



Coast Guard Concept of Operations for Offshore Assets

January 23, 2017

Fiscal Year 2016 Report to Congress



**Homeland
Security**

United States Coast Guard

Foreword

January 23, 2017

I am pleased to present this report titled, “Coast Guard Concept of Operations for Offshore Assets,” as prepared by the U.S. Coast Guard.

The Fiscal Year 2015 *Department of Homeland Security Appropriations Act* (P.L. 114-4) requires the submission of a revised Concept of Operations, which will be used as a planning document for the Coast Guard’s recapitalization needs.

Pursuant to congressional requirements, this report is being provided to the following Members of Congress:

The Honorable John R. Carter
Chairman, House Appropriations Subcommittee on Homeland Security

The Honorable Lucille Roybal-Allard
Ranking Member, House Appropriations Subcommittee on Homeland Security

The Honorable John Hoeven
Chairman, Senate Appropriations Subcommittee on Homeland Security

The Honorable Jon Tester
Ranking Member, Senate Appropriations Subcommittee on Homeland Security

I am happy to answer any further questions you may have. Please do not hesitate to contact me at (202) 372-4411 or the Department’s Acting Chief Financial Officer, Stacy Marcott, at (202) 447-5751.

Sincerely,



Paul F. Zukunft
Admiral, U.S. Coast Guard
Commandant





Coast Guard Concept of Operations for Offshore Assets

Table of Contents

I.	Legislative Language	1
II.	Background	2
III.	Operating Regions.....	4
IV.	Concept of Operations by Mission.....	5
	Drug Interdiction	5
	Alien Migrant Interdiction Operations	6
	Living Marine Resources.....	7
	Other Law Enforcement	8
	Search and Rescue	9
	Defense Readiness.....	10
	Ports, Waterways, and Coastal Security.....	11
	Ice Operations.....	12
V.	CONOPS Evaluation Using a Fleet Mix Analysis.....	14
	Phase I.....	14
	Phase II	16
	Conclusions	16
VI.	List of Abbreviations.....	19

I. Legislative Language

This report responds to the language set forth in Joint Explanatory Statement that accompanies the *Fiscal Year 2015 Department of Homeland Security (DHS) Appropriations Act* (P.L. 114-4).

The explanatory statement states:

MISSION NEEDS STATEMENT

Not later than September 30, 2016, the Commandant shall submit to the Committees a revised Concept of Operations (CONOPS), which, in conjunction with the MNS, will be used as a planning document for the Coast Guard's recapitalization needs. The CONOPS shall determine the most cost effective method of executing mission needs by addressing gaps identified in the MNS, addressing the funding requirements proposed in the five-year CIP, and providing options for reasonable combinations of alternative capabilities of air and surface assets, to include icebreaking resources and fleet mix.

II. Background

At all times, the U.S. Coast Guard is a military service and a branch of the armed forces, a federal law enforcement agency, a regulatory agency, a first responder, a humanitarian service, and a member of the Intelligence Community. The Coast Guard is the world's premier, multi-mission, maritime service responsible for the safety, security, and stewardship of the Nation's waters. In the execution of its duties within DHS, the Coast Guard serves on the front line for a Nation whose economic prosperity and national security are inextricably linked to its maritime interests. In this capacity, the Coast Guard protects and defends more than 100,000 miles of U.S. coastline and inland waterways, saves thousands of lives per year, and safeguards the world's largest Exclusive Economic Zone (EEZ), encompassing 4.5 million square miles.

The Coast Guard has 11 statutory missions, all of which contribute to national policy objectives and are fundamental to preserving the sovereign maritime interests of the United States.

- Ports, Waterways, and Coastal Security (PWCS)
- Drug Interdiction
- Alien Migrant Interdiction Operations (AMIO)
- Defense Readiness
- Other Law Enforcement (OLE)
- Marine Safety
- Search and Rescue (SAR)
- Aids to Navigation and Maritime Transportation System Management (ATON)
- Living Marine Resources (LMR)
- Marine Environmental Protection (MEP)
- Ice Operations (ICE)

Many of these missions, such as SAR, PWCS, ATON, ICE, Marine Safety, LMR, OLE, and Drug Interdiction, present demands that require extensive maritime domain awareness and broad operational capabilities to meet mission requirements. Some missions, such as AMIO and MEP, also require the ability for the Coast Guard to rapidly surge assets and capabilities to resource-demanding events such as mass migrations and major oil spills. Finally, the Defense Readiness mission requires sustainment of specific operational capabilities and training to support the Department of Defense (DOD) for war and to serve other national security priorities through the projection of U.S. maritime presence.

While the missions are diverse, the operations have many similarities in execution, and are most effectively and efficiently carried out by the Coast Guard's multi-mission focus and culture of adaptability. Each mission is scalable and the multi-mission approach

lends itself to risk-based prioritization of operations and optimal use of resources. Likewise, the Coast Guard's expansive authorities, capabilities, competencies, and partnerships allow it to lead or leverage support for a broad range of operations, both domestically and internationally.

The U.S. Coast Guard recently updated its 2004 Mission Needs Statement (MNS). The 2016 MNS highlighted changes in the global strategic landscape, addressed associated impacts on Coast Guard missions, and identified the enduring, high-level capabilities required for the Coast Guard to execute its broad statutory authorities. The MNS reflected national priorities and incorporated the most recent functional and regional strategies, including the Coast Guard Western Hemisphere Strategy, the Coast Guard Arctic Strategy, and the Coast Guard Cyber Strategy. The MNS supports DHS priorities outlined in the 2014 Quadrennial Homeland Security Review and recognizes the critical role that the Coast Guard plays in protecting the Nation's broad maritime equities.

Based on the 2016 MNS, the Coast Guard developed an updated CONOPS for the major asset classes operating in the offshore environment (major cutters, patrol boats, and rotary and fixed wing aircraft) that are undergoing recapitalization. This CONOPS describes the operational activity and characteristics of the asset class. Collectively, the current recapitalization projects, excluding polar-class icebreakers, comprise the Offshore Program of Record (POR). This report describes the offshore fleet operating environment (Section III) and describes the CONOPS under a mission framework (Section IV). To evaluate the overall performance of the air and surface fleets under the assumptions of the offshore fleet CONOPS, the Coast Guard conducted a campaign-level Fleet Mix Analysis (FMA). The FMA also simulated alternative fleet mixes for comparison to the POR fleet. The FMA results are discussed in Section V.

III. Operating Regions

The Coast Guard's operating environment encompasses the maritime domain. The domain is vast and varies widely in geography, weather, water temperatures, and sea states. The offshore fleet CONOPS breaks the maritime domain into four geographically focused regions: Northeast, Southeast, Western, and Alaska. Additionally, the Coast Guard supports overseas activities led by other agencies (e.g., combat/combat support, theater security cooperation for DOD, and icebreaking for the National Science Foundation) described in Figure 1.

These regions patrolled by Coast Guard assets are immense in size and extend to Hawaii and Alaska, overseas territories, foreign ports, across the world's largest EEZ and beyond, including millions of square miles of high seas. Each region presents different challenges and requires a different mix of assets to deliver the capabilities necessary to execute Coast Guard missions.

The offshore fleet CONOPS further delineates these maritime regions into the Inland, Coastal, and Offshore segments. The Inland segment is those waters shoreward of the U.S. baseline; the Coastal segment is defined by those waters from the U.S. baseline out to 50 nautical miles (nm) seaward of the U.S. baseline. The Offshore segment extends 50 nm seaward of the U.S. baseline to the far reaches of the sea, including foreign waters, when authorized.¹ The offshore assets generally do not operate in the Inland segment; thus, the offshore fleet CONOPS does not include this segment.

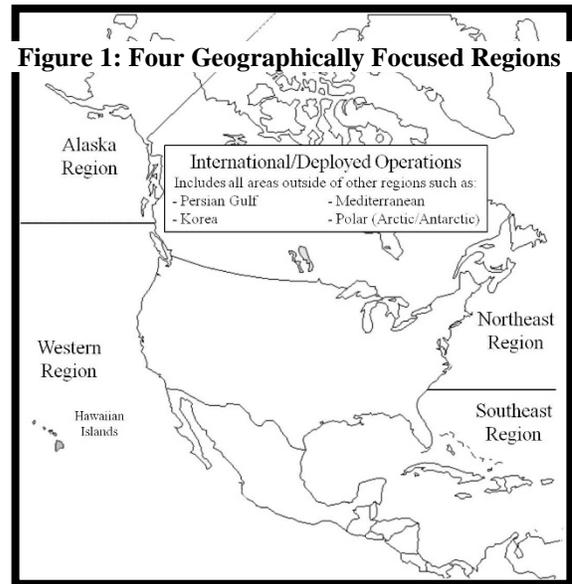


Figure 1: Four Geographically Focused Regions

For Drug and Migrant Operations, the Coastal and Offshore segments also are broken down into three separate zones - Departure, Transit, and Arrival.

- The Departure Zone is characterized as the territorial waters of a source country.²
- The Transit Zone is characterized as the ocean areas between the Departure and Arrival zones used by smugglers to transport contraband. The Transit Zone is roughly 6 million square miles.
- The Arrival Zone is characterized as the terminal locations for the maritime transit of illegal contraband in the United States and its territories, generally considered to be the territorial waters of the United States.

¹ Coast Guard Publication 3-0, p. 9

² United Nations Convention on the Law of the Sea

IV. Concept of Operations by Mission

The U.S. Coast Guard's command structure (framework) provides to operational commanders the flexibility to respond to changes in operational priorities and threat environments. This, combined with the Coast Guard's annual Strategic and Operational Planning Direction, enables operational commanders to effectively and efficiently employ complementary, multi-mission capable assets, teams, and personnel to deliver the capabilities necessary to execute Coast Guard missions in the vast and dynamic maritime domain. Patrol boats and short/medium-range air assets are geographically positioned where they can provide local mission execution for operational commanders at the District level. Homeports for major cutters are typically selected for the general region, and are not focused on local mission execution. The offshore fleet CONOPS describes the operational activity of the assets associated with each mission. Most missions are separated further by mission regions and operational areas.

Drug Interdiction

The Coast Guard conducts the Drug Interdiction mission in support of national and international strategies to deter and disrupt trafficking of illegal drugs, dismantle transnational criminal organizations, prevent transnational threats from reaching the United States, and foster regional stability.

Mission Regions and Operational Area – Drug Interdiction activities are conducted primarily in the Coastal and Offshore segments of the Western and Southeast regions.

Operations, Assets and Capabilities – The Coast Guard considers each at-sea interaction between the Coast Guard and any element of a transnational criminal organization an information exchange between two networks for which the law enforcement element must dominate. In order to maximize this advantage, tactical control (TACON) of cutters and aircraft is assigned to operational commanders to execute Drug Interdiction activities, which include detection, monitoring, interdiction, and apprehension.

Arrival Zone – Sector commanders and units under their operational control (OPCON) normally use station small boats or patrol boats to deliver boarding teams to conduct Drug Interdiction activities. Land-based Coast Guard aircraft, fixed- and rotary-wing, also are employed in the Arrival Zone for surveillance, detection, classification, and identification to conduct operations in the Arrival Zone.

Transit Zone – The majority of Coast Guard Drug Interdiction activities are executed in the Transit Zone and include response to specific intelligence/information and proactive patrols by both aircraft and cutters. Successful mission execution in the Transit Zone

relies on interagency and international cooperation. Joint Interagency Task Force-South is a DOD unit that provides detection and monitoring capabilities in the Transit and Departure zones of the Caribbean Sea and Eastern Pacific Ocean. U.S. Naval assets, foreign military assets, and Coast Guard assets work under the TACON of Joint Interagency Task Force-South to detect and identify targets of interest. Coast Guard assets, including law enforcement detachments embarked on U.S. Naval and foreign naval surface assets, then shift TACON to appropriate Coast Guard district commanders (normally District Seven or District Eleven) to conduct Drug Interdiction prosecution activities.

In the Transit Zone, adjacent to the Arrival Zone, Coast Guard patrol boats (i.e., Fast Response Cutters (FRC)), are the primary offshore fleet surface assets conducting Drug Interdiction activities. Normally, land-based Coast Guard aircraft, fixed- and rotary-wing, are employed for surveillance, detection, classification, and identification to support these assets.

In the deep Transit Zone, further from the U.S. shore than patrol boats are capable of efficiently and safely operating, major cutters (i.e., National Security Cutters (NSC) and Offshore Patrol Cutters (OPC)) are the primary surface assets assigned to drug interdiction activities. These assets provide longer transit capabilities, increased on-scene endurance, and command and control capabilities, while also delivering prosecution resources and capabilities (i.e., Cutter Boat – Over-the-Horizon, armed helicopters, and boarding teams). Land-based fixed-wing aircraft, including some operated and owned by interagency and international partners, provide surveillance, detection, classification, and identification capabilities to support operations. Coast Guard rotary-wing aircraft embarked on cutters provide airborne use-of-force capabilities, in addition to extending the cutters' surveillance and detection capabilities, in support of the mission.

Departure Zone – With consent of the coastal state, major cutters are the primary surface assets that conduct Drug Interdiction activities in the Departure Zone. Air and surface assistance from regional partners is coordinated to maximize interdiction effectiveness.

Alien Migrant Interdiction Operations

The Coast Guard conducts the AMIO mission to deter undocumented migrants and transnational smugglers from using maritime routes to enter the United States illegally.

Mission Regions and Operational Area – Migrant Interdiction activities are primarily conducted in the Coastal and Offshore segments of the Southeast and Western regions, but can occur in all four regions. While these activities normally occur in both the Arrival and Transit zones, the mission is executed as close to the Departure Zone as possible to minimize the risk to migrants traveling in unseaworthy vessels.

Operations, Assets and Capabilities – TACON of cutters and aircraft is assigned to operational commanders to execute Migrant Interdiction activities, which may include surveillance, detection, classification, identification, and prosecution activities.

Arrival Zone – Sector commanders and units under their OPCON conduct Migrant Interdiction activities as part of planned proactive patrols and also in response to specific intelligence or interagency requests. Migrant Interdiction activities in the Arrival Zone are primarily conducted in the vicinity of Southern Florida, Puerto Rico, the U.S. Virgin Islands, and the U.S/Mexico border in Texas and California. Normally, station small boats or patrol boats are utilized to conduct AMIO activities in this zone. Land-based Coast Guard fixed- and rotary-wing aircraft are employed in the Arrival Zone to provide surveillance, detection, classification, and identification capabilities. Additionally, the AMIO mission requires the capability to transport U.S. Citizenship and Immigration Services officials in order to conduct at-sea interviews.

Transit Zone – The majority of the Coast Guard AMIO activities are executed in the Transit Zone and include response to specific intelligence/information and proactive patrols by both aircraft and cutter assets.

In the Transit Zone, adjacent to the Arrival Zone, Coast Guard patrol boats are the primary offshore fleet surface assets conducting AMIO activities. However, there are instances when major cutters (i.e., OPCs) are required to provide temporary lodging for large groups of migrants. Land-based Coast Guard fixed- and rotary-wing, and occasionally ship-based rotary-wing aircraft, are employed to provide surveillance, detection, classification, and identification capabilities to support these operations.

In the deep Transit Zone, further from the U.S. shore than patrol boats are capable of efficiently operating, major cutters are the primary surface assets assigned to execute the AMIO mission. Major cutters provide longer transit capabilities, increased on-scene endurance, and capabilities of lodging and supporting large groups of migrants for a sustained period of time. Embarked rotary-wing aircraft extend the cutters' surveillance, detection, classification, and identification capabilities.

Departure Zone – With consent of the Coastal State, patrol boats and major cutters conduct limited Migrant Interdiction activities in the Departure Zone. For example, at the request of the Bahamian government, Coast Guard assets have conducted AMIO activities in Bahamian territorial seas.

Living Marine Resources

The Coast Guard conducts the LMR mission to enforce the laws and regulations pertaining to conservation and recovery of LMR, marine protected species, and national marine sanctuaries/monuments.

Mission Regions and Operational Area – LMR activities are executed in all four Coast Guard regions and are primarily focused on the Coastal and Offshore segments of the maritime domain.

Operations, Assets, and Capabilities – Operational and TACON of cutters and aircraft are assigned to operational commanders to execute LMR activities, which may include surveillance, detection, classification, identification, and prosecution activities. While some LMR closed-area enforcement can be effectively accomplished by aircraft, a majority of the operations require a surface presence on the fishing grounds and an ability to deliver boarding teams to fishing vessels for successful execution of the mission.

Coastal Segment – In this segment, the primary assets used to execute the mission are land-based Coast Guard fixed- and rotary-wing aircraft combined with Island Class Patrol Boats (WPB) and FRCs. However, if a sustained on-scene presence is required, Medium Endurance Cutters (WMEC) will be assigned.

Offshore Segment – The locations of Northeast, Alaskan, and Western region offshore fishing grounds present geography, weather, and sea state challenges that affect asset allocation for the LMR mission. In the Northeast and Alaskan regions, the distance to the fishing grounds, the sea state, and the need for an extended on-scene presence are normally beyond the capabilities of patrol boats, resulting in the use of major cutters as the most effective and efficient surface assets. Additionally, land-based fixed- and rotary-wing aircraft provide surveillance, detection, classification, and identification to support operations. In the Alaskan region, ship-based rotary-wing aircraft also provide surveillance, detection, classification, and identification capabilities to support the mission. The expanse of the Western region demands a variety of resource allocation solutions. In the area off of the west coast of the U.S., the distance to fishing grounds and need for on-scene presence results in major cutters as the surface asset of choice. In the far reaches of the Western region, patrol boats are used near and around the Hawaiian Islands and Guam. The distance required to reach the offshore fishing grounds within the EEZs of some U.S. territories and possessions requires the endurance capabilities of major cutters or the use of other cutters of opportunity (i.e., Seagoing Buoy Tender (WLB)).

Other Law Enforcement

The Coast Guard conducts the OLE mission to enforce federal laws; deter, detect, and interdict any foreign fishing vessel making incursions into the U.S. EEZ; ensure compliance with international agreements for the management of LMR; and deter illegal, unreported, and unregulated fishing activity.

Mission Regions and Operational Area – The OLE activities are executed in all four Coast Guard regions. These activities normally occur in both the Coastal and Offshore segments of the maritime domain.

Operations, Assets and Capabilities – OPCON and TACON of cutters and aircraft are assigned to operational commanders to execute OLE activities, which may include surveillance, detection, classification, identification, and prosecution activities. OLE activities and asset allocation varies greatly based on the region/area. For example, an intrusion of the U.S. EEZ by foreign fishing vessels near the Mexico border is normally an activity responded to by a station small boat. In the Alaskan region, a major cutter is required to prevent or prosecute foreign fishing vessels incursions of the Maritime Boundary Line.

Coastal Segment – OLE activities in the Coastal segment are focused primarily along the U.S.-Mexico border off the coast of Texas. These activities normally do not use Coast Guard offshore surface assets to prosecute; however, they are highly dependent on land-based fixed-wing and rotary-wing aircraft to conduct surveillance, detection, classification, and identification activities to support Coast Guard station surface assets that conduct prosecution activities.

Offshore Segment – Similar to the LMR mission, distance and the demanding maritime environment present significant challenges to the OLE mission in the Northeast, Alaskan, and Western (specifically the distant Pacific) regions, requiring the use of major cutters. Land-based fixed-wing aircraft are critical to the successful execution of the mission in the Offshore segment of the Western and Alaskan regions.

Search and Rescue

The SAR mission minimizes the loss of life, injury, and property damage or loss at sea by finding and rendering aid to those in distress. The Coast Guard executes this mission by:

- Conducting search planning and coordinating SAR response;
- Searching for, locating, and rescuing mariners in distress;
- Providing medical advice, assistance, or evacuation; and
- Providing, when necessary, persons in distress with safe transport to shore.

Mission Regions and Operational Area – The Coast Guard organizes and dispatches available SAR assets in SAR Regions, as defined in the National SAR Plan and Supplement.³ SAR Regions encompass all four Coast Guard regions. While a majority of the SAR activities, in terms of number of cases, occurs in the Inland and Coastal segments, Coast Guard SAR regions encompass both domestic and international waters

³ Commandant Publication 3-0, p. 3

covering the Atlantic, Pacific, and Arctic Ocean, the Great Lakes, inland rivers, and the Gulf of Mexico.

Operations, Assets and Capabilities – Given the potentially grave consequences presented by SAR cases, operational commanders carefully evaluate numerous factors in determining the proper resource allocation to maximize the probability of mission success. The Coast Guard SAR mission is a core mission for all Coast Guard operational units. Coast Guard offshore fleet assets are capable of conducting surveillance, detection, classification, identification, and prosecution activities in support of the SAR mission.

Coastal Segment – Station small boats, land-based rotary-wing aircraft, and patrol boats are the primary assets to execute SAR mission activities. However, there are occasions where SAR operations in the Coastal segment require major cutters with the capability to remain on station for lengthy periods, conduct a search in severe weather, or tow a large disabled vessel to port. Additionally, if the search area covers a large area, land-based fixed-wing aircraft are often the most effective, efficient search assets to support the SAR case.

Offshore Segment – Major cutters are the primary surface assets used for SAR missions with significant transit distances, large search areas, and severe weather conditions beyond the capabilities of patrol boats. Land-based fixed-wing, rotary-wing, and ship-based rotary-wing aircraft are used to support mission execution. In remote locations, normally in the Alaskan and Western regions, other Coast Guard assets (WLBs and Polar Class Icebreakers (WAGBs)) are used as available.

Defense Readiness

Under Title 14 U.S.C. § 1, the Coast Guard is “at all times an armed force of the United States.” As part of the Joint Force, the Coast Guard maintains its readiness to carry out military operations, as directed, in support of the policies and objectives of the U.S. Government.⁴ The Defense Readiness mission supports the National Military Strategy and DOD operations by ensuring that Coast Guard assets are capable and equipped to deploy and conduct joint operations in support of the most critical needs of the combatant commanders in the following major national defense areas:

- Maritime interception/interdiction operations;
- Military environmental response;
- Port operations, security, and defense;
- Theater security cooperation;
- Coastal sea control operations;
- Rotary-Wing Air Intercept operations;

⁴ Coast Guard Publication 3-0, p. 5

- Combating terrorism operations; and
- Maritime Operational Threat Response support.

Mission Regions and Operational Area – Defense Readiness activities are primarily executed in designated areas beyond the four regions described in Figure 1 in response to a Request for Forces from DOD combatant commanders.

Operations, Assets and Capabilities – Defense Readiness activities normally are supported by major cutters, aircraft, and deployable specialized forces, which are allocated annually in response to Requests for Forces. Coast Guard surface and aviation assets are expected to operate in the same weather conditions as their DOD partners. This can include extended deployments on the high seas.

Coastal Segment – While the majority of Defense Readiness activities are executed in the Offshore segment, major cutters and aircraft participate in readiness exercises and may support operations that are conducted in the Coastal segment and offshore waters immediately adjacent to the Coastal segment.

Offshore Segment – DOD combatant commanders request Coast Guard assets to support operations within their regions. Coast Guard assets provide unique capability and flexibility to Combatant Commands because major cutters are capable of operating alongside and in conjunction with Navy fleets, and provide a complementary asset to support Theater Engagement plans. For example, U. S. Coast Guard Cutter (USCGC) STRATTON took part in U.S. Pacific Command’s 2016 Rim of the Pacific Exercise, which included participants from 27 foreign nations. Specifically, USCGC STRATTON led a multinational SAR exercise and provided law enforcement boarding training and expertise to foreign naval assets.

Ports, Waterways, and Coastal Security

The PWCS mission protects people and property in the maritime transportation system by preventing, disrupting, and responding to terrorist attacks, sabotage, espionage, or subversive acts. PWCS especially relies upon the Coast Guard’s broad authorities and longstanding partnerships with governmental, maritime industry, and international partners.⁵

Mission Regions and Operational Area – PWCS activities are executed across the Inland and Coastal segments in all four Coast Guard regions. PWCS establishes and oversees maritime security regimes in the Coastal and Inland segments and is enforced through Maritime Security and Response Operations. However, the offshore assets do not operate inland; thus the Inland segment is not considered in this CONOPS.

⁵ Commandant Publication 3-0, p. 4

Operations, Assets, and Capabilities – Demand for Coast Guard’s PWCS services is represented in two forms: Directed Demand Events and Response Demand Events.

Directed Demand Events typically are tasked operations to support enhanced levels of prevention and/or protection activities. These events typically are scheduled and predictable, and include, but are not limited to:

- National Special Security Events;
- Limited Access Area Enforcement/Escort; and
- Patrols/ Presence.

Response Demand Events typically are unscheduled and require the assignment or diversion of assets to investigate suspicious vessels, cargo, or persons associated with the marine transportation system.

Coastal Segment – A majority of the PWCS activities are conducted by patrol boats in coordination with other Sector assets and deployable specialized forces. Land-based fixed- and rotary-wing aircraft are used to provide additional surveillance, detection, classification, and identification capabilities in execution of the PWCS mission.

Ice Operations

The Coast Guard ICE mission comprises both domestic and polar icebreaking operations. In June 2013, DHS approved the *Polar Icebreaker Recapitalization Project Mission Need Statement* and in September 2013, the Coast Guard completed the *Polar Icebreaker Recapitalization Project Concept of Operations*. This work pre-dated the President’s announcement in September 2015 that directed the Coast Guard to accelerate the recapitalization of one polar class icebreaker and plan for additional polar icebreakers. Although these special purpose assets were not included in the broader recapitalization POR, this CONOPS and associated Capital Investment Plan (CIP) now integrate this asset class.

Mission Regions and Operational Area – Polar ICE activities are separated into two categories: icebreaking operations and the International Ice Patrol (IIP). Currently, icebreaking operations are performed seasonally in portions of the Arctic and Antarctica, primarily supporting intergovernmental research missions. IIP operations monitor iceberg danger on the Grand Banks of Newfoundland and provide the Iceberg Limit, a geographical line delineating the iceberg danger area, to the maritime community from February to August each year.

Operations, Assets and Capabilities – The Coast Guard’s inventory of operational polar icebreakers consists of one Heavy Icebreaker (POLAR STAR) and one Medium Icebreaker HEALY. The Coast Guard’s Medium Icebreaker is a multi-mission asset that

primarily assists other governmental and scientific organizations in the pursuit of research and seabed mapping activities in the Arctic. As Arctic sea ice retreats, marine traffic associated with fishing, mineral exploration, cargo shipping, and tourism is expected to increase. The Offshore CONOPS envisions a commensurate increase in demand for Coast Guard presence, including vessels with icebreaking capability. In Antarctica, escorts to assist maritime resupply of McMurdo Station from November to March are expected to continue with the Coast Guard Heavy Icebreaker as the primary asset of choice. Heavy icebreakers are the only surface assets capable of conducting extended, independent, winter operations over the full range of ice conditions encountered in Antarctica and of providing assured year-round access to the Arctic. The Offshore CONOPS envisions that three Heavy Icebreakers will be needed in the future to assure year-round access to the Polar Regions. Recapitalization is already underway to replace POLAR STAR. The 2013 CONOPS envisioned that two additional Medium Icebreakers would be needed in the future to provide a 1.0, or full-time, presence in the Arctic. However, the Coast Guard's current priority is acquiring new heavy icebreakers.

IIP reconnaissance is conducted primarily with Coast Guard HC-130J fixed-wing aircraft. The information from Coast Guard aerial reconnaissance is compiled with Canadian government and commercial aerial reconnaissance, ships at sea, and commercial satellite reconnaissance. The Coast Guard uses a computer model to predict the drift and deterioration of icebergs based on observed and forecasted environmental factors such as winds, ocean currents, water temperature, and waves. The iceberg model is critical to estimating the location of icebergs in areas without recent reconnaissance. The IIP may track 1,000 icebergs daily over a region of 500,000 square nautical miles. The offshore fleet CONOPS assumes no change in the current utilization of the HC-130J (i.e., 500 hours, or about 1.4 percent of the total number of available fixed wing flight hours).

V. CONOPS Evaluation Using a Fleet Mix Analysis

A complete CONOPS characterizes the capacity of a system as well as its capabilities. Coast Guard operational capacity is defined by both the number of assets in class (i.e., cutter, rotary-, and fixed-wing aviation class) and the discrete capabilities of individual assets within each class. A campaign-level model, the Coast Guard Maritime Operational Effectiveness Simulation (CGMOES 3.0), was used to conduct complex comparative analyses of mission performance between different fleet mixes including the baseline acquisition POR. CGMOES 3.0 is a simulation tool to support Coast Guard leaders in making strategic decisions involving fleet mix options, understanding impacts of irregular mission profiles (surge or black swan events), and analyzing future mission states.

CGMOES 3.0 evaluates each fleet's relative performance through a stochastic analysis that simulates 1 year of Coast Guard air and surface fleet operations under various weather and sea state conditions. CGMOES 3.0 does not predict real-world operational performance, but rather compares the performance of alternative fleet mix options within the modeled environment.

The Coast Guard conducted the 2016 FMA in two phases. For Phase I, the POR surface fleet represented the baseline. The model then compared surface fleets with relatively higher or lower capability medium endurance cutter (MEC) replacements (Modernized Medium Endurance Cutters [M-MEC] were lower capability and OPCs were higher capability), as well as different mixes of MEC and Patrol Boat replacements. The POR air fleets were varied to assess different mixes of fixed-wing assets and the addition of a West Coast-based Helicopter Interdiction Tactical Squadron (HITRON). For Phase II, the surface fleet baseline was revised to add a ninth high endurance cutter replacement (i.e., NSC), then different mixes of high capability MECs (OPCs) and Patrol Boat replacements were varied. The combination of aviation assets remained fixed. The Coast Guard's FMA did not model the Coast Guard polar icebreaking fleet. The results of Phase I and II analyses are summarized below.

Phase I

Objectives

Phase I exercised alternative fleets of cutters (Table 1) and aircraft (Table 2) in the CGMOES 3.0 model to compare and assess the impacts of asset quantity and capabilities in the expected environment (weather and sea state) with the following objectives:

1. Evaluate the operational effectiveness impact of Sea State 5 versus Sea State 4 operating capability on the medium-sized major cutter, represented by the OPC

(Sea State 5 capable) and a conceptual M-MEC (Sea State 4 capable), respectively;

2. Evaluate the effect on operational effectiveness of the reduction of six HC-130J Maritime Patrol Aircraft, from 22 to 16 aircraft;
3. Evaluate the effect on operational effectiveness of the creation of a West Coast-HITRON; and
4. Evaluate the operational effectiveness impact of reducing medium-sized major cutter capacity and replacing it with patrol boat capacity, represented by the FRC.

Table 1 Phase I Cutter Fleet Combinations

Assets	Baseline Fleet	Fleet 2	Fleet 3	Fleet 4
NSC	8	8	8	8
OPC	25	11	0	11
M-MEC	0	14	25	9
FRC	58	9	58	67

Table 2 Phase I Aviation Fleet Combinations

Assets	FW A	FW B	Assets	RW A	RW B
HC-130J	16	22	MH-60T	44	44
HC-144B	18	18	MH-65E	102	102
HC-27J	14	14	West Coast Deployment	No	Yes

Results Summary

Based on the modeled results, it was concluded that:

1. Building MECs with lower seakeeping capability and patrol efficiency (i.e., M-MEC) reduces operational flexibility and can significantly reduce mission performance.
2. A reduction in the HC-130J fleet reduces counter-drug mission performance because of the loss of patrol hours and lack of long-range surveillance capability.
3. There was no significant change in operational performance that resulted from the establishment of a West Coast HITRON as modeled.
4. Reducing the number of MECs decreases operational performance for Interdiction missions in the Transit Zone that cannot be recouped with an increase of FRCs. However, Arrival Zone areas are serviceable by both major cutters and FRCs, and the increase of FRCs improves many operational performance metrics for interdiction missions in the Arrival Zone.

Phase II

Objectives

The second phase of the 2016 FMA continued to examine Objective 4 from Phase I and assessed the impact of altering the number of OPCs and FRCs. This phase also accounts for the impact of a ninth NSC. The cutter and aviation fleet combinations for this phase are displayed in Tables 3 and 4. Specifically, Phase II was conducted to:

1. Determine the performance of multiple fleets consisting of 9 NSCs, reduced numbers of OPCs, and increased numbers of FRCs.
2. Determine the performance of multiple fleets consisting of 9 NSCs, 58 FRCs, and reduced numbers of OPCs.

Table 3 Phase II Cutter Fleet Combinations

	NSC	OPC	FRC
Fleet 1	9	24	58
Fleet 2	9	20	65
Fleet 3	9	16	71
Fleet 4	9	11	80
Fleet 5	9	0	97
Fleet 6	9	20	58
Fleet 7	9	16	58
Fleet 8	9	11	58
Fleet 9	9	0	58

Table 4 Phase II Aviation Fleet Combinations

Assets	FW	Assets	RW
HC-130J	22	MH-60T	44
HC-144B	18	MH-65E	102
HC-27J	14		

Results Summary

1. The Phase II analysis reinforced the findings and Conclusion 4 from Phase I.
2. A major cutter fleet of nine NSCs and no OPCs (Fleet 5 and Fleet 9) cannot meet the threshold presence level for any offshore mission in any region and provides no reserve available for a major contingency.

Conclusions

The two-phased FMA evaluated performance tradeoffs between alternative combinations of cutter and aviation forces to help identify an end-state fleet mix that is consistent with the 5-year CIP, and will meet Coast Guard mission needs for the foreseeable future.

The 2016 FMA Phase I (Phase I) concluded that the OPC proved operationally more effective than the M-MEC due to the OPC's increased Sea State capability and its improved patrol efficiency.

Phase I also modeled a composition of OPCs and M-MECs against an increased number of FRCs, which enhanced performance in mission areas closer to shore, while decreasing performance further offshore. Performance decreases are due to the FRC's shorter range and patrol endurance when compared to the OPC. Performance increases are due to the enlarged FRC fleet in confined geographical areas.

The 2016 FMA Phase II (Phase II) modeled the operational effectiveness of a revised baseline composition (9 NSCs, 24 OPCs, and 58 FRCs) against a reduced number of OPCs and an increased number of FRCs. Reductions in OPCs significantly decreased operational performance in the transit zones, such as with cocaine interdictions/removals in the Southeast/Western regions and commercial LMR protection in the Northeast/Alaska regions. Increased FRCs, however, significantly improved performance in arrival zones, such as with AMIO, marijuana interdictions and removals, and recreational LMR. Performance differences follow the same logic as within Phase I.

Phase II also analyzed the operational effectiveness of the revised baseline composition against a reduced number of OPCs with no additional assets. The model demonstrated that significantly reducing OPCs without an offsetting capability decreases operational performance in most mission areas, which supports the conclusion that additional major cutter capacity, such as that provided by OPCs, is required beyond the 9 NSCs currently delivered/in production.

It is important to recognize that the two-phased analysis modeled steady state operations of the Coast Guard fleets. Surge events that respond to major incidents such as Deepwater Horizon draw upon Coast Guard cutters, aircraft, and boats. During these events, the Coast Guard may reposition assets to save lives, provide security, protect national interests, and mitigate damage to the environment. The flexibility to adjust to these occasional surge events was not modeled but was considered when comparing fleet mix performance. Icebreakers also were not considered in the fleet performance assessment because they do not contribute substantively to operational performance in the Coast Guard offshore missions that were modeled.

Of the fleets examined in FMA Phase I and Phase II, the fleet combination that provided the best comparative performance in executing Coast Guard offshore missions while also aligning with the current CIP is shown in Table 5.

Table 5: Coast Guard Offshore Assets⁶

Cutter Fleet	NSC	OPC	M-MEC	FRCs
	9	24	0	58

Aviation Fleet	HC-130J	HC-27J	HC-144B	MH-60T	MH-65E
	22	14	18	44	102

⁶ The Coast Guard is in the process of updating the NSC Acquisition Program Baseline to reflect acquisition of a ninth vessel. The APB for the OPC and FRC remains 25 and 58 vessels, respectively.

VI. List of Abbreviations

Abbreviation	Definition
AMIO	Alien Migrant Interdiction Operations
ATON	Aids to Navigation and Maritime Transportation System Management
CGMOES 3.0	Coast Guard Maritime Operational Effectiveness Simulation
CIP	Capital Investment Plan
CONOPS	Concept of Operations
DHS	Department of Homeland Security
DOD	Department of Defense
EEZ	Exclusive Economic Zone
FMA	Fleet Mix Analysis
FRC	Fast Response Cutter
HITRON	Helicopter Interdiction Tactical Squadron
ICE	Ice Operations
LMR	Living Marine Resources
MEC	Medium Endurance Cutter
MEP	Marine Environmental Protection
M-MEC	Modernized Medium Endurance Cutter
MNS	Mission Needs Statement
nm	Nautical Miles
NSC	National Security Cutter
OLE	Other Law Enforcement
OPC	Offshore Patrol Cutter
OPCON	Operational Control
POR	Program of Record
PWCS	Ports, Waterways, and Coastal Security
SAR	Search and Rescue
TACON	Tactical Control
USCGC	U. S. Coast Guard Cutter
WAGB	Polar Class Icebreaker
WLB	Seagoing Buoy Tender
WMEC	Medium Endurance Cutter
WPB	Island Class Patrol Boat