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GAP ANALYSIS OF HIGHER-LEVEL CONTRACT QUALITY REQUIREMENTS FOR MAINTENANCE AT THE U.S. AEGIS ASHORE MISSILE DEFENSE SYSTEM IN ROMANIA

June 2023

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Forward Deployed Regional Maintenance Center (FDRMC) relies on foreign-based contractors to perform maintenance for the Aegis Ashore Missile Defense System (AAMDS) in Romania. This maintenance adheres to the Joint Fleet Maintenance Manual (JFMM) and requires higher-level contract quality requirements for an approved Quality Management System (QMS) and process-specific procedures. This research conducts a gap analysis to determine where the foreign-based contractors' QMS and process-specific procedures fall short of the JFMM requirements. This research analyzes the Lowest Price Technically Acceptable (LPTA) contract files for fiscal years 2017 through 2022 to compare the technical evaluation rating of each proposal to the evaluation factors used to determine the technical acceptability of offerors' proposals. This research identifies the higher-level contract quality requirements that are not being met in the source selection process, explains how contracts are awarded when there are no technically acceptable proposals, and describes the implications of these findings. This research concludes with recommendations to assist these foreign-based contractors in improving their proposals to reflect a qualified QMS and process-specific procedures and thus be rated technically acceptable and eligible for a contract.

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Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

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LIST OF ACRONYMS AND ABBREVIATIONS

AAMDS	Aegis Ashore Missile Defense System
CAQAP	Contract Administration Quality Assurance Program
CNRMC	Commander, Navy Regional Maintenance Center
FAR	Federal Acquisition Regulation
FDRMC	Forward Deployed Regional Maintenance Center
JFMM	Joint Fleet Maintenance Manual
LPTA	Lowest Price Technically Acceptable
MSRA	Master Ship Repair Agreement
NAVSEA	Naval Sea Systems Command
NSI	NAVSEA Standard Item
QMS	Quality Management System
RMC	Regional Maintenance Center

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I. INTRODUCTION

This chapter introduces the research on Forward Deployed Regional Maintenance Center's (FDRMC) contracted maintenance for the Aegis Ashore Missile Defense System (AAMDS). This maintenance is conducted at the Naval Support Facility (NSF) in Deveselu, Romania. This research focuses on the problems encountered when contracting out for this maintenance. This chapter identifies the background of the research, the purpose of the research, the research questions, the methodology, the benefits and limitation, and the organization of this paper.

A. BACKGROUND

FDRMC is the tip of the spear for surface ship maintenance in the Navy's Fifth and Sixth Fleet area of operations. FDRMC is the designated Naval activity responsible for the integration, oversight, and certification of all maintenance accomplished for the AAMDS, including maintenance performed by foreign-based contractors (Naval Surface Force Atlantic [SURFLANT], 2014). The AAMDS is a land-based version of the same radar and missiles the Navy uses onboard its Arleigh Burke class destroyers (Missile Defense Agency [MDA], 2022).

Every year, the AAMDS operation is shut down to allow for maintenance to be performed. This maintenance is performed by contractors, specifically foreign-based contractors. This maintenance adheres to the Joint Fleet Maintenance Manual (JFMM), which requires these foreign-based contractors to meet higher-level contract quality requirements as specified in Federal Acquisition Regulation (FAR) Part 46. Proposals submitted by these offerors are evaluated and found to be technically unacceptable based on the evaluation factors set forth in the solicitation. To receive an award, offerors must have a documented Quality Management System (QMS) and associated procedures for routine ship repair (Naval Sea Systems Command [NAVSEA], 2021). When proposals are deemed technically unacceptable, FDRMC waives these higher-level contract quality requirements and must provide additional oversight to minimize the risk of unsuccessful contractor performance (FDRMC, 2019). This results in the problem of FDRMC having to

expend additional resources in providing oversight of selected contractors with QMS deficiencies who perform maintenance that could impact the AAMDS mission.

B. PURPOSE OF RESEARCH

The purpose of this research is to conduct a gap analysis on FDRMC's foreign-based contractors performing maintenance at the AAMDS to determine where their QMS and associated procedures fall short of the JFMM requirements. This research identifies the quality requirements that are not being met and provides recommendations for this industry base to improve their QMS and associated procedures to meet the JFMM requirements. This research will then provide recommendations to this industry base to improve their proposals to reflect a qualified QMS, and thus be rated technically acceptable and eligible for a contract.

C. RESEARCH QUESTIONS

The purpose of this research is to answer the following questions:

1. Based on the results of the gap analysis, which JFMM QMS requirements are not being met by FDRMC's foreign-based contractors performing maintenance at the AAMDS in Romania?
2. Based on the research findings, what recommendations can be made for FDRMC's foreign-based contractors to improve their QMS and associated procedures to meet JFMM requirements?
3. Based on this research, what approaches can be taken to implement the above recommendations for FDRMC's foreign-based contractors to improve their QMS and associated procedures to meet JFMM requirements?

D. METHODOLOGY

This research will conduct a gap analysis to JFMM requirements for higher-level contract quality requirements and the current state of FDRMC's contractors' QMS and associated procedures. The research will identify quality requirements that are not being met, explore the reasons why, and then make recommendations to this industry base to improve their proposals to reflect a qualified QMS, and thus be rated technically acceptable and eligible for a contract. The dataset for this research is comprised of FDRMC contract files including proposal evaluation criteria, QMS requirements, and source selection

documents explaining the proposal evaluation results. The contract files are stored on a shared-drive repository that is accessible to FDRMC employees.

E. BENEFITS AND LIMITATIONS OF THE RESEARCH

This research directly benefits the mission of FDRMC and the AAMDS by providing recommendations to prevent FDRMC from having to waive QMS requirements. If future offerors can meet QMS requirements, then FDRMC can provide more effective and economical contractor oversight and maintain the AAMDS to its designed specifications. In addition, this research may benefit any other Navy or DOD organization that contracts out maintenance in a similar environment.

This research has limitations in its scope. This research focuses on FDRMC's foreign-based contractors that perform maintenance for the AAMDS in Romania. Specifically, this research focuses on the Lowest Price Technically Acceptable (LPTA) source selection process for this maintenance, higher-level contract quality requirements specified in FAR Part 46, and the Navy's JFMM requirements for quality and contracted maintenance.

F. ORGANIZATION OF RESEARCH PAPER

This report consists of six chapters. Chapter I introduces the research background, purpose, research questions, methodology, and the benefits and limitations of the research. Chapter II presents the literature review on the theoretical foundation of gap analysis. It then discusses the National Contract Management Association (NCMA) Contract Management Standard (CMS), which defines key contract management concepts, processes, and relationships in the contract life cycle (i.e., pre-award, award, and post-award). Next, the chapter further explores the lowest price technically acceptable (LPTA) source selection process and the higher-level contract quality requirements specified in FAR Part 46. Then, the chapter examines the JFMM, which regulates the Navy's maintenance requirements across all platforms, including maintenance performed by foreign-based contractors. It then discusses FDRMC's contract management oversight polices for implementing the JFMM requirements for contracted maintenance. This chapter then discusses a Government Accountability Office (GAO) report that addresses the need

for improving contracted maintenance for ships based overseas. Chapter III provides an overview of the organizations involved in managing maintenance for the AAMDS, including the hierarchy of authority, and their overlapping roles and responsibilities. It then discusses the FDRMC mission and maintenance approach in more detail. Chapter IV explains the methodology used to answer the research questions. This includes the source and collection of data and the procedure used for analysis. Chapter V presents the findings and analysis of this research. It further explains the contractors' QMS shortcomings and provides recommendations for improving their QMS and associated procedures. Finally, Chapter VI provides a summary of the research, a conclusion of the findings, and areas for further research.

G. SUMMARY

This chapter introduced the research on the FDRMC contracted maintenance for the AAMDS in Romania. It discussed the problems encountered when contracting out for this maintenance. This chapter also identified the background of the research, the purpose of the research, the research questions, the methodology, the benefits and limitations, and the organization of this paper. The next chapter will present the literature review which sets the foundation for the research.

II. LITERATURE REVIEW

A. INTRODUCTION

The purpose of this chapter is to present the literature review that sets the foundation for this research. First, the theoretical foundation is covered. Next, the contract management process is discussed. Then, the chapter will focus on the source selection process with an emphasis on the Lowest Price Technically Acceptable approach. Next, contract quality requirements are covered. Then, the chapter discusses the Joint Fleet Maintenance Manual's requirements for contracted maintenance. Next, Forward Deployed Regional Maintenance Center's contract management oversight policy is discussed. This chapter then discusses a GAO report that describes some of the approaches the Navy uses to maintain its ships that are homeported in overseas locations. Finally, the chapter concludes with an examination of Master Ship Repair Agreements.

B. THEORETICAL FOUNDATION

Contract management can be researched using many theories, one of which is principal-agent theory (Rendon, 2015). Principal-agent theory explores the problems encountered in buyer-seller relationships. In government contracting, the government is the principal (i.e., buyer), and the contractor is the agent (i.e., seller). The principal contracts with the agent to perform a task on behalf of the principal (Rendon, 2015). The government expects the seller to fulfill all contract requirements (i.e., schedule and quality) at a fair and reasonable price (Rendon, 2015). On the other hand, the contactor's objectives are profit, increasing market share, and cash flow among other priorities (Rendon, 2015). In addition to competing objectives, the information available to both parties in a principal-agent relationship is typically asymmetric (Rendon, 2015). In other words, the buyer may have information that the seller does not have or vice versa. For instance, the government typically knows more about its agency's mission, the procurement requirements, and the budget, whereas the contractor knows more about its technical capability, costs, and return on investment requirements (Rendon, 2015).

In a principal-agent relationship, asymmetric information and competing priorities result in the problems of adverse selection and moral hazard (Rendon, 2015). Adverse selection occurs in the pre-award phase of the contract life cycle when asymmetric information puts one party at risk of making a poor business decision (Stremitzer, 2005). For example, a lack of information could lead the government to award a contract to a company that does not have the necessary experience, operational control, technical skill, or ability to attain them, to fulfill all contract requirements (National Contract Management Association [NCMA], 2019). The government can mitigate adverse selection by conducting thorough market research (Rendon, 2015). Moral hazard occurs in the post-award phase of the contract life cycle when one party believes that it can benefit by hiding or changing its behavior (Stremitzer, 2005). For instance, the agent may not expend resources to improve quality if it knows the principal will shoulder this effort or continue to accept the level of quality that is already being provided. The government can mitigate moral hazard by monitoring contract performance and inspecting and accepting deliverables (Rendon, 2015). The problems of adverse selection and moral hazard impact how both parties behave in the contract management process (Rendon, 2015). The next section will discuss the contract management processes where principal-agent theory problems and mitigations can occur.

C. CONTRACT MANAGEMENT PROCESS

The National Contract Management Association's Contract Management Standard (CMS) provides the framework and guiding principles for the three phases of the contract life cycle: Pre-Award, Award, and Post-Award. Additionally, the CMS explains the key processes of the contract life cycle from both a buyer and seller perspective. Figure 1 presents a top-level overview of the NCMA Contract Management Standard that will be discussed in this section. The contracting processes directly related to this research include Pre Award (Plan Solicitation and Request Offers), Award (Select Source), and Post Award (Ensure Quality). The following paragraphs discuss the contract life cycle phases and the processes where principal-agent theory problems and mitigations can occur.

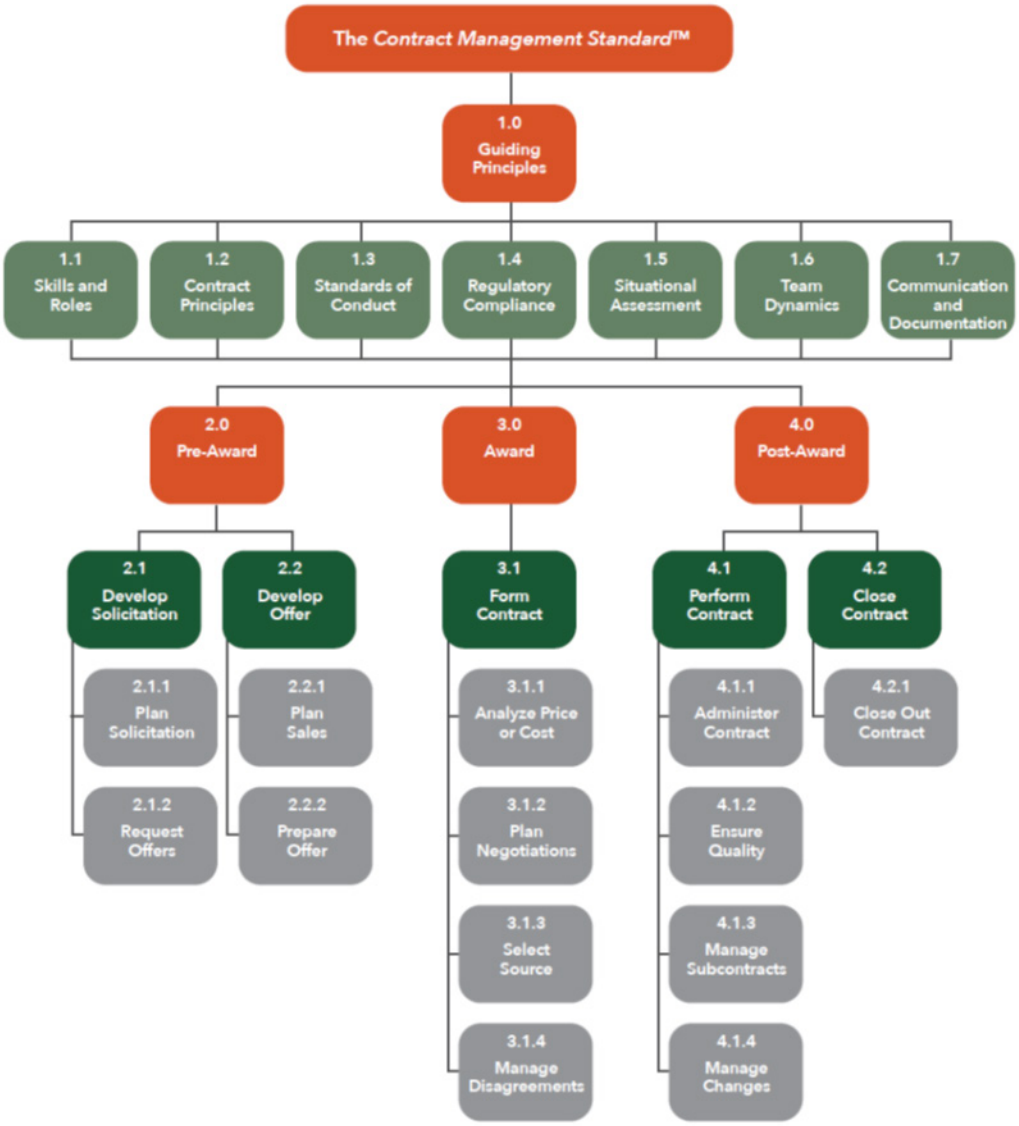

Figure 1. The Contract Management Standard. Source: NCMA (2022).

1. Pre-Award

Pre-award is focused on contract planning (NCMA, 2022). The buyer is responsible for developing a solicitation that accurately presents its customer's needs, including all the regulatory, technical, and quality requirements (NCMA, 2022). Specific tasks for the buyer include shaping internal customer requirements, formulating a contracting strategy, conducting market research, and finalizing a solicitation plan that will lead to responsive offers (NCMA, 2022).

The seller is responsible for providing a responsive offer with the intent of winning a contract and meeting all contract requirements (NCMA, 2022). To be determined "responsible," an offeror must have the necessary experience, operational control, technical skill, or ability to attain them, to fulfill all contract requirements (NCMA, 2019). The seller is responsible for understanding unique and special requirements, such as higher-level contract quality requirements, and assessing its capability to satisfy all solicitation requirements (NCMA, 2022). Specific seller tasks include assessing buyer relationships, determining supply chain support, evaluating solutions, requesting clarification, and conducting bid/no-bid analysis (NCMA, 2022).

As stated previously, the problem of adverse selection occurs in the pre-award phase due to competing objectives and asymmetric information. The government can mitigate the risk of adverse selection by conducting market research (Rendon, 2015). The buyer and seller communication and sharing of information during the market research process informs the buyer about capabilities within the market and provides industry with more details about the government's needs.

2. Award

Awarding the contract involves determining a fair and reasonable price, negotiating the proposal, source selection, and addressing misunderstandings (NCMA, 2022). Buyers are responsible for evaluating offerors' price or cost reasonableness and compliance, negotiations, source selection, contract award, and responding to protests and appeals (NCMA, 2022). Sellers are responsible for responding to clarification requests, negotiations, revising and or withdrawing offers, and submitting protests or appeals (NCMA, 2022). A proper contract award assures the highest probability of satisfactory contract performance at a fair and reasonable price. (NCMA, 2022). Because of the problems encountered in principal-agent theory, the government follows a structured source selection process. The source selection process is discussed in more detail in Section D.

3. Post-Award

The post-award phase involves contract administration and contract closeout. Successful contract performance and closeout require the buyer and seller to be engaged during contract administration (NCMA, 2022). Contract administration involves fulfilling contract requirements, providing the appropriate level of oversight to ensure quality, change management, and maintaining stakeholder relationships (NCMA, 2022). Providing the appropriate level of oversight minimizes the risk of unsuccessful contract performance (NCMA, 2022). Contract closeout involves verifying that all contract requirements are complete, outstanding items are resolved, and making the final payment (NCMA, 2022).

As previously stated, the problem of moral hazard occurs in the post-award phase due to competing objectives and asymmetric information. The government can mitigate moral hazard by monitoring contract performance and inspecting and accepting deliverables (Rendon, 2015). A structured contract management processes and proper government oversight protect against opportunistic behavior and provides motivation for principal-agent cooperation (Stremitzer, 2005).

This section discussed the contract management process, including the pre-award, award, and post-award phases of the contract life cycle. This section also discussed the processes where principal-agent theory problems and mitigations can occur. Because this research focuses on the problem of contractors not being determined technically acceptable during the source selection process, the next section will discuss the source selection process in more detail.

D. SOURCE SELECTION PROCESS

The source selection process is part of the award phase in the contract life cycle. Because of the problems encountered in principal-agent theory, the government follows a structured source selection process. Proposals are evaluated as described in the solicitation to ensure the offerors can fulfill all contract requirements (NCMA, 2022). A structured approach also assures a fair selection process for the seller (NCMA, 2022). FAR Subpart 15.101 (2023) states that the government "can obtain the best value in negotiated acquisitions by using any one or a combination of source selection approaches." A variety

of factors must be considered when choosing the appropriate source selection process, including how clearly the requirements are defined and understood in the market, and the relative importance of cost or price. FAR Subpart 15.101 (2023) discusses the best value continuum ranging from Lowest Price Technically Acceptable, to Tradeoff, to Highest Technically Rated Offer. We will discuss these source selection methods next.

1. Lowest Price Technically Acceptable

The Lowest Price Technically Acceptable (LPTA) process "is appropriate when the best value is expected to result from selection of the technically acceptable proposal with the lowest evaluated price (FAR 15.101-2, 2023)." LPTA is appropriate for commercial products and services and non-complex requirements that clearly define performance and quality standards (OUSD, 2022). When using the LPTA process, the solicitation must clearly define the technical acceptability criteria that will be used to evaluate the proposals (Office of the Under Secretary of Defense [OUSD], 2022). All technical factors area evaluated using a "go/no-go" rating system (NCMA, 2019). The technical acceptability of the proposal could be based on an approved quality management system.

Potential benefits to using LPTA include cost savings, accelerated contracting timeframes, and fewer bid protests (Congressional Research Service [CRS], 2021). On the other hand, disadvantages to using LPTA concern the lack of incentive for industry to improve its performance or develop innovative products and services (CRS, 2021). These disadvantages lead analysts to believe that LPTA contracts are not suited for maintaining and improving quality over time (CRS, 2021).

2. Tradeoff

The tradeoff process is appropriate when the government is more interested in a proposal with low risk or a superior solution than price (OUSD, 2022). Source selection involves tradeoffs between price and non-price factors to achieve performance objectives (OUSD, 2022). When using the tradeoff process, the solicitation must clearly state which evaluation factors are the most significant (NCMA, 2019).

3. Highest Technically Rated Offer

In this process, the source selected is the highest technically rated offer (HTRO) with a fair and reasonable price without tradeoffs (OUSD, 2022). The HTRO process is also appropriate for multiple award IDIQ contracts with price ceilings or delivery orders that require further competition (OUSD, 2022). If the price is not deemed fair and reasonable, then the HTRO is rejected (Federal Acquisition Institute [FAI], 2021). In this case, the next HTRO is evaluated until an award can be made. (FAI, 2021). Because the offerors are determined not technically acceptable due to quality requirements, the next section discusses contract quality requirements in more detail.

E. CONTRACT QUALITY REQUIREMENTS

FAR Part 46 (2023) provides the policies and procedures for ensuring the quality of products and services acquired through government contracts. FAR Part 46 (2023) defines contract quality requirements as "the technical requirements in the contract relating to the quality of the product or service and those contract clauses prescribing inspection, and other quality controls incumbent on the contractor, to assure that the product or service conforms to the contractual requirements." The specific contract quality requirements depend on the complexity and criticality of the product or service (FAR Part 46, 2023). These requirements range from inspection at the time of acceptance to an approved Quality Management System (QMS) (FAR Part 46, 2023). FAR Part 46.202 (2023) outlines four types of contract quality requirements: "Contracts for commercial products and commercial services, government reliance on inspection by the contractor, Standard inspection requirements, and higher-level contract quality requirements."

1. Commercial Products and Services

Commercial products and services are of a type that are available to the public. Typically, the government accepts commercial requirements the same way the public does (FAR Part 46, 2023). For instance, when purchasing a new vehicle, the government will rely on the manufacturer's existing quality system to ensure that it receives the product and quality it expects.

2. Government Reliance on Inspection by the Contractor

When using simplified acquisition procedures for non-commercial products, the government relies on contractor-performed tests and inspections to ensure quality (FAR Part 46, 2023). However, there may be instances when the government deems it necessary to have government personnel evaluate work in progress and perform the final acceptance tests and inspections (FAR Part 46, 2023). When deciding whether to provide this level of oversight, the government considers the criticality and complexity of the requirement, the risk and impact of defects, and the cost of additional oversight (FAR Part 46, 2023).

3. Standard Inspection Requirements

The contractor must have a government-approved inspection system for requirements above the simplified acquisition threshold (FAR Part 46, 2023). The approved inspection system does not preclude the government from performing tests and inspections to ensure quality requirements (FAR Part 46, 2023). The contractor shall also maintain a record keeping system that is accessible to the government (FAR Part 46, 2023).

4. Higher-Level Contract Quality Requirements

Higher-level contract quality standards are necessary for complex or critical products or services (FAR Part 46, 2023). These standards ensure successful contract performance by providing requirements and guidelines for organization, planning, documentation, operational control, and testing and inspection (FAR Part 46, 2023). These requirements and guidelines often incorporate a system of standards that accredited third parties establish (FAR Part 46, 2023). For instance, ISO 9001 provides requirements for an overarching Quality Management System (QMS) (FAR Part 46, 2023). SAE AS5553 is a product-specific standard for avoiding counterfeit electrical, electronic, and electromechanical parts from suppliers (FAR Part 46, 2023).

Government agencies are responsible for determining the risk of unsuccessful contract performance and which higher-level contract quality requirements to include in the solicitation and contract FAR Part 46 (2023). The Navy's procedures for applying higher-level contract quality requirements are delineated in the Joint Fleet Maintenance

Manual (JFMM). The next section will discuss the JFMM requirements for contracted maintenance.

F. JOINT FLEET MAINTENANCE MANUAL

For contracted ship maintenance, higher-level contract quality requirements stem from the Joint Fleet Maintenance Manual (JFMM) and its references. The Navy developed the JFMM to incorporate all maintenance requirements across all ship types (SUBMEPP, 2022). The JFMM is extensive and incorporates a myriad of requirements, references, and processes. The JFMM is made up of "seven distinct volumes: Volume I: New Construction, Volume II: Integrated Fleet Maintenance, Volume III: Deployed Maintenance, Volume IV: Tests and Inspections, Volume V: Quality Maintenance, Volume VI: Maintenance Programs, and Volume VII: Contracted Ship Maintenance. This section focuses on Volume VII. (SUBMEPP, 2022)"

Volume VII establishes the provisions for planning, execution, and oversight of contracted ship maintenance and modernization (SUBMEPP, 2022). Volume VII serves as a vehicle for implementing the FAR and includes mandatory procedures for the preparation of Work Items and use of NAVSEA Standard Items (NSI). A work item is an individual statement of work written in a standard format to accomplish a specific task or repair. NSIs are non-deviational requirements that invoke higher-level quality standards in the solicitation and contract for operational control and industrial processes such as welding, nondestructive testing, and painting.

To receive a contract award, offerors must have a Quality Management System (QMS) meeting the requirements of NSI 009-04: Quality Management System; provide. Third party certification is not required, however the QMS must address all aspects of ISO 9001 and additional requirements specified in NSI 009-04. ISO 9001 covers how an organization manages quality throughout the life cycle of its product or service from design, through production, installation, and maintenance. ISO 9001 is based on the following principles: "customer focus, leadership, involvement of people, process approach, system approach to management, continual improvement, factual approach to decision making, and mutually beneficial supplier relationships (NCMA, 2019)." NSI 009-

04 specifies QMS requirements that are in addition to ISO 9001 for calibration, verification of purchased product, subcontractor performance, test and inspection planning, documentation, government inspection, and corrective action requests. Other NSIs invoke higher-level quality standards for industrial processes such as welding, nondestructive testing, and painting. For instance, NSI 009-12 requires contractors to develop their welding procedures, inspection procedures, and qualification procedures to comply with a series of 18 military standards and specifications (Submarine Maintenance Engineering, Planning and Procurement [SUBMEPP], 2022). To receive a contract award, offerors must have a QMS and associated procedures that have been reviewed and accepted by the Navy's cognizant Regional Maintenance Center (RMC).

In addition to invoking NSIs for higher-level contract quality requirements, JFMM Volume VII outlines government responsibilities for ensuring that contractors resolve quality issues and improve quality processes. The contractor is responsible for controlling quality (SUBMEPP, 2022). Additionally, the government will not replace the contractor's QMS to determine the final product acceptability (SUBMEPP, 2022). To ensure proper oversight and compliance with contract requirements, RMCs are required to establish a comprehensive Contract Administration Quality Assurance Program (CAQAP) (SUBMEPP, 2022). RMCs are responsible for tailoring their CAQAP to provide the most effective and economical government oversight in their contracting environment (SUBMEPP, 2022). At a minimum, the CAQAP must include provisions for the following actions: inspection of product or process; review and acceptance of QMS and associated procedures; teaming with offerors and contractors to establish and improve their QMS and associated procedures; maintenance of government records for surveillance, nonconformities, and correction action requests; and final acceptance of product (SUBMEPP, 2022). Additional CAQAP actions to consider include bidder conferences, pre-award surveys, post-award conferences, and arrival conferences.

This section covered the higher-level contract quality requirements that stem from the JFMM. Requirements for contractor QMS and associated procedures for contracted ship maintenance were also discussed. Additionally, this section also outlined RMC responsibilities for developing and tailoring a CAQAP. To ensure contractors' QMS and

associated procedures meet JFMM requirements, Forward Deployed Regional Maintenance Center has its own contract management oversight policy which will be discussed next.

G. FDRMC CONTRACT MANAGEMENT OVERSIGHT POLICY

The JFMM requires RMCs to establish and tailor a CAQAP to provide the most effective and economical government oversight in their contracting environment (SUBMEPP, 2022). Forward Deployed Regional Maintenance Center (FDRMC) in Naples, Italy, provides contracted ship maintenance throughout the Navy's 6th Fleet area of operations (FDRMC, n.d.). FDRMC developed a local instruction to implement CAQAP requirements, FDRMCINST 4355.4B: Contract Administration Quality Assurance Program (2019). This instruction states that contractors utilized to repair, alter, or convert U.S. naval vessels are required to establish and maintain contract quality requirements, up to and including a Quality Management System (QMS) per NSI 009-04: Quality Management System; provide (Forward Deployed Regional Maintenance Center [FDRMC], 2019). This section outlines FDRMC's process for contract management oversight policy in accordance with FDRMCINST 4355.4B.

In the pre-award phase, FDRMC ascertains and shapes customer requirements into work items and specifications using NSIs. Additionally, FDRMC prepares a contractor technical qualification checklist of higher-level contract quality standards for the solicitation (FDRMC, 2019). This checklist is provided to the contracting officer with the requirements package (FDRMC, 2019). A QMS satisfying the requirements of NSI 009-04 is always included on the checklist. Procedures for product or process specific quality requirements included on the checklist depends on the particular type of work that is being contracted out (e.g., welding, nondestructive testing, painting, etc.). FDRMC provides the work items, reference data, independent government estimate, funding, market research, location, and period of performance information to the contracting officer for solicitation. FDRMC relies on Fleet Logistics Center (FLC) Sigonella for contract actions (SUBMEPP, 2022). The solicitations and contracts reviewed for this research were prepared by FLC using the Lowest Price Technically Acceptable (LPTA) source selection process. The

technical acceptability of proposals is based on an approved quality management system and any procedures for product or process specific quality requirements included on the solicitation checklist.

The LPTA solicitations and contracts reviewed for this research were prepared by FLC and use the Uniform Contract Format (UCF) in FAR Part 15.204. The various sections of the UCF coveys contract terms and conditions, technical requirements, and the basis for award to potential offerors. The UCF provides a description of the services being procured, including the location and period of performance. FDRMC work items are listed as Contract Line Item Numbers (CLIN) in Section B. Section J identifies attachments to the solicitation. Solicitations for FDRMC requirements include three attachments: Attachment 1 Contractor's Price Breakdown, Attachment 2 Specification Package (Work Items and Reference Data), and Attachment 3 Section L Contractor Technical Qualifications Checklist. Section L instructions for offerors and Section M basis for award will be discussed next.

Section L provides instructions, conditions, and notices to guide offerors in the preparation and submittal of their proposal. This section states the deadline for when proposals are due, provides the point of contact information for submitting a proposal, and explains what is required to be included in a proposal. Proposals for FDRMC requirements must include the following information which has been standardized in most solicitations since 2017:

a) Price: Section B "Supplies/Services and Price" and Attachment 1 "Contractor's Price Breakdown" must be filled. The Attachment must be filled providing the number of man hours, labor rate, total labor cost, subcontractor and material and any other costs.

b) Technically Capability documentation: Submission of all applicable technical qualifications that are marked within the Attachment 3 Contractor Technical Qualifications Checklist.

Section M identifies all the significant factors and any significant subfactors that will be considered in evaluating proposals. The evaluation factors for LPTA are based on

technical capability and then price (NCMA, 2019). For FDRMC requirements, the technical acceptability of a proposal is based on an approved quality management system and any procedures for product or process specific quality requirements submitted per Section L. FDRMC is responsible for the evaluation and rating of the QMS and procedures as "acceptable" or "unacceptable." Proposals rated technically unacceptable are ineligible for award.

When there are no proposals with an acceptable QMS and associated procedures, FDRMC performs a risk assessment to identify the source that has the highest probability of satisfactory contract performance. This process involves evaluating QMS deficiencies, and deficiencies found in procedures for product or process specific quality requirements, against the impact of noncompliance with technical requirements. The results of the risk assessment are documented in a FDRMC internal memo. Instead of informing FLC that there are no technically acceptable proposals, FDRMC informs FLC that the source with the highest probability of satisfactory contract performance is technically acceptable. FLC then proceeds with contract award based on FDRMC's technical acceptability rating.

During the post-award phase, FDRMC provides 100% oversight on work items to mitigate the risks documented in its internal memo. FDRMC actively engages the contractor to establish and improve their QMS and associated procedures to comply with contract requirements. If higher-level quality standards cannot be met in time to support the period of performance, FDRMC can initiate a contract modification to cancel work that can be postponed to another maintenance period or initiate a request for a Departure from Specification (DFS) to complete the work with an unqualified contractor. A DFS documents and tracks noncompliant work until it is corrected or adjudicated by the proper engineering authority (SUBMEPP, 2022). For instance, FDRMC's engineering department would need to approve a DFS to allow a contractor to weld a shipboard structure or piping system with equipment, material, qualifications and or procedures that do not comply with NSI requirements for welding. Ships are designed and built to execute mission requirements in various operating environments (SUBMEPP, 2022). Ships must be maintained to their designed specifications to ensure they can complete their missions (SUBMEPP, 2022).

FDRMCINST 4355.4B (2019) recognizes that following all NSI requirements for QMS and associated procedures will not always be possible for emergent work situations. Emergent work situations are referred to as Voyage Repairs (VR). The JFMM states that "VRs are solely for the accomplishment of corrective maintenance of mission or safety essential items necessary for a ship to continue its mission (SUBMEPP, 2022)." Due to their unscheduled nature, remote locations, and limited planning timelines, modified procedures are required to confirm the quality of contracted work (FDRMC, 2019). Modified procedures for VRs include identifying the source that has the highest probability of satisfactory contract performance, providing 100% oversight, and initiating DFSs when necessary. FDRMCINST 4355.4B (2019) does not give the same allowances for modified procedures for the Aegis Ashore Missile Defense System in Romania. This section discussed FDRMC's contract management oversight policy. It described how FDRMC implements JFMM requirements to establish and tailor a CAQAP for its area of operations. This section also discussed how FDRMC works closely with FLC to use the LPTA source selection process and address situations when there are no technically acceptable proposals. The problems that are occurring at FDRMC when there are no technically acceptable offerors is just one example of the challenges that the Navy is experiencing with ship maintenance in overseas locations. The next section discusses a GAO report about the approaches the Navy uses for ship maintenance in overseas locations.

H. GAO REPORT

GAO-20-86 described the Navy's capacity and approaches for maintaining surface ships based overseas (GAO, 2020). This report also described how the challenges with overseas maintenance impact the Navy's mission to protect national interests and our allies and respond to crises (GAO, 2020). The Navy's ability to accomplish overseas maintenance is essential for mission readiness (GAO, 2020). For its report, GAO (2020) focused on surface ship maintenance in Japan, Spain, and Bahrain from 2014 through 2018. For each location, there is a cognizant Regional Maintenance Center (RMC) for this maintenance (GAO, 2020). The RMCs are responsible for planning and overseeing contracted maintenance and ensuring quality standards are met (GAO, 2020). Table 1

provides an overview of the surface ships based in these locations and the respective Navy and contractor industrial base capacity to provide maintenance.

Table 1. U.S. Navy and Contractor Industrial Base Available for Depot-level Maintenance of U.S. Surface Ships Based at Homeports in Japan, Spain, and Bahrain as of September 2018. Source: GAO (2020).

Table 1: U.S. Navy and Contractor Industrial Base Available for Depot-level Maintenance of U.S. Surface Ships Based at Homeports in Japan, Spain, and Bahrain, as of September 2018

U.S. Navy maintenance organization	Surface ships based at homeport[a]	U.S. Navy maintenance facilities and capacity[b]	Contractor industrial base capacity
	Pacific Fleet Area of Responsibility		
U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center (SRF-JRMC) Yokosuka, Japan	12 surface ships[c] • 8 Destroyers (DDG) • 3 Cruisers (CG) • 1 Amphibious command ship (LCC)	Navy dry-dock capacity: 6 • 3 Navy-certified docks can accommodate DDG, CG, and LCC • 1 Navy-certified dock can fit approximately MCM-sized ships • 2 dry docks not certified SRF-JRMC authorized workforce[c] • U.S. military and civilian: 380 • Japanese nationals: 2,341	Dry-dock capacity • Work generally conducted on base; possible contractor docks available Contractor industrial base • One contractor for most work • Additional smaller contractors and vendors
SRF-JRMC Detachment Sasebo Sasebo, Japan	8 surface ships[d] • 1 Amphibious assault (LHD) • 1 Amphibious transport dock (LPD) • 2 Dock landing ships (LSD) • 4 Mine countermeasures (MCM)	Navy dry-dock capacity: 2 • 1 Navy-certified dry dock fits LSD; does not easily fit larger amphibious ships • 1 larger dry dock not certified SRF-JRMC authorized workforce • U.S. military and civilian: 105 • Japanese nationals: 450	Dry-dock capacity • Work generally conducted on base; possible contractor docks available Contractor industrial base • About a dozen smaller Japanese contractors and vendors
	Fleet Forces Area of Responsibility		
Forward Deployed Regional Maintenance Center (FDRMC) Detachment Rota Rota, Spain	4 surface ships • 4 DDG	Navy dry-dock capacity: 0 FDRMC authorized workforce • U.S. military and civilian: 81	Dry-dock capacity • No contractor dry docks used for ships based in Spain Contractor industrial base • One contractor provides depot-level maintenance
FDRMC Detachment Bahrain Manama, Bahrain	14 surface ships[e] • 10 Patrol Coastal (PC) • 4 MCM	Navy dry-dock capacity: 0 FDRMC authorized workforce • U.S. military and civilian: 130 (including 14 direct-hire foreign-national civilian positions)	Dry-dock capacity • 4 contractor docks for PC and MCM based in Bahrain; could accommodate some larger ships Contractor industrial base • Two main contractors provide depot-level maintenance

Source: GAO analysis of Navy information and discussions with Navy officials. | GAO-20-86

The Navy has several overseas locations that provide surface ship maintenance (GAO, 2020). Each location has different methods and strategies for providing maintenance depending on the available industrial base and the quantity and types of ships that require maintenance (GAO, 2020). In Sasebo, Japan, approximately two-thirds of ship

maintenance is contracted out to local private companies while the remainder is accomplished in-house (GAO, 2020). Additionally, the Japanese government subsidizes the facility and labor costs for maintenance performed by Japanese nationals (GAO, 2020). In Rota, Spain, Navantia is the only contractor available to maintain the ships based there (GAO, 2020). Navantia has a cadre of BAE Systems Ship Repair representatives embedded in their workforce to help ensure maintenance processes follow U.S. Navy requirements (Lundquist, 2015). BAE has extensive experience maintaining U.S. Navy surface ships in Norfolk, Jacksonville, San Diego, and Pearl Harbor (Lundquist, 2015). In Bahrain, there are two main contractors to maintain the ships based there (GAO, 2020).

When assessing the performance of these locations, GAO found that most of the planned maintenance was not completed on time. Specifically, of the 71 maintenance periods studied, 50 were completed later than planned (GAO, 2020). Of the 50 maintenance periods that were late, 29 were delayed 31 or more days longer than planned (GAO, 2020). Bahrain experienced the most delays while Spain experienced the least (GAO, 2020). The Navy found a lack of key personnel, planning issues, and unexpected maintenance requirements attributed to schedule delays (GAO, 2020). However, the GAO reported that the Navy's analysis of the schedule delays should have gone deeper to address the root cause (GAO, 2020). The GAO states that the Navy needs to comprehensively analyze its overseas maintenance requirements to ensure it has the necessary resources and processes to provide timely and effective maintenance (GAO, 2020). If the Navy were to conduct such an analysis, it would be beneficial to include the maintenance needs for the Aegis Ashore Missile Defense System in Romania, which is maintained by FDRMC in the same manner as a ship to JFMM requirements.

This section discussed a GAO report from 2020 that described the Navy's capacity and approaches for maintaining surface ships overseas. This section also discussed the GAO's findings that the Navy has not yet conducted a comprehensive analysis of its overseas maintenance and resource requirements. The Navy's approaches for overseas maintenance have changed over time with its mission requirements. The following section discusses previous research on the Navy's overseas maintenance approaches.

I. PREVIOUS RESEARCH

Conducting ship maintenance, repair and modernization overseas has been an ongoing challenge for the Navy. In the 1990s, the Navy relied on surface ship tenders and foreign-based contractors to provide overseas maintenance (Marchbanks, 1992). One challenge to contracted ship maintenance overseas during the 1990s was finding and developing foreign-based contractors to perform maintenance to Navy standards (Marchbanks, 1992). To mitigate this challenge and ensure satisfactory maintenance from capable contractors, the Navy utilized Master Ship Repair Agreement (MSRA) certifications (Marchbanks, 1992).

The MSRA is a region-specific agreement between a Navy organization and a vetted contractor to conduct maintenance and repairs on Navy ships (Commander, Navy Regional Maintenance Center [CNRMC], 2021). The MSRA aims to establish the terms and conditions for future contracts (CNRMC, 2021). Prospective MSRA holders must have the facilities, operational controls, production capabilities, and quality management systems necessary to perform ship maintenance (CNRMC, 2021). Regional Maintenance Centers are responsible for facilitating the MSRA process, including conducting site surveys and gathering documentation from MSRA applicants (CNRMC, 2021). The specific qualification requirements and procedure for issuing MSRA certifications are delineated in Volume VII of the JFMM (SUBMEPP, 2022).

J. SUMMARY

This chapter presented the literature review that sets the foundation for this research. It covered the theoretical foundation of agency theory, the problems of adverse selection and moral hazard and how that theory applies to contracting. Next, it discussed the contract management process. Then, the chapter expanded on the source selection process with an emphasis on the Lowest Price Technically Acceptable approach. Next, it discussed contract quality requirements. Then, the chapter covered the Joint Fleet Maintenance Manual's requirements for contracted maintenance. Next, Forward Deployed Regional Maintenance Center's contract management oversight policy was discussed. The chapter then examined a GAO report that describes some of the approaches the Navy uses

to maintain its ships that are homeported in overseas locations. Finally, the chapter concluded with a brief discussion about MSRA certifications for ship maintenance. The next chapter describes the mission and contracting environment of Forward Deployed Regional Maintenance Center in Naples, Italy.

III. THE STAKEHOLDERS

A. INTRODUCTION

This chapter provides an overview of the key stakeholders involved with Forward Deployed Regional Maintenance Center's (FDRMC) contracted maintenance for the Aegis Ashore Missile Defense System (AAMDS) in Romania. These stakeholders include Naval Sea Systems Command (NAVSEA), Commander, Navy Regional Maintenance Center (CNRMC), FDRMC, and the AAMDS. After a brief description of the key stakeholders, the mission and history of FDRMC and the AAMDS are discussed in more detail.

B. NAVAL SEA SYSTEMS COMMAND

NAVSEA is the Navy's largest system command (NAVSEA, n.d) NAVSEA's mission is to "design, build, deliver, and maintain ships, submarines, and systems reliably, on-time and on-cost (NAVSEA, n.d.)." To accomplish this, NAVSEA manages a work force of 86,000 civilian and military personnel in numerous Program Executive Offices and field activities (NAVSEA, n.d.). Figure 2 illustrates the NAVSEA organization structure that reports to the Chief of Naval Operations, which includes Submarine Maintenance Engineering, Planning and Procurement (SUBMEPP) and CNRMC (NAVSEA, 2023). In addition to providing manpower and resources, NAVSEA establishes and enforces the technical requirements for the Navy (NAVSEA, n.d.). These requirements include the Joint Fleet Maintenance Manual (JFMM), which is developed by SUBMEPP. As discussed in the previous chapter, the JFMM provides a single reference for maintenance requirements for all ship types and serves as a vehicle for implementing higher-level contract quality requirements for contracted ship maintenance. CNRMC is the link between NAVSEA and FDRMC. The following section discusses CNRMC.

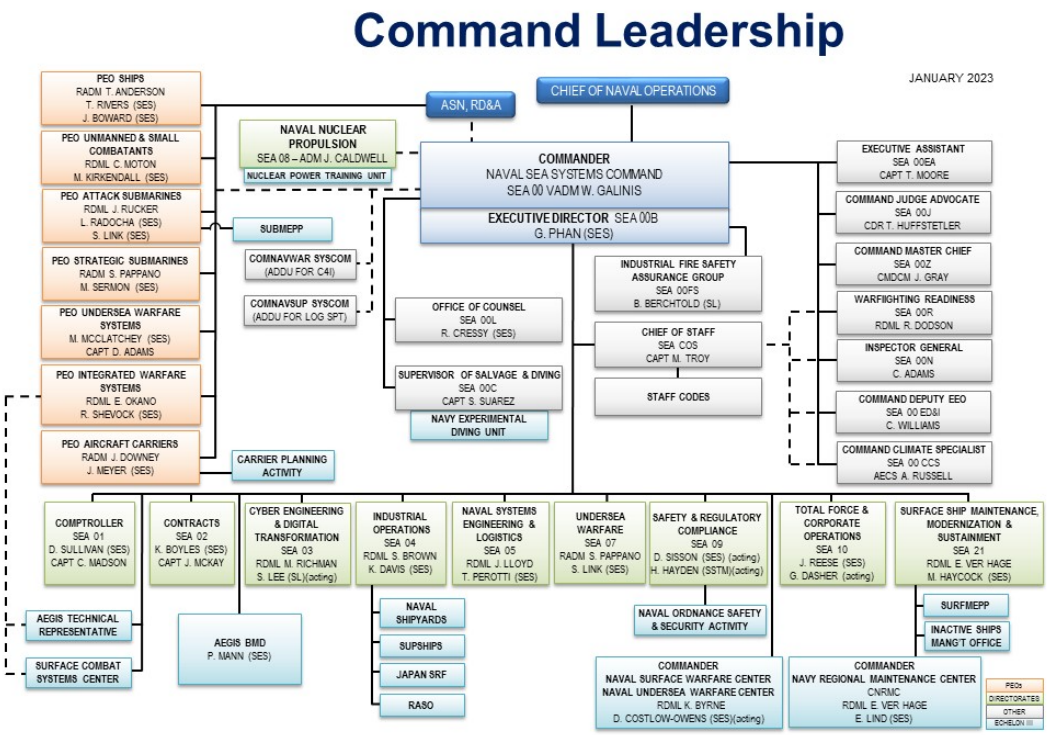

Figure 2. NAVSEA's Organization Chart. Source: NAVSEA (2023).

C. COMMANDER, NAVY REGIONAL MAINTENANCE CENTER

CNRMC's mission is to "deliver quality cost-wise material readiness to support U.S. naval forces worldwide (CNRMC, n.d.)." Established in 2010, CNRMC oversees the Navy's Regional Maintenance Centers (RMC) in their execution of contracted ship maintenance (CNRMC, n.d.). This oversight includes FDRMC and its detachment sites in Spain and Bahrain (CNRMC, n.d.). CNRMC enforces JFMM requirements and reviews and approves FDRMC's local Contract Administration Quality Assurance Program (CAQAP) (FDRMC, 2019). The following section describes FDRMC in more detail.

D. FORWARD DEPLOYED REGINAL MAINTENANCE CENTER

FDRMC is headquartered in Naples, Italy, and has detachment sites in Manama, Bahrain, and Rota, Spain (GAO, 2020). FDRMC's mission is to deliver and maintain mission-ready ships throughout the 5th and 6th Fleet area of operation. (FDRMC, n.d.). Figure 3 shows the area of operation for each of the Navy's Fleets. Each location requires

a different method and strategy for contracted maintenance depending on the available industrial base and the type of maintenance required (GAO, 2020).

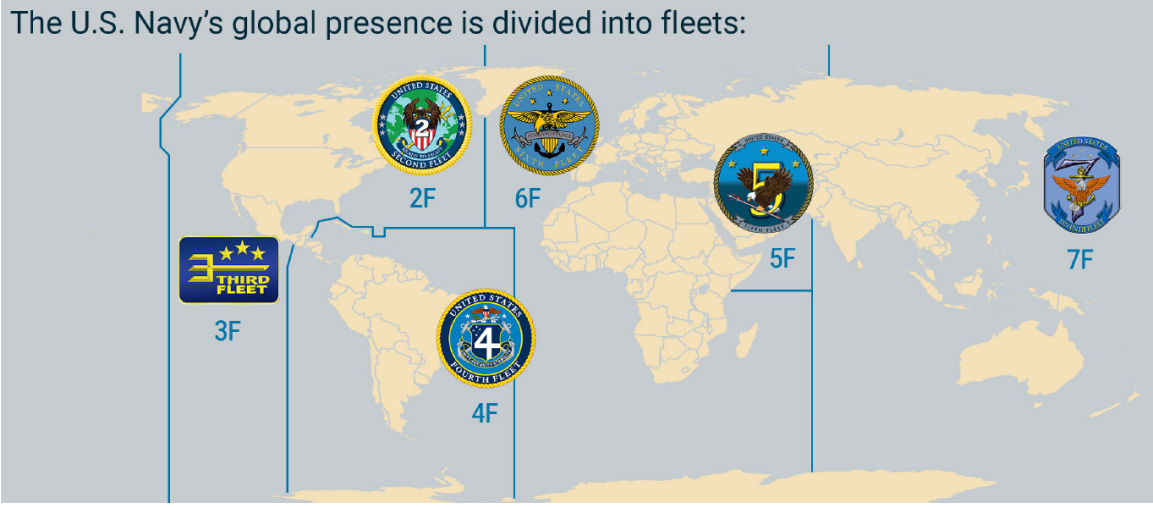

Figure 3. Numbered Fleets of the U.S. Navy. Source: U.S. Navy (2021)

1. History

FDRMC Detachment Rota became operational on December 10, 2013, with the mission to oversee industrial engineering and contractor services for the maintenance and modernization of four Arleigh Burke-class guided-missile destroyers homeported in Rota (GAO, 2020). As an organization, FDRMC was established on June 30, 2014, at Naval Support Activity, in Naples, Italy (GAO, 2020) FDRMC was established to meet the Navy's expanding need for overseas ship repair in the 5th and 6th Fleets (FDRMC, n.d.). Prior to establishing FDRMC, RMC functions in these areas were aligned under Mid-Atlantic Regional Maintenance Center (CNRMC, n.d.). After the AAMDS in Romania was declared operational in 2016, FDRMC Naples was assigned as the Naval Supervisor Authority (NSA) for the AAMDS maintenance availabilities (SURFLANT, 2014). The NSA is responsible for the integration and certification of all work accomplished by all organizations during maintenance availabilities (SUBMEPP, 2022).

2. FDRMC Naples

FDRMC Naples provides command and control functions, and oversight for the detachments in Rota and Bahrain (FDRMC, n.d.). FDRMC Naples relies on foreign-based contractors to provide industrial ship repair support within the 6th Fleet (FDRMC, n.d.). Key departments within FDRMC Naples include engineering, waterfront operations, and quality assurance. The engineering department consists of various subject matter experts and technicians that provide distance support and onsite technical assistance for ships and the AAMDS in Romania (FDRMC, n.d.). The waterfront operations department consists of project managers and shipbuilding specialists that plan and manage all contracted ship maintenance. The quality assurance department implements a local CAQAP, prepares the contractor technical qualifications checklist for solicitations, approves contractor quality management systems and associated procedures, and develops plans to oversee contractor performance (FDRMC, 2019). Supporting departments include the operations center, finance, and corporate operations.

Prior to being assigned as the NSA for the AAMDS maintenance availabilities, FDRMC Naples' workload consisted of supporting its detachments and conducting emergent voyage repairs throughout the 6th Fleet. When a ship requires voyage repairs, FDRMC Naples reviews the ship's schedule and expedites market research to find a suitable port of call with ship repair capability. Voyage Repairs are accomplished using foreign-based contractors. FDRMC relies on Naval Supply Systems Command Fleet Logistics Center (NAVSUP FLC) Sigonella to perform the contracting functions for its contracted maintenance (SUBMEPP, 2022). Due to the unscheduled nature of voyage repairs, limited planning timelines, remote locations, and the large area of the 6th Fleet, FDRMC Naples does not have continuous relationships with the private sector industrial base.

3. FDRMC Detachment Rota

FDRMC Rota is responsible for managing the maintenance of the Arleigh Burke-class guided-missile destroyers based there (GAO, 2020). FDRMC Rota also provides technical assistance and contracted maintenance to transient ships that visit Rota (GAO,

2020). FDRMC Rota has the same departmental structure as FDRMC Naples, plus a production department capable of some intermediate-level maintenance and repair for the homeported destroyers (FDRMC Rota, n.d.). NAVSUP FLC Sigonella provides the contracting functions for contracted work and provides integrated logistics support (GAO, 2020). FDRMC Rota relies on one Spanish state-owned shipbuilding company, Navantia, to maintain the ships based there (GAO, 2020). Navantia builds naval platforms such as frigates, submarines, patrol vessels, aircraft carriers, and amphibious ships (Navantia, n.d.). Navantia has a cadre of BAE Systems Ship Repair representatives embedded in their workforce to help ensure maintenance processes follow U.S. Navy requirements (Lundquist, 2015).

4. FDRMC Detachment Bahrain

At one point, FDRMC Bahrain managed the maintenance for the most homeported ships of all the Navy's overseas locations (GAO, 2020). In 2018, there were 14 ships homeported there: four Mine Counter Measure ships and 10 Patrol Coastal (PC) ships (GAO, 2020). However, the Navy decommissioned the last two PC ships in March 2023 (U.S. Naval Forces Central Command Public Affairs, 2023). FDRMC relies on two main contractors to provide ship maintenance, Bahrain Ship Repairing and Engineering Company and Arab Shipbuilding and Repair Yard (GAO, 2020). FDRMC Bahrain also uses foreign-based contractors to provide voyage repairs for transient ships within the 5th Fleet (GAO, 2020). FDRMC Bahrain has a similar departmental structure as FDRMC Rota, including a production department capable of some intermediate-level maintenance and repair, and NAVSUP FLC Sigonella support for contracting functions and logistics (FDRMC Bahrain, n.d.).

E. AEGIS ASHORE MISSILE DEFENSE SYSTEM

The AAMDS in Romania is part of the European Phased Adapted Approach (EPAA) (SURFLANT, n.d.). It is under the operational control of the Navy's 6th Fleet and protects U.S. forces and allies in the region (SURFLANT, n.d.). As shown in Figure 4, the AAMDS is a land-based missile defense system (SURFLANT, n.d.). The AAMDS uses the same Aegis Ballistic Missile Defense (BMD) system as the Aegis destroyers based on

Rota, Spain (MDA, 2022). The AAMDS in Romania is for defensive purposes only and the missiles do not have explosive warheads (U.S. Embassy in Romania, n.d.). Instead, the AAMDS missiles track and destroy incoming enemy missiles by colliding with them in the atmosphere (Raytheon, n.d.).

Figure 4. U.S. Aegis Ashore Missile Defense System in Romania. Source: U.S. Aegis Ashore Missile Defense System Romania (2023)

1. History

The Barack Obama administration conceived the European Phased Adapted Approach (EPAA) missile defense system in 2009 to defend against Iranian missile threats (Sankaran, 2015). The EPAA is designed to adapt and respond in proportion to Iranian capabilities (Sankaran, 2015). As originally planned, the EPAA missile defense system was to consist of four phases, beginning in 2011 and expected to reach full deployment in 2023, as follows: Phase 1 consists of the SM-3 IA missiles on Aegis ships in the Mediterranean Sea and a land-based radar in Turkey. Phase 2 consists of SM-3 IB missiles deployed on Aegis ships and the AAMDS site in Romania. Phase 3 consists of SM-3 IIA missiles deployed on Aegis ships and an additional AAMDS site in Poland. Phase 4 was planned to consist of SM-3 IIB missiles deployed at the AAMDS sites in Romania and

Poland. However, this Phase 4 was canceled due to development issues and funding (Sankaran, 2015).

2. Location and Organization

The AAMDS is physically bound within the Naval Support Facility (NSF) in Deveselu, Romania. NSF Deveselu is made up of approximately 200 personnel (U.S. Embassy in Romania, n.d.). This includes DOD civilian employees, contractors, and sailors assigned to the installation and the AAMDS (U.S. Embassy in Romania, n.d.). NSF Deveselu operates on 430 acres and is co-located with the 99th Romanian Military (U.S. Embassy in Romania, n.d.). The installation is located roughly 110 miles southwest of the nation's capital Bucharest and 25 miles from the Bulgarian border. NSF Deveselu has a Base Operations Support (BOS) contractor that operates and maintains the facilities and equipment for personnel and infrastructure support (Naval Technology, 2020). This includes food and housing services, morale, welfare, recreation services, utility systems, a fire station, custodial services, and grounds maintenance (Naval Technology, 2020).

The AAMDS is manned by Naval officers and enlisted personnel who are deployed to the site on a two-facet rotation cycle (SURFLANT, 2014). The command and staff element are on a staggered one-year unaccompanied tour, while the watch teams are on a six-month deployment rotation (SURFLANT, 2014). This rotational crew is augmented by a team of Lockheed Martin contractors integrated into the AAMDS manning construct to support continuous maintenance of the AWS and Mission Critical Support Equipment (SURFLANT, 2014). Additionally, the AAMDS has a Port Engineer. The Port Engineer is responsible for coordinating with stakeholders to develop and prioritize maintenance and modernization requirements for the AAMDS (SUBMEPP, 2022). The Port Engineer directs what work shall be done, when the work will be accomplished, and which organization will do the work (SUBMEPP, 2022). The Port Engineer assigns work to FDRMC, which is then contracted out to foreign-based contractors for accomplishment.

3. Maintenance Strategy: Treat It Like a Ship

Maintenance for the AAMDS adheres to JFMM requirements (SURFLANT, 2014). The AAMDS maintains its mission readiness by ceasing operations for scheduled

maintenance availabilities in the same manner as a ship (SURFLANT, 2014). Maintenance availabilities are scheduled periods of time to allow maintenance to be accomplished by outside sources, such as FDRMC contractors (SUBMEPP, 2022). The AAMDS typically has two to three maintenance availabilities each year. Maintenance availabilities range from two to six weeks for routine maintenance (GAO, 2020). Longer maintenance availabilities are scheduled every two to three years to conduct complex maintenance and modernization work (GAO, 2020). Leading up to a maintenance availability, the Port Engineer is responsible for the initial planning, directing what work shall be done, and which organization will do the work (SUBMEPP, 2022). As the work becomes more defined and the period of performance approaches, the FDRMC Naples Project Manager takes over the integration of work, including oversight and certification of all work accomplished by all organizations (SUBMEPP, 2022).

F. SUMMARY

This chapter provided an overview of the key stakeholders involved with FDRMC's contracted maintenance for the AAMDS in Romania. This chapter discussed the links between NAVSEA, CNRMC, FDRMC, and the AAMDS. The next chapter presents the methodology on how the research will be conducted.

IV. METHODOLOGY

A. INTRODUCTION

This chapter presents the methodology used to obtain and analyze the data for this research. First, this chapter will discuss the source of the data and how the data will be collected. Then, this chapter will describe how the data will be analyzed.

B. SOURCE OF DATA

The source of data for this research is a repository of Forward Deployed Regional Maintenance Center (FDRMC) contract files. FDRMC contract files include work items, references, estimates, funding documents, solicitation documentation, contractor technical qualification checklist, proposals, technical acceptability ratings, contract and modifications, corrective actions requests, and invoices. The repository is stored on a shared network drive that is accessible to FDRMC employees. The following section describes how the data will be collected. Access to the data was approved by the Naval Postgraduate School Institutional Review Board on December 27, 2022.

C. DATA COLLECTION

The data for this research will be collected from the FDRMC repository of contract files. First, the files will be filtered to identify contracts for fiscal years 2017 through 2022. Then, these files will be filtered to identify maintenance contracts for the Aegis Ashore Missile Defense System (AAMDS) in Romania. The files will be reviewed to identify the evaluation factors used to determine the technical acceptability of proposals. Specifically, the files will be reviewed to identify any higher-level contract quality requirements used to determine the technical acceptability of proposals. Additionally, the number of proposals for each solicitation and the justification for each technical evaluation rating will be collected for this research. The following section explains the gap analysis that will be used to assess this data.

D. DATA ANALYSIS

The data collected for this research will be assessed using a gap analysis. The gap analysis will compare the technical evaluation rating of each proposal to the evaluation factors used to determine technical acceptability in the source selection process. The technical evaluation factors that are not being met will be identified and analyzed to determine what recommendations can be made to ensure future offerors' technical proposals can be evaluated as technically acceptable in source selections.

E. SUMMARY

This chapter presented the methodology that will be used to obtain and analyze the data for this research. First, this chapter discussed the source of the data and how the data will be collected. Then, this chapter described how the data will be assessed using gap analysis. The next chapter discusses the research findings and analysis.

V. FINDINGS AND ANALYSIS

A. INTRODUCTION

The purpose of this chapter is to present the findings of this research for maintenance at the Aegis Ashore Missile Defense System (AAMDS) in Romania. This chapter will discuss the proposals received for this maintenance during fiscal years 2017 through 2022 and why some were deemed technically unacceptable. This chapter will also discuss the implications of the findings for maintaining all ship systems and components to their designed specifications which could impact the AAMDS mission. Finally, this chapter will provide recommendations based on the findings.

B. FINDINGS

Forward Deployed Regional Maintenance Center (FDRMC) received 19 proposals for maintenance contracts for the AAMDS during fiscal years 2017 through 2022. Of the 19 proposals, 13 contracts were awarded. Of the 13 contracts, 6 contracts were awarded to offerors with technically unacceptable proposals. These contracts were awarded using the Lowest Price Technically Acceptable (LPTA) source selection process. When there were no technically acceptable proposals, contracts were awarded to the source with the highest probability of satisfactory contract performance. Table 2 summarizes the number of proposals received, the number of contracts awarded, and the number of contracts awarded to technically unacceptable proposals. Pseudonyms are used to protect the anonymity of the offerors.

Table 2. Proposals and Contract Awards by Offeror for AAMDS Maintenance During Fiscal Years 2017 Through 2022

Offeror Pseudonym	Proposals Received	Contract Awards	Contracts with Technically Unacceptable Proposals
Alpha	1	1	0
Bravo	2	1	0
Charlie	10	7	4
Delta	1	1	1
Echo	1	1	0
Frank	3	1	0
Golf	1	1	1
Total	**19**	**13**	**6**

The technical acceptability criteria specified in the solicitations were based on higher-level quality standards. All solicitations required an approved Quality Management System (QMS) meeting the requirements of NAVSEA Standard Item (NSI) 009-04. Seven of the solicitations required process-specific quality standards in addition to an approved QMS. Maintenance contracts that included welding and inspection of welds required approved qualifications and welding and inspection procedures meeting the requirements of NSI 009-12. Maintenance contracts that included painting of critical coated areas, such as the exterior of the missile launchers, required approved worker and inspector qualifications meeting the requirements of NSI 009-32. Table 3 outlines the higher-level quality standards for each solicitation, the technical acceptability rating for each offeror (using pseudonyms), a gap description for the technically unacceptable proposals, and the offerors that won contracts.

Table 3. Higher-Level Quality Standards, Offerors, and Gap Description for AAMDS Solicitations During Fiscal Years 2017 Through 2022.

Solicitation	Higher-level Quality Standards	Offeror(s)	Technically Acceptable	Gap Description	Contract Award
1 (FY17)	NSI 009-04: Quality Management System (QMS) NSI 009-12: Weld, Fabricate, and Inspect NSI 009-32: Cleaning and Painting Requirements	Alpha	Yes	None.	X
2 (FY17)	NSI 009-04: Quality Management System (QMS)	Bravo	Yes	None.	X
3 (FY17)	NSI 009-04: Quality Management System (QMS) NSI 009-12: Weld, Fabricate, and Inspect NSI 009-32: Cleaning and Painting Requirements	Bravo	No	Bravo: Maintenance of welder qualifications do not meet NSI 009-12 requirements.	
		Charlie	No	Charlie: Submitted an ISO: 9001 QMS certificate instead of QMS manual. The offerors' QMS manual must be reviewed and approved prior to contract award. Worker and inspector qualifications do not meet 009-32 requirements.	X
4 (FY18)	NSI 009-04: Quality Management System (QMS)	Charlie	No	Charlie: Submitted an ISO: 9001 QMS certificate instead of QMS manual. The oferors' QMS manual must be reviewed and approved prior to contract award.	X
5 (FY18)	NSI 009-04: Quality Management System (QMS)	Delta	No	Delta: Did not provide a QMS manual. The offerors' QMS manual must be reviewed and approved prior to contract award.	X
6 (FY18)	NSI 009-04: Quality Management System (QMS) NSI 009-12: Weld, Fabricate, and Inspect	Charlie	No	Charlie: Submitted an ISO: 9001 QMS certificate instead of QMS manual. The offerors' QMS manual must be reviewed and approved prior to contract award.	X
7 (FY19)	NSI 009-04: Quality Management System (QMS) NSI 009-12: Weld, Fabricate, and Inspect NSI 009-32: Cleaning and Painting Requirements	Charlie	No	Charlie: Proposal does not meet NSI-009-32 requirements for safety, containment, and environmental controls.	
		Echo	Yes	Echo: None.	X
8 (FY20)	NSI 009-04: Quality Management System (QMS)	Charlie	Yes	None.	X
9 (FY20)	NSI 009-04: Quality Management System (QMS)	Charlie	Yes	None.	X
10 (FY21)	NSI 009-04: Quality Management System (QMS) NSI 009-12: Weld, Fabricate, and Inspect	Charlie	No	Charlie: QMS does not address NSI 009-04 requirements for calibration of monitoring and measuring equipment. The QMS does not include a matrix listing the correlation between ISO: 9001, the QMS manual and other submitted documents.	
		Frank	Yes	Frank: None.	X
11 (FY21)	NSI 009-04: Quality Management System (QMS) NSI 009-12: Weld, Fabricate, and Inspect	Charlie	Yes	Charlie: During contract performance, an in-depth review found that the certification body for the contractor's welding and non-destructive testing procedures does not meet NSI 009-12 requirements. A departure from specification was issued to complete the work with an unqualified contractor.	X
		Frank	Yes	Frank: None.	
12 (FY21)	NSI 009-04: Quality Management System (QMS)	Charlie	No	Charlie: Proposal did not include a complete QMS manual.	X
		Frank	No	Frank: Proposal did not include a QMS manual.	
13 (FY22)	NSI 009-04: Quality Management System (QMS) NSI 009-12: Weld, Fabricate, and Inspect NSI 009-32: Cleaning and Painting Requirements	Charlie	No	Charlie: Proposal was incomplete. Contractor was not able to price all work items.	
		Golf	No	Golf: Proposal did not include welding and non-destructive testing procedures. Worker and inspector certifications required by NSI 009-32 were expired.	X
Total					**13**

To be eligible for an award, offerors must have a documented QMS, process-specific procedures, and qualifications as described in the solicitation (NAVSEA, 2021). All technical factors in the LPTA process are evaluated using a "go/no-go" rating system (NCMA, 2019). The following paragraphs discuss the gap descriptions for the technically unacceptable proposals based on the NSI 009-004, NSI 009-012, and NSI 009-32 requirements described in each solicitation.

1. NSI 009-004: Quality Management System Requirements

FDRMC evaluated 19 proposals for technical acceptability based on NSI 009-04 requirements for QMS. Of the 19 proposals, 7 did not meet NSI 009-04 requirements for QMS and were deemed technically unacceptable. As reflected in Table 3, the 7 proposals were deemed technically unacceptable for the following reasons: 3 proposals submitted ISO:9001 QMS certificates instead of a QMS manual for review and approval; 2 proposals did not submit a QMS manual; 1 proposal submitted an incomplete QMS manual; and 1 proposal submitted a QMS manual that did not address the calibration requirements for monitoring and measuring equipment, and the QMS did not include a matrix listing the correlation to ISO: 9001 requirements.

These findings indicate two problem areas with the offerors' proposals regarding NSI 009-04 requirements. First, offerors may not fully understand the solicitation instructions for the preparation and submittal of their proposals. This is evidenced by incomplete proposals and proposals that submitted QMS certificates instead of a QMS manual. Second, offerors may not fully understand the unique calibration and QMS documentation required by NSI 009-04.

2. NSI 009-012: Weld, Fabricate, and Inspect Requirements

FDRMC evaluated 12 proposals for technical acceptability based on NSI 009-12 requirements for qualifications and procedures for welding and inspection of welds. Of the 12 proposals, 2 did not meet NSI 009-12 requirements and were deemed technically unacceptable. As reflected in Table 3, the 2 proposals were deemed technically unacceptable for the following reasons: 1 proposal submitted welder qualifications that were not utilized once per calendar quarter for maintenance as required by NSI 009-12;

and 1 proposal failed to submit welding and non-destructive test procedures for review. Additionally, one proposal was deemed technically acceptable prior to the contract award. However, an in-depth review during contract performance found that the contractor's welding and non-destructive test procedures were certified to ISO: 9606-1. The ISO: 9606-1 standard does not fully meet NSI 009-12 requirements. In this case, FDRMC approved a departure from specification to allow the contractor to weld with technically unacceptable procedures.

These findings indicate that the offerors do not fully understand the unique requirements for NSI 009-12 qualifications, welding, and non-destructive test procedures. NSI-009-12 has specific requirements for the certification and maintenance of welding qualifications. Based on the proposal that failed to submit the required procedures for review, this further indicates that offerors may not fully understand the solicitation instructions for the preparation and submittal of their proposals. Additionally, FDRMC may need to provide technical training to its source selection personnel that determines the technical acceptability of proposals to ensure that ISO standards and standards from other certification bodies can be properly evaluated to NSI 009-12 requirements.

3. NSI 009-32: Cleaning and Painting Requirements

FDRMC evaluated 7 proposals for technical acceptability based on NSI 009-32 requirements for worker and inspector qualifications. Of the 7 proposals, 3 did not meet NSI 009-32 requirements and were deemed technically unacceptable. As reflected in Table 3, the 3 proposals were deemed technically unacceptable for the following reasons: 1 proposal did not submit a required plan for safety, containment of industrial debris, and environmental controls that ensure the paint will cure properly; 1 proposal submitted expired worker and inspector qualifications; and 1 proposal submitted worker and inspector qualifications that were certified to Norwegian standards instead of a certification body approved by NSI 009-32. In this case, the offeror still won the contract, but the work items involving painting were canceled when the contractor could not obtain the proper qualifications.

These problems indicate that offerors may not be accustomed to the strict requirements of NSI 009-32. NSI 009-32 requires worker qualifications that are certified by the Society for Protective Coatings (SSPC) and inspectors that are NAVSEA Basic Paint Inspector (NBPI) or National Association of Corrosion Engineers (NACE) certified. Additionally, NSI 009-32 has strict requirements to ensure the safety of personnel and ships' equipment, environmental controls, and the application and cure time for critically coated areas.

This section presented the findings of this research. FDRMC awarded 13 maintenance contracts for the AAMDS during fiscal years 2017 through 2022. Of the 13 contracts, 6 contracts were awarded to offerors with technically unacceptable proposals. The findings indicate that the offerors are unfamiliar with the unique requirements of NSI 009-04, NSI 009-12, and NSI 009-32 and do not fully understand the solicitation instructions for the preparation and submittal of their proposals. The following section discusses the implications of these findings.

C. IMPLICATIONS OF THE FINDINGS

The Navy is at risk because they are awarding contracts to offerors' proposals that are not technically acceptable. When higher-level contract quality requirements for QMS, welding, fabrication, inspection, and painting are waived, the selected contractor may not have the technical capability to repair components to specification which could impact FDRMC's work and the AAMDS mission in several ways. Foremost, if the systems and components are not maintained to specification, they may not function properly or fail prematurely. This could result in injury to personnel, damaged equipment, and limited mission readiness. Additionally, if the risk of unsuccessful contract performance is deemed too high based on the complexity or criticality of the work, FDRMC may have to cancel or defer maintenance which could also impact the AAMDS mission.

Second, awarding contracts to offerors' proposals that are not technically acceptable could result in legal issues. All technical factors are evaluated using a "go/no-go" rating system (NCMA, 2019). Manipulating the source selection process to award a contract when there are no technically acceptable proposals may unfairly exclude the

offerors that did not win contracts. Furthermore, FDRMC could have issues enforcing quality and period of performance requirements. If the selected contractor does not have the technical capability to perform the maintenance to specification, then the contractor will have to rely on FDRMC to ensure the maintenance is done correctly, or the contractor will need additional time to obtain the technical capability that was specified in the solicitation.

Additionally, when proposals are deemed technically unacceptable, FDRMC waives the higher-level contract quality requirements and must provide additional oversight to minimize the risk of unsuccessful contract performance (FDRMC, 2019). This results in the problem of FDRMC having to expend additional time and resources in providing oversight of selected contractors that have deficiencies with their QMS and process-specific procedures that could impact the AAMDS mission. In addition to contract administration and surveillance efforts, FDRMC may have to plan and execute some of the contractors' responsibilities for progressing work and determining the acceptability of products and services. For instance, the contractor may need to rely on FDRMC to develop test and inspection plans to NSI 009-04 requirements or identify welding inspection processes and criteria to NSI 009-12 requirements. Providing this level of oversight requires additional time and personnel that could be used for other FDRMC requirements.

Finally, awarding contracts to offerors with technically unacceptable proposals does not incentivize the industry base to offer better performance. There is no business incentive for offerors to improve their proposals, especially when FDRMC shoulders some of the contractors' responsibility for progressing work and determining the acceptability of products and services. Instead, offerors may be encouraged to maintain their current technical capability and find ways to reduce their prices to win more contracts (CRS, 2021). Price reductions can lead to lower quality and more risk of unsuccessful contract performance. If the risk of unsuccessful contract performance is deemed too high, FDRMC may have to cancel or defer maintenance which could also impact the AAMDS mission.

This section discussed the implications of the research findings. When awarding contracts to offerors that are not technically acceptable, FDRMC must expend additional resources in providing oversight to minimize the risk of contractor performance (FDRMC,

2019). This increases the cost of AAMDS maintenance and reduces FDRMC's capacity to support other requirements. If contractors rely on FDRMC to progress work and determine the acceptability of their products and services, then the schedule risk could be transferred to FDRMC's ability to provide this type of support. Additionally, if the systems and components are not maintained to specification, they may not function properly or fail prematurely which impacts the AAMDS mission. The following section provides recommendations based on these findings and the implications of these findings.

D. RECOMMENDATIONS BASED ON THE FINDINGS

Based on these findings and the implications of these findings, this research identifies the following recommendations to FDRMC to improve future offerors' technical proposals so they will be determined technically acceptable to perform maintenance at the AAMDS. These recommendations should be completed in the sequence described below to maximize their benefits. These recommendations include consulting with other Navy organizations that use foreign contractors to provide ship maintenance, improving market research and issuing a request for information, hosting an industry day event, providing technical training to industry, and providing source selection training to FDRMC. These recommendations are discussed in more detail below.

1. Consult with Other Overseas Navy Organizations

As reflected in the GAO report discussed in chapter two, the Navy has several locations overseas that are dependent on foreign contractors to provide ship maintenance. FDRMC should consult with these other locations to learn their methods and strategies for working with foreign contractors to establish their QMS and associated procedures to meet JFMM requirements. Each overseas location may differ in the types of ships they maintain and the available industrial base to provide support. However, each location should have methods and strategies for working with foreign contractors to establish their QMS and associated procedures to meet JFMM requirements. This includes higher-level contract quality requirements for QMS, welding, fabrication, inspection, and painting. This is a mutually beneficial opportunity for these Navy organizations to share ideas, lessons learned, best practices, and training materials to improve industry's ability to meet quality

standards. This information could guide FDRMC in developing tailored solutions to the problems they are having with technically unacceptable proposals for maintenance at the AAMDS in Romania.

2. Improve Market Research and Issue a Request for Information

Market research is the ongoing process of identifying and evaluating potential sources with capabilities to satisfy the buyer's needs. (NCMA, 2019). FDRMC should expand its market research to identify the availability of any additional responsible offerors. FDRMC should seek out industry conferences in large cities near the AAMDS, such as Bucharest. Additionally, FDRMC should contact other agencies that contract out maintenance in Romania, such as the U.S. Army Corps of Engineers (USACE). Then, FDRMC should issue a request for information (RFI) to a broad base of vendors with the potential ability to meet JFMM requirements for QMS, welding, fabrication, inspection, and painting procedures and qualifications. The RFI could also notify interested vendors of a future industry day event. Additionally, the RFI would provide FDRMC with an opportunity to evaluate and help improve the QMS and associated procedures of interested vendors, which will increase the likelihood of FDRMC receiving technically acceptable proposals for maintenance at the AAMDS.

3. Host an Industry Day Event

FDRMC should host an industry day event for vendors interested in performing contracted maintenance for the AAMDS. FDRMC should present its plans for future AAMDS maintenance contracts, including forecasted work items and schedules. Industry day is an opportunity for FDRMC to discuss higher-level contract quality requirements and the instructions for offerors to submit complete and technically acceptable proposals for LPTA solicitations. These events are also good opportunities for representatives from the industry to provide feedback and ask questions about the solicitation process, technical requirements, and contract performance. The industry day can be tailored based on the results of the first two recommendations. Additionally, industry day events promote competition which can incentivize offerors to improve their proposals and result in better prices for FDRMC.

4. Provide Technical Training to Vendors

After consulting with other agencies that use foreign contractors, expanding market research and issuing an RFI, and hosting an industry day event, FDRMC should explore possible avenues for providing technical training to vendors. This training should be tailored to address the specific problem areas of the vendors' QMS, associated procedures, and the unique requirements of NAVSEA Standard Items (i.e., NSI 009-004, NSI 009-12, NSI 009-32, etc.) that differ from ISO and European standards. For instance, FDRMC could collaborate with trade schools and junior colleges that can develop a curriculum and provide training on NAVSEA Standard Item requirements for QMS and associated procedures. Additionally, FDRMC should consider using the "leader company contracting" method specified in FAR Subpart 17.4. Leader company contracting is a special contracting method for acquiring the services of a technically acceptable lead company to provide support and industry know-how to designated follower companies so they can also become a technically acceptable source (FAR 17.4, 2023). FDRMC can leverage this contracting method to have technically acceptable vendors teach other vendors how to improve their QMS and associated procedures and proposals to meet NAVSEA Standard Item requirements.

5. Provide Source Selection Training to FDRMC

FDRMC should provide additional source selection training to its personnel that are responsible for determining the technical acceptability of offerors' proposals. Specifically, this training should focus on evaluating ISO and European standards to NAVSEA Standard Item requirements. This will reduce the risk of initially determining an offeror's proposal to be technically acceptable prior to contract award but then discovering during contract performance that their QMS or process-specific procedures do not meet NAVSEA Standard Item requirements. This training should also cover the "go/no-go" rating system used in the LPTA process. Finally, because Naval Supply Systems Command Fleet Logistics Center (NAVSUP FLC) performs the contracting functions for FDRMC requirements, FDRMC and FLC should conduct this training jointly to better understand

the challenges that both parties encounter when contracting out maintenance for the AAMDS.

E. SUMMARY

This chapter presented the findings of this research for maintenance at the Aegis Ashore Missile Defense System (AAMDS) in Romania. This chapter discussed the proposals received for this maintenance during fiscal years 2017 through 2022 and why some were deemed technically unacceptable. This chapter also discussed the implications of the findings for maintaining all ship systems and components to their designed specifications which could impact the AAMDS mission. Finally, this chapter provided recommendations based on the findings.

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VI. SUMMARY, CONCLUSION, AND AREAS FOR OTHER RESEARCH

A. SUMMARY

Forward Deployed Regional Maintenance Center (FDRMC) is the designated Naval activity responsible for the integration, oversight, and certification of all maintenance availabilities accomplished for the Aegis Ashore Missile Defense System (AAMDS) in Romania (SURFLANT, 2014). This includes maintenance performed by foreign-based contractors. This maintenance adheres to the Joint Fleet Maintenance Manual (JFMM) and requires higher-level contract quality requirements for an approved Quality Management System (QMS) and associated procedures for routine ship repair (SURFLANT, 2014). Proposals submitted by these foreign-based contractors are evaluated and deemed technically unacceptable based on the higher-level contract quality requirements in the solicitation. When there are no technically acceptable proposals, FDRMC waives the higher-level quality requirements and must expend additional resources in providing additional oversight to minimize the risk of unsuccessful contract performance (FDRMC, 2019). This research conducted an analysis of the higher-level contract quality requirements and the technically unacceptable proposals submitted by these foreign-based contractors to determine where their QMS and associated procedures fall short of JFMM requirements.

B. CONCLUSION

This research reviewed the solicitations, proposals, and the technical acceptability ratings for contracted maintenance at the AAMDS for fiscal years 2017 to 2022. This research focused on the Lowest Price Technically Acceptable (LPTA) source selection process for this maintenance. Based on the findings, the implications of the findings, and the recommendations made to address the problems encountered when contracting out for this maintenance, the research questions presented in chapter 1 can be answered.

(1) Based on the results of the gap analysis, which JFMM QMS requirements are not being met by FDRMC's foreign-based contractors performing maintenance at the AAMDS in Romania?

The research found that the proposals submitted by FDRMC's foreign-based contractors did not meet all JFMM requirements for an approved QMS. The offerors' technically unacceptable proposals either did not submit a QMS manual for review, submitted an ISO 9001 QMS certificate instead of a QMS manual, or submitted a QMS manual that did not adequately address the requirements for equipment calibration and did not include a matrix listing the correlation to ISO: 9001 requirements. This research also found that the offerors' technically unacceptable proposals did not meet the higher-level contract quality requirements for welding, fabrication, inspection, and painting. Proposals either did not submit all of the qualifications and procedures for review as required in the solicitation, submitted qualifications and procedures that were expired or not maintained, or submitted qualifications and procedures that were not certified by an organization approved by the JFMM. Based on the incomplete and incorrectly submitted proposals, these foreign-based contractors may not fully understand the solicitation instructions for preparation and submittal of their proposals, and their QMS and associated procedures fall short of JFMM requirements to be eligible for a contract. Additionally, when higher level-contract quality requirements are waived, there is little incentive for these contractors to improve their QMS and associated procedures.

(2) Based on the research findings, what recommendations can be made for FDRMC 's foreign-based contractors to improve their QMS and associated procedures to meet JFMM requirements?

This research identified five recommendations which are summarized as follows: 1. Consult with other overseas Navy organizations. FDRMC can learn new methods and strategies for working with foreign contractors to establish their QMS and associated procedures to meet JFMM requirements. This information could guide FDRMC in developing tailored solutions to their problems with technically unacceptable maintenance proposals for the AAMDS in Romania. 2. Improve market research and issue a request for information (RFI). FDRMC should expand its market research to identify the availability of any additionally responsible offerors, including contacting other agencies that contract

out maintenance in Romania. Then, FDRMC should issue an RFI to a broad base of vendors with the potential ability to meet JFMM requirements. 3. Host an industry day event. FDRMC should host an industry day event and present its plans for future AAMDS maintenance contracts, including forecasted work items and schedules. These events promote competition and incentivize offerors to improve their QMS and associated procedures. 4. Provide technical training to vendors. This training should address the specific problem areas of the vendors' QMS and associated procedures. FDRMC should explore possible avenues for providing this training, such as collaborating with trade schools and junior colleges or utilizing the "leader company contracting" method specified in FAR Subpart 17.4. 5. Provide source selection training to FDRMC. This training should focus on evaluating ISO and European standards to NAVSEA Standard Item requirements and the "go/no-go" rating system used in the LPTA process.

(3) Based on this research, what approaches can be taken to implement the above recommendations for FDRMC's foreign-based contractors to improve their QMS and associated procedures to meet JFMM requirements?

This research provides a sequence of steps to implement the above recommendations for FDRMC's foreign-based contractors to improve their QMS and associated procedures to meet JFMM requirements. First, FDRMC should consult with other Navy organizations that use foreign contractors to provide ship maintenance. This will provide insight into how other overseas maintenance providers worked with foreign-based contractors to establish their QMS and associated procedures. Then, FDRMC should improve its market research and issue an RFI. This promotes competition and incentivizes improvement. Next, FDRMC should host regular industry days to discuss higher-level contract quality requirements and the instructions for offerors to submit complete and technically acceptable proposals for LPTA solicitations. Industry day events allow representatives from the industry to provide feedback and ask questions about the solicitation process, technical requirements, and contract performance. Finally, FDRMC should collaborate with technical training providers to provide training to contractor employees as well as potential contractor employees. This training should be tailored based on the results of these steps to help the foreign-based contractors improve their proposals

to reflect a qualified QMS and associated procedures and thus be rated technically acceptable and eligible for a contract.

C. AREAS FOR FURTHER RESEARCH

This research focused on FDRMC's foreign-based contractors that perform maintenance for the AAMDS in Romania. Specifically, this research focused on the LPTA source selection process for this maintenance and the higher-level contract quality requirements for an approved QMS and associated procedures. FDRMC could apply a similar analysis to its contracted maintenance for voyage repairs that are at risk because of the problems encountered when awarding contracts to offerors that are not technically acceptable. The scope of this research could be further expanded to include other Navy agencies that rely on foreign contractors for maintenance. Additionally, areas for further research could include the Army, Air Force, and other government agencies that rely on foreign contractors for maintenance and encounter technical acceptability issues. This further research would include determining the methods and strategies these agencies use to ensure they have a strong industrial base with the required technical capability to provide maintenance.

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