



U.S. COAST GUARD, HUMAN RESOURCES
Department of Homeland Security

Office of Human Systems Integration for Acquisitions Division (CG-1B3)

Manpower Estimate Report

FOR

**MARITIME SECURITY CUTTER - MEDIUM
(WMSM)**

18 March 2011

Executive Summary

This Manpower Estimate Report (MER) documents the preliminary assessment for the Maritime Security Cutter – Medium (WMSM) crew size and composition required to operate and maintain the cutter underway in an operational area. There are several purposes for this early estimate of manpower. The MER provides an initial crew size to evaluate costs, influence design, and assess enterprise workforce impacts. The MER also helps develop requirements and specifications by setting the level of automation and technology required to meet crewing limits.

This report is the third iteration of the WMSM MER. In conjunction with updating the WMSM Integrated Master Schedule (IMS) and submittal of the Human Systems Integration Plan (HSIP), CG-1 is updating the MER to reflect applicable sections of the recent (2010) Manpower Requirements Analysis (MRA) conducted for the WMSL that clarified maintenance workload, evolution manning and further policy document maturity surrounding the WMSL operations.

Methodology

The methodology used in the MER is based on the MRA process used to determine the Maritime Security Cutter – Large (WMSL) crew, coupled with assumptions from CG-4 and CG-7. The results are only an estimate because of the infancy of the WMSM acquisition documentation and are not mature enough to be considered the final crew requirement. The MER assumes the WMSM is in optimum condition, able to operate to full design capability, fully staffed with required personnel ready to perform. Excluded from the computations are budgetary constraints, allowances for personnel in a transient/leave status, inadequately trained personnel, habitability constraints, and abnormal operational demands resulting from military contingencies and emergencies. The analysis includes objective and micro-parametric techniques accounting for both workload elements of the standard Coast Guard work-week afloat as well as condition-based positions driven by events such as GQ or simultaneous requirements such as migrant repatriation during a low-visibility, sea and anchor detail. The solution did not account for Enterprise-level workforce imperatives, impacts to rating communities, or variation in member's training levels. The previous MER results were briefed to the work force managers as well as CG-1, 4, 6, 7, and PSC representatives. Their feedback has been captured on the WMSM micro-site and will be addressed during the WMSM MRA to resolve discreet and CG-wide personnel impacts. The MER results will change as requirements are solidified and not meant to be a final decision. The total manpower requirements should be solidified during acquisition process by a WMSM System focused MRA to include the manpower requirements to operate, maintain, train, and support the class from the crew to the instructors at Coast Guard Training Centers.

Key Assumptions

The MER is based on assumptions from numerous sources. The following subsets of assumptions are key drivers in the resulting crew size:

- Flight Operations--Rotary only - One helicopter embarked, flying for two sorties per day, two hours in duration each. There is no UAV capability workload in the crew.
- Law Enforcement--Reduced 50% from WMSL level to 21.8 hours per week.
- General Emergency (GE)--Two repair lockers manned with a Rapid Response Team (RRT) as first responders and no boarding teams away.
- General Quarters (GQ)--One repair locker manned with the Rapid Response Team (RRT) manning the second repair locker and no boarding teams away.
- Workload is calculated underway based on Condition IV watch positions.
- Condition III positions are capable of being maintained in a port and starboard watch rotation for a period of seven (7) days as per the Operational Requirements Document (ORD).
- Detachments bring non-organic functionality--Aviation Detachment (five personnel) and Ship's Signals Exploitation Space (SSES) Detachment (seven personnel).
- The SSES detachment will be supplemented by an Intelligence Specialist (IS1) which is accounted for in the permanent crew. SSES workload is not accounted for in the permanent crew.

Results

- The WMSM MER hypothesizes an Operating Crew of 104 positions. The crew size relies heavily on automation to reduce watch station and evolution workloads. The number does not include the aviation and SSES detachments. It does account for workload by the cutter crew that is necessary to support these, and only these detachments when deployed.
- The WMSM deployed crew (operating crew plus detachments) is estimated at 116 (104 operating crew plus 12 detachment personnel).
- Requirement for habitability should consider requirements for detachments and additional riders, and overall crew growth over the planned cutter life, typically 10% for Navy ships.
- Technology, automation, knowledge creation rather than data saturation, codification of policy assumptions, and a fully resourced support infrastructure will be required to achieve a crew size of 104. This often requires higher upfront acquisition costs to reduce longer operating costs which crewing cost is the prominent driver.
- Human System Engineering should be a key priority in the early stages of requirements development and clear adjudication of functional allocation between humans, software, and hardware.

Future Work

A WMSM System MRA should be performed concurrent with ship design to maintain alignment between the total system manpower requirements and the design. The WMSM System MRA will reflect changes in the crew and identify the supporting personnel infrastructure as maturation of the WMSM System requirements and design progress.

Introduction

Personnel costs comprise the single largest life-cycle expenditure of a system, typical 60% to 70% of an assets OE costs; therefore attention to Human Systems Integrations (HSI) is vital. An acquisition program should have a comprehensive plan for HSI in place early in the acquisition process to optimize total system performance, minimize total ownership costs, and ensure that the system is built to accommodate the characteristics of the user population that will operate, maintain, and support the system. Manpower is one of the seven HSI domains. This Manpower Estimate Report (MER) provides an entering data point for many of the activities associated with the Obtain phase of the WSM acquisition. The MER support activities such as the Affordability Assessment, Integrated Logistic Support Plan, Project Life Cycle Cost Estimates, trade studies, and maintenance concept development. The updating of the MER is an identified activity of the Obtain phase under the Coast Guard MSAM.

The WSM MER only provides an estimate of the operational crew requirements for a given set of assumptions. The MER does not detail the total WSM system requirements from tooth to tail. It is sufficient for understanding the assumed functions performed by the crew; providing a high level understanding of the design requirements implicit in its conclusions for such things as habitability systems, stores, berthing, technology, and automation.

Methodology

The WSM MER emphasizes underway crew workload quantification and assignment within the proposed crew distribution. The report analyzed assumptions derived from the WSM specific Concept of Operations (CONOPS), ORD and the 2010 WMSL crewing analyses.

A Required Operational Capabilities and Projected Operational Environment (ROC/POE) was not available for this analysis. ROC/POEs provide critical capability, capacity, and simultaneity requirements and limitations that in turn can significantly alter future MRA results. Fundamentally, the MER describes an operational crew in its patrol area doing common Coast Guard missions, limited to the outlined assumptions. There are two analyses conducted as Figure-1 illustrates. One considers conditions such as General Quarters (GQ or Condition I), General Emergency (GE), or Alien Migrant Interdiction Operations (AMIO). The other determines workload from such activities as watch standing, flight quarters, boarding activities, and organizational level maintenance. The most demanding of the two analyses will drive the crew size. For the WSM MER; workload is the manpower driver. Further manpower reductions or

an increased level of capability or capacity would require a manpower offset or labor eliminating policy/design change.

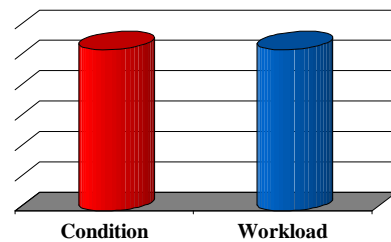
Assumptions about WMSM design, technology, or automation are largely taken from the WMSL design. Assumptions such as manning only one repair locker during GQ are based on direction from CG-751 and would require codification to be realized in practice. Workload data is evaluated and accounted for by an industrial engineering approach primarily utilizing information from maintenance procedure data and staffing standards.

Manpower Estimate Process

Rule based

1. Condition analysis
2. Workload analysis
3. Develop crew estimate

A consistent process for all new designs



Manpower Driven by Most Demanding Pillar

Figure 1 - Developing a Crew Hypothesis

Modeling Assumptions

The modeling approach used the approved WMSM ORD and CONOPS as well as the recently conducted (2010) WMSL MRA to construct the WMSM MER model. The following are entering arguments used to estimate workload and manpower requirements for the WMSM:

Model Baseline

- The (2010) WMSL MRA was utilized as the baseline document as significant collaboration had taken place and there is excellent traceability within the document. The WMSL MRA is a recent study conducted that reflects current manning schemes, increased automation and equipment sets of a newer class of ship.
- Substantial data from the WMSL MRA was used as parametric workload as the WMSM equipment list and maintenance procedure data have yet to be validated.
- Manpower constraints are applied to the enlisted workload portion of a MER. Workload assigned to commissioned officers is accounted for separately from the enlisted workload.

Conditions of Readiness Assumptions

- Limit GQ readiness Condition I damage control response capability to a single repair locker and one rapid response team (RRT) at the other repair locker. Assumed no boat crew or boarding team would be away from the cutter when GQ occurs.
- General Emergency response capability is two repair lockers and one rapid response team (RRT). Assumed no boat crew or boarding team would be away from the cutter when a general emergency occurs.

Evolution (EVO) Workload Reductions

- Reduce boarding activity by 50% from WMSL boarding expectations.
- Limit flight capacity to 4 hours per day, assuming a single embarked helicopter and five (5) detachment personnel.
- No UAV capability or capacity workload is accounted for in the crew. Specifically, none of the OS positions are assumed to control or direct a UAV. Further, the flight deck workload does not account for extended flight operations beyond the 4 hours associated with helicopter operations.
- If UAV is a future requirement, additional workload must be added, resulting in a potential increase in crew size or detachments that can drive habitability adjustments.

Standard Workweek Factors

- A standard at-sea workweek of 81 hours; 67 hours of work being the denominator to

determine the number of positions. This standard is established by Commandant Instruction (COMDTINST) M5312.11A.

- Within any work center (i.e. division or rating group within a division), the standard workweek may be exceeded by up to one hour per billet if failure to do so would result in the creation of an additional billet in that work center with a productive workload of less than 10 hours per week.
- At-sea watchstanding (OM) requirements are based on Condition IV steaming requirements, i.e. normal underway watch standing requirements in the patrol area.
- A four-section watch rotation is planned for WMSM.
- The total crew has sufficient skill quantity, type and levels to meet the workload requirements as the design matures.
- Certain evolutions are broken out separately in the WMSM MER because of their significance during operations.
- An allowance of seven hours per week per position is provided for unit Training (TR) that includes (Damage Control (DC) drills, Basic Engineering Casualty Control Exercises (BECCE), Damage Control Training Team (DCTT)/Engineering Training Team (ETT) meetings, etc.).
- An allowance of seven hours per week per position is provided for Service Diversion (SD) (quarters, haircuts, inspections, Non-Judicial Punishment, boards/committees, laundering clothing, etc.).
- A Make-Ready/Put Away (MR/PA) allowance of 30% is applied to the Planned Maintenance (PM) total.
- A Productivity Allowance (PA) of 20% is applied to Corrective Maintenance (CM), Facility Maintenance (FM,) Evolutions, and Own Unit Support (OUS) to account for an imperfect working environment and its impact on human fatigue.
- Each Officer position, except the Commanding Officer (CO) and Executive Officer (XO), are assigned FM for cleaning of personal space.
- Under Instruction (UI) workload has been included in the analysis.

Personnel Factors

- The WMSM makes periodic patrols during the year between 185-230 Days Away From Homeport (DAFHP) per year.
- The personnel support infrastructure is managed such that all replacements for planned crew losses report to the cutter before the departure of the incumbent.
- All personnel report aboard the cutter with all formal off-board training associated with initial assignment to the billet completed.

- Personnel were assigned to work and evolution positions based upon current policy documents.
- With the implementation of Maritime Enforcement Specialists into the enlisted and warrant officer communities in 2009 – two ME’s (ME1 and an ME3) were considered and included in this MER.
- Rules governing current USCG policies on tour lengths were followed.
- Individual leave is normally taken during homeport periods.

Training Concept

The Operating Crew provides sufficient qualified people to stand watches, engage in all evolutions up to and including simultaneous boardings and helicopter operations, conduct crew or operational team training needed for safety and efficiency, perform necessary corrective maintenance, and respond to shipboard emergencies. The Operating Crew can sustain short bursts of intense, high tempo operations (e.g., major SAR, AMIO, etc.). Protracted high tempo and surge operations could require additional crew.

Cutters and aircraft are scheduled for training to ensure that the deployed crew is capable of performing missions prior to arrival to the operational area. Individual technical and proficiency training is scheduled around the cutter and aircraft schedules.

WMSM crews will undergo 20 days of underway refresher training every 10 to 24 months. This type of training is designed to train the crew as a team in all-hands evolutions, such as firefighting, damage control, piloting, anchoring, gunnery exercises, and navigating a mine-swept channel. Regional Fisheries Training Centers provide regional-specific training for fisheries, including initial qualifications and refresher (just in time) training for cutters deploying on Living Marine Resource (LMR) patrols.

Additional training beyond that described above is received onboard while Under Instruction (U/I). The WMSM’s optimized crew requires that onboard training and qualifications be minimized. U/I hours were distributed throughout the crew to compensate for training and qualification requirements that must be accomplished once assigned to an operational cutter, e.g. cutter boat coxswains are trained and qualified on board as there is no ‘A’ School available. U/I workload is accounted for in the MER.

Evolution Analysis

Boarding, flight, and boat operations were analyzed and quantified as evolutions.

- **Flight Operations:** It is assumed that there is a single helicopter embarked with an aviation detachment of two pilots and three aircrew, conducting two helicopter sorties per day, seven days per week. Each sortie is two hours in duration. The MER followed guidance in the Helicopter Operations Manual COMDNTINST M3710.2D in manning the flight deck. All flight operations are assumed to be conducted with all systems functioning properly.
- **Boarding Operations:** It is assumed there are 21.8 hours of boarding workload per boarding team position. There are 12 boarding team positions identified plus five cutter boat crew positions and two boarding team U/I positions.

Planned and Corrective Maintenance Analysis (PM/CM)

- WMSM PM was separated into “At-Sea” and “Dockside” categories based upon periodicity. Maintenance activities that occurred daily, weekly, monthly, or which were required to be performed underway were considered “At-Sea.” Activities with a periodicity of quarterly or less frequent than quarterly were assigned to the “Dockside” category.
- Hull, Mechanical and Electrical (HM&E) and Weapons Systems maintenance data from the WMSL Cutter Maintenance Plan (CMP) was used to estimate maintenance workload. This estimate included Engineering, and Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) data. A complete analysis will not be available until a final WMSM Master Equipment List (MEL) is compiled and all vendor documentation assembled and an updated CMP is issued.
- PM/CM data from WMSL was used as an initial equipment baseline with modifications to account for projected differences in the WMSM design from that of the WMSL as can be determined considering the infancy of the acquisition phase of the WMSM.

Facility Maintenance Analysis (FM)

FM for the WMSM was calculated using parametric data from the recent (2010) WMSL MRA study. A 20% PA was applied to the workload numbers before distribution to the crew of the WMSM.

Own Unit Support Analysis (OUS)

OUS for the WMSM was calculated using parametric data from the recent (2010) WMSL MRA study. Parametric data was applied according to rate and/or division. A 20% PA was applied to the workload numbers before distribution to the crew of the WMSM. Maintenance not directly associated with PM/CM, such as administering user accounts on LAN systems, is accounted for under the OUS category.

Food Service Personnel

The number of Food Service Division (FS) personnel was determined from the USCG Staffing Standard COMDTINST M5312.11A and each person was given 67.0 hrs of OUS. The WMSM design will have a single galley for food preparation and service. Officers, Chiefs, and enlisted personnel will go through a single serving line, but dine in separate eating areas. This assumption requires an interpretation of the FS division standards. The allocation of FS and Mess Cooks (MC) requirements as a function of the deployed crew size was adjudicated in the WMSL HSI Sub-IPT. Further discussions with the Food Service Specialist (FS) RFMC resulted in the exchange of MCs for FS3s to improve the FS rating health and provide more skilled workers in the division. Further, the Coast Guard Personnel Manual, COMDTINST M1000.6 (series), suggests a nominal rotation of one in three for mess cook duty rotation – this MER accounts for this rotation.

Operating Crew

The WMSM crew development currently reflects a Minimum Crew of 104 critical positions. The projected modeling error is $\pm 5\%$, with a greater likelihood of crew growth than reduction, without specific assumption or design changes beyond those described. Assumptions concerning the detachment (make-up) only account for an aviation detachment of five personnel. Incorporating UAVs will likely require detachments with mission commander, operator and maintenance personnel. Functional workload is assigned to remain consistent with various assumptions in the model. Neither officer or enlisted is assigned an unreasonable level of evolution workload in relation to other workload requirements. Workload is optimized across the enlisted crew positions at 93%, to mean the average position is ‘filled’ to 93% of its available workload standard. Exceeding 95% typically results in overloading of the workforce and eliminates any labor reserves in actual operations. Tables 1 through 3 detail the crew and detachment composition.

Table 1. Officer Distribution.

Rank	Number
CDR	1
LCDR	1
LT	2
LTJG	3
ENS	4
W-4	4
Total	15

Table 2. Minimum Crew Enlisted Distribution.

Rate	E8	E7	E6	E5	E4	SN	FN	Total
OS	1	1	3	4	5			14
ET		1	1	3	2			7
IT		1	1	1				3
IS			1					1
BM		1	2	3	4	6		16
GM			1	1	1			3
ME			1		1			2
MK		2	2	4	5		3	16
EM		1	1	2	1			5
DC			1	2	2			5
YN			1		1			2
SK		1		1				2
HS			1					1
FS		1	2		5	3	1	12
Totals	1	9	18	21	27	9	4	89

Table 3. WSM Detachments

Detachment	O-C-E	Personnel
SSES	0-1-6	7
Aviation	2-1-2	5
Total	2-2-8	12

Enterprise Work Load

The preliminary estimate does not account for how the crew composition affects the Coast Guard workforce at this time. The previous MER's were briefed to Personnel Management, Rating Force Master Chiefs, Warrant Officer Community Managers, Coast Guard Personnel Command managers for officers and enlisted as well as CG-12A Workforce Forecasting managers and was posted to the WMSM micro-site on CGPortal.

Future Work

A WMSM System MRA should be performed concurrent with ship design to maintain alignment between the total system manpower requirements and the design. The WMSM System MRA will reflect changes in the crew and identify the supporting personnel infrastructure as the WMSM System requirements and design progress. A System MRA considers more than just the asset minimum number at the minimum skill, but includes enterprise-wide issues for workforce sustainment and the overall agency personnel requirements. It is predicated on system designs, operating environments, operational capabilities and capacities, culture, policies, and practices all the while maintaining fidelity with the recruit-able sailor. Figure 2 illustrates a comprehensive System MRA approach.

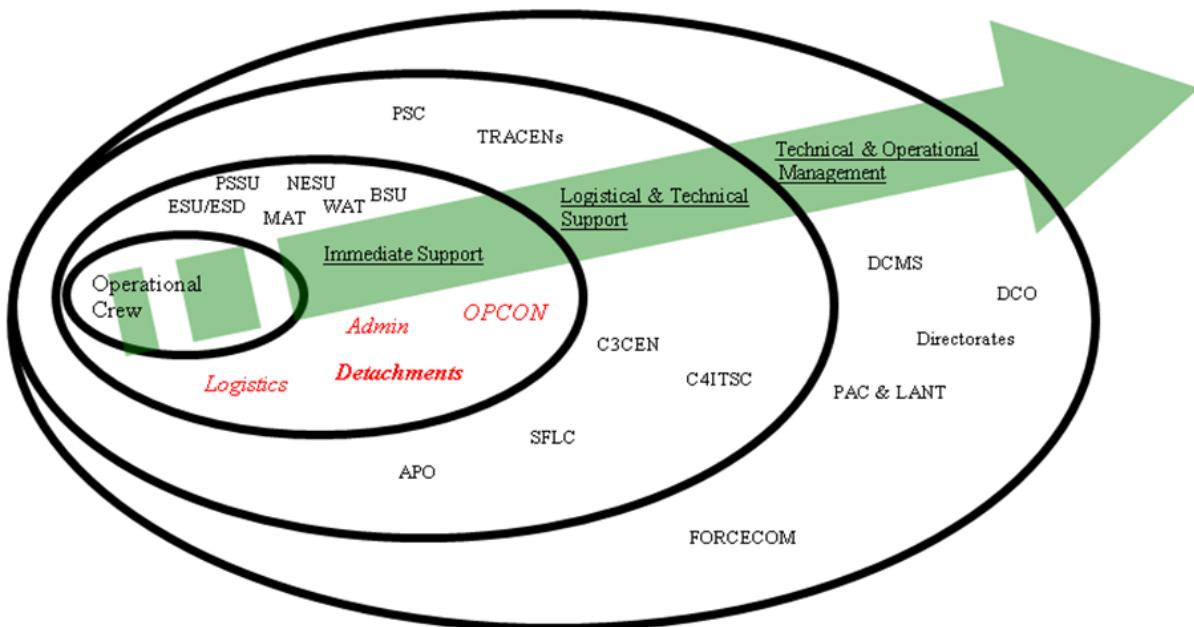


Figure 2- Comprehensive System MRA

Risk Assessment

Law Enforcement Sortie

The WMSM shall be capable of allowing Coast Guard personnel to board, inspect, interdict, report, and seize surface vessels. It shall also be capable of providing logistics, support, transportation, and protection of boarding teams through sustained presence. The WMSM shall be capable of communicating simultaneously with two boarding parties without interference with each other. The intensity of operations is constrained by the ability of the cutter's assigned crew to complete an LE Sortie on the targets found. That rate is set at 21.8 hours per week for the 12 boarding team members, two boarding team U/I positions and five boat crew positions. If the law enforcement capacity of the assigned crew is insufficient to meet demand for boardings, additional personnel will be required.

Repair Lockers

Two repair lockers shall be provided on the damage control deck: one forward and one aft of the amidships. The GQ condition is limited to a single fully manned repair locker, constraining the capability of the cutter crew to respond to emergencies and remain engaged with adversaries. Requiring two fully manned repair lockers during GQ would increase the crew size. Two fully manned repair lockers are provided during GE condition. The standard repair locker size for this MER is based on the approved WMSL assumption of a 27 person locker. A Rapid Response Team (RRT) is provided at all times, including GQ and GE conditions.

UAV Operations

Elimination of UAV operations restricts the range of the cutter's maritime domain awareness. If a UAV platform is to be employed in the future, sufficient habitability and C4ISR allowances should be included in design requirements as additional cutter personnel may be required to support UAV flight operations. There are no UAV controllers as part of the WMSM crew. An autonomous UAV aviation detachment of five or more will likely be required to provide a mission commander, as well as operators and maintainers for the air platforms.

Integration and Automation of Bridge, Combat and Engineering Systems

The WMSM crew is assumed to operate in a Condition IV posture the majority of the time in an operational area. There is a fundamental assumption that the level of automation and integration of engineering and C4ISR systems across the eight Condition IV watchstanding functions provide a level of usability, suitability, and acceptability to achieve mission effectiveness. Failure to deliver this level automation and integration will result in demand for additional watchstanders to

mitigate the additional work or lack of confidence in delivered systems.

Logistics Philosophy

The MER assumes a two tier maintenance approach, organizational and depot levels. The crew is unlikely to accomplish all organizational level maintenance in port and will require assistance by either contractor, civilian or military augmentation. When the total WMSM system manpower requirements are studied, the maintenance approach, quantity of cutters, product line support, introduction of the mission support organization and home porting plan will all impact the results.

C4ISR Maintenance

One of the assumptions of the MER is that ETs and ITs do not have a standing watch requirement, i.e. there is no radio room and ETs are not interchangeable with OSs for normal watchstanding in CIC. Driven by PM data and a ratio to derive CM workload, the previous MER estimate was considered inadequate by the respective Rating Force Master Chiefs given the amount of C4ISR equipment and the dependency on local area networks to integrate systems and data. This MER is scaled to the (2010) WMSL MRA study and attempts to close the gap between the data driven answer and the professional judgment of these community leaders.

Absenteeism

Historically, major cutters see an absenteeism rate of 9 to 11% due to billet vacancies, TAD requirements, or medical. The Staffing Standards do not have an allowance for absenteeism at the unit level, yet all manning hypotheses assume that all manpower requirements are funded, authorized, filled and finally muster when all lines are in with a service member with the correct experience and training to perform their assigned duties. In practice, this failure to account for the realities of our cutter force increases the inaccuracy of the manpower analysis results.

Enterprise Workforce Impacts

In isolation, the WMSM crew hypothesis meets the requirement of the minimum number of positions at the minimum grade to accomplish assigned missions. However, from the perspectives of individual rating communities, aggregation as a class, its interaction with other asset personnel demands or its impact on the Coast Guard workforce at large, the WMSM crew requires further efforts to be considered optimal. Sea duty intensive rates such as FSs will be challenged to support the WMSM demand in concert with the FS demand forecasted for the FRCs. There is a desire to have an E8 on the crew, but only the engineering ratings are capable of supporting E8s due to legislative caps on the top two enlisted pay grades. Shifting the demand for experienced personnel from E8s to CWOs complies with the law, but negatively impacts E6 and E7

populations to provide candidates. The Coast Guard depends on cutters to expose our junior personnel, officers and enlisted, to our wide mission set. With this real world experience derived from a first tour operational assignment, these sailors populate critical billets such as law enforcement detachments, independent duty corpsmen, and XOs on patrol boats. It is advisable that the Coast Guard gains an understanding of the true requirements for an effective workforce and the contribution required of each asset to contribute to the overall health of the workforce.

Conclusions

This estimate resulted in a total crew size of 104. Crew size drivers were reviewed and tracked throughout the analysis. Historically, the strongest driver for a Coast Guard cutter crew size was GQ, however, workload, including watchstanding, maintenance and other shipboard evolutions / activities has emerged as the dominant driver, often due to the constraint of assigning maintenance to the correct rating and skill level. If the limiting assumption concerning boarding activity is restored to the levels of the WMSL, the WMSM crew would increase by a minimum of 5 positions to $109 \pm 5\%$. At this point, only elimination of labor demand through policy or design initiatives will significantly reduce crew size.

It is critical that resources, time and money, be programmed into the WMSM acquisition for a total system MRA effort to understand the total operating cost impacts. Typically human costs are 60 to 70% of an asset's lifecycle costs. As we transition from the crew MER in the Produce / Deploy and Support phases of the WMSM acquisition to a full WMSM System MRA effort, greater fidelity and detail in the requirements, design maturation, codifying manpower assumptions, establishment of the maintenance philosophy, analysis and allocation of functions between hardware, software, and humans will refine total WMSM system personnel requirements and reduce uncertainty. The risk of crew size and total system personnel requirements changes remain significant as the program remains dynamic. Any labor drivers that we cannot eliminate through engineering and design, but are required to achieve mission capability and capacity will be mortgaged with increased manpower requirements.

Appendix A

SUMMARY OF ORGANIZATIONAL MANPOWER REQUIREMENTS

Offshore Patrol Cutter (WMSM)

(Detachments not included)

1. ORGANIZATIONAL MANPOWER REQUIREMENTS FOR THIS ACTIVITY ARE:

<u>OFFICER</u>	<u>CPO</u>	<u>OTHER ENLISTED</u>	<u>TOTAL</u>
15	9	80	104

2. GENERAL APPORTIONMENT OF ENLISTED SKILLS ARE AS FOLLOWS:

CHIEF PETTY OFFICERS	10.1%
PETTY OFFICERS	75.3%
FIREMAN	04.5%
SEAMAN	10.1%

3. PAY GRADE SUMMARY IS AS FOLLOWS:

<u>E-8</u>	<u>1</u>
<u>E-7</u>	<u>9</u>
<u>E-6</u>	<u>18</u>
<u>E-5</u>	<u>21</u>
<u>E-4</u>	<u>27</u>
<u>FN</u>	<u>4</u>
<u>SN</u>	<u>9</u>

Glossary

Corrective Maintenance (CM) - Work accomplished on an unscheduled basis because of malfunction, failure, or deterioration. In quantitative terms, it is the workload associated with restoration of disabled systems, equipment, or components to an operational condition within predetermined tolerances and limitations for which there is a corresponding PM action.

Corrective Maintenance (CM) Ratio - Corrective Maintenance (CM) workload is a ratio of PM to CM. A 2:1 ratio of PM to CM is used for hull/mechanical equipment, and a 1:1 ratio is applied to electronics/electrical equipment types.

Directed Requirements - Manpower required performing those duties, functions or tasks specifically directed by COMDT and/or by special programs over and above the functional workload requirements.

Facilities Maintenance (FM) – Work required maintaining the material condition of the ship.

Maintenance - Work required performing planned, corrective, and facilities maintenance.

Make Ready/Put Away (MR/PA) Allowance - An allowance applied to PM only which includes the steps required in research to determine required parts, filling out supply forms, obtaining and returning necessary instruction manuals, tools, and materials; transit to and from the work area; removal and replacement of any interference, and any necessary cleanup. This allowance is an average of values developed from extensive activity sampling. While considered to be accurate for the adjustment of total PM man-hours, it must be recognized that application of the allowance factors to any specific maintenance action may distort the true man-hour requirement to accomplish a specific action.

Manpower – Represents the total manpower requirements to accomplish the workload associated with each activity in accordance with the defined scenario defined in the ROC/POE.

Standard Workweek – A primary constraint for calculating manpower requirements. They are guidelines for sustained personnel utilization under projected wartime or peacetime conditions and are not intended to reflect the limits of personnel endurance. They are for planning purposes only and are non-binding on Commanders or Commanding Officers in establishing individual working hours. Daily workload intensity is a function of operational requirements; as such, the actual day-

to-day management of personnel is the responsibility of the commanding officer. The standard applicable to this study allocates 67 hours to work/watch, 7 hours SD, 7 hours for TR, 3 hours Sunday free time, 56 hours of sleep, 14 hours for messing, and 14 hours personal time spanning the available 168 hours.

Operational Manning (OM) - Often referred to as “Watch Stations,” is the time required to man essential operating stations during a specified condition of readiness.

Own Unit Support (OUS) – Work required to perform administrative, military, re-supply, food service, hygienic, utility tasks, and special evolutions, it also includes maintenance items that are not accounted for under PM and CM categories.

Planned Maintenance (PM) - Work accomplished in response to periodically scheduled preventative maintenance mandated by policy. In quantitative terms, it is the total workload associated with the performance of preventive maintenance actions on operational systems, equipment, or components contributing to uninterrupted operations within design characteristics.

Productive Allowance Factor (PA) - This is a percentage allowance applied to basic productive work requirements to reflect delays arising from fatigue, environmental effects, personal needs, and unavoidable interruptions increasing the time require for work accomplishment. The current standard used by the USCG is 20%. This is a composite of the average 15 percent relaxation allowance and a 5 percent contingency allowance. This is an average value applied to work aboard ship and may not express the exact total allowances applicable to any individual task or work element. Use of the PA factor does, however, provide a measured standard value reflecting all delays in productive work that will be experienced under the various conditions of ship employment.

Service Diversion (SD) - Service Diversions are those actions required of personnel by regulations or the nature of shipboard routine that must be, or are normally, accomplished during normal off-watch or working hours that reduce the individual’s availability to accomplish productive work. Service Diversion includes quarters, inspections, sick call, haircuts, business at the ship’s store, time awaiting service, administrative business, commanding officer’s non-judicial punishment, participation on boards and committees, interviews, and non-training related assemblies. Variable activities considered in the SD are in many cases influenced by internal ship procedures and management. Critical examination of the procedures affecting each activity or element may serve to point up changes that could reduce the man-hours involved. However, legitimate service

diversions reflect requirements imposed on ship personnel that must be included within the confines of the normal workday. It is, therefore, not permissible to attempt reduction of the SD by directing that accomplishment of a task outside of normal working hours. Elements of SD representing actions that are essentially individual in nature are stated as averages for all personnel. While obviously not applicable to any specific individual, such averages are reflective of total productive losses that may be expected in the ship as a whole. Based on a 1987 General Accounting Office (GAO) audit, 7 hours of service diversion time is applied to each requirement.

Training Allowance (TR) – An activity of a practical or instructional nature contributing directly to combat (total) readiness, mission readiness, or personnel effectiveness that otherwise detracts from an individuals capacity to accomplish productive work. Based on a 1987 GAO audit, 7 hours of training time is allocated to each requirement.

Workload - The activity of a body or mind which can be measured against standards in time, quantity or quality including but not limited to operation of equipment, watches, military duties, military assemblies, maintenance, administration, support, utility tasks, evolutions, training, supervision, job-related conversations, etc.