U.S. Coast Guard Engineering

A Challenging Career

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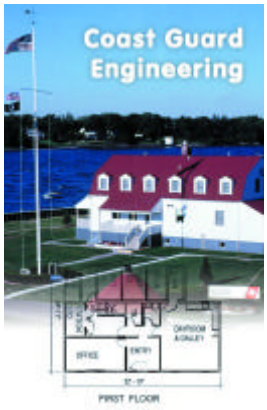

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This Coast Guard Engineering booklet is prepared by the U.S. Coast Guard Systems Directorate (G-S), U.S. Coast Guard Headquarters, Washington, DC, (www.uscg.mil/systems or http://cgweb.comdt.uscg.mil/g-s/gs.htm).

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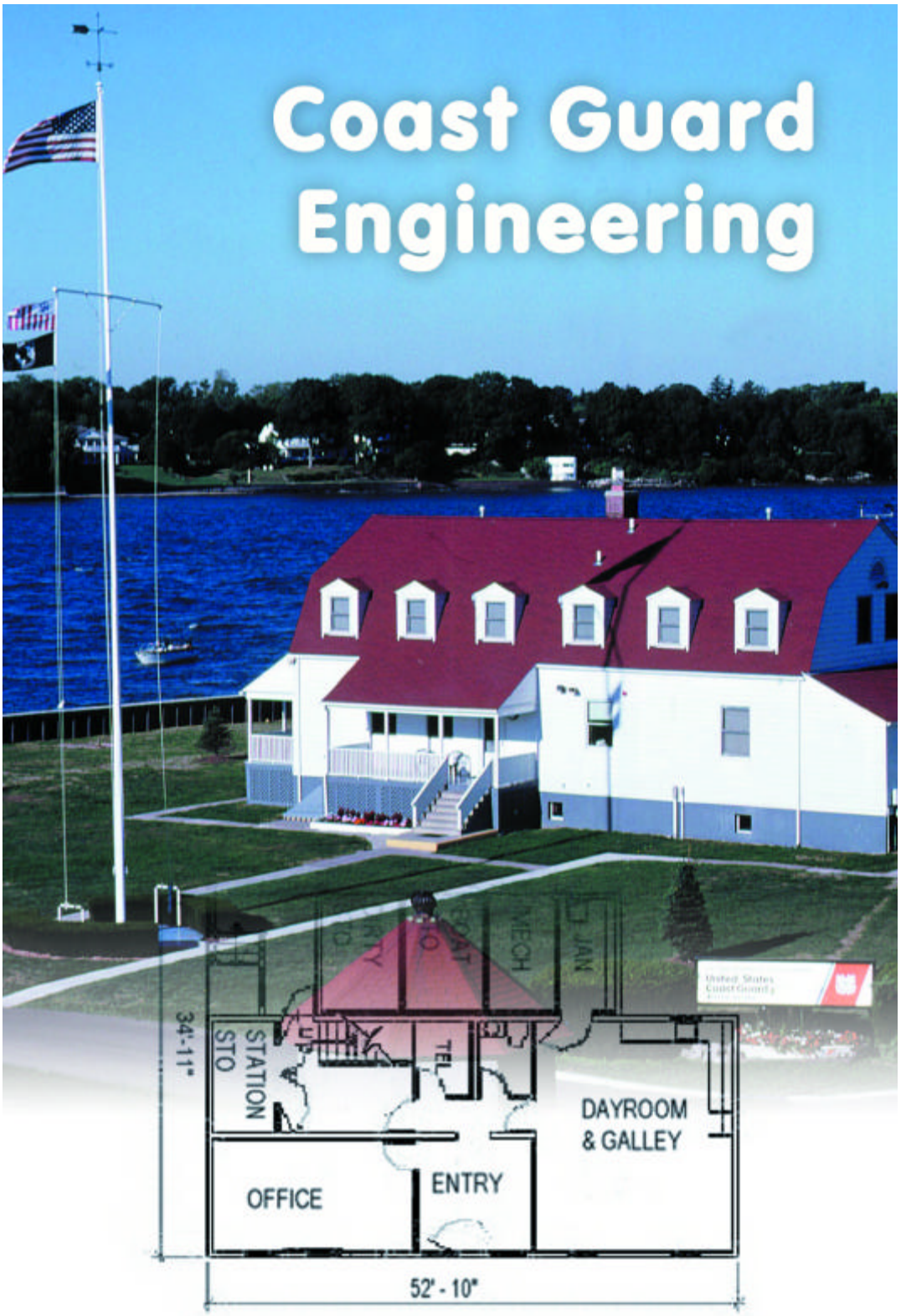
Coast Guard Engineering



FIRST FLOOR

Coast Guard Engineering

Introduction

Coast Guard Engineering duty offers you the challenge of applying and expanding your knowledge and experience by working in a variety of demanding assignments. In engineering duty, you can achieve a sense of personal achievement and self-satisfaction that is difficult to match elsewhere.

No position in the service will be closed to you because of your engineering specialty and background. Moreover, in many assignments which do not specifically call for an engineering specialist, you will be able to utilize the problem-solving techniques and analytical approach that engineering training provides. You will be able to plan a career while keeping your options open; the choices are yours as an engineer.

Bringing it All Together: Coast Guard Logistics

Long before the first propeller turns, supplies and support equipment must be in place. Logistics management is the lifeblood that sustains all Coast Guard missions. The quality of logistics support is a primary factor in determining operational readiness. A highly sophisticated and responsive supply structure that is fully integrated with maintenance and operational readiness requirements is a necessity in today's Coast Guard. Each day current Coast Guard logistics systems are being improved and new ones developed to meet these needs.

Logistics offers an opportunity for a challenging career for persons, especially engineers, with strong personnel and financial management skills. A cadre of trained logistics professionals are involved in the design and the delivery of equipment and supplies to Coast Guard operational units. Logisticians serve at all levels in various logistics assignments from supply officer afloat to the commanding officer of the Engineering Logistics Center.

For engineers in other specialties, Coast Guard logistics offers an opportunity to broaden their skills and helps shape the future of the Coast Guard. Logistics meshes engineering needs with business operations, and the management and business skills developed during a logistics tour will prove invaluable to engineers as they progress through their careers.

Opposite Page: Upper portion - Coast Guard Station Niagara, New York. Lower portion - first floor plan of Station Ashtabula, Ohio.

LTJG Anthony Erickson is a Ship Superintendent in the Industrial Department of the Coast Guard YARD in Baltimore, Maryland. A 1998 graduate of the Coast Guard Academy, LTJG Erickson holds a degree in Naval Architecture and Marine Engineering.

The Engineering Disciplines

Engineering is a technically oriented career field. Coast Guard Engineering consists of the following principle sub-specialties: Aeronautical Engineering, Civil Engineering, Naval Engineering, Ocean Engineering, Electronics Engineering, Telecommunications Engineering, Industrial Management, Material Management, Information Technology Management and C4 (Command, Control, Communications and Computers) Systems Engineering. Regardless of the engineering specialty you choose, you can expect assignments in increasingly responsible positions that will test your knowledge, leadership and management ability.

✓ *Aeronautical Engineering*

In the **Aeronautical Engineering** community, aviators, general officers, warrant officers, enlisted personnel and civilians all work together to plan, develop and support new Coast Guard aircraft and systems, as well as manage the

Coast Guard aircraft maintenance program. Approximately 200 Coast Guard helicopters and airplanes make up the seventh largest naval air force in the world. The rapid growth and ever-changing technology experienced in the aerospace sector provides a constant challenge for the aeronautical engineer in integrating, maintaining and logistically supporting the aircraft and systems used throughout the Coast Guard.

To specialize as a commissioned aeronautical engineer, you must first qualify as a Coast Guard aviator. The normal career pattern proceeds from pilot qualification to application for the student engineering training program described in the Training and Education Manual COMDTINST M1500.10 (series). This training combines on-the-job training and short-term technical schools over a 12-month period that leads to designation as an aircraft maintenance officer. The student engineer program prepares an officer to manage the engineering department at an air station. After one or two tours at aviation units, officers in the aeronautical engineer track may obtain advanced degrees by applying for postgraduate study.

Following postgraduate study, these aeronautical engineers may be assigned to Coast Guard Headquarters, Washington, DC; the Aircraft Repair and Supply Center, Elizabeth City, North Carolina; or to a large air station as an engineer officer. From that point, career aeronautical engineers generally move into command and control positions at air stations or senior staff positions throughout the Coast Guard.

The Coast Guard Cutter OAK (WLB 211) hits the icy waters of the Great Lakes for the first time. The cutter is the 11th of the Juniper Class Seagoing Buoy Tenders to be launched at the Marinette Marine Facility in Marinette, Wis. The OAK was launched on 26 January 2002.

Maintenance and Logistics Command Pacific (MLCPAC) Type Desk, LT Pat Murphy, and Engineer Officer, LT Chad Jacoby, inspect a 378' cutter's propulsion shaft liner while being machined in lathe at San Francisco Drydock.

✓ *Civil Engineering*

Coast Guard **Civil Engineers** manage the shore facility capital asset portfolio for the Coast Guard (CG). They are responsible for managing the entire life cycle of shore facilities by providing the necessary planning, investing, using and divesting services to support the "right" facility, at the "right" location, at the "right" time, for the "right" cost across all CG mission areas. Shore Facilities Capital Asset Management (SFCAM) is transitioning shore support from a facility engineering focus to a capital asset management focus. SFCAM will position the CG to be more flexible and agile by developing a portfolio of options from which the CG can adapt its shore facility capital assets to meet continually changing mission requirements.

The shore plant consists of over 30 million square feet of floor space on 65,000 acres of land, plus miscellaneous roads, towers and waterfront facilities. The Plant Replacement Value (PRV) is estimated at over $7.1 billion. The average age of a Coast Guard building exceeds 39 years; many were constructed before World War II. The effective operation and maintenance of this plant requires

innovative SFCAM techniques and the employment of modern ITM software. A Coast Guard civil engineer's duties encompass the full range of problem solving and technical skills to embrace the SFCAM principles to plan, invest, use and divest these shore facilities.

Specialization as a civil engineer is open to officers with a degree in civil engineering or an allied field, who have completed an initial assignment at sea or ashore. Two types of civil engineering assignments are available: facilities engineering duty and civil engineering staff duty.

Career patterns in civil engineering offer challenging opportunities. Some junior officers perform facilities engineering or civil engineering duty while awaiting assignment to postgraduate education. The CG Civil Engineering postgraduate opportunities offer two different options including: a Master's in Civil Engineering (MSCE) or a dual Master's degree in Civil Engineering (MSCE) and Business Administration (MBA). After postgraduate school, most officers are assigned to a Civil Engineering Unit (CEU) or a Facilities Design and Construction Center (FD&CC). Subsequent tours, involving greater responsibility, include assignments such as: assistant facilities engineer or facilities engineer at a major shore command, construction project manager at a FD&CC, executive officer of a CEU, or

The Ambros Light, located 7.5 miles east of Sandy Hook, New Jersey, under construction. Ocean engineers are responsible for the design, construction and maintenance of Aids to Navigation.

LCDR Susan Powers is Chief of the Facilities Management Division at the Coast Guard YARD. A graduate of the Coast Guard Academy, she earned her degree in Civil Engineering in 1987 and continued advanced studies in Civil Engineering with an emphasis in Construction Management at the University of Illinois.

assignment to the Shore Division of the Maintenance and Logistics Commands or the Office of Civil Engineering at Coast Guard Headquarters. Rotational tours may be available, if requested.

✓ *Naval Engineering*

Naval Engineering specialists are involved in the planning, design, construction, outfitting, operation, maintenance and alteration of Coast Guard boats and cutters (ships). This includes some of the most highly automated machinery, electrical and ordnance systems in the world. An undergraduate engineering or related technical degree is preferred for naval engineering specialty candidates. Entry level naval engineers normally complete a two- to three-year training/indoctrination program in afloat and ashore assignments. This familiarizes the individual with the entire spectrum of naval afloat operations and maintenance, contract administration, quality assurance procedures, project management and fleet maintenance support.

Naval engineers also serve as engineer officers and assistant engineer officers on larger cutters. They are responsi-

ble for the operation and maintenance of the cutter's engineering plant, and direction of engineering department personnel and financial resources.

Officers seeking engineering assignments afloat should complete the qualification requirements for shipboard engineer in accordance with the Personnel Manual COMDTINST M1000.6 (series) within their first two commissioned officer duty tours. With this qualification, you may serve as an engineer officer aboard two medium- or high-endurance cutters in subsequent duty tours.

Naval engineers may qualify for graduate level education programs that lead to Master's of Science degrees in either Naval Architecture and Marine Engineering, Mechanical Engineering or Naval Engineering Administration. In general, the senior-level naval engineering billets require postgraduate education.

✓ ***Ocean Engineering***

Coast Guard **Ocean Engineers** provide engineering support for aids to navigation and marine environmental protection. This includes the design, development, testing, evaluation, procurement and maintenance of a vast array of equipment used in these program areas such as; buoys and mooring hardware, light and sound signal systems, power and control systems, offshore structures, and oil/chemical spill containment and recovery equipment. Ocean engineers have managed the conversion to solar power of over 15,000 lighted aids to navigation and the automation of hundreds of lighthouses. They also manage multi-million dollar construction contracts to build offshore range towers with complex lighting and power systems.

A limited number of specialty billets are available at Coast Guard Headquarters, Civil Engineering Units and the National Data Buoy Center. Related tours may be performed in aids to navigation billets, afloat or ashore, or marine environmental protection billets at Marine Safety Offices or on the National Strike Force.

✓ ***Information Technology Management and C4 Systems Engineering***

With today's ever growing dependency on technology, the Coast Guard needs officers with Information Technology Management (ITM) and C4 (command, control, communications and computers) Systems Engineering background, experience and skills. The Coast Guard

LTJG Alex Dodd (left) and LT Josh Mickel (right), Civil Engineering graduates of the Coast Guard Academy in 1998 and 1995, respectively, review engineering drawings at the Coast Guard YARD, Baltimore, Maryland. LT Mickel is a 1999 Master of Science Civil Engineering graduate of Oregon State University and obtained his Professional Engineer's license in 2000.

Chief Information Officer's (CIO) vision is to deliver the right information to the right people at the right time to support all Coast Guard missions. As such, the need for ITM and C4 specialists will only grow. These jobs within the Coast Guard will become more demanding where an officer will not only need to master the technology, but will also need to master the operational and logistical business processes being leveraged by technology. The disciplines that comprise these ITM/C4 specialties include: information technology management, software systems engineering, communication systems engineering, telecommunication systems management, computer systems design, computer science, electrical/electronics engineering, digital signal processing, and guidance/control systems engineering. If an officer has a strong performance record, the officer will have an excellent chance of being selected to attend graduate school in one of these programs. Officers in these disciplines are spread across all other programs in the Coast Guard. ITM and C4 Systems Engineering will continue to be a critical specialty within the Coast Guard as cutters, boats, aircraft and other operational and support mission platforms advance in complexity and rely heavily on technology. These ITM/C4 technology experts should be capable of

applying and managing technology in support of all Coast Guard missions. Officers performing well in this specialty who demonstrate the skills necessary for performance at the next higher rank and level of responsibility will be very competitive for promotion and out-of-specialty operational assignments. The Electronics engineering and Telecommunications Engineering subspecialties are further discussed below.

Coast Guard members get some hands-on experience in how to inspect a tower.

✓ *Electronics Engineering*

Coast Guard **Electronics Engineers** are involved with all facets of electronic and C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) throughout the entire life cycle of the system. These engineering functions include the design, development, testing, evaluation, development of specifications, development of national and international standards; and support of a wide variety of systems, including navigation, shipboard, vessel traffic services, security and display systems and other specialized systems such as those developed to enhance maritime domain awareness. These systems are often among the leading end of technological innovation, and Coast Guard electronics engineers are internationally recognized as experts in maritime technology.

Coast Guard electronics engineers have designed shipboard electronics suites and integrated navigation systems, navigation services to the public such as differential GPS (Global Positioning System) and LORAN (LOng Range Aids to Navigation), standards for shipboard navigation safety equipment such as GPS, Electronic Chart Display Information Systems (ECDIS), integrated navigation systems, radar, shipboard

CDR Henry Hudson (Master of Science degree in Software Engineering, Florida Institute of Technology), Commanding Officer, USCG Electronic Systems Support Unit (ESU) New Orleans, reviews the ESU automated network and server system monitoring and analysis tools. These tools allow members of the ESU team to discover and correct CGSW server and workstation problems before a customer even becomes aware of a problem.

data networks and shipboard automatic identification systems. Coast Guard electronics engineers have been in the forefront in the design, development and implementation of command and control systems that not only provide a high level of interoperability between Coast Guard assets (land, sea and air) but also between the Coast Guard, Department of Defense and other government agencies.

✓ *Telecommunications Engineering*

Telecommunications Engineering, an electronics engineering specialty, is a skill supporting virtually all missions of the Coast Guard. Like electronics engineers, Coast Guard telecommunications engineers design, develop, test, evaluate, specify and support radio, landline and fiber networks integral to Coast Guard command and control, homeland security, and distress and safety operations. They improve maritime distress and safety systems, and ensure Coast Guard radio systems are protected from radio frequency interference. Additionally, telecommunications engineers are directly involved in the development of national and international standards.

✓ *Logistics*

Logistics encompasses all the activities associated with acquiring, sustaining, and retiring the components of capability: people, information and systems. Logistics in the Coast Guard is more broadly defined to include all the elements of support including financial, management, human resources, technical services, environmental concerns and information technology, as well as the traditional supply and maintenance functions. Logistics encompasses the entire life cycle of people, information and systems, from "cradle-to-grave." This expanded view of logistics offers opportunities to deliver improved support at reduced costs. The right stuff, at the right time, at the right place, and at the right cost equates to readiness, and is the underlying goal of the Coast Guard's logistics systems.

Logistics managers from Headquarters, the Headquarters' Centers-of-Excellence, and the many support elements contained within the Maintenance and Logistics Commands, work closely with their front line customers, ensuring that they are fully mission capable. (Industrial Management is a sub-specialty of Logistics and is described further below.)

✓ *Industrial Management*

This is a small, but important area of specialization within the Coast Guard; with approximately 15 billets service-wide require postgraduate-trained **Industrial Managers**. Among these billets are; industrial managers at Bases Miami Beach, Detroit, Honolulu and Ketchikan; at Support Centers Boston, New York, New Orleans, Alameda, San Pedro and Portsmouth. Industrial manager billets also exist at the Coast Guard Yard.

Industrial managers work closely with their many customers in support of the total engineering plant. Responsibilities include the budgeting and scheduling of industrial work, and the accounting of costs associated with the execution of work orders.

Following school, officers can expect two or three industrial management assignments during their careers. Rotational tours in or out of engineering billets are encouraged to maintain awareness of the needs of the operational units and may be provided up to 50 percent of the time. Typical assignments might include executive officer of a Coast Guard group or engineer officer afloat if qualified by previous experience.

LCDR Mark Lenassi is the Deputy Project Manager of the Production Division, Industrial Department, Coast Guard YARD. LCDR Lenassi holds an Associate in Applied Science degree in Mechanical Technology from Thomas Nelson Community College and an Associate of Arts degree from St. Leo University. LCDR Lenassi inspects a communications rack on the Coast Guard Cutter FAR-ALLON undergoing repairs at the YARD.

Typical Engineering Assignments

Following graduation from postgraduate school, an engineering specialist will probably be assigned to a billet intended to provide the officer with an opportunity to apply and further develop the recently acquired skills and education. At the same time, the officer will become familiar with the operation and philosophy of the Coast Guard engineering organization while acquiring the expertise that can lead to registration as a Professional Engineer (PE).

All **Aeronautical Engineering** officers can anticipate staff duty support roles interspersed with operational tours at air stations. Following postgraduate duty, officers may be assigned to Coast Guard Headquarters, Washington, DC; the Aircraft Repair and Supply Center in Elizabeth City, North Carolina; or to one of 27 air station as an engineer officer.

Civil Engineers are usually assigned to one of the following: the two Maintenance and Logistics Commands (MLCs) in Norfolk, Virginia and Alameda, California; the two Facilities Design and Construction Centers (FD&CCs) in Norfolk, Virginia and Seattle, Washington; six Civil Engineering Units (CEUs) Providence, Rhode Island; Miami, Florida; Cleveland, Ohio; Juneau, Alaska; Oakland, California; and Honolulu, Hawaii; Coast Guard Headquarters in Washington, DC; or to facilities engineering duty at the 17 major shore commands. Typical duties for the first civil engineering tour include: design and specification of small construction projects; participation on the design teams for major shore construction projects; performing civil engineering inspections of field units or assisting with the operation and maintenance of the physical plant at a large shore unit. Civil engineers are also involved in the design of small construction projects that will be in environmental compliance during construction and upon startup and operation; and assist in review and development of planning proposals to ensure they address environmental requirements.

Naval Engineering specialists may be assigned to Coast Guard Headquarters in Washington, DC, as project managers or support staff for cutter and boat design, construction and maintenance. Fleet maintenance support billets are available at the Engineering Logistics Center (ELC) in Curtis Bay, Maryland; Maintenance and Logistic Commands (MLCs) in Portsmouth, Virginia and Alameda, California;

The bridge on board the U.S. Coast Guard Cutter WILLOW (WLB 202). The WILLOW is a 225-foot buoy tender homeported in Newport, Rhode Island and is the second cutter of the new Juniper class.

LT Al Yelvington, under access floor, installs an upgraded power distribution system for the Loran-C timing and control equipment at the Loran Support Unit, Wildwood, New Jersey. The LT is a 1992 graduate of Michigan Tech University with a Bachelor of Science degree in Scientific and Technical Communications.

and Naval Engineering Support Units (NESUs) in Boston, Charleston, Portsmouth, Miami, New Orleans, Cleveland, St. Louis, Alameda, Seattle and Honolulu. Project Residence Office (PRO) and support staff engineers are assigned to commercial shipyards or to the Coast Guard YARD to perform the technical design reviews and inspection of ship and boat construction or major overhauls. The CG YARD, ELC, NESU and PRO assignments offer command opportunities for mid-grade and senior naval engineers. Naval engineers also serve as engineer officers and assistant engineer officers on larger cutters.

Ocean Engineers may be assigned to a tour at Coast Guard Headquarters in connection with design, procurement and support of short range aids to navigation and environmental protection response equipment. Officers at Civil Engineering Units plan, design and manage projects in support of the short range aids to navigation and marine environmental protection programs. Other assignments involving mostly research, testing and evaluation are available at the National Data Buoy Center. Tours of duty ashore and afloat provide experience in related operational fields.

The primary gateway into **Information Technology Management and C4 Systems Engineering** is postgradu-

ate training involving up to two years of duty under instruction. If an officer has a strong performance record, the officer will have an excellent chance of being selected to attend graduate school in one of the ITM/C4 programs (i.e., information technology management, software systems engineering, communication systems engineering, telecommunication systems management, computer systems design, computer science, electrical/electronics engineering, digital signal processing and guidance/control systems engineering). The first tour after postgraduate education develops practical application skills to adapt theoretical knowledge to Coast Guard needs. Typical assignments are to the Telecommunication and Information Systems Command, Command and Control Engineering Center, Operations Systems Center, Research and Development Center, Electronic Systems Support Units, Loran Support Unit and Headquarters major project offices (e.g., Deepwater Project, National Distress and Response System Modernization Project, Marine Information for Safety and Law Enforcement Project). Officers should quickly develop their technical skills during this tour.

Officers in the Information Technology Management and C4 Systems Engineering field should plan for in-specialty and out-of-specialty rotational tours, building on previous assignments. Many officers in these specialties have commanded ships of all classes and sizable operational groups. In-specialty command cadre leadership opportunities include commanding officer and executive officer assignments at several Electronic Systems Support Units, Command and Control Engineering Center, Telecommunication and Information Systems Command, Operations Systems Center, Loran Support Unit and two Communications Area Master Stations.

The Coast Guard Station at Atlantic City, New Jersey.

LT Michael Degon, a Port Engineer with the Naval Engineering Support Unit (NESU) Miami, inspects the hull of the Coast Guard Cutter FARALLON that is positioned on the shiplift at the Coast Guard YARD. LT Degon is a 1997 graduate of the Coast Guard Academy where he received a Bachelor of Science degree in Mechanical Engineering. He also holds a Master of Business Administration conferred by the Florida International University in 2002. The CGC FARALLON, homeported in Miami Beach, Florida, is a first in a series of 110' cutters receiving repairs for hull corrosion under the Coast Guard's 110' Hull Sustainment Project at the YARD. The goal of the project is to extend the life of 110' patrol boats for an additional ten years.

By the time an officer reaches the Commander level, all ITM/C4 specialists become senior managers of the program. Their primary in-specialty contribution is expected to be technical management in any or all of the disciplines of the ITM/C4 community. They are the leaders throughout the Coast Guard who guide the junior in-specialty officers, civilians and enlisted personnel. They direct virtually all projects and system developments in support of Coast Guard missions. They must be well rounded in Coast Guard roles and missions in addition to the ITM/C4 program.

Electronics Engineers are assigned throughout the Coast Guard, but are concentrated especially at the Maintenance and Logistics Commands (MLCs); Electronic Logistic Centers (ELCs); Coast Guard YARD, Baltimore, Maryland; Command and Control Engineering Center (C2CEN), Portsmouth, Virginia; Loran Support Unit (LSU), Wildwood, New Jersey; Telecommunication and Information Systems Command, Alexandria, Virginia; Navigation Center (NAVCEN), Alexandria, Virginia; Research and Development Center, Groton, Connecticut; and Coast Guard

Headquarters, Washington, DC. Depending on rank and billet requirements, electronics engineers can expect assignments in project management, engineering, contracting officers technical representatives positions, command cadre of Electronic Systems Support Units and staff positions in the electronics systems support program.

Telecommunications Engineers are assigned at locations similar to those electronics engineers are assigned (except C2CEN and NAVCEN), and are additionally assigned to the Communications Area Master Stations at Alameda, California and Chesapeake, Virginia.

Logistics offers an opportunity for a challenging career for persons, especially engineers, with strong personnel and financial management skills. A cadre of trained logistics professionals are involved in the design and the delivery of equipment and supplies to Coast Guard operational units. Logisticians serve at all levels in various logistics assignments from supply officer afloat to the commanding officer of the Engineering Logistics Center.

A graduate of **Industrial Management** training is generally assigned as industrial manager at a base or support center. An industrial manager coordinates the activity's industrial capabilities with unit commanding officers, group commanders, maintenance and logistics division chiefs, engineering unit commanding officers and District Office branch chiefs for its services, and is responsible for managing all of the activity's industrial operations.

Engineering assignments in all of the engineering disciplines are available at the **Research and Development (R&D) Center**. Scientists and engineers, serving at the Coast Guard Research and Development Center in Groton, Connecticut, are responsible for the development and evaluation of new technologies and performing research, testing and evaluation of new systems, equipment and procedures to improve Coast Guard mission performance and to close operational and support capability gaps.

Established in 1972, the R&D Center manages projects with a staff of approximately 125 civilian and military personnel. Since its inception, the center has used state-of-the-art technology to improve the efficiency and effectiveness of the Coast Guard in all of the missions that our service performs. Work is organized by investment areas that focus on the Coast Guard's highest priority capability needs. The following investment areas describe the primary focus of the R&D Program: Detect, Identify, and Classify Marine Targets; Future Communications and Tactical Data Exchange; Intelligent Waterways Systems; Risk

LTJG Ken Shovlin, Facilities Design and Construction Center Pacific, Seattle, Washington, and LCDR Engblom, Loran Support Unit, Wildwood, New Jersey, examine the construction of a new transmitter lab facility at the Loran Support Unit. The facility will house the next generation of Loran transmitting and timing equipment currently in development. The base of the 625 foot tall transmitting antenna can be seen in the background. LTJG Ken Shovlin is a 1998 graduate of the Coast Guard Academy and holds a Master of Science degree in Structural Geotechnology and a Bachelor of Science in Civil Engineering. LCDR Engblom holds an A.A.S. Laser Electro-optic Technology, a Bachelor of Science degree in Industrial Technology and a Master of Science in Information Systems. The LCDR is prior U.S. Army commissioned in 1990 through the Direct Commissioned Officer program.

Management, Decision Support, Resource Allocation; Human Error Reduction/Fatigue; and Interdiction Technologies.

Research and Development Center billet assignments include aviation, electrical, industrial, communications, computer science, human factors, ocean, naval and marine engineers. Officers are usually assigned to the Research and Development Center, after they have achieved the rank of lieutenant which allows time to gain valuable field engineering experience and possible obtain a postgraduate degree. These assignments provide an excellent opportunity to apply the technical skills obtained through education.

Future Prospects

Each of the the engineering disciplines is faced with exciting challenges and prospects in the years ahead.

Aeronautical Engineering is involved in several aircraft and system procurements as part of the Deepwater project and the Coast Guard shift to a more pronounced homeland security role.

Civil Engineering has embarked on a new cycle of shore construction to replace or rehabilitate aging facilities throughout the Coast Guard. Current facility designs must meet ever-changing operational needs like Deepwater and homeland security, maximize energy conservation, and comply with stringent environmental requirements without impairing the comfort and performances of the occupants. For the rapidly expanding concerns of environmental compliance and restoration, this includes participation in decisions involving environmentally preferable construction materials and practices, participation in environmentally sound site planning while providing for mission requirements; and ensuring sustainability concerns of construction program are addressed, including environmental concerns for renovation and demolition projects.

Naval Engineering is proceeding with the Integrated Deepwater System Team to make modifications to legacy cutters that are intended to keep the cutters operating, providing upgraded capabilities and interconnectivity until new assets replace them. Other projects in progress under naval engineering management are the mid-life Reliability Improvement and Science Upgrade projects on the two 400-foot Polar Icebreakers and fleetwide engineering improvements in support of Coast Guard missions. Naval engineering is also involved in several major vessel acquisition programs to

Coast Guard engineer's are responsible for the electronics and communications systems aboard Coast Guard boats.

Petty Officer 2nd class Chandra Hartsfield and Petty Officer 3rd class Matthew Minda from Electronic Systems Support Detachment Cleveland, work on the communications and electronic systems aboard a 47-foot motor lifeboat at Station Marblehead, Ohio.

LT Jim Betz consulting with Mr. Bill Sage of WRS Systems on GUI design of the Loran Consolidated Control System (LCCS). LCCS is a Unix Based systems used to display, control and record operations at Loran-C transmitting and monitor sites through North America. LT Jim Betz is a prior Chief Electronics Technician and commissioned through the Direct Commissioned Officer program. He holds an A.S. in Electronics Engineering Technology.

maintain the necessary mix of afloat resources in support of five primary Coast Guard mission areas: Defense Preparedness, Maritime Law Enforcement, Marine Environmental Protection, Marine Safety and Homeland Security. The programs include: new patrol boats, new standardized rescue boats, new oceangoing buoy tenders and a new great lakes icebreaker.

Ocean Engineering is continuing with the improvement and maintenance of pollution cleanup hardware and the construction of offshore range towers. These projects directly relate to environmental protection and maritime navigational safety, two areas of significant national concern.

Information Technology Management and C4 Systems Engineering affects every mission of the Coast Guard, with the vision of delivering the right information to the right people at the right time to support these missions. Adapting the rapidly changing advances in technology within the Coast Guard will be a continuing challenge for these engineers. Major initiatives and projects, including all e-Coast Guard applications, Deepwater project, National Distress and

Response System Modernization project, Marine Information for Safety and Law Enforcement project, Ports and Waterways Safety System project, and the Readiness Management System project are critical towards our organizational success. As the Coast Guard continues to strengthen homeland security efforts, the demand for fast access to reliable information will only continue to grow.

Electronics Engineering is continuing with major enhancements in integrated shipboard systems including the command and control and navigation functions, development of highly versatile and interoperable command and control systems (land/sea/air with the Department of Defense and other government agencies), the expansion of vessel traffic services, augmented GPS (Global Positioning System) navigation systems, and development of new/enhanced capabilities for our new cutters and aircraft. With the greatly increased Maritime Domain Awareness requirements, Coast Guard electronics engineers are at the forefront in designing, developing and implementing new and technologically advanced systems to meet these needs.

Telecommunications Engineering is updating data networks to accommodate rapidly expanding bandwidth and wireless needs of the Coast Guard, implementing the National Distress and Response

The Coast Guard Cutter HEALY (WAGB 20) breaking ice for the first time. Our newest WAGB is used for Polar Icebreaker and as a Research Vessel.

LT Greg Mason (BS, Management Information Systems; MS, Computer and Information Systems, Hood College), Operations Systems Center (OSC), Networks Branch Chief, overseeing TC1 Mark Orechovsky, Microsoft Certified Systems Engineer, and Ms. Jada Nichols, contractor, in the OSC console room where all of the OSC computer servers are monitored and backed up.

System modernization project, enabling public safety interoperability among other federal and local safety and law enforcement agencies and the maritime community, and improving distress and safety services to the maritime public. With the greatly increased Maritime Domain Awareness requirements, the Coast Guard telecommunications engineers are at the forefront in designing, developing and implementing new and technologically advanced systems to meet these needs.

The **Industrial Management** program is being studied with the goal to identify the Coast Guard's industrial requirements of the future and utilize the industrial resources most efficiently.

The **Research and Development Center** prospects for the future are predicated on a vision that articulates the expectations we share with our customers as to how we can best meet their needs today and on into the 21st century. That Vision is "to be the Coast Guard's pathfinder, anticipating and meeting future technological challenges, while partner-

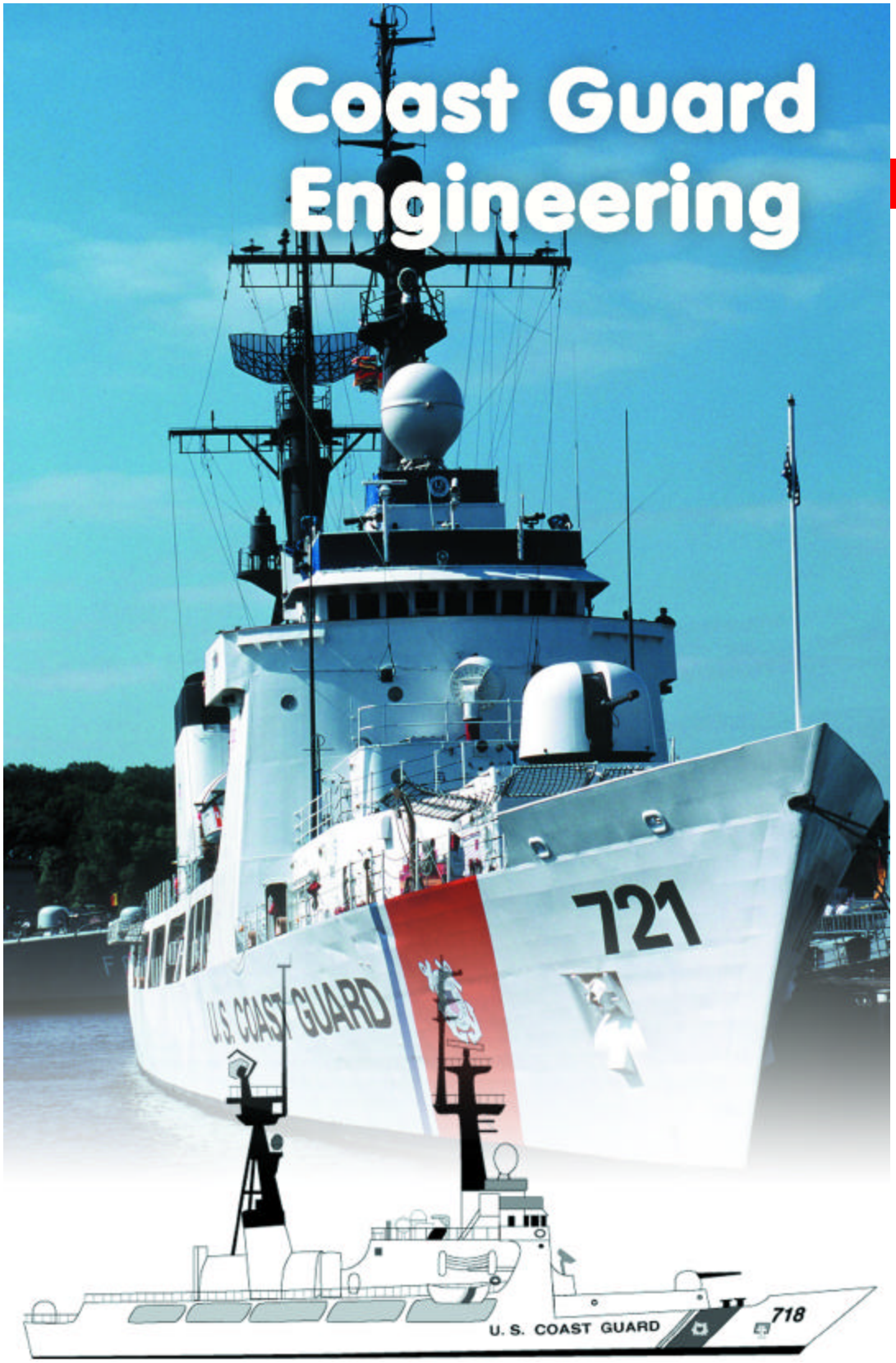
ing with others to shepherd the best ideas into implementable solutions."

In order to increase the Coast Guard's return on its R&D investment, the R&D Program's portfolio directly supports the Commandant's priority performance goals. These performance goals have been developed as a guide for planners to move the organization toward the Commandant's vision of "Coast Guard 2020." As the Commandant's scientific advisor, R&D will increase the number of high potential science and technology ideas, while striving to increase the number of products and services implemented in the operational fleet.

Achieving our vision will also require changes to the Coast Guard's policies, culture, operations and business practices. The Director of Information and Technology, acting as the Science Advisor to the Commandant (SAC), will collaborate with Program Managers and senior Coast Guard leaders to lead efforts to effect these changes. The R&D program will focus on the most important technological gaps in operational capabilities and collaborate extensively with partners to ensure that all aspects of the life cycle of a product are addressed. This will result in a portfolio of efforts that while smaller in number, may be greater in scope and will be more focused on the significant gaps in Coast Guard performance.

A Coast Guard HH-65a "Dolphin" helicopter from Coast Guard Air Station Miami flies over a Coast Guard 41-foot utility boat off Fort Lauderdale, Florida.

Coast Guard Engineering



Career Development

Selection Requirements

To qualify for a career as a Coast Guard Engineer, you should have a baccalaureate degree in engineering or the sciences from an accredited college or university, or have experience in an enlisted engineering rating. If you are interested in aeronautical engineering, you must qualify as a Coast Guard aviator before entering that specialty. Specific engineering billet requirements vary depending on specialty and grade. Approximately 60 percent of the billets, primarily those of junior officers, do not require previous engineering experience. Other billets require a Bachelor's of Science or Master's of Science in an engineering specialty, and some billets require a previous tour as student engineer or engineer officer. The majority of middle and senior level billets require engineering experience, and most require an advanced degree.

General Career Development Flows

An engineering career begins with the basic phase during which you obtain your fundamental skills as a Coast Guard officer and as an engineer. In this phase of your career you may be assigned sea duty and obtain your shipboard engineering qualification. You will also complete your graduate education in the engineering specialty of your choice.

After you choose a particular technical specialty, you will spend the majority of your engineering career in the professional phase. Your assignments will require you to apply your abilities in ways that will develop and fully utilize your potential as a Professional Engineer, while obtaining the requisite experience for assignments to key senior officer billets. Senior level assignments may be within or outside specialty, will involve significant management and leadership responsibilities, and may include opportunities for command.

The basic cornerstone of your military career development is the experience which you derive from job rotation. Every officer is expected to possess professional competence in one occupational field with experience in other fields through assignment diversity. This diversity can be achieved by varying the types of jobs and responsibilities within specialty or getting out-of-specialty (rotational) tours. Geographic diversity is also important. Officers are also expected to be familiar with the

Opposite Page: Upper portion - Coast Guard Cutter GALLATIN. Lower portion - Line drawing of 378-foot high endurance cutter.

ENS Craig Lawrence, a graduate of OCS class 3-01, inspect the base of a 300-foot Differential Global Positioning System antenna. ENS Lawrence is stationed at the Navigation Center in Alexandria, Virginia.

general administration of the Coast Guard and a tour at Coast Guard Headquarters.

Career patterns will vary between engineering specialties, depending on such factors as the number of specialty billets, the number of available specialists for these billets, and the background and experience of the officer requesting the out-of-specialty assignment.

Sea Duty Requirements

Junior officers interested in a career in naval engineering often perform their first tour of duty afloat. For Coast Guard Academy graduates, this entails an assignment as student engineer afloat for one year followed by a year on the same cutter as an assistant engineer. All Academy engineering majors are encouraged to enter the student engineering afloat program to obtain a good overall field engineering indoctrination. Officer Candidate School

(OCS) graduates normally perform their first tour ashore, however, those with prior service experience may go afloat for their first tour. Once the student engineering program has been successfully completed, officers are normally qualified to assume the duties of engineer officer once other educational or experience requirements are met.

Assignments

Assignment officers, also known as detailers, have a dual responsibility -- to satisfy the needs of the service and to represent you in the officer placement process. Three basic considerations enter into determining duty assignments: 1) the needs of the service; 2) the qualifications, career needs and performance of the individual; and 3) the desires of the individual. The mechanics of the placement/assignment process begin with the requirement to fill billets and the availability of officers during a specific time period. The detailers work with the program managers to determine assignments which take into account that:

1. The officer being nominated for the billet possesses the requisite background, training, education, experience and potential to accomplish the billet's requirements;

2. The assignment assists the officer to grow professionally within a given specialty; and

The Coast Guard's HU-25 "Falcon" aircraft undergoes maintenance.

LT Jeffrey Potensky advanced to Lieutenant from Chief Warrant Officer under the Direct Commission Engineering Program in 2001. LT Potensky is a graduate of Penn State University, where he earned an Associates degree in Electrical Engineering Technology, and of Charter Oak State College where he attained a Bachelors of Science degree in Electrical Technology and Management. Today, he is Project Manager of the Electronics and Ordnance Project Management Branch in the Industrial Department of the Coast Guard YARD in Baltimore, Maryland.

3. The assignment satisfies the officer's personal desires.

While the needs of the service are the paramount consideration, the Coast Guard recognizes that, where needs and desires coincide, professional success and personal satisfaction are most likely to follow. To maximize your satisfaction, you must maintain effective communication with your assignment officer. He or she will discuss any subject relating to your performance and assignments, but it is up to you to call for this service and list your preferences. It is also very important that you maintain a current Assignment Data Card (CG-3698A) on file with the Office of Personnel. If the card is not current, your interests will not be adequately represented. Refer to Table 1 for typical engineering career patterns.

Mentoring: Engineers taking care of Engineers

The word "mentor" has its roots in Greek mythology and is the name of the character in the "Odyssey," who was a friend of Odysseus entrusted with the education of Odysseus' son Telemachus. Today, mentor is defined as a trusted counselor or guide. As our young Coast Guard

engineers attempt to navigate the myriad of demands placed upon them, it is important for senior engineers to take an interest and provide mentoring. This must go beyond the occasional "advice sessions" or "passing conversation." It begins by taking an active interest in the junior engineer and assisting him or her with career choices and post-graduate programs. In a recent precept for a promotion board, the members were asked to evaluate whether officers showed "a propensity for developing and mentoring others, and be demonstrably committed to the welfare of subordinates." If you are not a mentor to a fellow engineer… be one. If you're a junior engineer…seek one. The future of Coast Guard engineering depends on how well we prepare our junior engineers. Mentoring is one of the easiest and most gratifying ways available to build esprit de corps and prepare for the future.

Professional Engineering Societies

Most junior engineers will be approached during their first assignment at an engineering billet to join a professional society. If you're like most Coast Guard officers who have found themselves in this situation, you're first reaction will be to politely decline. This is understandable, considering most junior officers are uncertain about the applicability of a society to their current position, but in the long-term it would be a mistake. Professional societies provide an excellent opportunity to stay connected with your engineering discipline and to follow new developments. Societies may be affiliated with the military or be strictly civilian. Some of the more prominent societies include: the American Society of Naval Engineers (ASNE), the Society of Naval Architect and Marine Engineers (SNAME), the Society of American Military Engineers (SAME), Association of Higher Education Facilities Officers

A Coast Guard officer plots a course for the Coast Guard Cutter HEALY on the cutter's automated course plotting system.

(APPA), Armed Forces Communications and Electronics Association (AFCEA), Institute of Electrical and Electronics Engineers (IEEE), the Society of Women Engineers (SWE), National Society of Black Engineers (NSBE) and Society of Hispanic Professional Engineers (SHPE).

Professional Activities

During the professional phase of your career, you will be expected to remain current in your chosen technical specialty through continuing education and training.

One means of accomplishing this is through membership in your specialty's professional society and registration as a Professional Engineer. More than that, participation in you professional society's activities marks you as a "complete engineer." This is particularly true when dealing with engineers in the private sector during the course of Coast Guard business.

Professional engineering societies include the following (this is not an all inclusive list):

- AIAA: American Institute of Aeronautics and Astronautics
- ASCE: American Society of Civil Engineers
- ASNE: American Society of Naval Engineers
- SNAME: Society of Naval Architects and Marine Engineers
- AIIE: American Institute of Industrial Engineers
- SOLE: Society of Logistics Engineers
- SAME: Society of American Military Engineers
- AFCEA: Armed Forces Communications and Electronics Association
- ASEE: American Society of Electrical Engineers
- ASME: American Society of Mechanical Engineers
- IEEE: Institute of Electrical and Electronics Engineers

The professional journals of these societies contain articles of relevant and current interest. Preparation and criticism of these papers is one excellent way to maintain experience in your field. In addition to annual national meetings, local chapters of many societies sponsor periodic seminars and presentations.

TABLE 1 - Typical Engineering Career Patterns

	ENSIGN
ACADEMY	Sea Duty upon commissioning Naval and Ocean Engineering: Qualify as Engineer Afloat
OCS	Operations ashore or specialty tour at Headquarters, Maintenance and Logistics Command or Engineering Unit Staff, or HQ Unit; (Centers of Excellence); Student Engineer - sea duty is possible
	LTJG
ACADEMY	Assistant Engineer Afloat, Engineering billet ashore, LORAN Station CO, Patrol Boat (WPB) CO
OCS	Sea Duty (Sea duty is determined by the needs of the service) Speciality tour at HQ, Maintenance and Logistics Command, field support unit, or Engineering Unit staff, or HQ Unit (Centers of Excellence)
BOTH	Postgraduate training in speciality Flight Training for Aviators Supply Officer Afloat, Academy Instructor
	LT
BOTH	Postgraduate training in specialty, then Specialty tour at HQ, Maintenance and Logistics Command, field support unit, or Engineering Unit staff, or HQ Unit (Centers of Excellence) Supply Officer Afloat, Academy Instructor Naval and Ocean Engineering: Engineer Officer afloat Aeronautical Engineering: Assistant AIRSTA Engineer Officer Civil Engineering: Facilities Engineer Electronics Engineering: Project Manager or Engineer at C2CEN, TISCOM, or LSU; MLC of ESU staff.
	LCDR
BOTH	Rotational tour out of specialty, then Specialty tour at HQ, Maintenance and Logistics Command or Engineering Support Unit, or HQ Unit Aeronautical Engineering: AIRSTA Engineer Officer Information Technology Management: XO CAMS/ESU, or CO at CS Kodiak Electronics Engineering: XO at ESU or LSU; Project Manager, Engineer, or Division Chief at C2CEN, TISCOM, or LSU; MLC staff
	CDR/CAPT
BOTH	Management position in specialty, then General Management Assignments Commanding Officer (i.e., ESU, C2CEN, ELC, OSC) Electronics Engineering: CO at ESU; division chief or office chief at MLC or HQ

Coast Guard Engineering

Education

Postgraduate

Graduate education is an integral part of a career in the Coast Guard's engineering program because it expands your base of expertise in your chosen field. Increasingly, many mid- and upper-level engineering billets require the occupant to possess a master's degree. The Coast Guard postgraduate school program is designed to provide the service's specialty requirements while matching your capabilities, interests and personal goals for achievement.

The postgraduate program offers instruction at various colleges and universities in specific program areas for designated periods of time.

As the first step in the process of specialization, postgraduate education opens some assignment avenues and closes others. The chosen field of specialization will influence the extent to which various assignment options are affected. The more scientific/technical the curriculum, the greater the degree of specialization. The management oriented curricula qualify the graduate for a wide variety of billets in many program areas.

Descriptions

The following is a representative list of approved postgraduate programs which were extracted from the various university bulletins. Additional information concerning these course of studies may be obtained by contacting CGPC-opm-1 (cgweb.comdt.uscg.mil/cgpc-opm/Opm/OpmMain.html) (Advanced Education); or the sponsoring program manager at Coast Guard Headquarters.

- Aeronautical Engineering
Program Manager: Office of Aeronautical Engineering (G-SEA)

Two-year graduate programs lead to a Master of Science degree in Aeronautics and Astronautics. Students have attended programs at schools such as Purdue University, Michigan University and the Massachusetts Institute of Technology. The programs are designed to provide a fundamental knowledge of scientific principles and techniques and their application to the solution of engineering problems. A

Opposite Page: Upper portion - ENS Craig Lawrence checks the front panel settings on the Ashtech Z-12-R Differential Global Position System reference station. Lower portion - Simple circuit diagram.

LTJG Alex Dodd, a 1998 graduate of the Coast Guard Academy, monitors power output gauges in the boiler plant at the Coast Guard YARD in Baltimore, Maryland. LTJG Dodd holds a Bachelor of Science degree in Civil Engineering.

student may pursue a program in any of the following areas of emphasis: dynamics and control, propulsion, structures and materials. A minimum of 30 semester hours must be completed for a Master of Science degree.

- Aviation Engineering Administration
Program Manager: Office of Aeronautical Engineering (G-SEA)

This graduate program is normally provided at the Krannert School of Management, Purdue University. The school offers an 11-month program that introduces students with engineering or science backgrounds to the major functional areas of management (accounting, financial management, problem solving techniques, labor relations, operations management and strategic planning) and leads to a Master of Science degree in Industrial Administration.

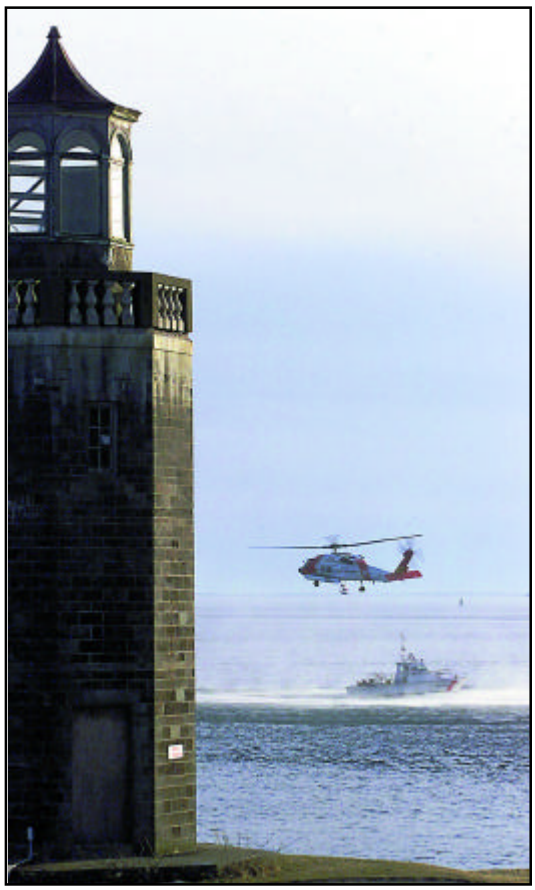
- Avionics/Project Management
Program Manager: Office of Aeronautical Engineering (G-SEA)

This program leads to a Master of Science degree in Avionics or Project Management disciplines related to the

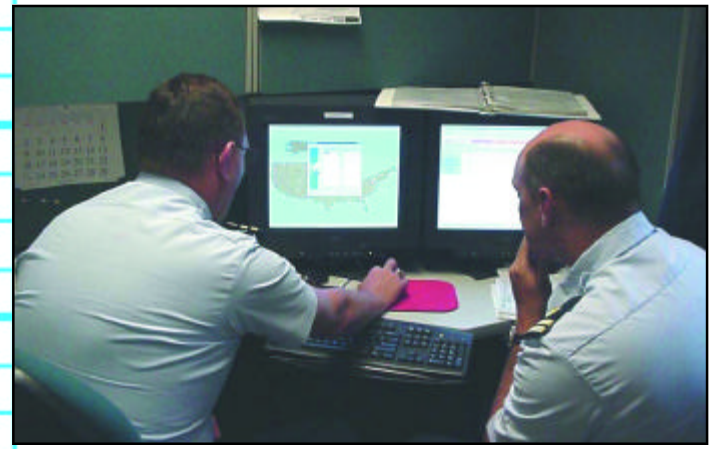
Aeronautical Engineering field. Students have attended programs at William and Mary, the University of Texas, the Naval Postgraduate School and the Air Force Institute of Technology. Working with program managers at Coast Guard Headquarters, students develop curricula that meet aeronautical engineering management requirements upon their graduation. Minimum master's degree requirements are 40 credit hours of approved graduate level study.

- Civil Engineering
Program Manager: Office of Civil Engineering (G-SEC)

University of Illinois at Champaign-Urbana, Virginia Tech, Texas A and M, University of Washington, Oregon State University, Arizona State University, Georgia Tech, University of Stanford. This 17-month program leads to a Bachelor or Master of Science degree in Civil Engineering, depending on previous education. The program offers courses in the fields of asset management, planning, construction management, structural analysis and design, geotechnical engineering, environmental engineering, business, finance and a number of other fields. The program is designed to provide techni-



An HH-60 "Jayhawk" helicopter from Air Station Cape Cod and a 41-foot utility boat from Station New London perform hoist operation exercise.



LT Frank Khucznik (left) a 1998 graduate of OCS Class 3-98 and LT Greg Wood (CWO - to LT Program June 1999) review operation of the Dual Eye operations client, a part of the Nationwide Control Station (NCS). The NCS incorporates a client-server architecture to control and monitor up to 200 Differential Global Positioning System (DGPS) sites simultaneously. DGPS service is controlled using NCS from the Navigation Center in Alexandria, Virginia, and the Navigation Center Detachment in Petaluma, California.

cal competence and business acumen to enable participants to deal with all aspects of shore facility asset management.

- Civil Engineering and Business Administration
Program Manager: Office of Civil Engineering (G-SEC)

The University of Illinois at Champaign-Urbana. This 24-month program leads to a Master of Science degree in Civil Engineering and a Master of Business Administration degree. The program has limited technical but an advanced managerial focus to provide a strong business faculty for the shore facility asset manager.

- Naval Engineering
Program Manager: Office of Naval Engineering (G-SEN)

This is one of the largest postgraduate training programs in the Coast Guard. Ten selectees annually attend a 24 month program at a University that meets the students and the Naval Engineering Program goals. Past students have attended the University of Michigan, Massachusetts Institute

of Technology, the Naval Postgraduate School, University of Rhode Island, University of New Orleans, Old Dominion University, University of Maryland, University of Washington, George Washington University and other institutions which grant a Master of Science degree in Engineering. Building on undergraduate engineering and other quantitative backgrounds, the basic curriculum includes course work in structures, power plants, systems automation and controls, computer applications as well as engineering management topics. The program provides the student an opportunity to complete education in either Naval Architecture and Marine Engineering, Mechanical Engineering or Engineering Management. Officers assigned to Naval Engineering can follow-on billets to Coast Guard Headquarters, Engineering Logistic Center, Maintenance and Logistics Commands, Naval Engineering Support Units, Engineer Officer afloat or assignment to the Coast Guard YARD. Daily work is wide ranging and challenging involving planning, design, construction, outfitting, maintenance, repair and alteration of all cutters and boats. Officers work closely with commercial naval architects and shipyard personnel. In-specialty tour rotations (e.g., between Marine Inspection and Naval) and out-of-specialty tours (e.g., XO-afloat) are possible. Primary selection emphasis is in the LTJG and LT grades. A Bachelor of Science degree in Marine Engineering, Mechanical Engineering or similar engineering specialty is highly desirable.

- Naval Engineering Technology
Program Manager: Office of Naval Engineering (G-SEN)

This 24-month program offers Chief Warrant Officers and Junior Officers without an undergraduate degree in engineering the unique opportunity to pursue Associate or Bachelor of Science degrees in a variety of naval engineering related disciplines. Most community colleges with Mechanical Technology degree programs and four-year colleges with Mechanical Engineering degree programs are acceptable. This program is an outstanding opportunity for personal growth and will prepare graduates for the rapid changes in technology occurring as the Coast Guard replaces aging labor intensive equipment with more modern labor saving equipment. Officers assigned to Naval Engineering can follow-on billets to Coast Guard Headquarters, Engineering Logistic Center, Maintenance and Logistics Commands, Naval Engineering Support Units, Engineer Officer afloat or assignment to the Coast Guard YARD. Daily work is wide ranging and challenging involving planning, design, construction, outfitting, maintenance, repair and

alteration of all cutters and boats. Officers work closely with commercial naval architects and shipyard personnel. In-specialty tour rotations (e.g., between Marine Inspection and Naval) and out-of-specialty tours (e.g., XO-afloat) are possible.

- Ocean Engineering
Program Manager: Office of Civil Engineering (G-SEC)

Oregon State University and Texas A&M University. These schools offer 24 months of postgraduate study leading to a Master's degree in Ocean Engineering.

- Information Technology Management and C4 Systems Engineering
Program Manager: Office of Force Management (G-SRF)

Multiple colleges and universities, including but not limited to: U.S. Navy Postgraduate School, University of Maryland, George Washington University, George Mason University, Old Dominion University and University of Rhode Island. The ITM/C4 program force manager will work with prospective student selectees in consideration of all educational institutions and curriculums to meet service needs. ITM/C4 program selectees will be required to take a core curriculum of IT and C4 subjects, depending on the specific PG program of selection ("Information Technology Management" or "Communications, Computers, and Electrical Engineering").

- Electronics and Telecommunications Engineering
Program Manager: Office of Force Management (G-SRF)

U.S. Navy Postgraduate School, University of Rhode Island, Massachusetts Institute of Technology. These schools offer 24 months of postgraduate study leading to a Master of Science degree in Electrical or Electronics Engineering, or Electronics Engineering with a specialty in Telecommunications.

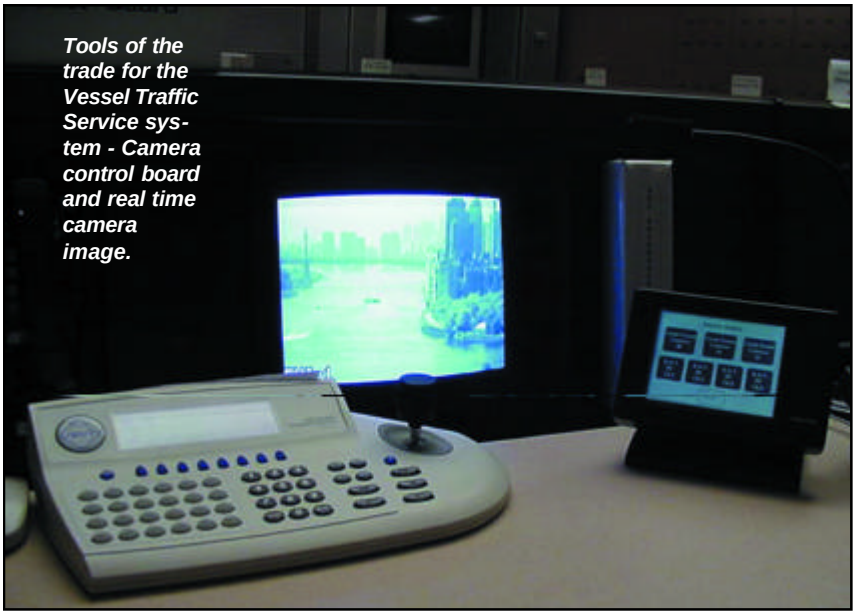
- Industrial Management
Program Manager: Logistics directorate (G-SLP)

Purdue University. The Krannert School of Management

offers a Master of Science in Industrial Administration, a program which requires a minimum of 49 credit hours. The program is designed to provide a broad scope of competence in industrial organization management, and offers courses in accounting, finance, marketing, information processing, production, human resources, applied statistics, operations research and general management.

Procedures

Selection for participation in the postgraduate education program is on a best-qualified basis. The selection board is comprised of the appropriate Assignment Officer (AO) (CGPC-opm), the responsible Program Manager (PM - i.e., Office of Aeronautical Engineering, etc.), and one or more additional members. The selection board is guided by the panel precept and consider the individual's application and PDR. Professional performance, as reflected in your Officer Evaluation Report record, is the key factor in the selection process. Other criteria are the applicant's undergraduate academic record, Graduate Record Examination scores, commanding officer's recommendation and the contents of the letter of application. Officers who apply, but are not selected, are encouraged to make subsequent applications for postgraduate study.



Tools of the trade for the Vessel Traffic Service system - Camera control board and real time camera image.

CDR Philip Sullivan is a 1981 graduate of the Coast Guard Academy where he received a Bachelor of Science degree in Marine Engineering. Today, he is the Chief, Industrial Staff at the Coast Guard YARD. The Commander directly supervises the Engineering and Planning, Estimating and Marketing Divisions of the shipyard and is the Assistant to the YARD's Industrial Manager. Attained in 1988, CDR Sullivan holds Master of Science Engineering degrees in Naval Architecture and Marine Engineering and Mechanical Engineering from the University of Michigan. The Commander is a Registered Professional Engineer in the State of Michigan.

Service Obligation

All officers who participate in the postgraduate education program, will incur a minimum active duty obligation of three months for each month of education for the first year and one for one thereafter, to commence upon completion of the advanced training.

Other Formalized Resident Training and Education Programs

In addition to postgraduate education leading to an advanced degree, three types of formal resident education and training programs are offered in the Coast Guard.
- Short term training (less than 20 weeks).
- Specialized training (20 or more weeks).
- Service Colleges (intermediate and senior).

Attendance at a service college, such as the Naval War College or the National Defense University, offers select officers, in the grades of Lieutenant Commander through Captain, a professionally broadening education to prepare them for greater responsibilities. The courses vary at the

different grade levels in content, course level and course objectives. Service school policy specifies that the best performing officers are selected for attendance. Normally, an officer will be selected to attend only one service college at a given level. Lieutenant Commanders may apply to attend one of the intermediate schools. Attendance at an intermediate service college is not a prerequisite for selection to attend a senior service college.

Tuition Assistance

The Coast Guard Tuition Assistance (TA) program is designed to assist military personnel to broaden their academic or technical background by funding their off-duty independent education. This program will cover up to $4,500 annually toward continuing education. The TA program also covers 100 percent up to a cap of $250 per semester hour; quarterly hours at $166.67; and clock hours at $16.67. Maximum tuition assistance allowed can change each fiscal year and is dependent on budget constraints. Off-duty education is viewed with favor by promotion boards and postgraduate education selection boards. See Personnel Manual (COMDTINST M1000.6 (series)) and Coast Guard Tuition Assistance Program (COMDTINST 1500.24) for further information.

Coast Guard Station Muskegon's 49-foot Aids to Navigation boat is underway working on buoys in the Great Lakes.

TABLE 2: POSTGRADUATE EDUCATION PROGRAMS IN ENGINEERING

CURRICULUM	PRIMARY INSTITUTION	COURSE LENGTH	ATTAINABLE DEGREE	ELIGIBILITY	AVE YRL INPUT
AVIATION ENGINEERING ADMINISTRATION	PURDUE UNIVERSITY	12 MOS	MSIA	NOTE 3	2
AERONAUTICAL ENGINEERING (Structures)	PURDUE UNIVERSITY	24 MOS	MS	NOTE 4	2
AERONAUTICAL ENGINEERING (Avionics/Project Management)	AFIT/PG MONTEREY	18 MOS	MS	NOTE 4	2
CIVIL ENGINEERING	UNIVERSITY OF ILLINOIS VIRGINIA TECH TEXAS A AND M U OF WASHINGTON OREGON STATE U ARIZONA STATE U GEORGIA TECH U OF STANFORD	17 MOS	MS		
CIVIL ENGINEERING AND BUSINESS ADMINISTRATION	UNIVERSITY OF ILLINOIS	24 MOS	MS, MBA		

INFORMATION TECHNOLOGY MANAGEMENT AND C4 SYSTEMS ENGINEERING	US NPGS MONTEREY U OF MARYLAND GEORGE WASHINGTON U GEORGE MASON U OLD DOMINION U UNIVERSITY OF RI NOTE 5	18-24 MOS	MS		
ELECTRONICS AND TELECOMMUNICATIONS ENGINEERING	USNPGS MONTEREY UNIVERSITY OF RI MASS INST OF TECH	24 MOS	MS		
NAVAL ENGINEERING ADMIN	GEORGE WASHINGTON U	24 MOS	MSE (EAD)	NOTE 1	2
NAVAL ENGINEERING TECHNOLOGY	VARIOUS	24 MOS	AS	CWO, ENS, LTJG, LT, LCDR	3
OCEAN ENGINEERING	OREGON STATE U TEXAS A&M UNIVERSITY	24 MOS	MS	LTJG, LT	2
INDUSTRIAL MANAGEMENT	PURDUE UNIVERSITY	11 MOS	MSIA	NOTE 1 & 2	1

NOTE: (1) OFFICERS IN THE GRADES OF LTJG, LT, AND LCDR ARE ELIGIBLE. PRIMARY SELECTION EMPHASIS IN LTJG AND LT GRADES.
(2) PREFERENCE GIVEN TO QUALIFIED APPLICANTS WITH SERVICE ENGINEERING TRAINING.
(3) LT, LCDR - preference given to designated Aeronautical Engineering Officers who are completing their first full Aeronautical Engineering tour
(4) CWO (AVI), LT, LCDR - preference given to designated Aeronautical Engineering Officers who are completing their first full Aeronautical Engineering tour
(5) Others as approved by the Program Manager.

Coast Guard Engineering

Useful Information

Officer Evaluation Reports (OERs), Selection Boards, Promotions

As you plan your Coast Guard career, it is important that you develop an understanding of selection boards, promotions and the Officer Evaluation System. Promotions and duty assignments are based on your demonstrated performance as indicated by the OERs in your record.

Copies of your OER(s) can be obtained from CGPC-opm-3, Officer Evaluations Branch, and you are encouraged to review your records periodically. Your OER represents a comparison of your performance with that of your contemporaries, regardless of billet. If you do not understand an evaluation on an OER, you should seek an explanation. While superiors are not expected to have to defend their judgements, they are usually prepared to explain them, and assist you in your self-evaluation and self-improvement. Although each individual OER is important in itself, it can only be fairly evaluated in relation to your overall record. Each evaluation gains weight as the same weaknesses or strengths are noted by other

Shown here is a FLIR (Forward Looking Infrared) sensor, one of the Coast Guards many technologies used for search and rescue and law enforcement.

Opposite Page: Upper portion - A VOSS (Vessel of Opportunity Skimming System) floats alongside the Coast Guard Rivertender OSAGE in the Kanawha River in Charleston, West Virginia. Lower portion - A line drawing of the Vessel of Opportunity Skimming System.

LT Brian Nutter, a 1994 graduate of the Coast Guard Academy, currently serves a s Chief of the Scheduling Branch at the Coast Guard YARD in Baltimore, Maryland. LT Nutter makes use of the latest in scheduling software and is responsible for planning the work for the shipyard's waterfront worth $60 million annually. LT Nutter holds a Bachelor of Science degree in Electrical Engineering. He served in engineering positions on the Coast Guard Cutter CHASE and for the Naval Engineering SUpport Unit (NESU) Alameda before reporting to the YARD.

reporting officers in later evaluations. Trends within the overall record are important, particularly those developed over a number of reporting periods. Of primary importance in your review of your record is the identification of the patterns, good or bad.

The commissioned officer strength of the Coast Guard (maximum of 6,200), and the number of officers within the various grades (by percentage) are fixed by title 14, U.S. Code. Promotion zones are derived from the vacancies expected within the respective grade after the count, retirements, resignations, etc., and stated opportunity for selection are determined by CGPC-opm, Officer Personnel Management Division. Officers on the Active Duty Promotion List above the rank of Lieutenant (junior grade) are selected on a best-qualified basis. In general, promotions occur as follows: LTJG-1 year; LT-4 years; LCDR-11 years; CDR-16 to 17 years; CAPT-22 to 23 years - times listed are cumulative service.

Selection boards are composed of senior officers with varying backgrounds and experience. They are aware that personality conflicts can bias an evaluation and that some marking officials are "hard" while others are "easy."

Board members are sworn to consider all cases impartially and each board works logically and fairly to select the "best qualified." Within the board, each member votes a personal and independent vote. The influence of a single member, even if one is tempted to be swayed by emotion, is minimal.

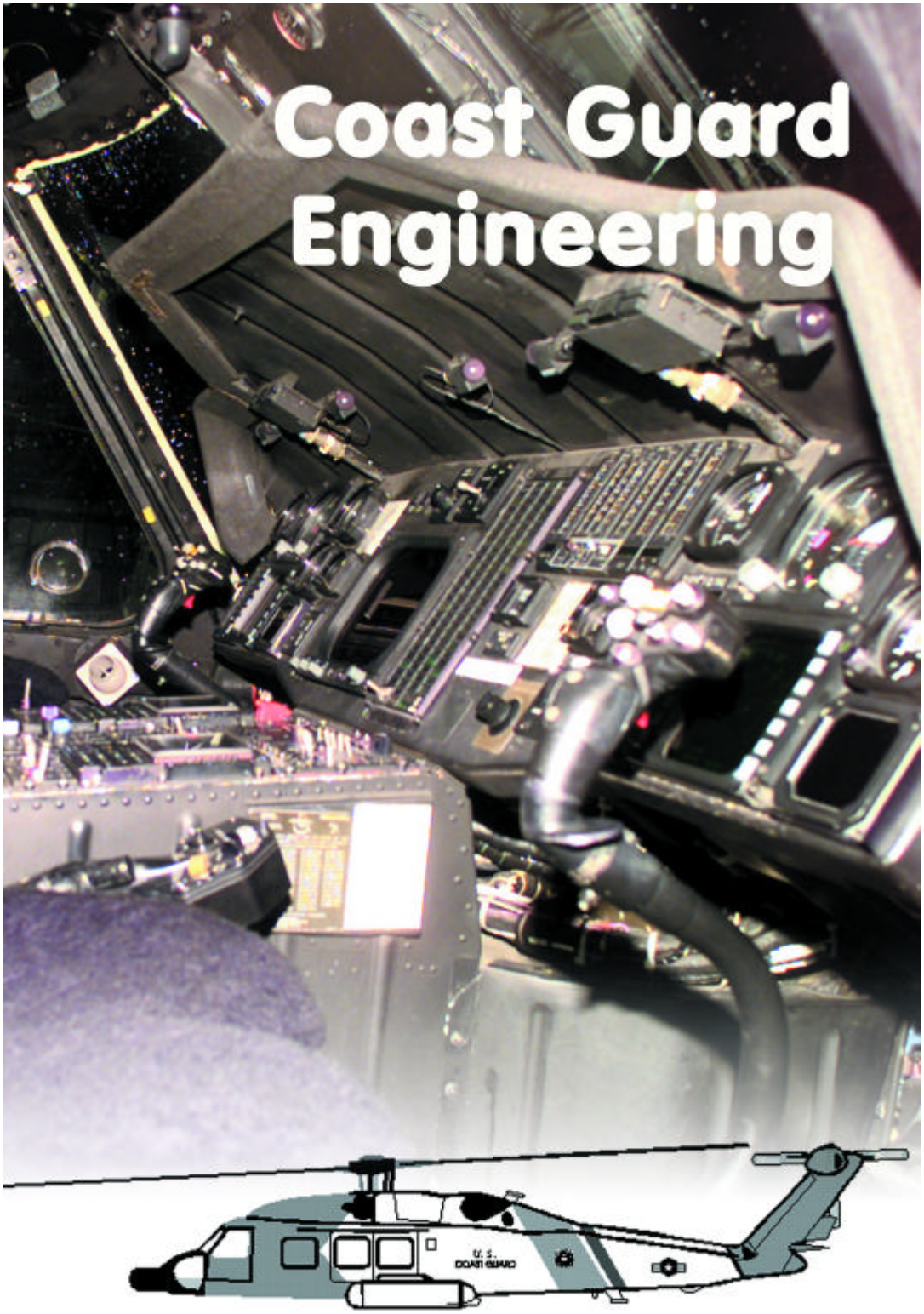
Each officer eligible for promotional consideration has the legal right to send a communication to the selection board, through the chain of command, to clarify any gray areas or matters of concern in his/her record. The communication may not criticize any officer or reflect on any officer's character, conduct or motives.

Command

Engineering specialists who are qualified may succeed to command afloat or ashore. As a result of the changing missions of the Coast Guard and the limited number of billets afloat, many officers may have difficulty in obtaining assignments to ships. Consequently, those officers will not have sufficient seagoing experience to qualify for a command afloat. Engineering specialists with suitable qualifications may be assigned to command major shore units, such as the Coast Guard YARD, the Aircraft Repair and Supply Center (ARSC), the Engineering Logistics Center, bases/support centers, engineering and field support units, group offices and air stations, in today's Coast Guard, the senior officer in a command position is viewed as a senior manager. Increasingly, command assignments are being opened to officers with demonstrated management potential, regardless of specialty. As a Coast Guard engineer, you will have ample opportunity to compete for positions of significant responsibility at the senior management level.

An Inside view of an HH-65A "Dolphin." An air crewman from U.S. Coast Guard Air Station Cape May, New Jersey, practices lowering a basket from his HH-65A "Dolphin" helicopter to a waiting 41-foot utility boat from Coast Guard Station Annapolis, Maryland.

Coast Guard Engineering

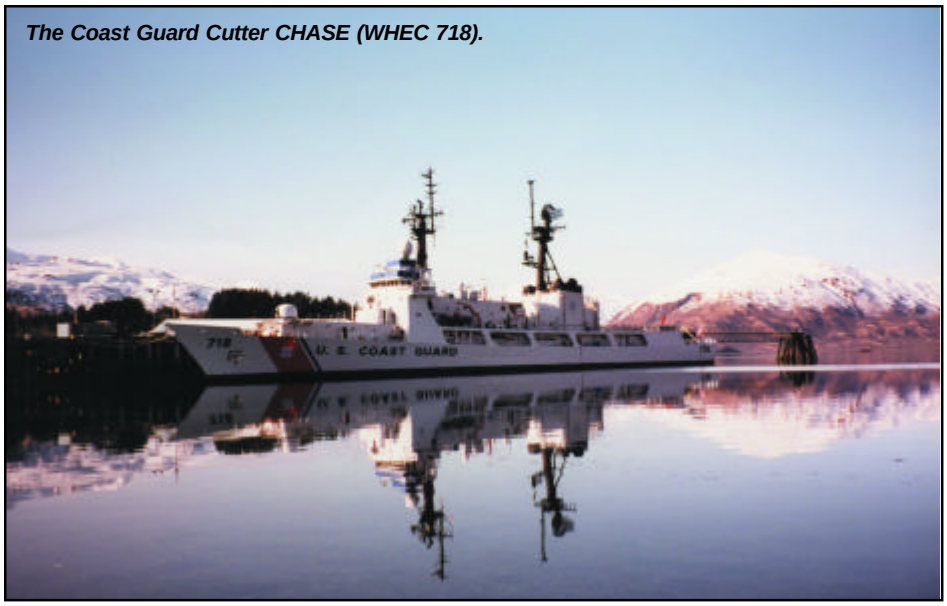


Conclusion: Your Career Planning

During your 20- to 30-year career as a Coast Guard Officer you will serve in a progression of assignments. Through intelligent career planning, you can maximize both your personal career satisfaction and your usefulness to the Coast Guard.

The career planning process is a cooperative endeavor between you and the Coast Guard; together you will design a flexible career path of potential assignments, training and education, which will provide you with the necessary experience and qualifications to attain positions of significant responsibility.

The promotional path is competitive and there is no single criterion of achievement. You should strive to make your career an end in itself so that, regardless of your level of attainment, you can reflect upon your years of service as productive and enjoyable. If you can succeed in that, you will not only have had a highly successful and extremely rewarding career, but will also have education, training and experience that is relevant, marketable commodity. Good luck in your Coast Guard future and beyond.



The Coast Guard Cutter CHASE (WHEC 718).

Opposite Page: Upper portion - view of the HH-60J (Jayhawk) cockpit. Lower portion - Line drawing of the HH-60J (Jayhawk).

TABLE 3. ENGINEERING SPECIALISTS SAMPLE CAREER PLAN				
GRADE	**YRS**	**SPECIALTY**	**PG EDUCATION**	**OUT OF SPECIALTY**
CAPT	30- 29- 28- 27- 26- 25- 24- 23-	Chief, Eng. Div.I HQ Chief, Eng. Div. MLC G-A Project Officer CO, CO, FD&CC; CO, ISC CO, Yard; CO, ONSC CO, PRO; CO, OCC; R&D Center CO, ELC	ICAF/ War College	CO, AIRSTA CO, Afloat CO, HQ Unit CO, Large Unit Chief District Division Group Commander (large) HQ Div. Ch.
CDR	22- 21- 20- 19- 18- 17-	HQ, Asst. Div. Ch. Facilities Engr. Major Unit HQ Branch Ch. MLC/FD&CC Br. Ch. HQ Unit, Div. Ch./CO/XO CO, Engineering Unit Eng. Off., AIRSTA	War College	Headquarters Dist Office/CO/XO AIRSTA HQ Unit Group Commander (small) CO/XO Base XO, SUPTCEN (large)
LCDR	16- 15- 14- 13- 12-	Facilities Eng./AIRSTA Eng. MLC/Engineering Unit FD&CC Engr. Off. Afloat (WHEC) Duty R&D Center, PRO G-A Proj. Staff Headquarters Eng. Industrial Off., Lrg Base/SUPRTCEN Academy Instructor	P.G. School	CO/XO Afloat HQ/AIRSTA Duty Off. District Office HQ Unit Deputy Group Commander XO Base (medium) XO SUPRTCEN (small)
LT	 11- 10- 9- 8- 7- 6- 5- 4.5-	E.O. Afloat (WMEC) Duty, R&D Center, PRO, G-A Project Staff Engr, MLC/Engr Unit/FD&CC Industrial Off., Small Base Facilities Engineering Headquarters Engineering AIRSTA Engineering Base/SUPRTCEN Supply Officer Afloat Academy Instructor	P.G. School	Second Tour Afloat Headquarters District Office HQ Unit CO/XO Base (small) CO/XO Afloat Group Staff
LTJG	4- 3- 2- 1.5-	LORAN CO First Tour Ashore	Some EO Tour Afloat	
ENS	1-	Afloat tour as ES or DWO	Ashore Tour	

Deepwater is the U.S. Coast Guard's future and our engineers will play an important role in making this future a reality. Join the engineering team and be a part of the future.

Useful Coast Guard Web Sites

Internet:

United States Coast Guard - www.uscg.mil
Systems Directorate - www.uscg.mil/systems
U.S. Coast Guard Academy - www.cga.edu
Engineering Department - www.cga.edu/academics/academicdepartments/engineeringdepartment
www.uscg.mil/jobs
Office of Military Personnel - www.uscg.mil/hq/g-w/g-wp/g-wpm/wpm
The Coast Guard Officer Career Development Guidebook - www.uscg.mil/hq/g-w/g-wt/g-wtl/ocgb/index

Intranet:

Officer Personnel Management Division (CGPC - opm) - http://cgweb.comdt.uscg.mil/cgpc-opm/Opm/OpmMain.html
Systems Directorate - http://cgweb.comdt.uscg.mil/g-s/gs.htm

U.S. Department of Transportation

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