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Preparing Engineering Duty Officers (EDOs) for Command of Major Acquisition Shore Commands and Major Acquisition Programs

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MONTEREY, CALIFORNIA

PREPARING ENGINEERING DUTY OFFICERS FOR MAJOR COMMAND ASSIGNMENTS

by

Dr. Simona L. Tick & Dr. Mark E. Nissen
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December 2022

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ABSTRACT

The U.S. Navy's capabilities regarding the design, acquisition and maintenance of ships and shipboard systems needs continuous improvement to counter advancing threats. Engineering Duty Officers (EDOs) have long been associated with these capabilities in both technical and leadership positions. Over the years, the range and complexity of these professional areas have increased, and some of the developmental leadership opportunities have become diluted, resulting in lower probability of success at command. This study centers on analysis of the fundamental leadership requirements for EDOs. It focuses specifically on the leadership experiences required to prepare EDOs to successfully take command and lead the Navy's large, complex civilian organizations such as shipyards, warfare centers, regional maintenance centers and major acquisition programs. Based on qualitative research findings, we make recommendations for improving the EDO community talent management practices to successfully prepare EDOs for command and leadership of major acquisition programs.

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EXECUTIVE SUMMARY: PREPARING ENGINEERING DUTY OFFICERS FOR MAJOR COMMAND ASSIGNMENTS

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Naval Postgraduate School
December 2022

Introduction

The U.S. Navy's capabilities regarding the design, acquisition and maintenance of ships and shipboard systems needs continuous improvement to counter advancing threats. Engineering Duty Officers (EDOs) have long been associated with these capabilities in both technical and leadership positions. Over the years, the range and complexity of these professional areas have increased, and some of the developmental leadership opportunities have become diluted, resulting in lower probability of success at command.

This study centers on analysis of the fundamental leadership requirements for EDOs. It focuses specifically on the leadership experiences required to prepare EDOs to successfully take command and lead the Navy's large, complex civilian organizations such as shipyards, warfare centers, regional maintenance centers (RMCs) and major acquisition programs. Moreover, because the EDO Community is associated with a wide variety of different jobs, we focus further on regional maintenance centers.

In this technical report, we provide key background information necessary to understand the context and focus of the study. This begins with a summary of the EDO Community. For comparison and potential insight, we summarize key aspects of the Navy Aviation Maintenance Community also, and we provide an overview of how maintenance is accomplished in the Air Force for further comparison and insight.

The qualitative research method is summarized subsequently. We seek a direct, grounded understanding of the EDO Community, so we employ very well-established, grounded theory building methods. Such methods equip us to develop an understanding inductively, from the data themselves, as opposed to relying upon a deductive, top-down model likely to be too general and coarse for our purpose.

Although we employ three techniques for data collection (i.e., document review, strategic contact, interview), semi-structured interviews comprise the central method for collecting our qualitative data. We ensure that our sample frame focuses on EDOs viewed as "successful" by the Navy, homing in on O6s who are commanding or have commanded either RMC or SUPSHIP organizations.

Results begin with an overview of the research method and sample frame. We then discuss and provide and examples of first order codes and second order codes, followed by issues and alternatives for consideration by EDO Leadership. In total, eleven interviews are conducted, each lasting roughly one hour, and each with a Navy Captain (O6) or above (i.e., one Rear Admiral and one Vice Admiral). Nearly a dozen hours of focused interview conversations generate over 300 pages of interview transcripts and notes, which the Researchers discuss and reconcile following each interview session. Analysis of the qualitative data generates nearly 500 first level codes, which support the identification of 10 clusters at the second level.

These clusters enable us to identify 10 major issues, analysis of which results in 26 alternatives or courses of action (COAs) for consideration by EDO Community leaders. These major issues and alternatives are summarized in Table 1 for reference. As a final step, member checking supports the fidelity of our interviews and reasonableness of our findings.

For the most part, this set of issues and alternatives center on four key elements: 1) education, 2) training, 3) experience and 4) mentoring. However, we also find 5) personality to represent an important contributor to command success.

In addition to this technical report, which is intended to be self-contained and informative, we have prepared a set of briefing materials and met multiple times with senior EDO Community leaders, who have commented on such issues and alternatives, and who are making decisions regarding the most feasible and effective approaches to mitigating major issues and implementing COAs. The EDO Community is in good hands clearly, and we remain very impressed with its bright, hardworking people.

Issues and Alternatives

In this executive summary, we focus directly on the set of issues and COAs. The first issue pertains to challenges that some EDOs have working with industry. It is important to note that such officers are educated technically and that all are required to earn a technical graduate degree. This provides them with excellent technical credentials and credibility, but at the highpoints of their careers (esp. when taking command of an RMC), their requisite skillset shifts from technology to business and management.

Table 1 Issues and Alternatives

Issue	**Alternative**
Working with industry is challenging	- RMC specific addition to EDO Sr Course - Ensure officers have prior RMC experience before command
Acquisition: Fixed price contracting	- Reassess acquisition strategy - Consider policy waivers
Acquisition: Training shortfalls	- Continue DAWIA certification - Continue Navy acquisition training - RMC specific addition to EDO Sr Course
CO prep is inadequate for some	- Executive coaching (beyond mentoring) - Soccer practice: full contact (RMC) CO course - FDRMC, Detachment or OIC as prerequisite to RMC CO
Lacking business understanding	- Enhance & extend Advanced Management Program (AMP) - EMBA Programs (NPS, others) - Technical undergrads pursue business degrees (MBA)
O6 is too late for first command	- FDRMC, Detachment or OIC as prerequisite to RMC CO - RMC XO-CO Fleet Up (shorter tours?)
Unclear path to Flag	- How much PM & SY experience is necessary? - How to gain RMC experience without becoming too narrow? - How to prevent wrong people from taking RMC CO jobs?
EDO retention & mobility	- Signal expectations for taking overseas jobs - Signing bonus for key EDO milestones - Merit reordering
Promotion based on technical talent	- Education, training, experience & mentoring + personality - Best engineers not necessarily best leaders - Flag level conversations
Not everyone is suited for command	- Seek out motivated, self-driven people - Understand people's strengths, weaknesses & potentials

Two alternative COAs develop from this: 1) the EDO Senior Course could be expanded to integrate more RMC content, and 2) career planning could be adapted to ensure that officers have prior RMC experience before taking command. Participants indicate that maintenance is unique, and some suggest that prior maintenance experience (and leadership) is key to efficacy.

The second issue pertains to challenges with fixed price contracting for ship maintenance. Identifying all possible problems with any particular ship, estimating how much it should cost for appropriate remedies, and forecasting the time required to complete the maintenance work, is challenging. Asking contractors to do so on a fixed price basis can be problematic. For one, contractors are appropriately risk averse, so they will price in potential costs for uncertainty. For another, most contractors are collocated on the waterfront, hence there is great opportunity for communication and coordination between RMC Commanders and contractors. One alternative centers on reassessing the acquisition strategy calling for fixed price maintenance contracting. Another suggests initiating a waiver policy where such strategy fails to serve the Navy's interest best.

The third issue pertains to perceived acquisition training shortfalls. Most study participants indicate that they had received sufficient acquisition training, and most emphasize that Defense Acquisition Workforce Improvement Act (DAWIA) certification is important, but many suggest that Defense Acquisition University (DAU) courses are weak. Alternatively, acquisition training courses offered within Navy commands are considered by many participants to be stronger and more worthwhile. Further, the contract oversight aspect of RMC command may not be covered adequately through extant acquisition training opportunities. Suggested alternatives for consideration include continuing DAWIA certification and Navy acquisition training, but the EDO Community may also be served well by integrating some RMC specific content into an offering such as the EDO Senior Course.

The fourth issue pertains to CO preparation, which appears to be inadequate for some RMC commanders. We view such preparation as a combination of education, training, experience and mentoring. One consideration centers on executive coaching, which extends beyond Navy mentoring and involves hiring external executive coaches to help (esp. new) RMC commanders. This practice is common in industry.

A second consideration calls for creation of an RMC CO course, to be completed in advance of assuming RMC command, to teach the skills necessary for success. We describe such course as "soccer practice" to indicate that it must go much further than slide presentations and guest speakers talking about RMC command: As a "full contact" sport, soccer players must learn to run, pass, kick, block and defend on the field. Likewise, RMC commanders must learn to deal with contractors and contracts, government civilians and leaders, Type Commanders (TYCOMs) and Fleet operators, and others in a full contact manner (e.g., via role play) like soccer players practicing on the pitch.

A third consideration looks to career planning. Several study participants highlight the value of prior assignments to a forward deployed RMC (FDRMC), detachment or officer in charge (OIC) role in terms of preparing them well for RMC (or other) command. As a "mini CO," an EDO has the opportunity to learn firsthand many of the skills required for RMC command, but with less pressure, exposure and responsibility. Indeed, more than one of our study participants suggest that such assignment or role should be a prerequisite for RMC command. Just as prerequisites in college are put in place to ensure that students have the

background necessary to succeed in advanced courses, the EDO Community has an opportunity to help increase future RMC commanders' chances of success.

The fifth issue pertains to a lack of business understanding. Despite the Advanced Management Program (AMP), which was established to help EDOs learn about business and develop the corresponding acumen, many study participants express dissatisfaction with it, some describing it as shallow and superficial. One consideration is to enhance and extend the AMP to make it deeper and more substantial.

Another consideration is to encourage or at least permit EDOs to complete an executive MBA (EMBA) program. The Naval Postgraduate School (NPS) developed an EMBA program for highly time constrained naval aviators some time back. The EDO Community may benefit from that or a similar program offered elsewhere.

A third consideration focuses on education also. Every EDO is required to complete a technical graduate degree at NPS or MIT. This requirement is seen as important by study participants for establishing credibility as an RMC commander. However, many study participants note that command does not require technical expertise, and some participants with technical undergraduate degrees question how much mechanical engineering or other technical education is necessary as an engineering *leader*. The EDO Community could consider allowing officers with a technical undergraduate degree to pursue business degrees (e.g., MBA) instead of insisting upon technical graduate work.

The sixth issue pertains to the rank at which RMC commanders have their first exposure to command, with the common complaint that Captain (O6) is too late. This relates to the CO preparation issue from above, and it corresponds to the same consideration of FDRMC, detachment or OIC as prerequisite to RMC CO. Another consideration draws from the URL surface warfare officer (SWO) Community, which routinely assigns a future CO to serve a tour as XO before the Fleet Up to command. Although the typical EDO job assignment of three years would complicate this approach, perhaps an EDO XO tour could be shortened to 18 months in order to accommodate the complex career planning and job sequencing process.

The seventh issue pertains to what some study participants describe as an unclear path to Flag (i.e., Admiral rank). Some participants describe the importance of maintenance experience for RMC success, but some also characterize maintenance as a relatively narrow career field with less opportunity for promotion when compared to other fields (e.g., program management [PM] or shipyard [SY]). The questions center on how much PM or SY experience is necessary, how to gain sufficient RMC experience without becoming too narrow, and how to prevent the wrong people (esp. with insufficient maintenance experience) from taking RMC CO jobs. The central consideration is for EDO Leadership to outline and articulate its ideas for addressing such questions. It is beyond the Researchers' expertise to do so.

The eighth issue pertains to EDO retention and mobility. Many EDOs choose to leave the Navy as more junior officers (e.g., O4 and O5), which is prior to them having an opportunity to make a major contribution through command. Reasons for such officers leaving are varied, but family sacrifice is noted frequently, especially for EDOs that take overseas jobs. Some considerations include EDO Leadership signaling expectations for EDOs to take overseas jobs, and the EDO Community could borrow from its SWO counterpart and offer a retention bonus at key times in an officer's career, perhaps with a connection to some key milestone such as moving to a different region or taking a job overseas. Several participants mention merit reordering as well as a motivator. This enables a reordering of promotion and pay increase for

praiseworthy officers. The Community could leverage such reordering as an additional incentive for taking less desirable or overseas jobs.

For reference, the SWO community has multiple retention bonuses utilized for talent management. The SWO Department Head Retention Bonus (DHRB) scheme includes a $105,000 bonus for first look screeners of Department Head (DH), a key milestone. This bonus is broken into increments over seven years. Second look DH screeners are eligible for a $95,000 bonus, and third look screeners are eligible for a $75,000 bonus upon signing a contract to complete two DH tours.

The ninth issue pertains to promotion based on technical talent. This is common among technical organizations everywhere, as engineers, for instance, get promoted for their engineering job performance. As some level, nonetheless, such engineers become managers and even executives, where they stop performing as engineers and must manage people and organizations. Many engineers and like technical people are not suited well for leadership, and some can rise to a level of incompetence. This is referred to as the Peter Principle (Peter, 1969). As a consideration, in addition to education, training, experience and mentoring, EDO Leadership may look into officers' personalities and aptitudes for leadership as another factor for promotion to command. Perhaps the best technical people can continue with technical jobs throughout their careers. These are clearly Flag level conversations.

The final issue follows, as it pertains to officers' suitability for command. Despite education, training, experience and mentoring, successful RMC (and other) commanders appear to be highly motivated, self-driven people. Several study participants note the importance of outside reading, for instance, to gain knowledge. Others note their willingness to seek out hard jobs and remain highly mobile to serve the Community. As a final consideration, EDO Leadership may look in particular for—and encourage—such people and seek to understand their key officers' strengths, weaknesses and potentials for command.

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I. INTRODUCTION

The U.S. Navy's capabilities regarding the design, acquisition and maintenance of ships and shipboard systems needs continuous improvement to counter advancing threats. Engineering Duty Officers (EDOs) have long been associated with these capabilities in both technical and leadership positions. Over the years, the range and complexity of these professional areas have increased, and some of the developmental leadership opportunities have become diluted, resulting in lower probability of success at command.

Indeed, in 2022 the Government Accountability Office (GAO) found that over the last decade, the US Navy encountered challenges in accomplishing its shipbuilding goals; that it failed to meet many deadlines; and that it experienced numerous delays, cost overruns, and performance below expectations (GAO, 2022).

This study centers on analysis of the fundamental leadership requirements for EDOs. It focuses specifically on the leadership experiences required to prepare EDOs to successfully take command and lead the Navy's large, complex civilian organizations such as shipyards, warfare centers, regional maintenance centers and major acquisition programs.

Moreover, because the EDO Community is associated with a wide variety of different jobs, we focus further on regional maintenance centers (RMCs). RMCs are particularly important for this study, as they serve operational fleets around the world, and they reflect lower probabilities of success for commanding officers (COs). Based on qualitative research findings, we make recommendations for improving the EDO community talent management practices to successfully prepare EDOs for command and leadership of RMCs.

This technical report is organized to follow this introduction with key background information necessary to understand the context and focus of the study. The research method is described subsequently and followed by detailed analysis and presentation of major results. Key conclusions are summarized next and followed by references and appendices.

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II. BACKGROUND

In this section, we summarize key background information necessary to understand the context and focus of the study. This begins with a summary of the EDO Community. For comparison and potential insight, we summarize key aspects of the Navy Aviation Maintenance Community also, and we provide an overview of how maintenance is accomplished in the Air Force for further comparison and insight.

A. NAVY EDO COMMUNITY

The goal of the EDO program is to produce naval engineers; who provide effective technical and business solutions in surface, submarine and aviation warfare. This is achieved by providing experts in fleet maintenance, acquisition program management, systems engineering and national missions. The mission areas for EDOs include System Engineering; Warfare Systems; Combat Systems; Hull, Mechanical and Electrical Systems (HM&ES); Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR); Ordnance Engineering; Fleet Maintenance; Program Management; Naval Architecture; Operational Engineering; and Diving and Salvage operations (COMNAVSEA, 2017).

EDOs are involved in both technical and leadership positions. With more than 750 highly specialized restricted line officers, the EDO community is focused on the life cycle of research, development, acquisition, construction, maintenance, modernization and disposal of all ship and submarine systems. Comprising just over one percent of all Navy Officers, EDOs are a select group.

These select officers pursue three alternate career paths: 1) Acquisition, 2) RMC Commander, and 3) Supervisor of Shipbuilding (SUPSHIP). Acquisition officers are involved with the programmatics of ships and systems. RMC officers are involved with ship maintenance, modernization and technical support. SUPSHIP officers are involved with the construction of new ships.

Most EDOs transfer laterally from unrestricted line (URL) officer communities, with a relatively large fraction serving first as surface warfare officers (SWOs). This provides officers with direct experience aboard the same ships that they will be

maintaining and repairing later as EDOs. They also gain direct leadership experience as junior officers aboard ship.

Once accepted into the EDO Community, most such officers earn a technical master's degree at the Naval Postgraduate School (NPS) or Massachusetts Institute of Technology (MIT). This graduate degree work requires approximately two years to complete, which represents a relatively large upfront investment in a new officer by the EDO Community.

After graduation, new EDOs attend the Engineering Duty Officer School at Port Hueneme, CA, where they complete the EDO Basic Course. This five week course is designed to provide all newly selected EDOs with knowledge of the plans, programs, policies and procedures by which the Navy accomplishes the acquisition and life cycle engineering of naval ships and systems. The course does not teach engineering in an academic sense, as most students have completed the technical graduate education noted above. Rather, the course focuses on those methods by which the Navy manages the engineering of its ships and systems. In addition to subjects taught by staff and other subject matter experts, students receive approximately 25 percent of their instruction from senior Community leaders, including Flag Officers and Senior Executive Service members in specific program areas. These guest lecturers provide updates on the most recent information in a given field, dispense leadership advice, and offer some career counseling opportunities. The students also earn some acquisition certifications through EDO Basic.

New EDOs are assigned then to their first jobs, where they complete the Engineering Duty Qualification Program (EDQP) in some relatively junior officer (JO) capacity. Most of these first jobs involve waterfront fleet maintenance, which would take place at a naval shipyard, RMC or like facility; where they are supervised and mentored by more senior EDO leaders. Many EDO jobs are coded as “Acquisition,” so these officers received credit toward higher level certifications.

EDOs continue working through different jobs, often at different facilities, where they gain diverse experience with ship maintenance. When promoted to the rank of Commander, these officers attend the EDO Senior Course to prepare them for the increased responsibilities in the acquisition and life cycle engineering management of

naval ships, submarines and systems. The course is taught primarily by senior guest lecturers from the EDO Community. Topics are selected to provide a broadened knowledge of naval engineering leadership and management techniques, as well as an awareness of new developments in engineering technology. In addition to the classroom sessions, each student participates in one or more career counseling sessions from Flag Officers.

The most successful maintenance EDOs will be offered RMC command jobs at the Captain (O6) level. Some officers of lower rank may be offered quasi command jobs as officers in charge (OIC) of RMC detachments (e.g., at Sasebo, Japan; Rota, Spain, Manama, Bahrain). In unusual cases, such officers may have the opportunity to serve as Executive Officer (XO) before taking command, via a process termed *Fleet Up*, which is common aboard many warships. Both of these opportunities provide some leadership experience to Commanders, but without the high level of pressure and scrutiny associated with RMC command.

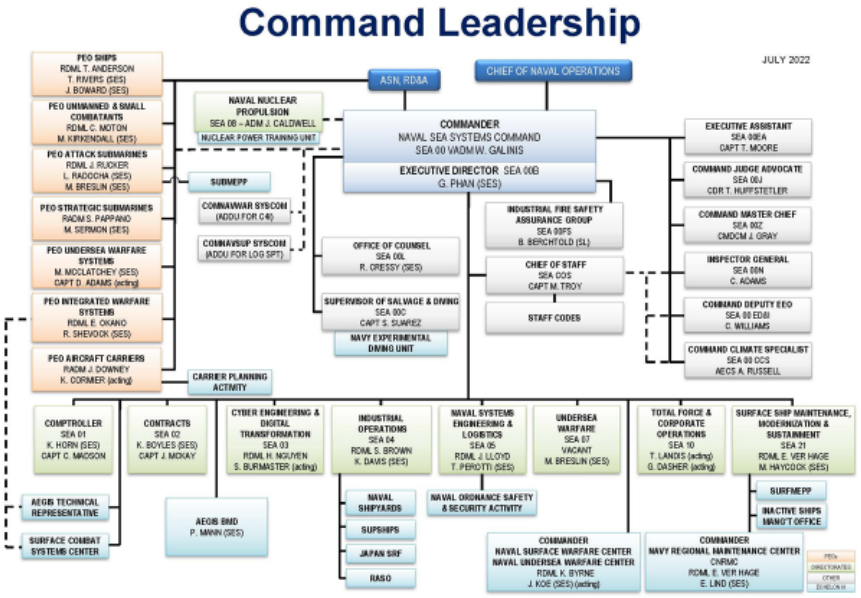

Figure 1 NAVSEA Organization

As noted above, the focus of this study centers on RMCs, which are shore installations associated with maintaining ships as part of the Naval Sea Systems Command (NAVSEA). Figure 1 depicts the NAVSEA organization (as of July 2022), within which

most RMCs are organized within SEA21 – Surface Ship Maintenance, Modernization & Sustainment.

As depicted in Figure 2, the RMCs are distributed geographically in fleet concentration and forward deployed areas around the world. By "RMC," we include the four major centers responsible for depot level maintenance: Mid Atlantic Regional Maintenance Center (MARMC) in Norfolk, Virginia; Southeast Regional Maintenance Center (SERMC) in Mayport, Florida; Southwest Regional Maintenance Center (SWRMC) in San Diego, California; and Forward Deployed Regional Maintenance Center (FDRMC) headquartered in Naples, Italy. The Naples FDRMC has detachments in Manama, Bahrain and Rota Spain. We include the Japan Naval Ship Repair Facility and Japan Regional Maintenance Center in Yokosuka also, along with the detachment in Sasebo. Due to the similarity of maintenance work, we include the intermediate level maintenance activities of RMC Northwest at Puget Sound Naval Shipyard in Washington and the Hawaii RMC embedded in the Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility too.

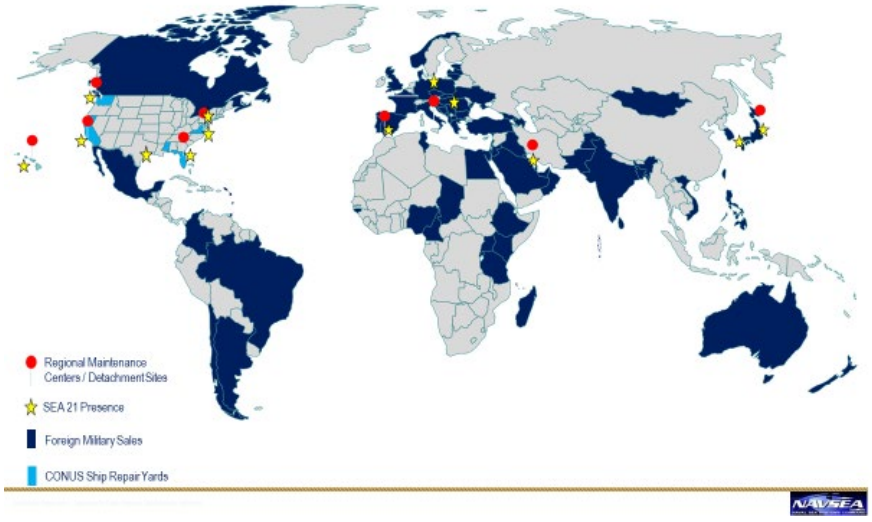

Figure 2 RMC Distribution

B. NAVY AVIATION MAINTENANCE COMMUNITY

Aircraft like ships represent complex systems of systems, hence aviation maintenance shares many commonalities with its ship counterpart. As with ship maintenance, for instance, aviation maintenance takes place at three levels: 1) organization, 2) intermediate and 3) depot. Organization level maintenance involves squadron personnel at sea or ashore. Intermediate level maintenance involves components removed from aircraft, and depot level maintenance involves major work to aircraft.

Beyond organization level maintenance, the Navy uses six facilities for combinations of intermediate and depot work: Cherry Point, NC; Jacksonville, FL; San Diego, CA; Oceana, VA; Whidbey Island, WA; and Lemoore, CA.

Aviation maintenance officers come from two sources and follow separate career tracks: 1) The Aerospace Engineering Duty Officer (AEDO) transfers laterally from naval aviation, generally as a pilot or naval flight officer (NFO). This is very similar to how most EDOs transfer laterally from URL career paths. 2) The Aerospace Maintenance Duty Officer (AMDO) begins aviation maintenance work directly. The two career tracks converge at major command (O6).

Unlike the EDO Community, for either track, the Navy values graduate education but does not insist upon it. Although a technical degree is viewed as desirable, as in the EDO Community, a graduate degree in *business* is valued for AEDOs and AMDOs. This differs substantially from EDO expectations and offers some insight into how the Aviation Maintenance Community prepares its officers differently. Also like the EDO Community, most AEDOs and AMDOs work in Acquisition coded jobs and are expected to complete certifications. Despite these education and training expectations, experience represents the most important source of knowledge, and successful experience remains the primary basis for promotion.

C. AIR FORCE MAINTENANCE COMMUNITY

The US Air Force (USAF) mirrors Navy aviation with maintenance performed at organization, intermediate and depot levels. We focus here on depot level maintenance, for it is most equivalent to work performed at RMCs. In this section we briefly outline the USAF depot organization; logistics utilization field; education, training and

experience requirements; knowledge, skills and abilities; senior officer background; and outsourcing.

1. Organization

The USAF organizes its depot level maintenance under the Air Force Material Command (AFMC), headquartered at Wright-Patterson Air force Base (AFB) in Ohio. AFMC conducts research, development, test and evaluation, and it provides acquisition management services and logistics support necessary to keep weapon systems ready for war (AFMC, 2022).

Specific to logistics support, which includes depot level maintenance, the AFMC's Air Force Sustainment Center (AFSC), headquartered at Tinker AFB in Oklahoma, provides sustainment and logistics readiness to deliver combat power for America. The AFSC provides globally integrated, agile logistics and sustainment to the warfighter through world class depot maintenance, supply chain management and installation support (AFMC, 2022). The AFSC consists of more than 40,000 military and civilian personnel that provides critical sustainment for the Air Force's most sophisticated weapons systems, including: A-10 Thunderbolt II, AC-130, B-1 Lancer, B-52 Stratofortress, C-5 Galaxy, C-17 Globemaster III, C-130 Hercules, E-3 Sentry, E-6 Mercury, E-8 Joint STARS, EC-130, F-15 Eagle, F-16 Falcon, F-22 Raptor, F-35 Lightning II, HC-130, HH-60 Pave Hawk, intercontinental ballistic missile(s), KC-135 Stratotanker, MC-130, MH-53 Pave Low, RQ-4 Global Hawk, U-2 Dragon Lady, and UH-1 Iroquois, as well as a wide range of aircraft engines and component parts (AFMC, 2022).

The AFSC provides this support through three logistics complexes: Warner Robins Air Logistics Complex (Warner Robins, Georgia), Ogden Air Logistics Complex (Ogden, Utah), and Oklahoma City Air Logistics Complex.

2. Air Force Logistics Utilization Field

The Air Force logistics career area includes the officers who are responsible for "aircraft, missile, and munitions maintenance; supply; transportation; and logistics plans. Inherently included are program formulation, policy planning, coordination, inspection,

command and direction, and supervision" (HQAFPC, 2020: 92). This utilization field includes the Logistics Readiness specialty (AFSC 21RX), Aircraft Maintenance specialty (21AX), and the Munitions and Missile Maintenance specialty (AFSC 21MX). We focus here on the Aircraft Maintenance specialty.

As specified in the Air Force Officer Classification Guide (HQAFPC, 2020), the Aircraft Maintenance specialty (21AX) includes the functions of production management, quality control, direction of aircraft maintenance, avionics, and aircraft and equipment readiness. The Aircraft Maintenance specialty responsibilities include immediate supervisory and technical responsibilities for removing, installing, modifying, calibrating, repairing and storing of aircraft and avionics equipment and components. Equipment and components include aircraft engines, airframes, accessories, instruments and aerospace ground equipment; aircraft systems and equipment (HQAFPC, 2020: 93).

The responsibilities of leading maintenance actions includes inspection, repair, overhaul, modification, preservation, refurbishment, troubleshooting, testing, analyzing condition and performance, and maintenance documentation. Leadership of safety, quality and timeliness in the performance of maintenance is paramount (HQAFPC, 2020: 92).

3. Education, Training and Experience Requirements

To meet the requirements for a fully qualified aircraft maintenance officer, one needs to complete the formal entry level training course, have a minimum of 24 months assigned to a 21A position, and complete the education and training requirements specified in the Aircraft Maintenance Officer Training Task List (HQAFPC, 2020: 92).

The Aircraft Maintenance specialty (21AX) requirements for education, training and experience are also specified in the Air Force Officer Classification Directory. In terms of education, although any degree is permitted for entrance into this career field, some degrees such as engineering, supply chain management, and business administration are desired for officers in this career field. Figure 3 provides the list of all education programs desired for officers in this career field.

★21A – Aircraft Maintenance

Tier	*Target Accession Rate*	*CIP*	*Education Program Description*	*Requirement*
1	> 10%	14.XX	Engineering, General	Desirable
2	> 65%	40.XXXX	Physical Sciences	Desirable
		15.1501	Engineering/Industrial Management	
			Data Analytics	
			Supply Chain Management	
			Process Engineering	
			Ops Research	
		52.02XX	Business Administration	
		52.0409	Parts, Warehousing and Inventory Management	
		52.06XX	Business/Managerial Economics	
		11.01XX	Computer and Information Science	
		11.02XX	Computer Programming	
		11.03XX	Data Processing	
		11.04XX	Information Science/Studies	
		11.07XX	Computer Science	
		11.10XX	Computer/Information Technology Administration and Management	
		52.12XX	Management Information Systems	
		49.0104	Aviation/Airway Management and Operations	
		49.0101	Aeronautics/Aviation/Aerospace Science and Technology	
3	> 25%	XX.XXXX	Any Degree	Permitted

Figure 3 Education Requirements

Aircraft maintenance officers require knowledge of maintenance and personnel management procedures, along with organization and mission requirements. They should also understand capabilities, limitations and basic operating principles of aircraft systems and components; theory of flight and airframe construction. Finally, aircraft maintenance officers should be knowledgeable of life cycle sustainment, quality assurance, supply, transportation, logistics plans, contracting, flying operations, munitions, and other unit operations related to aircraft maintenance units (HQAFPC, 2020: 93).

4. Knowledge, Skills, and Abilities

In his research on Air Force Aircraft Maintenance Officer knowledge, skills and abilities, Thompson (2013) identifies that almost half of the surveyed logistics officers recommended MBA degrees for aircraft maintenance officers. Graduate Logistics Management degrees were listed as the second most recommended degree for this career field. In addition, Thompson identifies Acquisition, Business Acumen, Repair Cycle, Forecasting and Contracting as the top five knowledge, skills and abilities (KSAs) for the Life Cycle Logistics mission set. Thompson also identifies Business Acumen and Process Improvement as the top two KSAs needed in the future.

5. Senior Logistics Officer Background

A review of senior logistics officers' background and education reflects a consistency in education and training credentials. For example, the current commander of the Warner Robins ALC is a career Aircraft Maintenance Officer, completed the Aircraft Maintenance Officers Course, has a BS in Management, an MS in Logistics from the Air Force Institute of Technology (AFIT), and completed the Advanced Program in Logistics from Kenan-Flagler Business School, University of North Carolina at Chapel Hill. The current commander of the Ogden ALC is a career Aircraft Maintenance Officer, completed the Aircraft Maintenance Officers Course, has a BS in Business Administration and an MBA in Aviation from Embry-Riddle Aeronautical University. The current commander of the Oklahoma City ALC is a career Aircraft Maintenance Officer, completed the Aircraft Maintenance Officers Course, has a BA in Business Administration, MA in Business Administration from Old Dominion University, and completed the Program for Executives in Logistics and Technology at the University of North Carolina Kenan-Flagler Business School, Chapel Hill (AFSC, 2022).

6. Extent of Outsourcing of Depot level Maintenance

The extent of outsourcing of depot level maintenance is evident in the dollars obligated by each of the Air Logistics Complexes. Based on reported data, each of the ALCs obligates billions of contract dollars every year. For example, Warner Robins ALC obligates approximately $6.7B annually. Ogden ALC obligates approximately $3.3B annually, while Oklahoma City ALC obligates approximately $4.7B annually (AFSC, 2022).

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III. RESEARCH METHOD

We summarize the qualitative research method employed for the study in this section. We seek a direct, grounded understanding of the EDO Community, so we employ very well-established, grounded theory building methods (Glaser & Strauss, 1967; Strauss & Corbin, 1990). Such methods equip us to develop an understanding inductively, from the data themselves, as opposed to relying upon a deductive, top-down model likely to be too general and coarse for our purpose.

Moreover, it provides a systematic, scientific process for qualitative research, one that both guides and encourages repeated iteration of data collection and analysis (Eisenhardt, 1989). Such repeated iteration is noted widely as key to grounding theory in the data of a qualitative study (Glaser & Strauss, 1967) and enables us to focus persistently on the EDO Community as a potentially unique and revelatory case to study (Yin, 1994). Results from this case study could then become even more useful in comparison with other Navy communities as complementary and contrasting cases, offering potential to elucidate insights unattainable through other research methods.

Studying a revelatory case such as this represents theoretical sampling (Glaser & Strauss, 1967) and makes it suitable for analytic generalization (Yin, 1994). As demonstrated several years back in the context of strategic learning (Thomas et al., 2001: 332), this calls in part for case selection of "a unique exemplar of a particular phenomenon to bring key dimensions to light." Through study of this revelatory case, we seek to bring the situated and nuanced nature of RMC command preparation to light and to illuminate patterns with potential to inform success.

We employ three techniques for data collection: 1) document review, 2) strategic contact, and 3) interview. Briefly, document review provides important background information about the EDO Community. It also helps the Investigators to ask informed interview questions. Additionally, the Researchers have candid, confidential and sustained access to a Strategic Contact (i.e., a senior, experienced, recently retired EDO). This former naval officer is very experienced with the EDO Community.

Semi-structured interviews (Rubin & Rubin, 1995) comprise the central method for collecting our qualitative data. Although we do pose a small number of common

questions to all participants, such questions are very open-ended, asking participants to tell about their experiences, feelings, observations and perceptions. We want to hear what the participants have to say—in their own words—not impose a set of theoretic, survey questions. Further, the interviews are conducted with probing (Nelson et al., 2000) and snowballing (Reich & Kaarst-Brown, 1999) techniques, and they continue until theoretical saturation (Glaser & Strauss, 1967) is reached. Because we focus in particular upon EDO success, which is a relatively narrow topic, such saturation is reached after nearly a dozen interviews, indicating sufficiency in terms of the sample frame. Each interview involves about one hour of oral interaction, often with follow up via email, telephone and additional meetings as necessary.

It is important to reemphasize that this is a qualitative study, not a quantitative analysis, and our interest is much more toward developing insight and understanding, not hypothesis testing. Hence, as noted above, we perform theoretical sampling (Glaser & Strauss, 1967), not statistical sampling, and we pursue analytic generalization (Yin, 1994), not statistical generalization. As such, we adhere to very well-established procedures for qualitative data collection and analysis (Denzin, 1994). Such procedures do not dictate that we attempt to develop large, random samples.

Quite to the contrary, we look for a small sample that will be informative, that we can understand in depth, and that will reveal both similarities and differences across participants. Additionally, we work deliberately to select participants who are likely to provide the kind of grounded data that we seek through interviews (Rubin & Rubin, 1995). Toward these ends, our recruitment process emphasizes volunteer participants. The idea is that people who volunteer are likely have something to say, both positive and negative. This helps to ensure smooth, candid, flowing interviews; and it increases the likelihood of collecting data that are considered important by the participants; particularly as our interview techniques enable us to probe and home in on different topics across the various participants. This provides considerable contrast to mandatory surveys with standard questions. Our recruitment script is included in Appendix A for reference.

Nonetheless, we ensure that our sample frame focuses on EDOs viewed as "successful" by the Navy, homing in on O6s who are commanding or have commanded either RMC or SUPSHIP organizations. We also ensure that we collect the same

background information from each participant, so we have a common basis of comparison.

Plus, we ensure further that at least some of the same interview questions apply to all participants, so we establish a base set of responses for comparison and contrast. Some study participants answer these questions in writing before their interviews. This streamlines the process and provides a good basis for asking other questions through probing and homing in on different topics across the various participants. The common set of interview questions is included in Appendix A for reference as well.

It is important to note that this whole sample frame reflects some intentional bias: All study participants are senior officers (O6 or O7). All have reached very high levels in the EDO Community, leading major RMC and SUPSHIP commands and beyond.

To enhance candid responses, and to reassure participants regarding anonymity, we choose not to use a tape or video recorder for interviews. Nonetheless, extensive notes are taken and summarized immediately following each interview, and we utilize an automatic transcription system to facilitate note taking. All results are anonymized and summarized for analysis and reporting purposes.

In terms of coding, following Gioia and colleagues (1994) in part, we employ a multistage analytic approach to data collection, analysis and interpretation. In the primary stage, data collected and analyzed through the course of our interviews lead to first order coding (van Maanen, 1979), accomplished in a manner comparable to open coding (Strauss & Corbin, 1990), which reflects terms used directly by organization participants. In other words, adhering to our grounded approach, we employ *in vivo* codes in the primary stage, using terms from the interviews themselves to code each passage and section. This helps to keep the coding process as close as possible to the data. Investigator reactions and analyses generate corresponding first order interpretations, which are meaningful to organization participants also. Where warranted by theoretical sampling, many first order interpretations may lead us to additional data collection and analysis at the same level, reflecting terms used directly by organization participants. This first order analysis grounds our interpretations in the data.

In the secondary stage, we treat first order interpretations as “data” for second order analysis. This second order analysis augments its first order counterpart with

theoretical insight and comparison, bringing in the investigator's perspective that is informed by the literature, in a manner comparable to axial coding (Strauss & Corbin, 1990). Gioia and colleagues (1994: 367) explain the benefits of using such a multistage approach. They include exposing and integrating different aspects of the phenomena of study that are revealed separately through first versus second order analysis and interpretation.

> Although informant views can reveal the rich means or methods by which members can construct reality … they usually do not address the deep structure of experience. Similarly, although the researcher views tend to gloss the richness of lived experience, they place in *bas-relief* the dimensions or structure of phenomena. Because the knower and known are interdependent in this process of understanding, however, the most desirable approach is to triangulate insider and outsider views.

As with the first interpretation stage, these second order interpretations may lead us in turn to collect and analyze additional data, to refine our first order interpretations, to augment our second order analysis, and so forth. This second order analysis bridges grounded data and interpretations with theory, and it helps us with the emergence of themes, accomplished in a manner comparable to selective coding (Strauss & Corbin, 1990).

Additionally, regarding the Qualitative Researcher's background and biases, he is a tenured full professor of Information Science and of Management at the NPS, and although he is a Navy civilian, he comes to the study independently and without operational military experience. This allows a relatively fresh look at the EDO Community, but one that includes considerable familiarity and experience with knowledge, success and preparation in industry and other sectors outside the Military. This is in addition to many years of research addressing diverse aspects of military organization, personnel, training, education and operations. Hence the Investigator is neither a jaded insider nor a naïve outsider.

Further, the Researcher comes to the study with no particular statement to make or point to prove. Rather, he comes seeking to understand EDO talent inductively, from a grounded perspective, and to elucidate possible approaches to preparing successful EDO leaders. Hence initial coding of data is conducted in a manner that lets the data speak for

themselves and that uses study participants' own terms. This helps to ensure that initial interpretations are both grounded firmly in the data and meaningful to organization participants.

Finally, in addition to the well-accepted methods and techniques outlined above, the study also employs many of the proven tactics for qualitative research outlined by Miles and Huberman (1994: 262-276), which include taking a low profile, sampling people with different views, triangulating across multiple data-collection techniques, multiple verification efforts, and seeking an *emic* perspective (Bernard, 1998). Such tactics serve to mitigate potential bias (e.g., stemming from a single Qualitative Researcher). Moreover, repeated member checking (Denzin, 1994) is accomplished through periodic interaction with our Strategic Contact and follow up with the study participants. Comments pertaining to the interview summaries and findings are also received from the Strategic Contact, participants in the study, experienced EDOs and other researchers, and a preliminary summary of study findings and implications is shared with the participants and others for comment.

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IV. RESULTS

We summarize key findings and results in this section. This begins with an overview of the method and summary of our interview sample frame. We then discuss and provide and examples of first order codes and second order codes, followed by issues and alternatives for consideration by EDO Leadership.

A. METHOD AND FRAME

The research method can be visualized succinctly via Figure 4. As shown, the process steps are intentionally highly iterative, beginning with background conversations (e.g., with EDO Community leaders, Strategic Contact, EDO School Commander) for orientation. This is important, as the Researchers lacked detailed understanding of the EDO Community in advance of this study.

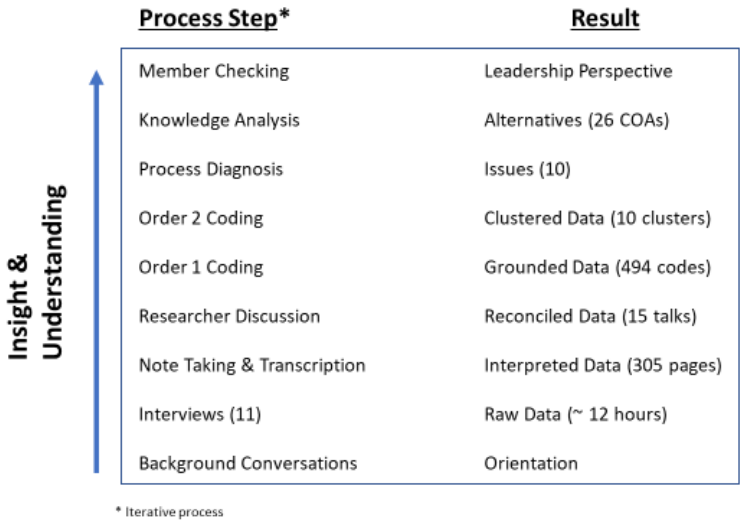

Figure 4 Research Method Overview

Eleven interviews are conducted, each lasting roughly one hour, and each with a Navy Captain (O6) or above (i.e., one Rear Admiral and one Vice Admiral). Nearly a dozen hours of focused interview conversations generate over 300 pages of interview transcripts and notes, which the Researchers discuss and reconcile following each interview session. Analysis of the qualitative data generates nearly 500 first level codes, which support the identification of 10 clusters at the second level. These clusters enable

us to identify 10 pathologies or major issues, which we propose to address through 26 alternatives or courses of action (COAs) for consideration by EDO Community leaders. Member checking supports the fidelity of our interviews and reasonableness of our findings.

B. FIRST ORDER CODES

As noted above, first order codes reflect terms used directly by study participants. Figure 5 displays a sample of first order codes from our initial three interviews (i.e., P2201, P2202, P2203). The numbers correspond with noteworthy codes, but other quotes are included for reference as well. Such first order codes become data for second order analysis.

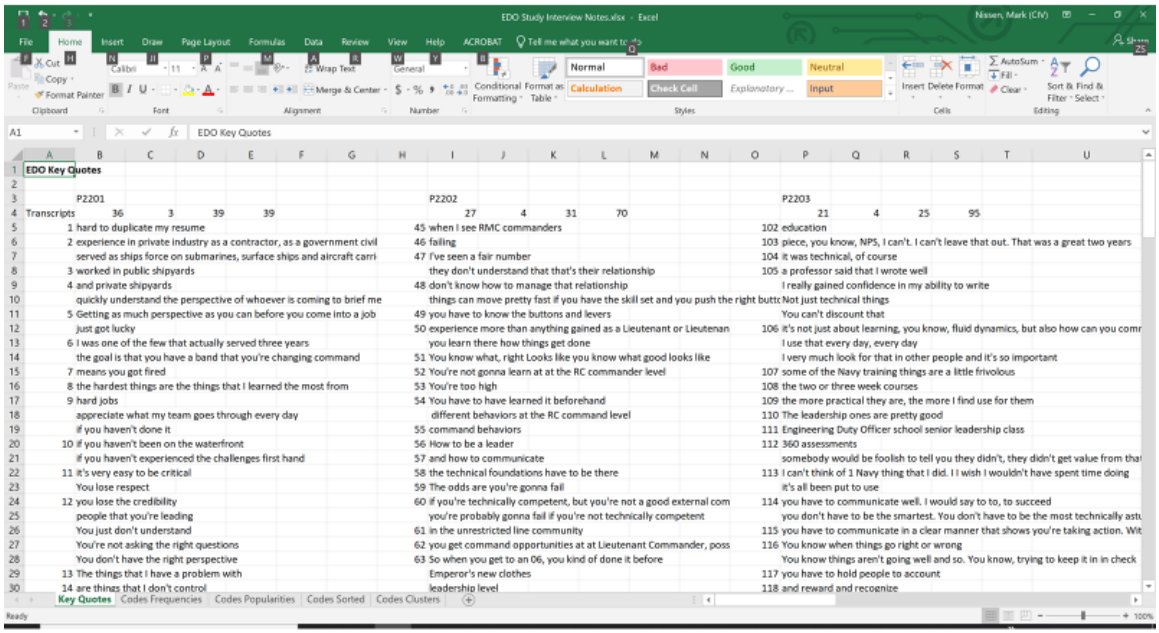

Figure 5 Sample First Order Codes

C. SECOND ORDER CODES

From there, we align first order codes that appear to coalesce around similar topics, which we organize to gauge their commonality and frequency. These are sorted and examined in search of emergent themes. This reflects second order coding, as the Researchers apply their theoretic and experiential knowledge to the first order codes and use such application to identify potentially important themes for further analysis. Notice for example how Participant P2201 indicates in Code 1 how it would be "hard to

duplicate my resume." This EDO implies that his or her somewhat unique experiential trajectory contributed greatly to success.

The various emergent themes are clustered in turn to elucidate higher level concepts that may indicate possible problems, insights and candidate alternatives for consideration. These are leveraged in turn to develop a set of issues and alternatives for the EDO Leadership to consider as they gain increasing insight into the Community and continue to formulate approaches to mitigating issues, recommending changes, and acting to further enhance the efficacy of future RMC (and other EDO) commanders. Figure 6 presents a screenshot of codes, key thoughts and emergent themes that have been clustered. Notice for example how Code 19 "learning curve" appears to apply across numerous study participants (albeit in somewhat different words) and contributes to our identification of "CO preparation" as a potential theme.

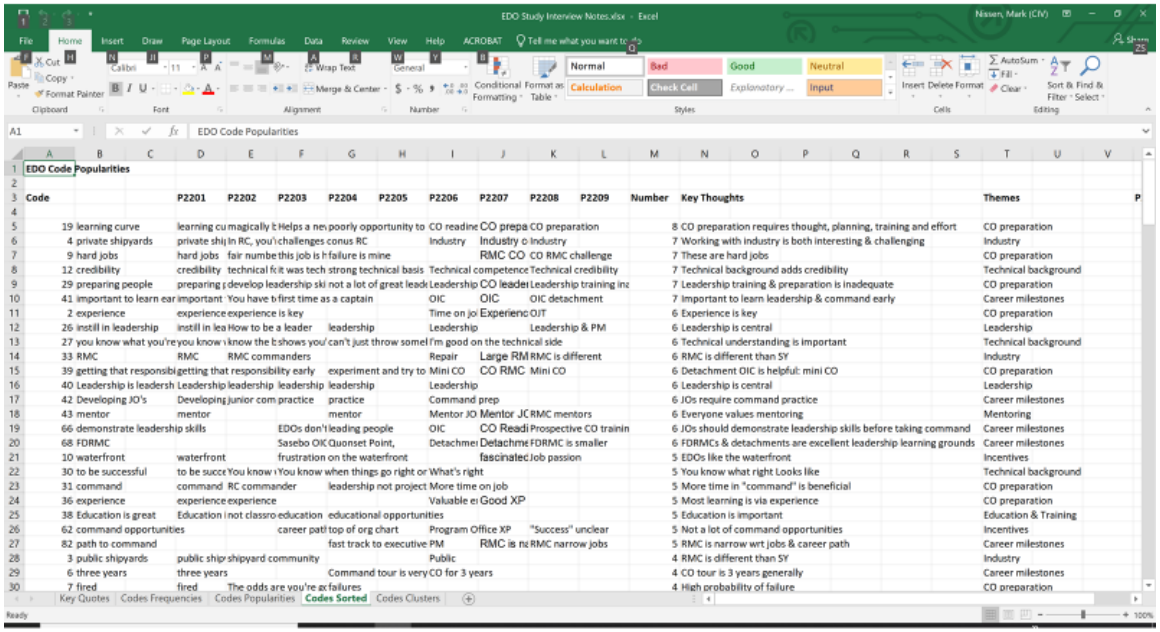

Figure 6 Codes and Emergent Themes

D. ISSUES AND ALTERNATIVES

The next step involves evaluating the various clusters to identify pathologies, insights and potential COAs to address them. Figure 7 summarizes the clusters in order and highlights several pathologies, insights and COAs. Here we present a sample of items from the "CO preparation" and "Education & Training" clusters. The pathologies "inadequate training for civilian leaders" and "business education would be valuable"

suggest insights such as “Possible to skip MS with technical undergrad education” and “Business acumen is important (but inadequate)” offer potential to mitigate their consequences. Such insights lead to alternatives including “CO course @ NLEC or NPS - soccer practice,” “EMBA (Executive Master of Business Administration),” and “Business degree for tech undergrads” as COAs for consideration.

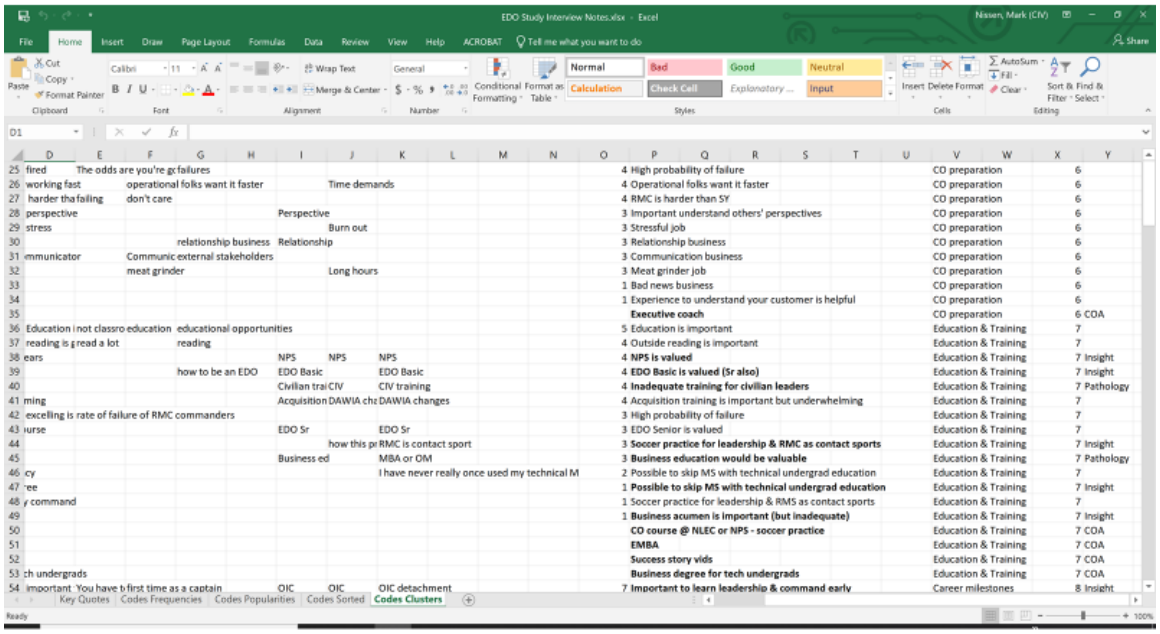

Figure 7 Pathologies, Insights and COAs

The analysis enables us to generate the set of issues and alternatives summarized in Table 2. The first issue pertains to challenges that some EDOs have working with industry. It is important to note that such officers are educated technically and that all are required to earn a technical graduate degree. This provides them with excellent technical credentials and credibility, but at the highpoints of their careers (esp. when taking command of an RMC), their requisite skillset shifts from technology to business and management.

Two alternative COAs develop from this: 1) the EDO Senior Course could be expanded to integrate more RMC content, and 2) career planning could be adapted to ensure that officers have prior RMC experience before taking command. Participants indicate that maintenance is unique, and some suggest that prior maintenance experience (and leadership) is key to efficacy.

Table 2 Issues and Alternatives

Issue	**Alternative**
Working with industry is challenging	- RMC specific addition to EDO Sr Course - Ensure officers have prior RMC experience before command
Acquisition: Fixed price contracting	- Reassess acquisition strategy - Consider policy waivers
Acquisition: Training shortfalls	- Continue DAWIA certification - Continue Navy acquisition training - RMC specific addition to EDO Sr Course
CO prep is inadequate for some	- Executive coaching (beyond mentoring) - Soccer practice: full contact (RMC) CO course - FDRMC, Detachment or OIC as prerequisite to RMC CO
Lacking business understanding	- Enhance & extend Advanced Management Program (AMP) - EMBA Programs (NPS, others) - Technical undergrads pursue business degrees (MBA)
O6 is too late for first command	- FDRMC, Detachment or OIC as prerequisite to RMC CO - RMC XO-CO Fleet Up (shorter tours?)
Unclear path to Flag	- How much PM & SY experience is necessary? - How to gain RMC experience without becoming too narrow? - How to prevent wrong people from taking RMC CO jobs?
EDO retention & mobility	- Signal expectations for taking overseas jobs - Signing bonus for key EDO milestones - Merit reordering
Promotion based on technical talent	- Education, training, experience & mentoring + personality - Best engineers not necessarily best leaders - Flag level conversations
Not everyone is suited for command	- Seek out motivated, self-driven people - Understand people's strengths, weaknesses & potentials

The second issue pertains to challenges with fixed price contracting for ship maintenance. Identifying all possible problems with any particular ship, estimating how much it should cost for appropriate remedies, and forecasting the time required to complete the maintenance work, is challenging. Asking contractors to do so on a fixed price basis can be problematic. For one, contractors are appropriately risk averse, so they

will price in potential costs for uncertainty. For another, most contractors are collocated on the waterfront, hence there is great opportunity for communication and coordination between RMC Commanders and contractors. One alternative centers on reassessing the acquisition strategy calling for fixed price maintenance contracting. Another suggests initiating a waiver policy where such strategy fails to serve the Navy's interest best.

The third issue pertains to perceived acquisition training shortfalls. Most study participants indicate that they had received sufficient acquisition training, and most emphasize that Defense Acquisition Workforce Improvement Act (DAWIA) certification is important, but many suggest that Defense Acquisition University (DAU) courses are weak. Alternatively, acquisition training courses offered within Navy commands are considered by many participants to be stronger and more worthwhile. Further, the contract oversight aspect of RMC command may not be covered adequately through extant acquisition training opportunities. Suggested alternatives for consideration include continuing DAWIA certification and Navy acquisition training, but the EDO Community may also be served well by integrating some RMC specific content into an offering such as the EDO Senior Course.

The fourth issue pertains to CO preparation, which appears to be inadequate for some RMC commanders. We view such preparation as a combination of education, training, experience and mentoring. One consideration centers on executive coaching, which extends beyond Navy mentoring and involves hiring external executive coaches to help (esp. new) RMC commanders. This practice is common in industry.

A second consideration calls for creation of an RMC CO course, to be completed in advance of assuming RMC command, to teach the skills necessary for success. We describe such course as "soccer practice" to indicate that it must go much further than slide presentations and guest speakers talking about RMC command: As a "full contact" sport, soccer players must learn to run, pass, kick, block and defend on the field. Likewise, RMC commanders must learn to deal with contractors and contracts, government civilians and leaders, Type Commanders (TYCOMs) and Fleet operators, and others in a full contact manner (e.g., via role play) like soccer players practicing on the pitch.

A third consideration looks to career planning. Several study participants highlight the value of prior assignments to a forward deployed RMC (FDRMC), detachment or officer in charge (OIC) role in terms of preparing them well for RMC (or other) command. As a "mini CO," an EDO has the opportunity to learn firsthand many of the skills required for RMC command, but with less pressure, exposure and responsibility. Indeed, more than one of our study participants suggest that such assignment or role should be a prerequisite for RMC command. Just as prerequisites in college are put in place to ensure that students have the background necessary to succeed in advanced courses, the EDO Community has an opportunity to help increase future RMC commanders' chances of success.

The fifth issue pertains to a lack of business understanding. Despite the Advanced Management Program (AMP), which was established to help EDOs learn about business and develop the corresponding acumen, many study participants express dissatisfaction with it, some describing it as shallow and superficial. One consideration is to enhance and extend the AMP to make it deeper and more substantial.

Another consideration is to encourage or at least permit EDOs to complete an executive MBA (EMBA) program. The Naval Postgraduate School (NPS) developed an EMBA program for highly time constrained naval aviators some time back. The EDO Community may benefit from that or a similar program offered elsewhere.

A third consideration focuses on education also. Every EDO is required to complete a technical graduate degree at NPS or MIT. This requirement is seen as important by study participants for establishing credibility as an RMC commander. However, many study participants note that command does not require technical expertise, and some participants with technical undergraduate degrees question how much mechanical engineering or other technical education is necessary as an engineering *leader*. The EDO Community could consider allowing officers with a technical undergraduate degree to pursue business degrees (e.g., MBA) instead of insisting upon technical graduate work.

The sixth issue pertains to the rank at which RMC commanders have their first exposure to command, with the common complaint that Captain (O6) is too late. This relates to the CO preparation issue from above, and it corresponds to the same

consideration of FDRMC, detachment or OIC as prerequisite to RMC CO. Another consideration draws from the URL surface warfare officer (SWO) Community, which routinely assigns a future CO to serve a tour as XO before the Fleet Up to command. Although the typical EDO job assignment of three years would complicate this approach, perhaps an EDO XO tour could be shortened to 18 months in order to accommodate the complex career planning and job sequencing process.

The seventh issue pertains to what some study participants describe as an unclear path to Flag (i.e., Admiral rank). Some participants describe the importance of maintenance experience for RMC success, but some also characterize maintenance as a relatively narrow career field with less opportunity for promotion when compared to other fields (e.g., program management [PM] or shipyard [SY]). The questions center on how much PM or SY experience is necessary, how to gain sufficient RMC experience without becoming too narrow, and how to prevent the wrong people (esp. with insufficient maintenance experience) from taking RMC CO jobs. The central consideration is for EDO Leadership to outline and articulate its ideas for addressing such questions. It is beyond the Researchers' expertise to do so.

The eighth issue pertains to EDO retention and mobility. Many EDOs choose to leave the Navy as more junior officers (e.g., O4 and O5), which is prior to them having an opportunity to make a major contribution through command. Reasons for such officers leaving are varied, but family sacrifice is noted frequently, especially for EDOs that take overseas jobs. Some considerations include EDO Leadership signaling expectations for EDOs to take overseas jobs, and the EDO Community could borrow from its SWO counterpart and offer a retention bonus at key times in an officer's career, perhaps with a connection to some key milestone such as moving to a different region or taking a job overseas. Several participants mention merit reordering as well as a motivator. This enables a reordering of promotion and pay increase for praiseworthy officers. The Community could leverage such reordering as an additional incentive for taking less desirable or overseas jobs.

For reference, the SWO community has multiple retention bonuses utilized for talent management. Figure 8 identifies the SWO Department Head Retention Bonus (DHRB) scheme. This includes a $105,000 bonus for first look screeners of Department

Head (DH), a key milestone. This bonus is broken into increments over seven years. Second look DH screeners are eligible for a $95,000 bonus, and third look screeners are eligible for a $75,000 bonus upon signing a contract to complete two DH tours.

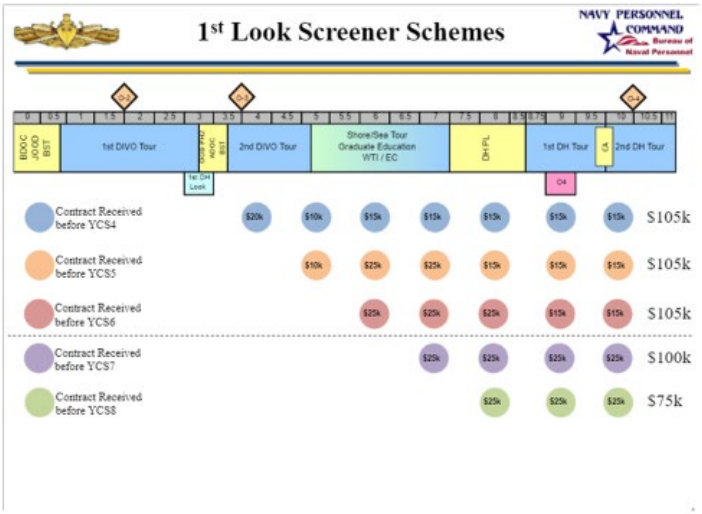

Figure 8 SWO Department Head Retention Bonus Scheme

The ninth issue pertains to promotion based on technical talent. This is common among technical organizations everywhere, as engineers, for instance, get promoted for their engineering job performance. As some level, nonetheless, such engineers become managers and even executives, where they stop performing as engineers and must manage people and organizations. Many engineers and like technical people are not suited well for leadership, and some can rise to a level of incompetence. This is referred to as the Peter Principle (Peter, 1969). As a consideration, in addition to education, training, experience and mentoring, EDO Leadership may look into officers' personalities and aptitudes for leadership as another factor for promotion to command. Perhaps the best technical people can continue with technical jobs throughout their careers. These are clearly Flag level conversations.

The final issue follows, as it pertains to officers' suitability for command. Despite education, training, experience and mentoring, successful RMC (and other) commanders appear to be highly motivated, self-driven people. Several study participants note the importance of outside reading, for instance, to gain knowledge. Others note their willingness to seek out hard jobs and remain highly mobile to serve the Community. As a final consideration, EDO Leadership may look in particular for—and encourage—such people and seek to understand their key officers' strengths, weaknesses and potentials for command.

V. CONCLUSION

The U.S. Navy's capabilities regarding the design, acquisition and maintenance of ships and shipboard systems needs continuous improvement to counter advancing threats. Engineering Duty Officers (EDOs) have long been associated with these capabilities in both technical and leadership positions. Over the years, the range and complexity of these professional areas have increased, and some of the developmental leadership opportunities have become diluted, resulting in lower probability of success at command.

This study centers on analysis of the fundamental leadership requirements for EDOs. It focuses specifically on the leadership experiences required to prepare EDOs to successfully take command and lead the Navy's large, complex civilian organizations such as shipyards, warfare centers, regional maintenance centers and major acquisition programs. Moreover, because the EDO Community is associated with a wide variety of different jobs, we focus further on regional maintenance centers (RMCs).

In this technical report, we provide key background information necessary to understand the context and focus of the study. This begins with a summary of the EDO Community. For comparison and potential insight, we summarize key aspects of the Navy Aviation Maintenance Community also, and we provide an overview of how maintenance is accomplished in the Air Force for further comparison and insight.

The qualitative research method is summarized subsequently. We seek a direct, grounded understanding of the EDO Community, so we employ very well-established, grounded theory building methods. Such methods equip us to develop an understanding inductively, from the data themselves, as opposed to relying upon a deductive, top-down model likely to be too general and coarse for our purpose.

Although we employ three techniques for data collection (i.e., document review, strategic contact, interview), semi-structured interviews comprise the central method for collecting our qualitative data. We ensure that our sample frame focuses on EDOs viewed as "successful" by the Navy, homing in on O6s who are commanding or have commanded either RMC or SUPSHIP organizations.

Results begin with an overview of the research method and sample frame. We then discuss and provide examples of first and second order codes, followed by issues

and alternatives for consideration by EDO Leadership. In total, eleven interviews are conducted, each lasting roughly one hour, and each with a Navy Captain (O6) or above (i.e., one Rear Admiral and one Vice Admiral). Nearly a dozen hours of focused interview conversations generate over 300 pages of interview transcripts and notes, which the Researchers discuss and reconcile following each interview session.
Analysis of the qualitative data generates nearly 500 first level codes, which support the identification of 10 clusters at the second level.

These clusters enable us to identify 10 major issues, analysis of which results in 26 alternatives or courses of action (COAs) for consideration by EDO Community leaders. As a final step, member checking supports the fidelity of our interviews and reasonableness of our findings.

For the most part, this set of issues and alternatives center on four key elements: 1) education, 2) training, 3) experience and 4) mentoring. However, we also find 5) personality to represent an important contributor to command success.

In addition to this technical report, which is intended to be self-contained and informative, we have prepared a set of briefing materials and met multiple times with senior EDO Community leaders, who have commented on such issues and alternatives, and who are making decisions regarding the most feasible and effective approaches to mitigating major issues and implementing COAs. The EDO Community is in good hands clearly, and we remain very impressed with its bright, hardworking people.

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APPENDIX A – RECRUITMENT SCRIPT AND COMMON QUESTIONS

To begin the study, the Researchers are provided with a list of RMC and SUPSHIP COs. Initial contact for recruitment is made by telephone with follow up via the script below, which includes a set of common questions asked of all study participants.

Introduction

"Thank you again for participating in the study on enhancing the EDO job experience. You were identified among a small and select cadre of people with experience and expertise in this area, and we selected you along with a few others for your potential to inform our study well. As a note, your comments will be kept anonymous; no personal details about you will appear in the study report or briefings; and only you and we will know that you participated in the study. Once you sign the consent form, We'll ask you a few relatively open ended questions, which we hope that you'll answer candidly. The interview should take 30 to 45 minutes, but we can go longer if you wish. Do you have any questions? Are you ready to begin?"

General Questions

1. For how long were or have you been in the Navy?
2. Can you tell me about how your career has progressed to this point?
3. What attracted you to the EDO Community?
4. What is or was your current or final EDO job?
5. Which education and training opportunities prepared you best for that job?
6. Which job assignments prepared you best for that job?
7. What education and training opportunities or job assignments could have prepared you better?
8. What were your greatest achievements through that job?
9. What were your greatest difficulties with that job?
10. What advice would you give to someone contemplating applying for or accepting that job?
11. What advice would you give to the Navy for helping someone succeed at that job?
12. Tell me a story about a someone who excelled at that job and one about someone who failed.

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