V. Enduring and Emerging Factors Shaping USCG Maritime Security Systems

The Coast Guard's Integrated Deepwater System comprises the in-service/legacy and future/new-acquisition surface, air, shoreside infrastructure, and C4ISR assets and logistics support systems required to meet all current and future maritime security missions and tasks. The IDS assets must be able to support peacetime routine, civilian emergency, crisis-response, and wartime operations, in an affordable, efficient, and effective manner. In so doing, the Coast Guard will continue to provide the nation the inherent attributes of maritime power:[141]

- strategic and tactical mobility
- versatility and flexibility in response
- adaptability in roles, missions, and functions
- sustained reach and presence, and freedom of movement on the high seas

These Deepwater assets, moreover, must envision operations with a broad spectrum of "partners": U.S. civilian and military agencies and forces; Non-Governmental Organizations (NGO) and Private Volunteer Organizations (PVO), especially in humanitarian responses; other countries' civilian and military agencies; and international governmental organizations (e.g., United Nations and International Maritime Organization). At their most fundamental level, these humanitarian, civilian law enforcement, and defense missions and tasks require the capabilities to provide appropriate levels of presence and surveillance, and to detect, classify, identify, intercept, and engage targets of interest.[142]

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[141] These attributes are shared by all naval forces in varying degrees, and are the basis for both the U.S. Coast Guard's and Navy's strategic visions and operational concepts for the 21st century. For other views, see Directorate of Naval Staff Studies, *British Maritime Doctrine* (London: HMSO, BR1806, 1995), pp. 57-63; Geoffrey Till, *Modern Sea Power* (London: Brassey's Defence Publishers, 1987), pp. 169-171; C. E. Callwell and Colin S. Gray, *Military Operations and Maritime Preponderance: Their Relations and Interdependence* (Annapolis, Maryland: Naval Institute Press, 1996); and Andrew Droman, *et alia*, eds. *The Changing Face of Maritime Power* (New York: St. Martin's Press, 1999).

[142] Although specifically focused on anti-piracy requirements, the listing of operational requirements by Richard Hill, "Piracy and Related Matters," *op.cit.*, at pp. 39-40, is instructive for the Coast Guard's future maritime security systems, as any of the various challenges and threats confronting America in the next century – e.g., drug traffickers, weapons smugglers, terrorists – can be substituted for "pirate" in Hill's analysis:

"First, they need intelligence. This includes information as to pirates' bases; their craft – speed, profile, manoerverability, sensors; their manpower – numbers in crew, discipline, weapon proficiency; their weaponry – small arms or worse; their methods – day or night attacks, preliminary manoeuvres, ways of boarding, degree of brutality; and their objectives – just money, valuables, cargo or whole ship and cargo.

"Second, they need operational information. Their own sensors must be capable, tracking facilities must be adequate, the position of friendly forces known and maintained. Aircraft whether shore or ship based are likely to be essential to give broad cover.

"Third, they need communications. The ability to speak to one another, to detached craft, to co-operating aircraft and to shore headquarters, in real time, is essential.

"Fourth, they need organization. The co-ordination of anti-piracy operations is likely to be a matter for high command, able to speak to a variety of non-naval authorities, in a shore headquarters or, more rarely in distant waters, in a force flagship. Adequate, well-informed staff work is needed. This will include the production of clear directives to, and rules of engagement for, forces at sea and in the air.

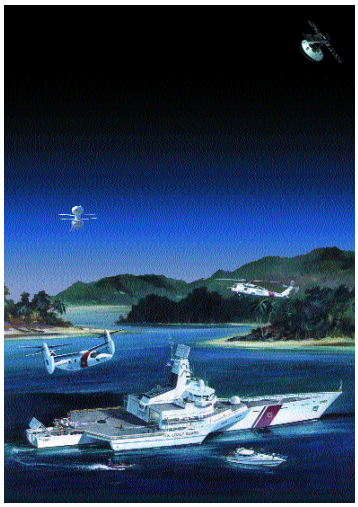
"Fifth, the need training. Small elite groups for anti-piracy initiatives at the 'sharp end' or in reaction to piratical attacks, need to be backed by well-trained operators in parent craft, particularly those manning sensors, combat centres, weapons and communications equipment.

"Sixth, they need endurance. Patient watching is likely to be a large part of anti-piracy work and it is no good having short-legged forces that must return to harbour just as things are hotting up.

Integrated Deepwater System Acquisition Program

Integrated Deepwater System Missions and Tasks

- Search and Rescue
- International Ice Patrol
- Humanitarian response
- General law enforcement
- Protection of living marine resources
- Maritime pollution enforcement and response
- Foreign vessel inspection
- Lightering zone enforcement
- Alien migrant, drug, and maritime interdiction operations
- Forward-deployed support to CinCs in peacetime engagement and crisis-response
- Environmental defense operations
- U.S. homeland security
- Port security and force protection
- Joint/combined combat operations in smaller-scale contingencies and major theater war



As the largest and most innovative acquisition effort ever undertaken by the Coast Guard, the Deepwater Project has been tasked with delivering the tools the men and women of the 21st-century Coast Guard need to stand an effective and efficient watch on the frontline of America's maritime safety and security.[143] With the Deepwater Project however, the Service has broken the traditional (non-DoD) federal acquisition paradigm and is implementing an innovative Mission-Based Performance Acquisition approach. Rather than focusing on specific hardware, e.g., a specific a class of cutter or aircraft, the Coast Guard has developed a performance specification that describes the fundamental capabilities the Service needs to perform all of its maritime security missions in the deepwater operational environment.

The overwhelming benefit of the Mission-Based Performance Acquisition approach is that industry is empowered with tremendous flexibility to leverage proven as well as leading-edge technologies and new processes to maximize the Coast Guard's deepwater operational effectiveness at the minimum total ownership cost. The Project's scope includes the entire range of Coast Guard deepwater assets – cutters, aircraft, sensors, communications, and logistics. The Coast Guard seeks to replace and or modernize these assets in order to gain the capabilities to effectively and efficiently perform its deepwater missions. The Project's encompassing scope affords industry vast trade-off spaces to develop the optimum type and mix of assets to comprise their proposed Integrated Deepwater System.

Deepwater Acquisition Strategy

The Deepwater acquisition strategy is patterned after the successful DoD model of contracting with competing industry teams for an eventual down-selection to a substantial contract award to a single team. The benefits of this approach include: industry is motivated to cost-share system development, competition encourages innovation and fair pricing, and collaborative teaming between government and industry reduces overall project risk. The end result is a contract award that ultimately yields the best value for the government.

As shown in Figure 11, throughout 1999 the Project was Phase 1 Conceptual Design, which began in August 1998 with the award of contracts to three industry teams each led by a single prime contractor. (Appendix G lists all Phase 1 industry team

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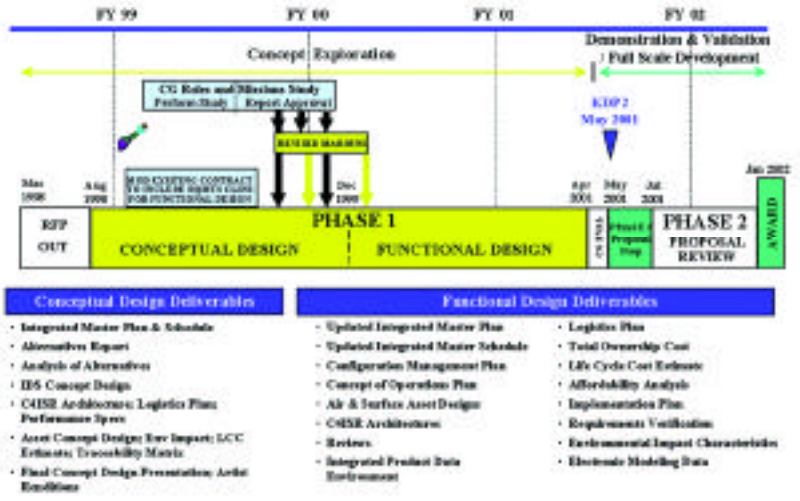
Operational replenishment is a capability that must be provided and practised.

"Finally, they need Rules of Engagement. These must be based on the two great principles governing all activities in the realm of self-defence (which after all, by extension to third parties, is the purpose of all anti-piracy operations). They are necessity and proportionality."

[143] This overview of the Deepwater Acquisition Program was derived from "The Deepwater Project – A Sea of Change for the U.S. Coast Guard," a paper prepared by LCDR Michael Anderson, Ms. Dianne Burton, LCDR Steve Palmquist, and LCDR Mike Watson, presented at the 1999 ASNE Day conference and published in the May 1999 issue of *Naval Engineers Journal* (pp. 125-131), as well as numerous internal USCG (G-OC and G-ADW) materials. For additional public information, see the Deepwater Acquisition Program's web page: www.uscg.mil/deepwater/. Another source for general IDS information is Ronald O'Rourke, "Coast Guard Integrated Deepwater System: Background and Issues for Congress," Congressional Research Service Report for Congress, 98-830F, 4 November 1998.

members.) During this phase of the project, participating industry teams were asked to conceive and engineer their proposed integrated Deepwater system concepts to approximately 50 percent design complete. After Conceptual Design, the Coast Guard can continue any or all of the participating teams into Functional Design. During Functional Design, the selected teams essentially continue to evolve and refine their Integrated Deepwater System concepts to approximately 80 percent design complete.

Figure 11. Deepwater Strategy and Plan



Also, in early 2000, the President's Interagency Task Force on the Roles and Missions of the Coast Guard was poised to report its findings. This group examined both current and possible future slates of overall Coast Guard mandates and responsibilities. The findings from this study will be incorporated into the Project as well as into industry's Integrated Deepwater System designs.

The commencement of Phase 2 marks another competitive decision point. The Coast Guard may continue up to three teams to develop their Phase 2 proposals for actual construction of their Integrated Deepwater System concept. The final award decision to one team for the construction and implementation of the Coast Guard's Integrated Deepwater System is scheduled for January 2002.

The Coast Guard is thus at a critical stage of the Deepwater Project in early 2000. The vast majority of the costs and capability of any proposed Integrated Deepwater System are locked-in during early Conceptual and Functional Design efforts. During this stage fundamental technical and cost risks are being identified and mitigated. Tradeoff studies are underway, and early operational assessments and technical demonstrations are being conducted to validate operational suitability and mitigate technical risk in system/subsystems. Bottoms-up cost estimates will be developed to support reliable acquisition and life cycle cost estimates. Essentially, the analysis and decisions made in Conceptual and Functional Design drive the fundamental cost and capabilities of the Integrated Deepwater System the Coast Guard will operate for the next 40 years, if not longer if past practice is any indication of future trends. It is critically important that a solid analytical foundation is in place to make the correct force structure, force elements, and force mix decisions, and that, to the maximum extent feasible, the Coast Guard take advantage of similar concept design and engineering studies in the U.S. Navy.

"We need to make a long-term investment commitment to the deepwater needs of the Coast Guard. And, beyond the deepwater needs, we need to ensure that our people have the best equipment possible – from the latest computers to global-positioning technology. If we expect them to do the job with all they have to offer, then we have to make sure that we are doing all we can to ensure they the equipment then need to do the job."

The Honorable Rodney E. Slater
Secretary of Transportation
Sea Power, **August 1999**

Deepwater Force Structure Analysis

Acquisition of cutters and aircraft typically takes a decade if not longer from the time the project is underway to the delivery of the first unit to the operating forces. Even with the full support of the Administration and Congress, for example, a new-design Deepwater cutter could not begin to be delivered until late in the first decade of the 21st century. Many of the Service's "legacy" cutters will be approaching if not exceeding 50 years of service by the time they can be replaced. Few of the world's navies or coastguards operate ships this old or technologically obsolete; in fact, at the end of 1999 the Coast Guard ranked 39th in age among 41 deepwater navies and coastguards. Yet, the American public will continue to place its trust in these increasingly problematic assets to go out when no one else can – or wants to – go.

A critical first step in this process therefore, is the determination of the optimum Deepwater force structure necessary to address the nation's maritime security roles, missions, and functions of today and the future that are to be satisfied by the Coast Guard's Deepwater forces. An effective force planning process must be based on a solid analytical framework of assumptions and variables in order to eliminate individual preferences for concepts or systems from impacting the analyses.[144] This analytical process must begin with the understanding of fundamental strategic, policy, and operational requirements placed on the expected force (which may include both legacy and new systems capabilities). As Chairman of the Joint Chiefs of Staff, General Henry H. Shelton, USA, wrote in the fall 1998 with regard to translating *Joint Vision 2020* concepts into capabilities, "Determining the warfighting capabilities that the joint force will need in the next century begins with defining the threats that our nation may face...."[145] These issues and other strategic- and operational-level topics were addressed by the Coast Guard and the President's Interagency Task Force on the Roles and Missions of the U.S. Coast Guard, and became the basis for additional studies and analyses.

As an integral element of the Deepwater Acquisition Project, the Coast Guard had already begun to investigate various future force structure mixes and alternatives and their effectiveness in meeting stated requirements. The use of scenarios and sensitivity assessments provided the basis for Deepwater trade-off studies and a comprehensive, objective evaluation of alternative systems, platforms, and force structure. These were, moreover, being structured at the operational level of analysis in which future systems, platforms, and integrated forces are arrayed against projected targets and threats; within operational situations in varying geographical, geophysical, and meteorological settings; and in response to multiple and simultaneous demands for services within entire areas of operations.

Coast Guard 2020 clearly acknowledges the challenges of the uncharted future. These challenges are significant variables in the force planning process that must be accommodated by force planners. One viewpoint suggests:

> In an uncertain and unpredictable world, as we have at the moment, prudence leans towards maintaining a force structure built with a maximum flexibility so that a wide range of tasks can be undertaken. Ideally, future force structures should be construct-

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[144] J. East, A. Fritz, M. Grund, "Suggested Coast Guard Force-Planning Framework," Center for Naval Analyses, CRM 99-75/September 1999, prepared for the Director, Operational Capabilities Directorate (G-OC).

[145] Henry H. Shelton, "Translating Concepts into Capabilities," U.S. Naval Institute *Proceedings*, September 1998, p. 29.

[146] Crickard, *op.cit.*

[147] See generally, John F. Troxell, *Force Planning in an Era of Uncertainty* (Carlisle, PA: Strategic Studies Institute, U.S. Army War College, 15 September 1997); Paul K. Davis, ed. *New Challenges for Defense Planning* (Santa Monica, CA: RAND, 1994); Paul K. Davis, David Gompert, and Richard Kugler, *Adaptiveness in National Defense: The Basis of a New Framework* (Santa Monica: RAND, 1996); Robert P. Haffa, Jr., "Planning U.S. Forces to Fight Two Wars: Right Number, Wrong Forces," *Strategic*

ed on the basis of a balanced mix of military capabilities that provides the necessary flexibility to undertake a wide range of national and international tasks.[146]

Two basic approaches and methodologies were available for the IDS planners and their industry teams.[147] The first is *threat-based analysis*, which is conceptually very strong when the threats to U.S. maritime security interests can be identified. The analytical task is to postulate reasonable scenarios, then determine the amount and mix of force to prevail. Both static and dynamic modeling can be employed to derive a quantifiable rationale for a specific policy/program alternative. The second basic methodology is *capabilities-based planning*, which is a valuable tool when threats to U.S. interests are somewhat vague or multifaceted and do not lend themselves to single-point scenario-based analysis. In this approach, the analyst would take advantage of professional judgment to determine the appropriate mix and level of Coast Guard Deepwater assets. It also focuses on end-state objectives rather than scenarios, and forces are sized/force mixed determined either by a resource constraint assumption (budget-limited) or by focusing on generic missions that are required to protect U.S. maritime security interests. Another alternative (see Figure 12) would be to combine both approaches, and to add performance plans and scenario alternatives, as well as deployment analyses, to help "bound" future challenges and to quantitatively rank potential force structures. "In fact," Dr. William Kaufmann of the Brookings Institution concluded in his study of conventional force planning,

> ...no one yet has devised a serious planning substitute for (a) the development and analysis of plausible but hypothetical campaigns in specific theaters, (b) the determination of the forces needed to bring about the desired military outcomes in those specific theaters, and (c) difficult judgments about the number of contingencies for which U.S. conventional forces should be prepared.[148]

Review, Winter 1999, pp. 15-22; and Richmond M. Lloyd, *et alia*, eds. *Fundamentals of Force Planning, Volume 1: Concepts* (Newport, R.I.: Naval War College Press, 1990), and *idem., Strategy and Force Planning* (Newport, R.I.: Naval War College Press, 1996). In the last, the article by Henry C. Bartlett and G. Paul Holman, Jr., "The Spectrum of Conflict: What Can It Do for Force Planners?", pp. 494-504, is particularly instructive for Coast Guard planners addressing current and future force structure demands.

[148] Kaufmann, *Planning Conventional Forces, 1950-1980* (Washington, D.C.: Brookings Institution, 1982), p. 24, quoted in Dr. Harland K. Ullman, *In Irons: U.S. Military Might in the New Century* (Washington, D.C.: National Defense University, 1995), at p. 111. Ullman continues by posing three sets of questions that are important for consideration as the IDS Project moves forward:

- What forces are needed strategically and operationally; how does that force structure incorporate the many independent and dependent variables of choice; and what are the assumptions and criteria underwriting each choice?
- What level of capability and what types of force structure are politically and economically sustainable and justifiable in this era of strategic uncertainty?
- How do we safely, sensibly, and affordably get from today's force structure and capability to that *[sic]* of tomorrow and properly balance the threat strategy, force structure, budget, and infrastructure relationships?

Figure 12. Notional Deepwater Force-Planning Process

Source: Adapted from John P. Troxell, *Force Planning in an Era of Uncertainty* (Carlisle, PA: Strategic Studies Institute, U.S. Army War College, 15 September 1997), p. 40.

"Reinvention Lab"

The Coast Guard's Deepwater Acquisition Project's program approach is so innovative that it has been designated a "Reinvention Laboratory" under the National Partnership for Reinventing Government.[149] As such, it is empowered to test new ways of doing the government's business, and to take the lessons-learned across government agencies. Deepwater was recognized for planning the entire Deepwater acquisition as a single coordinated system rather than a series of distinct procurements.

"[W]e've dramatically reformed the way we carry out the people's business," Rodney E. Slater, Secretary of Transportation, stated in an 8 June 1999 letter to Vice President Al Gore. "The Deepwater project will enhance America's national security by helping the Coast Guard perform its duties with maximum efficiency and savings to the taxpayer." It will do so by employing a unique procurement method in which competing teams design systems to meet a specified set of performance requirements. Instead of focusing on specific equipment, the Coast Guard has described the capabilities needed to perform its missions, thus permitting the three Deepwater contractor teams to determine which types, numbers, and mix of assets best meet these requirements.[150]

The Coast Guard's ability to remain *Semper Paratus* to carry out its daunting Deepwater missions and tasks at a cost that is affordable in today's and tomorrow's fiscal environment hangs in the balance. Without modernization or replacement of aging Deepwater capabilities, the Coast Guard will not be *"Always Ready"* to meet tomorrow's challenges to national maritime security. However, based upon a careful assessment of the

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[149] "Coast Guard Deepwater Acquisition Project Designated as Government Reinvention Laboratory," *op cit.*

[150] "System Performance Specifications (SPS) for the Integrated Deepwater System," *op.cit.*

requirements to carry out current Deepwater missions, and recognizing that there may well be other, yet-to-be-conceived mission sets that will be thrust upon the Coast Guard during the next half-century and more of Deepwater operations, there are several core and enduring – as well as emerging – factors that will help focus and shape the Coast Guard's Deepwater vision and programs.

A "National Fleet"

In his remarks at a November 1997 symposium, "The Role of Naval Forces in 21st Century Operations,"[151] then-Coast Guard Chief of Staff Vice Admiral James M. Loy called for a "national" response by the three Sea Services – the Coast Guard, the Navy, and the Marine Corps – to provide the full spectrum of naval and maritime capabilities needed to meet the challenges of the new millennium. "We need to think about coordinating and integrating our force planning activities," Admiral Loy remarked, "so that we can field non-redundant capabilities that are affordable, joint, interoperable, and multimission."

In early 2000, the Coast Guard and Navy are on the threshold of major recapitalizations of their forces to meet tomorrow's challenges. The Navy is committed to sustaining a near-term force structure of no fewer than 305 sophisticated, multimission warships – nuclear-powered aircraft carriers and submarines, guided missile cruisers and destroyers, and amphibious ships – that must be capable of fighting and winning in two nearly simultaneous Major Theater Wars, according to the direction of the 1997 Quadrennial Defense Review (QDR). Of these warships, by 2003 the Navy's surface force will comprise 116 multimission surface combatants (112 in the active forces and four Reserve Force warships).

This has proved to be insufficient, and today's Navy is increasingly under stress. As Admiral Johnson explained at the June 1999 Current Strategy Forum at the Naval War College, "Our forward-deployed carrier battle groups and amphibious ready groups are combat-ready and performing magnificently, as has been vividly demonstrated in recent events in the Balkans and the Arabian Gulf. But," he cautioned,

> ...today's force is a rotational force, and I continue to be deeply concerned about the readiness of units that are not forward deployed. To maintain the tip of the spear readiness, we are exacting a toll from our non-deployed ships and squadrons. Since the last Quadrennial Defense Review, I've said – and believed – that a force of 305 ships – fully manned, properly trained, and adequately resourced – would be sufficient for today's requirements within acceptable levels of risk. But...the mounting evidence leads me to believe that 305 ships is *[sic.]* not likely to be enough in the future.[152]

In addition to quantity, which has a quality of its own, among other multiwarfare needs, the Navy's surface combatants must be able to prevail in major theater war and must

"The shortfall in our surface capabilities to meet the challenges and threats that lie ahead demand a national response. The Navy-Coast Guard collective task is to prepare now the maritime forces for tomorrow's maritime challenges. To do that, we must, frankly, shed service parochialism and a "not-invented-here" philosophy. We must look forward, together, to providing the best maritime capabilities in the world, at a price Americans are willing to pay."

Vice Admiral James M. Loy, USCG Chief of Staff, November 1997

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[151] This symposium was jointly sponsored by the Fletcher School of Law and Diplomacy, the Institute for Foreign Policy Analysis, and the U.S. Navy and Marine Corps. Admiral Loy's presentation was later published as "Shaping America's Joint Forces: The Coast Guard in the 21st Century" in the Spring 1998 edition of *Joint Force Quarterly,* at pp. 9-16.

[152] Admiral Jay Johnson, "Shaping the Navy for a Changing World," keynote address at the Current Strategy Forum, U.S. Naval War College, 15 June 1999 (http://www.chinfo.navy.mil.). See also, Admiral Jay L. Johnson, U.S. Navy, "Numbers Do Matter," U.S. Naval Institute *Proceedings*, November 1999, p. 32.

be armed with theater ballistic missile defense and massed, precision land-attack weapons for direct support of land campaigns – capabilities that are clearly "high-end" and "high-tech." Additionally, these surface warships must have the capabilities to conduct the full array of responses required for smaller-scale contingency operations, as well as routine peacetime forward deployments, many of which will be conducted in concert with Coast Guard assets. The reality of the situation is apparent to naval and maritime strategist, Colin S. Gray, who recognized that

> In this decade the U.S. Navy will be reduced and reconfigured to be most effective in power projection against the shore, not for the conduct of blue-water campaigns to secure control of the oceans. The First Law of Prudence in Defense Planning, however, requires the making of provisions against the worst effects of unpleasant surprises. A U.S. Navy politically correct for the 1990s would be reshaped for modes regional conflicts and for constabulary duties in support of foreign policy. Unfortunately, such a navy would be both barely adequate to cope with strictly regional difficulties...and dramatically unfit to deliver the strategic effectiveness the United States would need in the case of a new balance-of-power struggle in Eurasia. It would be much better for the all but insular continental United States to have a navy somewhat overprepared for regional commitments, rather than critically underprepared for global scale of conflict.[153]

All current and future new-construction Navy surface warships – the *Arleigh Burke* (DDG-51) Aegis guided missile destroyers and the new-design DD-21 Land-Attack/ Maritime Dominance destroyers – are clearly "high-tech, high-end" surface warships that are not appropriate for the Coast Guard's Deepwater missions. But there are growing concerns that the relatively small numbers of ships that would at any time be available and ready to deploy would be insufficient to satisfy the Nation's commitments. In January 2000, the Coast Guard has 41 major cutters that safeguard America's maritime security and to support the requirements of the National Security and National Military strategies. With a Cold War 600-ship Navy comprising nearly 250 surface warships, 40 or so Coast Guard cutters were sometimes not given an appropriate consideration for their contributions to U.S. security needs. However, with the 305-ship Navy including only 116 surface combatants, and in a world plagued with regional instability, strife, and the reality of asymmetrical threats, the Coast Guard's major cutters along with several hundred coastal patrol boats take on new significance.

[153] Colin S. Gray, The Navy in the Post-Cold War World: The Uses and Value of Strategic Sea Power (University Park, PA: Pennsylvania State University Press, 1994), pp. 163-164.

Because of the growing sophistication of naval weapon systems and threats to maritime forces, the Coast Guard will not perform "high-end" warfighting missions. This does not mean the Coast Guard will not have a warfighting role, especially in Operations Other Than War (OOTW) – crisis-response, humanitarian operations, nation-building, peace-keeping and -enforcement, and counter-terrorism. In fact, the Chief of Naval Operations, in his 21 October 1997 letter to the Coast Guard Commandant, underscored that the Navy's "policy has been and will continue to be to ensure the Coast Guard is prepared to carry out assigned naval warfare tasks." Likewise, in his September 1999 report to the Interagency Task Force on the Roles and Missions of the Coast Guard, Secretary of the Navy Richard Danzig was emphatic on the Coast Guard's contribution to military operations and the need for Navy-Coast Guard interoperability:

> America's national security increasingly depends upon the successful completion of a wide variety of both maritime and naval missions. These range from the Coast Guard's maritime safety inspections and the protection of America's waterways to Navy's forward presence missions which help shape the security environment with a credible combat capability while being ready to respond to crises, from sanctions enforcement to war.
>
> The Coast Guard focuses on one end of the maritime spectrum, conducting operations that include law enforcement, search and rescue, environmental protection, and other peacetime missions. But it must maintain its readiness to operate with the Navy and fulfill the Service's responsibilities in our Nation's defense at the other end of the spectrum by helping to supplement the Navy wherever it can, including in a major war.

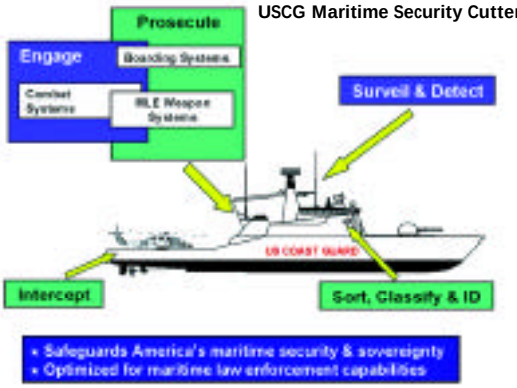
In this regard, Joint Coast Guard-Navy operations, perhaps under the nascent concept for a "National Fleet," are being taken into account by the Deepwater Program. This idea calls for the two services to address all possible operational requirements, from peacetime active and acceptable presence, to combat operations in major theater war. These operational needs will shape current and future designs and operational concepts for multimission surface warships and cutters that can mutually support the Nation's maritime and naval roles, missions, and functions that will be required of both the Coast Guard and the Navy. As Coast Guard Commandant Admiral Loy described in a 31 July 1998 letter to Chief of Naval Operations Admiral Johnson, "I envision a 'National Fleet' with the following attributes:

> First, it is a fleet of surface combatants and major cutters that would be affordable, interoperable, complementary, and balanced with minimum over-laps in their capabilities. Second, it would comprise capable multimission Navy surface combatants optimized for the full spectrum of naval operations, including Smaller Scale Contingencies (SSC) and Major Theater War (MTW). Third, the Coast Guard's "frigate-sized" maritime security cutter – which is one element of my ongoing Deepwater Project – would be optimized for peacetime and crisis-response Coast Guard missions. This cutter would also be able to work side-by-side with its Navy counterparts in many SSC and several MTW tasks, filling the requirement for a small, general-purpose, low cost, shallow-draft warship. Fourth, this cutter would become an attractive alternative for foreign military sales.

"The U.S. Navy forces in Vietnam have an urgent requirement for additional naval gunfire support. To provide such support it will be necessary to release U.S. Navy destroyers from other fleet missions. In order that the overall defense posture of the United States is not degraded, it is planned to assign destroyer escorts now on Market Time operations to replace these destroyers. Liaison between representatives of the U.S. Navy and U.S. Coast Guard has established that five high-endurance cutters can be made available to relieve the DERs [radar picket escorts]."

Paul H. Nitze, Secretary of the Navy
Memorandum to the Secretary of the Treasury
10 March 1967

The Joint Navy/Coast Guard Policy Statement on the National Fleet signed out by the Chief of Naval Operations and the Coast Guard Commandant on 21 September 1998 commits the Navy and Coast Guard "to shared purpose and common effort focused on tailored operational integration of our multimission platforms, meeting the entire spectrum of America's twenty-first century maritime needs."[154] This partnership calls for the Coast Guard and the Navy to



USCG Maritime Security Cutter

> ...work together to build a National Fleet of multimission surface combatants and cutters to maximize our effectiveness across all naval and maritime missions. The Navy and Coast Guard will coordinate surface ship planning, information systems integration, research and development, as well as expanding joint concepts of operations, logistics, training, exercises, and deployments. The Coast Guard and the Navy will work together to acquire and maintain future ships that mutually support and complement each service's roles and missions.

The likely benefits to such a coordinated and integrated approach are already apparent. They include meeting operational support and upgrade requirements more efficiently and economically; reduction of acquisition costs; standardized training and cross-training in service-specific operational specialties; improved operational planning, integrated doctrinal and tactical development; much-enhanced force and unit interoperability; and, where it makes sense to do so, commonality of technologies, systems, and platforms. "To ensure that we are prepared to meet the full range of America's maritime challenges," Secretary Danzig explained to the Interagency Task Force in September 1999, "we are building surface combatants and major cutters that are affordable, interoperable, and with complementary capabilities. These ships," Danzig continued, "will be designed around common naval equipment and systems where it is needed and makes sense." Such a joint-Service approach, moreover, could prove just as important for future Deepwater aviation elements as for the maritime security cutter.

A Common Aviation Vision

The Coast Guard is also addressing current and future fixed-wing and rotary-wing aviation requirements, again within the overall construct of the Service's roles, missions, functions, and task in support of America's maritime security. As has been proposed with regard to the Joint Navy/Coast Guard "National Fleet" initiative, the time is right to consider a Joint Navy/Coast Guard "Common Aviation Vision" that focuses on Coast

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[154] NATIONAL FLEET, *op.cit.* See Appendix C for the full text of the policy statement. See also "Coast Guard Eyes Large Part-Time Role in Forward Deployments," *Inside the Navy*, 29 November 1999, p. 2, where Admiral Loy noted that "Our intention is to create synergy among the Coast Guard and the Navy's multimission platforms, improving capability, interoperability, and affordability so that our nation is well-served acress the full breadth of this widened national security spectrum." During the summer and fall 1999, as this report was readied for publication, Coast Guard and Navy collaboration continued, including sharing of information regarding the so-called "Streetfighter" surface warship concept envisioned by Vice Admiral Arthur K. Cebrowski at the U.S. Naval War College and a "Littoral Warfare Craft" study sponsored by the Office of Naval Research. On Streetfighter and other "Navy-after-next" ship concepts, see Vice Admiral A. K. Cebrowski, U.S. Navy, and Captain Wayne P. Hughes, U.S. Navy (Retired), "Rebalancing the Fleet," U.S. Naval Institute *Proceedings*, November 1999, pp. 31-34; and Lieutenant Commander Dave Weeks, U.S. Naval Reserve, "A Combatant for the Littorals," *idem*., pp. 26-30.

Guard/Navy coordinated planning, research and development, acquisition, and life-cycle support – or, to paraphrase the "National Fleet" statement, the Sea Services should "work together to acquire and maintain future aircraft and aviation support systems that mutually support and complement each service's roles and missions."

Such an approach arguably would help ensure a force of aircraft and helicopters for naval/maritime operations that is designed specifically to work together. It is likely that this will also generate reductions in R&D and acquisition costs, as well as support costs through coordinated logistics, training, and operational planning. Perhaps the worst example of non-interoperability (not to mention non-commonality, which is different!) is the Coast Guard HH-65 helicopter with a French airframe and an American engine, a combination that makes it virtually insupportable anywhere in the world but a Coast Guard Air Station. That said, these aircraft continue to deploy to the Arabian Gulf on board cutters, and – until replaced – would deploy in significant numbers for crisis-response and wartime operations.

During the past three years, the Navy and Marine Corps aviation communities have undertaken a comprehensive assessment of current and future aviation requirements, and in 1997 produced a strategic vision and roadmap for R&D, new-aircraft acquisition, and modernization of existing land- and sea-based aviation assets[155] Specific Naval Aviation initiatives, which seem at first blush to have broad applicability to the Coast Guard's Deepwater aviation needs, include:

- Manned and unmanned tactical platforms and systems that support both operational- and tactical-level intelligence-gathering and real-time tactical reconnaissance needs[156]
- A Common Support Aircraft that looks to a common airframe (and mission-specific sensors and avionics) for a post-2010 initial operational capability
- The Helicopter Master Plan that addresses mission enhancements and modernization of the H-60 force, which could also support the future needs of the Coast Guard's HH-60J fleet, as well as the Marine Corp's MV-22 Osprey tilt-rotor aircraft that might be adapted for a variety of land- and high endurance cutter-based operations
- Long-range/endurance land-based patrol and multimission aircraft

Cooperation and coordination between the Coast Guard and Navy fixed- and rotary-wing aviation programs and operating forces could be extended to primary, advanced, and refresher training. Naval Aviation's strategic vision makes it abundantly clear that the Navy will pursue "integration of joint training where it makes sense."[157] Other possible areas include joint operational and depot-level maintenance. As the Coast Guard and the Navy are likely to work much more closely together in support of the Nation's maritime security,

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[155] Director, Air Warfare (N88), *Naval Aviation...Forward Air Power...From the Sea* (Washington, D.C.: Office of the Chief of Naval Operations, September 1997). Specific Naval Aviation program goals are outlined at pp. 16-21; aircraft and systems roadmaps and initiatives that have Coast Guard applicability are discussed at pp. 35, 40-42, 46-47, 48-51, and 54-58.

[156] See David Mulholland, "New Roles, Reliability Boost UAV Demand," *Defense News*, 14-20 September 1998, p. 12; Robert Holzer, "U.S. Navy Considers Vertical Takeoff UAVs," *ibid.*, p. 24; and Mulholland, "Global Hawk, DarkStar Offer Strategic Promise," *ibid.*, p. 16.

[157] *Naval Aviation Vision, op.cit.*, p. 67.

it makes good business and operational sense to explore all areas in which a common vision for land- and sea-based aviation can be fashioned.

Moreover, while the Service's multimission employment strategy requires current assets to serve, to at least some degree, in both coastal and deepwater environments, the separation between coastal and deepwater applications will become increasingly blurred with improvements in aircraft shipboard compatibility, DoT/DoD interoperability, standardization of cross-platform sensor capability and air-to-surface data link connectivity. In other words, whereas the Coast Guard now uses four core platforms to cover short-, medium-, and long-range mission requirements, it is both conceivable and economically desirable to imagine an integrated air and surface capabilities system which maximizes cross-platform, cross-deck, and cross-agency interoperability. This might ultimately permit a single aircraft platform routinely and seamlessly to cross short-range rescue and recovery (SRR), medium-range rescue and recovery/search (MRR/MRS) and even long-range search (LRS) boundaries. Possible attributes of such a system include the following:

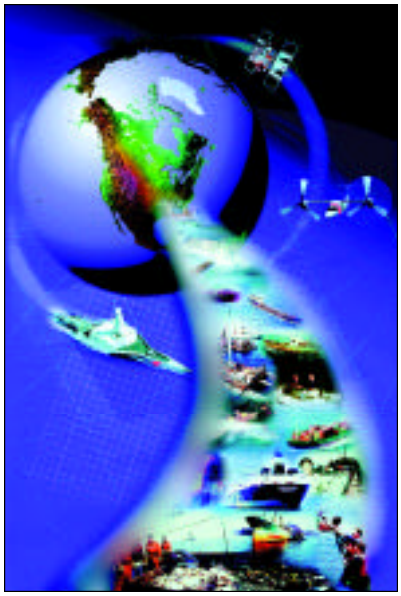
- **Integration of cutter and aviation capabilities.** All Coast Guard cutters must be capable of embarking and maintaining all vertical take-off and landing (VTOL)-capable aviation platforms, whether rotary wing, tilt-rotor, or unmanned aerial vehicles (UAVs). To optimize embarked aviation capability fully, detached aircrews and all deployable aviation platforms must be capable of remaining aboard ship for a minimum of two months without interruption. Because the vast majority of aviation maintenance infrastructure will remain ashore, sustenance of deployed aviation capability for prolonged periods will depend on: (1) improved individual aviation component reliability resulting in expansion of periodic maintenance intervals; (2) simplification of unit-level maintenance requirements; (3) maximum marinization of critical electronic components; (4) increased and improved shipboard aviation maintenance capability; and (5) flexible, reliable and economical logistics support and air delivery systems.
- **Standardization and integration of cross-platform sensor capability and air-to-surface information connectivity.** To the extent that sensor capability is standardized across all aviation and surface assets, acquisition, maintenance and training economies of scale will be realized while optimizing multimission utilization. Likewise, the real-time air-to-surface exchange of detection, classification and identification data will optimize tactical employment of both air and surface assets.
- **Interagency operability.** On an increasing basis, the Coast Guard interfaces with other agencies and DoD services. Whether as co-lead with Customs for air interdiction, as members of joint, interagency task forces, or in the Commandant's role as U. S. Interdiction Coordinator, the extent to which the Coast Guard can capitalize on a uniformed services acquisition strategy for aviation platforms and sensors will directly impact reductions in total ownership costs and markedly enhance the Coast Guard contribution to any interagency operation, to include national defense operations in time of war when, at the direction of the President, the Coast Guard functions as part of the Navy.
- **Satellite communications.** From short-notice requests for Statement of No Objection (SNO) authorization, to requests for aircraft parts, reliable and timely ship-to-shore and surface-to-air communications, both secure, non-secure, and DoD-compatible, are essential to development of any state-of-the-art operational capability.
- **Consolidation/collocation of air stations.** As advances in aviation technology increase performance parameters (speed, range, endurance), consolidation of air stations (or collocation with Navy/Marine Corps/DoD air stations) should be considered to reduce shore facility overhead costs and optimize logistics support

functions. While potentially a politically volatile issue, operational redundancy, particularly with respect to the Coast Guard's ability to meet its SAR program standard, must be eliminated.

- **Reduction of in-aircraft training.** The current high percentages of programmed flight hours dedicated to operational training suboptimizes tactical asset utilization. Following the commercial industry model, the majority of training could be moved from the cockpit to state-of-the-art, full-motion simulators, thus returning increased aviation capability in the form of additional programmed flight hours to the operational commander.

Determination of the number and types of different aircraft required to realize this integrated systems approach to the enhancement of Coast Guard aviation capability will depend to a large extent on how many of the core attributes discussed above can be realized in the anticipated austere fiscal environment. The ultimate success of the system itself, however, hinges primarily on the extent to which air and surface assets, information systems, and support infrastructure are successfully integrated in the developmental stages of the Deepwater acquisition process.

"Net-Centric" Deepwater Operational Concept



One implicit objective of the Integrated Deepwater System Capabilities Replacement Project is to deploy an integrated "system-of-systems" of diverse surface, air, C4ISR, and shoreside infrastructure assets.[158] Another way to describe "system-of-systems" is by the phrase "network-centric" as opposed to "platform-centric" operations, in which the focus of operations is on linking diverse platforms together in a "network" of information. Clearly the Deepwater system "whole" is intended to provide much greater capability than the sum of its individual "parts." In order to ensure this, all Coast Guard shore station and cutter/aircraft platform capabilities will be linked together in a seamless "web" of strategic, operational, and tactical data that supports mission objectives. In its most succinct definition, network-centric operations are focused on the *massing of effects* rather than the *massing of platforms*.[159]

Total Maritime Awareness

The basic mandate for the Coast Guard in all its Deepwater mission areas and tasks is the ability to conduct surveillance of critical maritime regions; to detect, classify, and identify targets of interest; and to intercept and engage those targets, quickly and effectively. The Coast Guard will provide appropriate levels of credible, on-scene presence in critical maritime areas, gather and disseminate in real-time information about all targets, and exploit that information in the most effective and efficient manner possible. If it "moves" in Deepwater operating areas, the Coast Guard will know about it and be able to determine the appropriate course of action, applying the right mix of forces to achieve mission objectives – quickly, effectively, and safely.

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[158] See IDS "System Performance Specifications," *op.cit*. In his prepared statement before the House Subcommittee on Coast Guard and Maritime Transportation, 19 May 1998, then-Commandant Admiral Robert E. Kramek specifically used the "system-of-systems" concept to describe the IDS.

[159] This network-centric Deepwater concept will also be a key element in the Coast Guard's enhanced and expanded joint operations with the Navy, which itself has embraced the concept of Network-Centric Warfare. See, for example: Admiral Jay Johnson, USN, "Anytime, Anywhere: A Navy for the 21st Century," U.S. Naval Institute *Proceedings*, November 1997, pp. 48-50; Vice Admiral Arthur K. Cebrowski, USN, and John H. Garstka, "Network-Centric Warfare – Its Origins and Future," U.S. Naval Institute *Proceedings*, January 1998, pp. 28-35; Vice Admiral James R. Fitzgerald, USN (Ret.), Raymond J. Christian, and Robert C. Manke, "Network-Centric Antisubmarine Warfare," U.S. Naval Institute *Proceedings*, September 1998, pp. 92-95; *VPP98*, *op.cit*., pp. 21-23; *Vision...Presence...Power*, 1999 ed. (Washington, D.C.: Department of the Navy, March 1999), pp. 18-21; and "Interview with CincPACFLT, Admiral Archie Clemins," *UNDERSEA WARFARE Magazine*, Summer 1999, pp. 2-5. At the request of Vice Admiral Cebrowski, in 1999 the Navy Warfare Development Command crafted a concept paper, "Naval Operations in the Information Age: A Capstone Concept for Future Naval Operations." This outlined how U.S. naval forces will "influence events decisively in the 2015 time-

No matter how successful the Coast Guard might be in garnering the necessary resources for the IDS Project, it will be impossible to acquire sufficient surface and airborne platforms to have on-scene presence in all areas of interest, all the time. (This constraint is shared with the U.S. Navy, for example, which has seen its Cold War posture of maintaining 100 percent coverage by aircraft carrier battlegroups of *three* critical AORs in the Mediterranean, Western Pacific, and Southwest Asia cut back to 80 percent coverage in only *two* AORs.) The reality of current and likely future fiscal environments will not support such a robust operational posture. Still, surveillance of the United States' immense maritime zones, which will remain the prerequisite for national maritime security, will require a full spectrum of national, shared, and Coast-Guard-specific space-based, air, surface, undersea, and land-based sensors and platforms.

For the Coast Guard's IDS systems, the nascent network-centric operations will ultimately derive their power from a robust networking of well-informed but geographically dispersed forces and command-and-control nodes. The enabling elements are a highly webbed intelligence-surveillance-information service, demand-pull access to all appropriate information and intelligence sources, enhanced command-and-control processes, and integrated sensors – all linked to operating forces.[160] A Deepwater information "backplane" could be developed for the Coast Guard's network-centric integrated system, which will support the information flow among sensor, command-and-control elements, and operating forces' "grids" – no matter where the actual forces may be deployed. In this way, the Coast Guard will enjoy a degree of "total maritime awareness" heretofore impossible to achieve, but clearly a fundamental element of the novel "Pressing Out Our Borders" operational concept that undergirds the Coast Guard's contribution to homeland defense.[161] But, as Commander Darren Knight, of the Canadian Maritime Forces Command, warned in 1994, C4ISR

> ...is more than just technology: it is a concept, a shared mental image binding several interrelated components together. It is only through the understanding of the concept as a whole and its constituent components that [C4ISR] technology, and all

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frame" through the "use of information to monitor developments and forestall undesirable events...to focus decisive effects on enemy vulnerabilities," according to a late-1999 draft.

The "network-centric" concept is essentially identical for the Coast Guard and the Navy, and relates to a concept of operations in which the various ship, aircraft, and unmanned systems are linked within a "backplane" of information that can be accessed to support directly the specific operation, from unit/tactical levels through campaign levels of force employment – whether the objective is "ordnance on target" for the Navy (e.g., long-range Tomahawk Land-Attack Cruise Missile strikes against terrorist training facilities) or a "boarding party on target" for the Coast Guard (e.g., surveillance, detection, classification, interdiction, search, and seizure of a drug-runner's fast craft). Not all is rosy, however, as the Navy continued to experience some frustrations in implementing IT-21 in the Fleet, particularly in training and support. See Bob Brewin, "Navy faces IT Training, Support Woes," *Federal Computer Week*, 21 June 1999.

[160] The questions of "Plug-and-Play" linkage to, if not actual co-acquisition of, appropriate Defense Department and Navy C4ISR systems must be addressed. For example, the Navy's Global Command and Control System-Maritime (GCCS-M, formerly known as the Joint Maritime Command Information System, JMCIS) technologies, systems, and protocols will be important for Coast Guard-Navy interoperability. Likewise, compatibility with the DoD Joint Tactical Information Distribution System (JTIDS) must be ensured for future IDS assets. Moreover, as close integration with Navy/DoD logistics systems is being investigated for future Coast Guard procurements, generally, compatibility with the Naval Tactical Command Support System (NTCSS) should be addressed. NTCSS is an integral element of JMCIS/GCCS, with both afloat and ashore nodes, that provides the commander key maintenance, supply, medical, and administrative information through migrated subsystems of the Shipboard Non-tactical Automated Program (SNAP), the Naval Aviation Logistics Command Management Information System (NALCOMIS), and the Maintenance Resource Management System (MRMS). All rely extensively on commercial- and government-off-the-shelf (COTS/GOTS) technologies and systems.

[161] In this regard, a U.S. Army-led program for Joint Land-Attack Cruise Missile Defense Elevated Netted Sensor (JLENS) system could provide the needed surveillance coverage of critical U.S. maritime zones. JLENS exploits high-altitude (15,000 feet), tethered aerostats (on the size of Boeing 747s) or high towers atop coastal highlands – spaced along all coastlines and on critical inland borders – equipped with large-aperture, look-down search and control radars and communications systems. The JLENS aerostats are linked to mobile mooring systems and signal-processing stations, which then link to other command-and-control-and-engagement systems. In addition to providing a crisis/wartime barrier against cruise missile attacks, a Joint Army-Navy-Coast Guard JLENS system, linking to Coast Guard

other technology, can be made to work to its full theoretical potential. Navies of the world can be analyzed in terms of their ability to understand and implement a truly integrated [C4ISR] concept.[162]

The Coast Guard's leadership role in addressing current and emerging transnational maritime security threats will require seamless C4ISR connectivity with not only its own operating forces, but those of myriad governmental agencies and nations allied with the United States in confronting those threats.[163] Effective linking of limited C4ISR systems (necessary if stringent total cost of ownership goals are to be met) will be critical in ensuring that the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's capability to do the same. This premise of information superiority is fundamental if America's military forces are to achieve new levels of effectiveness in joint operations.[164]

Future deepwater C4ISR architectures, systems, and transitional technologies should be adaptable across a wide range of surface and aviation platforms of varying sizes, and well as land-based sites. They should provide a degree of flexibility that will address changes in technologies or resources, as well as potential reconfiguration on-board operational platforms in response to changing missions and threats. In this regard, the Navy's Information Technology for the 21st Century – IT-21 – Program is focused on accelerating the Navy's capabilities to achieve information superiority. IT-21 is a Fleet-driven information technology strategy that provides Internet Protocol network connectivity for afloat, ashore, and mobile naval forces. IT-21 architecture leverages preexisting programs to provide global access to the Department of Defense's classified and unclassified Wide Area Networks.[165]

The resulting information superiority will fundamentally change the nature of Coast Guard operations, reduce work force requirements, and facilitate quality of life improvements for the Coast Guard's men and women. Indeed, former Commandant Admiral Robert E. Kramek described a future in which "we will work to take the 'search' out of 'search and rescue'." (To do so, however, will require a cooperative boating public to use available emergency-locator systems or to have advanced locating systems built into wireless

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and Maritime Defense Zone (MARDEZ) Atlantic and Pacific command centers, would be a key element in achieving the needed total maritime awareness to meet the nation's Deepwater needs. Early indications were that a JLENS system could provide redundant, 24-hour surveillance and engagement support at least out to 200 nautical miles from the coasts, capable of detecting and tracking very small surface craft. See Paul Kaminski and Scott Truver, "Cruise Missile Lessons," *Defense News*, 7 June 1999, p. 23.

For other perspectives on the need for total maritime awareness, see: Anders Lundqvist, "Civic Security – A Combined Technological, Institutional, and Cost Perspective," *EEZ Technology, op.cit.*, pp. 123-126; F.W. Crickard, G.J. Herbert, and B.A. Hobson, "Canada's Oceans Strategy: Surveillance and Enforcement," *idem*., pp. 153-158; and Orin E. Marvel, "C4ISR – The Big Picture," *idem*., pp. 159-162.

[162] Commander Darren Knight, Headquarters Maritime Forces Atlantic, "The Impact of Technology on Maritime Security: A User Perspective," in Griffiths and Haydon, Maritime Forces in Global Security, *op.cit*., p. 81. Commander Knight, writing before the widespread use of more expansive C4ISR term, specifically referred to "C3I" in his paper.

[163] For example, the Coast Guard is the lead counter-drug agency for maritime interdiction and co-lead agency (with the U.S. Customs Service) for air interdiction of illegal drugs. *Joint Pub 3-07.4, Joint Counterdrug Operations* (Washington, D.C.: Joint Chiefs of Staff, February 1998), p. III-23.

[164] *Concept for Future Joint Operations, Expanding Joint Vision 2010* (Washington, D.C.: Joint Chiefs of Staff, May 1997), p.i. See also, "Sea Power 2030: Operational Concept" Brief, *op.cit.*

[165] *VPP98, op.cit.*, pp. 21-22, and *VPP99, op.cit.*, pp. 18-21. See also, Captain Renny Ide, USN, OPNAV (N60B), "Information Technology for the 21st Century" Brief for the Director, Operations Capability Directorate (G-OC), Headquarters, U.S. Coast Guard, 5 August 1998.

[166] Lucent Technology's Bell Labs in June 1999 announced that it had developed a system that can very closely locate a wireless phone indoors or out. The technique uses the Global Positioning System (GPS) and "bare-bones" GPS technology in the wireless handset and linking to the existing GPS constellation. The impetus for this was the Federal Communications Commission requirement that a way be found by October 2001 to locate wireless phones placing calls to "911" emergency services. Lucent Technology's researchers have identified an additional feature that would make it possible to track the location of a wireless phone whether it is in use or not. Grant Buckler, *Newsbytes*, 30 June 1999, http://www.newsbytes.com.

phone and other communications systems.[166]) Effectiveness of command and response will be improved by transferring comprehensive operational, intelligence, and logistics information to the right place at the right time. The implementation cycles for commanders' directives will be accelerated, gaining operational initiative in virtually any situation, and increasing the probability of mission success.

Information superiority – much of it achieved through harnessing commercial technologies and systems – will result in the ability to share strategic, operational, and tactical pictures, and thereby ensure the ability of all Deepwater system elements to operate seamlessly together and to link with other civilian and Defense Department elements and commands – in short, to achieve and sustain total maritime awareness and security at the lowest total ownership costs. In short, a network-centric concept of operations will result in an integrated Coast Guard maritime security force, which will encompass national and Coast Guard-specific surveillance and reconnaissance assets, aircraft, cutters, commands, and shore support facilities linked together by the information network that focuses on the needs of the operators at sea.

Total Ownership Affordability

Affordability of Deepwater elements will be critical in delivering the required capabilities to tomorrow's Coast Guard at cost acceptable to the American taxpayer. A principal goal of IDS development is to minimize the total cost of ownership, those costs directly associated with research, development, procurement, operations, logistics support, and disposal – a "cradle-to-grave" approach. Total ownership costs also include indirect, but linked costs associated with the overall supporting infrastructure that plans, manages, and executes a system or program throughout its lifetime, as well as the costs associated with common items or systems necessary to the introduction of the system.

Application of a methodology that establishes realistic fiscal objectives while meeting operational requirements will allow routine components to work closely together as a team. Areas with the greatest potential to minimize the life-cycle costs of individual elements include reduced/optimal shipboard or aircraft manning levels, commonality of components across platforms and systems, and the use of a common, open systems architecture that will support insertion of future technologies. This will be particularly true with the harnessing of commercial information technologies and systems that will not only result in the ability to share common tactical pictures, but will enhance the synergy required to achieve operational effectiveness at the lowest total ownership cost.

Unquestionably, there is a need for manpower affordability in operations, both ashore and at sea, as personnel costs are the greatest contributors to total ownership costs. The reduction of personnel through innovative application of technology, similar to the approach being taken by the U.S. Navy as part of its "Smart Ship" program, combined with restructuring of traditional organizations, can ensure desired capabilities are sustained and even enhanced as the numbers or people afloat and ashore are reduced.[167]

In some regards, the future is already here for the Coast Guard. Its new *Juniper* (WLB-201)-class ocean-going buoy tenders, the lead unit of which was delivered in January 1996, have been described as being "wired for roughest seas" and the "cutter of the

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[167] Certainly, many of the personnel reductions achieved in the USS *Yorktown* (CG-48) as the Navy's "Smart Ship" laboratory have been the result of procedural changes, but the application of modern systems, especially automation, has also contributed to the success of the program so far, according to the Navy's Surface Warfare Directorate (N86). This perception has driven the demand for ever-greater technological infusion into future surface warships, with the "optimal manning" requirement for the DD-21 Land-Attack/Maritime Dominance destroyer set at 95 people. See, Scott C. Truver, "Surface Revolution: DD21 Redefines the Destroyer," *Jane's Navy International*, August 1998, pp. 12-18. Both the Navy and the Coast Guard, moreover, are learning that in many instances the infusion of leading-edge technologies throughout the ship, much originating in the commercial world, carry hidden maintenance and upgrade costs not apparent at the outset.

[168] Matthew L. Wald, "Fast Ship Steered with a Joy Stick," *The New York Times*, 2 February

future."[168] They are minimally manned vessels – no more than 40 crew members compared to about 55 on the older ocean-going tenders that are being phased out – that rely heavily on automation and technology to reduce crew workloads. A single watchstander carries out all propulsion evolutions, helping to reduce the number of people needed on the bridge. The *Juniper* class has some 4,000 sensors throughout each ship, which continuously monitor the operation of all principal equipment and spaces, and alert watchstanders if anything is amiss. The new tenders also serve other Coast Guard missions – icebreaking, pollution response, fisheries enforcement, and *Juniper's* computerized navigation system helped to direct some of the search efforts after the crash of TWA Flight 800. These and future cutters will go far in achieving Secretary of the Transportation Rodney Slater's vision that the Coast Guard was "using technology to work smarter." That said, the need for sufficient numbers of skilled people in critical personnel-intensive tasks – boarding teams, boat crews, oil-spill response teams – will not diminish in the decades ahead.

Although manning reductions will be critical to successful development of the IDS, the Coast Guard will continue to place the recruitment of the highest quality individuals as its foremost requirement. Clearly, the need for people with the philosophy, skills, and dedication needed for Coast Guard service will be as important, if not more so, in 2020 and beyond as was the case at the turn of the century.

Multimission and Operational Flexibility

Operational and mission flexibility, task agility, adaptability, and room for growth must be designed and built into every Deepwater system element. Building to narrow design characteristics – whether a future cutter or aircraft or information-processing/distribution system – to save dollars in the near term will only increase the risk of early obsolescence as threats, roles, missions, and functions change. This would be a false and dangerous economy from which there might be little opportunity for affordable change later on. If the past is indeed prologue, the Coast Guard's Deepwater systems – indeed, all future Coast Guard systems and platforms – will almost certainly be asked to assume potentially vastly different missions and tasks than what is in the Service's portfolio in 2000.

1997, METRO Section p. 34; and Adam Katz-Stone, "Farewell to Old Coast Guard, Hello New Cutter," *Navy Times*, 20 July 1998, p. 22. For a comprehensive engineering discussion, see Bernard F. Bentgen and Frank McGrath, "WLB and WLM: The Next Generation of United States Buoy Tenders," *Marine Technology*, April 1996, pp. 141-163. The "jury" was still out in mid-1999, however, regarding whether the Coast Guard has undercrewed and undersupported these new vessels.

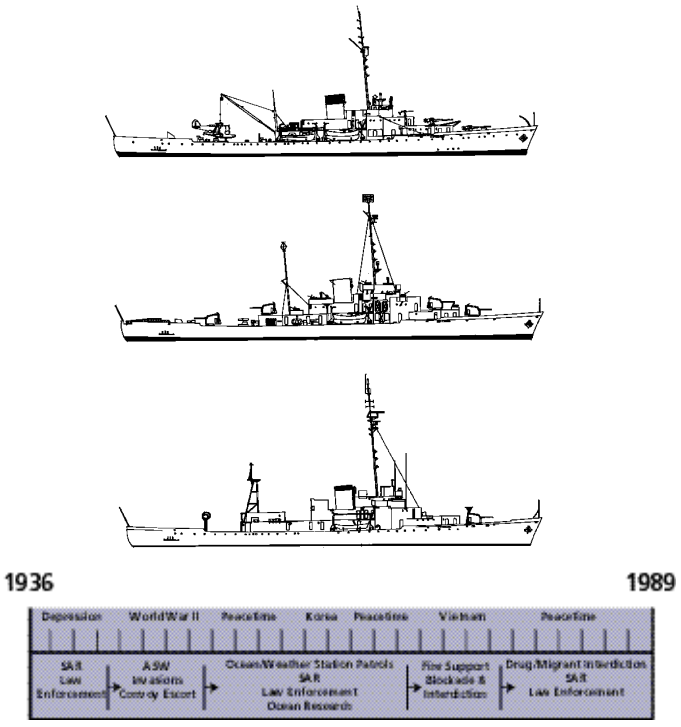
[169] Polmar, *Ships and Aircraft*, 16th ed., *op.cit.*, p. 505; Robert L. Scheina, *U.S. Coast Guard Cutters and Craft*, 1946-1990 (Annapolis, MD: Naval Institute Press, 1990), pp. 28-29; see also, Johnson, *Guardians of the Sea*, *op.cit*., pp. 154-155, 230-239.

The Coast Guard's experience with the Secretary-class 327-foot cutter provides an excellent illustration of the value of flexibility and versatility to carry out missions and tasks not originally anticipated when the cutters were acquired.[169] Built to a modified U.S. Navy *Erie*-class gunboat design, seven 327s were completed in 1936-37, with a design requirement to carry floatplanes and missions that included hydrographic research, general law enforcement, and search and rescue. An early example of Navy-Coast Guard standardization to save costs, the machinery plant and hull below the waterline were identical in the Secretary and *Erie* classes.

During World War II, they served as ocean escorts (WPG), protecting Allied convoys from German U-boats, and also served as amphibious command ships (WAGC).[170] One of the Secretary-class cutters, *Alexander Hamilton* (WPG-34), was sunk by the U-132 on 30 January 1942. By mid-1943 and the height of the Battle of the Atlantic, U.S. warships had sunk only 11 U-boats, six of which were destroyed by Coast Guard cutters, including three Secretary-class WPGs, *Spencer*, *Ingham*, and *Campbell*. When the Coast Guard returned to Treasury control at the end of the war, Secretary of the Navy James Forrestal stated, "During the arduous war years, the Coast Guard has earned the highest respect and deepest appreciation of the Navy and Marine Corps. Its performance of duty has been without exception in keeping with the highest traditions of the naval service."

In the immediate post-WW II period, the six survivors returned to peacetime missions, expanded to include ocean station patrols for weather and SAR standby. As the U.S. involvement in the Vietnam War grew, they conducted Naval Gun Fire Support tasks in support of forces ashore and maritime interdiction operations aimed at stopping Vietcong clandestine coastal movements. With the end of the war in 1975 and until the decommissioning of the last member of the class, the USCGC *Ingham* (WHEC/WPG-33) on 27 May 1988, they served in law enforcement, alien migrant and illegal drug interdiction,

Figure 13. The "Enduring Cutter" 327 - Foot *Secretary* Class 1936 to 1989



[170] *Guardians of the Sea*, *op.cit*., pp. 230-255.

and protecting living marine resources. For more than 50 years, these highly versatile and flexible cutters supported a broad spectrum of missions and tasks in both peace and war. (Figure 13 illustrates the multimission flexibility of the Secretary-class WPGs, enduring characteristics that must be embraced by the Deepwater project.)

Moreover, the Coast Guard usually conducts numerous distinct missions simultaneously, the heart of mission agility. A cutter on a fisheries patrol is prepared to divert to a search and rescue operation, to respond to a pollution incident, or to interdict a suspected drug smuggler – in many cases across thousands of nautical miles. A single cutter or aircraft thus can expect to enforce U.S. sovereignty and safeguard national maritime security in many ways through its active presence on the seas.

Operational flexibility, agility, adaptability, and the ability to carry out numerous missions simultaneously are enduring characteristics and will be important considerations for the future Coast Guard. The ability to adapt quickly, easily, effectively, and affordably to meet emergent requirements seems to invoke a design, systems engineering, and life-cycle support philosophy. This philosophy, furthermore, looks to embrace modularity and open-architecture systems designs that facilitate "plug-out/plug-in" of electronics, software, doctrine, sensors, and weapons for future IDS hardware, firmware, and software. It will, moreover, ensure that future Coast Guard Deepwater systems and platforms can be "tailored" for specific operations ensuring mission success.

Although he wrote about navies, James Cable's comments about an emerging "principle" seems to offer great irony for the Coast Guard:

> If anything approaching a principle emerges from the record of the past it may be that the natural political environment for navies, their raison d'etre, is the unforeseen. A navy exists and chance or an imaginative leader finds an unexpected use for it. This is at once the boon and the bane of naval force. In an appropriate emergency a navy is uniquely mobile and adaptable to political improvisation. But nobody devotes scarce resources to building a navy just because one day it might come in handy.[171]

In light of the Coast Guard's history of always coming in "handy" for a wide variety of tasks, it is remarkable how great the challenges have been to ensuring adequate resources for all its mandates.

"Tailored" for Multi-Agency Operations

The Coast Guard has a history of anticipating and responding to America's evolving needs. From its very beginning, the Coast Guard has absorbed new responsibilities – Revenue Cutter Service . . . Lighthouse Service . . . Lifesaving Service . . . Steamboat Inspection Service . . . Bureau of Navigation. The ability to adapt to new and sometimes daunting demands – such as far-offshore fishery enforcement (the Magnuson Act of 1976) and much-expanded vessel safety inspection and regulation (the Oil Pollution Act of 1990) – has been the hallmark of the Coast Guard. Perhaps more than any other federal agency, the Coast Guard has a history of effectively and efficiently consolidating diverse missions and additional responsibilities.

In most cases, the Coast Guard works with a wide range of organizations to accomplish its responsibilities. When other organizations have the resources and competencies, the Coast Guard does not take action except to ensure that the missions are accomplished effectively. More typically, the Coast Guard has primary responsibility for accomplishment of responsibilities and must cooperate and/or coordinate with numerous agencies. Thus, in all of its operations, the Coast Guard emphasizes cooperation and coordination with other

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[171] James Cable, *The Political Influence of Naval Force in History* (New York, New York.: St. Martin's Press, 1998), p. 172.

agencies and services. The Coast Guard stresses practical, local arrangements to get the job done. In many mission areas, such as search and rescue and waterways management, the Coast Guard leads the federal effort and coordinates operations of other federal, state, and local governments as well as private groups and international organizations.

The Coast Guard as supporting partner, shares responsibility with, and provides oversight to other agencies in many diverse areas. For example, the National Marine Fisheries Service regulates fisheries and living marine resources within the exclusive economic zone. The Coast Guard enforces these regulations at sea in cooperation with the National Marine Fisheries Service. The Office of Hazardous Material Safety is the lead agency for establishing regulations concerning transportation of dangerous cargoes. The Coast Guard enforces these regulations in the area of containerized or packaged cargoes in the marine mode. It works with other agencies in areas where they have responsibilities for hazardous material transportation. Its people enforce immigration law, but they act as maritime enforcement agents only. The Service can carry Immigration and Naturalization Service agents on its cutters, but it has no authority to initiate or process requests for asylum, or to make determinations whether migrants have a credible fear of returning to their homelands.

A recent analysis of the Coast Guard's enduring characteristics and its value to the nation concluded that a key aspect is its role as a coordinator and provider of maritime services.[172] It provides essential services, where and when required, and it bonds, focuses, and coordinates disparate actors, ensuring that the job gets done. No other agency has the breadth of responsibility in the maritime arena; existing authority; varied skill sets; international and domestic web of contacts, partnerships, and working relationships; predilection for cooperation and coordination; or is as "results-oriented" on a day-to-day basis.

Although most of the Coast Guard's responsibilities are domestically focused, it must operate and cooperate with international organizations and foreign agencies to perform its duties. To serve America's worldwide interests and provide U.S. leadership, the Coast Guard is active in international maritime affairs, providing important links, for example, to the International Maritime Organization (IMO), INTERTANKO, the North Atlantic Fisheries Organization, United Nations regional Action Plans, conferences, and in delicate multi- and bilateral negotiations.

The Coast Guard's IDS operational concepts, platforms, and systems must, therefore, anticipate the reality of planning and operations in close coordination with a variety of local, regional, national, and international partners. For example, in the command-and-control arena, alone, the Coast Guard will almost certainly have to link with local police and rescue squads (domestically as in the TWA Flight 800 and internationally as in the 1998 Swissair Flight 111 tragedies); regional and national emergency response agencies; state and federal law enforcement agencies, Department of Defense command elements and forces, and foreign coastguards and naval forces. Likewise, in drug interdiction operations, the Service works hand-in-glove with the U.S. Customs Service, Drug Enforcement Agency, Federal Bureau of Investigation, the Navy, and state and local law-enforcement agencies. Interoperability and compatibility, and the ability to "tailor" Coast Guard assets for the tasks at hand, will be important factors to consider as the Deepwater Program proceeds.

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[172] Roth and Kohout, *op.cit.*, pp. 37-44. In their study of Coast Guard identity and enduring characteristics, they relied upon the pioneering work of Carl Builder, who in his RAND study, *The Masks of War* (Baltimore, MD: Johns Hopkins University Press, 1989), focused on frameworks of Armed Service institutional personalities and identities as means to understand Service approaches to analysis, strategy, and planning. In this way, the CNA analysts noted (at page 42) "...how different the Coast Guard is from the other armed services. It is not a 'small navy.' The Coast Guard's 'altar' – what the service cherishes as the ideal – is its humanitarianism and multi-mission capabilities. This is very different from the 'tradition' of the Navy and its concept of independent command at sea. The Coast Guard is not preoccupied with 'toys' [i.e., platforms, systems, force structure] but rather passionately attached to skills.... We observed that, unlike any other service, the Coast Guard measured its institutional health by the accomplishment of its mission."

Expeditionary Mind-Set

If *Semper Paratus* means anything today and in the next century, it is that the Coast Guard will be ready and swift to respond to emergencies and crises in waters under U.S. jurisdiction, on the high seas, and in distant regions of critical importance to the United States. Deepwater assets will continue to deploy in both routine and emergency scenarios to overseas areas, alone or in the company of other U.S. Armed Services and the maritime and military forces of our allies and friends, to meet national and international needs.

This traditional expeditionary role of America's sea services – included the Coast Guard's military/defense operations – is as old as the Nation itself. It has demanded the perfection of unique operational skills and material requirements required of forces that respond on short notice and initiate operations along the shores of the worlds oceans. The challenges to expeditionary forces are at once environmental, technological, and human.[173]

They must, therefore, be structured, trained, supplied, and maintained to enable them to deploy with sufficient organic support to meet mission objectives – in Bering Sea SAR, western Pacific fisheries law enforcement, Caribbean drug interdiction, or Arabian Gulf sanction-enforcement operations. As with all naval and maritime forces, the Coast Guard's Deepwater surface cutters can remain on station for extended periods of time, and will be capable of being integrated into the Navy's at-sea underway replenishment system. Likewise, unrestricted by the need for transit or overflight approval from foreign governments, they can provide important levels of active, acceptable forward presence to deter threats from materializing in the first place. However, if deterrence is not successful, the Coast Guard's Deepwater forces must be able to identify and target threats as appropriate, in civilian, law enforcement, maritime, and national security/defense missions and tasks.

Readiness and sustainment – training, maintenance, spares, ordnance, equipment, safety, survivability – must therefore be "designed and built-in" from the outset of planning for future Deepwater assets, perhaps with the explicit objective of close working relationships with the logistics, support, and training infrastructure of the Navy to support Joint operations.

Shaped for Joint and Combined Military Operations

Because the Coast Guard's core maritime security role, missions, and tasks clearly include military/defense operations, the IDS will embrace the common direction for all U.S. Armed Services outlined by *Joint Vision 2010* to meet the challenging and uncertain future.[174] New and emerging technologies will be merged with innovative operational concepts that will greatly improve the Coast Guard's ability to conduct "joint" and "com-

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[173] *Challenges to Naval Expeditionary Warfare 1997* (Washington, D.C.: Office of Naval Intelligence, March 1997), pp. 1, 5.

[174] General John M. Shalikashvili, USA, Chairman, Joint Chiefs of Staff, *Joint Vision 2010* (Washington, D.C.: Department of Defense, July 1996). See also *Concept for Future Joint Operations: Expanding Joint Vision 2010*, *op.cit*.; and Strategic Studies Group, U.S. Naval War College, "Sea Power: 2030 Operational Concept," briefing dated 23 July 1998.

bined"– multi-U.S. service, multinational, and coalition – operations across the full range of peacetime, crisis, and wartime missions. Key to this future is information superiority. This, along with operational and technological innovation and a critical eye on total ownership costs, will ensure that the four new operational concepts, which are to serve as "templates" for future forces, including the Coast Guard, will satisfy future requirements in the most cost-effective manner possible:

- **Dominant Maneuver** is the multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed air, sea, land, and space assets to accomplish operational tasks – whether civilian search and rescue in peacetime or Joint combat operations in major theater war.
- **Precision Engagement** is a "system of systems" that enables Coast Guard and other maritime assets to locate the objective, provide responsive command and control, generate the desired engagement, assess the level of success, and retain the flexibility to reengage the objective when required.
- **Full-Dimensional Protection** is the multilayered capability to protect U.S. and coalition forces at all levels while maintaining freedom of action.
- **Focused Logistics** is the fusion of information, logistics, and transportation technologies to provide rapid crisis response and to deliver tailored logistics packages and sustainment

It is important to note that the *Joint Vision 2010* "template" and novel operational concepts are equally important for the peacetime humanitarian, civilian, and law-enforcement tasks conducted by Coast Guard Deepwater forces as for their crisis-response and wartime/defense missions. The ability to respond quickly and effectively to an alien migrant interdiction task or a search-and-rescue mission – "precision engagement" – will rely upon similar technologies, systems, and operational concepts as the Coast Guard's support to enforcing UN sanctions or providing harbor/coastal defense against special forces attack in some future conflict. Likewise, "full-dimensional protection" might mean the ability to defend individual Coast Guard units, Joint or coalition forces, or U.S. ports and coastal cities against special operations forces, as well as to respond effectively against a terrorist group armed with chemical, biological, or nuclear weapons and intent on shutting down a critical U.S. port when it is least expected.

In addition to these key attributes that should be embraced by the Coast Guard's Deepwater Project to meet humanitarian, civilian law enforcement, and defense requirements noted above, there are several other important considerations that must be taken into account. Three are addressed here: Coast Guard-Navy discussions aimed at articulating the requirements for a "National Fleet"; possible linkages with the Navy's Naval Aviation programs to achieve a common maritime/naval aviation vision; and the potential attractiveness of the Deepwater Project for international participation and subsequent foreign sales.

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[175] Two reports are important in this regard: Richard D. Kahout and Captain Patrick H. Roth, USCG (Ret.), *Future Coast Guard Cutter Study: The National Defense Requirement* (Alexandria, VA: Center for Naval Analyses, CRM96-90, November 1996); and O. Kim Malmin, Commander Jeffery K. Karonis, USCG, and Douglas A. Adams, *Future Coast Guard Cutter Study: Candidate Cutters and their Costs* (Alexandria, VA: Center for Naval Analyses, CRM96-91, November 1996). Five alternative cutter variants were analyzed, from very low-end/limited-defense missions cutters to multimission cutters capable of medium-threat operations: Deployable, Survivable, Sea Control, Littoral Warfare, and Expeditionary cutters. The only current U.S. Navy surface warship programs are the *Arleigh Burke* (DDG-51) Aegis guided missile destroyers (57 acquired between 1983 and 2003) and the new-design DD-21. To date, only the U.S. Navy and the Japanese Maritime Self Defense Force have acquired the 9,000-ton DDG-51s, although several other navies have either acquired (Spain) or are contemplating acquiring (Australia, Norway, Germany, and Italy, among others) the Aegis SPY-1 multi-function radar and weapon system. These highly capable and sophisticated multimission Navy surface warships, however, are not what most foreign navies or coastguards require or can afford.

A *World* "System-of-Systems"

As a model maritime agency that interacts with foreign navies, coastguards, and maritime agencies in ways unique to a U.S. military service, the Coast Guard supports U.S. national security and foreign policies in similarly unique ways. The Coast Guard's Deepwater Project, coupled with the Service's evolving international engagement activities, provides an innovative opportunity for forging closer relationships with foreign navies and maritime forces, especially in support of U.S. international programs, cooperative development, and foreign sales initiatives. Because the Coast Guard already works closely with the Department of the Navy International Programs Office (Navy IPO) in a variety of excess defense articles transfers and international training programs, this relationship could be expanded to the potential benefit of U.S. foreign and security policy and strategy, naval/maritime interoperability, and U.S. defense industries. Indeed, a focused U.S. Deepwater Systems International Program could address allied and friendly navies' and coastguards' needs for a similar "system-of-systems" approach to solving their own maritime security needs.

Certainly, a sustained Deepwater cutter program will be of great benefit to U.S. shipyards, which are currently experiencing a significant down-turn in orders for both new-construction and repair of Navy ships. But the Deepwater cutter – or *cutters* if a "family" of Deepwater surface platform designs is pursued – will be a different breed of ship than the U.S. Navy wants.[175] Although the prospective Deepwater cutter program in the near term can help to bridge the gap in Navy warship construction, and help keep U.S. shipyards afloat, a critical element of the Nation's national security industrial base, there are international implications for the Deepwater project. For example, a future cutter could be what some analysts are calling the "World Ship," a design that more appropriately fills the needs without bankrupting the budgets of other navies and coastguards.[176] A "frigate-sized" cutter with modular features and open-architecture systems is seen by some observers as an attractive design for many world naval forces.[177] Thus, possible foreign military sales or cooperative development considerations for the future Deepwater system should be pursued vigilantly.[178]

Coast Guard-Navy Deepwater International Collaboration

- **A joint Coast Guard-Navy international Deepwater initiative is one element in a multifaceted effort to meet the core objectives of the nation's international and security assistance programs, which are to:**
- **Support U.S. National Security Strategy, National Military Strategy, and the Unified Commanders-in-Chief's regional strategies and engagement plans**
- **Enhance interoperability and cooperation with allies and partners**
- **Promote cost-effective modernization of U.S. and friendly forces to increase coalition military power**
- **Ensure the viability and effectiveness of the U.S. and allied industrial bases to support shared political, economic, technological, and security objectives**

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[176] Dr. Robbin Laird, Stephen Keller, and Steven Walsh, "The U.S. Shipbuilding Industry and the coming 'Global' Warship," CSSO Critical Issues Paper (TECHMATICS, Center for Security Strategies and Operations, March 1998), prepared for Rear Admiral Robert Sutton, then-Director, Navy International Programs Office. See also the Coast Guard's internal European naval shipbuilding market survey "Comparative Practices of European Frigates and Offshore Patrol Vessels," *op.cit.*

[177] Comments of Rear Admiral Robert Sutton, USN, then-Director, Navy International Programs Office, 19 August 1998. Admiral Sutton also noted that U.S. and foreign industry that may participate in the IDS program can readily identify the features and characteristics of ship, aircraft, and C4ISR systems and platforms that make best operational sense for allied and friendly naval and coastguard forces.

[178] For example, the 18 August 1998 draft of the National Fleet Joint Navy/Coast Guard Policy Statement highlighted the foreign military sales (FMS) potential of the Deepwater cutter, which, "...if acquired by allied and friendly navies and coastguards, could contribute greatly to meeting the Navy's international Program Office objectives of generating enhanced interoperability and cooperation with allies and partners." During subsequent development of the final statement, this explicit reference to FMS was dropped, although U.S. shipyard and other naval/maritime defense industries see the future maritime cutter as America's "best bet" for overseas sales of advanced naval surface platforms.

Common needs can be illuminated by looking at other countries' approaches to their "deepwater" challenges. As Rear Admiral Ray Riutta, USCG, Assistant Commandant for Operations, noted at the October 1998 Euronaval Conference, "It will come to no one's surprise that the four principal challenges that we in the United States face – large-scale, cross-border aggression; failed states; transnational dangers; and the flow of potentially dangerous technologies – are in many respects identical to those confronting Western Europe today and into the future."[179]

This perspective was echoed by two European ship designers. "The protection of their rights on the Exclusive Economic Zone has recently assumed a very high priority in the policy of most countries," V. Farinetti and E. Bonnetti, of Ficantieri, Genoa, Italy, have explained.[180] Addressing the design requirements for three notional cutter/offshore patrol vessel (OPV) types – patrol vessels for sheltered waters, OPVs of mixed naval/commercial design, and naval standard OPVs – they catalog numerous notional missions that are nearly identical to the Coast Guard's Deepwater needs: interdiction of smugglers and aliens, fisheries and offshore oilfield protection, SAR, environmental protection, and general law enforcement. "However the more potentially simultaneous tasks that the vessel is supposed to perform," they stated, "the bigger should be the dimensions of the ship in order to avoid, or at least minimize interference or conflict of priorities, thus enhancing the level of functionality and efficiency.... EEZ protection requires vessels having real multipurpose capability and offering high levels of habitability for the crew who are intended to perform long missions at sea," Farinetti and Bonetti concluded. "The ships should also present high reliability, maintainability, and a low through-life cost."

"The interdependency of nations is already enormous; what is still lacking is global interoperability, firstly of concepts (what do we want the global society to look like), of fair distribution of scarce resources, of fighting common threats (pollution, natural catastrophes, crime, non-state actors, the occasional autocrat who defies the world community), and secondly, rather as a consequence, interoperability at the "nuts and bolts" level of systems, from tire-nipples to computers.... Nations ought to be interoperable in that sense, fighting these risks together, together seeking a better and comprehensive use of the common mass of water that gives the planet Gaia her prosperity."

Vice Admiral W.J.E. van Rijn,
Royal Netherlands Navy
***Naval Forces,* Volume 20**
Number 4, 1999

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[179] Rear Admiral Ray Riutta, USCG, Assistant Commandant for Operations, "Hemispheric Maritime Security: The U.S. Coast Guard Vision," Euronaval Conference, 18 October 1998; see also Scott C. Truver, "Strategic Imperatives for NATO's Navies: The Next 50 Years of Alliance Security," *NATO 50th Anniversary, 1949-1999* (Essex, United Kingdom: The Winchester Group, 1999) pp. 359-265, at p. 361.

For an example of another NATO state's concerns, see "The State's Action at Sea: French National Maritime Responsibilities and Tasks," published by the *Premier Ministre Secretariat General de la Mer,* which enumerates the following roles and missions: Safety of People, Safety of Navigation, Information of Seafarers, Maritime Leisure and Sporting Activities, Fight against Illegal Traffickings, Fishing Support and Surveillance, and Keeping Public Order at Sea. Likewise, the Italian Navy was increasingly being tasked to intercept and rescue people fleeing the misery of the Balkans. In July 1999, Italian authorities rescued 60 Gypsy migrants from Serbia, 39 of them children, after smugglers dumped them into the sea as their ship, which had sailed form the Albanian port of Vlore, neared Italy's southern coast. "The ship couldn't get close enough to dock because of cliffs," Gianluca Greco, chief of border police in Oranto, noted, "so the smugglers threw the people out." "Italians Rescue Serbian Gypsies from Sea," *Washington Post*, 28 July 1999, p. A18. See also, "Europe's Borders: A Single Market in Crime," *The Economist*, 16 October 1999, pp. 23-24, 28, in which the Italian navy's challenges of interdicting smugglers of alien migrants were further described: "Back in Otranto, the coastguards know they face a near-impossible task. The Italian government has reinforced the numbers of boats on patrol, and sent more policemen to the area. But, no sooner have they caught one lot of illegals and put them on the boat back to Albania than another boat with its pitiful human cargo hidden perilously inside will be on its way towards the coast again."

[180] V. Farinetti and E. Bonetti, "Vessel Design Considerations," *EEZ Technology,* Edition 4/Winter 1999, pp. 117-120.

Such considerations should also extend to other Deepwater system elements, including prospective manned fixed-wing aircraft and helicopters, as well as a variety of unmanned aerial, surface, and underwater vehicles that might be envisioned. Likewise, the Deepwater C4ISR system can benefit from the broadest possible U.S. and overseas participation, both to ensure that the resulting system has the best capabilities world – not solely U.S. – industries have to offer and to brighten the prospects for overseas sales.[181]

Looking to America's allied and friendly countries' requirements to upgrade their naval and maritime forces during the next 25 years, the prospect for an international elements in the Deepwater Project could be a vital factor in enhancing the U.S. security assistance "two-way street" philosophy. Perhaps most importantly, it could go far in enhancing U.S.-allied interoperability, especially in the maritime domain, which would overcome some of the negative "lessons" of the spring 1999 NATO Operation Allied Force air campaign against Yugoslavia. NATO political and military authorities noted that the lopsided division of labor between the United States and Europe. With the United States so far ahead in the use of precision-guided weapons, satellite reconnaissance, and other leading-edge technologies, NATO leaders admitted that Allied Force demonstrated that the alliance is in danger of becoming a "two-tier organization."[182] If not resolved, this could distort NATO's ability to respond to future crises and conflicts, and could even lead to serious friction regarding how to share defense burdens. Deepwater involvement by foreign, particularly NATO, navies, coastguards, and industries seems to offer solutions to both allied maritime interoperability and burden-sharing.

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[181] Vice Admiral Arthur K. Cebrowski, USN, then-Director, Space Information Warfare, Command and Control (N6), in 1997 envisioned a "Maritime Partners" initiative, which would help ensure that the naval and maritime-defense forces of U.S. allies and future coalition partners would have the most appropriate C4ISR interoperability with U.S. naval forces. See Scott C. Truver, "Harnessing the C4ISR Revolution," *Jane's Navy International*, October 1997, pp. 29-37, where the challenges for enhanced allied C4ISR interoperability are discussed.

[182] "War Showed U.S.-Allied Inequality," *The Washington Post*, 28 June 1999, pp. A1, A14.