits of capitalizing the remaining unit-level ships?

(2) Create a total cost projection for converting all end-use inventories to NWCF inventories, including cost of capitalizing the new ships and its cost savings.

(3) Would full capitalization be financially beneficial to NAVSUP?

(4) Informed by previous capitalizations, what are the best practices and processes for capitalizing the unit-level supply ships?

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3. Enhance Shipboard Material Handling and Equipment (MHE) Inventory Projection Calculator

a. Issue: A tool has been developed to project out shipboard MHE inventory. While this tool helps to articulate requirements to the resource sponsor, there are multiple features that are missing to make the results more accurate and realistic. The main goal of this project is to enhance the tool through incorporating real-life factors.

b. Background: Recently, a tool was developed to project out various shipboard MHE inventory metrics of importance and visualize the results. This has allowed the responsible team to advocate for more funding from the lead resource sponsor (OPNAV N4) during the Program Objective Memorandum (POM) process through showing the link between funding and the average age of MHE inventory. While this tool projects out multiple metrics, there are additional features that could make it even more realistic/accurate.

c. Project Actions:

(1) Identify data needed to add enhancements to tool

(2) Acquire tool and business rules surrounding computations

(3) Incorporate the following enhancements to the tool:

(a) Contracting constraints: Optimize across multiple fiscal years between the procurement year, fallow time, and up to three option years. Be able to set minimum and maximum quantities for each option year. Lastly, be able to incorporate lead times from obligation to delivery.

(b) Steady State: Once the MHE population is healthy, compute how much to buy every year thereafter to maintain a constant average age of all shipboard MHE

(c) Service Life Extension Program: Be able to recalculate the age of revitalized equipment

d. NAVSUP HQ POCs:

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4. Comparative Analysis of Wholesale Inventory Level Setting Methods for Navy Logistics (NAVSUP WSS).

a. Issue: The Navy's ability to maintain operational readiness hinges on effective inventory management strategies that balance fill rates with the solvency of the Navy Working Capital Fund (NWCF). This thesis aims to compare wholesale inventory level setting methods, including the Naval Postgraduate School (NPS) Wholesale Inventory Optimization Model, NAVSUP HQ Sales & Operations Planning (S&OP) analysis, and a hybrid approach, to identify optimal strategies for maintaining high fill rates while ensuring NWCF solvency.

b. Background: Effective inventory management is critical for the Navy, requiring sophisticated models to predict and fulfill parts demand accurately. The NPS Wholesale Inventory Optimization Model and NAVSUP HQ S&OP analysis represent two distinct approaches to setting inventory levels at the wholesale level. However, each method has its advantages and limitations in terms of improving fill rates and maintaining NWCF solvency. A comparative analysis of these methods, along with a hybrid approach, could offer insights into more effective inventory management practices.

c. Project Actions:

(1) Evaluate the NPS Wholesale Inventory Optimization Model, NAVSUP HQ's S&OP analysis, and a hybrid method in terms of their effectiveness in setting wholesale inventory levels.

(1) Analyze how each method impacts fill rates, focusing on the availability of critical parts for Fleet readiness.

(3) Assess each method's implications for the solvency of the NWCF, considering factors such as cost efficiency and cash flow management.

(4) Recommend an optimized approach for Navy wholesale inventory management that balances high fill rates with financial sustainability.

d. NAVSUP WSS POC: George Charlson, Email: george.w.charlson2.civ@us.navy.mil, Ph: (215) 697-1306

5. Optimizing COSAL Accuracy for Improved Onboard Spare Parts Availability.

a. Issue: Sailors frequently encounter challenges in performing maintenance due to the absence of necessary parts onboard, a critical issue that directly impacts Fleet readiness. This project examines how accurate inputs and updates to the Coordinated Shipboard Allowance List (COSAL) can ensure sailors have the right parts available for essential maintenance tasks.

b. Background: The COSAL is instrumental in dictating the inventory of parts maintained on Navy ships, designed to support their operational missions. Accurate and timely updates to the COSAL are essential for reflecting the current needs based on equipment changes, maintenance demands, and operational readiness. Discrepancies in COSAL inputs can lead to significant gaps in onboard spare parts availability, hindering sailors' ability to perform timely maintenance and repairs.

c. Project Actions:

(1) Investigate the current process for updating the COSAL, focusing on the accuracy of inputs and the timeliness of updates in response to changes in ship equipment and maintenance requirements.

(2) Identify common sources of inaccuracies in COSAL updates, including delays in reporting equipment changes and challenges in integrating data from various Navy databases.

(3) Develop recommendations for improving the accuracy and efficiency of COSAL updates, leveraging technology, streamlined processes, and enhanced coordination among responsible entities.

(4) Assess the impact of optimized COSAL accuracy on the availability of onboard spare parts and the readiness of Navy ships to perform essential maintenance tasks.

d. NAVSUP WSS POC: Greg Wendte, Email: greggory.l.wendte.civ@us.navy.mil, Ph: (717) 605-1778

6. Develop a wholesale inventory forecasting algorithm using supplemental information, such as flying hours, landings, takeoffs, etc. (NAVSUP WSS).

a. Issue: Navy Enterprise Resource Planning (ERP) uses exponential smoothing, seeded with backcasting as its only wholesale demand forecasting method. Attempts have been made to use supplemental information such as flying hours to make better forecasts, but an increase in flying hours does not correlate with an increase in demand across an entire weapon system and in many cases, there is hardly any correlation at all. Further information is needed to know when to apply a supplemental data point. Supplemental data points might include population, flying hours, takeoffs, landings, steaming hours, equipment startup/shutdown, environment, etc. Identifying reliable supplemental data and a source for said data and showing a consistent cause and effect relationship is the crux of this project.

b. Background: Knowledge of a particular weapon system and some items on said system would be necessary. Knowledge on what drives an item to fail, as well has some historical record of the events that caused the failure and some knowledge of the likely future state of that condition would be necessary.

c. Project Actions:

(1) Demonstrate that there is a particular condition that drives demand on a set of items.

(2) Determine if the future state of that condition is predictable.

(3) Use the past information and future state to produce forecasts.

(4) Test said forecasts against reality. This would be the accuracy of the future state and the accuracy of the demand forecasts. It may be necessary to do the forecasting as of a couple years previously so that a testing period is available.

d. NAVSUP WSS POCs:

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(3) CDR Amanda Jones, Email: amanda.m.jones.mil@us.navy.mil, Ph: (717) 605-4873

7. Warehouse Automation (NAVSUP FLC Norfolk).

a. Issue: NAVSUP warehouses would greatly benefit from alignment with industry standards of warehouse automation, but continue to lag far behind.

b. Background: Naval Sustainment System-Supply (NSS-S) seeks to streamline the Navy's supply chains to decrease maintenance turnaround times, increase end-to-end velocity of spares and reduce costs. Realizing those end states requires achieving better-than-industry time to move parts, managing cash in new ways to maximize readiness, and integrating existing supply chain resources toward a common goal. NAVSUP warehouse automation, in line with industry standards, is one essential element needed to bring Navy supply chains up to the NSS-S standard.

c. Project Actions:

(1) Request Naval Postgraduate School (NPS) student research and identify key differences between a representative sample of NAVSUP warehouses and those of industry leaders with respect to warehouse automation.

(2) Identify top areas where NAVSUP warehouses can be brought up to industry warehouse automation standards considering security, cost, existing infrastructure, and time constraints.

(3) Determine if lag between a warehousing automation system design and full system functionality is significantly different between NAVSUP warehousing and industry leaders in the field.

(4) Propose solution sets that could be implemented at NAVSUP warehouses, with a reasonable time from proposal to implementation, which would more closely align NAVSUP warehouses with industry standards of warehouse automation, such that those standards remain relevant upon implementation.

d. NAVSUP FLCN POC: Pierce, Toney D., Email: toney.d.pierce.civ@us.navy.mil, Ph: (757) 532-0322

8. Develop an Optimal Staffing Model for NAVSUP Warehouse Operations (NAVSUP HQ SUP 04).

a. Issue: The NAVSUP enterprise continues to grow its warehouse management efforts, but currently lacks formalized manpower standards (e.g., time and motion studies) for traditional warehouse operations (e.g., receive, stow, issue, pick, pack, ship, conduct inventory). The creation of a manpower staffing model that also identifies opportunities for technology integration would lead to the ability to accurately set staffing levels across the NAVSUP Fleet Logistics Centers (FLC) for NAVSUP managed warehouses. Today, staffing levels at NAVSUP FLCs are arbitrarily set based on historical staffing data and financial constraints. Further, no workload standards for basic work elements exist from which a staffing model based on actual forecasted workload can be developed.

b. Background: As part of the Office of the Chief of Naval Operations (OPNAV) directed Warehouse Utilization initiative, NAVSUP and the NAVSUP FLCs are set to be named as the Executive Agent/Warehouse Integrator that will be key to assessing current warehouse functions, inventory locations and identifying opportunities to consolidate the Navy's warehouse footprint. In addition, numerous Budget Submitting Offices (BSO) are engaged with NAVSUP to move material to NAVSUP owned and managed warehouses, which drives the need for clear manpower requirements based on material inventory and transaction volume. This data will support the agreement between NAVSUP and other BSOs part of this, the development of workload standards and staffing models that align with the mission are imperative. NAVSUP operates over-the-horizon sites at its three targeted NAVSUP FLCs (FLCSD, FLCJ and FLCN) and will be submitting two locations for each one. These sites host a mix of efforts supporting Navy Working Capital Fund inventory and other BSO Operating, Materials & Supplies (OM&S) material. Lastly, the creation of true workload standards will also assist in NAVSUPs ability to assess performance across its warehouse staff by taking into account inventory on hand, average throughput and the processes/time involved for traditional functions. The assumption is as material transactions increase and inventory grows, more manpower is needed to support these basic warehouse management functions (e.g., receive, stow, issue, pick, pack, ship, conduct inventory).

c. Project Actions:

(1) Develop NAVSUP enterprise engineered workload standards based on time-motion studies at several echelon 3 sites.

(a) NAVSUP FLCN – Cheatham Annex and New London

(b) NAVSUP FLCJ – NAS Jacksonville and NAS Mayport

(2) Develop an optimal staffing model that also identifies opportunities for technology integration for Supply Management Department to evaluate staffing efficiency relative to projected workload fluctuations (i.e., transaction and inventory volume increases).

d. NAVSUP HQ POCs:

(1) Mr. Adam Altice, Email: adam.a.altic.civ@us.navy.mil, Ph: (717) 418-4977

(2) Mr. Jared Trinkaus, Email: jared.s.trinkaus.civ@us.navy.mil, Ph: (484) 515-250

9. Advancing critical systems training and reducing disruptions with AR/VR technology.

a. Issue: In the past 12 months, 23 ships have been NMC due to training. When a system is downed/not capable, sailors can no longer train on them. The average delay for training is 143 days. Comparisons to the private sector indicate that investments in technology such as Augmented Reality or Virtual Reality devices can reduce training times needed for heavy machinery.

b. Background: The Navy consistently sees ships rendered Non-Mission Capable due to training requirements. Although training over standard timelines is a critical part of the planning cycle, a pattern of delays in training can become detrimental to the organization's surge capabilities. In the commercial sector, Augmented Reality (AR) and Virtual Reality (VR) technologies are revolutionizing training operations, with efficacy in manufacturing and when personnel must learn to operate complex machinery. These immersive technologies offer a dynamic platform to simulate real-world scenarios, enabling new hires to gain hands-on experience in a virtual environment. This method significantly advances skill development, as it eliminates the need for physical access or proximity to the equipment during early phases of training. Trainees can repeatedly practice procedures and troubleshoot common issues without risking damage to expensive equipment. Despite these growing advantages, the Navy has not yet applied these technologies within its training and onboarding frameworks. This gap presents a substantial opportunity to leverage AR and VR to expedite the training process while deepening Sailors' understanding and proficiency of critical systems.

c. Project Actions:

(1) How can AR/VR improve sailors' training times overall? What technology would be needed?

(2) Does AR/VR have amplified potential to reduce training times for on-board critical systems, especially downed critical systems?

(3) Does AR/VR training have the potential to reduce system failure due to wear and tear?

(4) What are the information security implications of using AR/VR on critical systems?

(5) What are the financial implications of employing or piloting AR/VR (for program financing and supply/materials impact)?

d. NAVSUP HQ POC: CAPT(Sel) Kirk Engler, Email: kirk.a.engler.mil@us.navy.mil; Ph: (717) 605-2872

10. Transforming and modernizing feeding Sailors ashore.

a. Issue: The cost of operating Navy ashore dining facilities has increased over the years while number of patrons have decreased, resulting in an unsustainable business model. Research and evaluation of opportunities to transform Navy's current ashore food service model is required to modernize dining facilities and upgrade food options to deliver tasty and nutritious food when, where, and how Sailors need it.

b. Background:

(1) The Navy is responsible for approximately 100 Dining Facilities Ashore ranging from the Naval Academy to Camp David in Thurmont Maryland. These Dining Facilities are all Non-Appropriated Funded and the majority are funded for the food via the Subsistence-In-Kind (SIK) Account and managed by Commander Naval Installations Command (CNIC).

(2) There are various types of dining facilities ashore. Naval Academy and Great Lakes are earmarked separately from the SIK account. The remainder are standard dining facilities, brigs, USS Constitution, or Essential Station Messing (ESM). Essential Station Messing are hybrid facilities that feed Ration-In-Kind (RIK) sailors in the hours that the standard dining facility is closed via Morale Welfare and Recreation (MWR) i.e. golf course restaurants, bowling alleys etc.

(3) The manning at the various facilities includes Government Service (GS), Contracted Employees, and Military.

c. Project Actions:

(1) Identify factors resulting in decreased number of patrons in Navy ashore galleys. This includes, but not limited to appropriated vs non-appropriated funding, facility locations, menus, recipes, nutrition, dietary needs, and manpower.

(2) Identify lessons learned from other Military Services on recent dining facility transformations. Conduct site visits as needed to review all military branches and facility usage in high RIK areas (i.e. training commands).

(3) Identify opportunities to implement positive lessons learned from other Services into current Navy ashore galleys. Research should include evaluation of kiosks, food trucks, modernized recipe use, and implementation time for new ingredients.

(4) Evaluate ability to utilize both appropriated funds and non-appropriated funds to provide food options to Sailors. Research and evaluate Air Force Dining Facility 2.0 model and how appropriated and non-appropriated funds are incorporated for ordering, receiving, and manning. Identify impact to Sea/Shore rotation or number of billets authorized for Culinary Specialists and Chief Warrant Officers for any proposed changes.

d. NAVSUP HQ POCs:

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11. Impact of Disaggregate Data on Fleet Readiness (NAVSUP FLC Jacksonville).

a. Issue: Regional Maintenance Centers (RMC) rely primarily on the Maritime Systems Environment (MSE) to plan and document maintenance, repair and modernization. NAVSUP Fleet Logistics Center (FLC) logisticians embedded with Naval Sea Systems Command (NAVSEA) at the RMC are forced to cobble together information from Navy Tactical Command & Support System Organizational Maintenance Management System-Next Generation (NTCSS (OMMS-NG)), Configuration Data Managers Database-Open Architecture (CDMD-OA), Navy Enterprise Resource Planning (N-ERP), Enterprise Business Systems (EBS), One Touch Support (OTS), Haystack and a myriad of other databases to provide integrated logistics and supply chain management support information to the production planners. As a result, identifying and analyzing trends, patterns, and correlations between complex logistics data elements is difficult. Delays in the timeliness of logistics information due to a variety of data, velocity, and lack of real-time data has the potential to result in poor logistical decisions affecting the on-time delivery of ships from maintenance availabilities with the requisite accomplished work.

b. Background: Vital ships repair and maintenance decisions start on the ship in NTCSS (OMMS-NG) with the creation of a ships' maintenance action form (OPNAV 4790/2K) and become the basis for the Class Maintenance Plan (CMP) or Current Ships' Maintenance Project (CSMP). Intermediate-level work is assigned to the RMC, and planning begins with the brokering/screening of the Baseline Availability Work Package (BAWP) and creation of the Ship Specification Package (SSP) with the Job Order (JO)/Item Control Number (ICN) being written in the Navy Maintenance Database (NMD). Production planners and estimators review Navy Modernization Program (NMP) work candidates and ensure all authorized alterations intended for accomplishment during Continuous Maintenance Availabilities are identified by priority based on material availability, as identified by the logistician. Production planners and estimators identify repair material required to include long-lead time material (LLTM), cross part number to National Stock Number (NSN) in Haystack, check material availability in OTS, create the Job Material List (JML) in MSE and submit JO/ICN requirements to Repair Parts Petty Officers in (C900) to create and route requirements for NSN items in Material Requirements (MRQT) to (C500) for procurement. Logisticians in (Code 500) perform daily JML technical edit research, screen requirements with logistics tools (i.e., CDMD-OA, Haystack, DoD FedMall, OTS, FEDLOG, etc.), to verify configuration, logistics and technical data (e.g., Allowance Parts List (APL), Allowance Equipage List (AEL), price, Quantity Purchase Agreement (QPA), Unit of Issue (U/I), etc.), before converting the requirement to a requisition, submitting to the Federal Supply System or procuring in the open market.

c. Project Actions:

(1) Explore Information Technology (IT) solutions to aggregate multiple sources of logistics data onto a single data warehouse to enhance predictive planning, improve material forecasting and reduce jobs in jeopardy during ships maintenance availabilities.

(2) Analyze the current process for requisitioning material at the RMC.

(3) Determine the relationship of jobs in jeopardy to unfilled orders and LLTM.

(4) Provide recommendations to improve decision making, limit jobs being deferred that are awaiting material and enhance Fleet Readiness.

d. NAVSUP FLC Jacksonville POCs:

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12. Determine Lead Time Data Subcategorizations (Buckets) that Optimize Forecast Accuracy (NAVSUP WSS).

a. Issue: NAVSUP WSS determines the level of stock for each National Item Identification Number (NIIN) using several data points, including Administrative Lead Time (ALT). ALTs are "bucketed" to improve forecast accuracy, but the bucketing has not been reviewed in many years to see if there is an alternative methodology or "bucketing plan" that would further improve forecast accuracy.

b. Background: Forecasts for ALT help determine the amount of stock needed on-hand in wholesale inventory to ensure availability of repair parts to satisfy Fleet demands. Higher forecast accuracy ensures the right stock levels while not overbuying stock for a particular item, which carries an opportunity cost for buying other items to support Fleet readiness. Improvement of ALT buckets would increase forecast accuracy, thereby increasing NAVSUP WSS's ability to support the Fleet.

c. Project Actions:

(1) Review current WSS Levels process, including how ALTs are currently bucketed.

(2) Use optimization techniques to determine if there are alternative bucketing recommendations that provide greater forecast accuracy. Techniques to consider include, but are not limited to, mathematical algorithms, simulations, and machine learning.

(3) Use past data to develop the optimization, then use recent data to test for accuracy improvements.

d. NAVSUP WSS POCs:

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(2) CDR Amanda Jones, Email: amanda.m.jones.mil@us.navy.mil, Ph: (717) 605-4873

(3) Rebecca Graham, Email: rebecca.h.graham.civ@us.navy.mil, Ph: (717) 605-2914

13. Optimizing COSAL Accuracy for Improved Onboard Spare Parts Availability.

a. Issue: Sailors frequently encounter challenges in performing maintenance due to the absence of necessary parts onboard, a critical issue that directly impacts Fleet readiness. This project examines how accurate inputs and updates to the Coordinated Shipboard Allowance List (COSAL) can ensure sailors have the right parts available for essential maintenance tasks.

b. Background: The COSAL is instrumental in dictating the inventory of parts maintained on Navy ships, designed to support their operational missions. Accurate and timely updates to the COSAL are essential for reflecting the current needs based on equipment changes, maintenance demands, and operational readiness. Discrepancies in COSAL inputs can lead to significant gaps in onboard spare parts availability, hindering sailors' ability to perform timely maintenance and repairs.

c. Project Actions:

(1) Investigate the current process for updating the COSAL, focusing on the accuracy of inputs and the timeliness of updates in response to changes in ship equipment and maintenance requirements.

(2) Identify common sources of inaccuracies in COSAL updates, including delays in reporting equipment changes and challenges in integrating data from various Navy databases.

(3) Develop recommendations for improving the accuracy and efficiency of COSAL updates, leveraging technology, streamlined processes, and enhanced coordination among responsible entities.

(4) Assess the impact of optimized COSAL accuracy on the availability of onboard spare parts and the readiness of Navy ships to perform essential maintenance tasks.

d. NAVSUP WSS POC: Greg Wendte, Email: greggory.l.wendte.civ@us.navy.mil, Ph: (717) 605-1778

14. Small Business Reinvigoration - NAVSUP HQ (SUP 41).

a. Issue: The federal government, along with the Department of Defense (DoD), are dependent on Small Businesses for sources of supply, but Small Businesses continue to significantly decline. The decline has a direct impact on Material Readiness for the Navy's ships and submarines, negatively affecting our warfighting capability, increasing Diminishing Manufacturing Sources and Material Shortages (DMSMS) and leading to no source of supply.

b. Background: In 2021, the DoD spent over $80 Billion dollars purchasing from small businesses. Federal Law requires all Federal agencies to award 23%. Small businesses are keys to innovations and vital for our nation's health and defense. Other key figures:

(1) Technical Referrals with no bid or item is obsolete have increased 860% from FY11 to FY 21.

(2) Competitive One Bid/Sole Source account for 94% of $3.2 Billion spent in FY21.

(3) Number of Small Vendors receiving awards has declined by 42% from FY11 to FY21.

(4) In FY21, 20.5% of potential Bids came back with no solicitation or as obsolete.

c. Project Actions:

(1) Analyze hurdles for small businesses to get DoD contracts.

(2) Determine how to get more of the many small businesses that do not seek Federal or DoD contracts to do so.

(3) Analyze current incentives or potential incentives to keep small businesses thriving.

(4) Work with Procurement Technical Assistance Centers (PTAC) to increase awareness of resources available to Small Businesses.

d. NAVSUP HQ POCs:

(1) Adam Powars, NAVSUP (SUP 41) Strategic Engagement Lead, Email: adam.l.powars.civ@us.navy.mil, Ph: (717) 829-4939

(2) Chris Espenshade, Director NAVSUP Office of Small Business Programs, Email: christopher.m.espenshade.civ@us.navy.mil, Ph: (717) 941-0038

15. Data Rights Procurement Strategy - NAVSUP HQ (SUP 41).

a. Issue: Fleet readiness has been negatively impacted by the Dept of Navy's failure to obtain technical data when purchasing material from sole source providers.

b. Background: The Navy procures material from Sole Source providers without obtaining the rights to technical data. Sole source providers can go out of business, move on to new products/technology and the Navy is left without a source for critical weapons systems material, and also left without the technical data necessary to reprocure or organically produce the item.

c. Project Actions:

(1) Compare Federal Aviation Authority (FAA) model for procurement which requires all Technical Data be shared from Original Equipment Manufacture (OEM) to FAA.

(2) Determine the hurdles in Navy procurements which have prevented Technical Data rights be procured.

(3) Propose solution: Legislative, procedural, or DFAR, etc.

d. NAVSUP HQ POCs:

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16. Determine Solutions for Runtime Inefficiencies within the Supply Chain Simulation Model (NAVSUP WSS).

a. Issue: Current groups of National Item Identification Numbers (NIIN) within Supply Chain Simulation have approximately 36K active items for maritime and 8k items for aviation. Current runtimes are approximately 50-150 hours on N61 Developer machines. Belief is that there are inefficiencies that, if discovered and corrected, could significantly reduce the runtimes and therefore offer NAVSUP enterprise greater flexibility in using this tool.

b. Background: The current model structure for the Supply Chain Simulation model simulates the entire universe of items within a specific budget group to ensure that expenditure does not exceed Obligation Authority.

c. Project Actions:

(1) Determine if it is feasible to split large groups of NIINs (36k) into subsets and multi-thread the process while maintaining metric consistency.

(2) Determine what changes can be made to the overall code to improve runtime efficiency.

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17. Enhance the Grouping Logic within the Site Inventory Optimization Model (NAVSUP WSS).

a. Issue: NAVSUP WSS (N4, N6) is seeking to enhance the grouping logic within Site Inventory Optimization Model (SIOM) to improve demand-based level setting. This proposal is to extend beyond the current price groups and consider other factors such as item essentiality, demand velocity, and/or other parameters. Additionally, NAVSUP WSS wants to develop a weighting structure that properly accounts for each grouping factor's relative impact within the optimization.

b. Background: The current grouping structure within SIOM is based on price. While this has proven sufficient to this point, NAVSUP WSS believes there is room for improvement.

c. Project Actions:

(1) Determine what formal methods for grouping can be used in this scenario.

(2) Determine a method to test the proposed solution, along with a recommendation(s) for periodicity for re-evaluation of grouping techniques.

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18. Supply Demand Based Levels (SDBL) and Aviation Consolidated Allowance List (AVCAL)/ Shore Consolidated Allowance List (SHORCAL) Reviews (NAVSUP FLC Norfolk).

a. Issue: Determine optimal timing to execute Supply Demand Based Levels (SDBL) and Shore Consolidated Allowance List (SHORCAL) reviews and fully identify procedural shortfalls which may negatively impact flight line readiness.

b. Background: Aviation Support Detachments (ASD) and other aviation retail shore sites control various amounts of Navy Working Capital Fund (NWCF) material. To optimize shelf stock postures, SDBL for consumables (9 Cognizance Code (COG)) are scheduled on a quarterly basis; SHORCAL reviews for repairable (3 COG/7 COG) material are executed every three years. Large ASDs commonly support multiple type/model/series aircraft and with consistent configuration changes occurring, the timing/periodicity for reviews may prove suboptimal.

c. Project Actions:

(1) Analyze the current timing of SDBLs/SHORCAL reviews and the impacts of delaying the reviews (in particular SDBLs). Historically, delays in SDBLs produce a 'bow wave' of requirements for site warehousing personnel due to the increased volume of referrals coupled with inbound range add/increases; this increased volume of requirements competes with normal 'day to day' business. Make recommendations to the optimal timing for SDBLs and SHORCAL reviews based on findings.

(2) Consider the Type/Model/Series (T/M/S) aircraft when conducting this project. Various T/M/S are in different phases of the weapons system's life cycle which can influence the decision to fund and/or process SDBLs/SHORCAL requirements. Communication between ASDs, NAVSUP WSS allowancing, and other stakeholders should be reviewed to examine areas for potential improvement.
Conduct deep dive analysis current state for executing SDBLs/SHORCALs to include funding considerations, customer ordering behavior, impact to NWCF sales, and operational outcomes. Provide recommendations to streamline the process and remove any non-value added steps/procedures.

d. NAVSUP FLCN POC: CDR Benjamin Hixson, Email: benjamin.e.hixson.mil@us.navy.mil, Ph: (301) 342-1801.

19 Statement for Small Business Innovation Research Phase III Basic Ordering Agreement.

a. Issue: With audit readiness a priority for Department of Defense (DoD), there is a need to establish processes for improving audit readiness and streamlining inventory procedures.

b. Background: The technology and services being developed and acquired under the proposed Basic Ordering Agreement (BOA) derived from a competitive solicitation for Small Business Innovation Research (SBIR) topic N171-077. Contract number N68335-17-C-0436 was awarded to Premier Solutions HI, LLC (PSHI) for Phase I research and development into the use of barcode scanning for audit compliant receiving and inventory of supply materiel. The resulting SBIR Phase I research and development led to identification of techniques, technology enhancements and business process improvements to the Financial Audit Compliance Enhancement Tool (FACET), which is used aboard Fleet afloat and ashore activities to automate receiving and inventory and reduce record-keeping and data entry workload while maintaining audit-compliant financial information. Additional Research and Development conducted by PSHI under Phase II award N171-077-0682 and SBIR Phase I Awards N182-122-0370 and Phase II award N182-123-03723 also involved technology and methods enhancing the FACET system for audit readiness and business process improvement through the use of barcode labels, mobile devices, automated document scanning, software-as-a-service (SaaS) and Electronic Data Interchange (EDI) technologies.

c. Project Actions:

(1) Determine feasibility of implementing BOA Navy wide.

(2) Analyze industry leaders who utilize similar technology and processes.

(3) Ensure processes remain auditable in accordance with Financial Improvement and Audit Readiness (FIAR) guidance.

(4) Establish efficient business processes and quantifiable metrics based on industry best practices.

(5) Explore the feasibility of technology investment for Fleet wide utilization on both FACET (scanners) and clipboard (phones/Bluetooth devices) to feed data back to Navy Enterprise Resource Planning (ERP). This effort would mirror technology and processes with the depot and waterfront.

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20. Initial outfitting of Allowance Part List (APL) effects on readiness and applicability of usage against the current costs limiting the Surface Fleet (NAVSUP WSS/DLA)

a. Issue: Whenever we introduce a new system or piece of gear we create a new APL that is populated with material based on Original Equipment Manufacturer (OEM) data and other factors. With the exception of the consumable items we are not seeing a return on investment versus the risk. Two decades ago, a study was conducted that found <~25% of APLs assigned to a ship had any 2K/MAF written against it for parts. That means that we have paid for billions of dollars of parts that are "risk" associated but are never used. Unfortunately, it looks like we are very close to those same percentages today.

b. Background: As new systems are introduced and an APL is created, we acquire and procure that material for all ships that are going to be outfitted with that system. The systems are incrementally installed on the Fleet during the availability yards periods or during a Continuous Maintenance Availability (CMAV). We are not basing the initial procurement of spares on actual demand as there is none to start with. The numbers continue to show decades later that we need to re-visit this process understanding the inherent risk associated with any decision on sparing.

c. Project Actions: Analyze the current NAVSUP Weapon Systems Support/Defense Logistics Agency creations of APLs and initial outfitting of those APLs. Consider the following:

(1) Are the APLs for new systems being outfitted with material that is actually used in the first 12-24 months of its issuance to the Fleet.

(2) Look at other outfitting strategies such as possibly acquiring only a finite amount of that proposed APL until it can prove demand for those systems after a 12-24 month or other time factor.

(3) Based on those results than determine the actual acquisition required for those new APL.

(4) Determine the possible cost avoidance resulting from using an alternative initial outfitting plan weighing what those funds can then be directed towards (such as the numerous backorder (BB) items), against the risk and additional cost of waiting to procure the initial APL for the remaining Fleet units.

(5) Provide recommendations to improve the outfitting of initial APLs to better expend our limited funding and focus on real demand and costs to NAVSUP.

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21. Develop a wholesale inventory forecasting algorithm using Machine Learning principles and statistically compare accuracy results against time-series forecasting techniques used by Navy Enterprise Resource Planning (NAVSUP WSS).

a. Issue: It has been suggested that inventory forecasting techniques using Machine Learning (ML) principles may produce forecasts that are more accurate than traditional time-series techniques. Accordingly, the purpose of this project is to gain insight if ML forecasting techniques may outperform traditional time-series forecasting techniques.

b. Background: See issue statement (above).

c. Project Actions:

(1) Develop a forecasting algorithm using ML principles.

(2) Apply the algorithm to generate forecasts for one aviation and one maritime platform.

(3) Compare ML forecast results with Navy Enterprise Resource Planning forecast results over the same time period, and assess performance in terms of forecast accuracy, bias, churn, and other agreed upon measures of performance.

(4) Determine if Machine Learning forecasting techniques may outperform traditional time-series forecasting techniques.

(5) Identify specific circumstances where using ML is better than time-series, and vice versa.

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22. Invoking Performance Based Logistic exit and off-ramping Performanced Based Logistic roles and responsibilities (NAVSUP WSS).

a. Issue: Performance Based Logistic (PBL) contracts at NAVSUP Weapon Systems Support (WSS) include exit phase language and requirements, which outline at a high level the first steps in the process of moving on from PBL support. If planned and executed properly this high level open ended language has been successful. However, in many cases, the determination to exit a PBL is made out of necessity at the end of an existing contract while targeting a renewal and therefore the Exit phase is highly rushed or accompanied by an interim support solution. Additionally, the roles and responsibilities of NAVSUP WSS (N7 and N98) in preparation and execution of the Exit process become muddled. Both of these issues have resulted in less than optimized outcomes historically.

b. Background: See issue statement (above).

c. Project Actions:

(1) What planning procedures should be revised or instituted to better prepare for exiting a PBL?

(2) Should any precautionary measures be included or put in place subsequent to the PBL contracts to be better prepared to Exit at the end of contract performance in an immediate fashion? If so what would these measures be?

(3) What are Contracting Department and Integrated Weapons Support Team's definitive roles and responsibility in preparation and execution of PBL Exit?

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23. Contracting in a predominately sole source environment (NAVSUP WSS)

a. Issue: Over 80% of NAVSUP contracts are sole source, which presents challenges to Contracting Officers. Contractors know they are the only company capable of meeting the Government's requirement and often drive the award schedule to the very end to force the Government's hand in both price and terms and conditions. Additionally, contractors will often no bid due to capacity or unwillingness to deal with low profits, which leaves the Government with no options. At NAVSUP WSS, it takes about 2 years to qualify a contractor as a repair source, if the Government owns the technical data.

b. Background: See issue statement (above).

c. Project Actions:

(1) What can be done to increase competition at NAVSUP WSS?

(2) Is it economical for the Government to by data rights to increase the number of repair sources?

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24. Integration of Robotics into Navy Exchange Service Command Distribution Centers.

a. Issue: Many Navy Exchange Service Command (NEXCOM) operations are currently an extremely manual, and all improvements to warehousing operations are currently evolutionary in nature verses revolutionary. This methodology does not allow NEXCOM the ability to realize substantial savings. The integration of robotics into receiving, storage, picking and shipping has the potential to produce a return of investment that would support the implementation of such a revolutionary initiative. These revolutionary upgrades need to be evaluated to determine what locations are capable of capitalizing on these enhancements in the near future, so NEXCOM can continue to provide the support our customers are accustomed to receiving as compared to industry leaders.

b. Background: As NEXCOM continues to look for ways to lower costs, improve accuracy, and increase productivity, NEXCOM needs to explore options on how to integrate robotics into our current operations in order to realize these benefits. The industry is currently leveraging robotics along with material handling automation to reduce receiving cycle time while simultaneously reducing the amount of product damage. Additionally, these advancements significantly improve picking metrics that translate into on time delivery to the customer. These results are being achieved today by industry leaders, and NEXCOM must integrate where feasible to remain competitive.

c. Project Actions:

(1) Identify areas where robotics can be easily integrated to reduce costs

(2) Develop a ROI on each recommendation to determine if it is feasible to execute

(3) Develop an implementation plan for the integration of robotics and MHE automation into the Distribution Centers.

(4) Develop a strategy to address change with the DC associates

d. NEXCOM (Code D) POC: William J. Cain Jr, Email: william.cain@nexweb.org, Ph: (757) 440-4528

25. Applying Commercial Procedures and Technology to Audit Readiness NAVSUP WSS (IOC).

a. Issue: The Navy must ensure full visibility and accountability of its assets and material.

b. Background: The Department of the Navy's (DON) does not have sufficient record keeping, processes, or controls in place for the management of physical assets, and this has a negative impact on our readiness. There are many logistics organizations that excel at warehousing, managing a supply chain, and transportation.

c. Project Actions:

(1) Analyze Top 10 Logistics organization such as Amazon, XPO Logistics, United Parcel Service (UPS) or Dalsey, Hillblom and Lynn (DHL). Identify processes and technological tools (Radio Frequency Identification (RFID), Robotic Process Automation (RPA), etc.), that enable Real Time Audit.

(2) How can these processes and tools be implemented in the Navy?

(3) Conduct a Budget Cost Analysis to determine which of these tools are feasible.

(4) Provide recommendations on implementing these process and technology tools.

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26. Accelerating Artificial Intelligence capabilities within the Supply Support Community NAVSUP HQ (SUP 04).

a. Issue: NAVSUP is currently piloting an artificial intelligence project and is looking for insights into how the technology can be utilized within the Naval Supply Community.

b. Background: NAVSUP seeks to streamline the Navy supply chain information provided to employees. There are multiple tools, Standard Operating Procedures, Policies, Training, and data available to employees, however, finding all of the information is extremely time-consuming and requires training in tools, data, and processes.

c. Project Actions:

(1) Determine the feasibility of implementing Generative Artificial Intelligence (GenAI) utilizing Large Language Models within the NAVSUP Business

(2) Analyze the implementation, use, and impact of organizations utilizing GenAI. Of interest to NAVSUP is Supply Chain Companies and how GenAI is transforming their organization.

(3) Review data, including cost to implement, maintain, return on investment, and measurable impact on the organization.

(4) Identify efficient business processes, quantifiable metrics, and feedback loops based on industry best practices to refine and improve GenAI in the organization.

(5) Explore the feasibility of technology investment for Fleet-wide utilization.

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27. Logistics Information Technology Support for supply chain operations in Communications- and Cyber-Contested Environments (NAVSUP BSC)

a. Issue: To prepare for Phase II operations, we must evaluate the resiliency and criticality of Logistics Information Technology (Log IT) for supporting operations in a communications and cyber contested environment.

b. Background: Log IT systems required to effectively manage the supply chain supporting operational units typically rely on Non-Classified Internet Protocol Router (NIPR) net connectivity and are not typically classified as critical for cybersecurity or reliability purposes. In the event of a shift to Phase II conflict, a contested cybersecurity or communications environment may make many of these systems unusable, with negative impacts on our ability to maintain an effective supply chain over the medium to long term. Analysis is required to determine which programs are most critical for Fleet support and which are most vulnerable to disruption, in order to develop and prioritize capabilities to protect and or restore these systems.

c. Project Actions:

(1) Evaluate Navy wide and NAVSUP Log IT programs to develop a Commander's estimate of vulnerabilities and capability gaps in Log IT support to the Fleet in a cyber- and/or communications-contested environment.

(2) What tools and systems must be protected or restored to support plans for support of operational units through push logistics?

(3) Which Log IT systems or tools are most critical to be protected or restored to ensure medium- to long-term maintenance of supply chain support to operational units at NAVSUP Weapon Systems Support and NAVSUP Ammunition Logistics Command?

(4) Is it possible to rearchitect or replatform Log IT systems using modern technologies and data integration practices to enable stand-alone, federated, or other decentralized and distributed to edge fallback scenarios (i.e. distributed systems, containers, eventual consistency/CAP theorem, disconnected data replication/synchronization/journaling, leader election, compensating behaviors, peer-to-peer/torrents, Git, blockchain)? Can secure distributed communications, authentication, and edge processing occur over wholly untrusted networks and sporadically connected or air-gapped systems?

(5) Is it possible or practical to move Log IT systems to Secure Internet Protocol Router (SIPR) networks in the event of long-term disruption of NIPR communications? What capabilities exist or must be developed to enable this contingency?

(6) What are the trade-offs the Navy should consider in regard to purposefully restricting communications in a cyber or communications contested environment?

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