

Iraqi Navy: Capability Requirements and Force Structure Recommendations for 2015 and Beyond



Alison C. Lawlor (Project Director)
Eric V. Thompson

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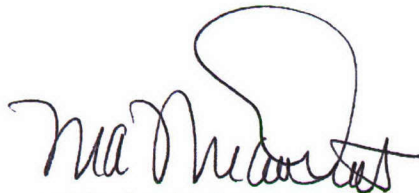
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Executive summary

Commander, U.S. Naval Forces Central Command (COMUSNAVCENT), on behalf of the Multinational Security Transition Command – Iraq (MNSTC-I) and the Iraqi Navy, asked the Center for Naval Analyses (CNA) to identify capability requirements and to recommend a force structure for the Iraqi Navy for 2015 and beyond. The goal of this study is twofold: to provide Iraqi and Coalition personnel with a common assessment of capability requirements and force structure recommendations for the Iraqi Navy and to provide the Iraqi Navy leadership with an analytic process for determining capability and force structure requirements to meet future needs.

The overall approach of this study included identifying key trends and factors that are likely to characterize the future Iraqi Navy operating environment, conducting mission analysis, developing concepts of operations (CONOPs) for accomplishing the missions in the future environment, deriving operational tasks and capabilities to support the CONOPs, and assessing force structure options for providing the relevant naval capabilities.¹

We identified four missions for the Iraqi Navy in 2015.

1. **Oil platform (OPLAT) protection.** The objective of this mission is to protect Iraq's two offshore OPLATs that provide Iraq's primary source of income.

¹ To conduct this assessment, CNA leveraged extensive field research in Iraq, interviews with high-level officers in the Iraqi Navy and officials in the Iraqi Ministry of Defense, participation in US/coalition and Iraqi staff talks and Stock Take meetings, discussions with MNSTC-I personnel, and extant CNA studies on determining future force structure requirements.

2. **Maritime security operations.** The objective of this mission is to preserve and protect the fair and legitimate use of Iraqi waters by mariners, to prevent smugglers and others from moving illicit materials through Iraqi waterspace, preventing terrorist, insurgent, pirate, or other attacks from or within Iraqi waters, and prevent use of the maritime environment as an aid to illegitimate activity ashore.
3. **Disaster response** (for man-made or natural disasters). The objective of this mission is to respond quickly to disasters that occur within territorial waters, or directly impact Iraqi maritime interests, by rapidly providing forces that are able to control the disaster scene and coordinate follow-on capabilities for consequence management.
4. **Territorial water (TTW) defense.** The objective of this mission is to defend Iraqi TTW from conventional and unconventional threats by deterring, defeating, or neutralizing enemies.

We then developed concepts of operations (CONOPs) in order to detail ways in which the Iraqi Navy can employ its forces to accomplish these missions. CONOPs are different for each mission, but each includes employment concepts for forces involved, the operational tasks that maritime forces will need to execute, how often they should be performed, command, control and communication needs, and related support requirements.² Once we assessed how the Iraqi Navy could employ its forces to execute its missions, we then determined which capabilities it will need to successfully operate in the Iraqi maritime operating environment.

² Support requirements do not include specific repair, maintenance, or logistical support information, as the baseline force structure does not include specific manufacturers or system configurations. Support requirements do include such factors as intelligence and information, fire coordination, coordination with other military services, and support from higher headquarters.

Capability requirements and force structure recommendations

For each CONOPs, we defined capability requirements in three broad areas. These capabilities are: *observe* activities in the operating environment, *react* to activities or threats in an appropriate and timely manner, and *coordinate* Iraqi Navy actions with higher headquarters, other Iraqi Navy and Iraqi Marine units, other military forces, and the maritime community.

The capabilities required to *observe* focus on maintaining situational awareness within Iraqi TTW by continuously monitoring all relevant surface traffic. The Iraqi Navy must be able to identify all vessels the size of a dhow or larger in its TTW during both day and night operations, in most weather or sea state conditions. The Iraqi Navy also needs the ability to observe activities beyond TTW. In support of this capability, the Iraqi Navy also needs to be able to conduct intelligence and surveillance activities and information operations.

The capabilities required to *react* entail a variety of activities. To fulfill its mission set, the Iraqi Navy must control access to sensitive areas/critical infrastructure; conduct regular presence patrols; conduct maritime interception operations and visit, board, search, and seizure [VBSS] operations; search and rescue response; demonstrate an ability to employ fires; attack enemy targets; provide local air defense; and respond to or neutralize an improvised explosive device [IED] or naval mines.

The capabilities required to *coordinate* entail providing flexible and sustained command, control, and communications (C3) for operational forces. This includes C3 from ashore and afloat locations. Coordination capabilities include communicating with nonmilitary vessels; relaying location information among forces securely and accurately; collecting, analyzing, and sharing information among forces; sharing a common operational picture; receiving and reporting incidents/disasters with local mariners; communicating with other regional military forces; coordinating with private entities to assist in disaster response efforts; and communicating with other Iraqi security services and/or the Iraqi Ministry of Defense.

Based on the missions, CONOPs, and capability requirements, we recommend a force structure for the Iraqi Navy. This force structure does not recommend specific equipment or manufacturers, but

instead identifies types of ships and craft (e.g. patrol boats, RHIBs, helicopters) and systems (e.g. fixed radars, FLIR, MANPADs) that satisfy the Iraqi Navy's future capability requirements. Importantly, this force structure assumes that the Iraqi Navy has completed its current procurement program of fifteen patrol boats, four patrol ships and two offshore support vessels (15/4/2) as planned. If the Iraqi Navy abandons or alters the 15/4/2 program, or alters the operational profile of the OPLAT protection³ mission, our force structure recommendation would change.

For the projected 2015 Iraqi Navy mission set, this study recommends the addition of the following ships, craft, systems, weaponry, and units.⁴

Ships/Craft	Weaponry
2 patrol boats capable of launching and recovering small armed boats and supporting VBSS teams	Coastal artillery
6 fast, armed shallow-draft boats for shallow water patrols and VBSS operations	Variety of smaller weapons, such as man-portable air defense systems (MANPADS)
3 harbor patrol craft (per port/harbor) for local security	Units
Aircraft	Specialized units for diving, mine countermeasures, and explosive ordinance disposal
3 armed helicopters	Supporting equipment
Surveillance equipment	TOC or similar C2 facility at the OPLATs and afloat
Fixed radars	Radios for secure communications
Automatic identification system (AIS)	Marine barriers
Forward-looking infrared (FLIR)	Warning signs

³ This study assumes that the Iraqi Navy acquires its planned 15/4/2 force structure for the OPLAT protection mission (based on the current Iraqi Navy-Coalition Transition Roadmap). As a result, the above-mentioned force structure recommendations are intended to supplement the 15/4/2 program.

⁴ Notably, there is no specific requirement that the Iraqi Navy man and equip all of these capabilities, just that the Iraqi Navy has the ability to bring them to bear and integrate and coordinate their employment. For example, IqAF aircraft and/or IqA units may be able to meet some of these capability and force structure requirements.

Introduction

The Iraqi Navy leadership has expressed a desire to implement an analytic process for determining capability and force structure requirements. The Iraqi Head of Navy (HON) has indicated that it is his goal to move the Iraqi Navy to a requirements-based planning process that aligns with the emerging guidance from the Iraqi Ministry of Defense (MOD). However, it appears that the Iraqi Navy currently does not have an analytic process to respond to emergent capability and force structure requirements.⁵

Commander, U.S. Naval Forces Central Command (COMUSNAVCENT), on behalf of the Multinational Security Transition Command – Iraq (MNSTC-I) and the Iraqi Navy, asked the Center for Naval Analyses (CNA) to determine capability requirements and recommend a force structure for the Iraqi Navy in 2015 and beyond. The goal of this study is twofold: to provide MNSTC-I with capability requirements and force structure recommendations for the Iraqi Navy and to provide the Iraqi Navy with an analytic approach for determining capability and force structure requirements to meet its needs.

In this study, we did not examine the specific logistics, maintenance, and sustainability requirements to support the recommended force structure. These requirements largely depend on the specific ships, craft, and weaponry in the force structure, and would be susceptible to significant variance depending on the specific model of each system or craft acquired by the Iraqi Navy. Because the sourcing op-

⁵ Under Saddam Hussein's regime, the Iraqi Navy acquisition process appears to have been determined in Baghdad with little or no coordination with the Navy leadership. Saddam sought a navy that showcased technology and power, and a force structure that demonstrated these characteristics. As a result, the Iraqi Navy force structure was not requirements based, but instead was determined by the whims of Iraq's non-navy leadership.

tions for Iraqi Navy systems and platforms are essentially unbounded (future acquisitions could be sources from virtually any company in the world) and the Iraqi Ministry of Defense's acquisition process is still developing, we avoided focusing on specific models of each ship or craft. Instead we identified the types of ships and craft that will meet the Iraqi Navy's needs. Once the Iraqi Navy and MoD choose the specific platforms and equipment to meet the identified capability requirements, it would be possible to identify logistics, maintenance, and sustainability requirements for that particular force structure.

Sources

CNA conducted extensive field research for this study in Baghdad and Umm Qasr, and with deployed Iraqi and coalition forces in the Northern Arabian Gulf. Researchers attended conferences, staff talks, and Stock Take meetings with the Iraqi Navy and NAVCENT staff at NAVCENT headquarters in Bahrain. We gathered information through interviews and discussions with senior members of the Iraqi Navy, including the HON in Baghdad and the Operations Commander at Umm Qasr Naval Base (UQNB). During our visits with the HON and at UQNB, we participated in formal and informal discussions with officers and enlisted personnel in the Iraqi Navy, who provided valuable insights into their operating environment. We also participated in conferences and discussions with US and coalition personnel in NAVCENT, the Naval Transition Team (NaTT) in Umm Qasr, and the NAVCENT Liaison Naval Officer and MNSTC-I personnel in Baghdad.

CNA also held a roundtable with civilian and uniformed subject matter experts (SMEs) to develop the capability requirements and force structure recommendations for the territorial water (TTW) defense mission. The roundtable involved SMEs from Naval Expeditionary Combat Command (NECC), the Special Forces community, the intelligence community, and CNA. We also utilized academic papers, media reports, statements by public officials, and extant studies on the Iraqi Navy, capability requirements, and force structure recommendations.

Analytic approach

To analytically derive the Iraqi Navy's future capability requirements and recommend a force structure, we posed three questions:

- What will the operating environment look like in the future?
- What will the Iraqi Navy need to be able to do in the future?
- What forces will the Iraqi Navy need to have in the future?

In answering these questions, we were able to discern what the Iraqi Navy's capability requirements may look like in the future and develop a force structure recommendation to meet these requirements.

What will the operating environment look like in the future?

To begin this study, we characterized the Iraqi Navy's operational environment by positing assumptions about the future of Iraq, describing potential characteristics of the future operating environment, and identifying the resource constraints that the Iraqi Navy may face in 2015. First, we posit two assumptions about the future of Iraq and the role of coalition forces. These two assumptions are critical elements on which the study is predicated. If either of these assumptions changes, then the capability requirements and force structure recommendations in this study will need to be re-examined.

Next, we describe potential characteristics of the future operating environment based on current data and trend-line projections in key areas (maritime traffic, oil production, other regional military forces, etc.). While these characteristics are important to understanding the future threats that Iraq may face in the maritime environment, and the equities and interests of potential competitors or adversaries in the region, our force structure analysis is not predicated solely on these characteristics. In other words, this is not a threat-based assessment. Instead, we adopted a capabilities-based approach, which focused on defining what the Iraqi Navy will need to be able to do in order to successfully accomplish its missions, rather than speculating on the specific decisions or actions of potential competitors or adversaries.

To characterize the likely future operating environment, we researched current regional naval force structures and rates of change in their capabilities, reputable predications of oil production, and the rate of change in container and commercial traffic in the region. We also examined statements by Iraqi officials about future development plans and considered how they may affect the operating environment.

Next, we identified resource constraints that the Iraqi Navy may face in 2015. While it is difficult to predict these constraints, the Iraqi Navy will most likely face some resource constraints that will affect its ability to acquire and operate its desired force structure. A current CNA assessment of the Iraqi Navy's development helped us to identify those aspects of development that may have a long-term impact on the Iraqi Navy's resource availability in 2015.⁶

This process of positing assumptions, describing characteristics, and identifying constraints allowed us to "set the scene" in order to consider the activities, interests, equities, and threats that the Iraqi Navy may need to consider in the future operating environment.

What will the Iraqi Navy need to be able to do in the future?

We examined several operational factors to determine what the Iraqi Navy will need to be able to do – how it should be prepared to act – in the future operating environment.

First, we derived the future **missions** of the Iraqi Navy. We interviewed Iraqi Navy, MOD, MNSTC-I, and coalition leadership to gain their perspectives on the role of the Iraqi Navy beyond the counter-insurgency (COIN) mission. We were given access to coalition and Iraqi plans and planning guidance. We leveraged our understanding of the future operating environment and the interests, equities, and threats that might arise from within that operating environment. We also examined mission sets of navies with similar operating environments.

⁶ At the request of NAVCENT, CNA conducted a baseline assessment of the Iraqi Navy's capabilities in 2007. CNA CRM document D001684.A2.Final, *Iraqi Navy: A Baseline Assessment*, January 2008.

Second, we described **concepts of operations** (CONOPs) for the Iraqi Navy. Specifically, we assessed how the Iraqi Navy may use its forces within its TTW, the command and control (C2) structure of the forces, the periodicity and/or persistence of operational requirements, and the Iraqi Navy's operational goals. We informed these CONOPs with research on how the Iraqi Navy employs its forces today, as well as how Iraq has employed maritime forces in the past. We also examined how US and coalition forces undertake similar missions.

The periodicity and persistence of the employment of forces (how frequently and for how long forces will have to be available to conduct operations in support of the mission) is a key factor in determining the CONOPs and, later, the size of the Iraqi Navy's force structure. We determined this based on our evaluation of the future operating environment and the nature of the mission itself.⁷

For the CONOPs, we also identified the operational tasks that the Iraqi Navy will need to be able to execute in order to carry out the CONOPs. As with the CONOPs themselves, the operational tasks were developed with consideration of the operational environment, Iraqi priorities and preferences, and the doctrine, tactics, techniques and procedures (TTP) that US and coalition forces use in similar circumstances.

Third, we determined the **capability requirements** for executing the CONOPs. We did so by assessing the capabilities the Iraqi Navy will need in order to *observe* activities in its operating environment and analyze threats, to *react* to activities in an appropriate and timely manner, and to *coordinate* its actions with other entities, such as commercial ships and foreign military vessels. Throughout the assessment, we use this "*observe, react, coordinate*" framework to identify the Iraqi Navy's capability requirements.

We were able to determine the capability requirements for the first three missions (OPLAT protection, maritime security operations, and disaster response) by examining the Iraqi Navy's operational environment, the CONOPs and operational tasks, and deriving the

⁷ Expected volume of traffic in the TTW, for example, is based upon our economic assumptions presented in the next section.

capabilities required to execute the CONOPs and operational tasks in Iraqi TTW. We also leveraged extant US naval doctrine, such as the Joint Capabilities Area and the Universal Naval Tactical Task List. However, the TTW defense mission is broader and more complex than the other missions, involving many different kinds of defense scenarios. To delve into the complexity of this mission and its capability requirements, we developed a series of scenarios to examine prospective challenges to Iraq's maritime interests and the security of its TTW. We then held a roundtable where subject matter experts developed capability requirements and force structure recommendations to address three TTW defense scenarios.

The first scenario posited a threat of attack on Iraq by a moderately-sized, conventional naval force. In this scenario, the Iraqi Navy's objective was to *deter and disrupt* this attack. The second scenario posited an attack by a smaller naval force with some conventional and some unconventional capability. In this scenario, the Iraqi Navy's objective was to *defeat* the attack. The third scenario posited an attack by a small, unconventional force, such as a terrorist group or a non-state actor. In this scenario, the Iraqi Navy's objective was to *identify and neutralize* the attack.

These three scenarios allowed us to examine a range of capabilities to deter and defeat different types of enemies and to identify those capabilities required for executing the TTW defense mission.

This process for deriving capability requirements for each mission allowed us to comprehensively examine all of the capability requirements for the Iraqi Navy across its entire mission set. As a result, we were able to identify overlapping capability requirements that are germane to multiple missions and those that are unique to a specific mission.

What force structure will the Iraqi Navy need to have in the future?

Finally, we examined the mission set, CONOPs, and capability requirements and then analyzed the equipment and skill options to determine which combination of ships, craft, weaponry, and units – or force structure – satisfies the Iraqi Navy's capability requirements

and provides flexibility within the force structure.⁸ While we tried to be as specific as possible in our identification, the equipment we reference is intended only to represent the equipment needed to provide a specific capability package.

We looked for synergies among the capability requirements and identified ships and craft that could support a variety of capabilities in order to minimize the amount of training and maintenance the Iraqi Navy will need to support its fleet. We also took into consideration the known rotation rate of platforms to determine how many of each ship or craft the Iraqi Navy may need. Through this process, we were able to identify a force structure that will fulfill the Iraqi Navy's future capability requirements.⁹

Outline of paper

This paper will begin with a discussion of the characteristics of the future Iraqi Navy operating environment. Next, the paper will describe in detail each mission and the associated CONOPs, capability requirements, and types of equipment/resources necessary to support the Iraqi Navy's various missions. Finally, the paper will present the future force structure recommendations for the Iraqi Navy, based on the capability requirements identified in this study.

⁸ Flexibility, in the form of ships and craft that can be used for multiple missions, is important for the Iraqi Navy to manage training, maintenance, and growth requirements.

⁹ Because the Iraqi Navy and MOD's acquisition process allows flexibility in choosing manufacturers of equipment, we have identified required capabilities and equipment instead of specific platforms. Therefore, while we may recommend a specific type of equipment (e.g. Defender class Safe Boats), it is meant to be used as a guide for choosing types of equipment from different manufacturers.

Future operating environment

The first step of the analytic process is to describe the future operating environment in order to understand the interests, equities, and threats the Iraqi Navy may need to consider as it develops its mission, capability requirements, and force structure. In this section, we present strategic assumptions, security and economic characteristics, and resource constraints that “set the scene” for the Iraqi Navy’s future operating environment.

Strategic assumptions

We posit two strategic assumptions about the security environment in Iraq in 2015.¹⁰ The assumptions are:

- Coalition forces will no longer be operating in Iraqi TTW. Coalition forces may still be operating in the area, but they will have returned control of Iraqi TTW to the Iraqi Navy and the Iraqi Navy will be operating independently within its TTW.
- A relatively stable regime will govern Iraq and will be supportive of the Iraqi Navy’s missions. We do not posit the nature of this regime, but we assume that it will support the Iraqi Navy and assist in its development.

¹⁰ Our findings are based on these assumptions about 2015, therefore, if either of these assumptions are not realized, then the capability requirements and force structure recommendations will need to be re-examined.

Characteristics of future operating environment

We believe that the security and economic characteristics of the Northern Arabian Gulf (NAG) will have changed by 2015.

Security characteristics

We posit that Iraq's security environment may change in the following ways:

- The Iraqi Navy will build a defense installation on the Al Faw peninsula. The Al Faw peninsula has been home to defense installations under Saddam Hussein's regime, and we posit that the peninsula will once again be used for defense facilities.¹¹
- Conventional and unconventional adversarial forces will be operating in the region. Given the region's history and the tense relationships between neighbors, it is prudent to assume that another nation or group of individuals may pose a threat to Iraq in the future.
- The Iraqi Navy will acquire its currently planned force structure for the COIN mission. That force structure comprises fifteen patrol boats, four patrol ships, and two offshore patrol vessels and is generally referred to as the 15/4/2 plan. The 15/4/2 force structure is intended to serve as protection for the OPLATs, in support of the COIN mission.¹²

In addition, we posit that the Iraqi Navy's area of operations will cover Iraqi TTW and that the Iraqi Navy's specific area of responsibility will extend southward from Buoy 36 in the Khawr Abd Allah (KAA) and the mouth of the Shatt Al Arab (SAA) out to the 12 mile TTW boundary.

¹¹ We were encouraged to consider such a development by senior Iraqi Navy officials.

¹² Equipment for the COIN mission was approved during the most recent acquisition process, and the Iraqi Navy has already signed contracts for obtaining the equipment.

Economic characteristics

We posit that Iraq's commercial and economic activity may develop in the following ways:

- Oil production will increase from today's production rate of approximately 2.0 million barrels per day to a production rate of approximately 3.3 million barrels per day. We posit this assumption based on the projection of the US Department of Energy's Energy Information Administration regarding future Iraqi oil production capacity.¹³
- Regional trade and economic activity will increase significantly. While insecurity is a key factor undermining economic activity, an increase in security – whether through peaceful resolution to conflict or improved methods of assuring safety – will lead to an increase in economic activity. Iraq has been isolated from international and regional trade for decades, and, given the opportunity, the trade relationships and economic activity can only increase.
- Commercial and civilian maritime traffic will increase as regional trade and economic activity increases. Southern Iraq is home to many important cultural and religious sites that may attract visitors from around the region.

Resource constraints

The Iraqi Navy may face resource constraints that could impact its ability to acquire and operate all of its desired forces, although it is impossible to determine the types and severity of constraints the Iraqi Navy may confront. Assessments of the Iraqi Navy today provide insight into the aspects of development that could have a long-term impact on the development of the Iraqi Navy.

The first constraint that we identified is funding, in terms of the scarcity of and competition for the Iraqi government's funds, and

¹³ International Energy Outlook 2007, US Department of Energy, Report #: DOE/EIA-0484(2007), Release Date: May 2007

the politics involved in spending money. While our previous assumption of an increase in production of Iraqi oil implies that Iraq will not be a poor country, it does not mean that Iraq will be wealthy or that money will be available for the Iraqi Navy. Given our strategic assumptions, in 2015 Iraq will be recovering from decades of economically devastating sanctions, wars, and occupation, and an increase in oil wealth will not be sufficient for addressing all of the country's needs.

When money is available for the military, the Iraqi Navy will have to compete with other security forces. Ground forces have traditionally received the majority of military funding in Middle Eastern countries, and currently the Iraqi Navy receives only a small portion of the defense budget. Therefore, even when money is available for military expenditure, the Iraqi Navy will have to compete politically to gain access.

The second constraint that we identified is jointness. Currently the Iraqi military does not have a joint doctrine and does not practice joint exercises or operations. The capability to conduct joint operations take years to develop; thus, it is plausible that the Iraqi military services will not be operating jointly by 2015. As a result, assets and capabilities located in another part of the military may not be accessible to the Iraqi Navy, thereby constraining its potential resources.

The third constraint relates to military culture. In the current operational environment, Iraqi Navy personnel have demonstrated reluctance to spending significant periods of time away from their homes and families. This is understandable in the current security environment; however, it may be a part of military culture that continues after the security situation improves. If the Iraqi Navy can not sustain operations at sea for several days at a time, the Iraqi Navy may have difficulty providing the capabilities required to complete its missions that require multiple-day and/or overnight missions.

In addition, the Iraqi Navy will have overcome the challenges that it currently faces with regards to the development of operational capabilities, the acquisition process, logistics support, C2 for a larger mission set, and political support for the Iraqi Navy.

Missions, CONOPs, and capabilities

In the next analytic step in our study, we identified four critical missions for the Iraqi Navy in 2015.¹⁴ Each mission has an associated CONOPs, operational task list, and capabilities requirement. This section defines the missions and the respective CONOPs, operational tasks, and capability requirements that we derived. It also provides representative equipment options for satisfying these capabilities requirements.

Mission: Protect the oil platforms

Today, the Iraqi Navy's primary mission is to protect Iraq's two oil platforms in the Northern Arabian Gulf: the Al Basrah Oil Terminal and Khawr Al Amaya Oil Terminal (ABOT and KAAOT, respectively). These two oil terminals currently pump approximately 2 million barrels of oil each day into tankers for export to the world market and account for approximately 90 percent of the Iraqi government's revenue. The oil platforms are expected to remain the lifeblood of Iraq's economy in the 2015 and beyond; hence, the OPLAT protection mission will remain a paramount responsibility of the Iraqi Navy.

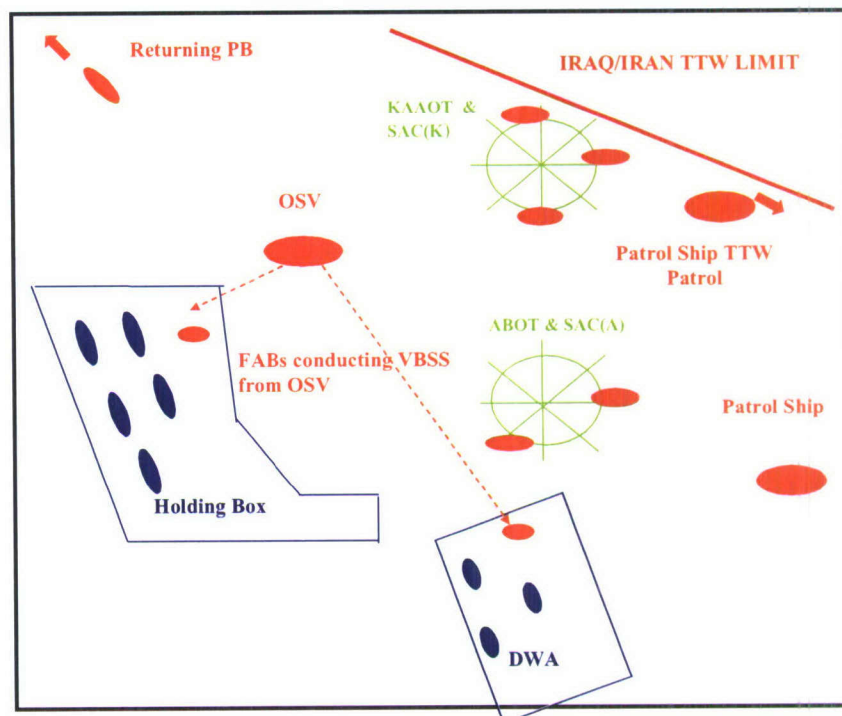
CONOPs

The CONOPs for protecting the OPLATs is based upon the coalition transition plan for the Iraqi Navy. The CONOPs entail persistent (24/7) deployment of a mix of small and medium sized surface ships in concentric rings of protection around the OPLATs in order to deny unauthorized access to the waterspace surrounding the plat-

¹⁴ CNA identified future missions based upon stated Iraqi Navy policy and plans (Ministry of Defense and Iraqi Navy), interviews with Iraqi Navy leadership, discussions with CTF, NaTT, and MNSTC-I.

forms. This protection is enhanced by security sweeps of tankers that are authorized to approach the OPLATS and VBSS capabilities to investigate unknown or suspect vessels. A common operational picture and command and control of forces involved in the OPLAT protection mission will be sustained on scene from both fixed and afloat locations.

Figure 1. CONOPs for OPLAT protection mission



Operational Tasks associated with CONOPs

- Conduct intelligence and surveillance operations
- Identify and monitor exclusion zones
- Establish Common Operational Picture (COP)
- Communicate with maritime traffic (hail, query, warn of exclusion zone)
- Conduct MIO/VBSS
- Conduct security sweeps at deep water anchorage
- Attack enemy targets

- Coordinate local area operations, exclusion zone enforcement, small boat operations, ship position, aircraft control, and fire coordination
- Sustain communications and information sharing with headquarters ashore

Associated capabilities

For the OPLAT protection mission, the capability to *observe* entails maintaining wide area situational awareness and the ability to positively identify commercial, military, and unknown surface contacts. The capability to *react* focuses on denying and controlling access and protecting OPLATs from attack. The capability to *coordinate* covers forces in the immediate area of operations, commercial and other maritime traffic, and fixed locations on the OPLATs and ashore.

Observe

To be capable of protecting the OPLATs, the Iraqi Navy must first have and maintain situational awareness by continuously monitoring all surface traffic in the vicinity of the platforms. According to Iraqi and coalition plans, the Iraqi Navy must be capable of identifying all surface vessels within 3000 yards of the OPLATs, all vessels in the deep water anchorage, be able to detect vessels operating at speeds greater than 20 knots, and to maintain awareness of all other military vessels in the vicinity (including outside Iraqi TTW).¹⁵

For this capability area, the Iraqi Navy could employ the following types of equipment:

- Fixed radars on OPLATS
- Automatic identification system (AIS) receivers (OPLATs, towers or other fixed sites)

¹⁵ Iraqi Navy and USN Staff Talks, *Iraqi Navy Future CONOPs and C2*, Iraqi Navy Operations Commander, 25 February 2007.

- Radars on patrol ships (PS), patrol boats (PBs), fast aluminum boats (FABs)¹⁶
- Forward-looking infrared (FLIR) or other day and night capable electro-optical, infrared cameras
- Unmanned Airborne Systems (UAS) (for example, Scan Eagle, Wasp, Aerostat)
- Manned observations posts (binoculars, etc.)

React

Protecting the OPLATs also requires the capability to control access to the platforms 24 hours per day, every day. Specifically, this means establishing a 3000 yard exclusion zone around the OPLATs and preventing unknown, unauthorized or hostile forces from approaching them.¹⁷

To enforce the exclusion zone and control access to the OPLATs, the Iraqi Navy needs to be able to quickly react and warn vessels 3000 yards away from the OPLATs, exclude vessels 2000 yards away, engage with direct fire at a vessel 1000 yards away, and provide a very robust point-defense capability within 1000 yards of the OPLATs. For friendly vessels that have a legitimate need to approach the OPLATs (i.e. oil tankers), the Iraqi Navy needs the ability to board and search the vessel and escort it to the OPLAT.¹⁸

In order to react to unknown contacts or to determine the nature and cargo of observed contacts, the Iraqi Navy will need the capability to carry out visit-board-search and seizure (VBSS) operations.

¹⁶ FABs are also called Fast Attack Craft and Fast Attack Boats. The Iraqi Navy currently used the term "Fast Aluminum Boat" to describe its small, rigid hull craft.

¹⁷ The forces cycle between UQNB and the OPLATS, returning periodically to UQNB for maintenance, rest, and training. Forces engaged in OPLAT protection will not be removed from that mission to support another mission unless they are in the maintenance, rest, and training part of the deployment cycle.

¹⁸ Iraqi Navy and USN Staff Talks, *Iraqi Navy Future CONOPs and C2*, Iraqi Navy Operations Commander, 25 February 2007,

For this capability area, the Iraqi Navy could employ the following types of equipment:

- Floating barriers
- Armed personnel afloat on the OPLATs to provide point defense
- Patrol boats (5 on-station at all times)
- Patrol ships (2 on-station at all times)
- Off-shore support vessels (1 on-station at all times)
- Fast aluminum boats (several on-station at all times)
- Armed aircraft (for overwatch of VBSS teams)

Coordinate

Protection of the oil platforms also requires a constant command, control, and communications (C3) capability. The Iraqi Navy needs to be able to communicate with its forces in a secure manner and with other relevant parties in its TTW at all times.

The CONOPs for OPLAT protection entails that forces protecting the OPLATs will be under the tactical control (TACON) of the deployed asset responsible for C2, not Iraqi Navy headquarters at UQNB. However, forces involved in the OPLAT protection mission will need to contribute to and maintain the operational picture at the Iraqi Navy headquarters at UQNB.

Constant C3 requires the on-scene commander to coordinate and direct activities of the Iraqi Navy forces in a secure manner and to communicate with other vessels in the area via open (e.g. commercial) channels. Individual Iraqi Navy units, including those conducting other missions, also need to be able to communicate with each other and with the command center at the Iraqi Navy headquarters in Umm Qasr. Finally, the Iraqi Navy will need to be able to develop, monitor, and share precision locating and track data and accurately relay this information.

For this capability area, the Iraqi Navy could employ the following types of equipment:

- Secure voice communications (ship-to-ship, ship-to-aircraft, ship-to-shore)
- Sustained real-time data connectivity between OSVs, tactical operations centers (TOCs), and UQNB (for shared operational and tactical picture)
- Commercial band radio (for contact with mariners)
- Public address, long range acoustics device (LRAD), or other direct means to hail non-responsive vessels
- C3 suite for TACON of multiple surface vessels (TOC, OSV, etc.)

Mission: Conduct maritime security operations

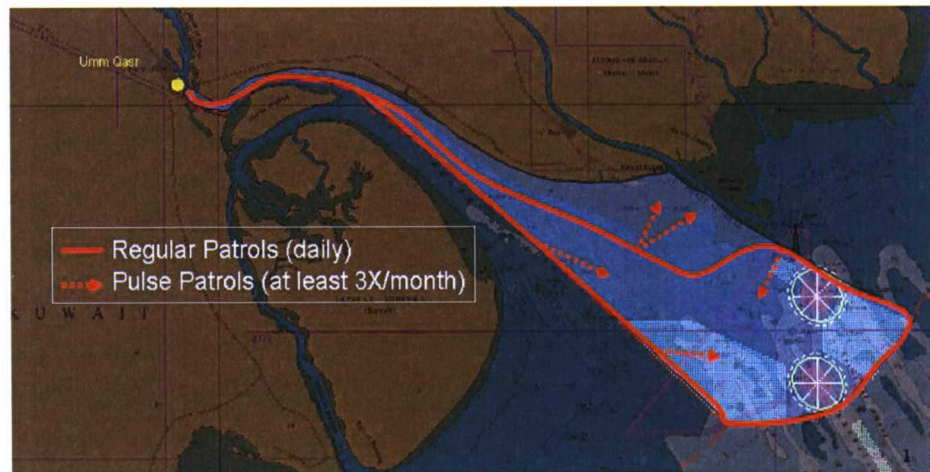
The second mission of the Iraqi Navy is to conduct maritime security operations (MSO). The focus of MSO is the preservation of the free and secure use of the water space by legitimate mariners and prevent terrorists and smugglers from using the maritime environment as a venue for attack/launching an attack onshore or transporting of illicit materials.¹⁹

CONOPs

The CONOPs for maritime security operations entail monitoring maritime traffic in Iraqi territorial water (including ports and the KAA), identifying prospective threats to maritime security, and interdicting illicit, dangerous, or illegitimate users of Iraqi waters. It involves the integration of diverse sensor data and information sharing and coordination among shore facilities and dispersed units. Maritime security operations also require presence patrols, frequent queries, inspections, and other interactions with maritime traffic, and, when necessary, interdiction and the use of force against threats to maritime security.

¹⁹ Derived from NAVCENT's definition of MSO. www.navcent.navy.mil

Figure 2. CONOPs for MSO mission



Operational Tasks associated with CONOPs

- Conduct intelligence and surveillance operations
- Monitor surface traffic in Iraqi TTW
- Identify prospective threats to maritime security
- Establish COP
- Conduct presence operations and patrols
- Conduct small boat operations
- Conduct maritime law enforcement operations
- Communicate with maritime traffic (hail, query)
- Conduct MIO/VBSS
- Attack enemy targets
- Provide assistance to mariners in distress
- Conduct search and rescue operations
- Coordinate surface and air operations
- Sustain communications and information sharing among afloat forces and with headquarters ashore

Associated capabilities

For the MSO mission, the capability to *observe* entails maintaining wide area situational awareness, the ability to target collections and information gathering to a particular area, and the ability to positively identify commercial, military, and unknown surface contacts. The capability to *react* focuses having periodic presence in important areas of Iraqi TTW, being able to shift and/or surge forces to respond to threats, having sufficient force to be able to dominate the area of operations in order to counter overcome sources of insecurity. The capability to *coordinate* covers forces in the territorial waters and other maritime traffic and fixed locations at UQNB and other locations ashore.

Observe

To conduct MSO, the Iraqi Navy must have the capability to maintain situational awareness within its water space. Specifically, the Iraqi Navy must be able to identify all vessels the size of a dhow or larger in its TTW during both day and night operations, regardless of the weather or sea state conditions. Additionally, the Iraqi Navy must have the ability to visually identify surface contacts and interact with personnel aboard maritime traffic in Iraqi TTW. Because direct interaction with local and transiting mariners can provide a rich source of information and intelligence, the ability to both query and board ships contributes to the ability of the Iraqi Navy to observe and analyze conditions in the maritime environment.

For this capability area, the Iraqi Navy could employ the following types of equipment:

- UAS (e.g. Scan Eagle, Wasp, Aerostat)
- Surveillance aircraft (i.e. helicopter or fixed-wing)
- VHF radar or similar wide-area surface search radar
- Patrol ships, PBs or other platforms capable of sustained presence in important areas of Iraqi TTW
- Shallow draft, highly maneuverable craft (FABs, 25 foot Defender Class Safe Boats) for shallow and restricted water operations

- Fixed radars on OPLATS
- Radar equipped patrol ships, PBs, FABs
- AIS receivers (OPLATs, towers or other fixed sites)
- FLIR or other day and night capable electro-optical, infrared cameras
- Commercial band radio (for contact with mariners)
- Public address, LRAD, or other direct means to hail non-responsive vessels

React

MSO requires sustained presence, the ability to respond quickly to events in the TTW, to deter illicit activities, and to provide appropriate security for mariners within its TTW. It also requires the capability to dominate the area of operations by shifting and/or surging forces as needed. Important capabilities include regular patrols of primary channels and sea lanes, maritime borders and other areas of potential vulnerability supplemented by occasional pulses or surges of additional forces (as a planning assumption, we defined the pulse rate as three times per week). Key capabilities for include the ability to conduct visit, board, search, and seizure (VBSS) operations at all times, to locate and assist mariners in distress, the ability to identify and disrupt illicit maritime traffic and destroy direct threats to maritime security.

For this capability area, the Iraqi Navy could employ the following types of equipment:

- Large patrol craft (e.g. WPB or medium endurance cutter (WMEC)) (1 deployed at all times)
- Fast, shallow draft patrol craft (e.g. Defender class Safe-Boats/Boston Whalers) (2 deployed at all times)
- Armed helicopters (e.g. Seahawk, HIND, Super Cobra, Hip) (1 deployed/ready to deploy at all times)
- Surveillance aircraft (i.e. helicopter or fixed-wing)(1 deployed daily)

The Iraqi Navy also needs the capability to continuously monitor all actions within the ports/harbors and respond quickly to an emergency there.

For this capability area, the Iraqi Navy could employ the following types of equipment:

- Small, armed harbor patrol boats (e.g. Defender class boats)(1 deployed at all times in each port/harbor)
- Marine barriers around port facilities (e.g. nets, floating barriers)
- Land barriers around port facilities (e.g. fence)
- Surveillance equipment (e.g. video camera, night vision equipment, binoculars)
- Full radar coverage of port area

Coordinate

Given that MSO operations will occur throughout Iraqi TTW, the Iraqi Navy will need to be able to execute both TACON and OPCON of forces from UQNB, with the option of passing TACON to a local commander afloat (such as on an OSV). Additionally, since forces executing MSO tasks may operate near OPLAT protection forces, or near harbor patrol forces, the ability to communicate and coordinate across the force will be important.

Since information gathered from fixed sensors and afloat forces must be fused to create maritime domain awareness, and supplemented by intelligence (including human intelligence (HUMINT), airborne surveillance information) the Iraqi Navy will need to be able to develop and share a common operational picture.

While the Iraqi Navy will need to be able to pass information between units and UQNB via secure means, afloat forces will also need to be able to communicate with a range of mariners in and around Iraqi TTW. Prospective communications capabilities include HF, VHF, and loudspeaker hails.

Finally, the Iraqi Navy will need an accurate means to identify and share location data. This may include such capabilities as global po-

sitioning system (GPS) navigation, developing detailed grid-maps, radar ranging, radio frequency (RF) direction finding.

For this capability area, the Iraqi Navy could employ the following types of equipment:

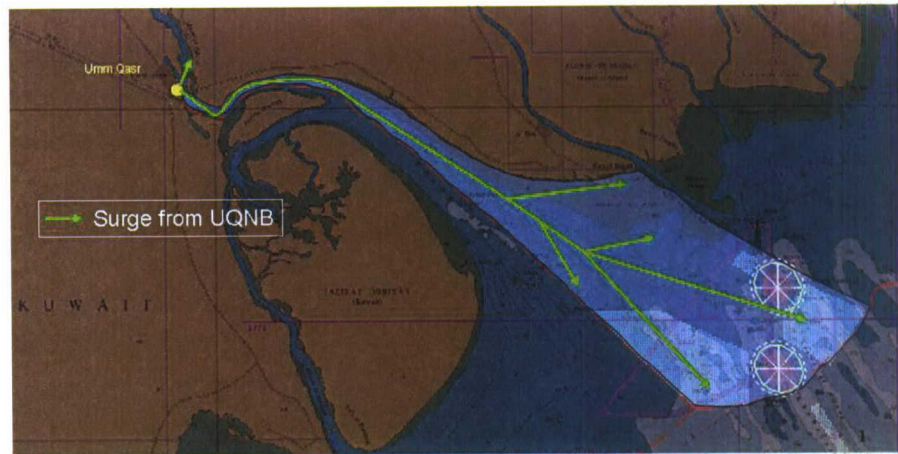
- Secure voice communications (ship-to-ship, ship-to-aircraft, ship-to-shore)
- Sustained real-time data connectivity between OSVs, TOCs, UQNB (for shared operational and tactical picture)
- Commercial band radio (for contact with mariners)
- Public address, LRAD, or other direct means to hail non-responsive vessels
- C3 suite for TACON of multiple surface vessels (TOC, OSV, etc.)
- GPS and other navigation and location aids

Mission: Respond to man-made or natural disasters

The Iraqi Navy also has a mission to respond to man-made or natural disasters and conduct appropriate consequence management. Man-made and natural disasters threaten safety and security at sea and ashore. Given the offshore oil infrastructure and heavy tanker traffic, the potential for disasters involving oil spills is substantial. Disasters may also affect Iraq's limited commercial maritime infrastructure and critical navigable waterways.

The CONOPs for this mission entails that the Iraqi Navy responds quickly to disasters and takes immediate control of the proximate maritime environment to minimize additional damage or loss of life. The Iraqi Navy will need to identify the nature and scale of the disaster; evacuate affected personnel/mariners, when necessary; cordon or otherwise exclude non-essential maritime traffic; and coordinate the swift introduction of national, international, and/or private sector response, mitigation and recovery capabilities.

Figure 3. CONOPs for Disaster Response mission



Operational Tasks:

- Conduct intelligence and surveillance operations
- Monitor surface traffic in Iraqi TTW
- Provide assistance to mariners in distress
- Conduct search and rescue operations
- Coordinate surface and air operations
- Identify and monitor exclusion zones
- Communicate with maritime traffic (hail, query, warn of exclusion zone)
- Coordinate local area operations, exclusion zone enforcement, small boat operations, ship position, aircraft control, and fire coordination
- Communicate with friendly maritime forces and commercial shipping vessels

Associated capabilities

For the disaster response mission, the capability to *observe* entails maintaining wide area situational awareness, and the ability to positively identify commercial, military, and unknown surface contacts. It also entails the ability to visually identify/survey disaster scenes.

The capability to *react* focuses on surging capabilities to the location of a disaster, establishing immediate control over the scene, and enabling the response of appropriate capabilities to mitigate, manage, and recover from the event. The capability to *coordinate* covers forces in the territorial waters, other maritime traffic, and fixed locations at the OPLATs, the UQNB, and other locations ashore. In addition, this capability includes the ability to coordinate with foreign governments or their militaries and private sector businesses to conduct salvage/disaster response activities.

Observe

In order to be able to respond to a disaster, the Iraqi Navy must have the capability to detect and identify an emerging or developing disaster in its TTW, day or night. The Iraqi Navy must also have the ability to receive and analyze information about disasters or potential disasters from other sources, including mariners, regional partners, open source media reporting and intelligence sources.

For this capability area, the Iraqi Navy could employ the following types of equipment:

- UAS (e.g. Scan Eagle, Wasp, Aerostat)
- Surveillance aircraft (i.e. helicopter or fixed-wing)
- Wide-area surface search radar (e.g. J/I-band radar)
- Patrol ships, PBs or other platforms capable of sustained presence in important areas of Iraqi TTW.
- Shallow draft, highly maneuverable craft (FABs, 25' Defender Class Safe Boats) for shallow and restricted water operations
- AIS receivers (OPLATs, towers or other fixed sites)
- FLIR or other day and night capable electro-optical, infrared cameras
- Commercial band radio (for contact with mariners)
- Public address, LRAD, or other direct means to hail non-responsive vessels

React

Once the Iraqi Navy identifies a disaster, it needs the capability to respond quickly – either with forces already on patrol or with additional forces from headquarters – to address the situation. A surge capacity for search and rescue (SAR), to control access/protect other mariners from entering into a dangerous/disaster area, to mark and monitor disaster areas, and to direct follow-on capability providers.

For this capability area, the Iraqi Navy could employ the following types of equipment:

- Patrol craft (e.g. PC, WPB, WMEC)(1 ready to deploy at all times)
- UAS (for example, Scan Eagle, Wasp, Aerostat)
- Surveillance aircraft (i.e. helicopter or fixed-wing)
- Helicopter for search and rescue (1 ready to deploy at all times)
- Marine barriers (e.g. floating barriers, warning signs)
- Helicopter (e.g. Sea Hawk) (1 ready to deploy at all times)
- Commercial band radio (for contact with mariners)
- Public address, LRAD, or other direct means to hail non-responsive vessels

In addition, the Iraqi Navy also needs the capability to quickly control access to the area and prevent maritime traffic from entering the disaster area.

For this capability area, the Iraqi Navy could employ the following types of equipment:

- Marine barriers (e.g. floating barriers, warning signs)
- Helicopter (e.g. Sea Hawk) (1 ready to deploy at all times)

Coordinate

For the disaster response mission, forces will be under the OPCON and TACON of Iraqi Navy headquarters at UQNB, unless a disaster

occurs within the OPLAT exclusion zone, in which case the TACON will switch to the OPLAT protection forces. C3 for response forces will need to be exercised across Iraqi TTW. As the Iraqi Navy identifies and responds to a disaster, it needs to the capability to communicate with its own forces, potentially the maritime forces of neighboring countries, and commercial and private maritime traffic. This includes the ability to communicate with all vessels in its TTW to receive reports of disaster incidents/calls of distress and warn other mariners of a dangerous situation. In addition to communicating with mariners and Iraqi Navy forces, the Iraqi Navy also needs the capability to coordinate with and, if necessary, direct commercial entities to assist in certain recovery efforts after the disaster incident.

For this capability area, the Iraqi Navy could employ the following types of equipment:

- Commercial band radio (for contact with mariners)
- Public address, LRAD, or other direct means to hail non-responsive vessels

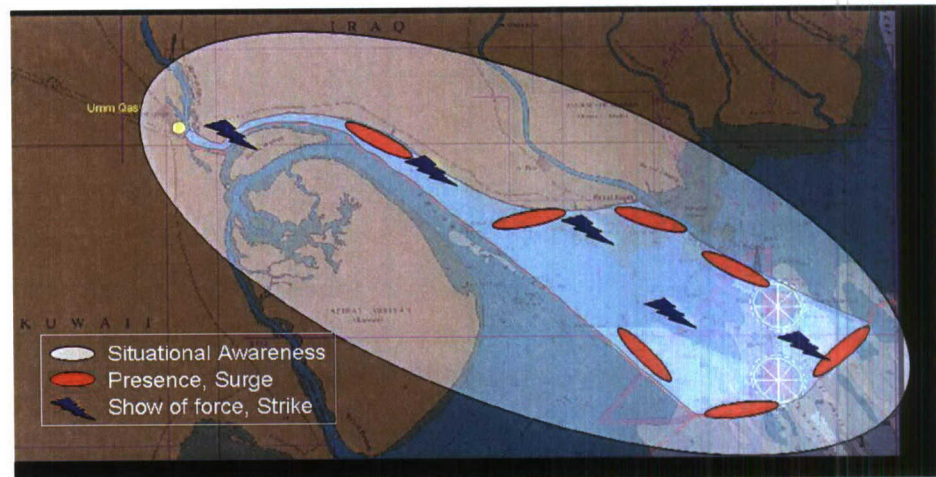
Mission: Defend territorial waters

According to guidance from the Iraqi MoD, the primary long-term mission of all of Iraq's military forces is the protection of Iraqi sovereignty. For the Iraqi Navy, this mission focuses on the defense of Iraqi TWW from all prospective threats. As part of the national security forces of Iraq, the Iraqi Navy must be able to defend its TTW from conventional and unconventional threats in the maritime environment, 24 hours per day, every day.

CONOPs for the defense of Iraqi territorial waters includes **detering and disrupting** aggression by a state with a sizable naval force, **defeating** any attack by a limited size conventional or mixed conventional/unconventional force, and the **identifying and neutralizing** the ability of irregular forces to conduct conventional or unconventional attacks. The CONOPs focuses on defense of TTW but it also entails monitoring of activities and forces that originate beyond Iraqi TTW. This CONOPs relies on accomplishing the mis-

sion without reallocating forces from the OPLAT protection mission.²⁰

Figure 4. CONOPs for TTW Defense mission



Operational Tasks:

- Conduct intelligence and surveillance operations
- Establish Common Operational Picture
- Attack enemy targets
- Conduct show of force operations
- Conduct presence operations
- Conduct local air defense
- Protect sea lines of communication (SLOCs)
- Perform combat search and rescue operations
- Conduct mine countermeasures operations
- Conduct explosive ordinance disposal operations
- Conduct information operations

²⁰ The preservation of the OPLAT protection mission is important because it is critical to the survival of the state. Potential adversaries may try to use an attack elsewhere in the TTW to lure Iraqi Navy forces away from the OPLATs, rendering them vulnerable to an attack.

- Interdict shipping vessels
- Coordinate local area operations, exclusion zone enforcement, small boat operations, ship position, aircraft control, and fire coordination
- Sustain communications and information sharing with headquarters ashore

Associated capabilities

For the TTW defense mission, the capability to *observe* entails maintaining wide area situational awareness, the ability to target situational awareness to a particular area, and the ability to positively identify commercial, military, and unknown surface contacts. The capability to *react* focuses on dominating the area of operations, demonstrating the ability to strike, and responding quickly to an attack. The capability to *coordinate* covers forces in the territorial waters and other maritime traffic and fixed locations at the OPLATs, UQNB, and other locations ashore.

Observe

As with its other missions, in order to defend its TTW, the Iraqi Navy needs the capability to see and identify ships and craft operating within and beyond its TTW. Specifically, the Iraqi Navy needs to have the ability to monitor its operating environment day and night and identify all vessels the size of a dhow or larger in its TTW, and approaching its TTW. The Iraqi Navy also needs the capability to rapidly assemble/focus capabilities for targeted situational awareness to respond quickly to investigate unusual activity or to observe closely all activities within a limited area.

For this capability area, the Iraqi Navy could employ the following types of equipment:

- Fixed wide-area search radars (on OPLATs, on shore)
- AIS receivers (OPLATs, towers or other fixed sites)
- Radars on patrol ships, PBs, FABs

- FLIR or other day and night capable electro-optical, infrared cameras
- UAS (e.g. Scan Eagle, Wasp, Aerostat)
- Manned observations posts (with binoculars, night vision equipment, etc.)
- Surveillance aircraft (i.e. helicopter or fixed-wing)
- Armed helicopter

React

To deal with an identified threat, the Iraqi Navy needs the capability to conduct a variety of strike operations to disrupt, neutralize, or defeat an enemy attack by delivering a blow to enemy forces.

The Iraqi Navy may need the capability to respond quickly to a threat and defeat the enemy by employing fires from a variety of positions (long distance, close distance, air). Because the Iraqi Navy's potential adversaries in 2015 could range from a conventional naval force to a smaller force with limited conventional capabilities, to an unconventional non-state actor, the capabilities requirements for this mission area represent a broad spectrum.

The Iraqi Navy also needs the capability to conduct VBSS to board or infiltrate a hostile vessel. The Iraqi Navy needs the capability to conduct VBSS anywhere in its TTW at any time of the day or night.

The Iraqi Navy may need the capability to respond to, defeat, neutralize, or deter a highly specialized attack through the employment of specialized forces in a limited area. Because Iraq and other NAG countries have a history of employing mine warfare and other explosive ordinances, the Iraqi Navy may need additional equipment and expertise to deal with to a specialized attack/counter attack.

Finally, the Iraqi Navy also needs the capability to conduct SAR operations to quickly locate and recover overboard personnel or enemy combatants. The Iraqi Navy needs to be able to conduct SAR anywhere in the TTW at any time of the day or night.

For this capability area, the Iraqi Navy could employ the following types of equipment:

- Coastal artillery on the Al Faw Peninsula
- Coastal defense cruise missiles
- Armed helicopters (e.g. Sea Hawk or Super Cobra with Hell-fire missiles) (1-2 minimum)
- Patrol ships with naval guns (e.g. PCs, WPB) (1-2)
- Missile boat (1)
- Point air defense capabilities (e.g. MANPADS)
- Mine countermeasures capability (e.g. divers and mine sweeping boats)
- Explosive ordinance disposal team
- Patrol craft (e.g. PC, WPB, 25' Defender Class Safe Boats) (1-2 minimum)

Coordinate

The Iraqi Navy also needs the capability to conduct robust C3 across its TTW. It may need to coordinate multiple task groups (for example, a surface action group and the OPLAT protection forces). It will need the ability to direct and coordinate a quickly maneuvering and dispersed force. It will require rapid and robust information and intelligence sharing capabilities.

Communications will have to be reliable and secure. The Iraqi Navy will need some capacity to transition its C2 headquarters from the UQNB to another location ashore or afloat.

The Iraqi Navy will also have to be able to coordinate across a broad sea-air battle space in order to synchronize and deconflict surveillance, attack, and search and rescue aircraft, air defenses, and fires that originate from the shore.

For this capability area, the Iraqi Navy could employ the following types of equipment:

- Shared COP between UQNB, the OPLATs, and other fixed locations (e.g. computers, radar links)
- Secure voice communications (ship-to-ship, ship-to-aircraft, ship-to-shore)
- Sustained real-time data connectivity between OSVs, TOCs, UQNB (for shared operational and tactical picture)
- Afloat C3 suite for TACON of multiple surface vessels (TOC, OSV, etc.)

Force structure recommendations

In the final analytic step of our study, we examined different ships, craft, systems, weaponry, and units for satisfying the requirement for the capabilities derived from the analysis of the missions and CONOPs. We identified areas of synergy among platforms, weaponry, and skill sets and derived a force structure that fulfills the Iraqi Navy's capability requirements, provides operational flexibility, and seeks to minimize number of different classes within the force structure.

Summary of platforms types needed to fulfill capability requirements

Missions

For OPLAT protection we leveraged existing force structure plans and periodicity rates to identify the number of forces necessary for the mission. For this mission, we adopted the current Iraqi Navy plan for satisfying this requirement with fifteen PBs, four PSs, and two OSVs.

We determined that the following forces will be appropriate for maritime security operations: one armed helicopter; two fast, armed, shallow-draft boats for patrolling TTW; one patrol boat with an endurance of several days at sea; and one small harbor patrol craft per each port/harbor.

We determined that the Iraqi Navy needs the following for disaster response: one helicopter (available at all times) and one fast, shallow-draft response boat.

The Iraqi Navy could utilize many assets for defending territorial waters. We determined that, for a defensive and deterrent posture, the Iraqi Navy would need the following: one armed helicopter; one

small, fixed-wing aircraft; several armed, shallow-draft patrol craft; coastal artillery on the Al Faw Peninsula; and one additional patrol boat with armament appropriate for anti-surface warfare against other similarly sized naval vessels. In addition, the Iraqi Navy will need to utilize units with specialized skills in explosive ordinance disposal and mine countermeasures.

Supporting activities across all missions

The following surveillance equipment will allow the Iraqi Navy to maintain maritime domain awareness: fixed radar towers onshore and offshore (in such locations as Umm Qasr, Al Faw, and on an OPLAT or tower in Iraq's TTW), AIS receivers, the ability to collect HUMINT from deployed on patrolling craft, and electro-optical and infrared (EO/IR) capability, such as FLIR, on surveillance aircraft (either small fixed-wing or helicopter).

The Iraqi Navy needs the following equipment for communication and other capabilities: secure communications (radio, IP), unsecured communications (commercial radio, LRAD, cell phone, etc.) marine barriers (nets, floating barriers), and warning signs.

Force structure recommendations

The following section describes our recommended force structure, which satisfies the capability requirements derived in this analysis. Figure 5 displays the ships and craft, weaponry, and equipment that satisfy the capability requirements for the Iraqi Navy's force structure.

Figure 5. Iraqi Navy force structure requirements²¹

	Rotation ratio	protection* OPLAT	Maritime security operations	Disaster response	Defend TTW	Number deployed regularly	Number to surge	Total
Boats/Craft								
Fast, armed, shallow-draft boat	3:1		x			2	1	6
Large, overnight patrol boat	2:1		x					
with small boat launch capability				x				
with weapons			x	x	x	1		2
Harbor patrol craft	3:1		x			1		3**
Aircraft								
Helicopter	3:1		x	x	x			
with weapons			x		x	1	1	3
Surveillance equipment								
Radar	1:1	x	x	x	x	1		1
AIS	1:1	x	x	x	x	1		1
FLIR (on helicopter)	1:1	x	x	x	x	1		1
Weaponry								
Coastal artillery	1:1				x	1		1
Naval guns	1:1				x	2		2
Supporting equipment								
Secure comms (radio and phone)	1:1	x	x	x	x			
Marine barriers	1:1	x	x	x				
Warning signs	1:1	x	x	x				

* We assumed the 15/4/2 force structure is complete, and included only additional capabilities in this chart

** Per port/harbor

We also examined the employment concept for the planned 15/4/2 force structure for the OPLAT protection mission and sought ways to maximize the utility of those ships, craft, and forces that the Iraqi Navy will already possess. We identified two assets from the 15/4/2 force structure that the Iraqi Navy may leverage for additional use in other mission areas without interfering with the OPLAT protection CONOPs. When transiting to and from the OPLATs, the Iraqi Navy's 15 patrol boats and four patrol ships (large, patrol boats) may be able to extend their deployments by hours or days in order to conduct patrols in support of maritime security operations, thereby lessening the burden on the rest of the fleet.

²¹ We derived the total number of assets for each ship, craft, weapon, or piece of equipment by multiplying the rotation ratio by the number of assets deployed regularly, taking into consideration the need to have the capability to surge. For example, fast, armed patrol boats have a rotation rate of 3:1 and two need to be deployed regularly, so the total number of fast, armed patrol boats that the Iraqi Navy needs is six.

Ships and craft

Fast, armed, shallow-draft patrol boats are important to the Iraqi Navy force structure because they provide the capability to operate throughout the TTW. Because much of Iraq's TTW are very shallow (in many areas averaging less than five feet), it is important that the Iraqi Navy has some craft that have a very shallow draft to patrol the entire TTW. These craft also need to be fast in order to conduct MIO and to respond quickly to disasters or mariners in distress. Finally, the craft need to be armed (such as with machine guns and perhaps grenade launchers) to support VBSS teams for MSO and TTW defense. An example of boats with these characteristics are the US Special Operations Craft – Riverine (SOC-R) or Small Unit Riverine Craft (SURC). Another example is the Patrol Boat - Riverine (PBR), found in the force structures of Romania and Sri Lanka.²²

Patrol boats capable of multi-day deployments are important to the Iraqi Navy's force structure because they help the Iraqi Navy fulfill the persistence requirement of constant presence in the TTW. The ability to stay at sea for several days allows the Iraqi Navy to have constant presence and deterrent capability. Equipping such patrol boats with a small boat (RHIB or similar) launch capability and the ability to accommodate a VBSS team provides the capabilities necessary to respond to disasters, distressed mariners, or to conduct a boarding. If the patrol boat is armed with MANPADS, mounted machine guns and anti-surface weapons (such as a 40-76mm guns) it provides additional MSO capability for VBSS, and it can provide firepower capabilities required in the TTW defense mission.

Harbor patrol craft become important as the amount of commercial and other traffic increases in and around Iraqi ports. These small patrol craft are able to provide a constant presence in the port/harbor, visit incoming ships, conduct compliant boardings, and provide a limited defense against a rogue small boat intrusion or attack.

Helicopters are key to conducting and supporting many of the Iraqi Navy's missions. Helicopters can provide surveillance (wide area

²² Janes' Fighting Ships, 2007.

search, platform for EO/IR sensors) and search and rescue capabilities. Helicopters armed machine guns and/or snipers can provide overwatch for VBSS teams in potentially hostile situations and can serve as a deterrent for criminal activity. Armed with missiles (such as the Penguin or Sea-Skua) helicopters can provide potent anti-surface capabilities for MSO and TTW defense missions. Other aircraft (such as small, fixed-wing planes) may provide some of these required capabilities, but helicopters fulfill a broader range of capabilities and, therefore, add greater utility to the overall force structure. In addition, a force structure with a single type of aircraft requires less training and less logistical and maintenance support than a force structure with both rotary and fixed-wing would require.

Systems

Radar is important to the Iraqi Navy force structure because it provides constant surveillance capabilities for the Iraqi Navy's entire operating area and beyond. Radar with an I- or J-band surface search capability will allow the Iraqi Navy to securely detect and track surface objects in its TTW throughout the day and night and in most weather conditions.

AIS plays an important role in fulfilling the Iraqi Navy's surveillance and situational awareness capability requirements. AIS allows participating vessels to transmit information about the position, course, speed, and other characteristics of the ship, making identity and pinpointing of ships easier. AIS is required by the IMO on ships of 300 or more gross tons, but is optional for smaller ships, and it can be turned off at any point in time. Because AIS is elective and does not provide information on all vessels in the TTW, AIS is best suited for use in conjunction with radar.

FLIR is important for the Iraqi Navy's force structure because it fulfills the capability requirement to be able to visually observe, track, and target vessels in the TTW in the dark and through atmospheric obscurants, such as smoke, fog, or haze. FLIR can be used in maintaining situational awareness for any mission, targeting acquisition and tracking for TTW defense, and locating mariners in distress in search and rescue or disaster response operations. FLIR may pre-

sent maintenance and technology challenges for the Iraqi Navy, but it can fulfill unique surveillance capability requirements when used in conjunction with aircraft.

Weapons

When we examined the capability requirements, we also determined that the Iraqi Navy may also need several new types of weapons in the future. Some of these weapons reside on the platforms we identified, while others represent a modification to or an increase in the Iraqi Navy's firepower capabilities.

The Iraqi Navy capability requirements indicate the need for a variety of weapons across ships, craft, and missions. To achieve its missions – particularly TTW defense and maritime security operations – the Iraqi Navy needs the capabilities that are provided by the following weapons: coastal artillery, naval guns or other ant-surface weapons, man-portable air defense systems (MANPADS) for unit self protection, and localized air defense for maritime installations.

Coastal artillery is well-suited to the Iraqi Navy's needs. It provides the capability to target a sizable attacking force (through saturation fire of specific areas), it enables area denial, and it is an affordable and visible way to conduct show of force operations. Given the commercial traffic – to include tankers – in the NAG and the presence of significant offshore infrastructure, coastal artillery avoids some of the disadvantages of cruise missiles which may lock on inappropriate or unintended targets.²³ In addition, given the Iraqi military's long experience with the employment of artillery – including operations in and around the Al Faw peninsula – it may be a relatively easy capability to develop and deploy. This also may be a capability that the Iraqi Navy can leverage from within the Iraqi land forces.

²³ Coastal artillery is not without targeting risks (such as misidentification, wind direction, mis-aiming, etc.) changes, but the potential kill range of an errant missile poses what we consider to be a greater risk.

Units

While this study did not assess the total manpower requirement to operate and sustain the force structure, it identified areas where highly-trained individuals may provide specialized skills, thereby increasing the Iraqi Navy's overall capability and capacity. Based on our assessment of the Iraqi Navy's prospective requirements to execute its TTW defense mission, the Iraqi Navy needs a mine countermeasure capability (MCM) (including divers and mine-sweeping equipment), the capabilities of an explosive ordinance disposal (EOD) team, VBSS teams, and point defense.

Highly specialized skill sets by their nature require a significant time and financial investment to develop. The Iraqi Navy may be able to procure these skill sets through a variety of ways. The Iraqi Navy could grow these capabilities within its own ranks (as it has begun to do for VBSS teams and point defense) – although this approach requires a significant investment of resources. For the less frequently employed capability requirements (such as MCM capabilities or EOD teams) the Iraqi Navy may be able to coordinate with other services (Iraqi Army, Iraqi Air Force) to develop joint capabilities or leverage extant capabilities within the other service. Joint operations may require less Iraqi Navy investment and would still provide the requisite skills. Another option may be for the Iraqi Navy to contract private security companies to provide these capabilities, although the Iraqi Navy may face security and bureaucratic hurdles with this approach.

In addition to these specialized skills, there is an additional capability requirement for the Iraqi Navy's force structure. In order to conduct several of its missions (OPLAT protection, MSO, TTW defense) as described above in the CONOPs, the Iraqi Navy must be able to operate at sea overnight, and in some cases, for several days or weeks at a time. This capability is critical to the successful completion of the Iraqi Navy's missions.

Other equipment options and capability requirements

There are equipment options and supporting capability requirements that are not listed in the above force structures. These were omitted for several reasons.

Equipment options

In the previous section, we listed several types of equipment and resources that may be appropriate for achieving the Iraqi Navy's capability requirements. However, several of these options, such as UAS, were not included in our final force structure recommendations.

We made recommendations for the Iraqi Navy's future force structure based on the ability of each ship or craft to be flexible in performing multiple types of missions, considerations of sustainability within the force, and the associated costs of purchase, training, and maintenance/replacement. If a capability could be provided by an asset already resident in the force (or necessary for other missions), then we did not include additional assets to duplicate capabilities. For example, the Iraqi Navy could employ UAS for surveillance of its TTW, but the combination of radar, AIS, and aircraft with FLIR (all of which are necessary for other missions) satisfies the capability requirements for surveillance. Therefore, UAS are not included in the Iraqi Navy force structure recommendations, because while they would augment existing capabilities, they would not have the flexibility to fulfill other capability requirements (as is the case with helicopters, for example).

Additionally, some equipment options (such as SCAN EAGLE) may be important needs for the Iraqi Navy in the near term (1-8 years), given the Iraqi Navy's current capabilities and technical expertise. However, these short term assets may become less important to the force structure as the Iraqi Navy develops the new areas of expertise develops more flexible equipment options (e.g. helicopters). Given that this force structure recommendation is for 2015 and beyond, we assumed that the Iraqi Navy will seek to develop the capabilities and expertise required to support ships and craft for its future force structure.

Supporting capability requirements

While supporting capabilities such as maintenance, logistics, and training are important requirements, we did not address them in this study because these requirements depend largely on the spe-

cific ships and craft in the Iraqi Navy force structure.²⁴ However, there are requirements for equipment, technology, and information tools specific to the Iraqi Navy's mission set, and which enable the Iraqi Navy to function efficiently and effectively.

The capability required for supporting and enabling the Iraqi Navy's force structure are found in: barriers, warning signs, secure communication equipment, a shared COP between UQNB and deployed forces, method for Iraqi Navy to communicate with the public, and communication within the Iraqi security services and the Government of Iraq.

Barriers provide a low-technology exclusion capability that is easy to obtain and maintain and requires very little support from the Iraqi Navy. Barriers to support the Iraqi Navy in OPLAT protection, maritime security operations, and disaster response are fences for port or harbor facilities, floating barriers, and marine nets to stop traffic or swimmers. Warning signs also provide a low-technology, cost-effective way of communicating in an exclusion zone. Signs reduce confusion and the chances of unintentional intrusion into an exclusion zone, which is important for OPLAT protection, maritime security operations, and disaster response.

Secure communications equipment will provide the Iraqi Navy with a reliable and protected way for Iraqi Navy forces to communicate with each other and to coordinate their actions, regardless of their location in the TTW or at UQNB. This equipment is instrumental to developing an operational C3 capability to support all missions.

Shared COP between UQNB and secondary locations (including OPLATs and other deployed assets) enables the Iraqi Navy to shift its headquarters to a secondary location (such as the OSV stationed at the OPLATs) in order to provide redundancy in C2 in case of an attack.

A method for the Iraqi Navy to communicate easily with the public (including mariners) would support the Iraqi Navy's disaster response and maritime security missions. This method could be used

²⁴ See earlier discussion of force structure options.

to issue public safety warnings and to receive reports of incidents or disasters in the TTW.

Finally, the Iraqi Navy also needs equipment and procedures to communicate within the Iraqi security services and the MOD in order to support the TTW defense and disaster response missions. In the event of an attack on Iraq, or the need for a specialized capability found in only in the other services, the Iraqi Navy needs a system in place to communicate quickly and securely with other parts of the Iraqi government.