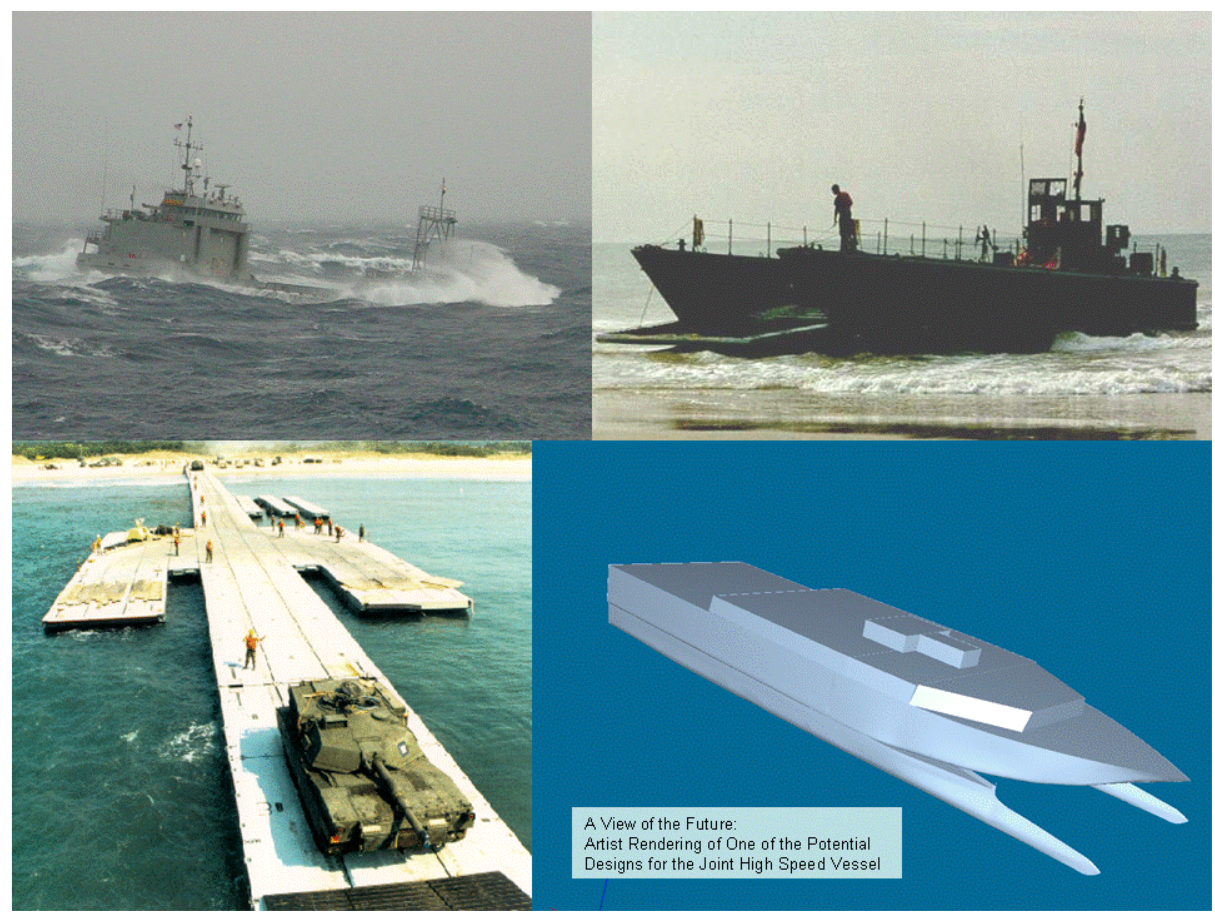
Army Watercraft Master Plan



Fleet Strategy

April 2008

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A Message from the Chief of Transportation

The Army's Future Force concepts describe an expeditionary and campaign-quality Modular force that is strategically responsive and operationally dominant across the full spectrum of military operations. Army Transformation is producing a more agile and lethal force - a force that needs versatile lift assets to meet deployment goals, provide for assured access, decrease predictability and dwell time, and quickly deliver force packages designed to build and sustain combat power. A critical part of this is a watercraft Fleet that will provide strategic responsiveness to the combatant commands and meet the challenges of an Army with an expeditionary mindset. The *Army Watercraft Master Plan* (AWMP) is a comprehensive document intended to address how our Fleet is structured to meet the needs of the current Army while continuing to transform into a responsive, flexible capability essential to the success of the Army's Transformation.

Modernization initiatives are already underway. Today we are on the verge of fielding a shallow-draft high-speed watercraft capability that will provide the speed and agility needed to support the deployment, maneuver, and critical sustainment of our ground forces when in theater. We are embedding robust command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) capabilities in our craft and in our Transportation Harbormaster Operations Detachments. Additional technology enablers are being pursued to further enhance our ability to rapidly enhance minor and degraded ports in austere environments. *The watercraft community is postured to revolutionize the way in which we transport and sustain forces and equipment.*

The recommendations in the 2008 AWMP are the results of the Joint Capabilities-Based Assessment (CBA) of Army watercraft capabilities approved by the Army Capabilities Integration Center (ARCIC) on 13 November 2007. This AWMP is derived from Joint inputs from the Combatant Commands (COCOM) and Departments of the Army and Navy, and built on top-down analysis of the Family of Joint Operations Concepts (JOpsC) and Army concepts for the Future Modular Force. Focused on the actions needed to achieve and maintain the capabilities required to support operations in the 2015-2024 timeframe, the 2008 AWMP is designed to support Army Transformation objectives, further improve strategic responsiveness and embrace Joint and Army concepts.

Implementation of this *Master Plan* will give the Army a powerful, flexible capability to project and sustain the operational force. The tenets of this plan will give the Joint Commander a watercraft Fleet unequalled in its capability to operationally move and maneuver combat forces through multiple access points in response to any contingency.

Army watercraft project and sustain America's forces!

James E. Chambers
Brigadier General, U.S. Army
Chief of Transportation

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Introduction

INTRODUCTION

Purpose of the Army Watercraft Master Plan (Fleet Strategy)

This Army Watercraft Master Plan (AWMP) identifies the key actions, sets priorities, and guides the decisions that must be made to ensure the Fleet is properly equipped, organized, positioned, trained, and sustained to achieve and maintain the capabilities needed to meet current and Future Force operational requirements. Army watercraft provide critical capabilities to support full-spectrum land combat operations by extending ground Commanders' available maneuver space. Army watercraft enable the Joint Force to conduct tactical port and JLOTS operations, take advantage of waterborne maneuver and supply routes, and conduct operations through littoral entry points even in the face of access-denial environments. The Army Watercraft Fleet envisioned possesses the speed, agility, and operational payload needed to maneuver operationally-ready modular forces, and provide the Joint Force Commander with the ability to deliver combat power at the time and place of his choosing. At the same time, the Army Watercraft Fleet is a key provider of the campaign quality sustainment support necessary to ensure the "continuous, precise, assured provisioning of deployed Army and supported sister Service forces in any environment, guaranteeing their ability to generate, maintain, and employ combat power throughout the campaign" (*The Army in Joint Operations: The Army's Future Force Capstone Concept 2015-2024*, p. 31). Providing key capabilities needed to conduct operations through fixed, degraded, and austere ports, as well as bare beach sites, Army watercraft are a key strategic-to-operational-to-tactical link in the deployment-employment-sustainment continuum.

2008 AWMP: Continuing the Path of Modernization

The Army Watercraft Fleet has undergone significant change since the first AWMP was published in 1996. Beginning with the Department of the Army (DA) Deputy Chief of Staff (DCS) G-4 "Analysis of the Army Watercraft Program" in December 2000, the Army undertook to transform the Fleet into a smaller, more focused set of capabilities specifically equipped, organized, and globally positioned to support a joint-minded, expeditionary, and campaign-quality Army. The most recent AWMP - published in December 2002 - articulated the Transformation that was subsequently implemented in accordance with (IAW) Phases 1 and 2 of the DA DCS, G-3/5/7 Army Watercraft Restructuring Plan (AWRP) executed in February and June 2003 respectively. AWRP directed divestiture of 135 vessels, reallocation of 355 active component and 264 reserve component spaces, implementation of forward-stationing and pre-positioning strategies that resulted in cost avoidance of approximately $40M per year. The major outcomes of the AWRP are: the elimination of Army Pre-Positioned Set 3 (APS 3) sustainment and deployment costs, and the recognition of the evolutionary capability defined by the Joint High Speed Vessel (JHSV) program. As 2008 begins, we are realizing the full impact of the

AWRP and are planning for operational implications of fielding the JHSV. At the same time, we find ourselves challenged by the need to simultaneously fight a continuing global war and transition to the Army's Future Modular Force.

On 13 November 2007, the Army Capability Integration Center (ARCIC) approved the Joint Capabilities-Based Assessment (CBA) of Army watercraft to give us an analytical foundation from which to build our modernization efforts. The impacts of AWRP combined with emerging operational requirements have created demands on the Army Watercraft Fleet during a period of Transformation. Force deployment realities reflect an ever increasing expeditionary role for land forces that are involved in protracted and distributed campaigns. Commensurate with this, Fleet Force Protection initiatives and evolving Army watercraft doctrine are adapting to threats from counter insurgency forces and asymmetric threats from traditional and terrorist enemies alike. The JHSV insertion into Fleet force structure is envisioned as a substantial enabling capability and planning for operational integration of the vessels is paramount to the success of this Army Fleet Strategy. At the same time, Army watercraft must continue to provide a broad range of tactical and operational littoral capabilities that integrate, but also go well beyond the JHSV. The new Army Modular Force designs (current), the Grow the Army (GTA) initiative (2008), new HQDA APS Strategy (2008-2015), Joint Integrating Concept (JIC) for Seabasing (2006), the new Global Force Management Policy (2007), and current Defense Planning Guidance reflect emerging requirements and conditions that demand diverse and ever-increasing intra-theater air, sea, and surface lift capabilities. All of these will challenge us as we modernize the Army Watercraft Fleet in the midst of an evolutionary change process.

The Army Fleet Strategy in this Plan charts a course for the continuing modernization of the Army's watercraft capabilities in this constrained and challenging operational and fiscal environment. It describes the priorities and actions that must take place to ensure the Fleet possesses the capabilities required by the Army's Future Modular Force in the 2015-2024 timeframe.

A Comprehensive, Integrated, and Coordinated Action Plan

Prepared as a coordinated effort between the Chief of Transportation, Assistant Secretary of the Army, Acquisition, Logistics & Technology (ASA(ALT)), the Department of the Army, Deputy Chiefs of Staff (DCS) G-3/5/7, G-4, and G-8, the Army Materiel Command, and the Army Capabilities Integration Center (ARCIC), the 2008 AWMP provides a comprehensive and coordinated strategy for current and future Fleet of vessels and capabilities as well as those capabilities yet to be developed. This document is organized differently from past plans and contains three sections: an Overview: Summary of the Army Watercraft Master Plan, Chapter One: Current Capability Assessment and Modernization Strategy, and Chapter Two: Future Capability Development Strategy.

The Synopsis describes the master plan in general terms and emphasizes the critical issues of the plan without going into great detail. This section is designed to serve as a stand alone document that can be used by a reader as a "high-level" take away of the master plan. It's in a format that is more extensive than an executive summary in that it provides a complete picture of the AWMP,

but not as detailed as the information found in Chapters One and Two. The intended audience for the Synopsis is senior Army leadership.

Chapter One provides a detailed assessment of currently fielded platforms and related capabilities. This chapter describes “where we are today” and how our current platforms and capabilities will be modernized to meet future Army and Joint requirements. This includes modernization and continued procurement of some existing platforms, and elimination of those that do not meet future requirements. This chapter also addresses strategies for modernizing the maintenance, training, and supply concepts and practices needed to support a modernized Fleet.

Chapter Two presents new materiel and non-materiel solutions that are already underway or need to be initiated to meet future requirements. Materiel solutions discussed here include three new programs that are already underway in the capability development process: the Joint High Speed Vessel (JHSV), Harbormaster Command and control Center (HCCC), and Vessel-to-Shore Bridging (VSB). Chapter Two also addresses the non-materiel change actions that need to be initiated to support and sustain future capabilities, and those requirement determination actions that need to take place now to lay the groundwork for future materiel development.

Lastly, there is a set of annexes which contain in-depth information on: Fleet capabilities and characteristics, Army watercraft employment vignettes, an explanation of the Functional Needs Analysis (FNA) gap formulation, funding information, training information, pertinent references and a list of acronyms.

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Synopsis

The 2008 Army Watercraft Master Plan

1. A JOINT, CAPABILITIES-BASED ACTION PLAN

This AWMP presents an action plan for achieving the capabilities identified by the Capabilities Based Assessment (CBA) of Army Watercraft, approved by the Army Capabilities Integration Center on 13 November 2007. This plan describes the priorities, identifies the key actions, and guides the decisions that must be made to ensure the Fleet is properly equipped, organized, positioned, trained, and sustained to conduct ongoing operations and meet Future Modular Force capability requirements. In doing so, this document is built within the framework of future joint capability requirements developed in the context of current operational realities. Further, the action plan described in this AWMP is oriented to DoD and Army resourcing cycles. Thus, this plan is framed by the following key parameters:

- ***Targeted to the Army's Future Timeframe: 2015–2024.*** Previous AWMP's targeted resourcing cycles based on a bottom-up approach to Fleet modernization. This AWMP departs from that approach in one important aspect: it targets the development of capabilities driven by a top-down analysis of Joint and Army requirements. At the same time, this Plan has something the previous plans did not have: an agreed-upon set of concepts that define the capabilities the Army must have to operate as part of a future Joint Force. The family of documents that includes the Army's Future Force Capstone Concept, Operational Concepts (Operational Maneuver and Tactical Maneuver), and Functional Concepts (Battle Command, Move, Protect, See, Strike, and Sustain), provide us a common context within which to develop capabilities and identify DOTMLPF requirements. Critical to this AWMP is the fact that all of the Army's Future Force concepts identify the precise timeframe during which those capabilities and DOTMLPF requirements must be achieved and maintained: 2015–2024. This AWMP is built with that timeframe in mind. The actions and priorities described are specifically targeted to achieving and maintaining the Army watercraft capabilities needed by the Army's Future Modular Force throughout the 2015–2024 timeframe.

- ***Based on Joint Capabilities-Based Assessment.*** The analytical underpinnings of this strategy are based on the application of the principles and processes established by JCIDS. JCIDS requires all DoD organizations to employ a top-down, joint capabilities-based analytical approach to identify, develop, and implement operational requirements. TRADOC Regulation 71–20 implements JCIDS as the system to be used by Army Proponents in the requirements determination and capability development process. Accordingly, the Future Army watercraft strategies described in this AWMP are based on the results of the JCIDS CBA of Army watercraft capabilities begun in December 2003 with the first draft of the Army Transportation FAA and approved by ARCIC on 13 November 2007**.** The Army Watercraft CBA, conducted by CASCOM with significant Combatant Command and Joint Departmental input, focused on the Army's Modular Force capabilities described in the Future Force family of concepts. The DOTMLPF approaches and recommended actions identified in the CBA are focused on the 2015–2024 timeframe described

in these concepts. This AWMP is a plan of action for implementing the most important findings of the CBA.

- ***Constraints.*** While this AWMP is designed to be an action plan for the CBA, it also takes into account the realities and constraints of the current operational—and fiscal—environments that may impact its execution. As such, this AWMP focuses on those capabilities that are required to achieve and maintain minimum operational capabilities needed through 2024. An important part of this AWMP is the identification of budget priorities used to guide Program Objective Memorandum (POM) decisions. Given the importance of the 2015–2024 timeframe, emphasis is placed on POM decisions that take place in the 2009–2014 timeframe. The priorities are time-sequenced based on the constraints imposed by current operational and fiscal realities. There are two key constraints that guide this AWMP: ongoing operations and current materiel procurements. The fiscal realities of supporting ongoing operations and current procurements both demand judicious prioritization of current and future Fleet requirements. The focus of this Plan is on bringing materiel systems currently in the procurement process to reality and assessing their impacts on the future Fleet before moving too quickly to spend limited resources on new materiel ideas. This does not mean this AWMP will not plan for the future materiel development required for Fleet modernization. Rather, the immediate focus will be on implementing materiel solutions already committed to, while continuing the capability development process to identify any future systems and non-materiel changes that may be required. The Army Watercraft CBA provides guidance as to what actions need to take place while the AWMP lays out the sequence and time frame for implementing these actions. In doing so, this Plan must be implemented within the context of the larger decisions and processes affecting modernization, to include the Defense Acquisition Working Group (DAWG) influencing JHSV manning, Total Army Analysis, Army Structure (ARSTRUCT) decisions, the Army Campaign Plan (ACP), and Army Modernization Plan (AMP).

2. Capabilities-Based Assessment Findings

The analytical underpinnings of this modernization strategy are based in the application of the principles and processes established in the Joint Capabilities Integration and Development System (JCIDS). ARCIC conducted a Post Independent Analysis (PIA) and, on 13 November 2007, approved the CBA of Army watercraft that includes three foundational documents:

- ***Army Transportation Functional Area Analysis (FAA).*** Originally validated on 14 May 2005, revised and updated IAW the PIA on 14 September 2007, the FAA assesses national strategies, Joint and Army operating, functional, and integrating concepts to identify the key capabilities required of Future Army Transportation to include the Army Watercraft Fleet. The FAA identifies Army watercraft as a critical capability needed to enable the Army's Future Force to concurrently maneuver and sustain land combat forces distributed throughout the an asymmetric operational environment. Further, the FAA identified the key capabilities Future Army watercraft must possess and the tasks they must perform. The FAA also identifies the conditions and standards to which the tasks must be accomplished.

- ***Army Watercraft Functional Needs Analysis (FNA).*** Originally validated on 30 August 2006, revised and updated IAW the PIA on 14 September 2007, the FNA provides an assessment of current and planned Army watercraft capabilities against the Future operational requirements identified in the FAA. The FNA begins with the Army watercraft tasks identified in the FAA and

translates the standards into measures of effectiveness (MOE) to identify gaps in the Army's ability to meet Future Force operational requirements. These capability gaps provide the basis for the approaches identified and analyzed in the FSA and ultimately adopted in the AWMP.

- ***Army Watercraft Function Solution Analysis (FSA).*** Approved on 13 November 2007, the FSA brought together a broad range of Subject Matter Experts (SME) from the COCOMs, DA and DoN, and other Joint and Army organizations to identify and analyze a range of DOTMLPF approaches to fill the capability gaps identified in the FNA. The FSA identified the need for an integrated DOTMLPF approach that includes both materiel and non-materiel approaches to meet Future Joint Force operational requirements.

The CBA SMEs employed a red-amber-green scale to assess how well current Army watercraft can achieve the required Future Modular Force capabilities in the timeframe they are required (2015–2024). Figure 1 provides a summary of the results of the CBA and identifies the primary capability gaps that make the current fleet red (unable to meet 2015–2024 operational requirements).

ARMY WATERCRAFT TASKS (2015-2024 Modular Force Requirements)	CBA (Current Fleet)	CRITICAL CAPABILITY GAP (Creating Red Assessment)
Close the Force		Current Fleet not designed to **move combat ready maneuver units or move at speeds required** to meet COCOM swiftness goals.
Establish and Maintain Situational Awareness		Current Fleet not fully equipped with interoperable, **Joint C4ISR capabilities** needed to maintain real-time situational awareness of the COP.
Provide BCOTM to Embarked Units		Current Fleet not designed to **support maneuver or equipped to provide BCOTM** to embarked forces.
Operate in Open Ocean and Anti-Access Environment		**NONE** – Maintaining Current Fleet capabilities meets minimum requirement (amber assessment).
Provide Operational Maneuver for Combat Forces		Current Fleet not designed to **move intact operationally-ready maneuver forces** to any access point in a manner that meets COCOM timelines.
Conduct Distributed Sustainment Operations		Current Fleet does not possess the **speed** to meet Modular Force requirements.
Support Terminal Operations		**NONE** – Maintaining Current Fleet capabilities meets minimum requirement (amber assessment).
Conduct Seabase Operations		Current Fleet not designed to **support movement of combat ready maneuver units from a seabase**.
Operate in Non-Contiguous, Uncertain Threat Environment		Current Fleet not equipped to **identify threats and/or mount appropriate defensive and/or lethal response**.

Figure 1. Summary of Army Watercraft Capability Gap Analysis

3. CURRENT FLEET ASSESSMENT

An important finding of the CBA is that our current Fleet - if it is maintained at its current state of readiness - can provide a minimum acceptable level (amber) in most of the required capabilities, but will degrade over time. Further, the CBA identifies the primary capability shortfalls, and identifies and prioritizes potential solutions. The focus of this AWMP is on those actions that will bring the Fleet up to at least an "amber"

rating in all of the categories assessed in the CBA, and translating them into a priority of work and resourcing over the 2009–2014 timeframe. Figure 2 summarizes the status of the current Army Watercraft Fleet by individual platform or system. It depicts how well each platform or system will be able to meet the 2015–2024 capability requirements if the potential solutions identified in the CBA are not implemented.

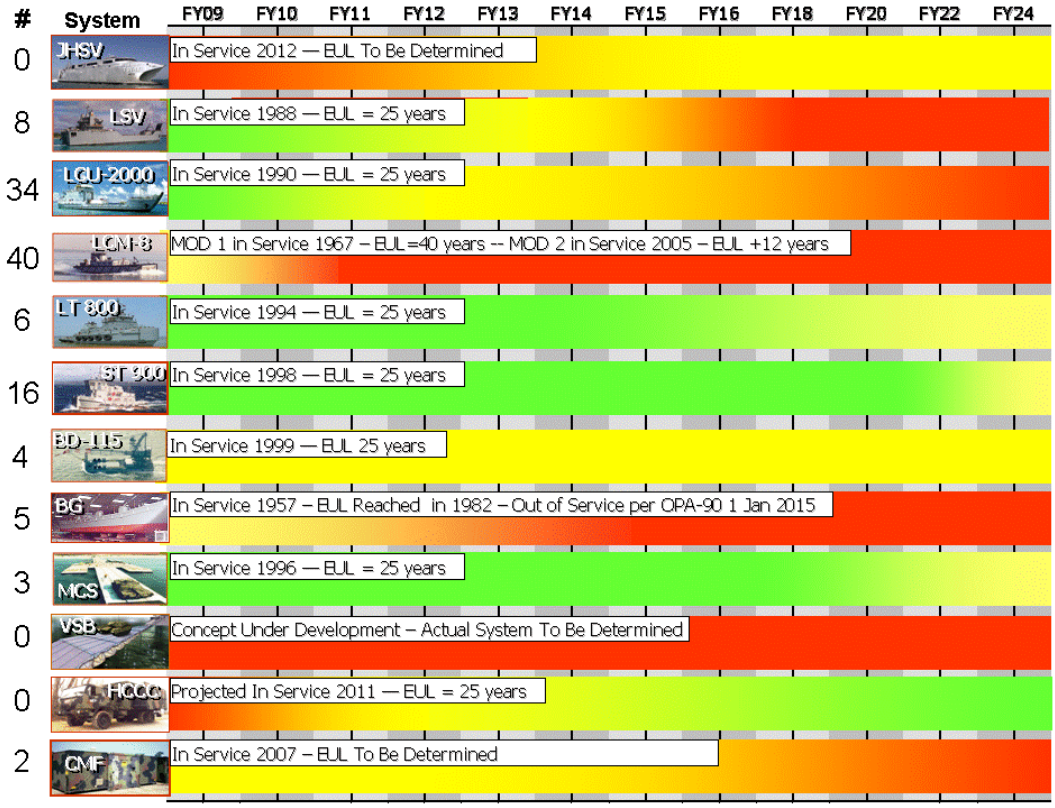

Figure 2. Fleet Assessment Pre-Modernization

The CBA findings suggest priorities based on the Joint assessment in an unconstrained environment. The platform/system assessment shown above refines the CBA summary chart by identifying which vessels are affected, how soon they are affected, and what the critical issues are that will potentially render them operationally unacceptable. This provides a realistic basis for prioritizing our efforts and planning how we need to act on the findings of the CBA in regards to the capabilities and characteristics of the Fleet. Based on the CBA and this assessment, following are our current priorities for Fleet resourcing actions over the 2009–2014 timeframe:

a) The CBA identifies the need to develop new lift capabilities, but also identifies continued service of the LSVs and LCU-2000s as a legitimate approach to meeting heavy sustainment lift requirements. Our subsequent Fleet assessment, however, identifies the fact that we will begin to lose this capability if we do not adequately fund modernization of our existing LSV and LCU-2000 Fleet. Further, to meet the residual future capability gaps, we must also fund adequate upgrades to LSV and LCU C4ISR and force protection systems.

b) Our tug Fleet is well within its life cycle and adequate to meet future requirements, if we continue the current program of modifications that are already planned and make appropriate upgrades to the C4ISR and force protection systems as indicated in the CBA.

c) The Fleet assessment graphically depicts that we have immediate issues with the LCM-8 Fleet and our fuel barges. The decision to retain and modernize, replace, divest or provide these capabilities by other means must be made within the next 12-18 months. For example, fuel barge capability could be provided by commercial lease or contingency contract. The CBA identifies the need for further capability development work to identify actual future terminal and tactical Lines of Communication (LOC) capability requirements, therefore there is no clear answer without determining our actual requirements. Completing the capability development and requirements determination work needed to support decisions on whether to retain or divest these platforms, or pursue new materiel solutions to these issues will be a priority of work for CASCOM in the immediate future.

4. Integrated DOTMLPF Plan to Achieve & Maintain Future Capabilities

Materiel Development Strategies

The CBA identifies approaches needed to fill our capability gaps that include pursuing new materiel programs and other actions that may have implications for future materiel programs. Consistent with our goal to focus on those materiel programs already underway while laying the developmental groundwork for potential future programs, our priorities for resourcing will be first on existing materiel programs, then on those actions needed to resolve our current Fleet issues in order of urgency:

1. ***Field JHSV, HCCC, and VSB.*** The CBA identifies the JHSV and the HCCC as critical capabilities already under development that must be fielded to fill critical gaps in closing, maneuvering, providing battlespace awareness for, and interoperability with Joint and Modular Forces. Further, the CBA identifies vessel-to-shore bridging (VSB) capabilities as a key enabler for the JHSV and current Fleet vessels in meeting the speed and assured access requirements. All three of these programs are underway in some manner and are already part of our future funding strategy. A top priority for 2009–2014 materiel program funding will continue to be these three programs.

2. ***Extend Service Life and Upgrade Existing Sustainment Lift Capabilities.*** Above all, the CBA found that the Future Force needs an Army Watercraft Fleet that possesses a range of lift capabilities. The JHSV helps close new capability gaps in operational and tactical maneuver, Battle Command on the Move (BCOTM), and Situational Awareness, but the Army will continue to require the heavy sustainment lift provided by the LSV and LCU-2000 Fleets. The CBA identifies the need for development of future sustainment lift capabilities, but also verifies that our 2015–2024 Future Force requirements can be met to at least an “amber” level by extending the service life and applying appropriate upgrades to the LSV and LCU-2000 Fleet. Given current fiscal constraints, and the emphasis on fielding the JHSV, our 2009–2015 strategy will be to maintain our existing LSVs and LCUs, with particular focus on the improvements needed to fill the C4ISR and force protection capability gaps identified in the CBA. All of these actions ensure the continued viability of these platforms through the 2024 timeframe.

3. ***Determine LCM-8 Requirements.*** These platforms are rapidly nearing a "drop-dead" date beyond which they are not viable due to maintainability costs. We have yet to determine whether the Future Force needs this capability in its current configuration. CASCOM must make completion of the capability development actions identified in the CBA a priority in 2009. CASCOM must determine the operational requirement and correct DOTMLPF action before these platforms become too expensive to maintain.

4. ***Continue to Engage Other Services in Joint Efforts.*** The CBA identifies the need to actively engage and participate in capability development programs in partnership with other Services and/or COCOMs that will impact Army watercraft Fleet modernization and potentially lead to future materiel and non-materiel development. Most important among these are the USTRANSCOM JLOTS Transformation, Navy-lead at-sea transfer initiatives, and Joint Seabasing.

5. ***Terminal Operations Capability Development.*** During the CBA, the COCOMs identified the need for Army watercraft to support tactical terminal and LOC operations. Further, this work needs to be closely integrated with the Terminal Operations CBA identified by the Army Transportation FAA, and must be integrated with ongoing joint initiatives, e.g., JTF-PO, JLOTS Transformation, and SDDC Transformation. Our current floating craft Fleet (Tugs, BD Cranes) can meet the 2015–2024 timeframe capabilities level with completion of planned modifications and appropriate upgrades. The BG fuel barges will be allowed to leave the inventory through attrition or no later than 1 January 2015. Thus, the Terminal Operations ICD work is not an immediate requirement. Since this involves completion of a CBA that has not yet progressed past the FAA stage, this should be a CASCOM focus to complete by the 2010 timeframe.

6. ***Future Sustainment Lift Capability Development.*** The CBA identifies the need for an Initial Capabilities Document (ICD) of future sustainment lift capabilities. However, it also identified the fact that Future Force sustainment lift requirements can be met to at least an "amber" level of capability, due to a lack of speed, by extending the service life and applying appropriate upgrades to the LSV and LCU Fleets. Therefore, this ICD work will influence the 2015 POM decisions. For instance, we may decide to not SLEP all LCU and instead pursue procurement of a new capability. This work is not critical but should be pursued within the next five years as future concepts and capabilities beginning to come into focus. This will be a CASCOM priority in the 2010–2011 timeframe.

INTEGRATED DOTMLPF STRATEGIES

1. ***Relook Pre-positioning Strategy.*** The Army must re-examine the current pre-positioning strategy as we evolve with fielding of the JHSV and to implement Future Force concepts. The CBA identified the fact that responsiveness and availability of the Army's watercraft continue to be a concern of the COCOMs. The COCOMs also state that the packages currently on hand are appropriate to meet current requirements; however, data provided by AMC indicates many of these packages have not been fully utilized. Achieving a more realistic balance of forward-stationed and pre-positioned watercraft—based on operational requirements—would enhance responsiveness and reduce maintenance and storage costs. I expect this to be a priority for the TCM-Transportation over the next year. This will require significant input and partnership with AMC and CASCOM.

2. ***Modernize Army Watercraft Sustainment Operations.*** Army Materiel Command (AMC) is already undertaking analyses of watercraft sustainment maintenance and supply concepts to identify how our current practices need to be modernized to meet the needs of the 21st-Century Army. The ultimate goal of these initiatives is to integrate supply support operations with both field and sustainment maintenance operations in a set of procedures that are appropriate to modern Army watercraft operations. In mid 2006, TCM-Trans and CASCOM began work on revising Army watercraft maintenance concepts and organizations to better align with the Army's 2-Level Maintenance concept. One issue that became clear during this preliminary work is the need to reconfigure the Containerized Maintenance Facility (CMF) to support a new operational maintenance concept. While AMC's work has been ongoing, the 2LM concept work has been delayed as the CBA has been completed. CASCOM and TCM-Trans will now re-energize their work to develop and implement 2LM concepts through policy, force structure, materiel and doctrinal updates. At the same time, CASCOM and TCM-Trans efforts must be coordinated with AMC's efforts to ensure the Fleet is supported by an integrated supply support, field and sustainment maintenance concept.

3. ***Finish Revision of Army Watercraft Doctrine.*** CASCOM has been working on revising our doctrinal manuals over the past two years, and effort that has been slowed due largely to the rapid pace of Army Transformation. Guided by the path forward articulated in this plan and the Joint analysis in the CBA, completion of doctrine to support operations in the 2015–2024 timeframe will be a priority for CASCOM for the remainder of 2008.

4. ***Integrate Army Watercraft Operations into Joint and Army Doctrine.*** An issue that emerged from the CBA is that COCOM operational planners are often not aware of, or do not fully understand how and where to employ Army watercraft capabilities as part of an integrated operation. Currently Army watercraft capabilities are inadequately addressed in both Army and Joint doctrinal manuals. Army watercraft—and their capabilities—must be expanded upon and more clearly defined in the doctrinal manuals used by Maneuver and Maneuver Support leaders and planners, as well as our Joint partners. We must complete the revisions to our Future Army watercraft doctrine as the basis for this effort. The next priority—anticipated to occur in the 2009 timeframe—will be to focus CASCOM's Concepts and Doctrine work on assessing Army and Joint doctrine for the purpose of integrating Army watercraft employment concepts.

5. ***Modernize Army Maritime Training***. The CBA identified modernizing the way in which Army mariners receive training as an issue that needs to be addressed as we modernize the Fleet. We must stress the increased use of virtual and distance learning by taking advantage of the advances in technology. Increased use of full-feature simulations for both deck and engineers is a must. Additionally, we must try to establish a high speed craft center of training for the Joint services. Fort Eustis, Virginia already has many of the features and assets needed to become such a center.

5. Resourcing Strategies to Achieve & Maintain Future Capabilities

ARMY WATERCRAFT STRATEGY 2009–2024 AND BEYOND

Figure 3, shown below, maps the actions that must take place to achieve and maintain the capabilities needed to meet the Army's Future Force operational requirements as identified in the Army Watercraft CBA. This is a summary of the actions described above and lays out a timeline for the complete DOTMLPF strategies as they need to take place in the 2009–2014 resourcing timeframe and into the 2015–2024 Future Force operational timeframe.

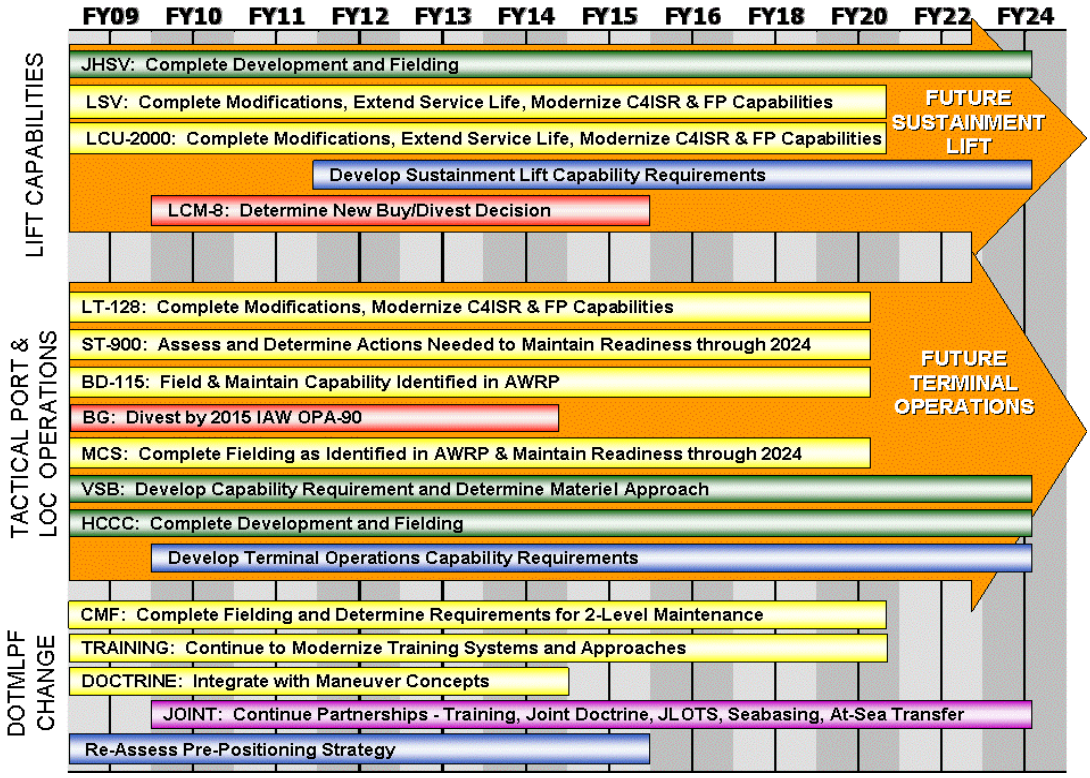

Figure 3. Army Watercraft Fleet Strategy 2009-2024 and Beyond

Figure 4, below, illustrates the impact of implementing the recommendations of this plan. All systems achieve and maintain an "amber" rating through the required 2024 timeframe. Additionally, by executing this plan, the required "up front" work is being accomplished that takes the Army Watercraft Fleet past the 2024 timeframe into the next generation of Army concepts.

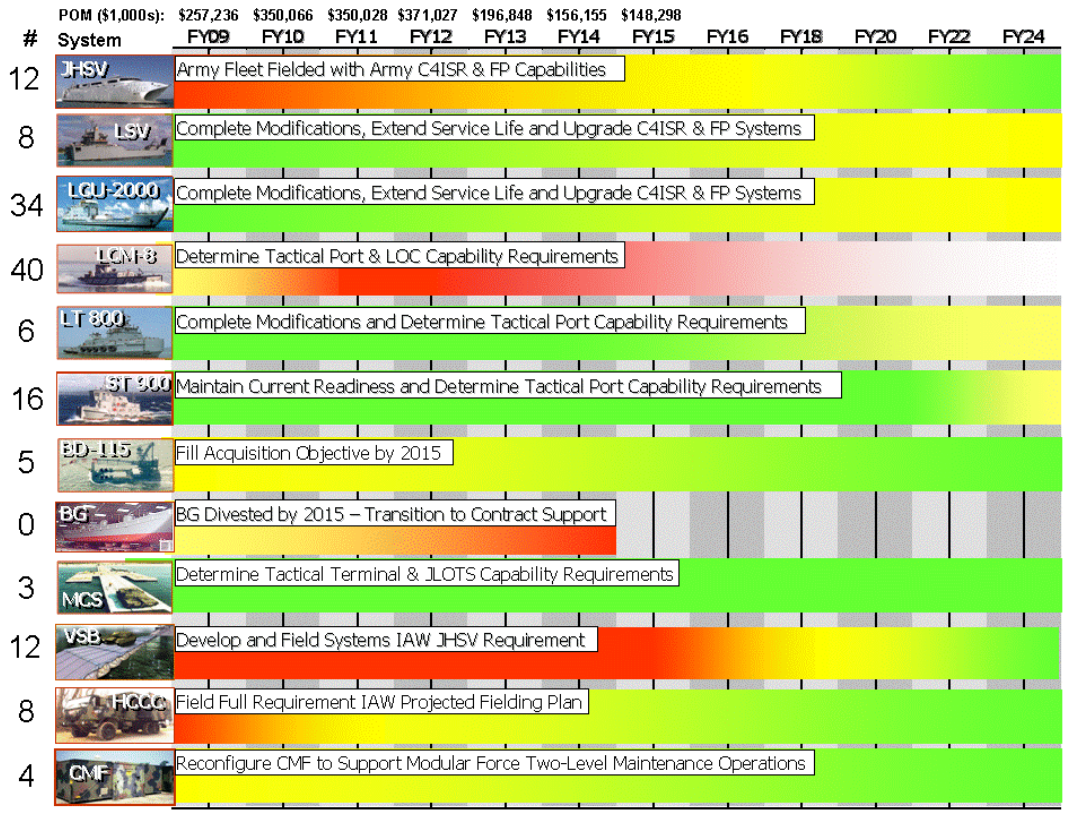

Figure 4. Fleet Assessment Post Modernization

RESOURCING REQUIREMENTS SUMMARY

Tables 1 & 2, shown below, summarize the resources required to achieve the DOTMLPF strategies described in the AWMP.

Table 1 outlines the costs associated with modernizing and maintaining the vessels and systems that comprise the watercraft Fleet. These are the costs associated with materiel strategies — procurement, modernization, and maintenance of the Fleet itself — typically requiring funding from the Department of the Army to support operations lead by AMC and TACOM, to include program costs for contracted support and travel of Government personnel. These data support development of Program Objective Memorandum (POM) inputs.

Requirement*		FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Procurement	JHSV	$171,782	$206,175	$206,015	$212,098	$21,414	$18,576	$19,134	$855,194
	HCCC	$16,248	$17,452	$16,400	$16,700	$0	$0	$0	$66,800
	VSB	$0	$0	$7,420	$6,068	$5,872	$5,892	$6,015	$31,267
	CMF	$0	$2,250	$2,250	$0	$0	$0	$0	$4,500
	BD	$0	$0	$1,092	$2,228	$40,898	$1,159	$591	$45,968
	TOTAL	$188,030	$225,877	$233,177	$237,094	$68,184	$25,627	$25,740	$1,003,729

	Requirement*	FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Modernization	JHSV Tech Inserts	$0	$0	$0	$14,560	$7,571	$7,874	$8,189	$38,194
	LSV	$5,340	$23,697	$25,026	$23,037	$100	$0	$0	$77,200
	LCU-2000	$17,586	$31,591	$33,135	$16,853	$48,104	$50,108	$43,403	$240,780
	LCM-8	$0	$0	$0	$0	$0	$0	$0	$0
	Floating Craft/MCS	$645	$541	$563	$585	$609	$633	$658	$4,234
	MITS/UNDS/IUID	$2,999	$6,638	$6,901	$10,131	$5,105	$5,435	$5,958	$43,167
	TOTAL	$26,570	$62,467	$65,625	$65,166	$61,489	$64,050	$58,208	$403,575
Maint	Current Fleet	$42,636	$61,722	$50,882	$67,100	$64,135	$62,344	$58,851	$407,670
	JHSV	$0	$0	$344	$1,667	$3,040	$4,134	$5,499	$14,684
	TOTAL	$42,636	$61,722	$51,226	$68,767	$67,175	$66,478	$64,350	$422,354
TOTALS		$257,236	$350,066	$350,028	$371,027	$196,848	$156,155	$148,298	$1,829,658

Table 1. Fleet Modernization Resourcing Requirements

Table 2 outlines the projected resourcing needed to accomplish the integrated DOTMLPF actions that must be accomplished in the 2009–2015 timeframe to support modernization and maintenance of Army watercraft capabilities. These include the critical non-materiel actions identified in the Plan: requirements determination, concept and doctrine development, force structure, training, leadership and education development and modernization. Primarily the domain of the Army Capabilities Integration Center (ARCIC), the Sustainment Center of Excellence (SCOE), and the Army Materiel Command (AMC), this is intended to integrate and focus the effort within CASCOM, the TRADOC Capability Manager - Transportation (TCM-Trans), and the Product Director—Army Watercraft Systems (PD-AWS), and to identify annual resourcing requirements and budget requirements. ARCIC, the SCOE, and AMC should use this information as the basis for allocating personnel, prioritizing and focusing work effort, and developing budget projections, to include identification of travel requirements, personnel shortfalls (if any), and contract support (if required to fill shortfalls). Table 2 depicts the flow and priority of effort needed to execute the changes required.

REQUIREMENT	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Complete JHSV Fielding							
Complete HCCC Development & Fielding							
Develop and Field VSB Capabilities							
Determine Littoral LOC Requirement							
Develop TLM Concept & CMF Configuration							
Complete Watercraft Doctrine							
Assess Current Fleet Organizational Structure							
Fleet Pre-Positioning Strategy							
Develop Terminal Operations Capability Requirements							
Continue to Engage Joint Programs							
Develop Future Sustainment Lift Capability							

Table 2. Capability Development Resourcing Requirements

Chapter 1
Current Capability Assessment and Modernization Strategy

This chapter provides a detailed assessment of currently fielded platforms and related capabilities. Chapter One describes "where we are today" and how our current platforms and capabilities will be modernized to meet future Army and Joint requirements. This includes modernization and continued procurement of some existing platforms, elimination of those that do not meet future requirements, and strategies for modernizing the maintenance, training, and supply concepts and practices needed to support a modernized Fleet. This chapter is divided into five major paragraphs. The first, Paragraph 1.1 describes the Fleet as it stands in 2008 with AWRP implemented and provides and overarching description of the strategy for modernization. Paragraph 1.2 provides a platform-by-platform assessment of the vessels in our current Fleet and the strategies for modernizing each one. Paragraph 1.3 describes our current and planned work to modernize our field and sustainment maintenance concepts, processes, and practices. Paragraph 1.4 addresses our training modernization strategy and the final section, Paragraph 1.5 discusses the efforts to transform watercraft supply support operations.

1.1. CURRENT FLEET STRATEGY

The Fleet Strategy described in this Plan charts a course for continuing the modernization of the Army's watercraft capabilities that began with implementation of the 2003 Army Watercraft Restructuring Plan (AWRP). In doing so, the 2008 AWMP is based on the premise that the AWRP is now complete and future modernization strategies are based on developing Future Modular Force capabilities in the context of current constraints. This chapter begins with an overview of the end state of the AWRP and the key overarching tenants that guided development of the 2009–2015 resourcing strategies for the current vessel platforms and systems. The second part of Chapter Two provides a platform-by-platform assessment and strategy for achieving and maintaining the capabilities identified in the CBA.

1.1.1. Current Fleet: AWRP End-state

The most recent AWMP—published in December 2002–articulated the Transformation that was subsequently implemented in accordance with (IAW) Phases 1 and 2 of the DA DCS G3 AWRP. We have now completed and are beginning to realize the full impact of the AWRP. The 2008 AWMP supersedes AWRP and describes a Fleet Strategy that charts a new course forward from the AWRP end-state. The 2003 AWRP directed divestiture of 135 vessels, reallocation of 355 active component and 264 reserve component spaces, implementation of forward-stationing and pre-positioning strategies that resulted in cost avoidance of approximately $40M per year through elimination of APS 3 sustainment and deployment costs. AWRP established three near-identical "packages," two of which are pre-positioned in Yokohama, Japan, and Kuwait Naval Base, with the third retained in CONUS. Further, the AWRP

resulted in forward-stationing of a portion of the LSV Fleet. Table 1-1 and Figures 1-1 and 1-2 depict the current Army watercraft as they are stationed IAW AWRP. When approved by Headquarters DA G-3, this document becomes the action plan taking the Army forward from AWRP.

CONUS Based		APS-4 Japan		APS-5 Kuwait	
Vessel Type	*No.*	*Vessel Type*	*No.*	*Vessel Type*	*No.*
LSV*	4	LSV (3 Forward Stationed HI)	0	LSV (1 Forward Stationed KNB)	0
LCU-2000	14	LCU-2000	10	LCU-2000	10
LCM-8, Mod 1	20	LCM-8, Mod 1	7	LCM-8, Mod 1	7
LCM-8, Mod 2	2	LCM-8, Mod 2	2	LCM-8, Mod 2	2
LT-800	3	LT-800	2	LT-800	1
LT Flight III	1	LT Flight III	0	LT Flight III	1
ST-900	8	ST-900	4	ST-900	4
BD-115**	3	BD-115	1	BD-115	1
Barge Fuel	3	Barge Fuel	1	Barge Fuel	1
Modular Causeway System					
RRDF	2	RRDF	2	RRDF	2
Floating Causeway	1	Floating Causeway	1	Floating Causeway	1
Causeway Ferry	1	Causeway Ferry	1	Causeway Ferry	1
Warping Tugs	6	Warping Tugs	6	Warping Tugs	6
TOTAL	68	TOTAL	37	TOTAL	37

*1 LSV Deployed OCONUS
**AC BD is 89T in lieu of 115T

Table 1-1. AWRP Army Watercraft Packages

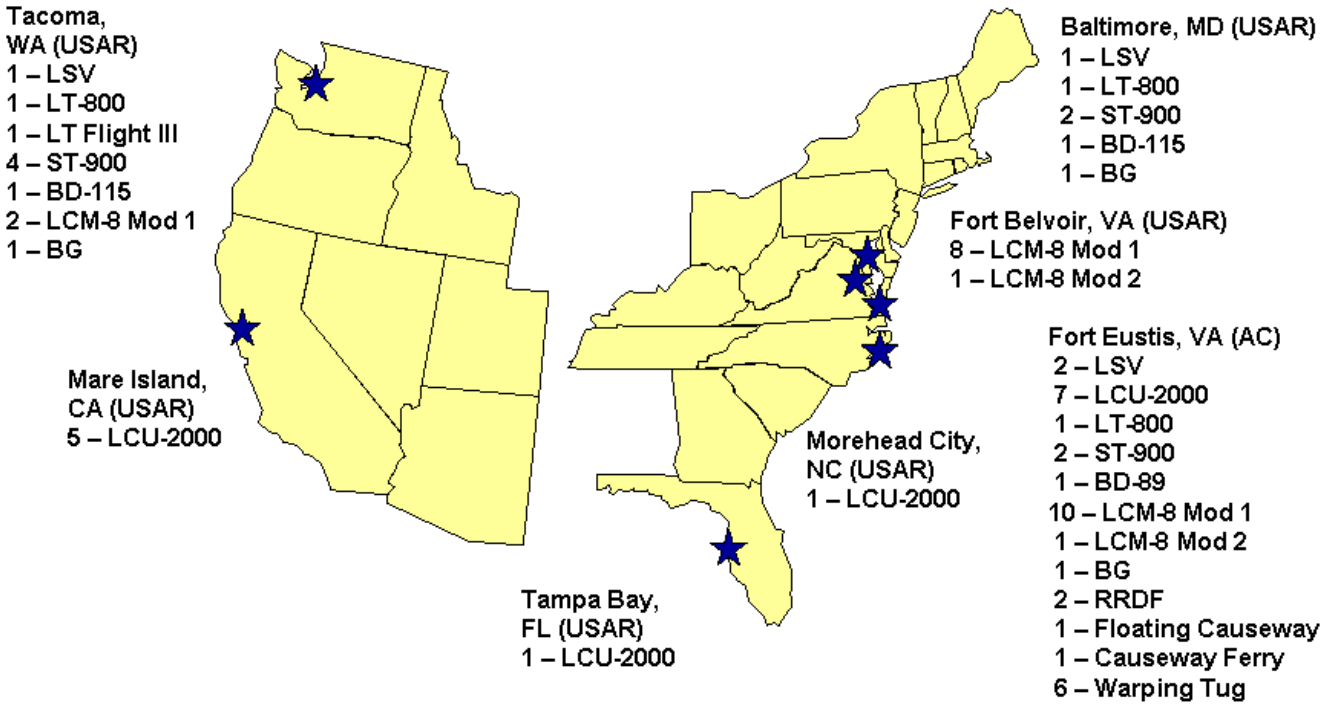

Figure 1-1. AWRP CONUS-Stationed Army Watercraft

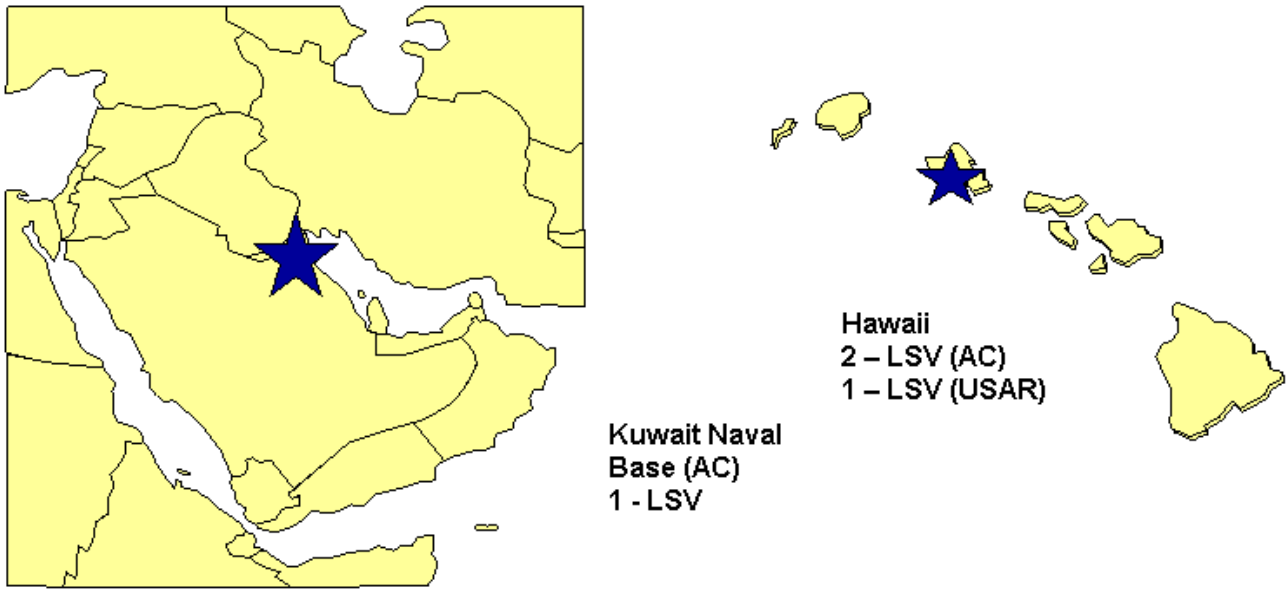

Figure 1-2. AWRP OCONUS-Stationed Army Watercraft

1.1.2. Current Fleet Priorities

The overarching finding of the CBA is that the Modular Force requires lift capability that is able to respond quickly and transition rapidly while operating across a range of battlefield conditions with little or no reliance on external logistics footprint. The CBA addressed the need to develop new lift capabilities that match Future Force requirements, but also identifies continued service of the LSVs and LCUs as a legitimate approach to meeting the heavy sustainment lift requirements. At the same time, the Future Force will require a Fleet capable of quickly deploying and operating in uncertain threat environments and be interoperable with Future Army and Joint land and maritime forces, to include sea based concepts. Further, the CBA identifies the need to develop and maintain the ability to conduct tactical terminal and waterborne line-of-communication (LOC) operations. Based on the findings of the CBA, and given the constraints of the current operational environment, the following key priorities guided development of the 2008 AWMP Fleet Strategy:

- Focus on those actions that will extend the service life of the current LSV and LCU-2000 Fleet, complete modifications already underway, and provide upgrades to critical C4ISR and force protection capabilities to at least the “amber” level.
- Our Floating Craft Fleet (tugs & barges) is well within its life cycle and adequate to meet future requirements — we can maintain this capability by completing the modifications that are already planned and make appropriate upgrades to C4ISR and force protection capabilities.
- The CBA identifies the need for work to develop future terminal capability requirements that include the waterborne LOC capabilities currently provided by the LCM-8. We have an immediate issue with the LCM-8 Fleet that requires a decision. These platforms are rapidly nearing a “drop-dead” date beyond which they are not viable due to maintainability costs. CASCOM must make completion of the capability development actions identified in the CBA a priority in 2009. CASCOM must determine the operational requirement and correct DOTMLPF action before these platforms become too expensive to maintain.

1.1.3. Current Fleet Resourcing Strategy

The resourcing strategies described in the latter section of Chapter Two are the result of a coordinated effort between the TCM-Trans, Product Director-Army Watercraft Systems (PD-AWS), and the Office of the Assistant Secretary of the Army (Acquisition, Logistics, and Technology) (ASA(ALT)), with input from CASCOM Materiel Systems Directorate, ARCIC Sustainment Division, Army Materiel Command (AMC), DA DCS G3, G4, and G8. This team followed the following steps in developing an overarching resourcing strategy to support 2009-2015 budget decisions:

- TCM-Trans, CASCOM and ARCIC, identified priorities IAW the CBA and Future Modular Force capabilities needed in the 2015–2024 timeframe.
- PD-AWS developed technical cost data based on a range of modernization strategies and cyclic maintenance requirements.

- PD-AWS and TCM-Trans reviewed and adjusted initial cost data to come to agreement on the baseline cost for modernization and maintenance strategies.
- TCM-T developed and prioritized a list of solutions by examining future requirements defined by the CBA, current Fleet readiness, failure trends, regulatory requirements and new and emerging technologies.
  - TCM-Trans and PD-AWS identified hull-specific requirements to eliminate those actions already accomplished or not needed for each vessel.
- ASA(ALT) provided guidance on key inputs needed to build requirements for 2010–2015 POM submission.
  - TCM-Trans and PD-AWS identified work that will be accomplished in FY 08-09 to determine the work that must be addressed in the 2010–2015 POM period.
  - To reduce costs and operational downtime, TCM-Trans and PD-AWS developed platform work schedule IAW the planned OCCM cycle (See Annex D).
- ASA(ALT), PD-AWS, TCM-Trans, and ARCIC coordinated proposed cost and work data to develop 2010–2015 POM strategy and 2009–2015 budget plan.

The following priority of work emerged from the above methodology (table reflects priority of work both vertically and horizontally):

<table>
<tr><th>LSV</th><th>LCU-2000</th><th>Floating Craft</th><th>CMF</th><th>MCS</th><th>LCM-8</th></tr>
<tr><td>Force Protection</td><td>Force Protection</td><td rowspan="3">Complete Tug Mods Already Underway</td><td rowspan="3">Complete Fielding</td><td rowspan="8">Maintain Current Readiness</td><td rowspan="8">Determine Tactical & Operational Requirement</td></tr>
<tr><td>Service Life Extension</td><td>Fuel Transfer Capability</td></tr>
<tr><td>C4ISR Upgrades</td><td>Complete Current MWOs</td></tr>
<tr><td>Complete Current MWOs</td><td>Maintenance Upgrades</td><td rowspan="2">Complete BD Fielding</td><td rowspan="5">Determine Requirement & Configuration to Support 2-Level Maintenance Concept</td></tr>
<tr><td>Implement Prototype MWOs</td><td>C4ISR Upgrades</td></tr>
<tr><td>Critical Subsystem Upgrades</td><td>Service Life Extension</td><td rowspan="2">Determine Tactical Terminal Requirement</td></tr>
<tr><td>Personnel Transport</td><td>Quality of Life Upgrades</td></tr>
</table>

Table 1-2. Current Fleet Resourcing Strategy

1.2. Platform Assessment and Strategy

1.2.1. Logistic Support Vessel (LSV)

As demonstrated by the Joint CBA, the Army will continue to require the capability provided by the LSV. It is the Army's workhorse with regard to moving large amounts of sustainment cargo and equipment within a theater of operations. The current platforms, however, are aging and the first vessel in class will reach the end of its projected life cycle — the economic useful life (EUL) in 2013. Although reaching EUL does not mean the vessels will cease to be safe or operational, it does indicate the beginning of loss of efficiency and capability that will worsen throughout the 2015–2024 timeframe. The CBA identifies service life extension as a viable approach as the Army determines long-term solutions to its sustainment lift capability requirements. Therefore, the 2009–2015 strategy will be to extend the useful life of these craft to 2024. Further, the CBA identifies the fact that our current Fleet is not equipped to meet the C4ISR interoperability and force protection capabilities required in the 2015–2024 timeframe, subsequently the strategy for the LSV Fleet must include upgrades to those systems. The initial LSV modernization plan will be implemented by the PD-AWS, to extend the LSV's service life and provide the minimum capabilities needed through 2024. The LSV's lack of speed will remain an issue, but the planned upgrades will allow the Fleet to maintain the CBA's "amber" capability level. The strategy will minimize impact of costs associated with transportation and increased downtime for vessels by scheduling the work-intensive C4ISR and FP upgrades to coincide with normal OCCM cycles while continuing to complete MWOs IAW the program already underway. This synchronization of between modernization and OCCM results some high priority upgrades to be scheduled later in the POM, however the strategy is to complete priority work prior to 2015.

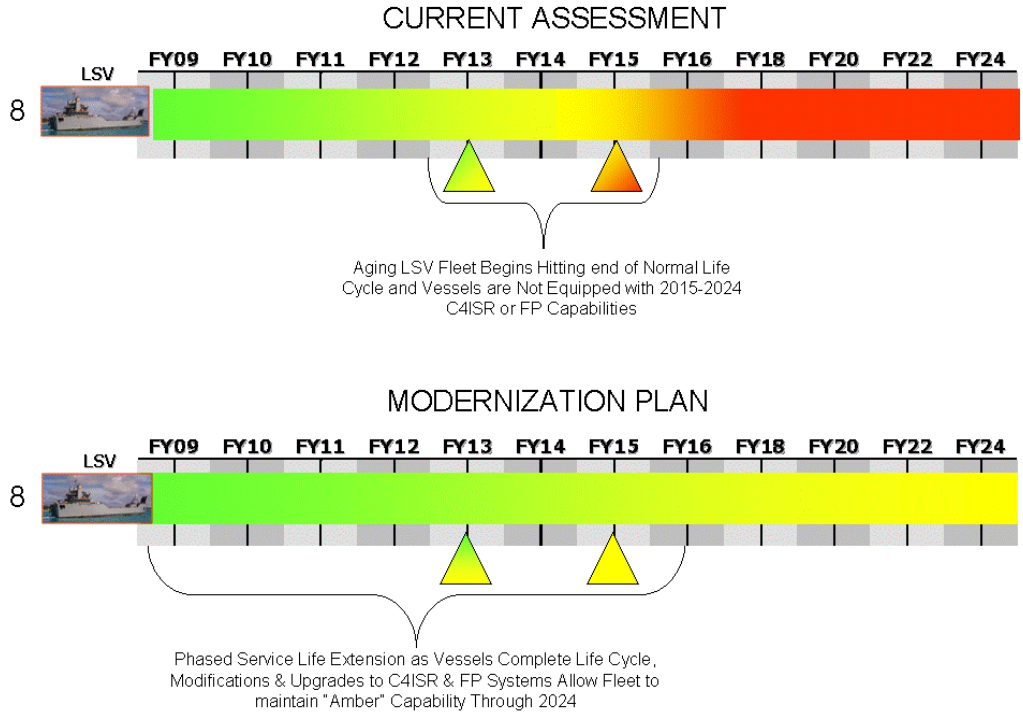

Figure 1-3. LSV Assessment and Modernization Plan

Platform Requirements

Platforms Required	8	Strategy
Platforms On-Hand	8	Complete planned modifications to existing Fleet and implement actions needed to extend service live through 2024 and upgrade force protection and C4ISR capabilities to meet Future Force requirements.
Delta	0	

ACTION	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Force Protection		LSV-4 LSV-5	LSV-3 LSV-6	LSV-1 LSV-2			
SLEP		LSV-4 LSV-5	LSV-3 LSV-6	LSV-1 LSV-2			
C4ISR		LSV-4 LSV-5	LSV-3 LSV-6	LSV-1 LSV-2 LSV-7**	LSV-8**		
Current MWOs	LSV-1 LSV-2	LSV-4 LSV-5	LSV-3 LSV-6				
Prototype MWOs*		LSV-5	LSV-3 LSV-6	LSV-1 LSV-2			
Critical Subsystems		LSV-4 LSV-5	LSV-3 LSV-6	LSV-1 LSV-2			
Personnel Transport		LSV-4 LSV-5	LSV-3 LSV-6	LSV-1 LSV-2 LSV-7	LSV-8		

NOTE: Any Immediate FP MODS will be completed as required

*All Prototype MWOs have been completed on LSV-4

**LSVs 7 & 8 only need selected C4ISR capability upgrades

Table 1-3. LSV Modernization Strategy

REQUIREMENT*		FY09	FY10	FY11	FY12	FY13	FY14	FY15
Force Protection		$ 0	$ 1,237	$ 1,287	$ 1,338	$ 0	$ 0	$ 0
Service Life Extension		$ 0	$ 5,501	$ 6,072	$ 6,679	$ 0	$ 0	$ 0
C4ISR	Upgrades	$ 0	$ 2,328	$ 2,421	$ 2,762	$ 0	$ 0	$ 0
	New Systems	$ 0	$ 3,318	$ 3,451	$ 3,589	$ 0	$ 0	$ 0
MWO	Complete Current	$ 2,340	$ 726	$ 2,296	$ 0	$ 0	$ 0	$ 0
	Prototype — Safety	$ 0	$ 79	$ 163	$ 169	$ 0	$ 0	$ 0
	Prototype - PIP	$ 0	$ 354	$ 735	$ 765	$ 0	$ 0	$ 0
Critical Systems	Safety	$ 0	$ 389	$ 405	$ 421	$ 0	$ 0	$ 0
	Maintenance	$ 0	$ 23	$ 24	$ 24	$ 0	$ 0	$ 0
	Quality of Life	$ 0	$ 2,443	$ 2,541	$ 2,643	$ 0	$ 0	$ 0
	PIP	$ 0	$ 3,187	$ 3,314	$ 2,525	$ 0	$ 0	$ 0
Personnel Transport		$ 0	$ 112	$ 117	$ 122	$ 0	$ 0	$ 0
ILS & Training		$ 2,500	$ 3,000	$ 1,700	$ 1,000	$ 0	$ 0	$ 0
Program Management		$ 500	$ 1,000	$ 500	$ 1,000	$ 100	$ 0	$ 0
TOTALS		$5,340	$23,697	$25,026	$23,037	$ 100	$ 0	$ 0
* $1,000's								

Table 1-4. LSV Modernization Funding Requirements

1.2.2. Landing Craft Utility (LCU 2000)

The capability provided by the current platform will continue to be required for the foreseeable future. It is the medium sized vessel used to move containers and outsized cargo. Immediate modernization of the on-board C4I suite will extend the utility of the current vessels and a service life extension program, implemented within the next 3–5 years will ensure this capability is available through year 2024.

Like the LSV, the CBA identifies service life extension and critical upgrades to the LCU-2000 as an acceptable approach to meet sustainment lift requirements through 2024. Some of the LCU's critical Like the LSV, the CBA identifies service life extension and critical upgrades to the LCU-2000 as an acceptable approach to meet sustainment lift requirements through 2024. Some of the LCU's critical subsystems are currently non-supportable or maintenance intensive, a condition that is further degrading Fleet readiness. These systems require modifications that will be implemented over the 2009–2013 timeframe to ensure this capability is available through 2024. The PD-AWS will implement the modernization plan to upgrade the critical systems and extend the LCU's service life to provide the minimum capabilities needed through 2024. Like the LSV, the LCU's lack of speed will remain an issue, but adequate upgrades will allow the Fleet to maintain the CBA's "amber" capability level. The strategy will minimize impact of costs associated with transportation and increased downtime for vessels by scheduling the work-intensive C4ISR and FP upgrades to coincide with normal OCCM cycles while continuing to complete MWOs IAW the program already underway. This synchronization between modernization and OCCM will result in some high priority upgrades to be scheduled later in the POM, however the strategy is to complete all priority work prior to 2015.

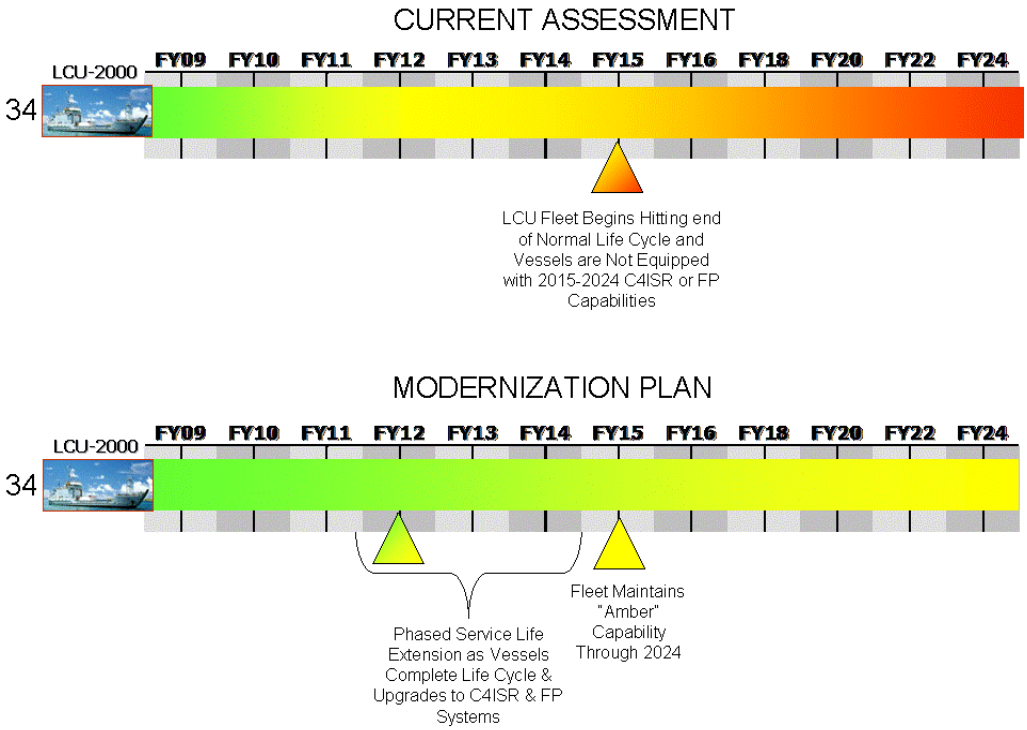

Figure 1-4. LCU-2000 Assessment and Modernization Plan

Platform Requirements

Platforms Required	34	Strategy
Platforms On-Hand	34	Complete planned modifications to existing Fleet and implement actions needed to extend service live through 2024 and upgrade force protection and C4ISR capabilities to meet Future Force requirements.
Delta	0	

ACTION	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Force Protection	LCU 2006 LCU 2007 LCU 2009 LCU 2011 LCU 2019 LCU 2029	LCU 2004 LCU 2005 LCU 2010 LCU 2016 LCU 2017 LCU 2025 LCU 2026 LCU 2028 LCU 2034	LCU 2001 LCU 2008 LCU 2012 LCU 2018 LCU 2023 LCU 2030 LCU 2031 LCU 2032 LCU 2033 LCU 2035	LCU 2002 LCU 2003 LCU 2014 LCU 2015	LCU 2013 LCU 2020 LCU 2022 LCU 2024 LCU 2027		
Fuel Transfer Capability Upgrade							
Current MWOs							
Maintenance Upgrades							
C4ISR					LCU 2004 LCU 2005 LCU 2025 LCU 2026	LCU 2001 LCU 2007 LCU 2008 LCU 2009 LCU 2018 LCU 2030	LCU 2006 LCU 2010 LCU 2011 LCU 2016 LCU 2034
SLEP							
Quality of Life Upgrades							

Table 1-5. LCU-2000 Modernization Strategy

REQUIREMENT*	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Force Protection	$ 4,629	$ 8,571	$ 9,593	$ 2,823	$ 3,669	$ 0	$ 0
Fuel Transfer Capability Upgrade	$ 608	$ 1,012	$ 1,170	$ 487	$ 633	$ 0	$ 0
Complete Current MWOs	$ 6,810	$ 9,920	$ 13,026	$ 5,431	$ 6,301	$ 0	$ 0
Maintenance Upgrades	$ 5,189	$ 7,938	$ 9,121	$ 3,862	$ 4,999	$ 0	$ 0
C4ISR	$ 0	$ 0	$ 0	$ 0	$ 6,630	$ 10,343	$ 8,964
SLEP	$ 0	$ 0	$ 0	$ 0	$ 19,362	$ 30,205	$ 26,177
Quality of Life Upgrades	$ 0	$ 0	$ 0	$ 0	$ 5,710	$ 8,960	$ 7,762
ILS & Training	$ 0	$ 3,150	$ 0	$ 4,000	$ 500	$ 100	$ 100
Program Management	$ 350	$ 1,000	$ 225	$ 250	$ 300	$ 500	$ 400
TOTALS	$17,586	$31,591	$33,135	$16,853	$48,104	$50,108	$43,403
* $1,000's							

Table 1-6. LCU-2000 Modernization Funding Requirements

1.2.3. Landing Craft Mechanized (LCM-8)

The LCM-8 is the terminal operators' administrative and utility vessel. The capability that this platform fulfills is that of a utility vessel used for port and near coastal and inland waterway operations. It can move personnel and small amounts of cargo in and around a port or terminal. The design of the current platform is 70 years old and the platforms themselves are approaching 40 years of age. Extending the service life of this platform for a third time is an unsound strategy given those costs (see Table 1-7 below) that are at a point which equal or exceed procurement costs for a new LCM-8. This, coupled with the platform's lack of speed and utility for current and emerging missions, indicated to the need to develop a new platform to meet future terminal and tactical operations capability requirements. Thus, the strategy not include efforts to modernize or extend the service life of the current vessel, but development of a new capability will be a key aspect of the CASCOM's terminal operations and tactical LOC capability development work to be undertaken in 2009. The current requirement remains one unit in each major combat operation theater, and will remain so until the future capability is developed and fielded. Although this allows for only one unit in the NEA Theater of operations and one rotational asset, we will not reduce the requirements for the capability. LCM 8 Mod 2 vessels completed fielding in 2006. These vessels will continue to be a valuable asset to JLOTS and need to remain in each APS set.

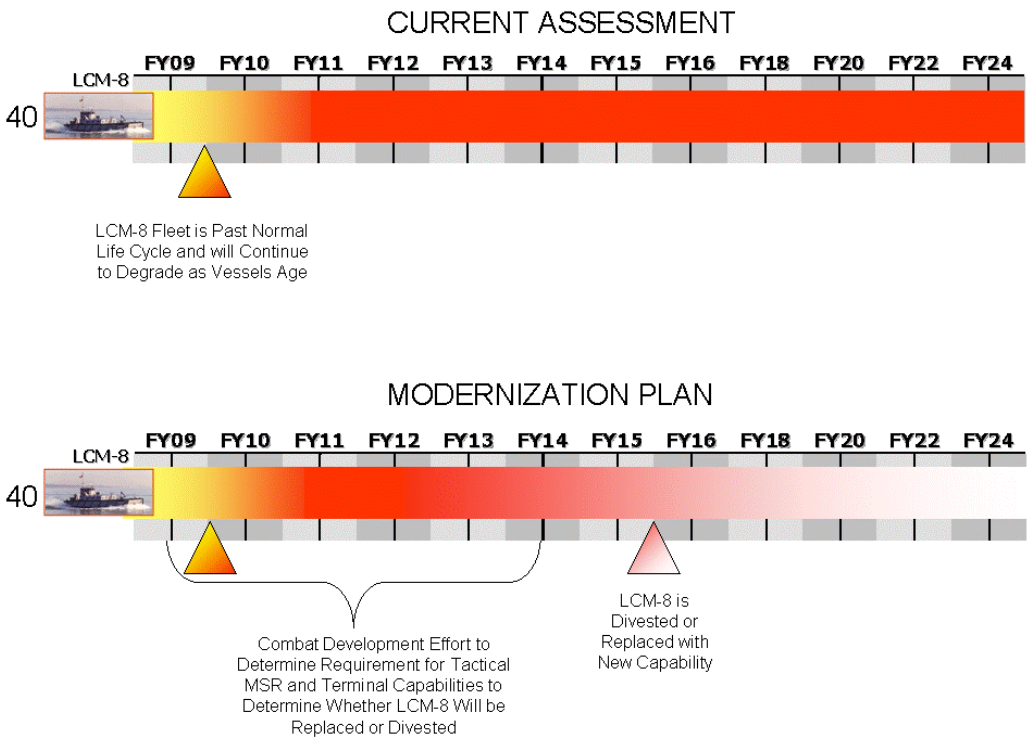

Figure 1-5. LCM-8 Assessment and Modernization Plan

Platform Requirements

Platforms Required	40	Strategy
Platforms On-Hand	40	CASCOM will lead capability development process to determine requirement for new platform. As the maintenance concept is refined, the Army may reconsider the number of LCM-8's required in the watercraft field maintenance organization.
Delta	0	

REQUIREMENT*	AVG COST PER VESSEL	PROJECTED OVER 2009-2015						
		FY09	FY10	FY11	FY12	FY13	FY14	FY15
Force Protection	$412	$0	$3,569	$3,712	$3,377	$3,513	$3,653	$3,799
C4ISR	$31	$0	$273	$284	$258	$269	$279	$291
SLEP	$21	$0	$186	$194	$176	$183	$191	$198
Quality of Life Upgrades	$251	$0	$2,174	$2,261	$2,058	$2,140	$2,226	$2,315
ILS & Training	$107	$2,366	$2,366	$0	$0	$0	$0	$0
Program Management	$21	$135	$135	$135	$135	$135	$135	$135
TOTALS	$846	$2,501	$8,705	$6,587	$6,007	$6,241	$6,486	$6,740
* $1,000's - Current $'s Based on Current Platform Readiness. These costs have NOT been included in the POM. Modernizing the LCM-8 is considered cost-prohibitive therefore resourcing will be directed to development of a new capability to meet Future Force requirements.)								

Table 1-7. LCM-8 Modernization Funding Requirements

1.2.4. Large Tug (LT 800 Series)

The LT 800 provides the terminal operator with a capability for coastal and ocean towing, docking and undocking operations of large ocean vessels. It also provides trans-oceanic transport of the Barge Derrick 115 Ton (BD 115T). It can recover disabled or damaged Army watercraft assets to include the Logistics Support Vessel. It also supports salvage operations for port clearance during denied and forced entry operations. General purpose duties to include fire-fighting, barge transport/repositioning and salvage capability. Two of the LT 800's special features are the ability to tow five medium barges and can sustain a minimum speed of five knots in Sea State 4 conditions under full tow with the BD 115T.The Series 800 Large Tug is currently being modified to eliminate its fielded stability problems. All of these modifications are scheduled to be completed by the Third Quarter of FY 2009. Additional modifications will include appropriate C4ISR and force protection upgrades. Although the LT 800 will be retained for the foreseeable future, preliminary work (ICD, CDD) must be performed to position a replacement when and if resources become available. For this reason, the Army will not procure this system to the Army Acquisition Objective of eight vessels.

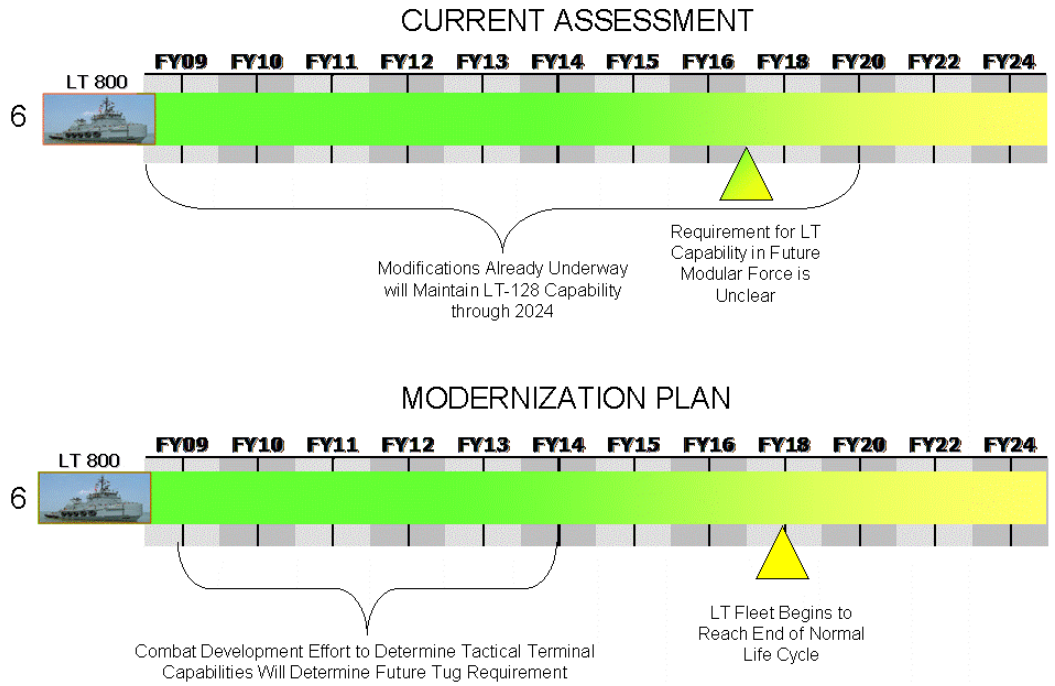

Figure 1-6. LT 800 Assessment and Modernization Plan

Platform Requirements

Platforms Required	8	Strategy
Platforms On-Hand	6*	*Two Flight III tugs have been retained as ILO items that are adequate to meet current mission requirements. There is no requirement to procure to the Army Acquisition Objective (AAO). Maintain current on-hand Fleet in ready condition through 2024 and complete combat development work to determine future requirements for tactical terminal and LOC capabilities.
Delta	-2	

Requirement*	FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Procurement	$0	$1,070	$27,299	$25,617	$2,272	$2,318	$591	$59,167
Modernization	Costs are consolidated with Floating Craft and MCS - See Annex E for funding by FY							
* $1,000's (Note the procurement costs shown above have NOT been included in the POM. The strategy is to maintain the current fleet of six LT-800 and two Flight III LTs.)								

Table 1-8. LT 800 Funding Requirements

1.2.5. Small Tug (ST 900 Series)

The 900 series small tug was designed and built to replace the 65' small tug as well as move ammunition LASH barges. Since that time the Army has changed its method of storing, shipping and handling ammunition. The Army's current system is the Containerized Ammunition Distribution System (CADS). Due to this change, these vessels are currently being utilized in port support roles; transporting/repositioning cargo and fuel barges and lighters of various types in harbors, ports, via inland waterways and along coastlines; assisting larger tugs in towing, docking and undocking operations, and transporting and repositioning the Barge Derrick 115 Ton (requires two ST 900s) inside ports. We do, however, need to assess the actual requirement for this capability and preliminary work (ICD, CDD) should be performed to position a replacement. This issue will be addressed in depth as CASCOM moves forward with the Terminal Operations CCP identified in the CBA. Two of the special features of the ST 900 are that it's transportable by deck loading aboard a Logistics Support Vessel and the Barge Derrick 115 Ton, and that it has push knees to better move barges within congested ports and waterways.

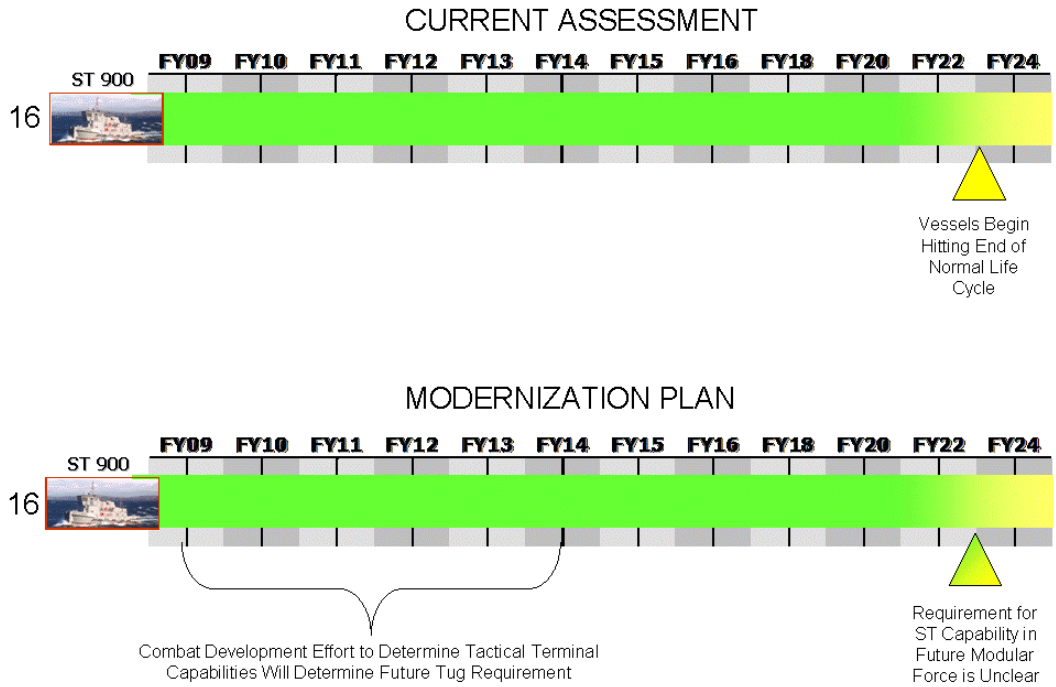

Table 1-9. ST 900 Assessment and Modernization Plan

Platform Requirements

Platforms Required	16	Strategy
Platforms On-Hand	16	Maintain current on-hand Fleet in ready condition through 2024 and complete combat development work to determine future requirements for tactical terminal and LOC capabilities.
Delta	0	

Requirement*	FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Procurement	$0	$0	$0	$0	$0	$0	$0	$0
Modernization	Costs are consolidated with Floating Craft and MCS - See Annex E for funding by FY							
* $1,000's								

Table 1-10. ST 900 Funding Requirements

1.2.6. Barge Derrick; 115 Ton (BD 115)

This platform was designed and built to provide the capability to lift an M1A2 main battle tank from the centerline of the Fast Sealift Ship. Because the M1 MBT will be in the inventory for the foreseeable future, the uniqueness of this capability and the uncertainty of commercial availability, it is only prudent to retain these platforms. The BD is also used to support port clearance and salvage missions. The AWRP distribution resulted in the active component not receiving this platform, but retaining an older 89T floating crane in lieu of the required BD 115T. This has resulted in the active component having no

trained and certified BD 115T crews to support early deployment requirements, thus the strategy is to train our AC crews and correct the AWRP strategy by fielding the full requirement of five BD 115T no later than FY 2015.

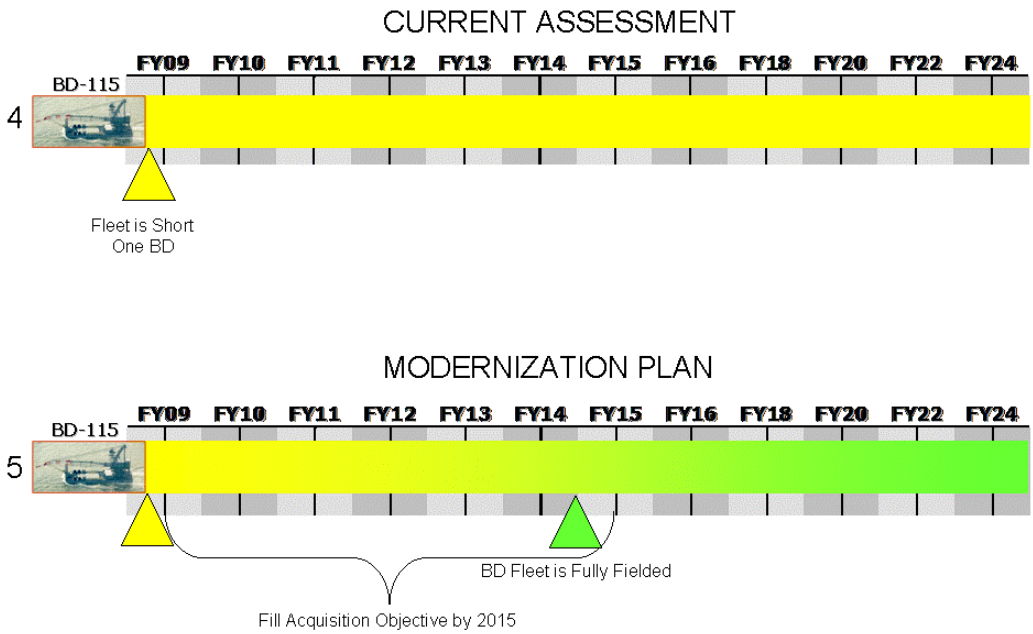

Figure 1-7. BD-115 Assessment and Modernization Plan

Platform Requirements

Platforms Required	5	Strategy
Platforms On-Hand	4	Shortage of 1 BD 115 negatively impacts the training and readiness of the one AC Floating Craft Company. Funds need to be allocated to procure the additional system and meet the AAO of 5 BD 115s.
Delta	-1	

Requirement*	FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Procurement	$0	$0	$1,092	$2,228	$40,898	$1,159	$591	$45,968
Modernization	Costs are consolidated with Floating Craft and MCS - See Annex E for funding by FY							
* $1,000's								

Table 1-11. BD-115 Funding Requirements

1.2.7. Barge; Liquid Cargo (BG)

The BG 231 provides the Army the capability to move bulk liquid cargos over water LOCs and inland waterways. The BGs capacity is 188,416 gallons and they are of a single hull design. They do not meet the standards for continued use as legislated in OPA 90 and will no longer be legal to operate after 1 January 2015. We will divest this platform through attrition as the vessels reach their maintenance expenditure limits in terms of maintenance costs.

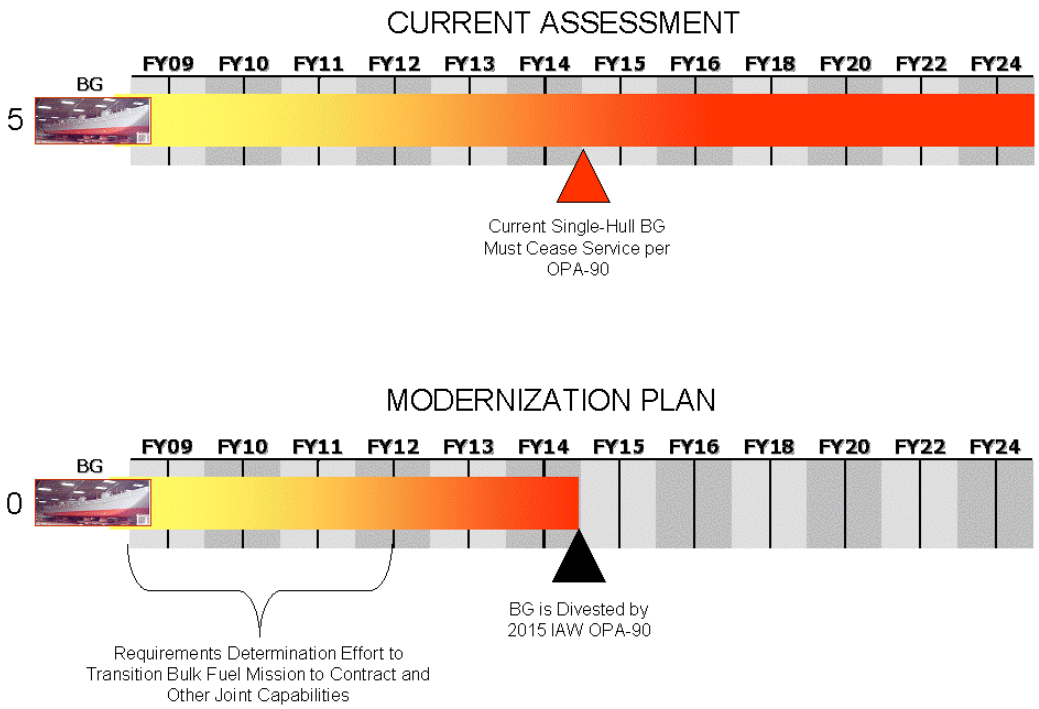

Figure 1-8. BG Assessment and Modernization Plan

Platform Requirements

Platforms Required	5	Strategy
Platforms On-Hand	5	BGs will be divested from the inventory as they meet or exceed their Maintenance Expenditure Limit (MEL) during or before their next scheduled OCCM period. Capability will be provide by commercial means.
Delta	0	

Requirement*	FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Procurement	$0	$0	$0	$0	$0	$0	$0	$0
Modernization	$0	$0	$0	$0	$0	$0	$0	$0
*$1,000								

Table 1-12. BG Funding Requirements

1.2.8. Modular Causeway System (MCS)

Modular Causeway Systems are: the Floating Causeway, the Causeway Ferry, the Roll-on/Roll-off Discharge Facility (RRDF) and the Modular Warping Tug. MCS is designed to provide the ability to establish logistics sites from remote and/or austere bare beach environments, provide a means to rapidly upgrade degraded or destroyed port facilities, and enable JLOTS operations as the key linkage between Strategic Lift assets and Army watercraft.

Currently, the Army and Navy each employ a different, Service-specific system for providing causeway capabilities to support JLOTS operations: the Army's MCS and the Navy's Improved Naval Lighterage System (INLS). The two systems are not interoperable, thus the Army and Navy are currently maintaining two distinct systems. During the USTRANSCOM-sponsored JLOTS Joint Transformation Integrated Process Team (JTIPT) meeting on 15 December 2006, and the Joint Sea Basing & Force Projection from the Sea Research and Development Symposium, jointly sponsored by the U.S. Army Engineer Research and Development Center (ERDC), Naval Surface Warfare Center (NSWC), and USTRANSCOM during January 2007, participants from both Services discussed whether the Joint Forces needed both systems. Essentially, the question asked was why each Service needed to maintain its own system. Could there be only one system used by the Joint Force and both Services when the capability was needed? This same question was also proposed to the Joint Subject Matter Experts (SME) during the CBA and the following key points emerged from those discussions:

- The INLS was specifically procured for and fielded with the Maritime Prepositioning Force (MPF)—it is loaded with the MPF and is not available as a common-user asset by other Services without downloading MPF stocks. This would negate the ability of the MPF to download.
- The MCS could be available to support Naval Forces, but those systems are stationed to support Army Pre-positioned Stocks (APS) and JLOTS operations, and would not be readily available to support MPF operations.
- The INLS is not as mobile as the MCS—it is not modular and unlike the MCS cannot be containerized and moved on multi-modal transport assets.
- The INLS is much more expensive to procure than the MCS.

Given the above, the answer to the question is that —until a viable future alternative is developed—the logical approach would be for each Service to continue maintaining its own capability. The INLS currently in existence is not available for employment by the Army unless the Army's deployment precisely coincides with the timing and location of the MPF download. Even then, the INLS may not be available, since it must be reset for follow-on MPF operations as its primary Joint Force mission. While not as efficient as desired, the Army's existing MCS provides the key capabilities required by the Joint force to execute operations in those austere locations where INLS does not meet Army requirements due to its lack of mobility and modularity. A single solution would require the Army be directed to procure INLS or the Navy be directed to procure MCS—an extremely expensive approach, particularly given that the Army already owns the MCS, can accomplish its Joint Force mission with the existing system, and the INLS does not meet the Army's mobility requirements. As will be discussed below, future capability gaps require development of appropriate materiel approaches that are coupled with increased Joint integration of doctrine, organization, and training approaches. Therefore the approach to ensure this capability is available for the Future Modular Force is for the Army to continue to maintain the MCS through at least 2024.

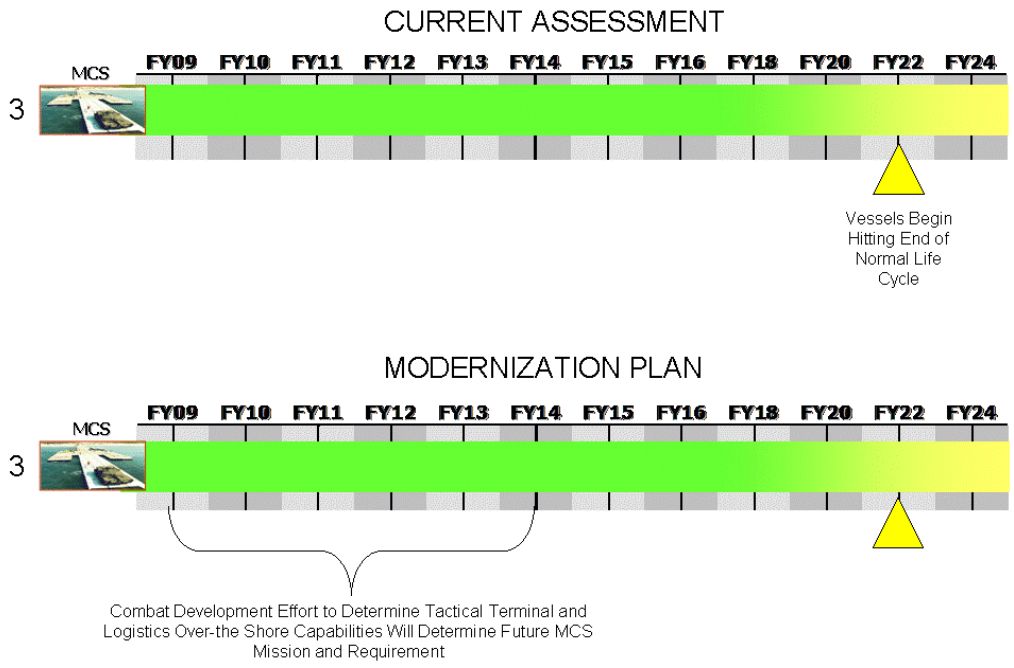

Figure 1-9. MCS Assessment and Modernization Plan

Platform Requirements

Platforms Required	30	Strategy Maintain current on-hand Fleet in ready condition through 2024. Combat development work needs to be conducted to assess and determine the future requirements for tactical terminal and JLOTS capabilities.
RRDF	6	
Causeway Ferry	3	
Warping Tugs	18	
Floating Causeway	3	
Platforms On-Hand	30	
RRDF	6	
Causeway Ferry	3	
Warping Tugs	18	
Floating Causeway	3	
Delta	0	

Requirement*	FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Procurement	$0	$0	$0	$0	$0	$0	$0	$0
Modernization	Costs are consolidated with Floating Craft and MCS - See Annex E for funding by FY							
* $1,000's								

Table 1-13. MCS Funding Requirements

1.2.9. Containerized Maintenance Facility (CMF)

The CMF is a combination of tactical rigid wall shelters and a standard ISO container grouped together into a system that, when completely fielded, will be the principal support maintenance for Army watercraft deployed worldwide in improved and unimproved ports. The CMF provides critical system support where deployed. The system is a stand-alone maintenance support package that may be tailored to the needs of the mission. The CMF has its own power generation/distribution system and is capable of using local commercial power sources when available.

The CMF was developed in 1997 as the principal item of equipment found in the Floating Craft Maintenance Company, and two were fielded in 2007 to the two companies currently in the force structure. Two are currently programmed for procurement for pre-positioned assets in FY 10 & 11. As part of the concept to move watercraft maintenance toward two-level maintenance, consideration must be given to the utility of the current CMF. The CMF will not appropriately support the emerging two-level maintenance concept without modification or reconfiguration.

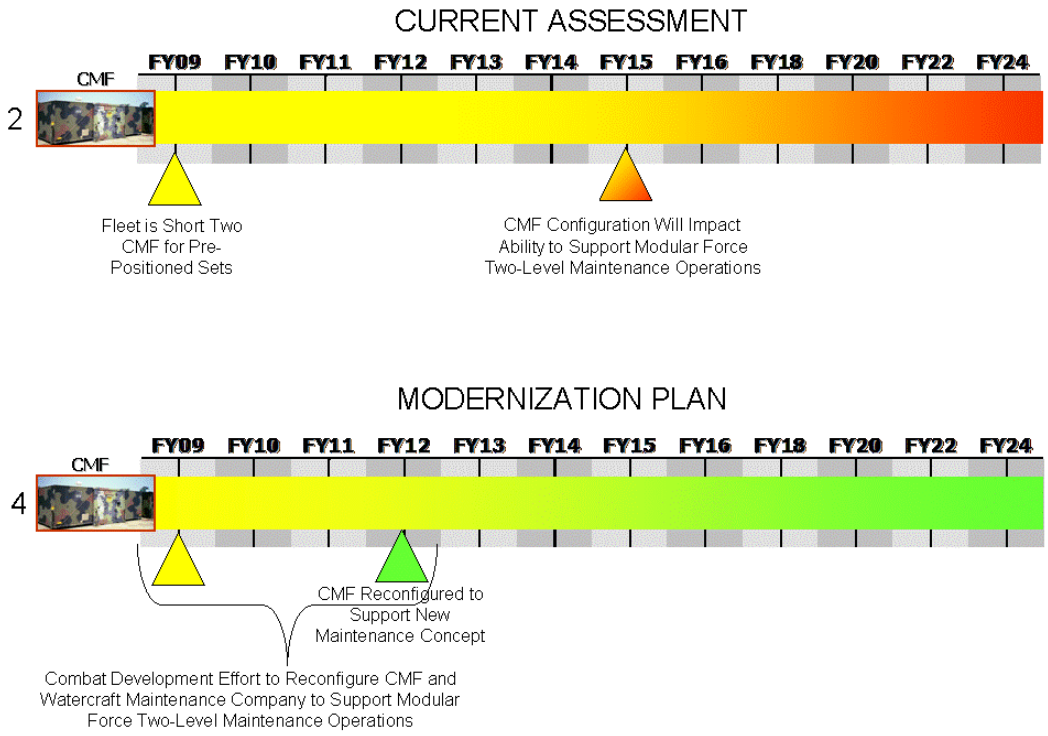

Figure 1-10. CMF Assessment and Modernization Plan

System Requirements

Systems Required	4	Strategy
Systems On-Hand	2	Two systems are currently on-hand in TOE units. Two systems being procured for Pre-positioned sets. Analysis must be done ICW the watercraft two-level maintenance concept to determine future configuration of the system.
Delta	-2	

Requirement*	FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Procurement	$0	$2,250	$2,250	$0	$0	$0	$0	$4,500
Modernization	Costs are consolidated with Floating Craft and MCS - See Annex E for funding by FY							
*$1,000								

Table 1-14. CMF Funding Requirements

1.3. MAINTENANCE STRATEGY

One of the gaps identified in the CBA is the ability to conduct two-level maintenance (TLM) IAW current and emerging Army Maintenance policies. Army watercraft maintenance policies and practices have not been updated to reflect TLM and our maintenance organizations are based on Cold War-era, and earlier, structures. At the same time, Army watercraft maintenance practices have evolved informally as the Fleet has transformed through technology advancements, the AWRP and in response to the 21st Century operational environment. An important element of the Fleet's modernization strategy is transformation of watercraft maintenance operational and organizational concepts and practices. This transformation will be within the framework of the TLM concept however, it will also reflect the realities and unique nature of Army watercraft. The maintenance strategy will be based on the analytical process begun in the CBA and designed to address issues stated by the Commanding General, Army Materiel Command (AMC), during meetings with the Chief of Transportation and representatives of the Tank-automotive and Armaments Command (TACOM). The single most important topic that came to light was the lack of a current watercraft modernization strategy that can be clearly articulated to the Department of the Army. To address this, we will focus effort on filling the TLM gap identified in the CBA by developing a comprehensive field maintenance strategy and by implementing work already underway within TACOM to modernize and improve sustainment policies and practices.

1.3.1. Field Maintenance Strategy

The results of the CBA indicate that the Army needs to revise and modernize maintenance doctrine, policy, organizations, and training appropriate to a globally-responsive watercraft Fleet. The current doctrine is based on Cold War, and earlier, organizational and operational concepts. While watercraft maintenance doctrine has not officially transitioned to the two-level maintenance (TLM) concept, to some extent the watercraft Fleet has begun the transition to a new maintenance concept. The Army watercraft maintenance concept will change. What will change and how it will change is still being decided. We need to develop the right maintenance concept for Army watercraft and design the support organizations to function within this new concept. Over the past year, CASCOM, TCM-Trans, and

TACOM have periodically met via a Watercraft Maintenance IPT to discuss many of the issues identified by the Joint SMEs. Work is focused on developing strategies for implementing the approaches identified in the CBA. The goal of this work is development of a comprehensive operational and organizational strategy that fits with the Army's Modular Force concepts and complements the sustainment maintenance strategy described in Paragraph 1.3.2. Development of the new field maintenance strategy will include:

- Re-assessing the design of the current Watercraft Maintenance Company—smaller, modular teams, potentially attached to theater maintenance organizations offer a potential new solution more in line with Modular Force concepts.
- Analysis of the basis of issue plan (BOIP) and the configuration of the Containerized Maintenance Facility (CMF).
- Review of the required versus available maintenance man-hours to determine the right organizational structures.
- Consideration of how Army watercraft maintenance information is entered into and maintained by Army information management systems, to include accurate reporting of underway operating hours and contractor maintenance support.
- Consideration of establishing formal relationships with other Services to both provide and receive maintenance support.

1.3.2. Sustainment Maintenance Strategy

The major components of watercraft sustainment maintenance are the actions and functions grouped under the term On Condition Cyclic Maintenance (OCCM). The primary focus of OCCM includes dry-docking, bottom cleaning, underwater painting, overhauls and replacement of major components, application of major Modification Work Orders (MWOs), emergency repairs, load line and quadrennial certifications, and all those actions formerly know as "depot maintenance." OCCM is a Title 46 responsibility and is defined as a "triennial depot level service" involving a series of inspections, certifications and maintenance actions that are designed to ensure that a watercraft's structure, machinery and other equipment are maintained in an operational, seaworthy and safe condition.

In the context of the emerging watercraft field maintenance concept, TACOM is currently implementing a new Sustainment Maintenance strategy designed to significantly reduce costs over the POM period and provide a more balanced approach to the needs of the Fleet. The strategy is not based on the traditional approach to OCCM in which every vessel was brought into the shipyard every three years. The new strategy identifies and groups critical functions that can be accomplished through a combination of on-station and shipyard maintenance. Further, the Sustainment Maintenance strategy will take into account the operational status and vessel type when identifying annual and multiyear maintenance cycles. This new strategy provides an integrated approach that is defined by three distinct, but integrated, functions integrated into vessels' operational cycle:

- Multiyear Phased Maintenance

- Annual Phased Maintenance
- Inspections/Certifications.

Multiyear Phased Maintenance: Vessel surveys, multiyear inspections and shipyard maintenance periods required to meet statutory and regulatory requirements for vessels. By separating those actions that require shipyard maintenance from those that can be performed on-station, the new strategy will yield a 25% reduction in shipyard evolutions. Multiyear Phased Maintenance includes:

- Underwater hull inspections required to meet Title 46 CFR requirements.
- Vessel is surveyed to include all operating systems.
- Annual underwater hull inspections for APS wet stored vessels.
- Dry-docking and vessel repairs to include extensive blasting and painting. when required.
- Inspections/maintenance for ABS 5 year load line letter.
- Quadrennial crane inspections.
- Hull structural repairs.
- Vessel system repairs exceeding field level capabilities that are best accomplished in a shipyard.
- Application of Equipment Change Packages (ECPs) and MWOs.
- The concept provides for a 90 day warranty.

Annual Phased Maintenance: Annual phased maintenance consists of interim vessel surveys and contracted maintenance to perform on condition maintenance pier side. By identifying functions that can be performed pier side at the normal station, vessels will be inspected and maintained more frequently and loss of operational availability will be reduced. Annual Phased Maintenance includes:

- Annual WIB surveys inspecting entire vessel condition and operation of all vessel systems.
- As required, a conditioned based maintenance contract is generated for pier side repairs.
- Repairs will take place pier side, either at military base or contractor’s facility, dependent upon which location is most advantageous to the Army.
- Repairs requiring dry-docking will be passed to Multiyear Phased Maintenance.
- C4I–Coordinating support with CECOM.

Inspections and Certifications: The third level of the Sustainment Maintenance concept provides for national level oversight of user level regulatory annually required tests, inspection and certifications. Inspections and Certifications include:

- Units and field maintenance remain responsible for initiating all regulatory (AR56-9) required tests, inspections and certifications and correcting deficiencies preventing certifications of systems/equipment.

- Annual inspections may be done during either phased maintenance periods, when determined by TACOM to be advantageous to the Army
- TACOM will monitor compliance with test, inspection and certification requirements.

The new Sustainment Maintenance Strategy will be implemented across the Fleet based on the operational and/or storage status of the vessel type. Table 1-15, below, shows the planned sustainment maintenance intervals for each vessel.

Fleet		Inspections & Certifications	Annual Phased Maintenance	Multiyear Phased Maintenance
AC & RC	All Vessels Except BCs & BDs	Annual	Annual	Triennial
	BD	Annual	Annual	Every 4 Years
	BC	Annual	Annual	Every 5 Years
APS	BD	Annual	Annual	Every 4 Years
	Wet Stored - LCU & LT	Annual	Annual	Every 5 Years
	Dry Stored - BG, LCM, ST, WT & SLWT	Annual	Annual	Every 6 Years

Table 1-15. Sustainment Maintenance Intervals

APS Watercraft Preservation Strategy: A key element of the Sustainment Maintenance Strategy is to improve the readiness of the vessels stored in APS sites to ensure they can realistically meet COCOM activation timelines and responsiveness requirements. A key element of the APS Preservation Strategy is to improve and verify overall vessel readiness and condition of War Stocks through periodic operation. Further, this new strategy is expected to reduce the overall cost to the Army over a ten-year period through periodic, detailed inspections and completion of 10/20 maintenance requirements, early recognition of equipment deficiencies to eliminate additional sustainment maintenance work, decreased materiel requirements for “deep” preservation, and a decrease in shelf-life management and procurement for items such as batteries. The key goals of the APS Preservation Strategy are:

- Vessels to be stored in full mission capable (FMC) status;
  - Minimal amount of preservation;
  - Key components operated monthly;
- Store as many associated items onboard vessel as possible; and
- Annual Full Technical Inspection with Sea and/or Dock Trials.

Current Fleet Sustainment Maintenance Requirements: Table 1-16 presents the funding requirements for current Fleet maintenance, separate funding for sustainment of current technology and historically based emergency maintenance funding. These amounts are required to support the sustainment maintenance strategy described above and are in addition to the modification and service life extension strategies discussed in Paragraph 1.2. The current Fleet sustainment maintenance funding requirements for the upcoming POM cycle are based on the following considerations:

- New Sustainment Maintenance Strategy will save significant dollars over the POM.
- SLEP of the Landing Craft Fleet will save significant dollars over the POM.
- In the first three years of the POM, savings will partially offset an increase. POM increases are:
  - Item Unique Identification (IUID) requirement (this requirement spikes in the first three years as initial installation is made across the Fleet);
  - C4I & MCS sustainment capability gap; and
  - Increased requirement for Ship Surveyors, TDY and Contracting support.
- Beyond the first three years of the POM, savings will offset the increases.

Requirement	FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Vessel Maintenance	$33,960	$42,954	$30,262	$43,531	$46,605	$44,485	$42,022	$283,819
C4I	$2,080	$2,163	$2,250	$2,340	$2,433	$2,531	$2,632	$16,429
IUID	$0	$8,838	$9,901	$12,500	$6,019	$5,886	$4,377	$47,521
MCS Sustain	$0	$381	$396	$412	$428	$445	$463	$2,525
Surveyors	$1,844	$2,444	$2,933	$2,972	$3,091	$3,215	$3,344	$19,843
ISA	$2,358	$2,452	$2,550	$2,652	$2,758	$2,869	$2,983	$18,622
Emergency	$2,394	$2,490	$2,590	$2,693	$2,801	$2,913	$3,030	$18,911
TOTALS	$42,636	$61,722	$50,882	$67,100	$64,135	$62,344	$58,851	$407,670

* $1,000's

Table 1-16. Current Fleet Sustainment Maintenance Requirements

1.4. TRAINING STRATEGY

The current strategy for training Army Mariners is built on an integrated approach that includes institutional and unit training, as well as continuing professional development and certifications IAW AR 56-9. Given the cost of vessel operations and the feasibility of real-world training at distant ports and operating sites, a key element of the Army watercraft training strategy is now and will continue to be the extensive use of simulations and simulators. Currently, the Army operates two vessel simulation facilities — one on the East Coast at Fort Eustis, and on the West Coast at Mare Island, California. These facilities provide a wide range of simulations, to include integrated bridge operation for all Army vessels, inclement weather and damage control operations, and the ability to simulate a number of ports around the world. The facility at Fort Eustis includes an engine room simulator that provides operations and trouble shooting training. Annex C outlines current institutional training requirements, course descriptions and pre-requisites; and Chapter Two includes a discussion of training modernization strategies. The CBA identified a number of approaches that will be incorporated in the training strategy as the Fleet is modernized and becomes more integrated into Joint operations:

- Increased simulation training as a viable alternative to develop and maintain diverse operational skills.

- Increased Force Protection training for operators and leaders, to include development of vessel force protection simulator and simulations should be considered as part of the tactical port operations capability development.
- Development and implementation of system specific training for low density military occupation skill (MOS) personnel within the watercraft field.

Another key finding of the CBA is the need to explore development of seabasing simulations and training. The idea that the Future Force needs to be able to operate from the littorals is widely acknowledged. Thus, in accordance with Future Force concepts, the Army is currently exploring how to leverage emerging seabasing capabilities and concepts. Although the Army will likely continue to employ land bases as the primary means of force projection, future Joint concepts dictate that our Leaders be trained in seabased operations. Given the nature of seabasing–large scale and expense in conducting training–the Transportation Corps should pursue a program to develop and integrate appropriate seabasing modeling and simulation training into its Leader development programs. Our training strategy will include integration of this effort with Naval modeling, simulation, and training initiatives in order to increase Inter-Service understanding and interoperability, while also advancing watercraft leaders' skills.

1.5. Supply Strategy

Currently, the Fleet is supported by maintenance assets organic to the vessel crews or unit organizations and the watercraft maintenance company. The source of supply for most secondary repair part items is the Defense Logistics Agency (DLA). However, the nature of Army watercraft operations and organization present unique challenges for the spare part supply support system. The Fleet is designed to conduct global, often widely dispersed, operations. Unlike the Army's wheeled vehicle Fleet, when deployed, Army watercraft are constantly on the move, often operating out of and between multiple sites making it difficult to anticipate where to provide supply support or deliver repair parts. The result is that many Army Mariners use the unit's IMPAC card to buy spare parts from local ship chandlers as the most expedient means to meet part supply requirements. Historically, this practice has produced problems with configuration control, even between vessels of the same class, and made it difficult to capture and track repair part demand history. This is further exacerbated by the fact that Army watercraft are by their nature low-density systems, making it difficult to plan for adequate and timely supply support because:

- Sporadic demands result in spare part National Stock Numbers washing out of the supply system due to inactivity.
- Small quantities needed for Fleet support make these items unattractive to contractors to bid on.
- Parts stockage policies frequently result in acquisition beginning only after receipt of a funded requisition from the field.

Given the problems we face in modernizing the Army watercraft maintenance strategy, we need to simultaneously develop a complementary repair part supply support system appropriate to a globally-responsive watercraft Fleet. Our current ILS approach is based on unit operations more akin to land-based transportation units that, even when dispersed across a theater of operations, still function in a relatively stable distribution system and supported by generally fixed resupply point. This has not worked well in

the past and will only get worse as the Fleet becomes more mobile. The Army watercraft supply support concept must change to meet the needs of the smaller, more responsive Fleet. TACOM has identified performance-based logistics (PBL) as a potential solution that bears closer analysis. To this end, TACOM performed a market survey in May 2007 as a means of gauging industry capabilities to provide this service to the Army. TACOM need to conduct a business case analysis (BCA) of the cost effectiveness of implementing PBL as the strategy for Army watercraft. The primary work to be accomplished includes:

- Coordinate with the user community to develop a list of the 300 most critical spare parts for each of four test vessels (LSV, LCU-2000, LT-800, ST-900), to include estimated demands and unit costs;
- Research and verify sources of funding for PBL, as well as the appropriate avenue for requesting this funding:
  - If funded by the Army watercraft program, how funds are replenished.
  - If funded by OMA, how funds are obtained.
- Determine how the contractor's parts delivery function operates:
  - Does contractor buy their own parts or serve as a broker.
  - How does the user order what is needed.
  - What is the method used to physically get the spare part to the user.
  - How is demand data captured and tabulated.
  - How is the contract managed.
- Detail the suitability of PBL for the Army Watercraft Fleet, to include:
  - Funding source
  - Contract type
  - Affordability
  - Recommended performance metrics.

A critical element of the Army watercraft supply strategy will be to ensure it is integrated with the developing watercraft maintenance strategy. Based on the outcome of the BCA, further refinement of the supply concept is forthcoming.

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Chapter 2
Future Capability Development Strategy

This chapter discusses vessels, systems, and other watercraft-related strategies that we do not currently possess. These include new materiel and non-materiel solutions that are either already underway or need to be initiated to meet future requirements. Chapter Two is divided into two major paragraphs. The first, Paragraph 2.1, discusses three new materiel programs that are already underway in the capability development process: the Joint High Speed Vessel (JHSV), Harbormaster Command and control Center (HCCC), and Vessel-to-Shore Bridging (VSB). The second major section, Paragraph 2.2, addresses the non-materiel change actions that need to be initiated to support and sustain future capabilities, and those requirement determination actions that need to take place now to lay the groundwork for future materiel development. Paragraph 2.2 addresses the non-materiel change actions as integrated DOTMLPF approaches, rather than addressing doctrine, organization, training, materiel, leadership, personnel and facilities, as un-related actions.

2.1. On-Going New Materiel Developments

2.1.1. Joint High Speed Vessel

The CBA clearly validated the JHSV as the top approach for transformation of Army watercraft capabilities and was judged to provide the best single-solution closure of the capability gaps, particularly in the higher-priority gaps. Joint and COCOM inputs support the belief that the JHSV will fill a critical gap in Future Force capabilities—the need for rapid response tactical and operational maneuver of expeditionary and Modular Forces. Since the JHSV is a documented program of record with an approved ICD and Capability Development Document (CDD), the CBA validates the JCIDS actions already underway. The current assessment remains in an “amber” status due to the Army procuring only 5 of the required 12 Army JHSVs. As currently planned, the JHSV will be delivered without the C4ISR and force protection capabilities needed to meet Army requirements. This will require additional funding in order to achieve the capabilities needed in the 2015–2024 timeframe. Once fielded, the JHSV will be maintained to ABS & MILSPEC standards IAW the program ILS plan to include ABS-Reliability Centered Maintenance concepts. The strategy is based on continuous surveillance of the vessels and the sustainment maintenance strategy described in paragraph 1.3.2. Phased shipyard maintenance period for the JHSV will be 5 years. First period is projected to be in FY 16.

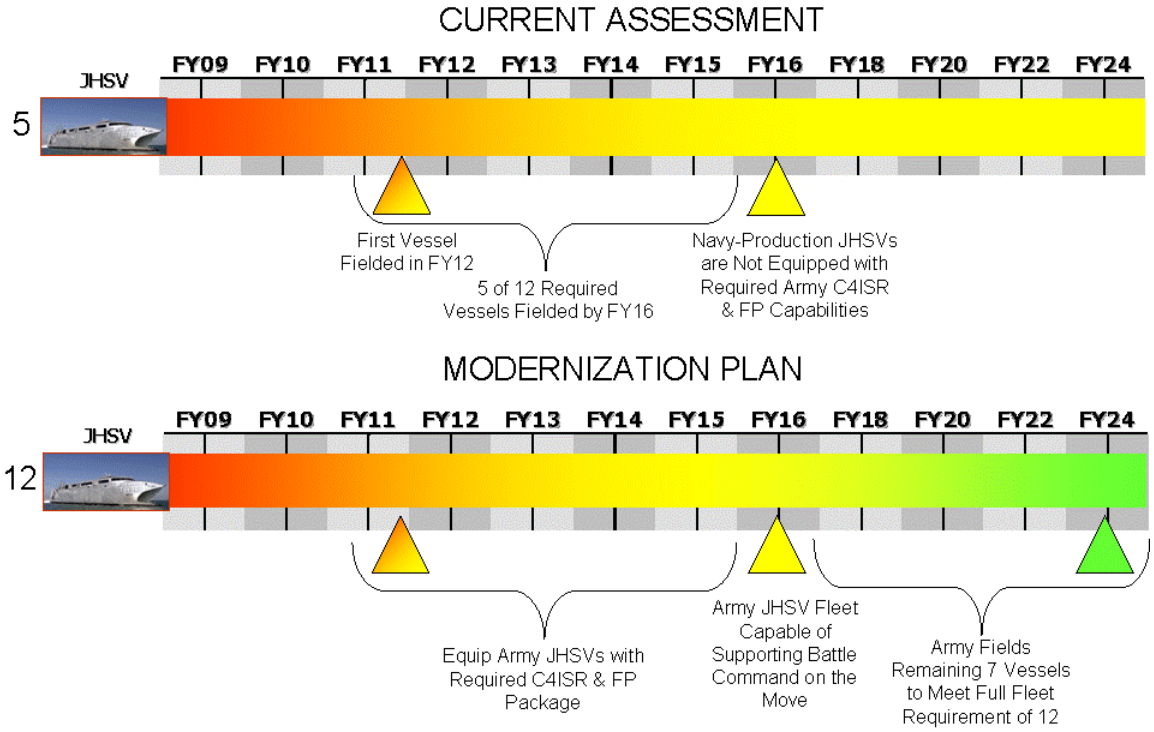

Figure 2-1. JHSV Assessment and Modernization Plan

Platform Requirements

Platforms Required	12	Strategy
Platforms Funded	5	Current Army funding supports acquisition on only 5 JHSVs and Navy Program Office does not plan to field vessels with full Army-required C4ISR & force protection package. Immediate strategy is to seek funding of C4ISR & FP requirements for 5 programmed Army vessels and then work toward procuring full requirement of 12 vessels.
Delta	-7	

REQUIREMENT*		FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Procurement		$171,782	$206,175	$206,015	$212,098	$21,414	$18,576	$19,134	$855,200
Maintenance	Vessel Maintenance	$0	$0	$0	$202	$702	$1,257	$2,051	$4,212
	C4I	$0	$0	$0	$541	$562	$585	$608	$2,296
	IUID	$0	$0	$0	$167	$348	$543	$752	$1,810
	ABS	$0	$0	$0	$246	$335	$429	$528	$1,538
	Surveyors	$0	$0	$147	$306	$879	$1,098	$1,329	$3,759
	ISA	$0	$0	$197	$205	$214	$222	$231	$1,069
Maintenance Totals		$0	$0	$344	$1,667	$3,040	$4,135	$5,499	$14,684
*$1,000									

Table 2-1.JHSV Funding Plan

2.1.2. Harbormaster Command and Control Center

Like the JHSV, the CBA found the HCCC to be an important solution, particularly in closing the C4ISR gap, and therefore validates the need for the JCIDS work that is already underway. The CBA identifies the HCCC as a valuable approach for transformation of Army watercraft joint interoperability capabilities. The HCCC is a documented program of record with an approved CDD and a funding line in the current POM. CASCOM and TCM-Trans are currently working closely with the Program Manager — Tactical Operations Centers (PM-TOCs) to finalize the Capability Production Document (CPD), and support production of the prototype system in FY08. Based on operational requirements and the HCCC system profile, CASCOM, TCM-Trans, DA G3, and DA G4 have determined the original requirement to place two HCCCs in APS is inadvisable and would result in unnecessary program costs. Further, TCM-Trans, the Transportation School, and PM-TOCs have identified a training package that is based largely on simulation and employment of dismounted communications systems, eliminating the need for fielding of a full HCCC solely for Institutional Training support. These actions allow the HCCC program requirement to be reduced to eight — the number needed to fill the TOE requirement in the four Active Component and four Army Reserve Harbormaster Detachments. The current plan is to complete integration and field the eight operational systems and training package prior to the end of the 2010–2015 POM period.

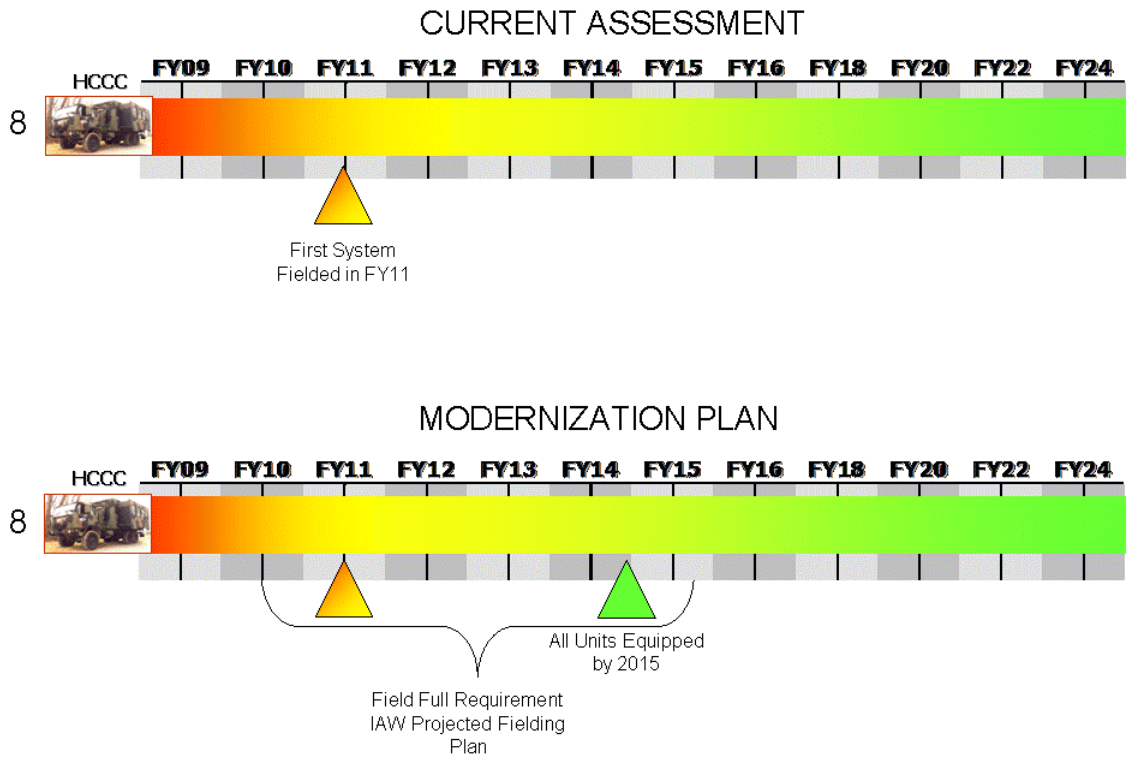

Figure 2-2. HCCC Assessment and Modernization Plan

Platform Requirement

Platforms Required	8	Strategy
Platforms Funded	8	Field full requirement IAW current Army plan.
Delta	0	

Requirement*	FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Procurement	$16,248	$17,452	$16,400	$16,700	$0	$0	$0	$66,800
* $1,000's								

Table 2-2.HCCC Funding Plan

2.1.3. Vessel-to-Shore Bridging (VSB) Capability

The Joint CBA identified Vessel-to-shore bridging (VSB) capability as one of the top materiel approaches to meet Future Force lift and access requirements. The CBA ranked this capability is the best approach to fill the current gap in the Army's ability to rapidly resupply distributed Modular Forces, and identified VSB as a key enabler for the JHSV and other watercraft platforms. Future Force operational concepts dictate that these platforms need a bridging technology that enables them to access any entry point, even bare-beach environments. The MCS provides a floating causeway system that provides that capability, but it is not designed for rapid emplacement and removal. The CBA found a continuing need for MCS in relatively fixed JLOTS and other port operations, but also recommended new VSB technology to enhance watercraft's ability to conduct self-supporting operations in an austere, distributed operational environment. The feasibility of this VSB capability is being validated by technologies developed and demonstrated through an Advanced Concept Technology Demonstration (ACTD) by the Engineer Research and Development Center (ERDC), and the Joint Enable Theater Access — Sea Port of Debarkation (JETA-SPOD) initiatives of the Transportation Center and the Maneuver Support Center (MANSCEN). This work indicates that a properly designed bridging system could provide the capability identified by the CBA and potentially enhance the mobility of land forces operating in un-navigable terrain, e.g. swamps or deep sand. By leveraging the work already underway in the JETA-SPOD initiative, the Army could develop an integrated capability that enhances both littoral access and land-power mobility. MANSCEN and the Deployment Process Modernization Office (DPMO) are already engaged in this work.

IAW the findings of the CBA, CASCOM is the process of developing and staffing an Initial Capabilities Document (ICD) to support the analysis of alternatives (AoA) needed to identify and procure a system to meet VSB requirements. The ICD has completed worldwide staffing and has been updated to include results of the JETA-SPOD ACTD. While VSB capabilities will be employed by all Army watercraft lift platforms, the primary initial need will be to fully enable the JHSV. Thus, the program will focus on developing, procuring, and fielding twelve systems to match the Army's JHSV requirement.

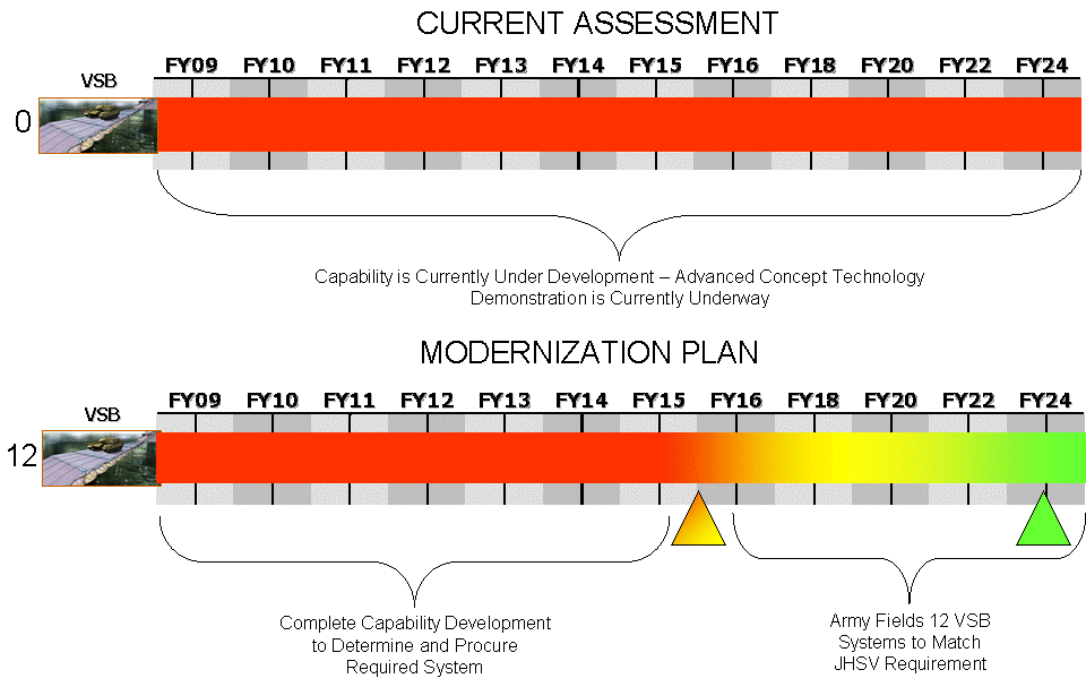

Figure 2-3. VSB Program Development Strategy

Platform Requirement

Platforms Required	TBD	Strategy
Platforms Funded	TBD	Complete development and documentation of VSB capability requirements in an Initial Capability Document (ICD) that will support analysis of alternatives (AoA) to determine best system approach.
Delta	TBD	

Requirement*	FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTALS
Procurement	$0	$0	$7,420	$6,068	$5,872	$5,892	$6,015	$31,267
* $1,000's								

Table 2-3. VSB Funding Plan

2.2. Immediate Capability Issues and Gaps

There are four time-critical issues that require immediate resolution: upgrading C4ISR systems and force protection capabilities on current craft, a decision on the future of the current LCM-8 (MOD 1) platform, and maturation of the watercraft maintenance concept. All of these issues must be addressed no later than FY09 to implement a solution impacting the 2015–2024 timeframe.

2.2.1. C4ISR Modernization

Army watercraft systems must be equipped with Joint and interoperable C4ISR capabilities appropriate to the mission and environment. Future Army watercraft capabilities will be employed as part of a Modular Force designed to operate across a widely distributed operational and tactical environment.

Army watercraft must be capable of operating - and therefore communicating — with all elements and organization of the Future Joint Force, to include land and maritime military forces as well as homeland security, national defense, and emergency response partners. The Army watercraft C4ISR modernization strategy will:

- Equip watercraft to ensure that all vessels have at least the capability to access the common operating picture (COP) relevant to their environment — both land and maritime.
- Equip vessels that are to perform tactical maneuver so as to enable BCOTM capabilities for embarked forces.

2.2.2. Force Protection Modernization

Like all land power and maneuver sustainment platforms, Army watercraft that will operate across the widely distributed operational environment envisioned in the in the 2015–2024 timeframe must possess an appropriate level of force protection. At the same time, the CBA stressed that these capabilities are not universal–they must be realistically allocated and appropriate to the mission of the vessel. Vessels operating in relatively protected ports and harbors will not need the same capabilities as those expected to conduct maneuver and sustainment operations across the operational environment. Army watercraft must be capable of operating and surviving in the environment in which the Modular Force operates. Therefore, the force protection modernization strategy will be to provide our vessels with organic force protection enablers, both lethal and non-lethal, based on a vessel’s class/mission, pursuant to the expected threat.

2.2.3. LCM-8

The LCM-8, as described in Chapter One, is rapidly approaching the end of its useful life. Although the Army needs to retain the capability provided by the LCM-8 (a small, maneuverable craft capable of inland waterway and LOC operations) the platform itself is in need of replacement. The cost to maintain these vessels is growing rapidly and will soon require more to maintain than to replace. OCCM costs are approaching $600K per vessel and the cost to modernize and extend the life of each craft is approximately $800K. As an interim measure, we need to divest down to the minimum wartime essential number of craft to save on OCCM and/or storage/preservation costs. At the same time, we must put our resources toward researching, testing, developing and evaluating the capabilities and requirements the Army needs for its replacement.

2.2.4. Two-Level Maintenance Concept

Current watercraft maintenance policies and force structure are less than optimum. The overall age of the Fleet is causing us to expend more time and money to maintain the vessels at an acceptable level of readiness. There have been technology insertions without review of crew size and skill level requirements. The maintenance force structure has not been modernized as the Army has been transforming. We must develop innovative policies and doctrine to ensure Army mariners are maintaining vessels in an acceptable state of readiness. An all encompassing maintenance concept must be developed, articulated and adopted and policies and regulations updated. The force structure should then be designed to support those concepts.

2.3. Integrated DOTMLPF Modernization Strategies: Laying the Path for Future Development

2.3.1. Fleet Pre-Positioning Strategy

The Army must re-examine the current pre-positioning strategy. A key concern of the COCOMs continues to center on the responsiveness and availability of the Army's watercraft, particularly in relation to short-notice requirements. The emphasis on the capabilities—and responsiveness—of the JHSV, and the availability of the forward-stationed LSV underscores the growing desire to ensure that watercraft assets are available quickly, when needed. The COCOMs have stated that the packages currently on hand are appropriate to meet current requirements. At the same time, requirements identified by the COCOMs indicate that Army watercraft capabilities need to be readily available to respond to short-notice operations. The majority of the current Fleet was not designed to be placed into long term storage and has been negatively impacted by the storage requirements in the AWRP. The development of new storage standards and configurations from a "cold vessel" status to a "warm vessel" status will improve the activation and utilization of vessels in storage. At a minimum, vessels will be stored in a fully mission capable condition using a minimum amount of preservation. All critical systems will be operated quarterly with full technical inspections with sea and/or dock trials conducted annually. Periodic inspections will reduce vessel sustainment maintenance cost due to early identification of materiel deficiencies and decreased materiel requirements for deep preservation. By improving the APS vessel activation process, there will be an overall decrease in costs to the Army. Employment of partial crews, stationed with the APS stocks, may provide an alternative to cold storage that maintains a higher level of readiness. Key points that emerge from the analysis and must be considered as part of the solution:

- While it is unlikely the Army can afford to forward station all of its watercraft, senior leadership should move to place more of the Fleet in a forward-stationed, as opposed to pre-positioned, status
- The Army needs to consider stationing or rotating partial crews to storage sites to maintain Army watercraft in a higher state of readiness—i.e., "warm" stationing
- The Army should conduct an analysis of actual requirements to establish an operationally-based standard for availability of pre-positioned Army watercraft
- The Army needs to continue to aggressively execute the Brigade Inspection Readiness Exercise Program (BIREP) annually for Army watercraft

2.3.2. Terminal Operations Modernization

Future Army watercraft operations must be developed in close coordination with the development of an overarching concept of how the Army and the Joint force will conduct terminal operations. Further, Army terminal operations should be integrated with Joint terminal initiatives, e.g., those currently being undertaken in USTRANSCOM's Joint Task Force-Port Opening (JTF-PO) initiative and the (Military) Surface Deployment and Distribution Command's (SDDC) transformation plan. As Modular force transportation organizations are fielded and the USTRANSCOM assumes greater global responsibilities

as the Distribution Process Owner (DPO), it is critical that roles, responsibilities, and operational relationships between the various units engaged in terminal operations be clearly described in Army and Joint doctrine and policy. The Army watercraft CBA identifies the need for an Army Terminal Operations FNA. Completing this FNA is an important step toward a complete Terminal Operations CBA that will provide the Joint analysis needed to support this effort. Key points that emerge from the analysis and must be considered as part of the solution:

- Engage USTRANSCOM—potentially establishing an IPT—to develop integrated port opening concepts ICW the Joint Task Force—Port Opening (JTF-PO) initiative
- CASCOM should engage the (Military) Surface Deployment and Distribution Command (SDDC) to develop an integrated concept that defines operational relationships, missions, capabilities, and responsibilities between Modular Force and SDDC terminal operations units.
- In coordination with USTRANSCOM and SDDC, CASCOM will resume the Terminal Operations FNA with the intent to complete a Joint Terminal Operations CBA that addresses an integrated approach to future terminal and watercraft operational capabilities

2.3.3. Intra-Theater Operational Sustainment Lift Capability

Closely following the JHSV is a set of approaches that collectively focus on the ability to conduct distributed sustainment operations. The findings of the CBA indicate that the JHSV—as primarily an operational maneuver platform—is not the solution-of-choice to provide sustainment support to the Future Force. This finding is consistent with input from the COCOMs—that the land force needs a balanced set of capabilities that include a platform specifically designed to conduct distributed sustainment operations. Within the next five years CASCOM needs to lead a combined effort to establish the capability requirements for this new platform.

2.3.4. Army Doctrine

Army watercraft operational doctrine needs to be more firmly integrated with Army concepts and emerging capabilities. One of the issues that emerges from discussions with the COCOMS is that operational planners are often not aware of the capabilities of Army watercraft and therefore do not understand how and where to employ those capabilities as part of an integrated operation. Part of this problem is that watercraft capabilities, while mentioned briefly, are not presented with detail in the Army's Capstone Concept. Further, doctrine for Army watercraft is essentially relegated to the field manuals that are used primarily by watercraft and or terminal operators and leaders. Army watercraft—and their capabilities — must be more clearly defined in the doctrinal manuals used by Maneuver and Maneuver Support, Leaders and planners, as well. Further, Army watercraft doctrine must become more integrated with emerging concepts and capabilities in order to provide a more complete picture of integrated, modular force Modular Force Operations. Key points that emerge from the analysis and must be considered as part of the solution:

- Review and revise the Army's Operational Maneuver Concept to define the employment of Army watercraft in operational maneuver and distributed sustainment operations. Lead–CASCOM CDD; Assist TCM-T.

- Engage the Combined Arms Command and Maneuver Support Center to identify and revise maneuver and maneuver support doctrinal manuals that should include littoral operations. Lead–CASCOM CDD.
- Review Modular Force Logistics Concepts and doctrinal manuals employed by Maneuver and Maneuver Support to identify areas in which watercraft and logistics airlift operations can be integrated to achieve greater capability in conducting over the shore logistics operations. Lead–CASCOM CDD.
- Identify requirements and revise watercraft doctrine to integrate employment of the new OPDS. Lead–CASCOM CDD; Assist–TCM-T.
- Integrate Army watercraft and Army diver doctrine to formalize salvage, recovery and force protection roles and responsibilities. Lead–CASCOM/MANSCEN

2.3.5. Joint Doctrine

The role and responsibilities of Army watercraft must be more clearly articulated in the Joint context. The findings of the CBA indicate that the Joint Force will gain the greatest combination of capabilities if there is a balanced, interoperable, combination of Army and Naval capabilities, as opposed to a single-Service approach. To maximize the Joint capabilities Army watercraft need to focus on the core capabilities of the Future Modular Force. The emphasis on force closure, operational maneuver and distributed sustainment, coupled with the concepts and capabilities articulated in the CBA, indicate the Army's land-power is best served by a littoral capability built on agile, flexible lift capability. Further, the emphasis on tactical port and waterway operations—identified in the CBA and by the COCOMs—suggests that the ability to gain access to austere points of entry for maneuver and maneuver sustainment operations is a key capability of the land maneuver commander and therefore the other aspect of the Army's core watercraft capabilities. While lift and tactical port and waterway operations are clearly the core competencies of the Army, these competencies must be integrated into Joint and Naval doctrine as appropriate. At the same time, Army doctrine must clearly articulate the interdependent relationships with Joint capabilities to ensure Army Leaders and planners understand how the two capabilities complement each other. Key points that emerge from the analysis and must be considered as part of the solution:

- The Army must continue to engage the other Services to clearly define the roles and responsibilities of the Services in Joint littoral operations
- The most effective Joint approach to future littoral operations is a balanced capability set provided by both the Army and Naval Forces
- Future Army watercraft core competencies should focus on lift and tactical port/waterway operations — we must continue to engage the Navy to ensure our core competencies are integrated with and complement Joint littoral operational requirements
- The Army should engage the Navy Supervisor of Salvage to identify how Army and Navy salvage concepts and capabilities can be integrated into Joint policy. The Navy Supervisor of Salvage has responsibility for marine salvage operations, while the Army possesses the marine salvage materiel assets and trained personnel.

2.3.6. Organizational Modernization

Organizational structures need to be balanced and staffed with the expertise necessary to properly plan for and employ watercraft capabilities in Joint and combined arms operations. A problem that continues to affect the watercraft field is a lack of awareness of the capabilities on the part of operational planners. While revising doctrine will provide part of the fix for this issue, the Army must also ensure that key staffs are resourced with the expertise necessary to leverage watercraft capabilities. As the Army continues to transition to a Modular Force, expertise in watercraft operations has largely been eliminated in the staffs above the functional battalion. Ensuring that theater-level maneuver and maneuver sustainment C2 organizations have access to watercraft operational expertise will enhance Commander's ability to leverage this capability and the littoral battlespace. Further, as the COCOMs stressed the need for more rapidly available capabilities, the allocation of capabilities between Army Components must be reviewed to ensure the right capabilities are available in the early phases, and that the capability can be sustained throughout all phases of Joint operations. Actions that will be considered include:

- Review and assess current C2 structures to identify the watercraft expertise currently documented at each level of command–redesign current organizations or develop new modular watercraft plugs to provide existing organizations with organic expertise. Lead—CASCOM FDD; Assist — TCM-T
- Re-assess the role and design of the Harbormaster Detachment (HD) in light of Modular Force concepts—the HCCC-equipped HD may be better suited to function at the Sustainment Brigade or Theater-Support Command. Lead–CASCOM FDD.
- Consider developing a Vessel Support Detachment to provide focused support to a number of watercraft operating in a theater. Lead-CASCOM FDD; Assist–CASCOM CDD, TCM-T.
- Re-assess the mix and stationing of Active and Reserve Component watercraft assets to ensure they are properly aligned with COCOM responsiveness requirements. Lead–TCM-T; Assist–CASCOM FDD, DA G3, FORSCOM G3, USARC.
- Address the maintainability issue within the modular causeway company in not being manned and equipped to maintain the craft within standards. Lead–CASCOM FDD; Assist–TCM-T.

2.3.7. At-Sea Transfer Capabilities

Another set of materiel approaches identified by the CBA encompass programs currently being undertaken by the Navy to improve the ability to conduct at-sea transfer capabilities. Since these programs are already being pursued by the Navy, it would seem counter-productive for the Army to duplicate those efforts, however, the Army should fully engage the Navy and provide input into those programs to ensure that (1) Army capability requirements are known and considered, and (2) to identify where future Army materiel development needs to integrate attributes to ensure interoperability with Joint and Coalition sea-basing concepts and platforms.

Annex A
Watercraft Characteristics & Capabilities

A-1. PURPOSE

The purpose of this annex is to describe the Fleet in terms of the total requirement, missions, capabilities, distribution, and modernization goals.

A-2. BACKGROUND

This annex identifies individual vessels that make up the Army watercraft Fleet. It addresses vessel mission, transportability, employment trends, characteristics and capabilities, vessel requirements, on-hand quantities, procurement or divestiture actions, distribution, and specific or ongoing actions required for the particular vessel. The sum of TAA TOE requirements and approved requirements for pre-positioned vessels establish the total Fleet requirement. The tables for each vessel provide a synopsis of Army watercraft requirements that shape the inventory into a Fleet capable of supporting the Current and Future Forces.

A-3. CATEGORIES OF WATERCRAFT

Watercraft fall into three categories: high-speed vessels, lighters, and floating craft. These three categories are defined according to the mission they perform.

a) High-speed vessels are designed to provide operational movement of intact ready-to-fight unit sets within a theater of operation. Designed to operate independently, high-speed vessels, such as the JHSV, provide intra-theater lift between an offshore inter-modal sustainment base and littoral battlefield, within the littoral battlefield or along rivers within the AO.

b) Lighters are used to transport equipment, cargo, and personnel between ships, from ship to shore, or for intra-theater transport. Lighters are further classified into conventional displacement (landing craft) or modular causeway system (causeway ferry). Army lighters include the LSV, LCU-2000, LCM-8 and the Causeway Ferry.

c) Floating craft perform operations incidental to water terminal operations, except lighter service. Watercraft in this category are harbor tugs and oceangoing tugs, pusher tugs, floating cranes, barges, floating causeways, roll-on/roll-off discharge facilities, and modular and side-loadable warping tugs. Army floating craft include the ST900, LT800, BD 115T and 89T floating cranes, floating causeway, modular warping tugs and the RRDF.

A-4. SCOPE

The following sections (by vessel type) provide the current system mission, capabilities and characteristics, current requirement and craft distribution.
In order to accurately interpret the contents of this annex, the reader must understand the scope of each paragraph as defined below:

a) *Mission:* the operational mission of the vessel.

b) *Transportability:* the methods available to transport the vessel to the area of operation.

c) *Employment Trends:* operational use of the craft in recent contingency and major combat operations.

d) *Characteristics/Capabilities:* vessel dimensions; payload in terms of capacity, equipment, and container carrying equivalents; operating range; crew size; and age.

(1) *Length overall:* the total length of the vessel.

(2) *Beam:* the extreme width of the vessel.

(3) *Displacement:* the weight of the total amount of water a vessel displaces when afloat. (Displacement [light] is the weight stated with no stores, fuel, water, or equipment [basic issue items] aboard. Displacement [loaded] is the weight stated with full stores, fuel, water, and equipment aboard.)

(4) *Deck Area:* the total square footage of deck space available for loading equipment. It is stated in square footage and, where appropriate, in terms of M1 main battle tanks, Strykers, and 20-foot containers

(5) *Payload:* the total weight a vessel can carry

(6) *Range:* the distance a vessel can travel with one full load of fuel (stated in both light [no cargo] and loaded [fully laden] terms)

(7) *Draft:* the amount of hull underwater when the vessel is afloat (stated in both light (no cargo) and loaded (fully laden) terms)

(8) *Crew Size:* taken from FM 55-50, Army Water Transport Operations, change 1, dated 22 March 1995, which will be revised in FY08 by the new FM 4-01.50, Army Watercraft Operations.

e) *Requirement:* the Army's equipment end-state objective. (It is the summation of resourced requirements derived from TAA TOE and pre-positioning requirements.)

f) *On-Hand:* the total number of TOE craft on hand as of TAA-11 and the MSFA.

g) *Distribution:* Modification TOE (by component) and pre-positioning distribution requirements. It takes approximately 1 to 3 years to field a vessel after funds are authorized and appropriated.

A-5. JOINT HIGH SPEED VESSEL

NSN: Under development
LIN: Z27774

Figure A-1. The TSV-1X - a Demonstration Vessel Employed by the Army to Develop and Test Joint High Speed Vessel Capabilities

a) *Mission:* The Joint High Speed Vessel is the Army's next-generation self-deploying watercraft. These vessels will bring an entirely new capability set to the Army and the Army watercraft community. This new capability will require COCOM planners to rethink how they plan and execute operations. The JHSV will maximize intra-theater lift from an offshore or out of sector staging base, or within the littoral battlefield and rivers, to provide the warfighter the capability to operationally move and maneuver combat ready forces into the forward areas. Unit sets can now be maneuvered into the battle space with little to no RSOI being required in the forward area. It can also provide follow-on sustainment through minor and degraded ports. Leveraging technologies developed within the commercial sector and DoD, the JHSV will be faster, more capable, and possess greater survivability than current generation watercraft.

b) *Transportability:* The JHSV is self-deployable anywhere in the world.

c) *Employment Trends:* The TSV-1X, Spearhead deployed to, and supported the CENTCOM and PACOM Theaters of Operations with an extensive mission array as part of Operation Iraqi Freedom while simultaneously executing an Advanced Concept Technology Demonstration (ACTD).

d) *Characteristics/Capabilities:* The JHSV is currently under development - the characteristics shown below are the threshold capabilities identified in the approved Capabilities Development Document (CDD) and may alter as the ship is constructed:

(1) *Length Overall:* 450 feet or less.

(2) *Beam:* Capable of transiting Panama Canal (less than 106 feet).

(3) *Displacement:* TBD.

(4) *Deck Area:* 20,000 square feet.

(5) *Payload:* 600 tons (personnel, supplies, and equipment).

(6) *Range:*
- ➤4,700 NM at 25 knots average speed without cargo
- ➤1,200 NM at 35 knots average speed with 600 tons of cargo

(7) *Draft:* 10 to 15 feet.

(8) *Crew Size:* 31.

e) *Requirement:* Based on current and anticipated needs, TAA-13 identified a requirement for 12 Army JHSVs. Current funding will provide for 5 Army owned JHSVs.

f) *On-Hand:* The first Army JHSVs will be fielded between FY11 and FY12.

g) *Distribution:* Distribution of the JHSV is currently under development pending resolution of procurement strategies. Expectation is the first JHSVs will be forward-stationed to meet combatant command responsiveness. See table below:

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	12	0	0	0	0	0	1	3	5	7	9	10	10
RC	0	0	0	0	0	0	0	0	0	0	0	0	2
Prepo.	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	12	0	0	0	0	0	1	3	5	7	9	10	12

Note: Req. = requirement.

Table A-1. JHSV Distribution

A-6. LOGISTICS SUPPORT VESSEL

NSN: LSV 1-6 - 1915-01-153-8801
LSV 7-8 - 1915-01-495-0036
LIN: LSV 1-6 - V00426
LSV 7-8 - V00426

Figure A-2. Logistics Support Vessel

a) *Mission:* The LSV is a world-wide deployable vessel that provides transport of combat vehicles and sustainment cargo in the theater zone. It provides intra-theater line haul of large quantities of cargo and equipment. Tactical resupply missions can be performed to remote underdeveloped coastlines and inland waterways. It is also ideally suited for the discharge or back load of sealift, including RO/RO vessels, such as a large medium-speed RO/RO (LMSR). The LSV can transport cargo from ship to shore in LOTS operations, including those in remote areas with unimproved beaches. All container and bulk cargoes, tracked and wheeled vehicles, including main battle tanks, dozers, and container-handling equipment, can be transported in LOTS operations. The LSV has both bow and stern ramps to be used in cargo operations and which are particulary adept in executing RO/RO operations. The vessel has a bow thruster to assist in beaching, beach extraction, docking, undocking and can conduct these operations without assistance. It can also be used for unit deployment and relocation. Because of its shallow draft, the LSV can carry cargo from deep-draft ships to shore ports or areas too shallow for larger ships. The LSV is ideally suited to execute cargo operations along coastal LOCs.

b) *Transportability:* The LSV can self-deploy anywhere in the world.

c) *Employment Trends:* LSVs have been extensively employed during operation in South-West Asia (Desert Shield and Operation Iraqi Freedom), Haiti, during humanitarian operations globally and operations in the Balkans. They repositioned APS-5 armor in support of OIF and were a mainstay cargo lifter in the

JLOTS operation bringing all the coalition ammunition into the theater. They remain deployed and continue to support the ground force.

d) *Characteristics/Capabilities:*

(1) *Length Overall:* LSV 1-6 - 273 feet; LSV 7-8 - 314 feet.

(2) *Beam:* 60 feet.

(3) *Displacement:* 4,199 long tons.

(4) *Deck Area:* 10,500 sq. ft. (up to 24 M1 main battle tanks or 25 [50 double stacked] 20-foot ISO containers).

(5) *Payload:* 2,000 tons (equivalent payload capacity of 40 C-17s).

(6) *Range:*
- Light: 8,200 NM at 12.5 knots.
- Loaded: 6,500 NM at 11.5 knots.

(7) *Draft:*
- Light: 6 feet.
- Loaded: 12 feet.

(8) *Crew Size:* 32 (8 warrant officers and 24 enlisted for 24-hour operation)

e) *Requirement:* Force requirements are for a Fleet of 8 LSV.

f) *On-Hand:* 8

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	5	5	5	5	5	5	5	5	5	3	3	3	3
RC	3	3	3	3	3	3	3	3	3	5	5	5	5
Prepo.	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	8	8	8	8	8	8	8	8	8	8	8	8	8

Note: Req. = requirement.

Table A-2. LSV Distribution

A-7. LANDING CRAFT, UTILITY 2000

NSN: 1905-01-154-1191
LIN: L36989

Figure A-3. Landing Craft, Utility 2000

a) *Mission:* The LCU-2000 provides transport of combat vehicles and sustainment cargo. It provides intra-theater movement of cargo and equipment. Tactical resupply missions can be performed to remote, underdeveloped coastlines and inland waterways. This includes missions in LOTS operations in remote areas with austere shore facilities or unimproved beaches. It is also ideally suited for the discharge or back load of sealift, including RO/RO vessels such as an LMSR. All container and bulk cargoes, tracked and wheeled vehicles, including main battle tanks, dozers, and container-handling equipment, can be transported in LOTS operations. The LCU-2000 has a bow ramp for RO/RO cargo, and a bow thruster to assist in beaching, beach extraction, docking, undocking and are able to perform these evolutions unassisted. It can also be used for deployment and relocation of unit equipment. Because of its shallow draft, the LCU-2000 can carry cargo from deep-draft ships to shore ports or areas too shallow for larger strategic lift ships. These vessels execute cargo operations along coastal LOCs.

b) *Transportability:* Depending upon distance, weather, and sea conditions, the LCU-2000 can be self-deployed. It can also be transported aboard a float-on/float-off (FLO/FLO) or lift-on/lift-off (LO/LO) ship. In the case of self-deployment, it has a non-refuelable range of 9,200 miles.

c) *Employment Trends:* During Desert Storm, LCU-2000s were used to reposition armored units. They were among the first vessels to bring relief supplies to Kuwait. In Somalia the 10th Infantry Division employed them to establish a low threat coastal MSR between Mogadishu and Kisamayu. During Operation Uphold Democracy in Haiti, Special Operations Forces used LCU-2000s to bypass road networks to ingress and egress along the under-developed coastline. In OIF they

were used to reposition APS-5 armor prior to the start of combat operations and along with the LSV were a mainstay cargo lifter in the JLOTS operation bringing all the coalition ammunition into the theater. Also during OIF, Special Operations Forces utilized LCU-2000s as Afloat Staging Bases during operations to capture offshore oil platforms. The craft continue to support ground forces in OIF.

d) *Characteristics/Capabilities:*

(1) *Length Overall:* 174 feet.

(2) *Beam:* 42 feet.

(3) *Displacement:* 575 long tons (light); 1,087 long tons (loaded).

(4) *Deck Area:* 2,500 sq. ft. (5 M1 main battle tanks or 12 [24 double stacked] 20-foot ISO containers).

(5) *Payload:* 350 tons (equivalent payload capacity of 7 C-17s loads).

(6) *Range:*
- Light: 9,200 NM at 12 knots.
- Loaded: 6,500 NM at 10 knots.

(7) *Draft:*
- Light: 8 feet
- Loaded: 9 feet

(8) *Crew Size:* 13 (2 warrant officers and 11 enlisted for 24-hour operation)

e) *Requirement:* TAA 13 revalidated the requirement for 20 LCU-2000s.

f) *On-Hand:* 34 (Quantity includes PREPO assets)

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	7	7	7	7	7	7	7	7	7	7	7	7	7
RC	7	7	7	7	7	7	7	7	7	7	7	7	7
Prepo.	20	20	20	20	20	20	20	20	20	20	20	20	20
Total	34	34	34	34	34	34	34	34	34	34	34	34	34

Note: Req. = requirement.

Table A-3. LCU-2000 Distribution

A-8. LANDING CRAFT, MECHANIZED 8

A-8.1 LCM-8, MOD 1
NSN: Pre-SLEP - 1905-00-935-6057
SLEP — 1905-01-284-2647 & 1905-01-284-2649
LIN: L36739

Figure A-4. Landing Craft, Mechanized 8, Modification 1

a) *Mission:* The LCM-8 transports cargo, troops, and vehicles from ship to shore or in retrograde movements. It is also utilized in lighterage operations and utility work in harbors. It is designed for use in rough or exposed waters and is capable of operating through breakers and grounding on a beach. The bow ramp permits RO/RO operations with wheeled and tracked vehicles. Its small size facilitates its use in confined areas as pictured here operating in some of the remotest areas in Alaska supporting a native Indian humanitarian project.

b) *Transportability:* The LCM-8 can be deck loaded on LSVs, LCU-2000s, commercial bulk carriers, heavy lift ships, and tactical auxiliary crane ships or carried in the well deck of LSDs and LPDs.

c) *Employment Trends:* There are 7 LCM-8 (Mod 1) are pre-positioned in each Army Pre-positioned Set of watercraft for use during contingency and combat operations. The LCM 8 was used extensively in OIF to support the JLOTS operation at Kuwait Naval Base.

d) *Characteristics/Capabilities:*

(1) *Length Overall:* 74 feet

(2) *Beam:* 21 feet

(3) *Displacement:* 58 long tons (light); 111 long tons (loaded)

(4) *Deck Area:* 620 sq. ft. (two 20-foot ISO containers or 200 combat-equipped soldiers)

(5) *Payload:* 53 tons (equivalent payload capacity of one C-17 load)

(6) *Range:*
- Light: 332 NM at 11 knots
- Loaded: 271 NM at 9 knots

(7) *Draft:*
- Light: 3.5 feet
- Loaded: 5 feet

(8) *Crew Size:* 6 enlisted (3 per shift for 24-hour operation)

e) *Requirement:* 22 to support one AC and one RC medium boat detachments and one medium boat platoon, each in PACOM and CENTCOM/EUCOM support packages.

f) *On-Hand:* 34

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	10	10	10	10	10	10	10	10	10	10	10	10	10
RC	10	10	10	10	10	10	10	10	10	10	10	10	10
Prepo.	14	14	14	14	14	14	14	14	14	14	14	14	14
Total	34	34	34	34	34	34	34	34	34	34	34	34	34

Note: Req. = requirement.

Table A-4. LCM-8 Mod 1 Distribution

A-8.2 LCM-8, MOD 2
NSN: 1905-01-465-7599
LIN: L36654

Figure A-5. Landing Craft, Mechanized 8, Modification 2

a) *Mission:* The primary mission of the LCM-8 (MOD 2) is command and control (C2), personnel transfer, and light salvage. It is used in harbors and inland waterways. The LCM-8 (MOD 2) is a fairly versatile vessel capable of performing many support functions in conditions up to SS3. As a C2 platform, the LCM-8 (MOD 2) provides the critical link between ship and shore operation centers. It can transport Army stevedores between shore points and a ship in a protected environment. It can also be used as a medical evacuation vessel, diver support platform, and firefighting and light salvage boat. The LCM-8 (MOD 2) can work in shallow inlets and rivers as well as retain its original ability to land on an unimproved beach.

b) *Transportability:* The LCM-8 (MOD 2) will be deck loaded onto a larger vessel for deployment to overseas locations.

c) *Employment Trends:* Two LCM-8 (MOD 2) are pre-positioned in each Army Pre-positioned Set of watercraft for use during contingency and combat operations.

d) *Characteristics/Capabilities:*

(1) *Length Overall:* 74 feet

(2) *Beam:* 21 feet

(3) *Displacement:*
- Light: 71.81

- Loaded: 116.07 tons

(4) *Deck Area:* 230 Sq Ft

(5) *Payload:*
- 41.26 tons
- 47 Passengers

(6) *Range:*
- Light: 320 nautical miles
- Loaded: 271 nautical miles

(7) *Draft:* 4 ft. 6 in.

(8) *Crew Size:* 6 enlisted (3 per shift for 24-hour operation)

e) *Requirement:* 6; one each to support an AC and RC medium boat detachment. 2 each in PACOM and CENTCOM/EUCOM support packages.

f) *On-Hand:* 6

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	1	1	1	1	1	1	1	1	1	1	1	1	1
RC	1	1	1	1	1	1	1	1	1	1	1	1	1
Prepo.	4	4	4	4	4	4	4	4	4	4	4	4	4
Total	6	6	6	6	6	6	6	6	6	6	6	6	6

Note: Req. = requirement.

Table A-5. LCM-8 Mod 2 Distribution

A-9. LARGE TUG (LT)

A-9.1 800-Series 128-Foot Large Tug (LT)
NSN: 1925-01-509-7013
LIN: T68330

Figure A-6. 128-Foot Large Tug

a) *Mission:* The LT-800, 128-foot large tug, is used for ocean and coastal towing operations. It has a secondary mission of accomplishing general-purpose harbor duties, such as positioning floating cranes. The LT is equipped to accomplish fire-fighting duties, a significant capability, particularly where ammunition ships are being worked. It will also be used to perform salvage and recovery operations for other watercraft disabled or damaged along the coastal MSR.

b) *Transportability:* The LT is self-deployable worldwide.

c) *Employment Trends:* During Desert Shield/Desert Storm, an Army Large Tug and Barge Derrick provided the heavy salvage capability that allowed Army divers to clear the port at Ash Shuaybha, Kuwait. During Operation Restore Hope, an Army LT/BD combination was again used to clear the port of Kismayu in order to overcome an enemy port denial scenario. During OIF, an LT conducted extensive salvage/clearance operations in the KAZ waterway and the port of Um Qasr during the early stages of the war. Also during OIF, Special Operations Forces utilized the Large Tug as a hardened Afloat Staging Base during operations in the KAZ waterway. The LT also played a traditional role in docking and undocking ships and supporting JLOTS operations during OIF.

d) Characteristics/Capabilities:

(1) *Length Overall:* 128 feet

(2) *Beam:* 36 feet

(3) *Displacement:* 786 long tons (light); 1,057 long tons (loaded)

(4) *Deck Area:* No on-deck cargo area

(5) *Payload:* Bollard Pull = 58 tons

(6) *Range:*
- Light: 5,000 NM at 13.5 knots
- Loaded: 5,000 NM at 12 knots

(7) *Draft:*
- Light: 14.5 feet
- Loaded: 17 feet

(8) *Crew Size:* 23 (8 warrant officers and 15 enlisted for 24-hour operation)

e) *Requirement:* Three to support 1 AC-flagged and 2 USAR-flagged floating-craft companies and 3 to support Army Pre-positioned Sets.

f) *On-Hand:* 6

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	1	1	1	1	1	1	1	1	1	1	1	1	1
RC	2	2	2	2	2	2	2	2	2	2	2	2	2
Prepo.	3	3	3	3	3	3	3	3	3	3	3	3	3
Total	6	6	6	6	6	6	6	6	6	6	6	6	6

Note: Req. = requirement.

Table A-6. LT 800 Distribution Table

A-9.2 100-Foot Large Tug (LT) Flight III
NSN: 1925-00-375-3003
LIN: X71046

Figure A-7. 100-Foot Large Tug Flight III

a) *Mission:* The 100' tug is used to berth and unberth large oceangoing vessels and for heavy towing within harbor areas. Secondary functions include general utility uses, fire fighting, and salvage operations. It may also be used for limited off-shore towing between terminals.

b) *Transportability:* dependent upon distance, weather, sea conditions, and crew training, the 100' tug can self-deploy or be transported aboard a FLO/FLO or LO/LO ship.

c) Employment Trends: A 100 Foot LT is currently employed in support of Operation Iraqi Freedom, supporting salvage operations and playing a traditional role in in docking and undocking ships and supporting JLOTS operations during OIF.

d) Characteristics/Capabilities:

(1) *Length Overall:* 107 feet

(2) *Beam:* 27 feet

(3) *Displacement:* 295 long tons (light)/390 long tons (loaded)

(4) *Deck Area:* No on-deck cargo area

(5) *Payload:* Bollard Pull = 13.8 long tons/31.5 long tons

(6) *Range:*
- Light: 3,323 NM at 12.8 knots/2,245 NM at 12.8 knots
- Loaded: Variable with two

(7) *Draft:*
- Light: 11.5 feet
- Loaded: 12.5 feet

(8) *Crew Size:* 16 (4 warrant officers and 12 enlisted for 24-hour operation)

e) *Requirement:* There is no requirement for the 100 Foot Tug, however, one Flight III 100' tug has been retained as a training platform at the request of the reserve component. One Flight III 100' tug has been retained as an In Lieu Of item in one pre-positioned equipment set.

f) *On-Hand:* 2

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	0	0	0	0	0	0	0	0	0	0	0	0	0
RC	0	1	1	1	1	1	1	1	1	1	1	1	1
Prepo.	0	1	1	1	1	1	1	1	1	1	1	1	1
Total	0	2	2	2	2	2	2	2	2	2	2	2	2

Note: Req. = requirement.

Table A-7. Distribution Table

A-10. SMALL TUG 900

NSN: 1925-01-435-1713
LIN: T68398

Figure A-8. Small Tug 900

a) *Mission:* The ST 900 is capable of moving cargo barges and floating craft of various types within a harbor, port, or LOTS anchorage. The ST 900 is shallow draft and of enough horsepower to tow and husband lighter-aboard-ship (LASH) and general cargo barges in harbors, inland waterways, and along coastlines, and will be capable of operation in SS3. It can also assist larger tugs with utility work, such as docking and undocking of ships of all sizes, movement of floating cranes, and line-handling duties. It is transportable aboard LASH ships.

b) *Transportability:* Deck loaded aboard LASH ships or heavy lift vessels.

c) *Employment Trends:* Four ST 900s are pre-positioned in each Army Pre-positioned Set of watercraft for use during contingency and combat operations. The ST 900 was used extensively during OIF supporting tactical watercraft operations forward of the strategic port and JLOTS.

d) *Characteristics/Capabilities:*

(1) *Length overall: 60 feet*

(2) *Beam:* 22 feet.

(3) *Displacement:* 105 long tons (light)/TBD (loaded)

(4) *Deck Area:* No on-deck cargo area

(5) *Payload:* Bollard Pull = 15 tons

(6) *Range:*
- Light: 720 NM at 6 knots
- Loaded: Variable with tow

(7) *Draft:* 6 feet

(8) *Crew Size:* 12 (6 soldier crew for 24-hour operation)

h) *Requirement:* 16; 8 to support one active-component and three Army Reserve–flagged floating-craft companies; 8 in Army Pre-positioned Sets.

i) *On-Hand:* 16

j) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	2	2	2	2	2	2	2	2	2	2	2	2	2
RC	6	6	6	6	6	6	6	6	6	6	6	6	6
Prepo.	8	8	8	8	8	8	8	8	8	8	8	8	8
Total	16	16	16	16	16	16	16	16	16	16	16	16	16

Note: Req. = requirement.

Table A-8. ST 900 Distribution Table

A-11. BARGE DERRICK (BD)

A-11.1 Barge Derrick, 115-Ton
NSN: 1935-01-434-6826
LIN: F36090

Figure A-9. Barge Derrick, 115 Ton

a) *Mission:* The BD 115T is used to load and discharge heavy lift cargo that is beyond the capacity of ships' gear. It provides the lift and reach needed to discharge the heaviest of projected Army cargo from LMSRs, as well as commercial container

ships, to accomplish strategic deployment. It is capable of lifting a 75-ton main battle tank from the centerline of a non-self-sustaining ship. The 89-ton BD does not have this capability. The BD 115T can be employed theater-wide anywhere water terminal or offshore operations are conducted.

b) *Transportability:* The BD 115T can be towed to overseas locations or deck loaded aboard a FLO/FLO ship for transport.

c) *Employment Trends:* During Desert Shield/Desert Storm, an Army BD provided the heavy salvage capability that allowed Army divers to clear the port at Ash Shuaybha, Kuwait and over the course of the war executed over 10,000 lifts. During Operation Restore Hope, an Army BD/LT combination was again used to clear the port of Kismayu in order to overcome an enemy port denial scenario.

d) *Characteristics/Capabilities:*

(1) *Length Overall:* 200 feet

(2) *Beam:* 80 feet.

(3) *Displacement:* 1,560 Tons

(4) *Deck Area:* While not designed for movement of cargo, the BD does have a reinforced well deck forward of the house with clover leafs to secure a limited amount of cargo or to be used as a work platform when pier space or barges are unavailable.

(5) *Payload:*
- Boom Length: 220 feet
- Capacity: 115 long tons at 80-foot radius

(6) *Range:* N/A (non-self-propelled)

(7) *Draft:*
- Light: 7 feet, 4 inches
- Loaded: To be determined

(8) *Crew Size:* 14 (1 warrant officers and 13 enlisted for 24-hour operation)

e) *Requirement:* 5 to support one AC-flagged, two Army Reserve–flagged floating-craft company and two in Army Pre-positioned Sets.

f) *On-Hand:* 4

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	1	0	0	0	0	0	0	1	1	1	1	1	1
RC	2	2	2	2	2	2	2	2	2	2	2	2	2
Prepo.	2	2	2	2	2	2	2	2	2	2	2	2	2
Total	5	4	4	4	4	4	4	5	5	5	5	5	5

Note: Req. = requirement.

Table A-9. BD 115T Distribution Table

A-11.2 Barge Derrick, 89-Ton

NSN: 1935-00-264-6219
LIN: F36090

Figure A-10. Barge Derrick, 89 Ton

a) *Mission:* The BD 89T is used to load and discharge heavy lift cargo that is beyond the capacity of ship's gear. It is commonly called the 100 ton crane, which is the short ton capacity rating.

b) *Transportability:* The BD 89T can be towed to overseas locations or deck loaded aboard a FLO/FLO ship for transport.

c) *Employment Trends:* The only 89-Ton BD currently in service is stationed at fort Eustis ILO of one 115-Ton BD. The 89-Ton BD primarily supports training, but cold be available for operational missions if other BDs are not available.

d) Characteristics/Capabilities:

(1) *Length Overall:* 140 feet

(2) *Beam:* 70 feet.

(3) *Displacement:* 1,630 Tons

(4) *Deck Area:* No usable deck space.

(5) *Payload:*
- Boom Length: 123.5 feet
- Capacity: 89 long tons at 80 foot radius

(6) *Range:* N/A (non-self-propelled)

(7) *Draft:*
- Light: Not Available
- Loaded: 6.3 feet

(8) *Crew Size:* 14 (1 warrant officers and 13 enlisted for 24-hour operation)

e) *Requirement:* There is no current requirement, however one 89-Ton BD is assigned to the AC ILO of the required 115-Ton BD.

f) *On-Hand:* 1

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	0	1	1	1	1	1	1	1	0	0	0	0	0
RC	0	0	0	0	0	0	0	0	0	0	0	0	0
Prepo.	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	1	1	1	1	1	0	0	0	0	0	0

Note: Req. = requirement.

Table A-10. BD 89T Distribution Table

A-12. BARGE, LIQUID CARGO (FUEL)

NSN: 1930-00-313-9472
LIN: B31197

Figure A-11. Barge, Deck or Liquid Cargo (Fuel)

a) *Mission:* The BG 231C is used to transport liquid or general cargo in harbors and inland waters. It can transfer liquid products from offshore tankers to shore facilities. The BG 231 can also serve as a refueling point for watercraft operating in the area.

b) *Transportability:* The BG 231C can be towed to overseas locations or deck loaded aboard a heavy lift ship (HLS).

c) *Employment Trends:* One BG is pre-positioned in each Army Pre-positioned Set of watercraft for use during contingency and combat operations.

d) Characteristics/Capabilities:

(1) *Length Overall:* 120 feet

(2) *Beam:* 33 feet

(3) *Displacement:* 185 long tons (light); 763 long tons (loaded)

(4) *Cargo Capacity:*
- Deck: 578 long tons
- Liquid: 4,160 barrels (188,416 gallons).
- Cargo pump capacity: 1,050 gallons per minute.

(5) *Draft:*
- Light: 3 feet
- Loaded: 9 feet

(6) *Crew Size:* 6 enlisted (3 per shift for 24-hour operation)

e) *Requirement:* 4 to support one AC-flagged and three Army Reserve–flagged floating-craft companies.

f) *On-Hand:* 5

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	1	1	1	1	1	1	1	1	0	0	0	0	0
RC	1	1	1	1	1	1	1	1	0	0	0	0	0
Prepo.	3	3	3	3	3	3	3	3	0	0	0	0	0
Total	5	5	5	5	5	5	5	5	0	0	0	0	0

Note: Req. = requirement.

Table A-11. BG 231C Distribution Table

A-13. MODULAR CAUSEWAY SYSTEM (MCS)

A-13.1. RO/RO DISCHARGE FACILITY (RRDF)

NSN: 1945-01-497-7059
LIN: C14572

Figure A-12. RO/RO Discharge Facility (RRDF)

a) *Mission:* The RRDF provides the essential interface between Army lighters and RO/RO ships. It receives tracked and wheeled vehicles when driven across the RRDF from the RO/RO ship directly onto an Army lighter moored to the RRDF.

b) *Transportability:* The RRDF is constructed of modular causeway systems and can be deployed aboard container ships and other cargo vessels.

c) *Employment Trends:* Two RRDFs are pre-positioned in each Army Pre-positioned Set of watercraft for use during contingency and combat operations.

d) Characteristics/Capabilities:

(1) *Components:*
- 17 modular causeway sections
- 1 combination beach and sea-end section
- 2 modular warping tugs
- 1 lighting, fendering, and anchoring system

(2) *Crew Size (required to assemble):* 31 enlisted (main section: 11 enlisted; warping tug crew: 20 [2 crews] for 24-hour operation)

e) *Requirement:* 6 to support one AC-flagged and two pre-positioned modular causeway companies.

f) *On-Hand:* 6

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	2	2	2	2	2	2	2	2	2	2	2	2	2
RC	0	0	0	0	0	0	0	0	0	0	0	0	0
Prepo.	4	4	4	4	4	4	4	4	4	4	4	4	4
Total	6	6	6	6	6	6	6	6	6	6	6	6	6

Note: Req. = requirement.

Table A-12. RRDF Distribution Table

A-13.2 Causeway Ferry (CF)
NSN: 1945-01-398-3856
LIN: M90110

Figure A-13. Causeway Ferry (CF)

a) *Mission:* The CF moves rolling, break-bulk, and containerized cargo from an ocean-going vessel directly to the shore-side logistics operation or to a fixed or semi-permanent pier. It will support RO/RO and LO/LO operations.

b) *Transportability:* The CF is constructed of modular causeway sections and can be deployed aboard container ships and other cargo vessels.

c) *Employment Trends:* One Causeway Ferry is pre-positioned in each Army Pre-positioned Set of watercraft for use during contingency and combat operations.

d) Characteristics/Capabilities:

(1) *Components:*

- Powered modular causeway section
- 2 modular causeway (intermediate) sections
- 1 combination beach and sea-end section

(2) *Crew Size (required to assemble and operate):* 16 enlisted (CF: 4 enlisted; powered section: 12 enlisted for 24-hour operation)

e) *Requirement:* 3 to support one AC-flagged and two pre-positioned modular causeway companies.

f) *On-Hand:* 3

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	1	1	1	1	1	1	1	1	1	1	1	1	1
RC	0	0	0	0	0	0	0	0	0	0	0	0	0
Prepo.	2	2	2	2	2	2	2	2	2	2	2	2	2
Total	3	3	3	3	3	3	3	3	3	3	3	3	3

Note: Req. = requirement.

Table A-13. Causeway Ferry Distribution Table

A-13.3 Floating Causeway (FC)
NSN: 1945-01-473-2162
LIN: C14504

Figure A-14. Floating Causeway (FC)

a) *Mission:* The FC provides a dry bridge for the discharge of cargo from lighters directly to the beach logistics operations. It can be emplaced in a number of configurations with the trident configuration being the most effective for most conditions. The FC is a key LOTS enabler to over come any beach obstacle or gradient condition in order to allow lighters beach access.

b) *Transportability:* The FC is constructed of modular causeway sections and can be deployed aboard container ships and other cargo vessels.

c) *Employment Trends:* One Floating Causeway is pre-positioned in each Army Pre-positioned Set of watercraft for use during contingency and combat operations.

d) *Characteristics/Capabilities:*

(1) *Components:*
- 29.3 modular causeway (intermediate) sections
- 2 combination beach and sea ends
- 1 lighting, fendering and anchor system
- 2 modular warping tugs (powered sections)

(2) *Crew Size (required to assemble and operate):* 33 enlisted (main segment: 13; warping tug: 20 enlisted for 24-hour operation)

e) *Requirement:* 3 to support one AC-flagged and two pre-positioned modular causeway companies.

f) *On-Hand:* 3

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	1	1	1	1	1	1	1	1	1	1	1	1	1
RC	0	0	0	0	0	0	0	0	0	0	0	0	0
Prepo.	2	2	2	2	2	2	2	2	2	2	2	2	2
Total	3	3	3	3	3	3	3	3	3	3	3	3	3

Note: Req. = requirement.

Table A-14. Floating Causeway Distribution Table

A-13.4 Warping Tug

NSN: 1945-01-473-2285
LIN: W41775

Figure A-15. Warping Tug

a) *Mission:* The warping tug is used tug is used as a tendering vessel to assemble, push, pull, restrain and maneuver the RRDF and FC, and to emplace and retrieve anchors.

b) *Transportability:* The warping tug can be deployed with the MCS aboard container ships and other cargo vessels.

c) *Employment Trends:* Six Warping Tugs are pre-positioned in each Army Pre-positioned Set of watercraft for use during contingency and combat operations.

d) Characteristics/Capabilities:

(1) *Components:* The modular warping tug (MWT) is a self-propelled craft composed of a 40-foot section and two 20-foot raked ends which are configured into 80' x 24' sections.

(2) *Crew Size:* 20 enlisted for 24-hour operations.

e) *Requirement:* 18 to support one AC-flagged and two pre-positioned modular causeway companies.

f) *On-Hand:* 18

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	6	6	6	6	6	6	6	6	6	6	6	6	6
RC	0	0	0	0	0	0	0	0	0	0	0	0	0
Prepo.	12	12	12	12	12	12	12	12	12	12	12	12	12
Total	18	18	18	18	18	18	18	18	18	18	18	18	18

Note: Req. = requirement.

Table A-15. Warping Tug Distribution Table

A-14. VESSEL-TO-SHORE BRIDGING (VSB)

NSN: Under Development
LIN: Under Development

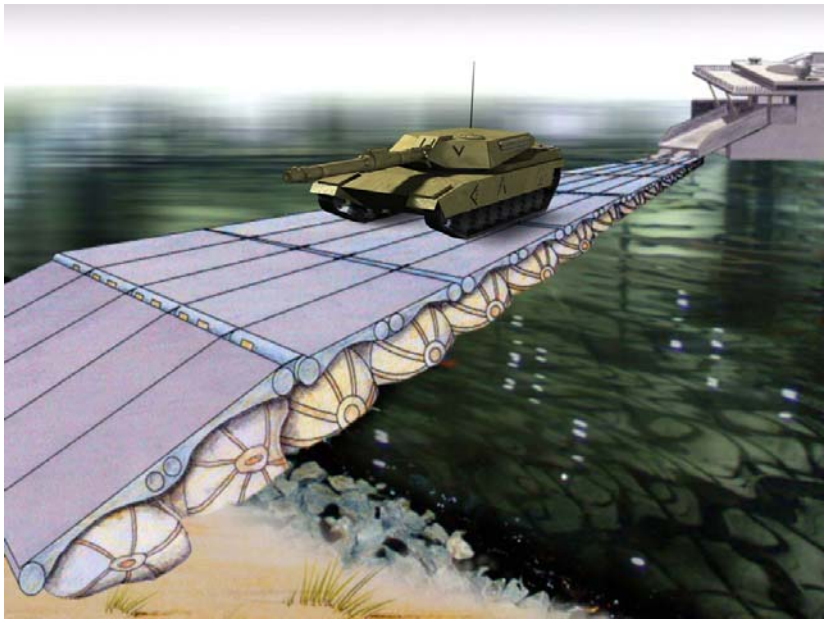

Figure A-16. Concept Drawing of Vessel-to-Shore Bridging

a) *Mission:* VSB capabilities enable current and future watercraft, e.g., the Joint High Speed Vessel (JHSV), to conduct rapid, expeditionary, intra-theater tactical maneuver, support, and sustainment operations in austere (including bare-beach), degraded, and anti-access environments. VSB will be easily employed to allow vessels to connect to austere and bare-beach littoral access points that they could not otherwise reach.

b) *Transportability:* VSB can be carried on current and future watercraft with little space and weight requirements and is transportable by and employable from intra-theater lift platforms.

c) *Employment Trends:* Expectation is that VSB capabilities will be initially be employed with the JHSV. The systems will be capable of being carried and employed by Army watercraft that need to rapidly access austere or bare beach on- and offload sites.

d) *Characteristics/Capabilities:* VSB will provide lightweight floating bridging that provides a causeway-like platform for the offload of wheeled and tracked vehicles, as well as containerized cargo.

e) *Requirement:* 12 to support initial requirement of JHSV Fleet.

f) *On-Hand:* 0

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	12	0	0	0	0	0	0	0	0	0	2	2	1
RC	0	0	0	0	0	0	0	0	0	0	0	0	0
Prepo.	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	12	0	0	0	0	0	0	0	0	0	2	4	5

Note: Req. = requirement.

Table A-16. VSB Distribution Table

A-15. HARBORMASTER COMMAND AND CONTROL CENTER (HCCC)

NSN: Under Development
LIN: Under Development

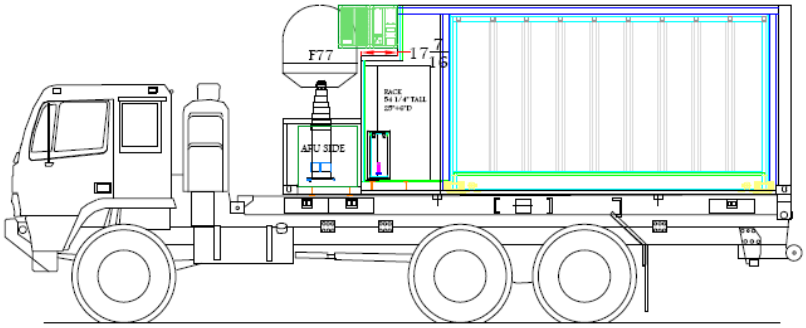

Figure A-17. Concept Drawing of Harbormaster Command and Control Center Mobile Platform

a) *Mission:* The HCCC will be the mission-critical platform that enables the Transportation Harbormaster Detachment to provide 24-hour visibility, and command, control, and coordination of Army watercraft operations.

b) *Transportability:* The HCCC is a mobile system that is fully transportable on intra-theater air and/or sea lift. Once deployed, the HCCC can maneuver itself to locations on the battlefield.

c) *Employment Trends:* HCCC will be designed to rapidly deploy by air or sea lift to any theater of operation in support of watercraft, JLOTS and terminal operations during contingency and combat operations.

d) *Characteristics/Capabilities:* The HCCC will be composed of two mobile platforms and modular components capable of supporting extended, multiple site operations. The system will be equipped with full-spectrum, interoperable communications and situational awareness capabilities. Systems resident in the HCCC mobile platforms provide:

- VHF, UHF, HF, secure & non-secure voice and data communications systems
- real-time vessel tracking
- in-transit visibility
- movement tracking
- joint interoperability with commercial and host nation vessels
- real-time meteorological and bathymetric data

e) *Requirement:* 8 to support four AC-flagged and four RC-flagged harbormaster detachments.

f) *On-Hand:* 0

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	4	0	0	2	4	4	4	4	4	4	4	4	4
RC	4	0	0	0	0	2	4	4	4	4	4	4	4
Prepo.	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	8	0	0	2	2	6	8	8	8	8	8	8	8

Note: Req. = requirement.

Table A-17. HCCC Distribution Table

A-16. CONTAINERIZED MAINTENANCE FACILITY (CMF)

NSN: 4940-01-514-5661
LIN: Z19253

Figure A-18. Containerized Maintenance Facility

a) *Mission:* The CMF is the primary repair system that supports theater-level Army watercraft field maintenance operations. When operational, the CMF provides a fully-equipped watercraft maintenance shop configured in five expandable-wall and two ISO containers.

b) *Transportability:* When configured for movement, the CMF's containers are fully transportable on inter- and intra-theater air and sea lift platforms.

c) *Employment Trends:* One CMF is to be pre-positioned in each Army Pre-positioned Set of watercraft for use during contingency and combat operations.

d) *Characteristics/Capabilities:* the CMF's seven containers provide the following facilities:

- Welding/Machine Shop
- Engine Rebuild/Component Rebuild Shop
- Electrical/Electronics Repair Shop
- Air Conditioning/Hydraulic Repair Shop
- Command and Control/Administrative/Shop Office
- Shop Stock/Bench Stock Storage
- Power Generation/Distribution System

e) *Requirement:* 4 to support one AC-flagged, one RC-flagged and two pre-positioned floating craft maintenance companies.

f) *On-Hand:* 2

g) *Distribution:*

Compo	Req.	Current	FY08	FY09	FY10	FY11	FY12	FY14	FY16	FY18	FY20	FY22	FY24
AC	1	1	1	1	1	1	1	1	1	1	1	1	1
RC	1	1	1	1	1	1	1	1	1	1	1	1	1
Prepo.	2	0	0	0	1	2	2	2	2	2	2	2	2
Total	4	2	2	2	3	4	4	4	4	4	4	4	4

Note: Req. = requirement.

Table A-18. CMF Distribution Table

Annex B
Army Watercraft Employment

The Army Watercraft Fleet is configured and positioned to increase access to area of operation by supporting fixed port operations, amphibious shore landing, operational maneuver and sustainment throughout intra-coastal zones and inland waterways. Army watercraft are employed to maneuver combat forces to the place and time they are needed, to manage and clear Ports of Debarkation (POD), enhance the throughput of an already saturated POD through alternative avenues and to support distribution via intra-theater lines of communication (LOC). These operations are conducted forward of the strategic port and are entirely tactical in nature. This Annex provides high-level operational views (OV-1) of some of the operations Army watercraft support with the intent to provide the reader with a general understanding of the Fleet's capabilities.

B-1. Force Closure Operations

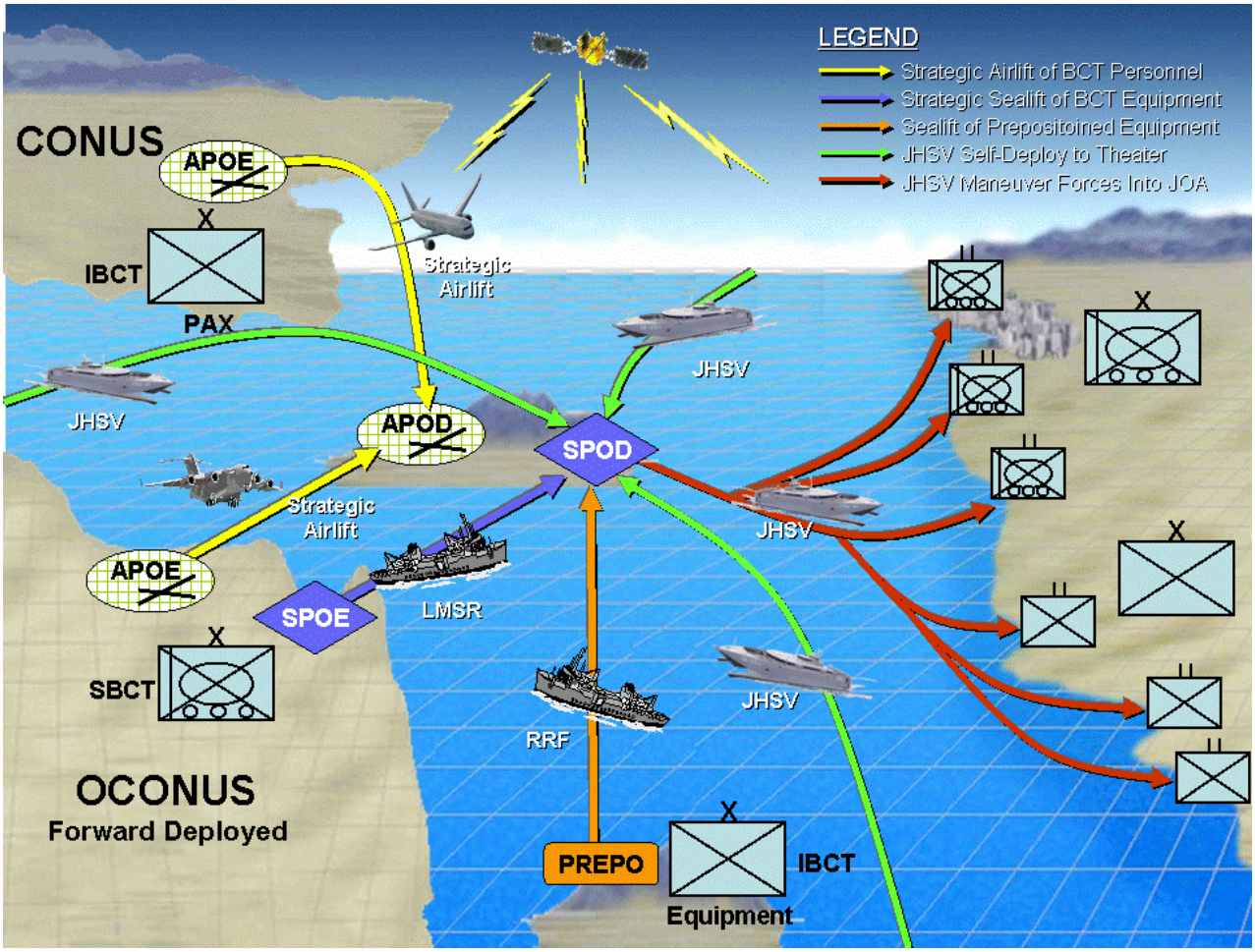

Figure B-1. Army Watercraft in Force Closure Operations

Current Army watercraft support force closure by conducting port opening operations and by repositioning unit equipment. The introduction of JHSV into the inventory will significantly expand the ability of maneuver commanders to close forces using intra-theater surface lift. The JHSV's high speed and shallow draft enables gaining positional advantage by being able to insert combat ready forces (vehicles, soldiers, and leaders) through non-traditional points of entry with little or no reception, staging, onward movement and integration (RSO&I) required in the contested combat zone.

B-2. Operational and Tactical Maneuver Operations

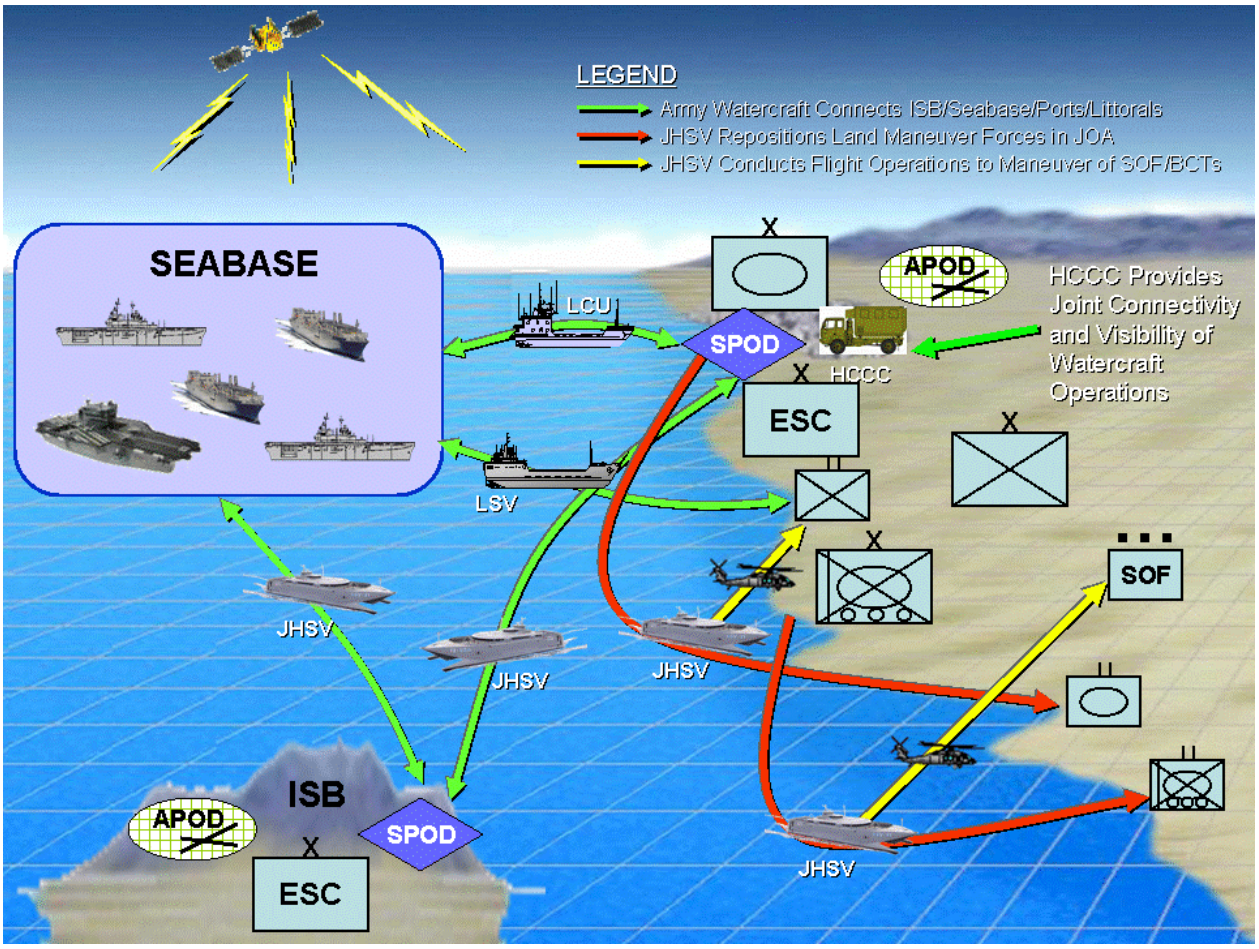

Figure B-2. Army Watercraft Supporting Operational and Tactical Maneuver

Army intra-theater surface lift assets, such as JHSV, are especially well suited to supporting operational and tactical maneuver to and within the operational environment. These platforms provide alternatives to traditional points of entry–mitigating the challenges of degraded infrastructure or a foe's anti-access strategy.

B-3. DISTRIBUTED SUSTAINMENT OPERATIONS

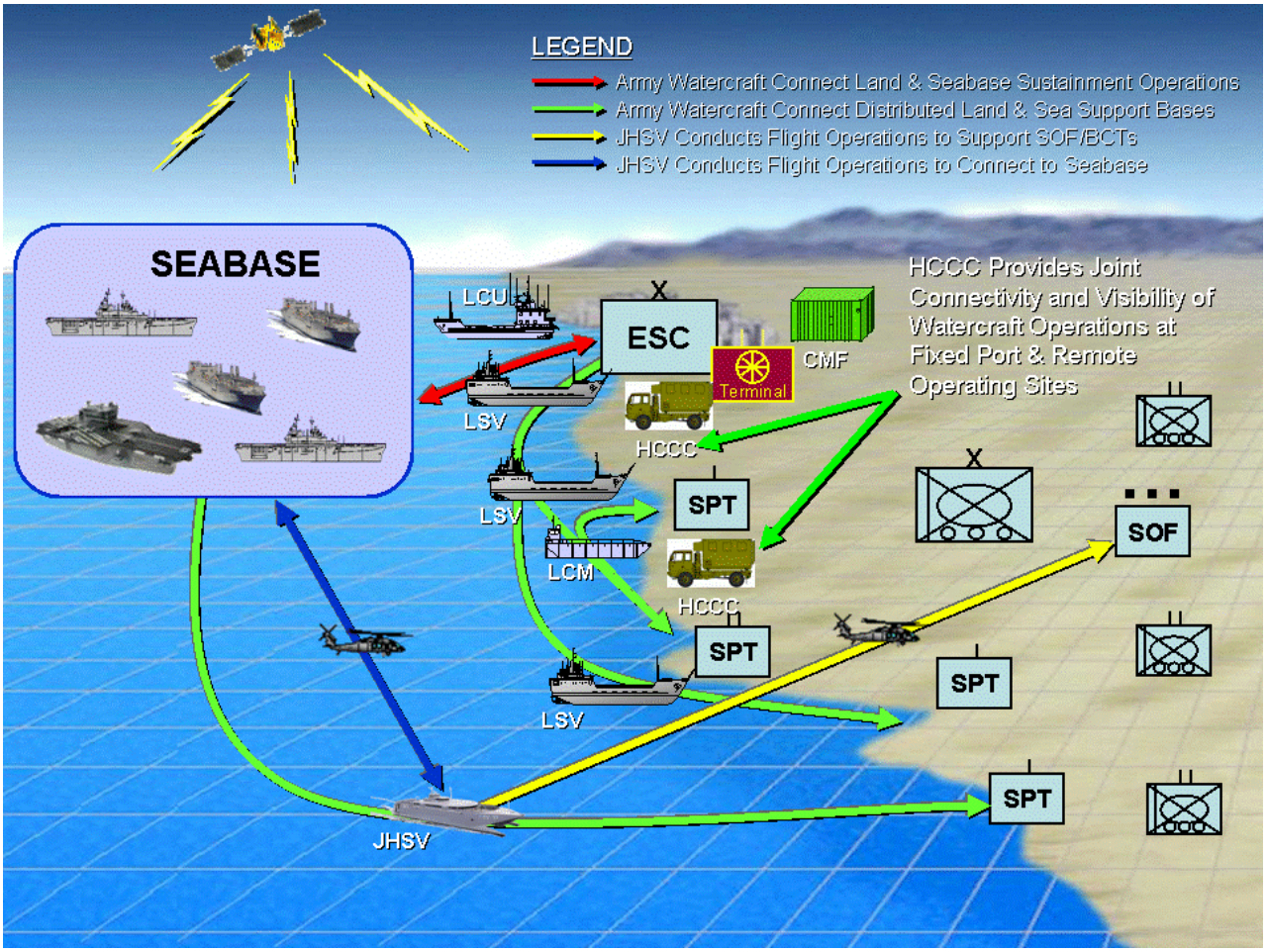

Figure B-3. Army Watercraft Supporting Distributed Sustainment

Intra-theater surface lift assets such as LCUs, LSVs, and LCMs are designed to provide distributed sustainment in the operational environment. Army watercraft can distribute all classes of supply, to include bulk POL, from a seabase, ISBs and other land-based operating sites to units in the operational environment. During operations Restore Hope the employment of LCU-2000s along a coastal LOC relieved 10th ID (Mountain) of the requirement to secure a land LOC from Mogadishu to Kismayuu.

B-4. TACTICAL TERMINAL OPERATIONS

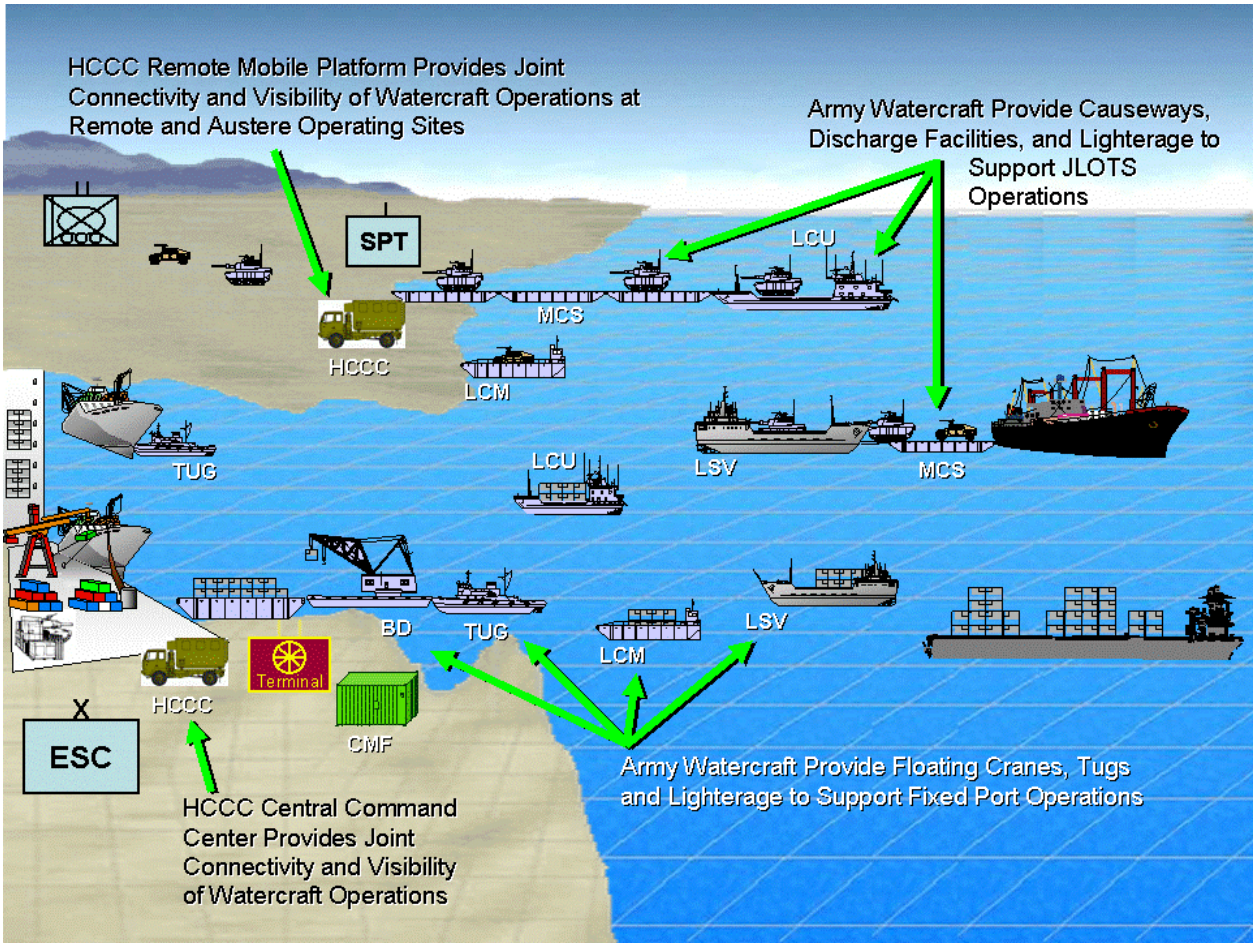

Figure B-4. Army Watercraft Employed in Tactical Terminal Operations

Army Floating Craft - tugs and floating barge derricks - are designed to provide the Army with an organic capability to clear and operate tactical ports whether they are in fixed facilities, austere ports, or in bare-beach JLOTS operations. Army lighters such as LSVs, LCUs and LCM, provide a range of cargo carrying capabilities that support throughput of large quantities of cargo by connect fixed and austere ports, and the Seabase. Working in conjunction with the Modular Causeway System, Army watercraft are capable of conducting in-stream discharge of Joint logistics and commercial vessels and accessing degraded or austere access points. The highly mobile HCCC provides Joint connectivity and m`aintains asset visibility and C2 of Army watercraft operations, including multi-site operations in a distributed operational environment. During Operation Iraqi Freedom, Army lighters, causeways and tugs were employed to augment the Kuwait Naval Base by providing in-stream discharge and throughput of critical ammunition stocks.

B-5. LINE OF COMMUNICATION (LOC) OPERATIONS

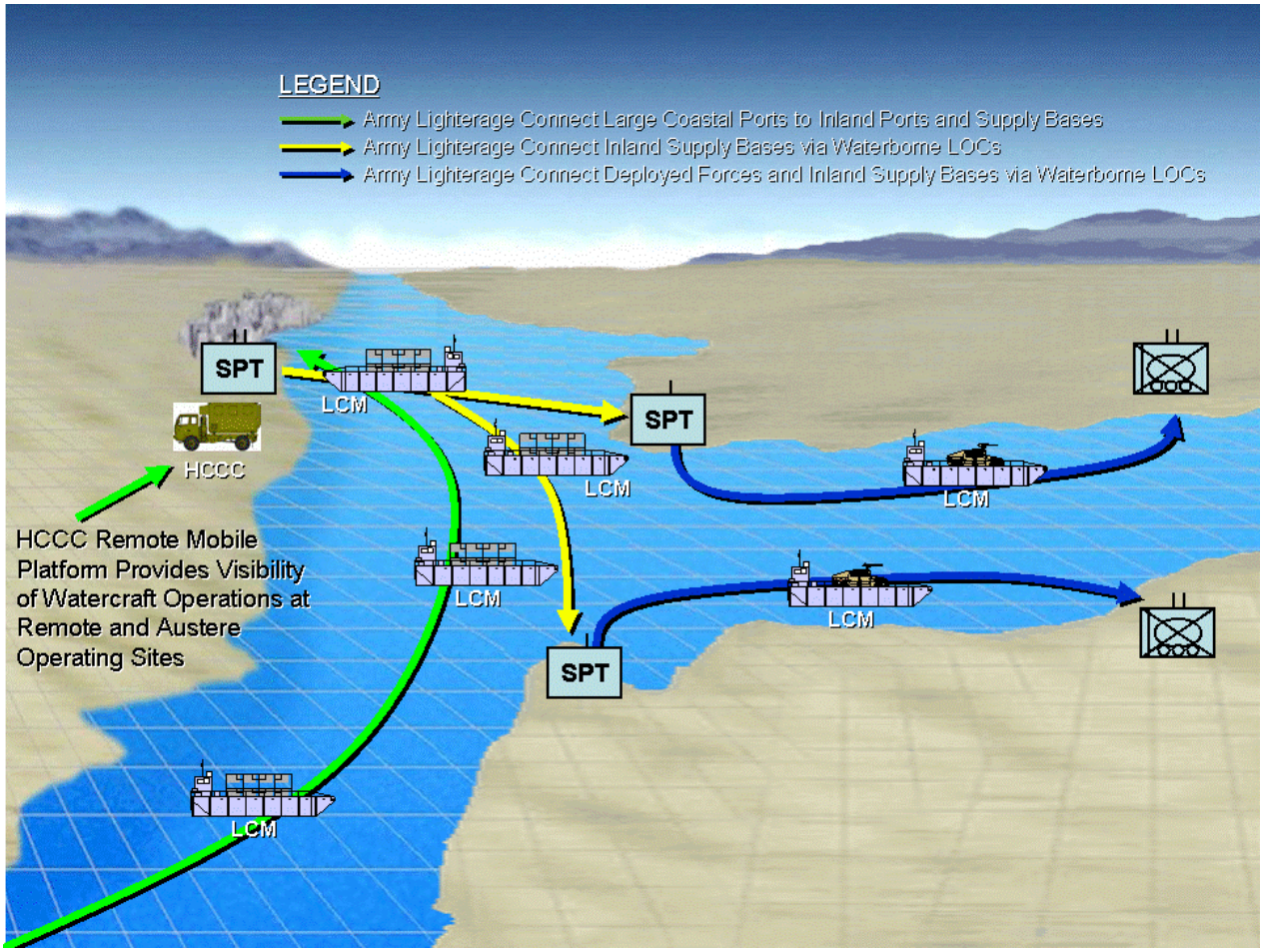

Figure B-5. Army Watercraft Employed to Conduct Tactical LOC Operations

Smaller vessels, such as the LCM, are uniquely designed to provide a range of capabilities that include movement of critical cargo and other movements in constricted areas of the littorals and inland waterways. These vessels support maneuver and sustainment by providing access to inland forces and facilities that cannot be accessed by land-based LOCs because of terrain or operational considerations. This gives the ground commander the ability to support small units and distributed forces with a platform capable of maneuvering well into remote areas of the battlefield and with a larger capacity than tactical wheeled vehicles.

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Annex C
Mariner Training Programs of Instruction

C-1. PURPOSE

The U. S. Army Transportation School is committed to fielding a trained and ready force of Army mariners. Training the force begins with TRADOC and carries over to the Active, Army Reserve, and National Guard units. The high level of skill an Army mariner is expected to attain and maintain requires that frequent crew and unit training be performed at sea. While strong training programs emphasize hands-on underway operations, Training Aids, Devices, Simulators and Simulations (TADSS) complement underway training and are integral to providing a trained and ready force. Vessel Bridge and Engineroom simulators and simulations familiarize and stress vessel crews in performing intricate underway maneuvers during heavy sea conditions, limited visibility and in less than ideal conditions. They are critical to ensuring that mariners of the Power Projection Army can perform watercraft operations worldwide. This annex discusses the Programs of Instruction of the various Army mariner training courses.

C-2. STRUCTURE OF PROGRAMS OF INSTRUCTION

Proponent School Programs of Instruction (POI) for enlisted MOS 88K (Watercraft Operator) and 88L (Watercraft Engineer) and officer MOS 880A (Marine Deck Officer) and 881A (Marine Engineering Officer) are intended to impart core knowledge and fundamental skills to the trained soldier. Training goals are the successful completion of the appropriate Marine Technical Examination (MTE) and competent operation of marine systems at the given skill level. Courses are intended to provide sufficient understanding of the operation, laws, rules, concepts, safety, and techniques to allow the soldier to advance his competency and skill in a unit training program.

a) Course content of each POI must be reviewed annually and updated to reflect the most current techniques being used and new equipment fielded. References and training materials used during training are current and reflect what the soldier would expect to use in actual operation of watercraft.

b) To the greatest extent feasible, hands-on training is on the actual equipment or most realistic simulation available. Instructor personnel are qualified on the equipment or system they are demonstrating. Because training is conducted on actual equipment, student supervision and risk management is paramount.

c) A synopsis of the resident course POI is given for each skill level of maritime training. The scope, objectives, and prerequisites are provided for each POI..

Figure C-1. Marine engineers are responsible for the safe and efficient operation of vessel machinery.

1) *Enlisted Marine Engineering Courses.* Watercraft engineers are the technical experts for all engineering systems aboard the vessel. This includes electrical power generation, power distribution, electrical troubleshooting and repair, pipefitting, welding and structural repair, air conditioning and refrigeration, potable water, sewage processing, main propulsion including diesel engines, reduction gears and shafting, and all other services normally taken for granted in a shore environment.

Table C-1. Enlisted Marine Engineering Courses

Specialty	Course
MOS: 88L10 Watercraft Engineer	
Purpose	Provide enlisted personnel with entry-level training on the performance requirements of selected critical tasks related to operation and maintenance of ships' engines and machinery. The duty position for which training is provided is engineman aboard all Army vessels.
Scope	Marine hydraulic/pneumatic systems, shipboard fire fighting/damage control, drills and survival measures, shipboard sanitation and first aid, miscellaneous technical tasks, high-speed diesel engines, heavy duty diesel engines, marine electric and utility systems, and environmental control systems.
Prerequisites	Active Army or Reserve Component enlisted personnel. Prerequisites are not waiverable. Uncorrected distant visual acuity of not more than 20/200 in each eye, that corrects with spectacle lenses to 20/20 in one and 20/40 in the other eye.
MOS: 88L20 Watercraft Engineer	
Purpose	Train selected personnel to perform 88L20 common watercraft engineer tasks and to successfully complete the MTE.
Scope	Marine hydraulics/pneumatics, high-speed diesel engines, heavy duty diesel engines, electrical systems, marine heating/refrigeration, propellers, fuel systems, utility/environmental control, and common technical tasks.

Table C-1. Enlisted Marine Engineering Courses

Specialty	Course
Prerequisites	Active Army or Reserve Component enlisted personnel with recommendation of commander. Prerequisites are not waiverable. Uncorrected distant visual acuity of not more than 20/200 in each eye, that corrects with spectacle lenses to 20/20 in one and 20/40 in the other eye. Be certified and current by the U. S. Army Marine Qualification Division (MQD) to the 10 level certification in accordance with AR 56-9.
MOS: 88L30 Watercraft Engineer (Basic Noncommissioned Officer Course ([BNCOC] Technical Track)	
Purpose	Train selected personnel to perform common marine engineer tasks, supervise subordinates, and successfully complete the MTE. Complement 88L30 training by building leadership skills, introducing new doctrine, and refresher training in those areas of high learning decay.
Scope	Marine hydraulics/pneumatics, shipboard fire fighting and damage control, marine electrical systems, marine heating/refrigeration, utility/environmental control, supervisory responsibility, and common technical tasks. Leadership, military, and professional skills; resource and training management; and training conducted in a structured environment.
Prerequisites	Active Army or Reserve Component enlisted Soldier that meets enlistment requirements. Selected by PERSCOM (Active Army) or recommended by unit commander (Reserve Component). Meets requirements outlined in AR 350-1, paragraphs 3-8 and 3-9. Active and Reserve soldiers over 40 must complete required medical screening and received status prior to attending. Only SSGs and SGTs will attend. Must successfully complete PLDC at least 6 months prior to attending this course. Meet the Physical requirements in accordance with DA PAM 611-21. Be certified and current by the U. S. Army Marine Qualification Division (MQD) to the 20 level certification in accordance with AR 56-9. Students must complete the Composite Risk Management (CRM) Commander's Safety Course (dl) on line through the Combat Readiness Center website https://crc.army.mil this is a prerequisite for graduation from the BNCOC.
MOS: 88L40 Watercraft Engineer (Advanced Noncommissioned Officer Course [ANCOC] Technical Track)	
Purpose	Train selected personnel to perform as platoon/control sergeants and marine/amphibian maintenance supervisors. Become certified to grade by successfully completing the MTE.
Scope	Leadership, communication, and common military skills; training management; common engineering tasks; technical inspections; fuel injection; electrical and refrigeration systems; hydraulics; familiarization with EMD; Cummins and Caterpillar engines.
Prerequisites	Active Army or Reserve Component enlisted Soldier that meets enlistment requirements. Selected by PERSCOM (Active Army) or recommended by unit commander (Reserve Component). Meets requirements outlined in AR 350-1, paragraphs 3-8 and 3-9. Active and Reserve soldiers over 40 must complete required medical screening and received status prior to attending. Only SFC and SSGs will attend. Successfully completed BNCOC at least 1 year prior to attending course. Meet the Physical requirements in accordance with DA PAM 611-21. Be certified and current by the U. S. Army Marine Qualification Division (MQD) to the 30 level certification in accordance with AR 56-9. Students must complete the Composite Risk Management (CRM) Operational Course (dl) on line through the Combat Readiness Center website https://crc.army.mil this is a prerequisite for graduation from the ANCOC.

Figure C-2. Watercraft operators are responsible for the safe operation of vessels.

2) *Enlisted Deck Operations Courses.* Watercraft operators are the technical experts for all vessel operations to include communications, navigation, vessel administration, deck seamanship, towing, deck maintenance, and other tasks pertaining to the operation of ships in international waters.

Table C-2. Enlisted Deck Operations Courses

Specialty	Course
MOS: 88K10 Watercraft Operator	
Purpose	Provide enlisted personnel with entry-level training on the performance requirements of selected critical tasks related to operation, navigation, and maintenance of Army watercraft. Duty position for which training is provided is watercraft operator aboard all Army vessels.
Scope	Identification of ship's structure, communications, emergency and lifesaving procedures, marlinespike seamanship, vessel operations, vessel administrative duties, vessel maintenance, fire fighting, and watch standing.
Prerequisites	Active Army or Reserve Component enlisted personnel. Prerequisites are not waiverable. Uncorrected distant visual acuity of not more than 20/200 in each eye, that corrects with spectacle lenses to 20/20 in one and 20/40 in the other eye.
MOS: 88K20 Watercraft Operator	
Purpose	Train selected personnel to perform 88K20 common marine tasks and successfully complete the MTE.
Scope	Passenger movements, fire fighting/damage control, marlinespike seamanship, vessel administration, leadership, navigation and quartermaster duties, vessel handling and seamanship, marine deck operations, and maritime regulations.

Table C-2. Enlisted Deck Operations Courses	
Specialty	Course
Prerequisites	Active Army or Reserve Component enlisted personnel with recommendation of commander. Prerequisites are not waiverable. Uncorrected distant visual acuity of not more than 20/200 in each eye, that corrects with spectacle lenses to 20/20 in one and 20/40 in the other eye. Be certified and current by the U. S. Army Marine Qualification Division (MQD) to the 10 level certification in accordance with AR 56-9.
MOS: 88K30 Watercraft Operator (BNCOC Technical Track)	
Purpose	Train selected personnel to perform 88K30 common marine tasks, supervise subordinates, and successfully complete the MTE. Complement 88K30 training by building leadership skills, introducing new doctrine and refreshment in those areas of high learning decay.
Scope	Fire fighting/damage control, marine cargo operations, marlinespike seamanship, rigging of tows, vessel administration and leadership, navigation and quartermaster duties, marine deck operations, maritime regulations, and shipboard sanitation. Leadership, military, and professional skills; resource and training management, and training conducted in a structured environment.
Prerequisites	Active Army or Reserve Component enlisted Soldier that meets enlistment requirements. Selected by PERSCOM (Active Army) or recommended by unit commander (Reserve Component). Meets requirements outlined in AR 350-1, paragraphs 3-8 and 3-9. Active and Reserve soldiers over 40 must complete required medical screening and received status prior to attending. Only SSGs and SGTs will attend. Must successfully complete PLDC at least 6 months prior to attending this course. Meet the Physical requirements in accordance with DA PAM 611-21. Be certified and current by the U. S. Army Marine Qualification Division (MQD) to the 20 level certification in accordance with AR 56-9. Students must complete the Composite Risk Management (CRM) Commander's Safety Course (dl) on line through the Combat Readiness Center website https://crc.army.mil this is a prerequisite for graduation from the BNCOC.
MOS: 88K40 Watercraft Operator (ANCOC Technical Track)	
Purpose	Train selected personnel to perform as Platoon/Control Sergeants , Watercraft NCOs (Mates) and Master of Small Tugs and to become certified to grade by successfully completing the MTE and the Marine Radar Observer Examination.
Scope	Leadership, communications, and common military skills; training management; general marine subjects, rules of the road, shipboard operations, vessel administration; shipboard emergencies; firefighting/damage control, navigational math, deck seamanship; visual communications, marine communications; meteorology, piloting; ship handling; and collision avoidance radar navigation, piloting field training exercise (FTX) voyage, culminating with an end-of-course comprehensive marine technical examination (MTE).
Prerequisites	Active Army or Reserve Component enlisted Soldier that meets enlistment requirements. Selected by PERSCOM (Active Army) or recommended by unit commander (Reserve Component). Meets requirements outlined in AR 350-1, paragraphs 3-8 and 3-9. Active and Reserve soldiers over 40 must complete required medical screening and received status prior to attending. Only SFC and SSGs will attend. Successfully completed BNCOC at least 1 year prior to attending course. Meet the Physical requirements in accordance with DA PAM 611-21. Be certified and current by the U. S. Army Marine Qualification Division (MQD) to the 30 level certification in accordance with AR 56-9. Students must complete the Composite Risk Management (CRM) Operational Course (dl) on line through the Combat Readiness Center website https://crc.army.mil this is a prerequisite for graduation from the ANCOC.
Marine Radar Observer	
Purpose	Provide selected marine personnel with a working knowledge of the fundamentals, operation, and use of marine radar as an anticollision device. Upon successful completion, the student will be issued a U.S. Coast Guard approved Marine Radar Observer Certificate. MOS for which trained: None.
Scope	Radar theory and operation, government policy pertaining to radar, and radar plotting of single and multiple targets for determining true course and speed of targets and evasive action of observer's vessel to avoid collision.
Prerequisites	Active Army and Reserve component personnel to qualify for Warrant Officer MOS 880A1 (Marine Deck Officer); certified enlisted MOS 88K40 (Mate), MOS 88K20 Mod 2 LCM-8s Coxswain; and appropriately certified enlisted operators assigned to radar equipped watercraft. Personnel from other services and U.S. government civilians assigned or pending assignment to positions requiring certification as radar observer may be accepted. Applicants for renewal of the radar observer certification may be accepted for attendance more than once.

Figure C-3. Engineering records are kept on vessel machinery operation.

3) *Warrant Officer Engineer Courses.* The Marine Engineering Officer is directly responsible to the Vessel Master for the safe and efficient operation of the engineering department. The Marine Engineering Officer is the subject matter expert for all engineering systems aboard the vessel.

Table C-3. Warrant Officer Engineer Courses

Specialty	Course
MOS: 881A1, Marine Engineering Officer	
Purpose	Train Warrant Officers, approved for MOS 881A, to perform as Chief or Assistant Chief Engineer aboard Army watercraft and to successfully meet the academic and vessel-specific requirements for the U.S. Army Marine License annotated: Chief Engineer of Class A1 Motor Vessels; Assistant Engineer of Class A-2 Unlimited Motor Vessels.
Scope	General marine subjects; damage control, firefighting, confined space entry, pollution control and abatement, ship structure and stability, welding, hull repair, non destructive testing procedures, and military briefing techniques; supply procedures; repair parts; maintenance management; marine engineering principles and practices; marine refrigeration, heating, ventilation, and air conditioning; marine sanitation; marine auxiliary equipment maintenance and repair; high speed and main two- and four-stroke cycle marine diesel propulsion engines and drive reduction gear; boilers; alternating and direct current marine electrical generation and distribution systems; marine hydraulics; and marine electric and hydraulic steering and thruster control systems for academic certification and vessel-specific licensing.
Prerequisites	Active Army and Reserve component Warrant Officers. Graduates of the Warrant Officer Candidate School. Must meet mandatory prerequisites for MOS 881A as established by the current DA Warrant Officer Procurement Circular.
MOS: 881A2 Marine Engineering Officer	
Purpose	Train selected Marine Engineering Officers to perform as Chief Engineer, operating, maintaining and repairing engineering systems aboard Army watercraft in open ocean waters for towing, salvage, and resupply operations; and successfully complete the academic requirements for U.S. Army Marine Certification as: Chief Engineer of Class A2 Unlimited Motor Vessels upon Oceans.
Scope	Proponent common subjects: supply, Army maintenance policies and procedures, confined space entry, pollution control and abatement, military briefings, and hazcom. MOS specific subjects: Inspection and ensure compliance with federal, state, local, and Army regulations, guidelines, and policies of ship systems to include but not limited to piping, steering, hydraulic, electrical, marine sanitation, and air systems. Other areas of concentration are non destructive testing, props, shafts, rudders, barges, and lifting gear.
Prerequisites	Active Army or Reserve component Marine Engineering Officer with 4 years of marine Warrant Officer Service in MOS 88lAl and meet the general requirements described in AR 56-9. Active service obligation after completion of course: Active Army Warrant Officers, 360 days; RC Warrant Officer, None.

Figure C-4. Deck officers are responsible for all operations conducted on or with their vessel and for the C2 in open and restricted waters.

4) *Warrant Officer Deck Operations Courses.* Marine deck officers are responsible and accountable for all operations conducted on or with their vessel. Responsible for the command and control of the vessel in open and restricted waters in accordance with local and international laws. The Vessel Master is the ultimate decision authority on his vessel while underway.

Table C-4. Warrant Officer Deck Operations Courses

Specialty	Course
MOS: 880A1 Marine Deck Officer	
Purpose	Train Warrant Officers to command, operate, and maintain Army watercraft in inland, coastal, and open waters for resupply, amphibious, towing, and salvage operations. Successfully meet the academic and vessel-specific requirements for U.S. Army Marine License annotated: Master of Class A-1 Motor Vessels upon Coastal and Inland Waters; Mate of Class A2 Unlimited Motor Vessels upon Oceans; Radar Observer.
Scope	General marine subjects, rules of the road, piloting and shipboard operations, electronics, aids to navigation, CPR and first aid, confined space entry, pollution prevention, shipboard medical emergencies, shipboard emergencies, voyage planning, cargo operations, stability, nautical math, meteorology, adjusting the magnetic compass, marine sextant corrections, dead reckoning, ocean winds and currents, Mercator sailing, electronic and celestial navigation, marine radar and radar collision avoidance, radar piloting, Systematic Radar Vector Analysis, Global Maritime Distress and Safety Systems (GMDSS), Bridge Resource Management (BRM), NAVSAT/global positioning system (GPS), navigation rules, radio communications, visual communications, towing, towing gear, tugboat design and equipment, tow preparation and makeups, emergency towing, shiphandling, navigational astronomy, time, nautical almanac, sight reduction tables, celestial LOP, sun azimuth and amplitude, star identification, celestial fixes, piloting/celestial field training exercise (FTX) voyage, culminating with an end-of-course comprehensive examination.
Prerequisites	Active Army and Reserve component Warrant Officers, Graduates of an approved Warrant Officer Candidate School. Must be approved for MOS 880A1 and meet the prerequisites established by the current DA Warrant Officer Procurement Circular and AR 56-9.
MOS: 880A2 Marine Deck Officer	
Purpose	Train selected Marine Deck Officers to command, operate, and maintain Army watercraft in support of worldwide Army logistic operations. Successfully complete the academic requirements for U.S. Army Marine Certification as: Master of Class A2 Unlimited Motor Vessels upon Oceans; Radar Observer.
Scope	Computer literacy, military writing, military briefing, unit status reports, CPR and first aid, confined space entry, medicine, voyage planning, harbor pilot, cargo operations, stability, nautical math, meteorology, adjusting the magnetic compass, marine sextant corrections, dead reckoning, ocean winds and currents, mercator sailing, great circle sailing, electronic and celestial navigation, marine radar and radar collision avoidance, radar piloting, LORAN, NAVSAT/global positioning system (GPS), Global Maritime Distress and Safety Systems (GMDSS), Bridge Resource Management (BRM),navigation rules, radio communications, towing, towing gear, tugboat design and equipment, tow preparation and makeups, emergency towing, shiphandling, navigational astronomy, time, nautical almanac, sight reduction tables, celestial LOP, sun azimuth and amplitude, star identification, latitude by celestial observation, celestial fixes, piloting/celestial field training exercise (FTX) voyage, culminating with an end-of-course comprehensive examination.
Prerequisites	Active Army or Reserve Component Marine Deck Officer with 4 years of Marine Warrant Officer Service in MOS 880A1 and meets the general requirements described in AR 56-9. Active service obligation after completion of course: Active Army Warrant Officers, 360 days; RC Warrant Officer, None.

5) *Joint High Speed Vessel (JHSV) Training.* The JHSV is unique in Army watercraft in that it is designed to operationally move unit sets. This means the JHSV will be the first Army watercraft designed to move personnel and equipment together in a ready-to-fight configuration. This will require new approaches to training, requiring each course to emphasize the unique nature of this craft as an operational platform as opposed to simply another logistics vessel. The JHSV training program is currently under development. The following identifies the conceptual framework around which JHSV training programs will be conducted. The JHSV will include

Internet-based training without increasing the training burden on the institution or operator or placing undue reliability burdens on the control systems and indicators at the individual platform level. This embedded training must be able to be used before, during, and after deployment, allow crews to digitally train in the environment in which they will fight, and to conduct en route mission planning and rehearsals. Proper operation must not be so complicated that frequent, extensive retraining is required to maintain operator and maintainer proficiency. Appropriate training methods, devices, simulators, and simulations must be available for the institutional training base as well as JHSV-equipped units. JHSV systems and subsystems must be designed to serve as training devices without actual operation of the equipment to facilitate individual, crew, and organizational training proficiency. The same controls that are used to operate the JHSV systems must serve as the training simulation controls and must be used in the same manner for training as for actual operations. Embedded simulations will also permit mission planning and rehearsal in both stand-alone and Internet-based modes. JHSV will employ embedded simulations combining their capabilities into one package for both training and operational missions. Training for the JHSV personnel will involve four courses:

- High Speed Craft Safety Course (HSCS)
- High Speed Craft Deck Systems (HSCDS)
- High Speed Craft Engineering Systems (HSCES)
- High Speed Craft Integrated Bridge Operations (HSCIBO).

C-3. SUMMARY

Maintaining skilled and highly capable crews for Army watercraft requires a total commitment to training. This commitment must include funding resources for the training aids and simulators necessary for use by instructors in the Transportation School and funding to allow operators to practice their skills in an operational environment. Continued review of POIs, development of improved training methods, use of new technology and continued execution of SEDREs, JLOTS exercises, and other unit training missions will ensure a trained, proficient staff of Army mariners

Annex D
Watercraft Capability Gap-Task-MOE Crosswalk

The CBA assessed the required capabilities against measures of effectiveness (MOE) within each of nine watercraft tasks the Army must be able to perform to meet Future Joint Force operational requirements. The CBA assessed each of the MOE using a red-amber-green rating system - based on input from Army and Joint Subject Matter Experts (SME) - and then translated those ratings into the seven capability gaps. The CBA used the MOE ratings and the residual gaps identified in the gap analysis as the framework for developing and analyzing potential approaches to fill the future capability gaps. This framework formed a matrix (Figure D-1) that depicts the relationships between the gaps and the metrics by which they were measured—the tasks and MOEs. The ratings do not evaluate the current Fleet's ability to meet current requirements; they are an assessment of current and emerging capabilities ability to meet future operational requirements. Table D-2 shows how the matrix will change with implementation of the strategies in the 2008 AWMP, with the goal to achieve at least an "amber" level for all capabilities. Table D-2 indicates the 2015-2024 goal and references the section in the AWMP that describes the actions/strategies that, if accomplished, will lead to the higher rating.

The summary chart - shown in figure 1 on page 3 - provides a synopsis of the gap and solutions analyses shown in Figures D-1 and D-2. Figure 1 depicts the summary analysis of the current Fleet's capabilities (Figure D-1) by showing the approximate percentage of MOEs that are green, amber, and red for each Task. For example, if a task is composed of 20 MOEs across the seven gaps, five of which are rated amber and the other 15 rated red, then the CBA summary column in Figure 2-1 is shown as approximately 25% amber and 75% red. The critical capability shortfall shown for each task in Figure 2-1 is intended to provide a summation of the findings of the FSA as detailed in Figure D-2. Figure 2-1 notes the solutions that move the capability from red up to at least amber - Figure D-2 provides a more detailed summary of the findings of the FSA.

For a complete understanding of the CBA, readers should refer to the approved CBA documents themselves.

TASK	MEASURES OF EFFECTIVENESS	GAPS						
		C4ISR, JC2 Capability	BCOTM Situational Awareness Capability	Close, Employ, Support and Sustain Joint Forces	Rapidly Shift Combat Ready Maneuver Units	Rapid Sustainment During Expeditionary Operations	Resupply to Distributed Modular Forces	Ability to conduct Two-Level Maintenance
Close the Force	Army waterborne capabilities include operational lift platforms capable of moving intact operationally-ready combat forces over strategic distances.				R			
	Waterborne operational lift platforms are capable of moving at speeds sufficient to meet NMS swiftness goals and COCOM responsiveness requirements.			R	R	R		
	Waterborne operational lift platforms are capable of interfacing with and operating as part of Joint Seabasing operations.	A			A	A	A	
	Waterborne operational lift platforms possess shallow draft capabilities that enable interface with austere access operations.			A	R	A	A	
	Waterborne & operational lift platforms are capable of interfacing with and operating as part of JLOTS operations.	A			A	A	A	
Establish and Maintain Situational Awareness	Army waterborne platforms are equipped to enable real-time visibility and situational awareness of the common operating picture (COP).	R	R					
	Army waterborne platforms are adequately equipped to conduct full range of real-time operational data-gathering, to include electronic observation/monitoring of the local area, and threat-detection sensor capability	R	R					
	Army waterborne platforms are adequately equipped to conduct the full range of real-time meteorological and bathymetric data-gathering necessary to support vessel operations in any environment.	A	A					
	Army waterborne platforms are adequately equipped to conduct real-time ISR and input tactical and operational-level information into the COP.	R	R					
Provide BCOTM to Embarked Units	Provide embarked maneuver forces with BCOM capability adequate to maintain operational readiness and connectivity to the COP.	R	R		R	R		
	Army waterborne platforms provide embarked maneuver forces with the ability to maintain connectivity with and responsiveness to higher, lower and adjacent headquarters, enabling continuity of combat operations while moving.	R	R		A	A		
	Army waterborne platforms provide embarked maneuver forces with the ability to communicate, receive and plan changes in mission, based on shifts in operational requirements while embarked.	R	R		R	R		
	Army waterborne platforms provide embarked maneuver forces with the ability to conduct enroute mission rehearsal.	R	R		R	R		
Operate in Open Ocean an Anti- Access Environmen	Army waterborne platforms are capable of operating throughout the littorals, to include austere, shallow-draft access points, rivers and inland waterways, in order to meet COCOM assured access requirements.			A	A	A	A	
	Army waterborne platforms are capable of operating in and moving strategic distances over open ocean and deep water in order to meet COCOM responsiveness requirements.			A	A	A	A	
	Army waterborne platforms are capable of operating in elevated seastate and severe meteorological environments			A	A	A	A	
	Army waterborne platforms are capable of surviving extreme sea state and meteorological environments			A	A	A	A	
Provide Operationa Maneuver for Combat Forces	Provide combatant commanders the ability to move intact, operationally ready maneuver forces through the littorals to austere access points.	R	R	R	R	R		
	Army waterborne platforms provide Maneuver Force commanders the ability to conduct operational maneuver through the littorals to achieve tactical objectives.	R	R	R	R	R		
	Army waterborne platforms are capable of maneuvering operationally ready units to any littoral access point necessary to meet COCOM operational requirements, to include austere, degraded and bare beach sites.	R	R	R	A	A		
	Army waterborne platforms are configured to load and unload combat ready units and equipment in a manner that meets COCOM operational and tactical movement timelines.	R	R	R	R	R		
Conduct Distributed Sustainment Operations	Army Waterborne platforms provide commanders with the ability to move large volumes of sustainment cargo throughout the littorals, rivers and inland waterways.					G	G	
	Army waterborne platforms provide integrated and interoperable capability to on-load and offload sustainment stocks.					A	A	
	Army waterborne platforms are capable of providing coordinated, simultaneous support to multiple sustainment operations sites distributed throughout the JOA.			A		A	A	A
	Army waterborne platforms provide the ability to conduct sustainment operations at any access point necessary to meet COCOM operational requirements to include austere, degraded and bare beach operations.			A		A	A	A
	Army waterborne platforms are capable of interfacing with and operating in support of Joint Force cargo and terminal operations units engaged in sustainment operations.	A				A	A	A
	Army waterborne platforms are capable of interfacing with and operating in support of homeland security and emergency response organizations engaged in sustainment operations.	A				R	R	
Support Terminal Operations	Army waterborne platforms are capable of interfacing with cargo handling capabilities and operations at commercial and military fixed ports.	G		G		G	G	
	Army waterborne platforms are capable of accessing, and interfacing with cargo handling capabilities and operations at degraded ports.	A		A		A	A	
	Army waterborne platforms are capable of accessing and interfacing with cargo handling capabilities and operations at austere littoral access points.	A		A		A	A	
	Army waterborne platforms are capable of accessing bare beach sites, and interfacing with cargo handling capabilities and operations engaged in Joint-Logistics-Over-the-Shore (JLOTS) operations.	A		A		A	A	
	Army waterborne platforms are maintained and supported IAW applicable policies and concepts.			A	A	A	A	A
	Army waterborne platforms are capable of conducting port or harbor clearence and salvage operations at austere or degraded ports and littoral entry points			A		A	A	A
Conduct Seabase Operations	Army waterborne platforms are capable of interfacing with vessels and platforms operating within a Joint Seabase.	A		A	A	A	A	
	Army waterborne platforms are capable of interfacing with Joint Forces operating within the Seabase of a Joint Seabasing operation.		A	A				
	Army waterborne platforms are capable of loading and unloading operationally ready maneuver forces form the seabased vessels and platforms within the Seabase.			R	R			
	Army waterborne platforms are capable of interfacing with cargo handling capabilities being employed from a seabased platform.			A	A	A	A	
	Army waterborne platforms are capable of supporting operational maneuver of combat ready forces as part of Joint Seabasing operations	R	R	R	R			
Operate in a Non-Contiguous, Uncertain Threat Environment	Army waterborne platforms are capable of identifying hostile threats in a manner that allows appropriate response enabling protection of the vessel, crew, passengers and cargo.	R	R					
	Army waterborne platforms are capable of responding with passive defense measures to mitigate the effects of hostile threats.	R	R					
	Army waterborne platforms possess force protection capabilities that enable active response to hostile threats in a manner that maintains operational tempo while protecting the vessel, crew, passengers and cargo.	A	A	A	A	A	A	
	Army waterborne platforms are capable of identifying severe and threatening meteorological and maritime conditions in a manner that allows appropriate response enabling protection of the vessel, crew, passengers and cargo.	A	A	A	A	A	A	
	Army waterborne platforms are capable of responding to severe and threatening meteorological and maritime conditions in a manner that maintains operational tempo while protecting the vessel, crew, passenger, and cargo.	A	A	A	A	A	A	A

Figure D-1. Army Watercraft Capability Gap—Task—MOE Crosswalk

TASK	MEASURES OF EFFECTIVENESS	GAPS							AWMP REFERENCE & STRATEGY
		C4ISR JC2 Capability	BCOTM Situational Awareness Capability	Close, Employ, Support and Sustain Joint Forces	Rapidly Shift Combat Ready Maneuver Units	Rapid Sustainment During Expeditionary Operations	Resupply to Distributed Modular Forces	Ability to conduct Two-Level Maintenance	
Close the Force	Army waterborne capabilities include operational lift platforms capable of moving intact operationally-ready combat forces over strategic distances.				G				2.1.1: Field JHSV in sufficient quantities and with Army-required C4ISR capabilities
	Waterborne operational lift platforms are capable of moving at speeds sufficient to meet NMS swiftness goals and COCOM responsiveness requirements.			G	G	G			
	Waterborne operational lift platforms are capable of interfacing with and operating as part of Joint Seabasing operations.	G			G	G	G		
	Waterborne operational lift platforms possess shallow draft capabilities that enable interface with austere access operations.			G	G	G	G		
	Waterborne & operational lift platforms are capable of interfacing with and operating as part of JLOTS operations.	G			G	G	G		
Establish and Maintain Situational Awareness	Army waterborne platforms are equipped to enable real-time visibility and situational awareness of the common operating picture (COP).	A	A						1.2.1, 1.2.2, 2.1.1 & 2.1.2: Field JHSV and HCCC; Upgrade critical C4ISR systems on LSV and LCU-2000
	Army waterborne platforms are adequately equipped to conduct full range of real-time operational data-gathering, to include electronic observation/monitoring of the local area, and threat-detection sensor capability	A	A						
	Army waterborne platforms are adequately equipped to conduct the full range of real-time meteorological and bathymetric data-gathering necessary to support vessel operations in any environment.	A	A						
	Army waterborne platforms are adequately equipped to conduct real-time ISR and input tactical and operational-level information into the COP.	A	A						
Provide BCOTM to Embarked Units	Provide embarked maneuver forces with BCOM capability adequate to maintain operational readiness and connectivity to the COP.	G	G		G	G			2.1.1: Field JHSV with Army-required C4ISR capabilities
	Army waterborne platforms provide embarked maneuver forces with the ability to maintain connectivity with and responsiveness to higher, lower and adjacent headquarters, enabling continuity of combat operations while moving.	G	G		G	G			
	Army waterborne platforms provide embarked maneuver forces with the ability to communicate, receive and plan changes in mission, based on shifts in operational requirements while embarked.	G	G		G	G			
	Army waterborne platforms provide embarked maneuver forces with the ability to conduct enroute mission rehearsal.	G	G		G	G			
Operate in Open Ocen and Anti-Access Environment	Army waterborne platforms are capable of operating throughout the littorals, to include austere, shallow-draft access points, rivers and inland waterways, in order to meet COCOM assured access requirements.			A	A	A	A		1.2.1, 1.2.2, 1.2.4,1.2.5, 1.2.6, 1.2.7 & 1.2.9: Already at amber - SLEP vessels and maintain readiness through 2024
	Army waterborne platforms are capable of operating in and moving strategic distances over open ocean and deep water in order to meet COCOM responsiveness requirements.			A	A	A	A		
	Army waterborne platforms are capable of operating in elevated seastate and severe meteorological environments			A	A	A	A		
	Army waterborne platforms are capable of surviving extreme sea state and meteorological environments			A	A	A	A		
Provide Operational Maneuver for Combat Forces	Provide combatant commanders the ability to move intact, operationally ready maneuver forces through the littorals to austere access points.	G	G	G	G	G			2.1.1 & 2.1.3: Field JHSV in sufficient quantities and with Army-required C4ISR capabilities; develop VSB capabilities
	Army waterborne platforms provide Maneuver Force commanders the ability to conduct operational maneuver through the littorals to achieve tactical objectives.	G	G	G	G	G			
	Army waterborne platforms are capable of maneuvering operationally ready units to any littoral access point necessary to meet COCOM operational requirements, to include austere, degraded and bare beach sites.	G	G	G	G	G			
	Army waterborne platforms are configured to load and unload combat ready units and equipment in a manner that meets COCOM operational and tactical movement timelines.	G	G	G	G	G			

Figure D-2. AWMP References and Strategies
(Continued on Next Page)

TASK	MEASURES OF EFFECTIVENESS	GAPS							AWMP REFERENCE & STRATEGY
		C4ISR JC2 Capability	BCOTM Situational Awareness Capability	Close, Employ, Support and Sustain Joint Forces	Rapidly Shift Combat Ready Maneuver Units	Rapid Sustainment During Expeditionary Operations	Resupply to Distributed Modular Forces	Ability to conduct Two-Level Maintenance	
Conduct Distributed Sustainment Operations	Army Waterborne platforms provide commanders with the ability to move large volumes of sustainment cargo throughout the littorals, rivers and inland waterways.					G	G		1.2.1, 1.2.2, 2.1.1, 2.1.2 & 2.1.3: Field JHSV and HCCC; Develop VSB capabilities; Upgrade critical C4ISR systems on LSV and LCU-2000
	Army waterborne platforms provide integrated and interoperable capability to on-load and offload sustainment stocks.					A	A		
	Army waterborne platforms are capable of providing coordinated, simultaneous support to multiple sustainment operations sites distributed throughout the JOA.			A		A	A	A	
	Army waterborne platforms provide the ability to conduct sustainment operations at any access point necessary to meet COCOM operational requirements to include austere, degraded and bare beach operations.			A		A	A	A	
	Army waterborne platforms are capable of interfacing with and operating in support of Joint Force cargo and terminal operations units engaged in sustainment operations.	A				A	A	A	
	Army waterborne platforms are capable of interfacing with and operating in support of homeland security and emergency response organizations engaged in sustainment operations.	A				A	A		
Support Terminal Operations	Army waterborne platforms are capable of interfacing with cargo handling capabilities and operations at commercial and military fixed ports.	G		G		G	G		1.2.1, 1.2.2, 1.2.4,1.2.5, 1.2.6, 1.2.7, 1.2.9 & 2.3.2: Already at amber - SLEP vessels and maintain readiness through 2024; Complete terminal operations modernization
	Army waterborne platforms are capable of accessing, and interfacing with cargo handling capabilities and operations at degraded ports.	A		A		A	A		
	Army waterborne platforms are capable of accessing and interfacing with cargo handling capabilities and operations at austere littoral access points.	A		A		A	A		
	Army waterborne platforms are capable of accessing bare beach sites, and interfacing with cargo handling capabilities and operations engaged in Joint-Logistics-Over-the-Shore (JLOTS) operations.	A		A		A	A		
	Army waterborne platforms are maintained and supported IAW applicable policies and concepts.			A	A	A	A	A	
	Army waterborne platforms are capable of conducting port or harbor clearence and salvage operations at austere or degraded ports and littoral entry points			A		A	A	A	
Conduct Seabase Operations	Army waterborne platforms are capable of interfacing with vessels and platforms operating within a Joint Seabase.	A		A	A	A	A		2.1.1, 2.3.5 & 2.3.7: Field JHSV; Continue to engage Joint partners to integrate Joint doctrine and develop at-sea transfer capabilities
	Army waterborne platforms are capable of interfacing with Joint Forces operating within the Seabase of a Joint Seabasing operation.		A	A					
	Army waterborne platforms are capable of loading and unloading operationally ready maneuver forces form the seabased vessels and platforms within the Seabase.			G	G				
	Army waterborne platforms are capable of interfacing with cargo handling capabilities being employed from a seabased platform.			A	A	A	A		
	Army waterborne platforms are capable of supporting operational maneuver of combat ready forces as part of Joint Seabasing operations	G	G	G	G				
Operate in a Non-Contiguous, Uncertain Threat Environment	Army waterborne platforms are capable of identifying hostile threats in a manner that allows appropriate response enabling protection of the vessel, crew, passengers and cargo.	A	A						2.2.1: Modernize C4ISR and Force Protection capabilities
	Army waterborne platforms are capable of responding with passive defense measures to mitigate the effects of hostile threats.	A	A						
	Army waterborne platforms possess force protection capabilities that enable active response to hostile threats in a manner that maintains operational tempo while protecting the vessel, crew, passengers and cargo.	A	A	A	A	A	A		
	Army waterborne platforms are capable of identifying severe and threatening meteorological and maritime conditions in a manner that allows appropriate response enabling protection of the vessel, crew, passengers and cargo.	A	A	A	A	A	A		
	Army waterborne platforms are capable of responding to severe and threatening meteorological and maritime conditions in a manner that maintains operational tempo while protecting the vessel, crew, passenger, and cargo.	A	A	A	A	A	A	A	

Figure D-3. 2008 AWMP References and Strategies

Annex E
Detailed Cost Tables

The tables presented in this annex depict the detailed costs that were used to construct the modernization requirements summarized in Tables 1, 1-4, and 1-6. The tables are organized by Fiscal Year and present costs in the following sets of data:

- Table E-1 summarizes the LSV and LCU modernization requirements that are detailed in the subsequent LSV and LCU tables and shows the distribution of program costs across the POM period. Further, this table also shows the costs associated with modernization and maintenance of the other vessels in the Fleet, and required technical insertions for the JHSV as that system is fielded. The costs in these tables focus primarily on the modernization costs related to the LSV and LCU Fleet, as those vessels are the ones identified in the AWMP as those that must be modernized to meet the sustainment lift needs through 2024.

- Tables E-2 and E-3 detail the modernization costs for the LSV Fleet, by Fiscal Year. Specific costs for each modernization action are identified for each LSV, by hull number. The costs shown in these tables identify only those actions associated with vessel modernization and do not include the maintenance costs identified in Table 1-16.

- Tables E-4 through E-9 detail the modernization costs for the LCU Fleet, Fiscal Year. Specific costs for each modernization action are identified for each LCU, by hull number. The costs shown in these tables identify only those actions associated with vessel modernization and do not include the maintenance costs identified in Table 1-16.

- Tables E-11 and E-12 detail the resourcing requirements and strategy for achieving the non-materiel capability development work identified in Table 2 and discussed in Chapter Two. Table E-11 provides a time sequence for the critical actions that must take place to achieve the integrated DOTMLPF strategies. Table E-12 identifies the agencies that must be resourced to accomplish this work. These two tables are intended to provide a baseline for projecting manpower requirements.

VESSEL		FY09	FY10	FY11	FY12	FY13	FY14	FY15
LSV	LSV 1	$ 1,278,018.56			$ 10,057,923.55			
	LSV 2	$ 1,061,698.56			$ 10,979,538.12			
	LSV 3			$ 11,705,581.35				
	LSV 4		$ 9,156,955.39					
	LSV 5		$ 10,539,953.18					
	LSV 6			$ 11,120,652.07				
	LSV 7				$ -			
	LSV 8					$ -		
	Subtotal	$ 2,339,717.12	$ 19,696,908.57	$ 22,826,233.43	$ 21,037,461.67	$ -	$ -	$ -
	ILS & Tng	$ 2,500,000.00	$ 3,000,000.00	$ 1,700,000.00	$ 1,000,000.00	$ -	$ -	$ -
	Prog Mgt	$ 500,000.00	$ 1,000,000.00	$ 500,000.00	$ 1,000,000.00	$ 100,000.00	$ -	$ -
LSV Total		$ 5,339,717.12	$ 23,696,908.57	$ 25,026,233.43	$ 23,037,461.67	$ 100,000.00	$ -	$ -
LCU	2001			$ 3,225,534.02			$ 8,242,601.89	
	2002				$ 3,141,641.12			
	2003				$ 3,141,641.12			
	2004		$ 3,101,475.02			$ 7,925,578.74		
	2005		$ 3,101,475.02			$ 7,925,578.74		
	2006	$ 2,982,187.52						$ 8,572,305.96
	2007	$ 2,914,539.52					$ 8,255,761.20	
	2008			$ 3,038,356.65			$ 8,255,761.20	
	2009	$ 2,800,971.52					$ 8,255,761.20	
	2010		$ 2,921,496.78					$ 8,585,991.65
	2011	$ 3,233,611.52						$ 8,572,305.96
	2012			$ 3,038,356.65				
	2013					$ 3,286,286.55		
	2014				$ 3,159,890.92			
	2015				$ 3,159,890.92			
	2016		$ 2,837,131.98					$ 8,585,991.65
	2017		$ 3,371,442.38					
	2018			$ 3,038,356.65			$ 8,255,761.20	
	2019	$ 2,503,531.52						
	2020					$ 3,374,858.89		
	2022					$ 3,286,286.55		
	2023			$ 3,506,300.08				
	2024					$ 2,368,297.61		
	2025		$ 3,062,104.78			$ 7,925,578.74		
	2026		$ 3,062,104.78			$ 7,925,578.74		
	2027					$ 3,286,286.55		
	2028		$ 3,062,104.78					
	2029	$ 2,800,971.52						
	2030			$ 3,506,300.08			$ 8,242,601.89	
	2031			$ 3,506,300.08				
	2032			$ 3,506,300.08				
	2033			$ 3,506,300.08				
	2034		$ 2,921,496.78					$ 8,585,991.65
	2035			$ 3,038,356.65				
	Subtotal	$ 17,235,813.12	$ 27,440,832.31	$ 32,910,461.01	$ 12,603,064.09	$ 47,304,331.10	$ 49,508,248.58	$ 42,902,586.88
	ILS & Tng	$ -	$ 3,150,000.00	$ -	$ 4,000,000.00	$ 500,000.00	$ 100,000.00	$ 100,000.00
	Prog Mgt	$ 350,000.00	$ 1,000,000.00	$ 225,000.00	$ 250,000.00	$ 300,000.00	$ 500,000.00	$ 400,000.00
LCU Total		$ 17,585,813.12	$ 31,590,832.31	$ 33,135,461.01	$ 16,853,064.09	$ 48,104,331.10	$ 50,108,248.58	$ 43,402,586.88
OTHER VESSEL COSTS	Fltg Craft & MCS Mods	$ 644,800.00	$ 540,800.00	$ 562,432.00	$ 584,929.28	$ 608,326.45	$ 632,659.51	$ 657,965.89
	MITS	$ 312,000.00	$ 2,498,496.00	$ 2,395,960.32	$ 5,615,321.09	$ 364,995.87	$ 506,127.61	$ 657,965.89
	UNDS	$ 1,127,669.76	$ 1,976,763.12	$ 2,255,185.24	$ 2,175,506.76	$ 2,306,840.77	$ 2,398,278.26	$ 2,668,607.87
	IUID	$ 1,560,000.00	$ 2,163,200.00	$ 2,249,728.00	$ 2,339,717.12	$ 2,433,305.80	$ 2,530,638.04	$ 2,631,863.56
	JHSV Tech Insert				$ 14,560,000.00	$ 7,571,200.00	$ 7,874,048.00	$ 8,189,009.92
TOTALS		$ 26,570,000.00	$ 62,467,000.00	$ 65,625,000.00	$ 65,166,000.00	$ 61,489,000.00	$ 64,050,000.00	$ 58,208,000.00

Table E-1. Summary of Current Fleet Maintenance and Modernization

Table E-2. LSV Modernization Plan —FY 09–10

	MODERNIZATION PLAN	FY 07 COST PER VESSEL	FY 09		FY 10	
			LSV-1	LSV-2	LSV-4	LSV-5
Force Protection						
	Forward-Looking Radar	$ 400,000.00	$ -	$ -	$ 449,945.60	$ 449,945.60
	Relocate and/or add Additional Mk 93 Gun Mounts	$ 50,000.00	$ -	$ -	$ 56,243.20	$ 56,243.20
	Non-lethal Weapons - Fire Monitor Installation	$ 75,000.00	$ -	$ -	$ 84,364.80	$ 84,364.80
	Relocate/add Small Arm Stowage IAW FP Requirements	$ 25,000.00	$ -	$ -	$ 28,121.60	$ 28,121.60
	Force Protection Sub-Totals	**$ 550,000.00**	**$ -**	**$ -**	**$ 618,675.20**	**$ 618,675.20**
Service Life Extension Program						
	Refurbish shafts and install new seals	$ 300,000.00	$ -	$ -	$ 337,459.20	$ 337,459.20
	Replace Propellers	$ 90,000.00	$ -	$ -	$ 101,237.76	$ 101,237.76
	Upgrade Engine Monitoring System	$ 580,000.00	$ -	$ -	$ 652,421.12	$ 652,421.12
	Replace existing HVAC System	$ 790,000.00	$ -	$ -	$ 888,642.56	$ 888,642.56
	Update existing Motor Controllers	$ 60,000.00	$ -	$ -	$ 67,491.84	$ 67,491.84
	Refurbish Propulsion Reduction Gear	$ 450,000.00	$ -	$ -	$ 506,188.80	$ 506,188.80
	Install main Engine Vent demisters	$ 5,000.00	$ -	$ -	$ 5,624.32	$ 5,624.32
	Replace Voltage Regulators	$ 100,000.00	$ -	$ -	$ 112,486.40	$ 112,486.40
	Replace Black Iron Piping with Copper Piping	$ 300,000.00	$ -	$ -	Completed	Completed
	Replace existing Air Compressors	$ 70,000.00	$ -	$ -	$ 78,740.48	$ 78,740.48
	SLEP Sub-Totals	**$ 2,745,000.00**	**$ -**	**$ -**	**$ 2,750,292.48**	**$ 2,750,292.48**
C4ISR Improvements						
Upgrades	Upgrade Gyros to Digital System	$ 200,000.00	$ -	$ -	Completed	$ 224,972.80
Upgrades	Reconfigure Communication Suite	$ 200,000.00	$ -	$ -	$ 224,972.80	$ 224,972.80
Upgrades	Install GMDSS Systems	$ 100,000.00	$ -	$ -	$ 112,486.40	$ 112,486.40
Upgrades	Install Speed Logs and Echo Sounders	$ 200,000.00	$ -	$ -	$ 224,972.80	$ 224,972.80
Upgrades	Replace PLGR with DAGR	$ 25,000.00	$ -	$ -	$ 28,121.60	$ 28,121.60
Upgrades	Update Existing C4ISR/CEN Suite HW/SW	$ 250,000.00	$ -	$ -	$ 281,216.00	$ 281,216.00
Upgrades	Replace AN/APX-72 with the AN/APX-118	$ 160,000.00	$ -	$ -	$ 179,978.24	$ 179,978.24
New Systems	MTS	$ 200,000.00	$ -	$ -	$ 224,972.80	$ 224,972.80
New Systems	Iridium Telephone	$ 25,000.00	$ -	$ -	$ 28,121.60	$ 28,121.60
New Systems	Upgrade UHF SATCOM	$ 200,000.00	$ -	$ -	$ 224,972.80	$ 224,972.80
New Systems	AIS	$ 200,000.00	$ -	$ -	$ 224,972.80	$ 224,972.80
New Systems	SHF	$ 500,000.00	$ -	$ -	$ 562,432.00	$ 562,432.00
New Systems	Blue Force Tracker	$ 200,000.00	$ -	$ -	$ 224,972.80	$ 224,972.80
New Systems	TV Direct to Sailor	$ 150,000.00	$ -	$ -	$ 168,729.60	$ 168,729.60
	C4ISR Sub-Totals	**$ 2,610,000.00**	**$ -**	**$ -**	**$ 2,710,922.24**	**$ 2,935,895.04**
Modification Work Orders						
Current	Hull & Structure Improvements	$ 200,000.00	$ 216,320.00	Completed	Completed	Completed
Current	Ventilation and Quarters Upgrade	$ 336,000.00	$ 363,417.60	$ 363,417.60	Completed	Completed
Current	Electrical System Upgrade	$ 147,000.00	$ 158,995.20	$ 158,995.20	Completed	$ 165,355.01
Current	Air System and Work Boat Upgrade	$ 498,600.00	$ 539,285.76	$ 539,285.76	Completed	$ 560,857.19
Safety	Exterior Deck Lighting	$ 16,860.00	$ -	$ -	Completed	$ 18,965.21
Safety	Remote Operating Gear Replace	$ 37,800.00	$ -	$ -	Completed	$ 42,519.86
Safety	Bow thruster Comp Vent Mod	$ 12,360.00	$ -	$ -	Completed	$ 13,903.32
Safety	Laundry Room Heater Relocation	$ 2,640.00	$ -	$ -	Completed	$ 2,969.64
PIP	Aft Freeing Port Relocation	$ 5,760.00	$ -	$ -	Completed	$ 6,479.22
PIP	Sound Power Phone Mod	$ 18,720.00	$ -	$ -	Completed	$ 21,057.45
PIP	Fuel & Lube Oil Heaters	$ 69,360.00	$ -	$ -	Completed	$ 78,020.57
PIP	Bow Thruster Vent Trunk	$ 9,960.00	$ -	$ -	Completed	$ 11,203.65
PIP	Crews Mess Vent Mod	$ 12,600.00	$ -	$ -	Completed	$ 14,173.29
PIP	Bow Ramp Winch Hyd Sys	$ 33,120.00	$ -	$ -	Completed	$ 37,255.50
PIP	Add Cargo Deck Fittings	$ 8,880.00	$ -	$ -	Completed	$ 9,988.79
PIP	Bow Anchor Chain Hawse Pipes	$ 12,480.00	$ -	$ -	Completed	$ 14,038.30
PIP	Bow Anchorindless Mod	$ 2,640.00	$ -	$ -	Completed	$ 2,969.64
PIP	Forecastle Crosswalk	$ 20,040.00	$ -	$ -	Completed	$ 22,542.27
PIP	Ext Pushbutton Sta Replace	$ 11,400.00	$ -	$ -	Completed	$ 12,823.45
PIP	General Alarm Battery Boxes	$ 9,660.00	$ -	$ -	Completed	$ 10,866.19
PIP	Exterior Sounding Tubes	$ 23,160.00	$ -	$ -	Completed	$ 26,051.85
PIP	Shaft Coling Pump Relocate	$ 36,480.00	$ -	$ -	Completed	$ 41,035.04
PIP	Forepeak Void Access	$ 13,080.00	$ -	$ -	Completed	$ 14,713.22
PIP	Arms Control Dehumidfier	$ 10,080.00	$ -	$ -	Completed	$ 11,338.63
PIP	Add Arms Cont Rm Locker	$ 8,040.00	$ -	$ -	Completed	$ 9,043.91
PIP	Potable Water Isolation Valves	$ 8,760.00	$ -	$ -	Completed	$ 9,853.81
	MWO Sub-totals	**$ 1,565,480.00**	**$1,278,018.56**	**$ 1,061,698.56**	**$ -**	**$ 1,158,024.99**
LSV Critical Subsystem Review/Improvement						
Safety	Formalizes spare stowage	$ 125,000.00	$ -	$ -	$ 140,608.00	$ 140,608.00
Safety	Modify DC Lockers for Required Equipment	$ 38,000.00	$ -	$ -	$ 42,744.83	$ 42,744.83
Safety	Install additional Medical Lockers	$ 10,000.00	$ -	$ -	$ 11,248.64	$ 11,248.64
Mnt	Replace joiner panels along side of all exterior doors	$ 10,000.00	$ -	$ -	$ 11,248.64	$ 11,248.64
Quality of Life	Replace deck coating with PRC flooring; terrazo in the heads	$ 350,000.00	$ -	$ -	$ 393,702.40	$ 393,702.40
Quality of Life	Modify Officer Berthing toaccomodate 8 vice 6 officers	$ 400,000.00	$ -	$ -	$ 449,945.60	$ 449,945.60
Quality of Life	Install astandalone HVAC for the bridge	$ 16,000.00	$ -	$ -	$ 17,997.82	$ 17,997.82
Quality of Life	Replace food service equipment	$ 50,000.00	$ -	$ -	$ 56,243.20	$ 56,243.20
Quality of Life	Increase size of Refrigeration space	$ 75,000.00	$ -	$ -	$ 84,364.80	$ 84,364.80
Quality of Life	Provide routers and connection for phone and network	$ 50,000.00	$ -	$ -	$ 56,243.20	$ 56,243.20
Quality of Life	Clean / inspect ventilation sys	$ 30,000.00	$ -	$ -	$ 33,745.92	$ 33,745.92
Quality of Life	Refurbish exisitng CHENG office	$ 15,000.00	$ -	$ -	$ 16,872.96	$ 16,872.96
Quality of Life	Convert port.stbd voids into stowage spaces	$ 100,000.00	$ -	$ -	$ 112,486.40	$ 112,486.40
PIP	Increase exisitng Lubrication stowage	$ 100,000.00	$ -	$ -	$ 112,486.40	$ 112,486.40
PIP	Upgrade current Oil Water system	$ 181,000.00	$ -	$ -	$ 203,600.38	$ 203,600.38
PIP	Upgrade current MSD System	$ 353,000.00	$ -	$ -	$ 397,076.99	$ 397,076.99
PIP	Relocate existing controlair dryer	$ 15,000.00	$ -	$ -	$ 16,872.96	$ 16,872.96
PIP	Replace existing Galley Vent	$ 10,000.00	$ -	$ -	$ 11,248.64	$ 11,248.64
PIP	Upgrade the exisitng Ramp Handling Sys	$ 757,500.00	Completed	$ -	$ 852,084.48	$ 852,084.48
	Critrical subsystem Sub-Totals	**$ 2,685,500.00**	**$ -**	**$ -**	**$ 3,020,822.27**	**$ 3,020,822.27**
Personnel Transport						
	Accommodate 6 People Pods/36 Passengers	**$ 50,000.00**	**$ -**	**$ -**	**$ 56,243.20**	**$ 56,243.20**
	TOTAL MODERNIZATION COSTS	**$ 10,205,980.00**	**$ 1,278,018.56**	**$ 1,061,698.56**	**$ 9,156,955.39**	**$ 10,539,953.18**

Table E-3. LSV Modernization Plan – FY 11-13

	MODERNIZATION PLAN	FY 07 COST PER VESSEL	FY 11		FY 12			FY 13
			LSV-3	LSV-6	LSV-1	LSV-2	LSV-7	LSV-8
Force Protection								
	Forward-Looking Radar	$ 400,000.00	$ 467,943.42	$ 467,943.42	$ 486,661.16	$ 486,661.16	Not Required	Not Required
	Relocate and/or add Additional Mk 93 Gun Mounts	$ 50,000.00	$ 58,492.93	$ 58,492.93	$ 60,832.65	$ 60,832.65		
	Non-lethal Weapons - Fire Monitor Installation	$ 75,000.00	$ 87,739.39	$ 87,739.39	$ 91,248.97	$ 91,248.97		
	Relocate/add Small Arm Stowage IAW FP Requirements	$ 25,000.00	$ 29,246.46	$ 29,246.46	$ 30,416.32	$ 30,416.32		
	Force Protection Sub-Totals	**$ 550,000.00**	**$ 643,422.21**	**$ 643,422.21**	**$ 669,159.10**	**$ 669,159.10**		
Service Life Extension Program								
	Refurbish shafts and install new seals	$ 300,000.00	$ 350,957.57	$ 350,957.57	$ 364,995.87	$ 364,995.87	Not Required	Not Required
	Replace Propellers	$ 90,000.00	$ 105,287.27	$ 105,287.27	$ 109,498.76	$ 109,498.76		
	Upgrade Engine Monitoring System	$ 580,000.00	$ 678,517.96	$ 678,517.96	$ 705,658.68	$ 705,658.68		
	Replace existing HVAC System	$ 790,000.00	$ 924,188.26	$ 924,188.26	$ 961,155.79	$ 961,155.79		
	Update existing Motor Controllers	$ 60,000.00	$ 70,191.51	$ 70,191.51	$ 72,999.17	$ 72,999.17		
	Refurbish Propulsion Reduction Gear	$ 450,000.00	$ 526,436.35	$ 526,436.35	$ 547,493.81	$ 547,493.81		
	Install main Engine Vent demisters	$ 5,000.00	$ 5,849.29	$ 5,849.29	$ 6,083.26	$ 6,083.26		
	Replace Voltage Regulators	$ 100,000.00	$ 116,985.86	$ 116,985.86	$ 121,665.29	$ 121,665.29		
	Replace Black Iron Piping with Copper Piping	$ 300,000.00	$ 350,957.57	Completed	$ 364,995.87	$ 364,995.87		
	Replace existing Air Compressors	$ 70,000.00	$ 81,890.10	$ 81,890.10	$ 85,165.70	$ 85,165.70		
	SLEP Sub-Totals	**$ 2,745,000.00**	**$ 3,211,261.75**	**$ 2,860,304.18**	**$ 3,339,712.22**	**$ 3,339,712.22**		
C4ISR Improvements								
Upgrades	Upgrade Gyros to Digital System	$ 200,000.00	$ 233,971.71	Completed	$ 243,330.58	$ 243,330.58	Not Required	Not Required
	Reconfigure Communication Suite	$ 200,000.00	$ 233,971.71	$ 233,971.71	$ 243,330.58	$ 243,330.58		
	Install GMDSS Systems	$ 100,000.00	$ 116,985.86	$ 116,985.86	$ 121,665.29	$ 121,665.29		
	Install Speed Logs and Echo Sounders	$ 200,000.00	$ 233,971.71	$ 233,971.71	$ 243,330.58	$ 243,330.58		
	Replace PLGR with DAGR	$ 25,000.00	$ 29,246.46	$ 29,246.46	$ 30,416.32	$ 30,416.32		
	Update Existing C4ISR/CEN Suite HW/SW	$ 250,000.00	$ 292,464.64	$ 292,464.64	$ 304,163.23	$ 304,163.23		
	Replace AN/APX-72 with the AN/APX-118	$ 160,000.00	$ 187,177.37	$ 187,177.37	$ 194,664.46	$ 194,664.46		
New Systems	MTS	$ 200,000.00	$ 233,971.71	$ 233,971.71	$ 243,330.58	$ 243,330.58		
	Iridium Telephone	$ 25,000.00	$ 29,246.46	$ 29,246.46	$ 30,416.32	$ 30,416.32		
	Upgrade UHF SATCOM	$ 200,000.00	$ 233,971.71	$ 233,971.71	$ 243,330.58	$ 243,330.58		
	AIS	$ 200,000.00	$ 233,971.71	$ 233,971.71	$ 243,330.58	$ 243,330.58		
	SHF	$ 500,000.00	$ 584,929.28	$ 584,929.28	$ 608,326.45	$ 608,326.45		
	Blue Force Tracker	$ 200,000.00	$ 233,971.71	$ 233,971.71	$ 243,330.58	$ 243,330.58		
	TV Direct to Sailor	$ 150,000.00	$ 175,478.78	$ 175,478.78	$ 182,497.94	$ 182,497.94		
	C4ISR Sub-Totals	**$ 2,610,000.00**	**$ 3,053,330.84**	**$ 2,819,359.13**	**$ 3,175,464.08**	**$ 3,175,464.08**	**$ -**	**$ -**
Modification Work Orders								
Current	Hull & Structure Improvements	$ 200,000.00	Completed	Completed	$ -	Completed	Not Required	Not Required
	Ventilation and Quarters Upgrade	$ 336,000.00	$ 393,072.48	$ 393,072.48	$ -	$ -		
	Electrical System Upgrade	$ 147,000.00	$ 171,969.21	$ 171,969.21	$ -	$ -		
	Air System and Work Boat Upgrade	$ 498,600.00	$ 583,291.48	$ 583,291.48	$ -	$ -		
Safety	Exterior Deck Lighting	$ 16,860.00	$ 19,723.82	$ 19,723.82	$ 20,512.77	$ 20,512.77		
	Remote Operating Gear Replace	$ 37,800.00	$ 44,220.65	$ 44,220.65	$ 45,989.48	$ 45,989.48		
	Bow thruster Comp Vent Mod	$ 12,360.00	$ 14,459.45	$ 14,459.45	$ 15,037.83	$ 15,037.83		
	Laundry Room Heater Relocation	$ 2,640.00	$ 3,088.43	$ 3,088.43	$ 3,211.96	$ 3,211.96		
PIP	Aft Freeing Port Relocation	$ 5,760.00	$ 6,738.39	$ 6,738.39	$ 7,007.92	$ 7,007.92		
	Sound Power Phone Mod	$ 18,720.00	$ 21,899.75	$ 21,899.75	$ 22,775.74	$ 22,775.74		
	Fuel & Lube Oil Heaters	$ 69,360.00	$ 81,141.39	$ 81,141.39	$ 84,387.05	$ 84,387.05		
	Bow Thruster Vent Trunk	$ 9,960.00	$ 11,651.79	$ 11,651.79	$ 12,117.86	$ 12,117.86		
	Crews Mess Vent Mod	$ 12,600.00	$ 14,740.22	$ 14,740.22	$ 15,329.83	$ 15,329.83		
	Bow Ramp Winch Hyd Sys	$ 33,120.00	$ 38,745.72	$ 38,745.72	$ 40,295.54	$ 40,295.54		
	Add Cargo Deck Fittings	$ 8,880.00	$ 10,388.34	$ 10,388.34	$ 10,803.88	$ 10,803.88		
	Bow Anchor Chain Hawse Pipes	$ 12,480.00	$ 14,599.83	$ 14,599.83	$ 15,183.83	$ 15,183.83		
	Bow Anchorindless Mod	$ 2,640.00	$ 3,088.43	$ 3,088.43	$ 3,211.96	$ 3,211.96		
	Forecastle Crosswalk	$ 20,040.00	$ 23,443.97	$ 23,443.97	$ 24,381.72	$ 24,381.72		
	Ext Pushbutton Sta Replace	$ 11,400.00	$ 13,336.39	$ 13,336.39	$ 13,869.84	$ 13,869.84		
	General Alarm Battery Boxes	$ 9,660.00	$ 11,300.83	$ 11,300.83	$ 11,752.87	$ 11,752.87		
	Exterior Sounding Tubes	$ 23,160.00	$ 27,093.92	$ 27,093.92	$ 28,177.68	$ 28,177.68		
	Shaft Coling Pump Relocate	$ 36,480.00	$ 42,676.44	$ 42,676.44	$ 44,383.50	$ 44,383.50		
	Forepeak Void Access	$ 13,080.00	$ 15,301.75	$ 15,301.75	$ 15,913.82	$ 15,913.82		
	Arms Control Dehumidfier	$ 10,080.00	$ 11,792.17	$ 11,792.17	$ 12,263.86	$ 12,263.86		
	Add Arms Cont Rm Locker	$ 8,040.00	$ 9,405.66	$ 9,405.66	$ 9,781.89	$ 9,781.89		
	Potable Water Isolation Valves	$ 8,760.00	$ 10,247.96	$ 10,247.96	$ 10,657.88	$ 10,657.88		
	MWO Sub-totals	**$ 1,565,480.00**	**$ 1,597,418.47**	**$ 1,597,418.47**	**$ 467,048.72**	**$ 467,048.72**	**$ -**	**$ -**
LSV Critical Subsystem Review/Improvement								
Safety	Formalizes spare stowage	$ 125,000.00	$ 146,232.32	$ 146,232.32	$ 152,081.61	$ 152,081.61	Not Required	Not Required
	Modify DC Lockers for Required Equipment	$ 38,000.00	$ 44,454.63	$ 44,454.63	$ 46,232.81	$ 46,232.81		
	Install additional Medical Lockers	$ 10,000.00	$ 11,698.59	$ 11,698.59	$ 12,166.53	$ 12,166.53		
Mnt	Replace joiner panels along side of all exterior doors	$ 10,000.00	$ 11,698.59	$ 11,698.59	$ 12,166.53	$ 12,166.53		
Quality of Life	Replace deck coating with PRC flooring; terrazo in the heads	$ 350,000.00	$ 409,450.50	$ 409,450.50	$ 425,828.52	$ 425,828.52		
	Modify Officer Berthing toaccomodate 8 vice 6 officers	$ 400,000.00	$ 467,943.42	$ 467,943.42	$ 486,661.16	$ 486,661.16		
	Install astandalone HVAC for the bridge	$ 16,000.00	$ 18,717.74	$ 18,717.74	$ 19,466.45	$ 19,466.45		
	Replace food service equipment	$ 50,000.00	$ 58,492.93	$ 58,492.93	$ 60,832.65	$ 60,832.65		
	Increase size of Refrigeration space	$ 75,000.00	$ 87,739.39	$ 87,739.39	$ 91,248.97	$ 91,248.97		
	Provide routers and connection for phone and network	$ 50,000.00	$ 58,492.93	$ 58,492.93	$ 60,832.65	$ 60,832.65		
	Clean / inspect ventilation sys	$ 30,000.00	$ 35,095.76	$ 35,095.76	$ 36,499.59	$ 36,499.59		
	Refurbish exisitng CHENG office	$ 15,000.00	$ 17,547.88	$ 17,547.88	$ 18,249.79	$ 18,249.79		
	Convert port.stbd voids into stowage spaces	$ 100,000.00	$ 116,985.86	$ 116,985.86	$ 121,665.29	$ 121,665.29		
PIP	Increase exisitng Lubrication stowage	$ 100,000.00	$ 116,985.86	$ 116,985.86	$ 121,665.29	$ 121,665.29		
	Upgrade current Oil Water system	$ 181,000.00	$ 211,744.40	$ 211,744.40	$ 220,214.18	$ 220,214.18		
	Upgrade current MSD System	$ 353,000.00	$ 412,960.07	$ 412,960.07	$ 429,478.47	$ 429,478.47		
	Relocate existing controlair dryer	$ 15,000.00	$ 17,547.88	$ 17,547.88	$ 18,249.79	$ 18,249.79		
	Replace exisitng Galley Vent	$ 10,000.00	$ 11,698.59	$ 11,698.59	$ 12,166.53	$ 12,166.53		
	Upgrade the exisitng Ramp Handling Sys	$ 757,500.00	$ 886,167.86	$ 886,167.86	Completed	$ 921,614.57		
	Critrical subsystem Sub-Totals	**$ 2,685,500.00**	**$ 3,141,655.16**	**$ 3,141,655.16**	**$ 2,345,706.80**	**$ 3,267,321.37**	**$ -**	**$ -**
Personnel Transport								
	Accommodate 6 People Pods/36 Passengers	**$ 50,000.00**	**$ 58,492.93**	**$ 58,492.93**	**$ 60,832.65**	**$ 60,832.65**	**$ -**	**$ -**
	TOTAL MODERNIZATION COSTS	**$ 10,205,980.00**	**$ 11,705,581.35**	**$ 11,120,652.07**	**$ 10,057,923.55**	**$ 10,979,538.12**	**$ -**	**$ -**

Table E-4. LCU-2000 Modernization Plan – FY 09

	MODERNIZATION PLAN	FY 07 COST PER VESSEL	FY 09					
			LCU 2006	LCU 2007	LCU 2009	LCU 2011	LCU 2019	LCU 2029
Force Protection								
	Forward-Looking Radar	$ 400,000.00	$ 432,640.00	Not Needed	Not Needed	$ 432,640.00	Not Needed	Not Needed
	Relocate and/or add Additional Mk 93 Gun Mounts	$ 50,000.00	$ 54,080.00	$ 54,080.00	$ 54,080.00	$ 54,080.00	$ 54,080.00	$ 54,080.00
	Non-lethal Weapons - Fire Monitor Installation	$ 75,000.00	$ 81,120.00	$ 81,120.00	$ 81,120.00	$ 81,120.00	$ 81,120.00	$ 81,120.00
	MTS	$ 200,000.00	$ 216,320.00	$ 216,320.00	$ 216,320.00	$ 216,320.00	$ 216,320.00	$ 216,320.00
	Blue Force Tracker	$ 200,000.00	$ 216,320.00	$ 216,320.00	$ 216,320.00	$ 216,320.00	$ 216,320.00	$ 216,320.00
	Ballistic Plating at Gun Mount Rail	$ 50,000.00	$ 54,080.00	$ 54,080.00	$ 54,080.00	$ 54,080.00	$ 54,080.00	$ 54,080.00
	Add 110 Power for Passive Force protection device	$ 5,000.00	$ 5,408.00	$ 5,408.00	$ 5,408.00	$ 5,408.00	$ 5,408.00	$ 5,408.00
	Force Protection Sub-Totals	**$ 980,000.00**	**$ 1,059,968.00**	**$ 627,328.00**	**$ 627,328.00**	**$ 1,059,968.00**	**$ 627,328.00**	**$ 627,328.00**
Fuel Transfer Capability Upgrade								
	Marine Fuel Transfer Capability	**$ 100,000.00**	**$ 108,160.00**	**$ 100,000.00**	**$ 100,000.00**	**$ 100,000.00**	**$ 100,000.00**	**$ 100,000.00**
Modification Work Orders								
Incomplete	Hull and Electrical Modifications	$ 275,500.00	$ 297,980.80	$ 297,980.80	$ 297,980.80	$ 297,980.80	$ 297,980.80	$ 297,980.80
Incomplete	Oily Water Separator Replacement	$ 275,000.00	Completed	$ 297,440.00	$ 297,440.00	$ 297,440.00	Completed	$ 297,440.00
Incomplete	Miscellaneous – Fuel Oil System, Watertight doors, Compressed Air	$ 375,000.00	$ 405,600.00	$ 405,600.00	$ 405,600.00	$ 405,600.00	$ 405,600.00	$ 405,600.00
Incomplete	Fire and Bilge/Ballast Pump Replacement	$ 75,000.00	$ 81,120.00	$ 81,120.00	$ 81,120.00	$ 81,120.00	$ 81,120.00	$ 81,120.00
Incomplete	Relocate external washdown system on LCU 2002 and 2003	$ 25,000.00	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed
Incomplete	Upgrade existing MSD system	$ 140,000.00	$ 151,424.00	$ 151,424.00	$ 151,424.00	$ 151,424.00	$ 151,424.00	$ 151,424.00
Incomplete	Modify exisitng SW supply to MSD Unit	$ 500.00	$ 540.80	$ 540.80	$ 540.80	$ 540.80	$ 540.80	$ 540.80
	MWO Sub-Totals	**$ 1,166,000.00**	**$ 936,665.60**	**$ 1,234,105.60**	**$ 1,234,105.60**	**$ 1,234,105.60**	**$ 936,665.60**	**$ 1,234,105.60**
Maintenance Upgrades								
	Formalizes the steering sys upgrade LCU 2001 thru 2007	$ 35,000.00	$ 37,856.00	$ 37,856.00	Completed	Completed	Complete	Complete
	Replace Emergency Diesel Generator	$ 186,000.00	$ 201,177.60	$ 201,177.60	$ 201,177.60	$ 201,177.60	$ 201,177.60	$ 201,177.60
	Replace Existing HVAC system	$ 425,000.00	$ 459,680.00	$ 459,680.00	$ 459,680.00	$ 459,680.00	$ 459,680.00	$ 459,680.00
	Replace Voltage Regulators	$ 100,000.00	$ 108,160.00	$ 108,160.00	$ 108,160.00	$ 108,160.00	$ 108,160.00	$ 108,160.00
	Cross connect Emergency Fire Pump to Bilge Suction	$ 25,000.00	$ 27,040.00	$ 27,040.00	$ 27,040.00	$ 27,040.00	$ 27,040.00	$ 27,040.00
	Replace Bow ramp Hooks	$ 7,200.00	$ 7,787.52	$ 7,787.52	$ 7,787.52	$ 7,787.52	$ 7,787.52	$ 7,787.52
	Replace existing Emer Gen, Eng room & EOS doors	$ 3,000.00	$ 3,244.80	$ 3,244.80	$ 3,244.80	$ 3,244.80	$ 3,244.80	$ 3,244.80
	Replace EOS and PH HVAC	$ 30,000.00	$ 32,448.00	$ 32,448.00	$ 32,448.00	$ 32,448.00	$ 32,448.00	$ 32,448.00
	Convert day room into Berthing space LCU 2007 and 2020 only	$ 70,000.00	Not Needed	$ 75,712.00	Not Needed	Not Needed	Not Needed	Not Needed
	Maintenance Upgrades Sub-Totals	**$ 881,200.00**	**$ 877,393.92**	**$ 953,105.92**	**$ 839,537.92**	**$ 839,537.92**	**$ 839,537.92**	**$ 839,537.92**
C4ISR Improvements								
Upgrades	Upgrade Gyros to Digital System	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU
Upgrades	Reconfigure Communication Suite							
Upgrades	Install GMDSS Systems							
Upgrades	Replace PLGR with DAGR	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -
Upgrades	Update Existing C4ISR/CEN Suite HW/SW	$ 250,000.00	$ -	$ -	$ -	$ -	$ -	$ -
Upgrades	Replace AN/APX-72 with the AN/APX-118	$ 160,000.00	$ -	$ -	$ -	$ -	$ -	$ -
New Systems	Iridium Telephone	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -
New Systems	Upgrade UHF SATCOM	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -
New Systems	AIS	Completed	Completed	Completed	Completed	Completed	Completed	Completed
New Systems	SHF	$ 500,000.00	$ -	$ -	$ -	$ -	$ -	$ -
New Systems	TV Direct to Sailor	$ 150,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	C4ISR Sub-Totals	**$ 1,310,000.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
LCU Critical Subsystem Review								
SLEP	Refurbish Shafting	$ 2,500,000.00	$ -	$ -	$ -	$ -	$ -	$ -
SLEP	Replace Propellers							
SLEP	Replace main Engines & reduction Gear							
SLEP	Update exisiting Motor Controllers	$ 60,000.00	$ -	$ -	$ -	$ -	$ -	$ -
SLEP	Upgrade Engine Monitoring System - install Navy version of Integrated Condition Assessment System (ICAS)	$ 580,000.00	$ -	$ -	$ -	$ -	$ -	$ -
SLEP	Replace all Potable Water piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -
SLEP	Replace Graywater piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -
SLEP	Replace Black water piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -
SLEP	Fit Vessels with Low Point drain under the port engine	$ 500.00	$ -	$ -	$ -	$ -	$ -	$ -
	Fit closure doors out of aluminun rather then steel plate	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Relocate exisitng Bilge ballast valve outside of BT room	$ 10,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Provide routers and connection for receipt of phone and network connection	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Critical Subsystem Sub-Totals	**$ 3,825,500.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Vessel Upgrades								
Quality of Life	Increase size of Potable Water Tank	$ 150,000.00	$ -	$ -	$ -	$ -	$ -	$ -
Quality of Life	Replace food service equipment, including ice machine, milk,and soda dispenser, etc	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -
Quality of Life	Replace deck coating with PRC flooring, only use terrazo in the heads	$ 100,000.00	$ -	$ -	$ -	$ -	$ -	$ -
Quality of Life	Connect Waste Heat Evaporator to Ship's Service generator	$ 94,000.00	$ -	$ -	$ -	$ -	$ -	$ -
Quality of Life	Increase size of Refrig Space	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -
Quality of Life	Clean / inspect ventilation sys	$ 30,000.00	$ -	$ -	$ -	$ -	$ -	$ -
Quality of Life	Replace all shower stahls and refurbish heads	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -
Quality of Life	Relocate Bow Ramp equip & Hydr pack to BT room, convert Bosian locker to stowage	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Install Water Tight Ventilation Covers - PREPO vessels	$ 10,000.00	Not Needed	$ -	$ -	Not Needed	$ -	$ -
	Replace Engine Room Vent Covers	$ 5,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Lower Existing Mast	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Install Main Engine Vent Demisters	$ 5,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Increase Lubrication Stowage	$ 100,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Replace/relocate depth finder and speed log	$ 100,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Replace the existing tank vents with correct size/mat'r	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Replace existing Air Compressors	$ 60,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Install 4 " sq cres tubing behind Eng Rm Vent towers	$ 1,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Anchor Stow & Handling control boxes and internals	$ 75,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Rurbish existing BT comp doors	$ 8,200.00	$ -	$ -	$ -	$ -	$ -	$ -
	Vessel Upgrades Sub-Totals	**$ 1,138,200.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
	TOTAL MODERNIZATION COSTS	**$ 9,400,900.00**	**$ 2,982,187.52**	**$ 2,914,539.52**	**$ 2,800,971.52**	**$ 3,233,611.52**	**$ 2,503,531.52**	**$ 2,800,971.52**

Table E-5. LCU-2000 Modernization Plan – FY 10

	MODERNIZATION PLAN	FY 07 COST PER VESSEL	FY 10								
			LCU 2004	LCU 2005	LCU 2010	LCU 2016	LCU 2017	LCU 2025	LCU 2026	LCU 2028	LCU 2034
Force Protection											
	Forward-Looking Radar	$ 400,000.00	$ 449,945.60	$ 449,945.60	Not Needed	Not Needed	$ 449,945.60	$ 449,945.60	$ 449,945.60	$ 449,945.60	Not Needed
	Relocate and/or add Additional Mk 93 Gun Mounts	$ 50,000.00	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20
	Non-lethal Weapons - Fire Monitor Installation	$ 75,000.00	$ 84,364.80	$ 84,364.80	$ 84,364.80	$ 84,364.80	$ 84,364.80	$ 84,364.80	$ 84,364.80	$ 84,364.80	$ 84,364.80
	MTS	$ 200,000.00	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80
	Blue Force Tracker	$ 200,000.00	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80	$ 224,972.80
	Ballistic Plating at Gun Mount Rail	$ 50,000.00	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20	$ 56,243.20
	Add 110 Power for Passive Force protection device	$ 5,000.00	$ 5,624.32	$ 5,624.32	$ 5,624.32	$ 5,624.32	$ 5,624.32	$ 5,624.32	$ 5,624.32	$ 5,624.32	$ 5,624.32
	Force Protection Sub-Totals	**$ 980,000.00**	**$ 1,102,366.72**	**$ 1,102,366.72**	**$ 652,421.12**	**$ 652,421.12**	**$ 1,102,366.72**	**$ 1,102,366.72**	**$ 1,102,366.72**	**$ 1,102,366.72**	**$ 652,421.12**
Fuel Transfer Capability Upgrade											
	Marine Fuel Transfer Capability	**$ 100,000.00**	**$ 112,486.40**	**$ 112,486.40**	**$ 112,486.40**	**$ 112,486.40**	**$ 112,486.40**	**$ 112,486.40**	**$ 112,486.40**	**$ 112,486.40**	**$ 112,486.40**
Modification Work Orders											
Incomplete	Hull and Electrical Modifications	$ 275,500.00	$ 309,900.03	$ 309,900.03	$ 309,900.03	$ 309,900.03	$ 309,900.03	$ 309,900.03	$ 309,900.03	$ 309,900.03	$ 309,900.03
	Oily Water Separator Replacement	$ 275,000.00	Completed	Completed	$ 309,337.60	$ 309,337.60	$ 309,337.60	Completed	Completed	Completed	$ 309,337.60
	Miscellaneous – Fuel Oil System, Watertight doors, Compressed Air	$ 375,000.00	$ 421,824.00	$ 421,824.00	$ 421,824.00	$ 421,824.00	$ 421,824.00	$ 421,824.00	$ 421,824.00	$ 421,824.00	$ 421,824.00
	Fire and Bilge/Ballast Pump Replacement	$ 75,000.00	$ 84,364.80	$ 84,364.80	$ 84,364.80	Completed	$ 84,364.80	$ 84,364.80	$ 84,364.80	$ 84,364.80	$ 84,364.80
	Relocate external washdown system on LCU 2002 and 2003	$ 25,000.00	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed
	Upgrade existing MSD system	$ 140,000.00	$ 157,480.96	$ 157,480.96	$ 157,480.96	$ 157,480.96	$ 157,480.96	$ 157,480.96	$ 157,480.96	$ 157,480.96	$ 157,480.96
	Modify existing SW supply to MSD Unit	$ 500.00	$ 562.43	$ 562.43	$ 562.43	$ 562.43	$ 562.43	$ 562.43	$ 562.43	$ 562.43	$ 562.43
	MWO Sub-Totals	**$ 1,166,000.00**	**$ 974,132.22**	**$ 974,132.22**	**$ 1,283,469.82**	**$ 1,199,105.02**	**$ 1,283,469.82**	**$ 974,132.22**	**$ 974,132.22**	**$ 974,132.22**	**$ 1,283,469.82**
Maintenance Upgrades											
	Formalizes the steering sys upgrade LCU 2001 thru 2007	$ 35,000.00	$ 39,370.24	$ 39,370.24	Completed	Completed	Completed	Complete	Complete	Complete	Complete
	Replace Emergency Diesel Generator	$ 186,000.00	$ 209,224.70	$ 209,224.70	$ 209,224.70	$ 209,224.70	$ 209,224.70	$ 209,224.70	$ 209,224.70	$ 209,224.70	$ 209,224.70
	Replace Existing HVAC system	$ 425,000.00	$ 478,067.20	$ 478,067.20	$ 478,067.20	$ 478,067.20	$ 478,067.20	$ 478,067.20	$ 478,067.20	$ 478,067.20	$ 478,067.20
	Replace Voltage Regulators	$ 100,000.00	$ 112,486.40	$ 112,486.40	$ 112,486.40	$ 112,486.40	$ 112,486.40	$ 112,486.40	$ 112,486.40	$ 112,486.40	$ 112,486.40
	Cross connect Emergency Fire Pump to Bilge Suction	$ 25,000.00	$ 28,121.60	$ 28,121.60	$ 28,121.60	$ 28,121.60	$ 28,121.60	$ 28,121.60	$ 28,121.60	$ 28,121.60	$ 28,121.60
	Replace Bow ramp Hooks	$ 7,200.00	$ 8,099.02	$ 8,099.02	$ 8,099.02	$ 8,099.02	$ 8,099.02	$ 8,099.02	$ 8,099.02	$ 8,099.02	$ 8,099.02
	Replace existing Emer Gen, Eng room & EOS doors	$ 3,000.00	$ 3,374.59	$ 3,374.59	$ 3,374.59	$ 3,374.59	$ 3,374.59	$ 3,374.59	$ 3,374.59	$ 3,374.59	$ 3,374.59
	Replace EOS and PH HVAC	$ 30,000.00	$ 33,745.92	$ 33,745.92	$ 33,745.92	$ 33,745.92	$ 33,745.92	$ 33,745.92	$ 33,745.92	$ 33,745.92	$ 33,745.92
	Convert day room into Berthing space LCU 2007 and 2020 only	$ 70,000.00	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed
	Maintenance Upgrades Sub-Totals	**$ 881,200.00**	**$ 912,489.68**	**$ 912,489.68**	**$ 873,119.44**	**$ 873,119.44**	**$ 873,119.44**	**$ 873,119.44**	**$ 873,119.44**	**$ 873,119.44**	**$ 873,119.44**
C4ISR Improvements											
Upgrades	Upgrade Gyros to Digital System	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU
	Reconfigure Communication Suite										
	Install GMDSS Systems										
	Replace PLGR with DAGR	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Update Existing C4ISR/CEN Suite HW/SW	$ 250,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace AN/APX-72 with the AN/APX-118	$ 160,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
New Systems	Iridium Telephone	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Upgrade UHF SATCOM	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	AIS	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed
	SHF	$ 500,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	TV Direct to Sailor	$ 150,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	C4ISR Sub-Totals	**$ 1,310,000.00**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
LCU Critical Subsystem Review											
SLEP	Refurbish Shafting	$ 2,500,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Propellers										
	Replace main Engines & reduction Gear										
	Update exisiting Motor Controllers	$ 60,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Upgrade Engine Monitoring System - install Navy version of Integrated Condition Assessment System (ICAS)	$ 580,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace all Potable Water piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Graywater piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Black water piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Fit Vessels with Low Point drain under the port engine	$ 500.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Fit closure doors out of aluminun rather then steel plate	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Relocate exisitng Bilge ballast valve outside of BT room	$ 10,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Provide routers and connection for receipt of phone and network connection	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Critical Subsystem Sub-Totals	**$ 3,825,500.00**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Vessel Upgrades											
Quality of Life	Increase size of Potable Water Tank	$ 150,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace food service equipment, including ice machine, milk,and soda dispenser, etc	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace deck coating with PRC flooring, only use terrazo in the heads	$ 100,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Connect Waste Heat Evaporator to Ship's Service generator	$ 94,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Increase size of Refrig Space	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Clean / inspect ventilation sys	$ 30,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace all shower stahls and refurbish heads	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Relocate Bow Ramp equip & Hydr pack to BT room, convert Bosian locker to stowage	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Install Water Tight Ventilation Covers - PREPO vessels	$ 10,000.00	Not Needed	Not Needed	$ -	$ -	Not Needed	Not Needed	Not Needed	Not Needed	$ -
	Replace Engine Room Vent Covers	$ 5,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Lower Existing Mast	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Install Main Engine Vent Demisters	$ 5,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Increase Lubrication Stowage	$ 100,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace/relocate depth finder and speed log	$ 100,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace the existing tank vents with correct size/mat'r	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace existing Air Compressors	$ 60,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Install 4 " sq cres tubing behind Eng Rm Vent towers	$ 1,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Anchor Stow & Handling control boxes and internals	$ 75,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Rurbish existing BT comp doors	$ 8,200.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Vessel Upgrades Sub-Totals	**$ 1,138,200.00**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	TOTAL MODERNIZATION COSTS	**$ 9,400,900.00**	**$ 3,101,475.02**	**$ 3,101,475.02**	**$ 2,921,496.78**	**$ 2,837,131.98**	**$ 3,371,442.38**	**$ 3,062,104.78**	**$ 3,062,104.78**	**$ 3,062,104.78**	**$ 2,921,496.78**

Table E-6. LCU-2000 Modernization Plan –FY 11

	MODERNIZATION PLAN	FY 07 COST PER VESSEL	FY 11									
			LCU 2001	LCU 2008	LCU 2012	LCU 2018	LCU 2023	LCU 2030	LCU 2031	LCU 2032	LCU 2033	LCU 2035
Force Protection												
	Forward-Looking Radar	$ 400,000.00	$ 467,943.42	Not Needed	Not Needed	Not Needed	$ 467,943.42	$ 467,943.42	$ 467,943.42	$ 467,943.42	$ 467,943.42	Not Needed
	Relocate and/or add Additional Mk 93 Gun Mounts	$ 50,000.00	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93
	Non-lethal Weapons - Fire Monitor Installation	$ 75,000.00	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39
	MTS	$ 200,000.00	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71
	Blue Force Tracker	$ 200,000.00	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71	$ 233,971.71
	Ballistic Plating at Gun Mount Rail	$ 50,000.00	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93	$ 58,492.93
	Add 110 Power for Passive Force protection device	$ 5,000.00	$ 5,849.29	$ 5,849.29	$ 5,849.29	$ 5,849.29	$ 5,849.29	$ 5,849.29	$ 5,849.29	$ 5,849.29	$ 5,849.29	$ 5,849.29
	Force Protection Sub-Totals	**$ 980,000.00**	**$ 1,146,461.39**	**$ 678,517.96**	**$ 678,517.96**	**$ 678,517.96**	**$ 1,146,461.39**	**$ 1,146,461.39**	**$ 1,146,461.39**	**$ 1,146,461.39**	**$ 1,146,461.39**	**$ 678,517.96**
Fuel Transfer Capability Upgrade												
	Marine Fuel Transfer Capability	**$ 100,000.00**	**$ 116,985.86**	**$ 116,985.86**	**$ 116,985.86**	**$ 116,985.86**	**$ 116,985.86**	**$ 116,985.86**	**$ 116,985.86**	**$ 116,985.86**	**$ 116,985.86**	**$ 116,985.86**
Modification Work Orders												
Incomplete	Hull and Electrical Modifications	$ 275,500.00	$ 322,296.03	$ 322,296.03	$ 322,296.03	$ 322,296.03	$ 322,296.03	$ 322,296.03	$ 322,296.03	$ 322,296.03	$ 322,296.03	$ 322,296.03
	Oily Water Separator Replacement	$ 275,000.00	Completed	$ 321,711.10	$ 321,711.10	$ 321,711.10	$ 321,711.10	$ 321,711.10	$ 321,711.10	$ 321,711.10	$ 321,711.10	$ 321,711.10
	Miscellaneous – Fuel Oil System, Watertight doors, Compressed Air	$ 375,000.00	$ 438,696.96	$ 438,696.96	$ 438,696.96	$ 438,696.96	$ 438,696.96	$ 438,696.96	$ 438,696.96	$ 438,696.96	$ 438,696.96	$ 438,696.96
	Fire and Bilge/Ballast Pump Replacement	$ 75,000.00	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39	$ 87,739.39
	Relocate external washdown system on LCU 2002 and 2003	$ 25,000.00	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed
	Upgrade existing MSD system	$ 140,000.00	$ 163,780.20	$ 163,780.20	$ 163,780.20	$ 163,780.20	$ 163,780.20	$ 163,780.20	$ 163,780.20	$ 163,780.20	$ 163,780.20	$ 163,780.20
	Modify exisitng SW supply to MSD Unit	$ 500.00	$ 584.93	$ 584.93	$ 584.93	$ 584.93	$ 584.93	$ 584.93	$ 584.93	$ 584.93	$ 584.93	$ 584.93
	MWO Sub-Totals	**$ 1,166,000.00**	**$ 1,013,097.51**	**$ 1,334,808.62**	**$ 1,334,808.62**	**$ 1,334,808.62**	**$ 1,334,808.62**	**$ 1,334,808.62**	**$ 1,334,808.62**	**$ 1,334,808.62**	**$ 1,334,808.62**	**$ 1,334,808.62**
Maintenance Upgrades												
	Formalizes the steering sys upgrade LCU 2001 thru 2007	$ 35,000.00	$ 40,945.05	Completed	Completed	Completed	Complete	Complete	Complete	Complete	Complete	Complete
	Replace Emergency Diesel Generator	$ 186,000.00	$ 217,593.69	$ 217,593.69	$ 217,593.69	$ 217,593.69	$ 217,593.69	$ 217,593.69	$ 217,593.69	$ 217,593.69	$ 217,593.69	$ 217,593.69
	Replace Existing HVAC system	$ 425,000.00	$ 497,189.89	$ 497,189.89	$ 497,189.89	$ 497,189.89	$ 497,189.89	$ 497,189.89	$ 497,189.89	$ 497,189.89	$ 497,189.89	$ 497,189.89
	Replace Voltage Regulators	$ 100,000.00	$ 116,985.86	$ 116,985.86	$ 116,985.86	$ 116,985.86	$ 116,985.86	$ 116,985.86	$ 116,985.86	$ 116,985.86	$ 116,985.86	$ 116,985.86
	Cross connect Emergency Fire Pump to Bilge Suction	$ 25,000.00	$ 29,246.46	$ 29,246.46	$ 29,246.46	$ 29,246.46	$ 29,246.46	$ 29,246.46	$ 29,246.46	$ 29,246.46	$ 29,246.46	$ 29,246.46
	Replace Bow ramp Hooks	$ 7,200.00	$ 8,422.98	$ 8,422.98	$ 8,422.98	$ 8,422.98	$ 8,422.98	$ 8,422.98	$ 8,422.98	$ 8,422.98	$ 8,422.98	$ 8,422.98
	Replace existing Emer Gen, Eng room & EOS doors	$ 3,000.00	$ 3,509.58	$ 3,509.58	$ 3,509.58	$ 3,509.58	$ 3,509.58	$ 3,509.58	$ 3,509.58	$ 3,509.58	$ 3,509.58	$ 3,509.58
	Replace EOS and PH HVAC	$ 30,000.00	$ 35,095.76	$ 35,095.76	$ 35,095.76	$ 35,095.76	$ 35,095.76	$ 35,095.76	$ 35,095.76	$ 35,095.76	$ 35,095.76	$ 35,095.76
	Convert day room into Berthing space LCU 2007 and 2020 only	$ 70,000.00	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed
	Maintenance Upgrades Sub-Totals	**$ 881,200.00**	**$ 948,989.26**	**$ 908,044.21**	**$ 908,044.21**	**$ 908,044.21**	**$ 908,044.21**	**$ 908,044.21**	**$ 908,044.21**	**$ 908,044.21**	**$ 908,044.21**	**$ 908,044.21**
C4ISR Improvements												
Upgrades	Upgrade Gyros to Digital System	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU
	Reconfigure Communication Suite											
	Install GMDSS Systems											
	Replace PLGR with DAGR	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Update Existing C4ISR/CEN Suite HW/SW	$ 250,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace AN/APX-72 with the AN/APX-118	$ 160,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
New Systems	Iridium Telephone	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Upgrade UHF SATCOM	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	AIS	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed
	SHF	$ 500,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	TV Direct to Sailor	$ 150,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	C4ISR Sub-Totals	**$ 1,310,000.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
LCU Critical Subsystem Review												
SLEP	Refurbish Shafting	$ 2,500,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Propellers											
	Replace main Engines & reduction Gear											
	Update exisiting Motor Controllers	$ 60,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Upgrade Engine Monitoring System - install Navy version of Integrated Condition Assessment System (ICAS)	$ 580,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace all Potable Water piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Graywater piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Black water piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Fit Vessels with Low Point drain under the port engine	$ 500.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Fit closure doors out of aluminun rather then steel plate	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Relocate exisitng Bilge ballast valve outside of BT room	$ 10,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Provide routers and connection for receipt of phone and network connection	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Critical Subsystem Sub-Totals	**$ 3,825,500.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Vessel Upgrades												
Quality of Life	Increase size of Potable Water Tank	$ 150,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace food service equipment, including ice machine, milk,and soda dispenser, etc	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace deck coating with PRC flooring, only use terrazo in the heads	$ 100,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Connect Waste Heat Evaporator to Ship's Service generator	$ 94,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Increase size of Refrig Space	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Clean / inspect ventilation sys	$ 30,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace all shower stahls and refurbish heads	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Relocate Bow Ramp equip & Hydr pack to BT room, convert Bosian locker to stowage	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Install Water Tight Ventilation Covers - PREPO vessels	$ 10,000.00	Not Needed	$ -	$ -	$ -	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	$ -
	Replace Engine Room Vent Covers	$ 5,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Lower Existing Mast	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Install Main Engine Vent Demisters	$ 5,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Increase Lubrication Stowage	$ 100,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace/relocate depth finder and speed log	$ 100,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace the existing tank vents with correct size/mat'r	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace existing Air Compressors	$ 60,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Install 4 " sq cres tubing behind Eng Rm Vent towers	$ 1,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Anchor Stow & Handling control boxes and internals	$ 75,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Rurbish existing BT comp doors	$ 8,200.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Vessel Upgrades Sub-Totals	**$ 1,138,200.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
	TOTAL MODERNIZATION COSTS	**$ 9,400,900.00**	**$ 3,225,534.02**	**$ 3,038,356.65**	**$ 3,038,356.65**	**$ 3,038,356.65**	**$ 3,506,300.08**	**$ 3,506,300.08**	**$ 3,506,300.08**	**$ 3,506,300.08**	**$ 3,506,300.08**	**$ 3,038,356.65**

Table E-7. LCU-2000 Modernization Plan – FY 12

	MODERNIZATION PLAN	FY 07 COST PER VESSEL	FY 12			
			LCU 2002	LCU 2003	LCU 2014	LCU 2015
Force Protection						
	Forward-Looking Radar	$ 400,000.00	Not Needed	Not Needed	Not Needed	Not Needed
	Relocate and/or add Additional Mk 93 Gun Mounts	$ 50,000.00	$ 60,832.65	$ 60,832.65	$ 60,832.65	$ 60,832.65
	Non-lethal Weapons - Fire Monitor Installation	$ 75,000.00	$ 91,248.97	$ 91,248.97	$ 91,248.97	$ 91,248.97
	MTS	$ 200,000.00	$ 243,330.58	$ 243,330.58	$ 243,330.58	$ 243,330.58
	Blue Force Tracker	$ 200,000.00	$ 243,330.58	$ 243,330.58	$ 243,330.58	$ 243,330.58
	Ballistic Plating at Gun Mount Rail	$ 50,000.00	$ 60,832.65	$ 60,832.65	$ 60,832.65	$ 60,832.65
	Add 110 Power for Passive Force protection device	$ 5,000.00	$ 6,083.26	$ 6,083.26	$ 6,083.26	$ 6,083.26
	Force Protection Sub-Totals	**$ 980,000.00**	**$ 705,658.68**	**$ 705,658.68**	**$ 705,658.68**	**$ 705,658.68**
Fuel Transfer Capability Upgrade						
	Marine Fuel Transfer Capability	**$ 100,000.00**	**$ 121,665.29**	**$ 121,665.29**	**$ 121,665.29**	**$ 121,665.29**
Modification Work Orders						
Incomplete	Hull and Electrical Modifications	$ 275,500.00	$ 335,187.87	$ 335,187.87	$ 335,187.87	$ 335,187.87
Incomplete	Oily Water Separator Replacement	$ 275,000.00	$ 334,579.55	$ 334,579.55	$ 334,579.55	$ 334,579.55
Incomplete	Miscellaneous – Fuel Oil System, Watertight doors, Compressed Air	$ 375,000.00	$ 456,244.84	$ 456,244.84	$ 456,244.84	$ 456,244.84
Incomplete	Fire and Bilge/Ballast Pump Replacement	$ 75,000.00	Completed	Completed	$ 91,248.97	$ 91,248.97
Incomplete	Relocate external washdown system on LCU 2002 and 2003	$ 25,000.00	$ 30,416.32	$ 30,416.32	Not Needed	Not Needed
Incomplete	Upgrade existing MSD system	$ 140,000.00	$ 170,331.41	$ 170,331.41	$ 170,331.41	$ 170,331.41
Incomplete	Modify exisitng SW supply to MSD Unit	$ 500.00	$ 608.33	$ 608.33	$ 608.33	$ 608.33
	MWO Sub-Totals	**$ 1,166,000.00**	**$ 1,327,368.32**	**$ 1,327,368.32**	**$ 1,388,200.96**	**$ 1,388,200.96**
Maintenance Upgrades						
	Formalizes the steering sys upgrade LCU 2001 thru 2007	$ 35,000.00	$ 42,582.85	$ 42,582.85	Completed	Completed
	Replace Emergency Diesel Generator	$ 186,000.00	$ 226,297.44	$ 226,297.44	$ 226,297.44	$ 226,297.44
	Replace Existing HVAC system	$ 425,000.00	$ 517,077.48	$ 517,077.48	$ 517,077.48	$ 517,077.48
	Replace Voltage Regulators	$ 100,000.00	$ 121,665.29	$ 121,665.29	$ 121,665.29	$ 121,665.29
	Cross connect Emergency Fire Pump to Bilge Suction	$ 25,000.00	$ 30,416.32	$ 30,416.32	$ 30,416.32	$ 30,416.32
	Replace Bow ramp Hooks	$ 7,200.00	$ 8,759.90	$ 8,759.90	$ 8,759.90	$ 8,759.90
	Replace existing Emer Gen, Eng room & EOS doors	$ 3,000.00	$ 3,649.96	$ 3,649.96	$ 3,649.96	$ 3,649.96
	Replace EOS and PH HVAC	$ 30,000.00	$ 36,499.59	$ 36,499.59	$ 36,499.59	$ 36,499.59
	Convert day room into Berthing space LCU 2007 and 2020 only	$ 70,000.00	Not Needed	Not Needed	Not Needed	Not Needed
	Maintenance Upgrades Sub-Totals	**$ 881,200.00**	**$ 986,948.83**	**$ 986,948.83**	**$ 944,365.98**	**$ 944,365.98**
C4ISR Improvements						
Upgrades	Upgrade Gyros to Digital System	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU
Upgrades	Reconfigure Communication Suite					
Upgrades	Install GMDSS Systems					
Upgrades	Replace PLGR with DAGR	$ 25,000.00	$ -	$ -	$ -	$ -
Upgrades	Update Existing C4ISR/CEN Suite HW/SW	$ 250,000.00	$ -	$ -	$ -	$ -
Upgrades	Replace AN/APX-72 with the AN/APX-118	$ 160,000.00	$ -	$ -	$ -	$ -
New Systems	Iridium Telephone	$ 25,000.00	$ -	$ -	$ -	$ -
New Systems	Upgrade UHF SATCOM	$ 200,000.00	$ -	$ -	$ -	$ -
New Systems	AIS	Completed	Completed	Completed	Completed	Completed
New Systems	SHF	$ 500,000.00	$ -	$ -	$ -	$ -
New Systems	TV Direct to Sailor	$ 150,000.00	$ -	$ -	$ -	$ -
	C4ISR Sub-Totals	**$ 1,310,000.00**	**$ -**	**$ -**	**$ -**	**$ -**
LCU Critical Subsystem Review						
SLEP	Refurbish Shafting	$ 2,500,000.00	$ -	$ -	$ -	$ -
SLEP	Replace Propellers					
SLEP	Replace main Engines & reduction Gear					
SLEP	Update exisiting Motor Controllers	$ 60,000.00	$ -	$ -	$ -	$ -
SLEP	Upgrade Engine Monitoring System - install Navy version of Integrated Condition Assessment System (ICAS)	$ 580,000.00	$ -	$ -	$ -	$ -
SLEP	Replace all Potable Water piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -
SLEP	Replace Graywater piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -
SLEP	Replace Black water piping with Copper or Copper/Nickel	$ 200,000.00	$ -	$ -	$ -	$ -
SLEP	Fit Vessels with Low Point drain under the port engine	$ 500.00	$ -	$ -	$ -	$ -
	Fit closure doors out of aluminun rather then steel plate	$ 25,000.00	$ -	$ -	$ -	$ -
	Relocate exisitng Bilge ballast valve outside of BT room	$ 10,000.00	$ -	$ -	$ -	$ -
	Provide routers and connection for receipt of phone and network connection	$ 50,000.00	$ -	$ -	$ -	$ -
	Critical Subsystem Sub-Totals	**$ 3,825,500.00**	**$ -**	**$ -**	**$ -**	**$ -**
Vessel Upgrades						
Quality of Life	Increase size of Potable Water Tank	$ 150,000.00	$ -	$ -	$ -	$ -
Quality of Life	Replace food service equipment, including ice machine, milk,and soda dispenser, etc	$ 50,000.00	$ -	$ -	$ -	$ -
Quality of Life	Replace deck coating with PRC flooring, only use terrazo in the heads	$ 100,000.00	$ -	$ -	$ -	$ -
Quality of Life	Connect Waste Heat Evaporator to Ship's Service generator	$ 94,000.00	$ -	$ -	$ -	$ -
Quality of Life	Increase size of Refrig Space	$ 25,000.00	$ -	$ -	$ -	$ -
Quality of Life	Clean / inspect ventilation sys	$ 30,000.00	$ -	$ -	$ -	$ -
Quality of Life	Replace all shower stahls and refurbish heads	$ 200,000.00	$ -	$ -	$ -	$ -
Quality of Life	Relocate Bow Ramp equip & Hydr pack to BT room, convert Bosian locker to stowage	$ 50,000.00	$ -	$ -	$ -	$ -
	Install Water Tight Ventilation Covers - PREPO vessels	$ 10,000.00	$ -	$ -	$ -	$ -
	Replace Engine Room Vent Covers	$ 5,000.00	$ -	$ -	$ -	$ -
	Lower Existing Mast	$ 50,000.00	$ -	$ -	$ -	$ -
	Install Main Engine Vent Demisters	$ 5,000.00	$ -	$ -	$ -	$ -
	Increase Lubrication Stowage	$ 100,000.00	$ -	$ -	$ -	$ -
	Replace/relocate depth finder and speed log	$ 100,000.00	$ -	$ -	$ -	$ -
	Replace the existing tank vents with correct size/mat'r	$ 25,000.00	$ -	$ -	$ -	$ -
	Replace existing Air Compressors	$ 60,000.00	$ -	$ -	$ -	$ -
	Install 4 " sq cres tubing behind Eng Rm Vent towers	$ 1,000.00	$ -	$ -	$ -	$ -
	Replace Anchor Stow & Handling control boxes and internals	$ 75,000.00	$ -	$ -	$ -	$ -
	Rurbish existing BT comp doors	$ 8,200.00	$ -	$ -	$ -	$ -
	Vessel Upgrades Sub-Totals	**$ 1,138,200.00**	**$ -**	**$ -**	**$ -**	**$ -**
	TOTAL MODERNIZATION COSTS	**$ 9,400,900.00**	**$ 3,141,641.12**	**$ 3,141,641.12**	**$ 3,159,890.92**	**$ 3,159,890.92**

Table E-8. LCU-2000 Modernization Plan – FY 13

	MODERNIZATION PLAN	FY 07 COST PER VESSEL	FY 13								
			LCU 2004	LCU 2005	LCU 2013	LCU 2020	LCU 2022	LCU 2024	LCU 2025	LCU 2026	LCU 2027
Force Protection											
	Forward-Looking Radar	$ 400,000.00	$ -	$ -	Not Needed	Not Needed	Not Needed	Not Needed	$ -	$ -	Not Needed
	Relocate and/or add Additional Mk 93 Gun Mounts	$ 50,000.00	$ -	$ -	$ 63,265.95	$ 63,265.95	$ 63,265.95	$ 63,265.95	$ -	$ -	$ 63,265.95
	Non-lethal Weapons - Fire Monitor Installation	$ 75,000.00	$ -	$ -	$ 94,898.93	$ 94,898.93	$ 94,898.93	$ 94,898.93	$ -	$ -	$ 94,898.93
	MTS	$ 200,000.00	$ -	$ -	$ 253,063.80	$ 253,063.80	$ 253,063.80	$ 253,063.80	$ -	$ -	$ 253,063.80
	Blue Force Tracker	$ 200,000.00	$ -	$ -	$ 253,063.80	$ 253,063.80	$ 253,063.80	$ 253,063.80	$ -	$ -	$ 253,063.80
	Ballistic Plating at Gun Mount Rail	$ 50,000.00	$ -	$ -	$ 63,265.95	$ 63,265.95	$ 63,265.95	$ 63,265.95	$ -	$ -	$ 63,265.95
	Add 110 Power for Passive Force protection device	$ 5,000.00	$ -	$ -	$ 6,326.60	$ 6,326.60	$ 6,326.60	$ 6,326.60	$ -	$ -	$ 6,326.60
	Force Protection Sub-Totals	**$ 980,000.00**	$ -	$ -	**$ 733,885.03**	**$ 733,885.03**	**$ 733,885.03**	**$ 733,885.03**	$ -	$ -	**$ 733,885.03**
Fuel Transfer Capability Upgrade											
	Marine Fuel Transfer Capability	**$ 100,000.00**	$ -	$ -	**$ 126,531.90**	**$ 126,531.90**	**$ 126,531.90**	**$ 126,531.90**	$ -	$ -	**$ 126,531.90**
Modification Work Orders											
Incomplete	Hull and Electrical Modifications	$ 275,500.00	$ -	$ -	$ 348,595.39	$ 348,595.39	$ 348,595.39	Completed	$ -	$ -	$ 348,595.39
Incomplete	Oily Water Separator Replacement	$ 275,000.00	Completed	Completed	$ 347,962.73	$ 347,962.73	$ 347,962.73	$ 347,962.73	Completed	Completed	$ 347,962.73
Incomplete	Miscellaneous – Fuel Oil System, Watertight doors, Compressed Air	$ 375,000.00	$ -	$ -	$ 474,494.63	$ 474,494.63	$ 474,494.63	Completed	$ -	$ -	$ 474,494.63
Incomplete	Fire and Bilge/Ballast Pump Replacement	$ 75,000.00	$ -	$ -	$ 94,898.93	$ 94,898.93	$ 94,898.93	Completed	$ -	$ -	$ 94,898.93
Incomplete	Relocate external washdown system on LCU 2002 and 2003	$ 25,000.00	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed
Incomplete	Upgrade existing MSD system	$ 140,000.00	$ -	$ -	$ 177,144.66	$ 177,144.66	$ 177,144.66	$ 177,144.66	$ -	$ -	$ 177,144.66
Incomplete	Modify exisitng SW supply to MSD Unit	$ 500.00	$ -	$ -	$ 632.66	$ 632.66	$ 632.66	$ 632.66	$ -	$ -	$ 632.66
	MWO Sub-Totals	**$ 1,166,000.00**	$ -	$ -	**$ 1,443,729.00**	**$ 1,443,729.00**	**$ 1,443,729.00**	**$ 525,740.05**	$ -	$ -	**$ 1,443,729.00**
Maintenance Upgrades											
	Formalizes the steering sys upgrade LCU 2001 thru 2007	$ 35,000.00	$ -	$ -	Completed	Complete	Complete	Complete	Complete	Complete	Complete
	Replace Emergency Diesel Generator	$ 186,000.00	$ -	$ -	$ 235,349.34	$ 235,349.34	$ 235,349.34	$ 235,349.34	$ -	$ -	$ 235,349.34
	Replace Existing HVAC system	$ 425,000.00	$ -	$ -	$ 537,760.58	$ 537,760.58	$ 537,760.58	$ 537,760.58	$ -	$ -	$ 537,760.58
	Replace Voltage Regulators	$ 100,000.00	$ -	$ -	$ 126,531.90	$ 126,531.90	$ 126,531.90	$ 126,531.90	$ -	$ -	$ 126,531.90
	Cross connect Emergency Fire Pump to Bilge Suction	$ 25,000.00	$ -	$ -	$ 31,632.98	$ 31,632.98	$ 31,632.98	$ 31,632.98	$ -	$ -	$ 31,632.98
	Replace Bow ramp Hooks	$ 7,200.00	$ -	$ -	$ 9,110.30	$ 9,110.30	$ 9,110.30	$ 9,110.30	$ -	$ -	$ 9,110.30
	Replace existing Emer Gen, Eng room & EOS doors	$ 3,000.00	$ -	$ -	$ 3,795.96	$ 3,795.96	$ 3,795.96	$ 3,795.96	$ -	$ -	$ 3,795.96
	Replace EOS and PH HVAC	$ 30,000.00	$ -	$ -	$ 37,959.57	$ 37,959.57	$ 37,959.57	$ 37,959.57	$ -	$ -	$ 37,959.57
	Convert day room into Berthing space LCU 2007 and 2020 only	$ 70,000.00	Not Needed	Not Needed	Not Needed	$ 88,572.33	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed
	Maintenance Upgrades Sub-Totals	**$ 881,200.00**	$ -	$ -	**$ 982,140.62**	**$ 1,070,712.95**	**$ 982,140.62**	**$ 982,140.62**	$ -	$ -	**$ 982,140.62**
C4ISR Improvements											
Upgrades	Upgrade Gyros to Digital System	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU
Upgrades	Reconfigure Communication Suite										
Upgrades	Install GMDSS Systems										
Upgrades	Replace PLGR with DAGR	$ 25,000.00	$ 31,632.98	$ 31,632.98	$ -	$ -	$ -	$ -	$ 31,632.98	$ 31,632.98	$ -
Upgrades	Update Existing C4ISR/CEN Suite HW/SW	$ 250,000.00	$ 316,329.75	$ 316,329.75	$ -	$ -	$ -	$ -	$ 316,329.75	$ 316,329.75	$ -
Upgrades	Replace AN/APX-72 with the AN/APX-118	$ 160,000.00	$ 202,451.04	$ 202,451.04	$ -	$ -	$ -	$ -	$ 202,451.04	$ 202,451.04	$ -
New Systems	Iridium Telephone	$ 25,000.00	$ 31,632.98	$ 31,632.98	$ -	$ -	$ -	$ -	$ 31,632.98	$ 31,632.98	$ -
New Systems	Upgrade UHF SATCOM	$ 200,000.00	$ 253,063.80	$ 253,063.80	$ -	$ -	$ -	$ -	$ 253,063.80	$ 253,063.80	$ -
New Systems	AIS	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed	Completed
New Systems	SHF	$ 500,000.00	$ 632,659.51	$ 632,659.51	$ -	$ -	$ -	$ -	$ 632,659.51	$ 632,659.51	$ -
New Systems	TV Direct to Sailor	$ 150,000.00	$ 189,797.85	$ 189,797.85	$ -	$ -	$ -	$ -	$ 189,797.85	$ 189,797.85	$ -
	C4ISR Sub-Totals	**$ 1,310,000.00**	**$ 1,657,567.91**	**$ 1,657,567.91**	$ -	$ -	$ -	$ -	**$ 1,657,567.91**	**$ 1,657,567.91**	$ -
LCU Critical Subsystem Review											
SLEP	Refurbish Shafting	$ 2,500,000.00	$ 3,163,297.55	$ 3,163,297.55	$ -	$ -	$ -	$ -	$ 3,163,297.55	$ 3,163,297.55	$ -
SLEP	Replace Propellers										
SLEP	Replace main Engines & reduction Gear										
SLEP	Update exisiting Motor Controllers	$ 60,000.00	$ 75,919.14	$ 75,919.14	$ -	$ -	$ -	$ -	$ 75,919.14	$ 75,919.14	$ -
SLEP	Upgrade Engine Monitoring System - install Navy version of Integrated Condition Assessment System (ICAS)	$ 580,000.00	$ 733,885.03	$ 733,885.03	$ -	$ -	$ -	$ -	$ 733,885.03	$ 733,885.03	$ -
SLEP	Replace all Potable Water piping with Copper or Copper/Nickel	$ 200,000.00	$ 253,063.80	$ 253,063.80	$ -	$ -	$ -	$ -	$ 253,063.80	$ 253,063.80	$ -
SLEP	Replace Graywater piping with Copper or Copper/Nickel	$ 200,000.00	$ 253,063.80	$ 253,063.80	$ -	$ -	$ -	$ -	$ 253,063.80	$ 253,063.80	$ -
SLEP	Replace Black water piping with Copper or Copper/Nickel	$ 200,000.00	$ 253,063.80	$ 253,063.80	$ -	$ -	$ -	$ -	$ 253,063.80	$ 253,063.80	$ -
SLEP	Fit Vessels with Low Point drain under the port engine	$ 500.00	$ 632.66	$ 632.66	$ -	$ -	$ -	$ -	$ 632.66	$ 632.66	$ -
SLEP	Fit closure doors out of aluminun rather then steel plate	$ 25,000.00	$ 31,632.98	$ 31,632.98	$ -	$ -	$ -	$ -	$ 31,632.98	$ 31,632.98	$ -
SLEP	Relocate exisiting Bilge ballast valve outside of BT room	$ 10,000.00	$ 12,653.19	$ 12,653.19	$ -	$ -	$ -	$ -	$ 12,653.19	$ 12,653.19	$ -
SLEP	Provide routers and connection for receipt of phone and network connection	$ 50,000.00	$ 63,265.95	$ 63,265.95	$ -	$ -	$ -	$ -	$ 63,265.95	$ 63,265.95	$ -
	Critical Subsystem Sub-Totals	**$ 3,825,500.00**	**$ 4,840,477.91**	**$ 4,840,477.91**	$ -	$ -	$ -	$ -	**$ 4,840,477.91**	**$ 4,840,477.91**	$ -
Vessel Upgrades											
Quality of Life	Increase size of Potable Water Tank	$ 150,000.00	$ 189,797.85	$ 189,797.85	$ -	$ -	$ -	$ -	$ 189,797.85	$ 189,797.85	$ -
Quality of Life	Replace food service equipment, including ice machine, milk,and soda dispenser, etc	$ 50,000.00	$ 63,265.95	$ 63,265.95	$ -	$ -	$ -	$ -	$ 63,265.95	$ 63,265.95	$ -
Quality of Life	Replace deck coating with PRC flooring, only use terrazo in the heads	$ 100,000.00	$ 126,531.90	$ 126,531.90	$ -	$ -	$ -	$ -	$ 126,531.90	$ 126,531.90	$ -
Quality of Life	Connect Waste Heat Evaporator to Ship's Service generator	$ 94,000.00	$ 118,939.99	$ 118,939.99	$ -	$ -	$ -	$ -	$ 118,939.99	$ 118,939.99	$ -
Quality of Life	Increase size of Refrig Space	$ 25,000.00	$ 31,632.98	$ 31,632.98	$ -	$ -	$ -	$ -	$ 31,632.98	$ 31,632.98	$ -
Quality of Life	Clean / inspect ventilation sys	$ 30,000.00	$ 37,959.57	$ 37,959.57	$ -	$ -	$ -	$ -	$ 37,959.57	$ 37,959.57	$ -
Quality of Life	Replace all shower stahls and refurbish heads	$ 200,000.00	$ 253,063.80	$ 253,063.80	$ -	$ -	$ -	$ -	$ 253,063.80	$ 253,063.80	$ -
Quality of Life	Relocate Bow Ramp equip & Hydr pack to BT room, convert Bosian locker to stowage	$ 50,000.00	$ 63,265.95	$ 63,265.95	$ -	$ -	$ -	$ -	$ 63,265.95	$ 63,265.95	$ -
Quality of Life	Install Water Tight Ventilation Covers - PREPO vessels	$ 10,000.00	Not Needed	Not Needed	$ -	$ -	$ -	$ -	Not Needed	Not Needed	$ -
Quality of Life	Replace Engine Room Vent Covers	$ 5,000.00	$ 6,326.60	$ 6,326.60	$ -	$ -	$ -	$ -	$ 6,326.60	$ 6,326.60	$ -
Quality of Life	Lower Existing Mast	$ 50,000.00	$ 63,265.95	$ 63,265.95	$ -	$ -	$ -	$ -	$ 63,265.95	$ 63,265.95	$ -
Quality of Life	Install Main Engine Vent Demisters	$ 5,000.00	$ 6,326.60	$ 6,326.60	$ -	$ -	$ -	$ -	$ 6,326.60	$ 6,326.60	$ -
Quality of Life	Increase Lubrication Stowage	$ 100,000.00	$ 126,531.90	$ 126,531.90	$ -	$ -	$ -	$ -	$ 126,531.90	$ 126,531.90	$ -
Quality of Life	Replace/relocate depth finder and speed log	$ 100,000.00	$ 126,531.90	$ 126,531.90	$ -	$ -	$ -	$ -	$ 126,531.90	$ 126,531.90	$ -
Quality of Life	Replace the existing tank vents with correct size/mat'r	$ 25,000.00	$ 31,632.98	$ 31,632.98	$ -	$ -	$ -	$ -	$ 31,632.98	$ 31,632.98	$ -
Quality of Life	Replace existing Air Compressors	$ 60,000.00	$ 75,919.14	$ 75,919.14	$ -	$ -	$ -	$ -	$ 75,919.14	$ 75,919.14	$ -
Quality of Life	Install 4 " sq cres tubing behind Eng Rm Vent towers	$ 1,000.00	$ 1,265.32	$ 1,265.32	$ -	$ -	$ -	$ -	$ 1,265.32	$ 1,265.32	$ -
Quality of Life	Replace Anchor Stow & Handling control boxes and internals	$ 75,000.00	$ 94,898.93	$ 94,898.93	$ -	$ -	$ -	$ -	$ 94,898.93	$ 94,898.93	$ -
Quality of Life	Rurbish existing BT comp doors	$ 8,200.00	$ 10,375.62	$ 10,375.62	$ -	$ -	$ -	$ -	$ 10,375.62	$ 10,375.62	$ -
	Vessel Upgrades Sub-Totals	**$ 1,138,200.00**	**$ 1,427,532.92**	**$ 1,427,532.92**	$ -	$ -	$ -	$ -	**$ 1,427,532.92**	**$ 1,427,532.92**	$ -
	TOTAL MODERNIZATION COSTS	**$ 9,400,900.00**	**$ 7,925,578.74**	**$ 7,925,578.74**	**$ 3,286,286.55**	**$ 3,374,858.89**	**$ 3,286,286.55**	**$ 2,368,297.61**	**$ 7,925,578.74**	**$ 7,925,578.74**	**$ 3,286,286.55**

Table E-9. LCU-2000 Modernization Plan – FY 14

	MODERNIZATION PLAN	FY 07 COST PER VESSEL	FY 14					
			LCU 2001	LCU 2007	LCU 2008	LCU 2009	LCU 2018	LCU 2030
Force Protection								
	Forward-Looking Radar	$ 400,000.00	$ -	Not Needed	Not Needed	Not Needed	Not Needed	$ -
	Relocate and/or add Additional Mk 93 Gun Mounts	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Non-lethal Weapons - Fire Monitor Installation	$ 75,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	MTS	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Blue Force Tracker	$ 200,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Ballistic Plating at Gun Mount Rail	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Add 110 Power for Passive Force protection device	$ 5,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Force Protection Sub-Totals	**$ 980,000.00**	$ -	$ -	$ -	$ -	$ -	$ -
Fuel Transfer Capability Upgrade								
	Marine Fuel Transfer Capability	**$ 100,000.00**	$ -	$ -	$ -	$ -	$ -	$ -
Modification Work Orders								
Incomplete	Hull and Electrical Modifications	$ 275,500.00	$ -	$ -	$ -	$ -	$ -	$ -
	Oily Water Separator Replacement	$ 275,000.00	Completed	$ -	$ -	$ -	$ -	$ -
	Miscellaneous – Fuel Oil System, Watertight doors, Compressed Air	$ 375,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Fire and Bilge/Ballast Pump Replacement	$ 75,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Relocate external washdown system on LCU 2002 and 2003	$ 25,000.00	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed
	Upgrade existing MSD system	$ 140,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Modify exisitng SW supply to MSD Unit	$ 500.00	$ -	$ -	$ -	$ -	$ -	$ -
	MWO Sub-Totals	**$ 1,166,000.00**	$ -	$ -	$ -	$ -	$ -	$ -
Maintenance Upgrades								
	Formalizes the steering sys upgrade LCU 2001 thru 2007	$ 35,000.00	$ -	$ -	Completed	Completed	Completed	Complete
	Replace Emergency Diesel Generator	$ 186,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Existing HVAC system	$ 425,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Voltage Regulators	$ 100,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Cross connect Emergency Fire Pump to Bilge Suction	$ 25,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Replace Bow ramp Hooks	$ 7,200.00	$ -	$ -	$ -	$ -	$ -	$ -
	Replace existing Emer Gen, Eng room & EOS doors	$ 3,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Replace EOS and PH HVAC	$ 30,000.00	$ -	$ -	$ -	$ -	$ -	$ -
	Convert day room into Berthing space LCU 2007 and 2020 only	$ 70,000.00	Not Needed	$ -	Not Needed	Not Needed	Not Needed	Not Needed
	Maintenance Upgrades Sub-Totals	**$ 881,200.00**	$ -	$ -	$ -	$ -	$ -	$ -
C4ISR Improvements								
Upgrades	Upgrade Gyros to Digital System	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU
	Reconfigure Communication Suite							
	Install GMDSS Systems							
	Replace PLGR with DAGR	$ 25,000.00	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29
	Update Existing C4ISR/CEN Suite HW/SW	$ 250,000.00	$ 328,982.94	$ 328,982.94	$ 328,982.94	$ 328,982.94	$ 328,982.94	$ 328,982.94
	Replace AN/APX-72 with the AN/APX-118	$ 160,000.00	$ 210,549.08	$ 210,549.08	$ 210,549.08	$ 210,549.08	$ 210,549.08	$ 210,549.08
New Systems	Iridium Telephone	$ 25,000.00	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29
	Upgrade UHF SATCOM	$ 200,000.00	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36
	AIS	Completed	Completed	Completed	Completed	Completed	Completed	Completed
	SHF	$ 500,000.00	$ 657,965.89	$ 657,965.89	$ 657,965.89	$ 657,965.89	$ 657,965.89	$ 657,965.89
	TV Direct to Sailor	$ 150,000.00	$ 197,389.77	$ 197,389.77	$ 197,389.77	$ 197,389.77	$ 197,389.77	$ 197,389.77
	C4ISR Sub-Totals	**$ 1,310,000.00**	**$ 1,723,870.63**	**$ 1,723,870.63**	**$ 1,723,870.63**	**$ 1,723,870.63**	**$ 1,723,870.63**	**$ 1,723,870.63**
LCU Critical Subsystem Review								
SLEP	Refurbish Shafting	$ 2,500,000.00	$ 3,289,829.45	$ 3,289,829.45	$ 3,289,829.45	$ 3,289,829.45	$ 3,289,829.45	$ 3,289,829.45
	Replace Propellers							
	Replace main Engines & reduction Gear							
	Update exisiting Motor Controllers	$ 60,000.00	$ 78,955.91	$ 78,955.91	$ 78,955.91	$ 78,955.91	$ 78,955.91	$ 78,955.91
	Upgrade Engine Monitoring System - install Navy version of Integrated Condition Assessment System (ICAS)	$ 580,000.00	$ 763,240.43	$ 763,240.43	$ 763,240.43	$ 763,240.43	$ 763,240.43	$ 763,240.43
	Replace all Potable Water piping with Copper or Copper/Nickel	$ 200,000.00	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36
	Replace Graywater piping with Copper or Copper/Nickel	$ 200,000.00	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36
	Replace Black water piping with Copper or Copper/Nickel	$ 200,000.00	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36
	Fit Vessels with Low Point drain under the port engine	$ 500.00	$ 657.97	$ 657.97	$ 657.97	$ 657.97	$ 657.97	$ 657.97
	Fit closure doors out of aluminun rather then steel plate	$ 25,000.00	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29
	Relocate exisitng Bilge ballast valve outside of BT room	$ 10,000.00	$ 13,159.32	$ 13,159.32	$ 13,159.32	$ 13,159.32	$ 13,159.32	$ 13,159.32
	Provide routers and connection for receipt of phone and network connection	$ 50,000.00	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59
	Critical Subsystem Sub-Totals	**$ 3,825,500.00**	**$ 5,034,097.02**	**$ 5,034,097.02**	**$ 5,034,097.02**	**$ 5,034,097.02**	**$ 5,034,097.02**	**$ 5,034,097.02**
Vessel Upgrades								
Quality of Life	Increase size of Potable Water Tank	$ 150,000.00	$ 197,389.77	$ 197,389.77	$ 197,389.77	$ 197,389.77	$ 197,389.77	$ 197,389.77
	Replace food service equipment, including ice machine, milk,and soda dispenser, etc	$ 50,000.00	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59
	Replace deck coating with PRC flooring, only use terrazo in the heads	$ 100,000.00	$ 131,593.18	$ 131,593.18	$ 131,593.18	$ 131,593.18	$ 131,593.18	$ 131,593.18
	Connect Waste Heat Evaporator to Ship's Service generator	$ 94,000.00	$ 123,697.59	$ 123,697.59	$ 123,697.59	$ 123,697.59	$ 123,697.59	$ 123,697.59
	Increase size of Refrig Space	$ 25,000.00	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29
	Clean / inspect ventilation sys	$ 30,000.00	$ 39,477.95	$ 39,477.95	$ 39,477.95	$ 39,477.95	$ 39,477.95	$ 39,477.95
	Replace all shower stahls and refurbish heads	$ 200,000.00	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36	$ 263,186.36
	Relocate Bow Ramp equip & Hydr pack to BT room, convert Bosian locker to stowage	$ 50,000.00	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59
	Install Water Tight Ventilation Covers - PREPO vessels	$ 10,000.00	Not Needed	$ 13,159.32	$ 13,159.32	$ 13,159.32	$ 13,159.32	Not Needed
	Replace Engine Room Vent Covers	$ 5,000.00	$ 6,579.66	$ 6,579.66	$ 6,579.66	$ 6,579.66	$ 6,579.66	$ 6,579.66
	Lower Existing Mast	$ 50,000.00	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59	$ 65,796.59
	Install Main Engine Vent Demisters	$ 5,000.00	$ 6,579.66	$ 6,579.66	$ 6,579.66	$ 6,579.66	$ 6,579.66	$ 6,579.66
	Increase Lubrication Stowage	$ 100,000.00	$ 131,593.18	$ 131,593.18	$ 131,593.18	$ 131,593.18	$ 131,593.18	$ 131,593.18
	Replace/relocate depth finder and speed log	$ 100,000.00	$ 131,593.18	$ 131,593.18	$ 131,593.18	$ 131,593.18	$ 131,593.18	$ 131,593.18
	Replace the existing tank vents with correct size/mat'r	$ 25,000.00	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29	$ 32,898.29
	Replace existing Air Compressors	$ 60,000.00	$ 78,955.91	$ 78,955.91	$ 78,955.91	$ 78,955.91	$ 78,955.91	$ 78,955.91
	Install 4 " sq cres tubing behind Eng Rm Vent towers	$ 1,000.00	$ 1,315.93	$ 1,315.93	$ 1,315.93	$ 1,315.93	$ 1,315.93	$ 1,315.93
	Replace Anchor Stow & Handling control boxes and internals	$ 75,000.00	$ 98,694.88	$ 98,694.88	$ 98,694.88	$ 98,694.88	$ 98,694.88	$ 98,694.88
	Rurbish existing BT comp doors	$ 8,200.00	$ 10,790.64	$ 10,790.64	$ 10,790.64	$ 10,790.64	$ 10,790.64	$ 10,790.64
	Vessel Upgrades Sub-Totals	**$ 1,138,200.00**	**$ 1,484,634.23**	**$ 1,497,793.55**	**$ 1,497,793.55**	**$ 1,497,793.55**	**$ 1,497,793.55**	**$ 1,484,634.23**
	TOTAL MODERNIZATION COSTS	**$ 9,400,900.00**	**$ 8,242,601.89**	**$ 8,255,761.20**	**$ 8,255,761.20**	**$ 8,255,761.20**	**$ 8,255,761.20**	**$ 8,242,601.89**

Table E-10. LCU-2000 Modernization Plan – FY 15

	MODERNIZATION PLAN	FY 07 COST PER VESSEL	FY 15				
			LCU 2006	LCU 2010	LCU 2011	LCU 2016	LCU 2034
Force Protection							
	Forward-Looking Radar	$ 400,000.00	$ -	Not Needed	$ -	Not Needed	Not Needed
	Relocate and/or add Additional Mk 93 Gun Mounts	$ 50,000.00	$ -	$ -	$ -	$ -	$ -
	Non-lethal Weapons - Fire Monitor Installation	$ 75,000.00	$ -	$ -	$ -	$ -	$ -
	MTS	$ 200,000.00	$ -	$ -	$ -	$ -	$ -
	Blue Force Tracker	$ 200,000.00	$ -	$ -	$ -	$ -	$ -
	Ballistic Plating at Gun Mount Rail	$ 50,000.00	$ -	$ -	$ -	$ -	$ -
	Add 110 Power for Passive Force protection device	$ 5,000.00	$ -	$ -	$ -	$ -	$ -
	Force Protection Sub-Totals	**$ 980,000.00**	$ -	$ -	$ -	$ -	$ -
Fuel Transfer Capability Upgrade							
	Marine Fuel Transfer Capability	**$ 100,000.00**	$ -	$ -	$ -	$ -	$ -
Modification Work Orders							
Incomplete	Hull and Electrical Modifications	$ 275,500.00	$ -	$ -	$ -	$ -	$ -
Incomplete	Oily Water Separator Replacement	$ 275,000.00	Completed	$ -	$ -	$ -	$ -
Incomplete	Miscellaneous – Fuel Oil System, Watertight doors, Compressed Air	$ 375,000.00	$ -	$ -	$ -	$ -	$ -
Incomplete	Fire and Bilge/Ballast Pump Replacement	$ 75,000.00	$ -	$ -	$ -	Completed	$ -
Incomplete	Relocate external washdown system on LCU 2002 and 2003	$ 25,000.00	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed
Incomplete	Upgrade existing MSD system	$ 140,000.00	$ -	$ -	$ -	$ -	$ -
Incomplete	Modify exisitng SW supply to MSD Unit	$ 500.00	$ -	$ -	$ -	$ -	$ -
	MWO Sub-Totals	**$ 1,166,000.00**	$ -	$ -	$ -	$ -	$ -
Maintenance Upgrades							
	Formalizes the steering sys upgrade LCU 2001 thru 2007	$ 35,000.00	$ -	Completed	Completed	Completed	Complete
	Replace Emergency Diesel Generator	$ 186,000.00	$ -	$ -	$ -	$ -	$ -
	Replace Existing HVAC system	$ 425,000.00	$ -	$ -	$ -	$ -	$ -
	Replace Voltage Regulators	$ 100,000.00	$ -	$ -	$ -	$ -	$ -
	Cross connect Emergency Fire Pump to Bilge Suction	$ 25,000.00	$ -	$ -	$ -	$ -	$ -
	Replace Bow ramp Hooks	$ 7,200.00	$ -	$ -	$ -	$ -	$ -
	Replace existing Emer Gen, Eng room & EOS doors	$ 3,000.00	$ -	$ -	$ -	$ -	$ -
	Replace EOS and PH HVAC	$ 30,000.00	$ -	$ -	$ -	$ -	$ -
	Convert day room into Berthing space LCU 2007 and 2020 only	$ 70,000.00	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed
	Maintenance Upgrades Sub-Totals	**$ 881,200.00**	$ -	$ -	$ -	$ -	$ -
C4ISR Improvements							
Upgrades	Upgrade Gyros to Digital System	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU	Systems Already on LCU
Upgrades	Reconfigure Communication Suite						
Upgrades	Install GMDSS Systems						
Upgrades	Replace PLGR with DAGR	$ 25,000.00	$ 34,214.23	$ 34,214.23	$ 34,214.23	$ 34,214.23	$ 34,214.23
Upgrades	Update Existing C4ISR/CEN Suite HW/SW	$ 250,000.00	$ 342,142.26	$ 342,142.26	$ 342,142.26	$ 342,142.26	$ 342,142.26
Upgrades	Replace AN/APX-72 with the AN/APX-118	$ 160,000.00	$ 218,971.05	$ 218,971.05	$ 218,971.05	$ 218,971.05	$ 218,971.05
New Systems	Iridium Telephone	$ 25,000.00	$ 34,214.23	$ 34,214.23	$ 34,214.23	$ 34,214.23	$ 34,214.23
New Systems	Upgrade UHF SATCOM	$ 200,000.00	$ 273,713.81	$ 273,713.81	$ 273,713.81	$ 273,713.81	$ 273,713.81
New Systems	AIS	Completed	Completed	Completed	Completed	Completed	Completed
New Systems	SHF	$ 500,000.00	$ 684,284.53	$ 684,284.53	$ 684,284.53	$ 684,284.53	$ 684,284.53
New Systems	TV Direct to Sailor	$ 150,000.00	$ 205,285.36	$ 205,285.36	$ 205,285.36	$ 205,285.36	$ 205,285.36
	C4ISR Sub-Totals	**$ 1,310,000.00**	**$ 1,792,825.46**	**$ 1,792,825.46**	**$ 1,792,825.46**	**$ 1,792,825.46**	**$ 1,792,825.46**
LCU Critical Subsystem Review							
SLEP	Refurbish Shafting	$ 2,500,000.00	$ 3,421,422.63	$ 3,421,422.63	$ 3,421,422.63	$ 3,421,422.63	$ 3,421,422.63
SLEP	Replace Propellers						
SLEP	Replace main Engines & reduction Gear						
SLEP	Update exisiting Motor Controllers	$ 60,000.00	$ 82,114.14	$ 82,114.14	$ 82,114.14	$ 82,114.14	$ 82,114.14
SLEP	Upgrade Engine Monitoring System - install Navy version of Integrated Condition Assessment System (ICAS)	$ 580,000.00	$ 793,770.05	$ 793,770.05	$ 793,770.05	$ 793,770.05	$ 793,770.05
SLEP	Replace all Potable Water piping with Copper or Copper/Nickel	$ 200,000.00	$ 273,713.81	$ 273,713.81	$ 273,713.81	$ 273,713.81	$ 273,713.81
SLEP	Replace Graywater piping with Copper or Copper/Nickel	$ 200,000.00	$ 273,713.81	$ 273,713.81	$ 273,713.81	$ 273,713.81	$ 273,713.81
SLEP	Replace Black water piping with Copper or Copper/Nickel	$ 200,000.00	$ 273,713.81	$ 273,713.81	$ 273,713.81	$ 273,713.81	$ 273,713.81
SLEP	Fit Vessels with Low Point drain under the port engine	$ 500.00	$ 684.28	$ 684.28	$ 684.28	$ 684.28	$ 684.28
	Fit closure doors out of aluminun rather then steel plate	$ 25,000.00	$ 34,214.23	$ 34,214.23	$ 34,214.23	$ 34,214.23	$ 34,214.23
	Relocate exisitng Bilge ballast valve outside of BT room	$ 10,000.00	$ 13,685.69	$ 13,685.69	$ 13,685.69	$ 13,685.69	$ 13,685.69
	Provide routers and connection for receipt of phone and network connection	$ 50,000.00	$ 68,428.45	$ 68,428.45	$ 68,428.45	$ 68,428.45	$ 68,428.45
	Critical Subsystem Sub-Totals	**$ 3,825,500.00**	**$ 5,235,460.90**	**$ 5,235,460.90**	**$ 5,235,460.90**	**$ 5,235,460.90**	**$ 5,235,460.90**

Table E-11. Capability Development Resourcing Requirement

REQUIREMENT		FY09	FY10	FY11	FY12	FY13	FY14	FY15
JHSV	Operational Concept							
	Facility/Stationing Development							
	Training Development							
	Doctrinal Change							
	Fuel/Aviation Operations							
	Organizational Change							
HCCC	CPD							
	System Design Development							
	TEMP Development							
	Materiel Procurement							
	Organizational Change							
	Training Development							
	Doctrinal Change							
VSB	Concept Development							
	Concept Demonstration							
	LMCS Transition							
	ICD							
	AoA							
	CDD							
	CPD							
	System Design Development							
	TEMP Development							
	Materiel Procurement							
	Organizational Change							
	Training Development							
	Doctrinal Change							
Future Tactical LOC	Concept Development							
	Concept Demonstration							
	ICD							
	AoA							
	CDD							
	CPD							
	System Design Development							
	TEMP Development							
	System Transition							
	Materiel Procurement							
	Organizational Change							
	Training Development							
	Doctrinal Change							

Table E-11. Capability Development Resourcing Requirement

REQUIREMENT		FY09	FY10	FY11	FY12	FY13	FY14	FY15
TLM	Concept Development							
	Organizational Change							
	System Redesign							
	Training Development							
	Doctrinal Change							
Water-craft	Doctrinal Change							
	Training Development							
Current Organiza-tion Re-design	Organizational Assessment							
	Organizational Concept Develop-ment							
	Organizational Change							
Pre-Position-ing Strat-egy	O&O Concept Development							
	Organizational Change							
	Training Development							
	Doctrinal Change							
	Facility/Stationing Development							
Future Terminal Opera-tions	CCP							
	FNA							
	FSA							
	Materiel Solution Development							
	DOTMLPF Change Recommenda-tion							
Joint Pro-grams	JLOTS Transformation							
	Seabasing							
	JETA-SPOD							
	Joint Force Projection							
Future Sustain-ment Lift	Concept Development							
	Concept Demonstration							
	ICD							
	AoA							
	CDD							
	CPD							
	System Design Development							
	TEMP Development							
	System Transition							
	Materiel Procurement							
	Organizational Change							
	Training Development							
	Doctrinal Change							

Table E-12. Capability Development Resourcing Requirements

ACTION* *P = Primary Responsibility S = Supporting Role		SCOE				PD-AWS	AMC
		CDI	TCM-T	DPMO	TD		
Field JHSV							
	Operational Concept	P	S				
	Facility/Stationing Development	S	S			S	
	Training Development	S	S		P		
	Doctrinal Change	P	S				
	Fuel/Aviation Operations	P	S		S		
	Organizational Change	P	S		S		
Complete HCCC Development & Fielding							
	CPD	S	P				
	System Design Development	S	S				
	TEMP Development	S	S				
	Materiel Procurement	S	S				
	Organizational Change	P	S				
	Training Development	S	S		P		
	Doctrinal Change	P	S				
Develop VSB Requirements							
	Concept Development	P	S	S			
	Concept Demonstration	S	S	P			
	ICD	P	S	S			
	AoA	P	S	S			
	CDD	P	S	S		S	
	CPD	S	P	S		S	
	System Design Development	S	S	S		P	
	TEMP Development	S	S	S		P	
	LMCS Transition	S	S	S		P	
	Materiel Procurement	P	S	S			
	Organizational Change	S	S	S	P		
	Training Development	P	S	S			
	Doctrinal Change	P	S	S			
Determine Tactical LOC Requirement							
	Concept Development	P	S				
	Concept Demonstration	P	S				S
	ICD	P	S				S
	AoA	P	S				S
	CDD	P	S				S
	CPD	S	P				S
	System Design Development	S	S				P
	TEMP Development	S	S				P

Table E-12. Capability Development Resourcing Requirements

ACTION* *P = Primary Responsibility S = Supporting Role		SCOE				PD-AWS	AMC
		CDI	TCM-T	DPMO	TD		
	Materiel Procurement	S	S				P
	Organizational Change	P	S				S
	Training Development	S	S			P	S
	Doctrinal Change	P	S				S
Develop TLM Concept & CMF Configuration							
	Concept Development	P	S			S	
	Organizational Change	P	S			S	
	System Redesign	P	S			S	
	Training Development	S	S		P		
	Doctrinal Change	P	S				
Complete Watercraft Doctrine							
	Doctrinal Change	P	S	S		S	S
	Training Development	S	S	S	P		
Assess Current Fleet Organizational Structure							
	Organizational Effectiveness Assessment	P	S	S			
	Organizational Concept Development	P	S	S		S	
	Organizational Change	P	S	S		S	
Fleet Pre-Positioning Strategy							
	O&O Concept Development	P	S	S		S	S
	Organizational Change	P	S	S		S	S
	Training Development	S	S	S	P	S	S
	Doctrinal Change	P	S	S		S	S
	Facility/Stationing Development	S	S	S		S	P
Future Terminal Operations Capability Requirements							
	CCP	P	S	S		S	S
	FNA	P	S	S		S	S
	FSA	P	S	S		S	S
	Materiel Solution Development	P	S	S		S	S
	DOTMLPF Change Recommendation	P	S	S	S	S	S
Continue to Engage Joint Programs							
	JLOTS Transformation	P	S	S		S	S
	Seabasing	P	S	S		S	S
	JETA-SPOD	S	S	P		S	S
	Joint Force Projection	S	S	P		S	S
Future Sustainment Lift Capability Requirements							
	Concept Development	P	S				

Table E-12. Capability Development Resourcing Requirements

ACTION* *P = Primary Responsibility S = Supporting Role		SCOE				PD-AWS	AMC
		CDI	TCM-T	DPMO	TD		
	Concept Demonstration	P	S				S
	ICD	P	S				S
	AoA	P	S				S
	CDD	P	S				S
	CPD	S	P				S
	System Design Development	S	S				P
	TEMP Development	S	S				P
	Materiel Procurement	S	S				P
	Organizational Change	P	S				S
	Training Development	S	S			P	S
	Doctrinal Change	P	S				S

SCOE = Sustainment Center of Excellence
CDI = Capabilities Development and Integration
TCM-T = TRADOC Capability Manager - Transportation
DPMO = Deployment Process Modernization Office
TD = Training Directorate
PD-AWS = Product Director - Army Watercraft Systems
AMC = Army Materiel Command

Annex F
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Annex G
Acronyms

AAO	Army Acquisition Objective
ABS	American Bureau of Shipping
AC	Active Component
ACP	Army Campaign Plan
AIS	Automatic Identification System
AMC	Army Materiel Command
AMP	Army Modernization Plan
APS	Army Pre-positioned Stocks
AE	Army Regulation
ARCIC	Army Capabilities Integration Center
ARSTRUCT	Army Structure
ASA(ALT)	Assistant Secretary of the Army for Acquisition, Logistics and Technology
ATFP	Anti-Terrorism and Force Protection
AWMP	Army Watercraft Master Plan
AWRP	Army Watercraft Restructuring Plan
BC	Barge, Cargo
BCOTM	Battle Command On The Move
BD	Barge, Derrick
BFT	Blue Force Tracker
BG	Barge, Liquid Cargo
BOIP	Basis of Issue Plan
BOIPFD	Basis of Issue Plan Feeder Data
BT	Bow Thruster
C2	Command and Control
C3	Command, Control and Communications
C4I	Command, Control, Communications and Computers
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance
CAC	Combined Arms Center

CADS	Containerized Ammunition Distribution System
CASCOM	U.S. Army Combined Arms Support Command
CASCOM CDD	CASCOM Concepts and Doctrine Directorate
CASCOM FDD	CASCOM Force Development Directorate
CASCOM MSD	CASCOM Materiel Systems Directorate
CBA	Capabilities Based Assessment
CDD	Capabilities Development Document
CECOM	Communications and Electronics Command
CF	Causeway Ferry
CFR	Code of Federal Regulations
CMF	Containerized Maintenance Facility
COCOM	Combatant Command
CONUS	Continental United States
COP	Common Operating Picture
CPD	Capabilities Production Document
DA	Department of the Army
DAGR	Defense Advanced GPS Reciver
DCS	Deputy Chief of Staff
DLA	Defense Logistics Agency
DOTMLPF	Doctrine, Organizations, Training, Materiel, Leadership Development, Personnel, Facilities
DoD	Department of Defense
DoN	Department of the Navy
DPMO	Deployment Process Modernization Office
ECP	Equipment Change Package
EOS	Engine Operating System
ERDC	Engineering Research and Development Center
EUL	Economic Useful Life
FAA	Functional Area Analysis
FC	Floating Causeway
FNA	Functional Needs Analysis
FORSCOM	United States Forces Command
FP	Force Protection

FMC	Fully Mission Capable
FNA	Functional Needs Analysis
FORSCOM	U.S. Army Forces Command
FSA	Functional Solutions Analysis
FSS	Fast Sealift Ship
GPS	Global Positioning System
GTA	Grow the Army
HCCC	Harbormaster Command and Control Center
HD	Harbormaster Detachment
HVAC	Heating, Ventilation and Air Conditioning
IAW	In Accordance With
ICD	Initial Capabilities Document
ILO	In Lieu Of
INLS	Improved Navy Lighterage System
IPT	Integrated Process Team
IUID	Item Unique Identification
JCIDS	Joint Capabilities Integration and Development System
JETA-SPOD	Joint Enable Theater Access – Seaport of Debarkation
JHSV	Joint High Speed Vessel
JIC	Joint Integrating Concept
JLOTS	Joint Logistics Over The Shore
JOpsC	Joint Operations Concept
JTIPT	Joint Transformation Integrated Process Team
JTF-PO	Joint Task Force – Port Opening
LCM	Landing Craft, Mechanized
LCU	Landing Craft, Utility
LOC	Line Of Communication
LOTS	Logistics Over The Shore
LSV	Logistic Support Vessel
LT	Large Tug
MANSCEN	U.S. Army Maneuver Support Center
MCS	Modular Causeway System
MILSPEC	Military Specification

MITS	Maritime Integrated Training System
MOE	Measure of Effectiveness
MOS	Military Occupational Specialty
MSD	Marine Sanitation Device
MTS	Movement Tracking System
MWO	Modification Work Order
MWT	Modular Warping Tug
NSWC	Naval Surface Warfare Center
O&O	Operational and Organizational
OCCM	On Condition Cyclic Maintenance
OCONUS	Outside the Continental United States
OPA 90	Oil Pollution Act of 1990
PD-AWS	Product Director - Army Watercraft Systems
PIA	Post Independent Analysis
PIP	Product Improvement Program
PLGR	Precision Lightweight GPS Receiver
PM-TOCs	Program Manager – Tactical Operations Centers
POM	Program Objective Memorandum
RC	Reserve Component
RRDF	Roll-on/Roll-off Discharge Facility
SATCOM	Satellite Communications
SCOE	U.S. Army Sustainment Center Of Excellence
SDDC	(Military) Strategic Deployment and Distribution Command
SLEP	Service Life Extension Program
SLWT	Side Loadable Warping Tug
SME	Subject Matter Expert
ST	Small Tug
SHF	Super High Frequency
TAA	Total Army Analysis
TACOM	Tank Automotive Command
TCM-Trans	TRADOC Capabilities Manager for Transportation
TLM	Two Level Maintenance
TOE	Table of Organization and Equipment

TRADOC	U.S. Army Training and Doctrine Command
UHF	Ultra High Frequency
UNDS	Uniform National Discharge Standards
USTRANSCOM	United States Transportation Command
USAR	United States Army Reserve
USARC	United States Army Reserve Command
VSB	Vessel to Shore Bridging
WIB	Watercraft Inspection Branch
WT	Warping tug

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