CENTER FOR STRATEGIC AND BUDGETARY ASSESSMENTS

CSBA

Outside-In

Operating from Range to Defeat Iran's Anti-Access and Area-Denial Threats

BY MARK GUNZINGER
With Chris Dougherty

OUTSIDE-IN: OPERATING FROM RANGE TO DEFEAT IRAN'S ANTI-ACCESS AND AREA-DENIAL THREATS

BY MARK GUNZINGER

With Chris Dougherty

2011

About the Center for Strategic and Budgetary Assessments

The Center for Strategic and Budgetary Assessments (CSBA) is an independent, nonpartisan policy research institute established to promote innovative thinking and debate about national security strategy and investment options. CSBA's goal is to enable policymakers to make informed decisions on matters of strategy, security policy and resource allocation.

CSBA provides timely, impartial and insightful analyses to senior decision makers in the executive and legislative branches, as well as to the media and the broader national security community. CSBA encourages thoughtful participation in the development of national security strategy and policy, and in the allocation of scarce human and capital resources. CSBA's analysis and outreach focus on key questions related to existing and emerging threats to U.S. national security. Meeting these challenges will require transforming the national security establishment, and we are devoted to helping achieve this end.

About the Authors

Mark Gunzinger is a Senior Fellow at the Center for Strategic and Budgetary Assessments. Mr. Gunzinger has served as the Deputy Assistant Secretary of Defense for Forces Transformation and Resources. He is the principal author or co-author of multiple Defense Planning Guidance directives, key strategic planning guidance documents that shape DoD force planning. A retired Air Force Colonel and Command Pilot with over three thousand flight hours, he joined the Office of the Secretary of Defense in 2004. He was appointed to the Senior Executive Service and served as Principal Director of the Department's central staff for the 2005–2006 QDR. Following the 2006 QDR, he was appointed Director for Defense Transformation, Force Planning and Resources on the National Security Council staff where he championed defense priorities at the national level and played a major role in shaping the 2007 "surge" of U.S. forces to Iraq. Mr. Gunzinger holds a Master of Science degree in National Security Strategy from the National War College, a Master of Airpower Art and Science degree from the School of Advanced Air and Space Studies, a Master of Public Administration from Central Michigan University, and a Bachelor of Science in Chemistry from the United States Air Force Academy (Class of 1977). He is the recipient of the Department of Defense Distinguished Civilian Service Medal, the Secretary of Defense Medal for Outstanding Public Service, the Defense Superior Service Medal, and the Legion of Merit Medal.

Christopher Dougherty researches, writes and conducts wargames in support of CSBA's strategic studies program. He has contributed extensively to CSBA monographs including: *Sustaining America's Strategic Advantage in Long-Range Strike*; *AirSea Battle: A Point of Departure Operational Concept*; *Special Operations Forces: Future Challenges and Opportunities*; *The US Navy: Charting a Course for Tomorrow's Fleet*; and *Why AirSea Battle?*. He has supported numerous CSBA wargames with a particular focus on developing operational concepts and capabilities for countering anti-access/area-denial threats.

Mr. Dougherty graduated *Summa Cum Laude* with a BA in Security Studies from the Henry M. Jackson School of International Studies at the University of Washington and received an MA in Strategic Studies with distinction from the Paul H. Nitze School of Advanced International Studies at Johns Hopkins University. He also served as an airborne infantryman with the 2nd Battalion, 75th Ranger Regiment from 1997 to 2000.

Acknowledgments

The authors would like to thank the CSBA staff for their assistance with this report. Special thanks go to Andrew Krepinevich, Jim Thomas, Jan van Tol, and Dakota Wood for their many contributions, Eric Lindsey and Abigail Stewart for their editorial and production support, and Cutting Edge for their design. The analysis and findings presented here are solely the responsibility of the Center for Strategic and Budgetary Assessments and the authors.

CONTENTS

FIGURES

EXECUTIVE SUMMARY

Since the collapse of the Soviet Union, the U.S. military has been able to project power overseas with few serious challenges to its freedom of action. This "golden era" for U.S. power projection may be rapidly drawing to a close. As described in previous analyses by the Center for Strategic and Budgetary Assessments (CSBA), the People's Republic of China (PRC) is developing an anti-access/area-denial (A2/AD) battle network that could constrain the U.S. military's ability to maneuver in the air, sea, undersea, space, and cyberspace operating domains. Over the coming years, the spread of advanced military technologies will allow other states to pursue A2/AD strategies tailored to the unique geographic and geostrategic characteristics of their regions.

Iran, in particular, has been investing in new capabilities that could be used to deter, delay, or prevent effective U.S. military operations in the Persian Gulf. Iran's acquisition of weapons which it could use to deny access to the Gulf, control the flow of oil and gas from the region, and conduct acts of aggression or coercion, are of grave concern to the United States and its security partners.

As the United States redeploys its forces from Iraq and Afghanistan, it has the opportunity to develop a new operational concept for projecting power that could offset Iran's growing military might. This will require the Department of Defense to change assumptions it developed some thirty years ago, when the threat of aggression by the Soviet Union drove the U.S. military's planning for Persian Gulf contingencies. This planning framework presumed that the United States would enjoy unfettered access to close-in bases, U.S. battle networks would remain intact and secure, and neither the Soviet Union nor a regional power would pose a serious threat to air or sea lines of communication. Over time, these assumptions led to defense budget decisions that favored short-range aircraft, non-stealthy systems, and other capabilities best suited for operations in permissive environments.

In light of Iran's pursuit of A2/AD capabilities, it seems unlikely that the U.S. military's legacy planning assumptions will remain valid. Iran has had ample opportunity over the last twenty years to examine the "American way of war" and to deduce that allowing the United States and its allies to mass overwhelming combat power on its borders is a prescription for defeat. Therefore, Iran is pursuing measures to deny the U.S. military access to close-in basing and make traditional U.S. power-projection operations in the Persian Gulf possible only at a prohibitive cost.

A2/AD WITH "PERSIAN CHARACTERISTICS"

The unique characteristics of the Persian Gulf region combined with Iran's weakness in a direct military competition with the United States suggest that Iran will pursue an asymmetric "hybrid" A2/AD strategy that mixes advanced technology with guerilla tactics to deny U.S. forces basing access and maritime freedom of maneuver.

Wherever possible, Iran will seek to avoid direct confrontation with the U.S. military, instead choosing to coerce relatively weaker and possibly less resolute states to deny the United States permission to stage operations from Gulf bases. The populations, governments, and much of the wealth of the region are remarkably concentrated in a handful of urban areas within range of Iran's ballistic missiles. Although counter-value strikes against Gulf cities may have little direct military utility, their psychological and political impact on regional governments could be significant, especially if Iran demonstrated the capacity to arm their missiles with chemical, biological, radiological, or nuclear warheads. Iran could also mobilize its network of predominately Shiite proxy groups located across Southwest Asia to conduct acts of terrorism and foment insurrection in states that remain aligned with the United States. Iran's proxies could become far more dangerous should Iran arm them with guided rockets, artillery, mortars and missiles (G-RAMM). Other groups, like Lebanese Hezbollah, could conduct a terrorism campaign designed to broaden the crisis and hold U.S. rear areas—even the U.S. homeland—at risk.

Given that this indirect approach may not succeed, Iran could use its ballistic missiles and proxy forces to attack U.S. bases and forces in the Persian Gulf directly. Iran's hybrid strategy would continue at sea, where its naval forces would engage in swarming "hit and run" attacks using sophisticated guided munitions in the confined and crowded littorals of the Strait of Hormuz and possibly out into the Gulf of Oman. Iran could coordinate these attacks with salvos of antiship cruise missiles and swarms of unmanned aircraft launched either from the Iranian shore or from the islands guarding the entrance to the Persian Gulf.

Iran has begun investing in the capabilities necessary to execute this hybrid A2/AD strategy and could continue to improve upon them significantly over the next two decades. In light of this, the U.S. military should develop a new operational concept for future Persian Gulf contingencies, one that assumes that close-in basing may not be available, all operating domains will be contested, and Iran may threaten terror and WMD attacks, including the use of nuclear weapons, to deter or prevent a successful U.S. military intervention in the Persian Gulf.

AN "OUTSIDE-IN" ENABLING OPERATIONAL CONCEPT

This paper proposes three lines of operation to prevent the success of an Iranian anti-access and area-denial strategy and regain the U.S. military's freedom of action:

- Setting conditions to deter or defeat Iranian coercion and aggression, while deploying U.S. forces to support initial operations against Iran from outside the reach of its anti-access threats;
- Operating from range to reduce the effectiveness of Iran's A2/AD complex by degrading its ISR capabilities and decreasing the density of its offensive and defensive systems, including ballistic missiles, maritime exclusion capabilities, and air defense network; and
- Establishing localized air and maritime superiority when and where needed, including sea control through the Strait of Hormuz, to support follow-on force deployments and theater campaign operations.

These lines of operation are designed to exploit the U.S. military's ability to fight from extended ranges to counter Iran's emerging A2/AD strategy and maintain access to the Persian Gulf.Accordingly, this enabling concept calls for repositioning U.S. air and maritime assets from their present locations near Iran to more distant bases and maritime operating areas out of range of Iran's strike assets. From this posture of advantage, the U.S. military could then reduce the density of Iran's A2/AD complex and regain the freedom of action necessary to conduct follow-on operations.

The U.S. military should also be prepared to conduct other lines of operation as part of a comprehensive theater campaign. These operations could include:

- Deterring Iran from transferring or employing WMD, including nuclear weapons, and, should deterrence fail, preventing their use and diminishing the impact of a nuclear strike;

- Countering proxy groups equipped with G-RAMM, to include preventing Iran from resupplying terrorist groups located throughout Southwest Asia;
- Imposing costs on Tehran by attacking energy infrastructure and other critical targets required to sustain its war effort; and
- Conducting unconventional warfare that could set the conditions for a regime change from within, should it become necessary.

CAPABILITY AND FORWARD POSTURE INITIATIVES

To implement an enabling operational concept, the Department of Defense (DoD) will need to develop new capabilities and a diversified forward posture that are not currently part of its program of record. Achieving this within an increasingly constrained budget will require defense planners to make difficult decisions; the United States cannot meet the challenges that Iran could pose to its vital interests in the Gulf by simply spending more and adding new capabilities and capacity. In light of current budget realities, DoD may need to rebalance its portfolio by reducing its emphasis on capabilities that are over-optimized for permissive threat environments in order to prioritize capabilities needed for a range of operations in environments that will be increasingly non-permissive in nature. Interestingly, capabilities needed to support an *AirSea Battle* operational concept for the Western Pacific and an *Outside-In* enabling concept for the Persian Gulf have a remarkable amount of overlap.[1] For example, both emphasize the need to develop new long-range systems such as penetrating bombers and carrier-based unmanned aircraft; increase the U.S. Navy's undersea magazine of standoff munitions; improve air and missile defenses; and pursue forward posture initiatives that will complicate the operational planning of an enemy force.

This report recommends the following initiatives to support an enabling operational concept for the Persian Gulf.

SURVEILLANCE AND STRIKE CAPABILITIES. The U.S. military should design its new long-range strike family of systems to operate in degraded or denied communications environments, and procure non-kinetic capabilities, including cyber, electronic warfare and directed energy systems, to disrupt, disable, or destroy Iranian A2/AD threats. This family of systems should include an Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS) aircraft that will extend the reach and persistence of the U.S. Navy's carrier air wings in high threat operating environments. The U.S. Navy should also integrate payload modules into future *Virginia*-class attack submarines to partially reverse

[1] See Jan van Tol with Mark Gunzinger, Andrew Krepinevich and Jim Thomas, *AirSea Battle: A Point-of-Departure Operational Concept* (Washington, DC: CSBA, 2010).

planned reductions in its capacity to conduct standoff cruise missile attacks, and develop a Large Displacement Unmanned Undersea Vehicle that could extend its undersea surveillance network.

MARITIME CAPABILITIES. To counter Iran's maritime exclusion capabilities, DoD should field a ship-based, solid-state laser for defending against swarming boats and salvos of anti-ship cruise missiles, and equip a new Long-Range Strike Bomber to carry anti-ship missiles and mines. To help fulfill future expeditionary requirements, the Department of the Navy should field a new Amphibious Combat Vehicle that is optimized for ground combat missions, and sustain sufficient amphibious lift capacity to support a joint theater-entry operation.

MISSILE AND G-RAMM DEFENSES. The U.S. military should develop air-launched missiles that can intercept ballistic missiles in their boost phase, as well as invest in promising directed energy technologies that could improve terminal defenses against cruise and ballistic missiles at a negligible cost-per-shot compared to current kinetic interceptors. DoD should also pursue advanced mines and non-lethal capabilities that could create physical barriers to terrorist G-RAMM attacks against U.S. forces and forward operating locations.

STRATEGIC LIFT. Prior to the planned closure of the C-17 production line, it may be prudent for DoD to assess its future strategic lift requirements assuming that Iran will be capable of controlling sea lines of communication through the Strait of Hormuz and the Persian Gulf in the initial stages of conflict.

POSTURE REALIGNMENTS. The U.S. military should diversify and harden its Persian Gulf bases to complicate Iran's ballistic missile targeting, while creating an expanded network of distant shared access locations to support initial U.S. power-projection operations from beyond the reach of Iran's anti-access threats. A future close-in Persian Gulf posture should seek to reduce the U.S. military's overall footprint on the ground while supporting missions such as missile defense, building partner capacity, and counterterrorism that would help regional partners resist aggression by Iran and its proxies. Partner capacity building priorities should include creating "counter-A2/AD networks" with early warning radars, ballistic missile and air defense capabilities, short- and medium-range ballistic missiles, and frigates and corvettes.

In summary, the assumptions of the past thirty years may not provide the best planning framework for operations in the Persian Gulf against an adversary whose strategy is designed to counter the American way of war. Iran's acquisition of A2/AD weapons and other asymmetric capabilities designed to challenge the U.S. military across all warfighting domains strongly suggests that DoD must

develop innovative operational concepts for new Persian Gulf contingencies. These operational concepts can also provide the connective tissue between the U.S. military's strategy, plans, and capability requirements, and help inform decisions on investment priorities in an age of flat or declining defense budgets.

AN IMPORTANT CAVEAT

Although this assessment uses Iran's A2/AD capabilities as a "pacing threat" to illustrate the impact of asymmetric capabilities against future U.S. military operations in the Persian Gulf, there is no intent to imply that conflict between the United States and Iran is inevitable. On the contrary, the intent is to identify initiatives that could help enhance conventional deterrence, improve crisis stability, and avoid conflict. Furthermore, although this assessment postulates one potential conflict scenario, a candidate enabling operational concept for the Persian Gulf should be tested against a representative set of scenarios to determine its robustness under varying circumstances.

INTRODUCTION

Since the end of the Cold War, the United States has enjoyed an unprecedented ability to project military power with few constraints to its freedom of action in all domains—air, sea, undersea, land, space, and cyberspace. Today, the diffusion of advanced military technologies to potential adversaries, particularly the proliferation of precision-guided munitions and nuclear weapons, combined with the adoption of novel concepts of operation, has enormous implications for America's future ability to project power abroad.

AirSea Battle: A Point-of-Departure Operational Concept, a report released by CSBA in 2010, offered a diagnosis of the problem specific to the Western Pacific and proposed a candidate operational concept for projecting military forces to the region despite China's possession of a robust A2/AD battle network.[2] *AirSea Battle* recommended that a U.S. military operational concept designed to "set the conditions at the operational level to sustain a stable, favorable conventional military balance throughout the Western Pacific" should account for the region's specific geographic and geostrategic features, including the strengths and weaknesses of the People's Liberation Army (PLA) and the capabilities of America's allies and partners.[3] Similarly, this report provides a diagnosis of the shifting military balance in the Persian Gulf, to include the capabilities of Iran's military forces, before outlining a point-of-departure operational concept describing how the United States could maintain its ability to project military power into this region of continuing vital interest.

---

[2] Ibid., henceforth called *AirSea Battle* for the purposes of this report. Also for the purposes of this paper, "anti-access" threats are defined as those associated with preventing U.S. forces from deploying to forward bases in a theater of operations, while "area-denial" threats aim to prevent the U.S. military's freedom of action in an area of operations. See Andrew F. Krepinevich, *Why AirSea Battle?* (Washington, DC: CSBA, 2010), pp. 8–11.

[3] Thus, operational concepts designed for the characteristics of other regions should not simply be a lesser-included case of a concept tailored specifically for the Western Pacific. *AirSea Battle*, p. xi.

BACKGROUND

For over seventy years, the Persian Gulf has been a major focus of U.S. military planning. The competition with Germany for access to oil; the threat of a Soviet invasion in the last two decades of the Cold War; the fall of the Shah of Iran and the rise of Khomeinism; and concern over Iraq's hegemonic ambitions during the Saddam Hussein era all drove America's Persian Gulf policies and military posture.

THE U.S. MILITARY POSTURE IN THE PERSIAN GULF. The foundation for the Defense Department's current posture in the Gulf can be traced to the following declaration by President Carter in 1980:

> An attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America, and such an assault will be repelled by any means necessary, including military force.[4]

To support what became known as the "Carter Doctrine," DoD activated a Rapid Deployment Joint Task Force (RDJTF) Headquarters as a subordinate command to the United States Readiness Command with the mission of preparing for conventional military operations in Southwest Asia. In 1983, the RDJTF became United States Central Command, a separate unified command with an area of responsibility that stretches across the Middle East, Central Asia, and North Africa.[5] Today, Central Command maintains a forward posture that includes a continuous naval presence in the Persian Gulf; forces in Kuwait, Iraq, and Afghanistan; Headquarters for the U.S. Naval Forces Central Command and Navy 5th Fleet in Bahrain; and a Combined Air Operations Center (CAOC) in Qatar.[6] This posture is maintained as part of

---

[4] President Carter made this declaration during his 1980 State of the Union Address. A transcript of the address is accessible online at http://www.presidency.ucsb.edu/ws/index.php?pid=33079#axzz1O4C4bIEu. Three months earlier, President Carter had stated his intent to "further enhance the capacity of our rapid deployment forces to protect our own interests and to act in response to requests for help from our allies and friends." A transcript of this speech is accessible online at http://www.presidency.ucsb.edu/ws/index.php?pid= 33079#axzz1O4C4bIEu.

[5] Today, Central Command's area of responsibility includes Afghanistan, Bahrain, Egypt, Iran, Iraq, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Oman, Pakistan, Qatar, Saudi Arabia, Syria, Tajikistan, Turkmenistan, United Arab Emirates, Uzbekistan, and Yemen. See the United States Central Command's official website at http://www.centcom.mil/area-of-responsibility-countries.

[6] The Commander of the U.S. Naval Forces Central Command/5th Fleet (COMUSNAVCENT/COMFIFTHFLT) commands over 3,000 personnel ashore, and approximately 25,000 people afloat, most as part of a Carrier Strike Group (CSG), an Amphibious Ready Group (ARG), and/or an Expeditionary Strike Group (ESG). See http://www.cusnc.navy.mil/command/command.html. The CAOC at al Udeid Air Base in Qatar is responsible for orchestrating coalition air operations throughout Central Command's area of responsibility.

the United States' strategy to advance its security interests in the region, which include maintaining access to the Gulf's oil and gas resources and transforming Iran's national policies "away from its pursuit of nuclear weapons, support for terrorism, and threats against its neighbors."[7]

CONTINUED RELIANCE ON PERSIAN GULF ENERGY RESOURCES. Despite the global search for new sources of hydrocarbon-based energy, the Persian Gulf states—Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates—still control about 55 percent of the world's proven oil reserves and produce about 28 percent of the oil consumed annually.[8] The United States alone relies on the region for over 14 percent of its annual oil imports.[9] In 2009, 77 percent of Japan's imported oil and 74 percent of South Korea's oil imports originated in Iran, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates.[10]

THE WORLD'S MOST VULNERABLE MARITIME CHOKEPOINT. In total, over 30 percent of all seaborne traded oil flows through the Strait of Hormuz, the world's most important and vulnerable maritime chokepoint.[11] At its narrowest point, the Strait, which connects the Persian Gulf with the Arabian Sea, is only about 34 miles wide.[12] Peacetime traffic exiting the Strait, which includes an average of thirteen crude oil tankers each day, is further restricted to using one channel for inbound traffic and a second channel for outbound vessels, each of which is about two miles wide.[13] Iran borders the Strait and has claimed sovereignty over several islands, including Abu-Musa, Tunb al Kubra (Greater Tunb), and Tunb al Sughra (Lesser Tunb), which command the Strait's western approaches (see Figure 1).

---

7 *National Security Strategy* (Washington, DC: The White House, May 2010), p. 24, accessible online at http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf.

8 The Department of Energy's Energy Information Administration (EIA) classifies Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates as Persian Gulf states.

9 See "U.S. Imports by Country of Origin," EIA, accessible online at http://www.eia.doe.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbl_m.htm.

10 See "Japan: Country Analysis Brief," EIA, March 2011, p. 5, available online at http://www.eia.gov/EMEU/cabs/Japan/pdf.pdf, and "South Korea: Country Analysis Brief," EIA, March 2011, p. 2, accessible online at http://www.eia.gov/EMEU/cabs/South_Korea/pdf.pdf.

11 According to the EIA: "Hormuz is the world's most important oil chokepoint due to its daily oil flow of 15.5 million barrels in 2009, down from a peak of 17 million bbl/d in 2008. Flows through the Strait in 2009 are 33 percent of all seaborne traded oil (40 percent in 2008), or 17 percent of oil traded worldwide." See "World Oil Transit Chokepoints" Country Analysis Brief, EIA, February 2011, p. 1, accessible online at http://www.eia.doe.gov/cabs/world_oil_transit_chokepoints/Full.html.

12 The navigable width for deep draft tankers would be less than 34 miles. For example, the narrowest area of water at least 45 feet deep is only about 23 miles wide.

13 Ibid., p. 2.

FIGURE 1. STRAIT OF HORMUZ

IRAN'S MILITARY COMPLEX. Iran's growing military might, which includes a variety of weapons that could be used to deny access to the Persian Gulf, are of grave concern to the United States, its allies, and security partners. As Secretary of Defense Robert Gates observed in late 2007, "There can be little doubt that their [Iran's] destabilizing foreign policies are a threat to the interests of the United States, to the interests of every country in the Middle East, and to the interests of

all countries within the range of the ballistic missiles Iran is developing."[14] Iran's arsenal includes ballistic missiles that can reach targets across the Persian Gulf region. Iranian leaders have repeatedly threatened to use anti-ship cruise missiles, smart mines, fast attack craft, and other advanced weaponry to exert their control over the Strait of Hormuz and Gulf shipping lanes. Moreover, Iran continues to sponsor and arm proxy groups that threaten regional stability.[15] Absent a revolutionary change to its internal governance and ambitions, it is highly likely that Iran will continue on its current path toward creating an arsenal of advanced weapons and a network of proxy groups to challenge U.S. interests throughout Southwest Asia.

It is highly likely that Iran will continue on its current path toward creating an arsenal of advanced weapons and a network of proxy groups to challenge U.S. interests throughout Southwest Asia.

OPPORTUNITY TO SET A NEW COURSE. Clearly, the Persian Gulf security environment has changed substantially since the Carter Doctrine was first conceived. The security policies, force posture, and military capabilities that flowed from this doctrine were primarily in response to the threat of conventional military adventurism by the Soviet Union in the Gulf during the Cold War. After the fall of the Soviet Union, U.S. concerns shifted to Saddam Hussein's Iraq and the threat it posed to Kuwait and Saudi Arabia. Like the Soviet threat, Iraq's has ceased to exist, but new asymmetric challenges, such as those posed by Iran's ballistic missiles, proxy forces, and maritime exclusion capabilities, have arisen in their wake.

As the United States redeploys its forces from Iraq and Afghanistan, it has the opportunity to develop a new operational concept for projecting power to the Persian Gulf region that will offset Iran's growing military might and ambitions. This will not be easy. Promulgating a new operational concept for the Persian Gulf, then developing and fielding the capabilities needed to support it will require time and significant resources. A major restructuring of the United States' forward posture would likewise require intensive consultations with partners and allies and may necessitate a long process of construction of facilities and relocation of forces. Nonetheless, failing to take action to address the changing security environment in the Persian Gulf will likely jeopardize the U.S. military's ability to sustain assured access to the region.

---

[14] Remarks Delivered by Secretary of Defense Robert Gates, "Manama Dialogue, Manama, Bahrain," December 9, 2007, accessible online at http://www.defense.gov/Speeches/Speech.aspx?SpeechID=1201.

[15] Iran's sponsorship and use of proxy groups may be "the most immediate and serious threat to Iraqi security" today. See Frederick W. Kagan, *Iraq Threat Assessment* (Washington, DC: American Enterprise Institute, May 2011), p. 1, accessible online at http://www.aei.org/paper/100223.

METHODOLOGY

This report's assessment begins with the premise that sustaining access to the Persian Gulf, which like access to the South China Sea and other East Asian waters is a vital interest of the United States, presents a unique set of challenges requiring the development of new operational concepts to enable the U.S. military to project military power into the theater. In particular, while *AirSea Battle* focused on China's rapidly increasing military capabilities, the operational concept offered in this paper focuses on how to address Iran's growing military threat.

The U.S. military's current operating concepts and forward posture in the Gulf region reflect a passing era when America's ability to project forces far forward was effectively unchallenged.

The U.S. military's current operating concepts and forward posture in the Gulf region reflect a passing era when America's ability to project forces far forward was effectively unchallenged. This paper first assesses how Iran may be planning to take advantage of the unique features of the Persian Gulf as well as advanced technologies with military applications to prevent the United States from deploying its forces into the region at acceptable levels of risk. It then proposes elements of an *enabling operational concept* to maintain the freedom of action needed for the United States to uphold its security commitments and conduct effective operations against an A2/AD battle network with "Persian characteristics."[16] In so doing it will also create the conditions necessary to conduct other operations that might be part of a comprehensive military campaign for a conflict in the region, such as combating weapons of mass destruction (WMD) and countering terrorism by proxy. This assessment concludes with thoughts on capabilities and regional posture initiatives that may be needed to implement an enabling operational concept.

WHAT SHOULD AN ENABLING CONCEPT DO?

The purpose of the enabling operational concept advanced here is to offer a way to offset Iran's development of an A2/AD battle network. It is neither a comprehensive campaign plan for a war, nor does it imply that the United States seeks a conflict with Iran. As was the case with *AirSea Battle,* the enabling concept proposed in this report is focused primarily on the operational level of war. Thus it is not a "war-winning" strategy in itself.

A coherent enabling operational concept must do the following:

STRATEGIC LEVEL. First and foremost, an enabling concept must support the broader U.S. strategy for the Persian Gulf. Although a detailed discussion of strategy is beyond the scope of this report, enduring U.S. strategic objectives will likely

[16] For the purpose of this assessment, an enabling operational concept consists of integrated, overlapping lines of operation designed to maintain the U.S. military's freedom of action in a Persian Gulf A2/AD environment.

include maintaining regional stability; assuring regional partners; protecting sea lines of communication; deterring aggression by regional actors; and countering terrorism and WMD proliferation emanating from this region.[17] In the event of actual conflict, components of a warfighting strategy could be derived from these broader goals, such as ensuring the free flow of maritime traffic through the Gulf; deterring Iran from using nuclear weapons; defending U.S. and partner forces and supporting infrastructure against attacks; denying Iran access to materials needed to sustain its military effort; and, potentially, conducting unconventional warfare to set the conditions for a change in Iran's ruling regime from within.

OPERATIONAL LEVEL. To preserve a stable, favorable military balance in the Persian Gulf, an enabling operational concept must address the most critical challenges that Iran's emerging A2/AD strategy would present a future U.S. crisis response force. Specifically, it must address how the United States can reduce the growing vulnerability of its forward bases and forces locations from Iran's A2/AD threats. The concept must also address how, should deterrence fail, the U.S. military could exploit Iran's weaknesses and offset its strengths to regain the freedom of action needed to enable a comprehensive theater campaign plan.

ROADMAP

This report uses the following approach in developing a candidate operational concept for enabling effective U.S. forward-presence and crisis response operations in the Persian Gulf in response to ongoing Iranian efforts to shift the regional military balance dramatically in its favor.

Chapter One, "From Rapid Deployment to Permanent Presence," explains the origins of the U.S. military's current posture in the Persian Gulf, and how the framework of assumptions developed and used by DoD over the past thirty years has influenced its operational concepts and capabilities for projecting power to the region.

Chapter Two, "Anti-Access/Area-Denial with Persian Characteristics," summarizes Iran's military capabilities, and in particular describes how it is developing an A2/AD strategy with unique national characteristics rather than directly emulating China's military investments and posture. The chapter then describes how Iran could use these capabilities in a campaign designed to attack U.S. forces already in the region, deny access to forward basing to follow-on U.S. air and ground

[17] *National Security Strategy*, pp. 24–27; and *Quadrennial Defense Review Report* (Washington, DC: Office of the Secretary of Defense, February 2010), pp. 61, 67, accessible online at http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf.

forces, close off maritime access to the Persian Gulf via the Strait of Hormuz, and in so doing buy time to achieve its strategic objectives in the region.[18]

Chapter Three, "Elements of an Outside-In Enabling Operational Concept," proposes a new framework of assumptions to inform the development of operational concepts for future U.S. military operations in the Persian Gulf. The elements of a candidate enabling concept are then described. For the purposes of this report, an "outside-in" enabling operational concept exploits America's ability to fight from staging locations that are beyond the reach of Iran's offensive capabilities to counter its emerging A2/AD complex, and preserve U.S. and partner interests in the Persian Gulf.

Chapter Four, "Initiatives to Support an Enabling Operational Concept" concludes the assessment by identifying key capabilities and theater-basing initiatives needed to support an enabling operational concept.

[18] This illustrative vignette is used to illustrate challenges to potential U.S. power-projection operations in the Persian Gulf region. Obviously the Department of Defense should test an enabling operational concept against a range of plausible scenarios and contingencies.

CHAPTER 1 > **FROM RAPID DEPLOYMENT TO PERMANENT PRESENCE**

> Today's contingency force is not well-suited to many of the problems it is likely to face.
>
> — From a 1979 DoD study on potential Persian Gulf contingency operations[19]

Before addressing the challenges that should shape a new enabling concept for projecting military power into the Persian Gulf region, it is important to understand the key assumptions that underlie DoD's current framework for conducting conventional operations in the region.

This chapter begins by assessing the origins of the U.S. military's posture in the Persian Gulf. It reviews the framework for non-nuclear contingency operations developed by DoD planners in the aftermath of the Vietnam conflict, which was premised on the assumption that U.S. forces would be able to deploy rapidly and operate with near impunity from bases in close proximity to a regional aggressor. This assumption drove the development of operational concepts and a forward basing posture that deterred aggression by the Soviet Union during the Cold War and proved successful in two conflicts with Saddam Hussein's Iraq. DoD's current Persian Gulf posture and investments in capabilities that are best suited for permissive environments indicate that this framework, despite its Cold War heritage, remains the foundation for potential U.S. power-projection operations in the region. Succeeding chapters will address emerging military challenges that threaten the stability of the Persian Gulf, and propose a new framework of assumptions that could underpin an enabling concept for operating in an environment that will be increasingly non-permissive in nature.

---

[19] See a declassified DoD report by Dr. Paul Wolfowitz, "Capabilities for Limited Contingencies in the Persian Gulf," Office of the Assistant Secretary of Defense for Programs, Analysis, and Evaluation, Department of Defense, June 15, 1979, p. 2.

BREAKING WITH THE PAST

In the decade immediately following the Vietnam conflict, there was a growing awareness that DoD had to shift the primary focus of its conventional warfare planning and investments from "the requirement for fighting a war centered in Europe" toward preparing for a wider range of contingencies in other theaters, including the Persian Gulf.[20] A series of crises in Southwest Asia—the 1973 Arab oil embargo, the 1978 Iranian Revolution, the Soviet Union's 1979 invasion of Afghanistan, and the 1980 outbreak of conflict between Iran and Iraq—served to heighten the United States' awareness of the region's growing instability and the threat it posed to the global economy. In June 1979, DoD completed an internal assessment of the U.S. military's ability to deter and respond to crises in the Persian Gulf.[21] This assessment and other contemporary analyses sponsored by the Office of the Secretary of Defense and the Joint Staff helped establish a strategic rationale for improving DoD's preparedness to project military power rapidly into Southwest Asia.[22]

Unsurprisingly, recommendations from these assessments reveal that DoD's perspective on the nature of potential contingencies in the Persian Gulf was influenced primarily by America's Cold War strategic priorities, i.e., protecting and restoring the flow of oil in the event of a Soviet military incursion into the region, minimizing Soviet influence over oil-producing states, and preventing regional conflicts from escalating to superpower confrontations between the United States and the Soviet Union. Although other priorities included influencing Arab states to adopt favorable policies toward the West and preventing radical regional powers from coercing or overthrowing more moderate governments, countering

---

[20] Fred Charles Ikle, "The Reagan Defense Program: A Focus on the Strategic Imperatives," *Strategic Review*, Spring 1982, p. 15, accessible online at http://csis.org/images/stories/ikle/025.StrategicReview1982.pdf. Ikle was the Undersecretary of Defense for Policy during both Reagan administrations.

[21] See Wolfowitz, "Capabilities for Limited Contingencies in the Persian Gulf." This document, declassified on April 23, 2003, summarizes results of an internal DoD analysis completed in 1979 on capabilities and posture initiatives needed to support potential contingency operations in the Persian Gulf. These contingency operations include a Soviet invasion of Iran; "lesser contingencies" such as a conflict between Iraq and Iran, and attacks against Persian Gulf oil infrastructure and lines of communication.

[22] Dr. Paul K. Davis, the RAND Corporation's Strategic Assessment Center Director, observed in 1982 that DoD's progress since the summer of 1979 toward improving preparedness for Persian Gulf contingencies was due to a "correlation of forces" which included "a background of staff studies in DoD developed after years of neglecting contingency capabilities." Combined, these studies "were the origin of most of the RDF-related program initiatives in late 1979 and 1980." See Paul K. Davis, "Observations on the Rapid Deployment Joint Task Force: Origins, Direction, and Mission," RAND, June 1982 pp. iii, 14, accessible online at http://www.rand.org/pubs/papers/P6751.html. Dr. Davis was a major contributor to the 1979 Persian Gulf analysis led by Dr. Paul Wolfowitz (see footnote 17).

a Soviet invasion of Iran was envisaged as the most stressing scenario that might require a large-scale U.S. military response.[23]

As a first step toward creating a new framework for dealing with crises in the Persian Gulf-Arabian Peninsula region, DoD's assessments strongly recommended abandoning a key assumption that underpinned what was then known as a "one-and-one-half conventional wars" strategy. Since 1969, DoD had deemed it would be adequately prepared for non-nuclear contingency operations if it had the ability to simultaneously support a major war with the Warsaw Pact in Europe and a second minor contingency—or "half war"—in another region.[24] As Secretary of Defense Brown reported to Congress in 1980, this strategy assumed that the United States would depend "primarily on our allies to man the forward defense lines in peacetime" to sustain a credible deterrent posture and, should deterrence fail, create time needed to deploy a decisive military force to a theater of operations.[25] In light of the loss of Iran as a U.S. security partner in 1979, this was deemed an unreasonable assumption for expeditionary forces preparing to counter a Soviet invasion in the Persian Gulf:

> When this study was first planned, several assumptions were made about Iran: it would continue to be an ally of the United States; it would participate in joint defense planning with the United States; it would provide effective host-nation logistic support; and its armed forces would participate effectively if an invasion should occur. The Iranian revolution has drastically altered conditions, and none of these assumptions now appears reasonable.[26]

Based on their assessments of the emerging threat environment, defense planners recommended creating a more visible and permanent U.S. military presence in Southwest Asia. Major options for this new posture included military equipment and consumables prepositioned to support the rapid deployment of expeditionary forces and a "year-round presence of a carrier task group and/or an amphibious readiness group" in the region.[27] Over the next decade, these recommendations became reality.

---

[23] Wolfowitz, pp. 6–10, 14–15.

[24] "Ever since 1969, the United States has defined non-nuclear adequacy as the capability to deal simultaneously with one major and one minor contingency in conjunction with our allies." See *Department of Defense Annual Report Fiscal Year 1981* (Washington DC: US Government Printing Office, January 29, 1980), p. 7.

[25] "In order to achieve the necessary capability, we have depended primarily on our allies to man the forward defense lines in peacetime." Secretary of Defense Harold Brown, *Department of Defense Annual Report Fiscal Year 1981* (Washington DC: US Government Printing Office, January 29, 1980), p. 7.

[26] Wolfowitz, p. IV–1.

[27] Ibid., p. 10.

AMERICA'S EVOLVING PERSIAN GULF POSTURE

Although the Carter administration acknowledged the need to upgrade the U.S. military's preparedness to respond to crises in Southwest Asia, it did not significantly alter the balance of forces in the region. Of the 2,802 DoD employees deployed to the Persian Gulf and surrounding states in 1975, approximately 63 percent were stationed in Saudi Arabia and Iran to support a "twin pillars" strategy that relied on local military forces to maintain regional stability.[28] In 1977, President Carter announced his intent to implement a "rapid deployment force" (RDF) concept to enhance DoD's preparedness to fight a major war in Europe and simultaneously conduct conventional military operations in the Middle East or Korea.[29] Despite DoD's subsequent creation of a Rapid Deployment Joint Task Force Headquarters, prior to the start of the Iran-Iraq War, actions to implement the RDF concept did not include significant changes to U.S. forces permanently or rotationally postured in the Middle East. Between 1975 and 1979, America's presence in the region increased by well less than 1,000 personnel (see Figure 2).[30]

The United States began to expand its permanent military presence significantly in Southwest Asia following the outbreak of war between Iran and Iraq in September 1980. By 1989, DoD had nearly tripled its footprint in the region, with fighter and Airborne Warning and Control Systems (AWACs) aircraft stationed in Saudi Arabia to support air defense missions, and major naval units, including an aircraft carrier, postured to ensure freedom of navigation through the Persian Gulf and Strait of Hormuz.[31]

The First Gulf War in 1991 and subsequent military operations led to another dramatic increase in DoD personnel continuously deployed to Southwest Asia. Following the success of Operation Desert Storm, U.S. land-based and carrier-based air forces continued to operate in the Persian Gulf to enforce no-fly zones north of the 36th parallel and south of the 32nd parallel in Iraq and conduct maritime interdiction operations (MIO) embargoing selective Iraqi imports.[32] In 1998,

---

[28] See Defense Manpower Data Center, "Deployment of Military Personnel by Country," September 30, 1975, http://siadapp.dmdc.osd.mil/personnel/MILITARY/history/309hist.htm, and Stephan Andrew Kelley, *Better Lucky Than Good: Operation Earnest Will as Gunboat Diplomacy* (Monterey, CA: Naval Post Graduate School, June 2007), p. 13.

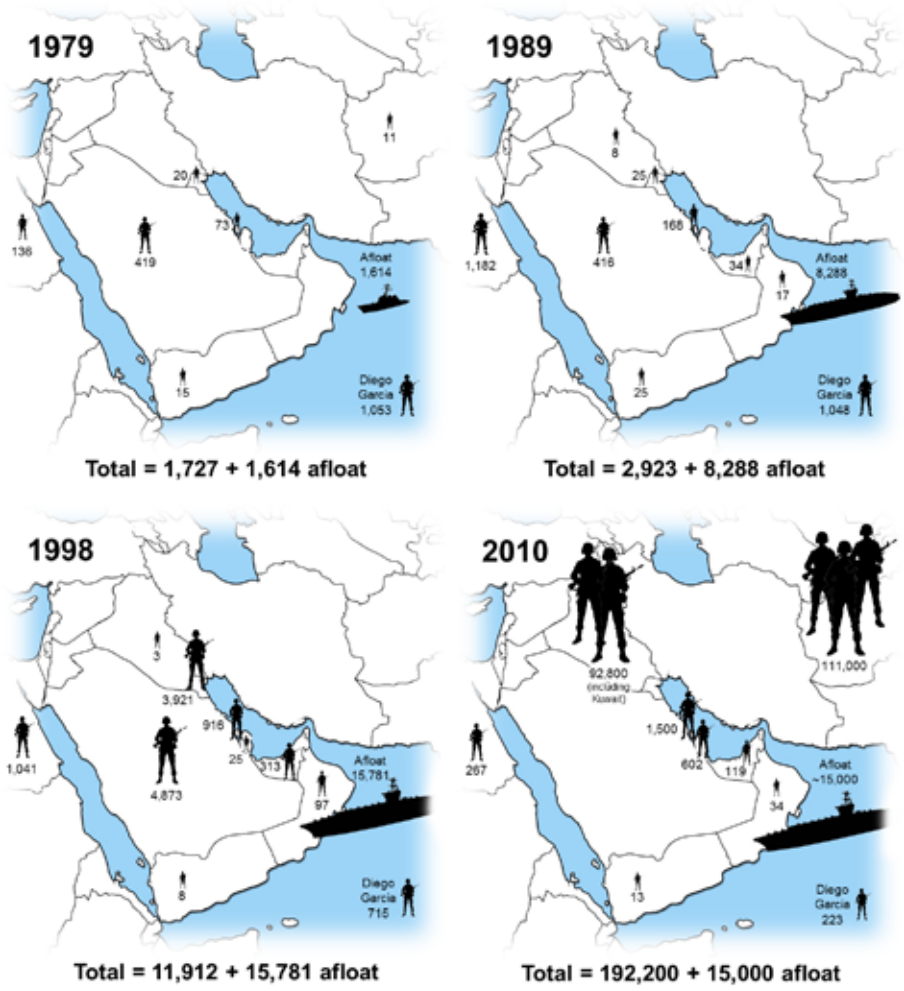
[29] Sami Hajjar, *US Military Presence in the Gulf: Challenges and Prospects* (Carlisle, PA: Strategic Studies Institute, U.S. Army War College), p. 17, accessible online at http://www.strategicstudiesinstitute.army.mil/pdffiles/pub185.pdf.

[30] Including personnel afloat, the Navy provided 79 percent of all U.S. military personnel deployed to the Persian Gulf region in 1979. An additional 1,053 Navy personnel were stationed at the Naval Support Facility in Diego Garcia. See Defense Manpower Data Center, accessible online at http://siadapp.dmdc.osd.mil/personnel/ MILITARY/history/Hst0979.pdf.

[31] The AWACs were jointly operated by the U.S. Air Force and Royal Saudi Air Force.

[32] For more on the Navy's presence in the Persian Gulf region, see Peter M. Swartz, *Sea Changes: Transforming US Navy Deployment Strategy, 1775–2002* (Alexandria, VA: Center for Naval Analysis, July 31, 2002), p. 54.

FIGURE 2. EVOLUTION OF THE U.S. MILITARY'S POSTURE



over 27,000 U.S. service personnel remained afloat in the Persian Gulf and ashore at bases in Kuwait, Saudi Arabia, and the United Arab Emirates.[33]

By the end of 2010, more than 2,900 U.S. military personnel were supporting missions in the Persian Gulf region, with another 189,000 service members serving in Iraq and Afghanistan.[34] In 2003, the majority of U.S. military personnel

---

[33] Defense Manpower Data Center, accessible online at http://siadapp.dmdc.osd.mil/personnel/MILITARY/history/hst0998.pdf.

[34] Defense Manpower Data Center, http://siadapp.dmdc.osd.mil/personnel/MILITARY/history/hst1012.pdf. This does not include 15,000 personnel afloat.

stationed in Saudi Arabia moved to bases in Qatar and other regional facilities. Today, the Air Force maintains a CAOC at al Udeid Air Base in Qatar and operates cargo and intelligence, surveillance, and reconnaissance (ISR) aircraft from the base's runway, which at 12,303 feet in length is one of the longest runways in the Persian Gulf. The U.S. Navy has co-located the headquarters for its 5th Fleet with U.S. Naval Forces Central Command in Manama, Bahrain's capital city. On average, the Commander for USNAVCENT/FIFTHFLT commands approximately 15,000 people afloat, 1,500 personnel ashore and up to forty naval vessels configured in Carrier Strike Groups (CSG), Amphibious Ready Groups (ARG), and/or Expeditionary Strike Groups (ESG).[35] DoD has announced a plan to invest $580 million to nearly double the size of this facility by 2015.[36] Other U.S. military personnel and aircraft are located at al Dhafra Air Base in the United Arab Emirates and at facilities in Qatar, Bahrain, and the United Arab Emirates.[37]

A FRAMEWORK FOR PROJECTING POWER

Despite the increased focus on Persian Gulf contingencies that began during the Carter administration, it is interesting to note that the basic framework for projecting military power outlined by DoD's 1979 "Capabilities for Limited Contingencies in the Persian Gulf" study in many ways resembled contemporary doctrine for countering a Soviet invasion of Western Europe. In the first phase of such a conflict, this framework envisaged using forward "presence" units as an initial fighting force to slow invading enemy forces and create time for U.S. reinforcements to arrive in theater. These in-place units would be augmented by a large contingent of American tactical fighters and bombers that would rapidly deploy to theater bases during the early days of a conflict. As U.S. heavy ground reinforcements arrived in theater by sea and by air, they would close on prepositioned equipment and prepare for offensive operations. Finally, with a "decisive force" in place, the United States and its partners would initiate a counteroffensive at a time and place of their choosing.

This conventional warfare framework, adopted for contingency operations in the Persian Gulf, was underpinned by a number of key assumptions. To protect sea

---

[35] For more information on current U.S. active duty military personnel deployed to the Persian Gulf, see "Active Duty Military Personnel Strengths By Regional Area And By Country," Department of Defense, March 31, 2011, accessible online at http://siadapp.dmdc.osd.mil/personnel/MILITARY/history/hst1103.pdf. For additional information on 5th Fleet organization and forces, see http://www.cusnc.navy.mil/command/command.html and http://www.ctf74.navy.mil/engagements/5thfleetregion.htm#Fleet Organization.

[36] Andrew Tilghman, "5-year NSA Bahrain expansion project begins," *Navy Times*, June 1, 2010, accessible online at http://www.navytimes.com/news/2010/06/navy_bahrain_060110w/.

[37] See Defense Manpower Data Center, accessible online at http://siadapp.dmdc.osd.mil/personnel/MILITARY/history/hst0998.pdf.

lines of communication (SLOCs) through the Persian Gulf and Strait of Hormuz, for example, it was assumed that sufficient close-in forward basing would be available to support air, naval, and logistics operations. It was also believed that aircraft carriers "would be able to defend themselves" and could conduct effective close-in strike operations in the Persian Gulf, although they would be at some risk due to potential threats from enemy aircraft.[38] In the event of a Soviet invasion of a Persian Gulf state, DoD planners determined that the United States would have to rely on its overall advantage in tactical fighters to "compensate for early asymmetries in ground forces."[39] While not explicitly addressed in Wolfowitz's 1979 assessment, it is also clear that it was assumed that U.S. fighters, operating from Persian Gulf bases, would be capable of quickly achieving the air superiority needed to enable effective joint air, maritime, and ground operations, and would have sufficient range—augmented by aerial refueling support—to reach their target areas. The assumption that U.S. close-in bases would enjoy near-sanctuary status from attack evidently extended to U.S. command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) and logistics networks needed to sustain high-tempo combat operations.

BACK TO THE FUTURE?

> Our analysis showed that we can maintain a capability to fight and win two major regional conflicts and still make prudent reductions in our overall force structure—so long as we implement a series of critical force enhancements to improve our strategic mobility and strengthen our early-arriving anti-armor capability, and take other steps to ensure our ability to halt regional aggression quickly.
>
> — *Department of Defense Report on the Bottom-Up Review*, 1993[40]

The 1993 Bottom-Up Review (BUR), DoD's first major post-Cold War strategic review, created a framework for conventional operations that basically repeated concepts outlined by the 1979 Wolfowitz study. In essence, the BUR established priorities to guide DoD's preparation to fight two "major regional conflicts" (MRCs) in separate theaters nearly simultaneously.[41] The *Report on the Bottom-Up Review* explained that operations envisioned for MRC scenarios might unfold in four phases. In Phase 1: "halt the invasion," U.S. land-based fighters,

---

38 Wolfowitz, p. 9

39 Ibid., p. 9.

40 See *Report on the Bottom-Up Review* (Washington, DC: Office of the Secretary of Defense, October 1993), p. iii. The entire report, which will be referred to hereafter as the 1993 Bottom-Up Review Report, is accessible online at http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA359953&Location=U2&doc=GetTRDoc.pdf.

41 Ibid., p. 14. The BUR focused primarily on two illustrative MRC scenarios: "aggression by a remilitarized Iraq against Kuwait and Saudi Arabia, and by North Korea against the Republic of Korea."

long-range bombers and carrier strike assets combined with anti-armor ground forces would rapidly deploy to augment forward presence units and help achieve a "rapid halt" of an invading enemy force. Phase 2: "build U.S. combat power in the theater while reducing the enemy's," would find the United States employing many of the capabilities from Phase 1 to grind down the enemy while continuing to deploy forces to the area of operations. Once the buildup was completed, Phase 3: "decisively defeat the enemy" counteroffensive operations would commence. The successful conclusion of Phase 3 would be followed by Phase 4 "provide for post-war stability" operations to prevent follow-on crises and enforce war termination agreements.[42]

With variations, this model described U.S. operations during the First Gulf War against Iraq in 1991 and predicted the basic framework for operations in the Second Gulf War a dozen years later. Both conflicts featured phased operations that deployed major combat units to bases located on the periphery of an enemy state; used land-based and sea-based precision strike to reduce enemy threats before the onset of close-in ground combat; and launched large-scale, combined-arms offensives that prevailed against a technically inferior conventional force. Of course, the two Gulf War campaigns differed in a number of ways—the first evicted Iraqi forces from Kuwait while the second effected a regime change and led to a long-duration stability operation.[43] Despite their differences, the basic elements of both campaigns were nicely captured in a 1996 observation made by General "Chuck" Horner, commander of Coalition air forces during the First Gulf War, that "U.S. warfighting strategy hinges on the deployment of short-range fighters and ground forces to foreign bases in the theater of conflict" that are located—figuratively—in the backyard of an opponent.[44]

Arguably, this template continues to characterize DoD's operational concepts for countering acts of aggression and coercion in the Persian Gulf region. For example, a *Strategic Environment Assessment* released by the Air Force in March 2011 reported that:

> Today's U.S. air operations usually expect: (1) secure permanent or deployed bases in or close to theater, in order to generate sufficient sorties; (2) effective low-observable (or "stealthy") capabilities to penetrate air-defense systems; (3) long force buildups in theater to support maximum sustained operations; (4) secure

[42] Ibid., pp. 15–17.

[43] Both contingencies shared another significant characteristic: in neither case did Iraq mount a serious effort to prevent the United States from deploying its forces into the theater.

[44] General Charles A. Horner, USAF (Ret.), "What We Should Have Learned in Desert Storm, But Didn't," *Air Force Magazine*, Vol. 79, No. 12, December 1996, accessible online at http://www.airforce-magazine.com/MagazineArchive/Pages/1996/December%201996/1296horner.aspx.

lines of communication for fuel and other logistics; (5) effective beyond visual range air-to-air missiles; and (6) adequate tanker support.[45]

Appropriately, the Air Force's assessment questions "whether the USAF can depend on any of these key enablers of air power in the future primarily due to growing challenges associated with anti-access and area-denial (A2/AD) strategies and enabling capabilities." While this is a very relevant question, DoD's future capability priorities indicate that there has been little real movement away from its legacy planning assumptions. For example, of the 95 major acquisition programs included in DoD's most recent Selected Acquisition Reports (SARs), which total $1.8 trillion in planned investments, 27 percent of future funding is dedicated to the F/A-18, F-22, and F-35. The F-35 alone accounts for 19 percent of total costs reported in the SARs. Drilling a bit deeper, more than 70 percent of the Air Force's budget for new aircraft over the next decade—including a new bomber—will go toward just two programs, the F-35A and a replacement aerial refueling tanker.[46] Unquestionably, these investments will lead to a fighter force that, *when airborne*, is more survivable in non-permissive areas.[47] Yet this fighter force will still be highly dependent on close-in bases or aircraft carriers, as well as aerial refueling. Without such base support or the ability to operate carriers in hazardous waters close to Iran, U.S. fighters may be unable to cover large portions of the battlespace in the Persian Gulf (see Figure 3).[48]

A Persian Gulf warfighting environment that is increasingly non-permissive will impose similar operational constraints on other capabilities that DoD intends to procure. Over the last decade, the Defense Department has rapidly expanded its fleet of unmanned aircraft systems (UAS) for a range of surveillance and light strike missions. The Air Force alone is fielding sufficient MQ-1 Predator and MQ-9 Reaper remotely piloted aircraft (RPAs) to sustain 65 continuous "combat air patrols" (CAPS) to provide full-motion video and a light strike capability in

---

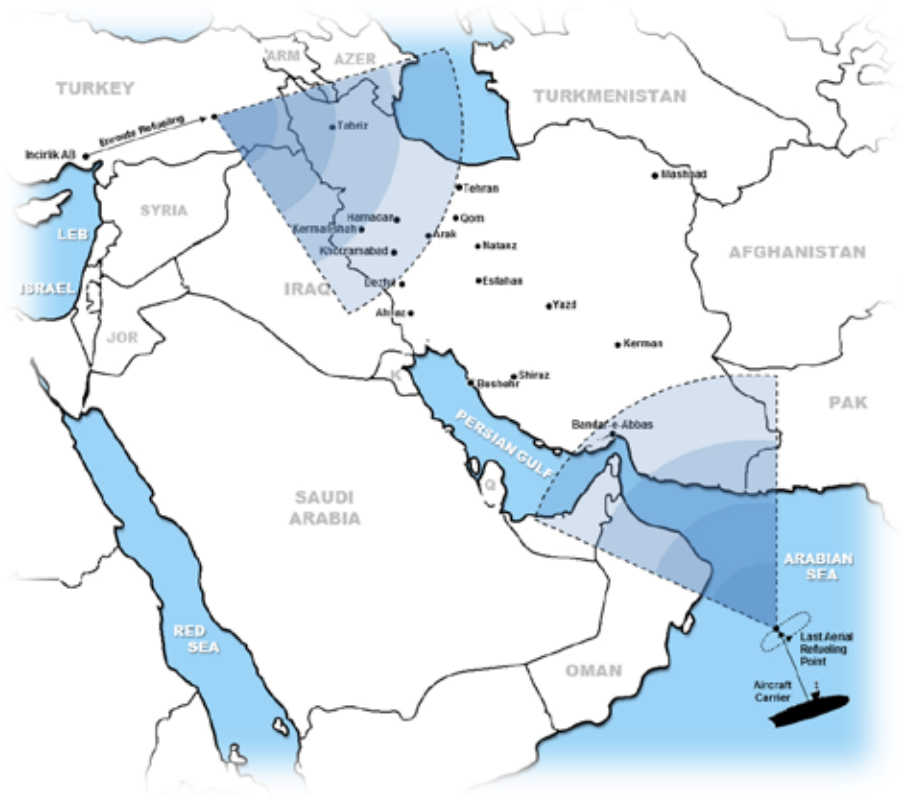
45 See *United States Air Force Strategic Environmental Assessment* (Washington, DC: Directorate of Strategic Planning, Headquarters United States Air Force, March 11, 2011), p. 14.

46 Including all Air Force procurement programs reported in DoD's "Aircraft Procurement Plan for Fiscal Years (FY) 2012–2041," Department of Defense, March 2011, pp. 15, 17, 21.

47 Today, about 7 percent of America's fighter force consists of stealthy "5th generation" platforms such as the F-22 and F-35. Current plans call for this share to increase to 33 percent by FY2021 and will reach nearly 100 percent by 2041 as the Military Services retire the last of their legacy fighters. Ibid., pp. 12–13.

48 Figure 3 assumes Air Force F-35A Conventional Takeoff and Landing (CTOL) fighters with a combat radius of 584 nautical miles (nm) are permitted to stage combat operations from Incirlik Air Base in Turkey. The F-35As are accompanied by co-located refueling tankers to a point approximately 150 nm from the border of Iran. Figure 3 also assumes the Navy's F-35C Aircraft Carrier Variant (CV) with an estimated combat radius of 615 nm complete refueling approximately 300 nm from Iran's coastline. Note: the Marine Corps F-35B Short Takeoff and Vertical Landing (STOVL) fighter may have a combat radius of only 469 nm. Combat radius estimates are from DoD's "2010 Selected Acquisition Report for the Joint Strike Fighter," December 31, 2010, p. 10, accessible online at http://www.fas.org/man/eprint/F-35-SAR.pdf.

FIGURE 3. NOTIONAL FIGHTER COVERAGE WITHOUT PERSIAN GULF ACCESS



support of operations that are primarily in Central Command's area of responsibility.[49] The Army is procuring the Predator-based MQ-1C "Grey Eagle" UAS over the next five years for an estimated $4 billion.[50] While the Services' shift toward unmanned capabilities was needed to support today's operations, all three unmanned systems are limited to operating in relatively permissive areas. In fact, of the $36.9 billion that the Congressional Budget Office estimates DoD will spend on unmanned aircraft through 2020, the vast majority of funding will be dedicated to procuring systems that require relatively benign threat environments.[51]

---

[49] Typically, four MQ-1s or MQ-9s are needed to sustain one continuous orbit.

[50] See "Policy Options for Unmanned Aircraft Systems," Congressional Budget Office, June 2011, p. x., accessible online at http://www.cbo.gov/ftpdocs/121xx/doc12163/06-08-UAS.pdf.

[51] Ibid., p. vii. There are exceptions. While details for the RQ-170 "Sentinel" program are classified, the Air Force has acknowledged that the aircraft has low observable characteristics. The Navy is pursuing a new Unmanned Carrier-Launched Airborne Surveillance and Strike aircraft that may have survivability characteristics suitable for operating in contested airspace.

LOOKING AHEAD

In summary, the "conventional wisdom" of the past may not provide the best template for future military operations against enemies who do not resemble those the United States has encountered in recent decades. Assumptions and operational concepts for conventional contingencies developed during an era when cross-border ground invasions by heavy armor units represented the greatest threat to peace and stability in the Persian Gulf may not be the best fit for an emerging threat environment replete with guided ballistic and cruise missiles, maritime swarming tactics, proxy forces equipped with G-RAMM, and the threat of chemical, biological, radiological or nuclear (CBRN) attacks.

Potential adversaries have observed the success of America's way of war over the last two decades and are developing capabilities to offset the U.S. military's strategic and operational advantages. The proliferation of A2/AD weapon systems and other asymmetric capabilities intended to challenge the U.S. military's freedom of action across all warfighting domains strongly suggests that the U.S. military needs to pace the competition by developing innovative concepts to address new Persian Gulf contingencies. In particular, it should assume that a future aggressor is unlikely to make the same mistake that Saddam Hussein made—twice—when he allowed a U.S.-led coalition to mass a large, decisive military force on Iraq's borders. In light of these factors, it is clearly time for DoD to reassess the validity of its legacy planning assumptions, operational concepts, and forward military posture for the Persian Gulf.

A future aggressor is unlikely to make the same mistake that Saddam Hussein made when he allowed a U.S.-led coalition to mass a large, decisive military force on Iraq's borders.

CHAPTER 2 > **ANTI-ACCESS/AREA-DENIAL WITH PERSIAN CHARACTERISTICS**

> From Desert Storm to the present, the U.S. and its allies have had relatively exclusive access to sophisticated precision-strike technologies. Over the next decade or two, that technology will be increasingly possessed by other nations. The diffusion of precision-strike technology will have a cumulative effect. It will enable anti-access and area denial strategies, thereby creating challenges for our ability to project power to distant parts of the globe.
>
> — Deputy Secretary of Defense William J. Lynn, III[52]

Chapter 1 outlined the recent history of the U.S. military's posture in the Persian Gulf and how it was shaped by conventional threats from the Soviet Union and Iraq. Today, traditional operational concepts and planning assumptions no longer seem particularly relevant. America's potential enemies have observed the success of its power-projection operations over the last two decades and have learned that attempting to counter the U.S. military symmetrically, or "head-on," is a recipe for defeat, particularly if the United States is permitted to deploy overwhelming combat power to a theater of operations.

America's potential enemies have observed the success of its power-projection operations over the last two decades and have learned that attempting to counter the U.S. military symmetrically, or "head-on," is a recipe for defeat.

Iran, in particular, is developing an asymmetric strategy to counter U.S. operations in the Persian Gulf. This strategy may blend irregular tactics and improvised weapons with technologically advanced capabilities to deny or limit the U.S. military's access to close-in bases and restrict its freedom of maneuver through the Strait of Hormuz. Iran's "hybrid" A2/AD strategy could exploit the geographic and political features of the Persian Gulf region to reduce the effectiveness of U.S. military operations. Such an approach may not, in itself, be a war-winning

---

[52] Deputy Secretary of Defense William J. Lynn, III, "The Future of War: Keynote Address at the CSIS Global Security Forum 2011," June 08, 2011, accessible online at http://www.defense.gov/speeches/speech.aspx?speechid=1580.

strategy for Iran. Significantly raising the costs or extending the timelines of a U.S. military intervention may, however, create a window of opportunity for Iran to conduct acts of aggression or coercion.

This chapter assesses Iran's emerging military complex as a "pacing threat" for the Persian Gulf region and how its development of a hybrid A2/AD strategy may invalidate many of DoD's contingency planning assumptions. It begins by briefly highlighting how Iran's development of A2/AD capabilities could differ from China's. It continues by illustrating key characteristics of the Persian Gulf region that could influence the operations of Iran and the United States in a conflict. Next, it describes Iran's current military capabilities as well as plausible systems that it may acquire. Based on these assessments, the chapter then posits how Iran might use a future A2/AD battle network to prevent the United States from effectively intervening in the Persian Gulf.

A2/AD WITH PERSIAN CHARACTERISTICS

Iran's version of an A2/AD weapons complex is perhaps best illustrated by comparing it with the A2/AD strategy being implemented by the PRC. China is developing sophisticated A2/AD capabilities comprising long-range precision-guided munitions (PGMs) and the battle networks to support them for the purpose of preventing the United States from conducting effective power-projection operations in the Western Pacific.[53] The PRC is investing heavily in ballistic missiles, land-attack cruise missiles, and strike aircraft for the purpose of holding U.S. forward bases in the region at risk. The PRC is also creating a dense, layered, maritime reconnaissance-strike network comprising over-the-horizon sensors, strike aircraft armed with anti-ship cruise missiles (ASCMs), submarines armed with ASCMs and advanced torpedoes, and anti-ship ballistic missiles (ASBMs) capable of hitting moving naval targets at ranges in excess of 1,000 nautical miles. The PRC has blanketed its eastern borders and littorals with a dense integrated air defense system (IADS) comprising advanced surface-to-air missile systems, fourth- and potentially fifth-generation fighter aircraft, and sophisticated, hardened, and dedicated command and control networks that are designed to resist efforts at penetration, interruption, and exploitation. The PRC is also developing anti-satellite weapons and computer network attack capabilities to degrade the United States' ability to sense and communicate over long distances—an essential element of the U.S. military's battle network.

---

[53] See Andrew Krepinevich, *Why Airsea Battle?*; Jan van Tol, et.al., *AirSea Battle: A Point-of-Departure Operational Concept*; and Roger Cliff, Mark Burles, Michael S. Chase, Derek Eaton and Kevin L. Pollpeter, *Entering the Dragon's Lair: Chinese Antiaccess Strategies and their Implications for the United States* (Santa Monica, CA: RAND, 2007), accessible online at http://www.rand.org/pubs/monographs/2007/RAND_MG524.pdf.

The PRC's long-range A2/AD complex requires significant technical expertise and resources to develop, operate, and maintain. As Barry Watts and Robert Work have noted, advanced PGMs can achieve accuracy independent of range, but range is still heavily dependent on cost.[54]

Although Iran lacks the means to deploy A2/AD capabilities identical to the PRC's, it might pursue an A2/AD strategy suited to its relatively modest resources and the geographic and geostrategic attributes of the Persian Gulf region. For example, unlike the PRC's long-range maritime reconnaissance and strike complex which must cover huge swaths of the Pacific Ocean, Iran can focus its maritime exclusion capabilities on the far smaller Persian Gulf and the vital chokepoint at the Strait of Hormuz. Moreover, in the event of a conflict with the United States, Iran will likely seek to coerce its neighbors to deny the U.S. military access to close-in operating locations as opposed to relying solely on the effectiveness of direct military attacks against U.S. regional bases. There is, however, one very significant similarity between the A2/AD strategies of China and Iran: both seek to impose costs on a U.S. force by using a layered approach that begins with offensive strikes over long ranges and culminates with defenses that increase in intensity as U.S. forces approach the homeland. In the case of Iran, this strategy accords with Iran's concept of a "mosaic defense":

> In defending the homeland in depth and pursuing popular resistance against occupation, Iran would seek to impose a high cost upon an invader (namely, the United States)... Iran envisions a 'mosaic defense' and partisan warfare that presents the invader with multiple threats each step of the way to Tehran.[55]

IRAN'S A2/AD OBJECTIVES

Tehran has repeatedly proclaimed that a U.S. military presence in the Persian Gulf threatens the natural order of the region.[56] Such statements reflect Iran's long-term effort to expand its influence in the Middle East by presenting itself

---

[54] See Barry Watts, *Six Decades of Guided Munitions and Battle Networks: Progress and Prospects* (Washington, DC: CSBA, March 2007), pp. xiv, 14, 15, accessible online at http://www.csbaonline.org/wp-content/uploads/2011/06/2007.03.01-Six-Decades-Of-Guided-Weapons.pdf.

[55] Frederic Wehrey, et al., *Dangerous but not Omnipotent* (Santa Monica, CA: RAND, 2009), p. 53.

[56] For example, in 1997 Major General Mohsen Rezai, Commander of the Iranian Revolutionary Guard Corps, stated, "let me send a clear message to the Americans: the Persian Gulf is our region; they have to leave our region." See Sam Peterson, "Iran War Games Begin with New Ultra-Fast Speed Boats," *Christian Science Monitor*, April 22, 2010, accessible online at http://www.csmonitor.com/World/Middle-East/2010/0422/Iran-war-games-begin-with-new-ultra-fast-speedboats. In 2011, General Hassan Firouzabadi, Chief of Staff of Iran's Armed Forces, essentially repeated this sentiment, "The Persian Gulf has always, and shall always belong to Iran." See Iranian General Denounces Rival Gulf States, *Agence France-Presse*, April 30, 2011, accessible online at http://www.defensenews.com/story.php?i=6378172.

as the Shiite antipode to Sunni regimes backed by the United States.[57] Thus, the likely goal of Iran's A2/AD strategy is to overturn the present political order of the Persian Gulf region, and perhaps the broader Middle East, and establish itself as a regional hegemon. Iran would hope to achieve this by deterring or preventing the United States from intervening effectively in a Persian Gulf crisis, thereby increasing Tehran's ability to coerce other regional states to align with Iran once they perceive that security guarantees from the United States are no longer credible.

Should the United States choose to intervene in spite of Iran's A2/AD capabilities, Iran would likely hope to inflict significant losses on U.S. forward-deployed forces at the outset of a conflict while preventing the U.S. military from reinforcing those forces by sea and air. This may help create the time and space needed for Iran to consolidate its gains and force the United States to choose between fighting its way into the Persian Gulf at great cost and with little or no support from regional states, or accepting a new regional balance of power that favors Iran. Tehran may hope that the United States, faced with the prospect of a long and costly campaign to reopen the Gulf, may ultimately balk at defending autocratic Gulf regimes that have never been particularly popular with the American public.

The next two sections summarize the attributes of the Persian Gulf region and how Iran could exploit them as part of a cost-imposing, coercive A2/AD strategy.

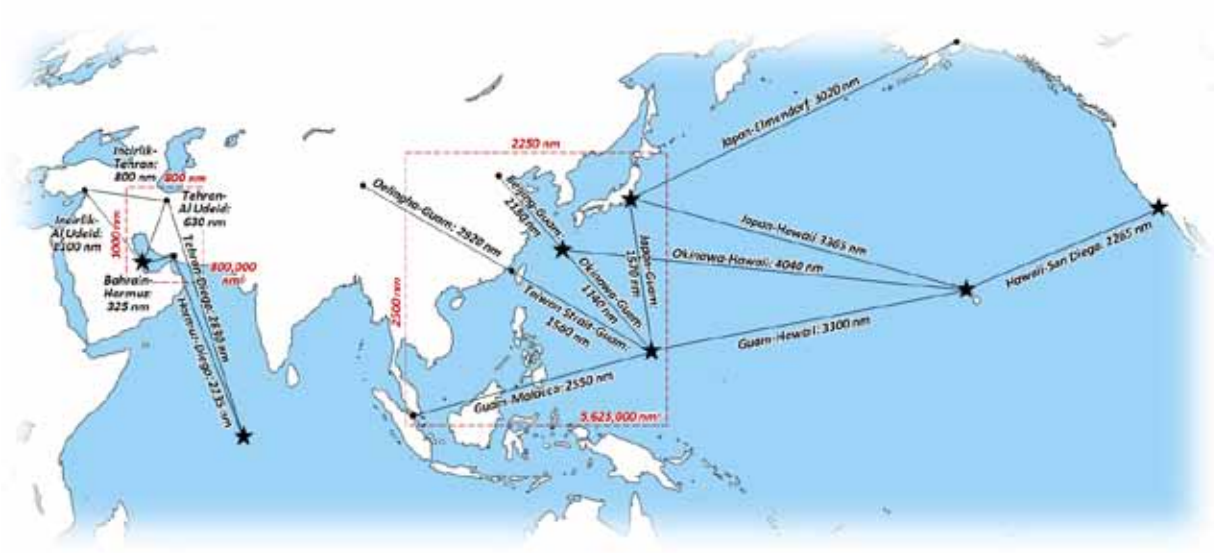
KEY GEOGRAPHICAL FACTORS

Iran could exploit the following geographical features to constrain or impede U.S. forces from carrying out many of the traditional tasks and missions that are essential to operational success. Conversely, the U.S. military's operational planning must seek to offset Iran's ability to capitalize on these features:

- Relative to the Western Pacific, the Persian Gulf region is compact, with Gulf Cooperation Council (GCC) major population centers and military bases well within range of Iran's short- and medium-range strike assets;
- The narrow waters of the Strait of Hormuz act as a chokepoint for maritime traffic;
- The difficult acoustic conditions in the Persian Gulf and its approaches complicate anti-submarine warfare (ASW) operations; and
- Persian Gulf states have highly concentrated populations located in close proximity to Iran, which could increase their vulnerability to coercive actions.

[57] Ibid.

FIGURE 4. ILLUSTRATIVE DISTANCES

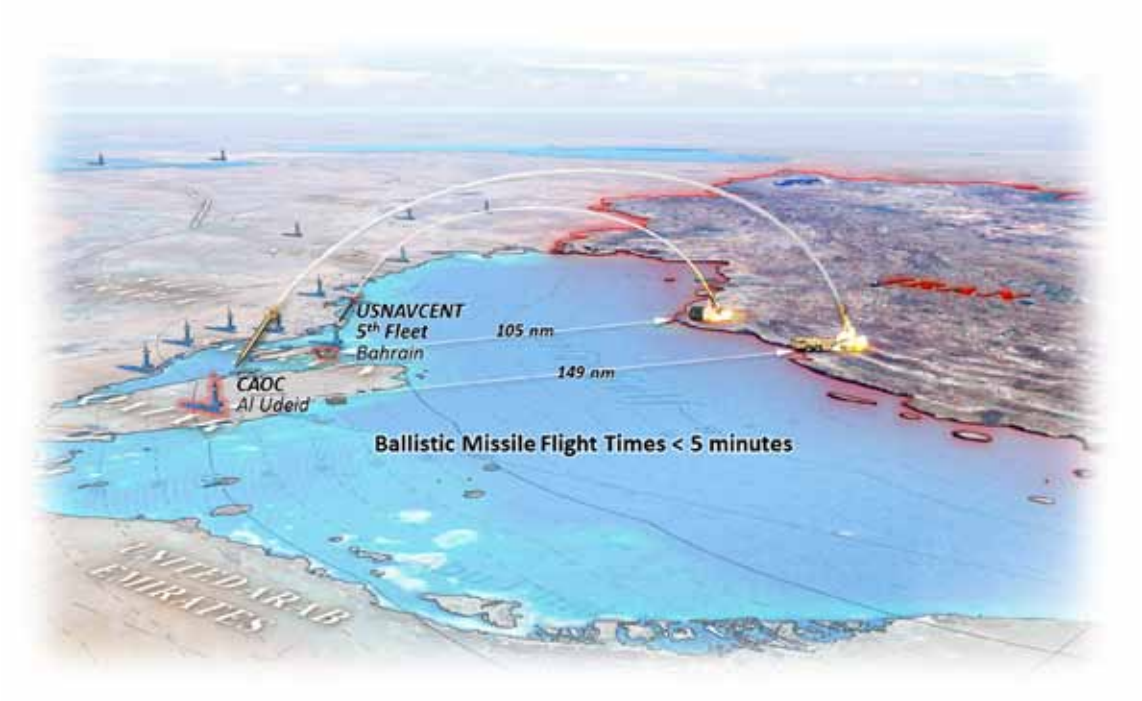


DISTANCES IN THE PERSIAN GULF

The physical dimensions of the Persian Gulf area of operations are an order of magnitude smaller than the geography of the Western Pacific (see Figure 4). These dimensions help mitigate Iran's shortfalls in conventional long-range strike capabilities. Moreover, many U.S. forces deployed to the region are supported by bases that are in close proximity to Iran. In addition to the port facilities in Manama, U.S. Navy ships frequent ports at Jebel Ali near Dubai in the United Arab Emirates.[58] USCENTAF operates from a number of locations in the region, including al Udeid Air Base, Qatar, and al Dhafra Air Base in the United Arab Emirates. Al Udeid hosts the USCENTAF's CAOC, a critical command and

[58] 5th Fleet forces rotate into the theater on a regular basis. The Navy operates two *Osprey*-class coastal mine-hunters and two *Avenger*-class oceangoing minesweepers from Bahrain. These will be replaced in the next decade by Littoral Combat Ships (LCS). See David S. Cloud and Paul Richter, "U.S. walks tightrope in policy toward Bahrain violence," Los Angeles Times, February 17, 2011, accessible online at http://articles.latimes.com/2011/feb/17/world/la-fg-us-bahrain-20110218.

FIGURE 5. ILLUSTRATIVE BALLISTIC MISSILE FLIGHT TIMES



U.S. forward operating locations are well within the reach of numerous strike systems, including short- and medium-range ballistic missiles, that could be launched from Iran's coastal areas.

control node for U.S. air and space operations throughout Central Command.[59] These and other U.S. forward operating locations are well within the reach of numerous strike systems, including short- and medium-range ballistic missiles, that could be launched from Iran's coastal areas (see Figure 5).[60]

Iran would also have the benefit of being able to exploit its interior lines of operation to deploy and frequently move its mobile ballistic missiles batteries to complicate U.S. counter-strikes, as well as create a distributed resupply network that would be resistant to attack.

---

[59] "Today, the U.S. military runs most of its regional operations out of the base, including patrols to counter any hostile moves by Iran a hundred miles to the north and flights over Afghanistan six hundred miles to the east. Yet U.S. forces do not have carte blanche over al Udeid: the Qatari military jealously guards its sovereign control over access to the facility even though its own small air force does not use it, instead operating from one side of the capital's main international airport." Simon Henderson, "Qatar's Quest to Become the Leading Arab State," *Policy Watch #1789*, Washington Institute for Near East Policy, March 31, 2011, accessible online at http://www.washingtoninstitute.org/templateC05.php?CID=3341.

[60] Many of these facilities are unhardened, making them more vulnerable to missile attacks.

POPULATION CONCENTRATIONS

The populations of most Persian Gulf states are remarkably concentrated and urbanized. Roughly 96 percent of Qatar's population is located in urban areas, while the majority of Bahrain's citizens live in Manama and its suburbs. Both the UAE and Kuwait have similar settlement patterns, with their populations concentrated (at 84 and 98 percent, respectively) in small, coastal urban areas. Although Saudi Arabia is geographically much larger than Qatar, Bahrain, Kuwait, and the UAE, 82 percent of its population is located in Riyadh, Jeddah, Mecca, and Medina.[61]

These demographics increase the vulnerability of Persian Gulf states to Iranian coercive, counter-value ballistic missile attacks. Although Iran's large arsenal of short- and medium-range missiles and rockets currently lack the accuracy of modern PGMs, they could still be used as effective terror weapons against urban areas throughout the Persian Gulf region. The coercive potential of these threats would increase greatly should Iran demonstrate the ability to arm them with weapons of mass destruction, including nuclear weapons.

Although Iran's large arsenal of short- and medium-range missiles and rockets currently lack the accuracy of modern PGMs, they could still be used as effective terror weapons against urban areas throughout the Persian Gulf region.

IMPACT OF GEOGRAPHY ON NAVAL OPERATIONS

Unlike the open maritime approaches to Taiwan in the Western Pacific, the Strait of Hormuz provides a very narrow entrance to the Persian Gulf. The Strait is approximately 98 nautical miles (nm) long and is only 30 nm wide at its narrowest point, forming a natural chokepoint that reduces the freedom of maneuver of large U.S. warships. The difficult acoustic conditions in the Strait of Hormuz and Persian Gulf present significant challenges for U.S. ASW against Iranian submarines and mini-submarines. ASW would be just as difficult for Iranian submarines, but their primary mission is likely to lay mines or sink surface vessels rather than anti-submarine warfare.[62]

While the Persian Gulf and Strait of Hormuz present the U.S Navy with a difficult set of challenges, the Iranian Navy and the Iranian Revolutionary Guard Corps Navy (IRGCN) may be able to exploit their features. First, Tehran's navies would benefit from very short lines of communication, making resupply, rearming, and repair and maintenance less difficult compared to U.S. naval units, which may need to withdraw for significant distances to carry out some of those

[61] All figures are from *The CIA World Factbook*, accessible online at https://www.cia.gov/library/publications/the-world-factbook/index.html.

[62] These observations are based on discussions with numerous U.S. Navy officers with operational ASW experience.

functions.[63] The proximity of the Strait of Hormuz to major Iranian port facilities, such as Bandar Abbas, would permit Iran's large inventory of small boats, fast attack craft (FAC), and mine laying vessels to rapidly engage or disengage from maritime exclusion operations. Moreover, the geography of the Strait creates opportunities for Iran to use smart mines, small boat swarming attacks, short-range unmanned aerial vehicles (UAVs), and shore-based ASCMs to deny military and civilian vessels safe passage. Finally, Iran's familiarity with the maritime areas and traffic assets such as those preferred by the IRGCN, to "hide" among civilian vessels and exploit them as non-traditional ISR sources.

KEY GEOSTRATEGIC FACTORS

The following geostrategic factors could influence Iran's A2/AD strategy and military investments:

> Dependency on energy resources that flow through the Strait of Hormuz would affect all actors in a Gulf conflict, including both oil-importing and oil-exporting states; and

> The presence of disadvantaged, primarily Shia, populations in the Middle East creates opportunities for Iran to conduct warfare by proxy.

PERSIAN GULF ENERGY RESOURCES

The global economy depends on Persian Gulf oil and gas resources, and shipping those resources through the Strait of Hormuz is the most efficient way to get them to global markets. Collectively, Persian Gulf states possess over half of the world's proven reserves of crude oil and slightly over one-third of proven reserves of natural gas.[64] The Gulf region is the origin for about 35 percent of the world's exports of crude oil and roughly 88 percent of that total leaves the Gulf on tankers through the Strait of Hormuz.[65] Every day, approximately thirteen crude oil tankers transit the Strait carrying around fifteen and a half million barrels of oil, or 33 percent of all seaborne traded oil and 17 percent of all oil traded

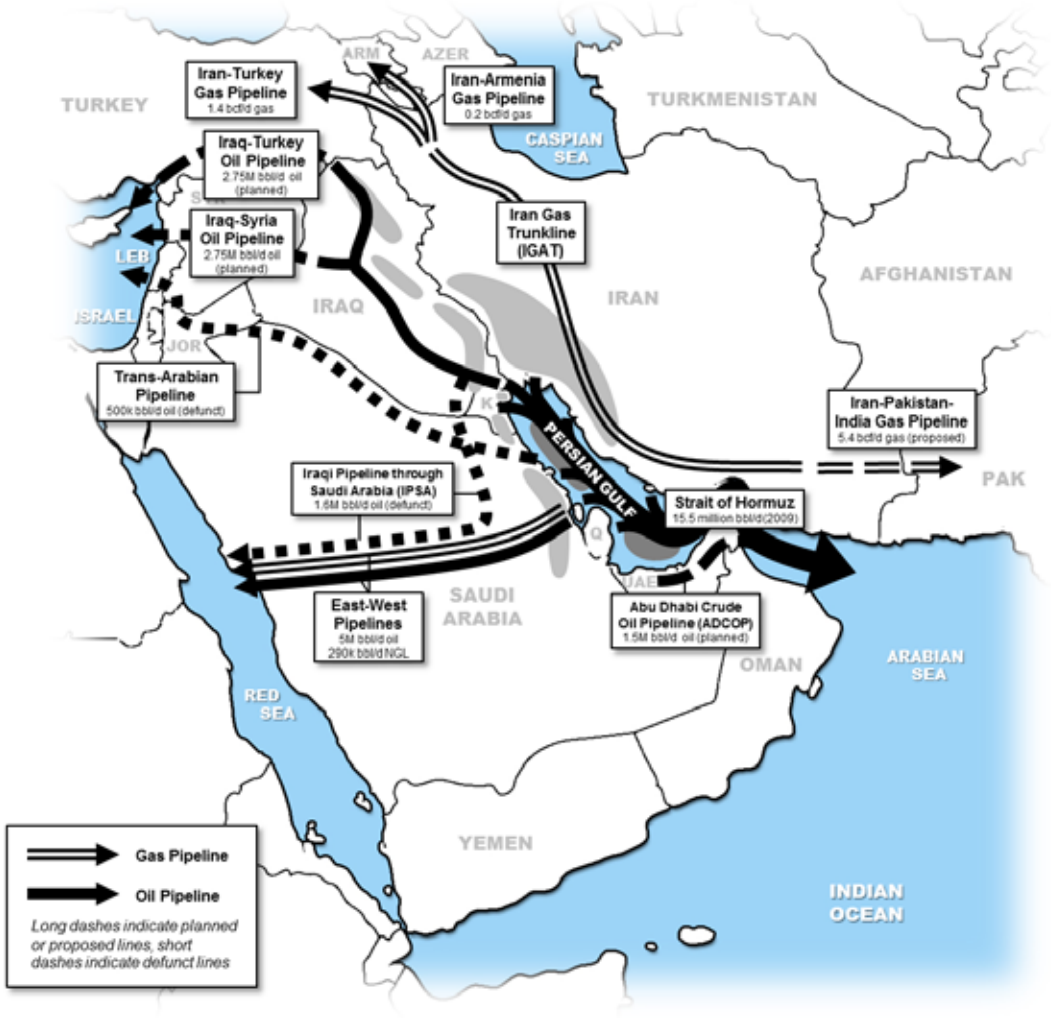
---

[63] The U.S. Navy is highly proficient at conducting underway replenishment (UNREP)—with the notable exception of rearming VLS cells—which has given it tremendous operational flexibility. However, ships are highly vulnerable to attack during UNREP operations. Were Iran to acquire extended-range anti-ship weapons, U.S. UNREP operations will have to adapt accordingly, moving further away from the area of operations.

[64] All data from is from EIA, "International Energy Statistics," accessible online at http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm.

[65] Jean-Paul Rodrigue, "Straits, Passages and Chokepoints: A Maritime Geostrategy of Petroleum Distribution," *Cahiers de Geographie du Quebec*, 48, No. 135, 2004, p. 367.

FIGURE 6. PERSIAN GULF ENERGY ROUTES



worldwide.[66] If the Strait of Hormuz were to close, active overland pipelines in the region could only carry around one-third of the Strait's daily throughput (see Figure 6).[67] Planned pipelines, such as the Habshan-Fujairah pipeline across the UAE, or deactivated pipelines like the Iraqi Pipeline across Saudi Arabia (IPSA), could increase this to around 40 percent.

---

[66] EIA, *World Oil Transit Chokepoints* (Washington, DC: Department of Energy, EIA, 2011), p. 1, accessible online at http://www.eia.doe.gov/cabs/world_oil_transit_chokepoints/Full.html.

[67] Ibid.

The South Pars/North Field gas field, which lies under the Persian Gulf between Qatar and Iran, adds another degree of complexity to the region's energy and security dynamics. The shared natural gas field and the critical role that natural gas plays in Qatar's economy give the Qatari government a vested interest in maintaining cordial relations with Iran. Qatar has long had closer relations with Iran than other members of the GCC, and has favored negotiations and engagement with Iran to resolve regional issues.[68] Qatar's desire to achieve a balance between its security relations with the United States and its commercial relations with Iran may influence its willingness to allow U.S. forces to operate from Qatari bases. As Qatar's Emir, Sheikh Hamad bin Khalifa al Thani observed:

> We are a small country and we can live with anything around us. We will not be an enemy to anybody, but of course we will not allow anybody to use us against others. We will not, for example, stand with America against Iran…Iran never bothered us, it never created a problem for us… It will be hard for the Gulf countries to be with Iran against the United States. And I believe Iran knows this.[69]

ENERGY DEPENDENCIES CUT BOTH WAYS. As much as the world continues to depend on imported Persian Gulf oil and gas, Gulf economies are far more dependent on their energy exports. For example, oil production accounts for around 40 percent of Saudi Arabia's gross domestic product (GDP) and is the source for 80 to 90 percent of its government revenues. Similarly, Iran's oil sector is the source of 10 to 20 percent of its total GDP, 40 to 70 percent of its government revenues, and approximately 80 percent of its export revenues.[70] Iran has an additional dependency in that it must rely on imported refined petroleum products, especially gasoline, because its refining capacity has lagged behind domestic consumption. This has led to chronic gasoline shortages that the Iranian government has attempted to mitigate through rationing and other measures.[71] These twin dependencies suggest that if energy SLOCs through the Persian Gulf and Strait of Hormuz were closed for an extended period of time, Iran's economy and its ability to sustain a high tempo of military operations may suffer significantly.

---

[68] "Iran: Regional Perspectives and U.S. Policy," Congressional Research Service, January 13, 2010, pp. 7–8, accessible online at http://www.fas.org/sgp/crs/mideast/R40849.pdf; Justin Dargin, "Qatar's Gas Revolution," *Harvard Belfer Center LNG Review*, 2010, pp. 124–125, http://belfercenter.ksg.harvard.edu/files/Qatars_Gas_Revolution.pdf; and Janine Zacharia, "Qatar Steers Between U.S., Iran, Using Gas to Boost Influence," *Bloomberg*, March 3, 2008, accessible online at http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aPFYilDYIFCo&refer=home.

[69] "Qatari Emir Views Foreign Investments, Change in Economic Powers, Mideast Peace," OSC Report EUP20090329499001, March 29, 2009, cited in "Iran: Regional Perspectives and U.S. Policy," Congressional Research Service, January 13, 2010, p. 8, accessible online at http://www.fas.org/sgp/crs/mideast/R40849.pdf.

[70] United Nations Industrial Development Organization, "An Overview of the Economy of the Islamic Republic of Iran," accessible online at http://www.unido.org/index.php?id=5035.

[71] EIA, "Iran Country Analysis Brief," January 2010, accessible online at http://www.eia.gov/countries/cab.cfm?fips=IR.

IRAN'S PROXIES

Iran's ability to tap Shiite populations to develop a wide-ranging network of client and proxy groups throughout the Middle East is another factor that likely influences Iran's A2/AD strategy. In 2009, an erstwhile Iranian diplomat claimed that Iran had developed sleeper cells in Shiite populations across the Middle East.[72] Although such statements may be an information operation designed to deter attacks against Iran, it is clear that Iran's intelligence agencies, including the IRGC's unconventional warfare wing the Quds Force, have funded and trained terrorist groups that threaten regional peace and stability.

It is clear that Iran's intelligence agencies, including the IRGC's unconventional warfare wing the Quds Force, have funded and trained terrorist groups that threaten regional peace and stability.

While Lebanese Hezbollah may be the best-known Iranian proxy, Iran has supported similar terrorist groups in Bahrain, Saudi Arabia, and Iraq.[73] The Government of Bahrain has accused both Iran and Lebanese Hezbollah of involvement in the Shiite protests and uprisings against the Sunni al-Khalifa monarchy in the spring of 2011.[74] The Iranian-supported Saudi Hezbollah has been accused of perpetrating the terrorist attack against the Khobar Towers U.S. military housing facility in 1996, which killed 19 and injured 373 U.S. service members.[75] Iranian-backed insurgent groups have also been implicated in attacks against U.S. forces in Iraq. These groups are increasingly using Iranian-provided explosively formed penetrators (EFPs), which are capable of piercing the armor of Mine-Resistant, Ambush-Protected (MRAP) vehicles. According to the Department of Defense:

> Fifteen Americans died in Iraq in June [2011], most killed by Iraqi extremists who received weapons and training from Iran… The weapons killing these troops are

---

[72] Colin Freeman, "Iran Poised to Strike in Wealthy Gulf States," *The Telegraph*, March 4, 2007, accessible online at http://www.telegraph.co.uk/news/worldnews/1544535/Iran-poised-to-strike-in-wealthy-Gulf-states.html.

[73] For more on the relationship between Iran and Lebanese Hezbollah, see Mohamad Bazzi, "Hezbollah & Iran: Lebanon's Power Couple," *Council on Foreign Relations*, Oct 14, 2010, accessible online at http://www.cfr.org/iran/hezbollah-iran-lebanons-power-couple/p23163; and Anthony Cordesman, "Iran's Support of the Hezbollah in Iran," Center for Strategic and International Studies (CSIS), July 15, 2006, accessible online at http://csis.org/files/media/csis/pubs/060715_hezbollah.pdf. For more on Iranian and Lebanese Hezbollah's support of Bahraini Shiite groups, see Jay Solomon, "Bahrain Sees Hezbollah Plot in Protest," *Wall Street Journal*, April 25, 2011, accessible online at http://online.wsj.com/article/SB10001424052748703907004576279121469543918.html, and Michael Slackman, "The Proxy Battle in Bahrain," *New York Times*, March 19, 2011, accessible online at http://www.nytimes.com/2011/03/20/weekinreview/20proxy.html?pagewanted=all. For more on Iran's proxies in Saudi Arabia, see "The Shiite Question in Saudi Arabia," International Crisis Group, September 19, 2005, pp. 4–7, accessible online at http://www.crisisgroup.org/~/media/Files/Middle%20East%20North%20Africa/Iran%20Gulf/Saudi%20Arabia/The%20Shiite%20Question%20in%20Saudi%20Arabia.ashx.

[74] See Solomon, "Bahrain Sees Hezbollah Plot in Protest;" and Slackman, "The Proxy Battle in Bahrain."

[75] See Anthony Cordesman, "Islamic Extremism in Saudi Arabia and the Attack on Al Khobar," CSIS, June 2001, p. 22–23, accessible online at http://csis.org/files/media/csis/pubs/saudi_alkhobar.pdf.

improvised rocket-assisted mortars and explosively formed penetrators that are designed specifically to pierce armor. Both types of weapons have been traced directly to Iran's Quds Force.[76]

Iran's proxies outside the Persian Gulf extend beyond Hezbollah. For example, according to many sources Iran provides assistance to the Shiite Houthi rebels of Northern Yemen.[77] Although most of its overseas proxies are from the Shia sect of Islam, Iran also has been known to cooperate with non-Shiite groups, including Hamas in the Gaza Strip.[78]

CONCLUSIONS ON THE IMPACT OF THE PERSIAN GULF'S ATTRIBUTES

In summary, the Persian Gulf's geographical and geostrategic characteristics are likely to shape Iran's A2/AD strategy and present U.S. forces with a unique set of challenges.

- The constricted waters of the Strait of Hormuz and the Persian Gulf limit freedom of maneuver for U.S. vessels and place them within range of Iran's short-range maritime exclusion capabilities, such as ASCMs, FACs, mines, and mini-submarines. The Gulf's difficult acoustic conditions may also degrade U.S. ASW operations.
- The range asymmetry in the Gulf's maritime domain carries over into air operations. U.S. forward bases in the Persian Gulf are well within range of many of Iran's ballistic missiles, while potential target areas inside Iran are outside the unrefueled range of U.S. fighter aircraft launched from those bases.
- The concentration of population and government infrastructure in most Persian Gulf states may make them more susceptible to coercion. Iran might

---

[76] See Jim Garamone, "Panetta Vows to Protect U.S. Troops," American Forces Press Service, July 11, 2011, accessible online at http://www.defense.gov/news/newsarticle.aspx?id=64614. Also see Frederick W. Kagan, "Iraq Threat Assessment," *American Enterprise Institute*, May 2011, pp. 4–5, accessible online at http://www.aei.org/docLib/Iraq-Threat-Assessment.pdf.

[77] Scott Peterson, "Does Iran play role in Yemen conflict?," *Christian Science Monitor*, November 11, 2009, accessible online at http://www.csmonitor.com/World/Middle-East/2009/1111/p06s15-wome.html; and Sudarsan Raghavan, "Yemen's fight with rebels a regional concern," *Washington Post*, November 14, 2009, accessible online at http://www.washingtonpost.com/wp-dyn/content/article/2009/11/13/AR2009111304246.html. Iranian support for Hezbollah's bombing of the Israeli-Argentine Mutual Association (AMIA) in 1994, which killed 85 people and wounded another 300, demonstrates its willingness to use proxies to strike targets far from the Middle East. See Matthew Levitt, "Iranian Doublespeak on the Anniversary of the AMIA Bombing," Washington Institute for Near East Policy, July 20, 2011, accessible online at http://www.washingtoninstitute.org/templateC06.php?CID=1680.

[78] Marie Colvin, "Hamas wages Iran's proxy war on Israel," *The Times*, March 9, 2008, accessible online at http://www.timesonline.co.uk/tol/news/world/middle_east/article3512014.ece.

threaten to launch salvos of ballistic missiles against major regional cities with the implied threat of potential WMD attacks. Iran could also unleash its proxy forces to commit acts of terror and attack vital infrastructure such as oil, natural gas, and desalination facilities.

- Some Persian Gulf governments may not require a great deal of coercion to deny access to U.S. forces out of fear of alienating a large part of their citizenry.

IRAN'S A2/AD CAPABILITIES

Iran's A2/AD capabilities can be grouped into four broad categories: ballistic missiles, some of which could be armed with WMD warheads; unconventional warfare and terrorism by proxy, possibly made more lethal by G-RAMM weapons; maritime exclusion systems such as mines, ASCMs, and fast attack craft; and air defenses. This section will describe each of these in brief.

Ballistic Missiles and Weapons of Mass Destruction

> Our enemy's strategy is based on air and sea operations... Their strategy will be aerial operations, be it by long-range missiles or fighter planes. In the face of their air raids or missile attack, we have adopted the strategy of utilizing long-range or surface-to-surface missiles.
>
> — Iranian Revolutionary Guard Corps Commander[79]

Since the Iran-Iraq War, ballistic missiles have been Iran's primary conventional means of striking targets at long ranges.[80] Although Iran possesses a nominally large air force, it suffers from obsolete systems and a lack of spare parts, munitions, skilled technicians, and pilots.[81] Instead of relying on strike aircraft, Iran has invested heavily in acquiring a sizeable arsenal of ballistic missiles and a research and industrial base to support their production.[82] This section summarizes Iran's ballistic missile systems in order of range from shortest to longest, and concludes

---

[79] An anonymous IRGC commander, as quoted in Anthony Cordesman and Martin Klieber, *Iran's Military Forces and Warfighting Capabilities: The Threat in the Northern Gulf* (Washington, DC: CSIS, 2007), p. 134.

[80] Ibid., p. 134; Steven Ward, *Immortal—A Military History of Iran and its Armed Forces* (Washington, DC: Georgetown University Press, 2009), p. 309; and *Iran's Ballistic Missile Capabilities: A Net Assessment* (London, UK: International Institute for Strategic Studies, 2010), p. 13.

[81] Cordesman and Klieber, *Iran's Military Forces and Warfighting Capabilities*, p. 41; Ward, *Immortal—A Military History of Iran and its Armed Forces*, p. 317.

[82] *Iran's Ballistic Missile Capabilities: A Net Assessment*, p. 13.

with a brief assessment of how Iran may mature its ballistic missile arsenal over time, including the possibility that it may arm them with WMD warheads.[83]

Iran's Ballistic Missiles

> TONDAR-69. Tondar (Thunder)-69 is the Iranian name for CSS-8/M-7 short-range ballistic missiles that Iran purchased from the PRC in the 1990s. The CSS-8 is essentially an SA-2 Guideline surface-to-air missile (SAM) system modified for use as a surface-to-surface missile. It has a range of around 81 nm with a standard 200 kilogram warhead and has two-stage propulsion consisting of a solid rocket booster and a liquid-fuel main stage. Estimates suggest that Iran may have acquired around 200 of these missiles.[84]

> FATEH-110A. The Fateh (Victorious)-110A is probably an evolution of the Zelzal-2 rocket that Iran may have supplied to Hezbollah.[85] By adding a guidance system and stabilizing fins to the otherwise-unguided Zelzal and reducing the size of its warhead, Iran has created a short-range ballistic missile that it can produce domestically. The Fateh-110A uses solid fuel rocket motors and has an approximate range of 108 nm while carrying a 500 kilogram warhead. Estimates of the Fateh-110A's accuracy vary widely. Some sources claim it could have a potential circular error probable (CEP) of around 100 meters should Iran outfit it with a combination of inertial guidance and Global Positioning System (GPS) data. Other sources, however, claim that "one cannot classify the Fateh-110A as a guided missile," implying that it is instead more akin to an unguided artillery rocket.[86] Should Iran improve the accuracy of the Fateh-110A,

---

[83] All data from *Iran's Ballistic Missile Capabilities: A Net Assessment*; "Ballistic and Cruise Missile Threat," National Air and Space Intelligence Center, April 2009, accessible online at http://www.fas.org/programs/ssp/nukes/NASIC2009.pdf; and Steven A. Hildreth, "Iran's Ballistic Missile Programs: An Overview," Congressional Research Service, February 4, 2009, accessible online at http://www.fas.org/sgp/crs/nuke/RS22758.pdf.

[84] Hildreth, "Iran's Ballistic Missile Programs: An Overview," p. 4.

[85] "Hezbollah's Rocket Force," *BBC News*, July 18, 2006, accessible online at http://news.bbc.co.uk/2/hi/middle_east/5187974.stm.

[86] See Joshua R. Itzkowitz Shifrinson and Miranda Priebe, "A Crude Threat: The Limits of an Iranian Missile Campaign Against Saudi Arabian Oil," *International Security*, Vol. 36, No. 1, Summer 2011 p. 181; and *Iran's Ballistic Missile Capabilities: A Net Assessment*, p. 53. DoD defines CEP as "an indicator of the delivery accuracy of a weapon system, used as a factor in determining probable damage to a target. It is the radius of a circle within which half of a missile's projectiles are expected to fall." See Joint Publication 1-02, "Department of Defense Dictionary of Military and Associated Terms," November 8, 2010, p. 53, accessible online at http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf.

the agility conferred by its smaller size and solid-fuel motors could make it an effective and relatively survivable short-range strike system.[87]

> SHAHAB-1. The Shahab (Meteor)-1 is the Iranian version of a North Korean copy of the liquid-fueled Soviet Scud-B short-range ballistic missile (SRBM). Carrying a 1,000 kilogram warhead, the Shahab-1 has a range of 162 nm and has a CEP of around 1,000 meters.

> SHAHAB-2. The Shahab-2 is an Iranian version of a North Korean copy of the liquid-fueled Soviet Scud-C SRBM. The range of the Shahab-2 has been stretched by reducing the weight of the warhead to around 700–750 kilograms and by increasing the amount of fuel it carries, as well as the length of time that the missile's fuel burns after launch. The Shahab-2 has a range of around 270 nm, but it is even less accurate than the Shahab-1, with an approximate CEP of 1,500 meters.

> SHAHAB-3. The Shahab-3 is Iran's version of North Korea's No-Dong medium-range ballistic missile (MRBM), which is itself a heavily modified variant of the Scud. The liquid-fueled Shahab-3 has a range of 540 to 700 nm depending on the size of its warhead. Longer ranges necessitate a warhead of 750 kilograms or smaller while a warhead of around 1,000 kilograms would leave the missile with a shorter range.[88] The upper boundary of the Shahab-3's range is significant since the absolute minimum distance from Iran to Israel is roughly 520 nm and the distance to Jeddah is 715 nm. Striking targets in Israel using the Shahab-3 would be difficult unless Iran was willing to launch the missile from its border with Iraq. The accuracy of the No-Dong on which the Shahab-3 is based is quite poor, with an estimated CEP of around 2,500 meters. It is possible that Iran could improve on this; Pakistan operates a No-Dong variant called the Ghauri, which may have a guidance system upgraded with assistance from the PRC.[89]

> GHADR-1. The Ghadr (Powerful)-1 is also frequently referred to as the Shahab-3M. Like the Shahab-3, it is based on North Korea's No-Dong missile. Iran has increased the range of the Ghadr-1 to 850 nm or greater by stretching the Shahab-3's fuselage, using aluminum to decrease the weight of the airframe, and by fitting the missile with a smaller "baby bottle" warhead. Perhaps the most noteworthy aspect of the Ghadr-1 is that Iran purportedly developed

[87] Solid-fueled missiles may be launched more quickly than liquid-fueled missiles because they do not need to be loaded with fuel prior to launch or accompanied by fueling trucks. This allows systems such as the Fateh-110A to conduct "shoot-and-scoot" missions with less risk of interdiction by U.S. aircraft and, consequently, less risk to scarce TELs. See Cordesman and Klieber, *Iran's Ballistic Missile Capabilities: A Net Assessment*, p. 64.

[88] Ibid., pp. 19–21.

[89] Ibid., p. 20.

these modifications indigenously.[90] This indicates that Iran possesses the wherewithal to upgrade its existing missiles and even develop new missile technologies, instead of relying solely on foreign suppliers such as North Korea.

> SAJJIL-2. The Sajjil (Baked Clay)-2 is a solid-fueled MRBM with a range of approximately 1,080–1,190 nm while carrying a 750 kilogram warhead. The Sajjil-2 appears to be largely an Iranian designed and built missile, including the complex solid fuel motors, although Iran probably received foreign technical assistance from the PRC and possibly North Korea.[91] Images of the Sajjil show some design similarities with the Ghadr, including the size and shape of the warhead and the diameter of the missile body, which may allow for the two missiles to use the same transporter erector launchers (TELs).[92] As is the case with the Ghadr, the CEP of the Sajjil is unknown and is dependent on Iran's access to advanced foreign guidance systems.[93] Given the degree of technical cooperation between Iran and China, Iran may be able to improve the Sajjil's accuracy over the next two decades.

Iran's investments have paid dividends in the form of a large arsenal of SRBMs, a growing number of increasingly sophisticated MRBMs, and the ability to produce missiles indigenously.

TAKING STOCK OF IRAN'S BALLISTIC MISSILES. Iran's investments in missile technologies have paid dividends in the form of a large arsenal of SRBMs, a growing number of increasingly sophisticated MRBMs, and the ability to produce missiles such as the Fateh-110, Ghadr-1 and Sajjil-2 indigenously (see Figure 7). These investments also allowed Iran to place a satellite into orbit in 2009.[94]

In spite of this progress, Iran's ballistic missiles have capability shortcomings that could reduce their operational effectiveness. According to most open sources, Iranian ballistic missiles are inaccurate. With CEPs measured in kilometers for most of its missiles, Iran would likely be unable to conduct direct precision strikes against U.S. or partner bases in the region. A recent assessment has found that Iran's inaccurate missiles likewise may pose little threat to the oil infrastructure in the Gulf. According to this assessment, an attack against a major facility, such as the Abqaiq stabilization plant, would require over 1,300 Shahab missiles to have a 75 percent chance of destroying just one of Abqaiq's eighteen stabilization towers.[95] In the near-term, the inaccuracy of Iran's ballistic missiles may relegate them to being used as coercive terror weapons against population centers,

---

[90] Ibid., p. 26.

[91] Ibid., pp. 54–64.

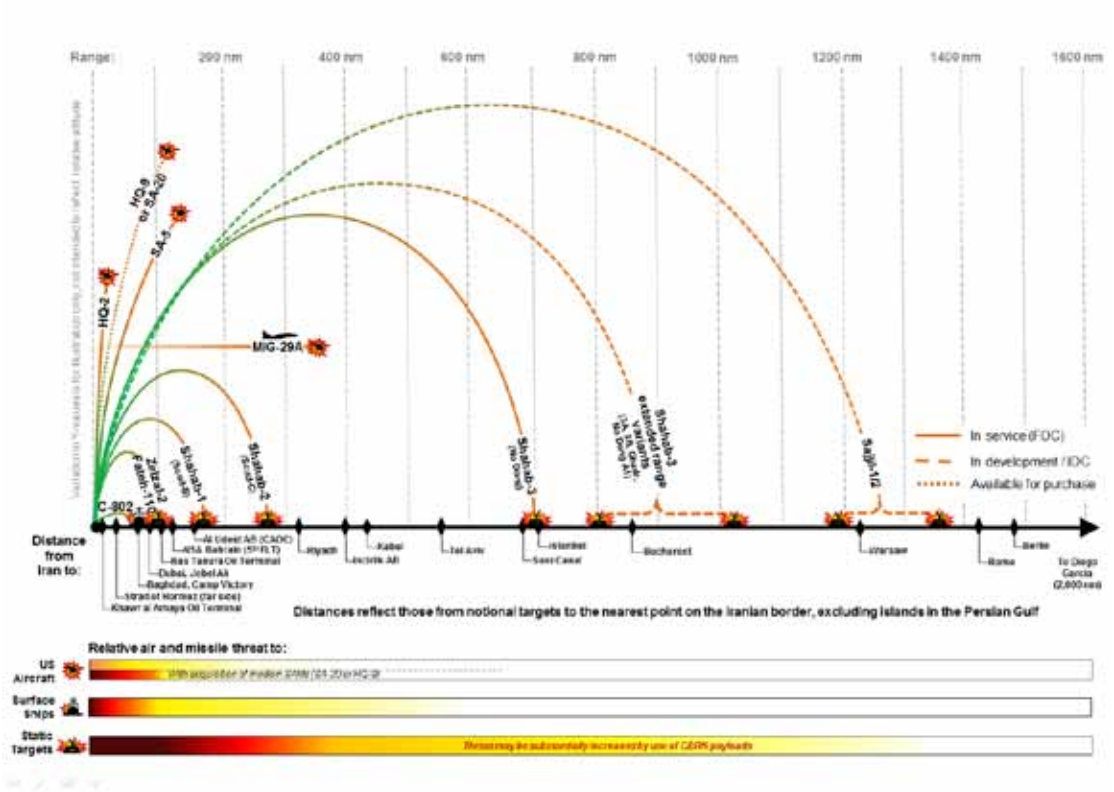
[92] Ibid., p. 56.

[93] Ibid., pp. 58–60, 63, 97.

[94] Ibid., p. 26. A Safir missile designed and built by Iran was used for the launch.

[95] Stabilization plants remove hydrogen sulfide from petroleum, turning it from "sour" to "sweet" crude and thereby enabling it to be shipped safely. Abqaiq stabilizes approximately two-thirds of all Saudi Arabian oil. See Shifrinson and Priebe, pp. 174, 184–186.

FIGURE 7. IRANIAN AIR AND MISSILE SYSTEMS



much as Iran and Iraq did during the "War of the Cities."[96] Moreover, while Iran is believed to have anywhere from 200 to around 600 Shahab-1/2 missiles, it may possess only around 100 launchers for its entire SRBM arsenal (Tondar-69, Fateh-110A, Shahab-1, and Shahab-2).[97] The high ratio of SRBMs to launchers could limit Iran's ability to conduct effective salvo attacks on multiple targets simultaneously.[98]

---

96 Ward, *Immortal—A Military History of Iran and its Armed Forces*, pp. 316–317.

97 Andrew Feickert, "Iran's Ballistic Missile Capabilities," Congressional Research Service, August 23, 2004, p. 1, accessible online at http://fpc.state.gov/documents/organization/39332.pdf. Although this data is from 2004, given Iran's investments in the Fateh-110A and Shahab-3 programs, it is unlikely that they have substantially increased their arsenal of the aging and obsolescent Shahab-1 and 2. Also see "Ballistic and Cruise Missile Threat," p. 13.

98 Wehrey, et al., *Dangerous but not Omnipotent*, pp. 61–62.

In the near-term, Iran could seek to overcome these shortcomings by arming ballistic missiles with conventional submunitions.[99] Replacing a unitary high-explosive warhead with multiple small submunitions that can be released across wide areas increases the probability that a less-accurate missile can achieve effects on a target.[100] Submunitions are not without their drawbacks, however. Most are generally effective in open terrain against personnel and soft-skinned vehicles such as trucks and aircraft, but are ineffective against hardened or buried targets.[101]

Should Iran acquire operational nuclear weapons, it is likely that they would be an addition to, not a replacement for, other capabilities that Iran would use in a coercive campaign.

Iran's Chemical, Biological, or Radiological Capabilities

Chemical, biological, or radiological (CBR) warheads are another means that Iran might choose to compensate for the inaccuracy of its ballistic missiles. Although it is a signatory of the Biological and Toxin Weapons Convention of 1972, Iran is believed to have the ability to develop and weaponize biological and chemical agents. Furthermore, Iran's nuclear programs could produce sufficient materials to build radiological weapons.[102]

Although precision targeting is not required to achieve significant effects with a WMD warhead, the current inaccuracy of Iran's ballistic missiles coupled with their payload and salvo constraints would limit Iran's ability to disperse chemical, biological, or radiological agents on multiple targets.[103] A military force that is capable of assuming a protective posture and continuing operations—albeit at a slower tempo—would mitigate the effectiveness of CBR attacks. Against large, unprotected civilian targets, however, ballistic missiles tipped with CBR warheads could be extremely effective terror weapons. The threat alone of such attacks may be enough to coerce some GCC states into denying access to U.S. forces.[104]

Nuclear Warheads

Although often lumped together with CBR weapons, nuclear weapons are much more destructive and deserve to be considered separately. Most Iranian missiles are capable of carrying a nuclear warhead, potentially at the expense of somewhat shorter ranges should the warhead design have greater mass than a conventional

---

[99] Although analysts disagree on the scope, scale and pace of Iran's nuclear weapons, this analysis assumes that Iran has the ability to develop a nuclear weapons capability within the next two decades.

[100] Wehrey, et al., *Dangerous but not Omnipotent*, p. 61.

[101] Cordesman and Klieber, *Iran's Ballistic Missile Capabilities: A Net Assessment*, p. 125.

[102] Wehrey, et al., *Dangerous but not Omnipotent*, p. 62.

[103] Cordesman and Klieber, *Iran's Ballistic Missile Capabilities: A Net Assessment*, pp. 126, 128.

[104] Ward, *Immortal—A Military History of Iran and its Armed Forces*, p. 314.

munition.[105] The question remains, however, whether Iran would actually use nuclear weapons in a war with the United States. Iranian military strategists seem to understand the limited utility of nuclear weapons, since "press statements, writings in military journals, and other glimpses into Iranian thinking on this issue appear to support the conclusion that Tehran regards nuclear weapons as powerful psychological assets but poor warfighting tools."[106] Should Iran acquire operational nuclear weapons, it is likely that they would be an addition to, not a replacement for, other capabilities that Iran would use in a coercive campaign.[107]

Toward the Future

To sum up, Iran's ballistic missiles give it a strike capability that would be difficult and expensive for U.S. forces to counter, as will be discussed in Chapter 3. Despite their potential as terror weapons, Iran's missiles lack precision and sufficient TELs to support multiple simultaneous salvo attacks against military targets. Over the course of the next twenty years, it is possible that Iran will make progress toward addressing these shortfalls. Iran's development of the Ghadr and Sajjil suggest that it is seeking to extend the range of its missiles. At the same time, these programs demonstrate that Iran is maturing its domestic ability to design, develop, and manufacture systems needed to upgrade its missile arsenal.

UNCONVENTIONAL WARFARE

As noted earlier in this chapter, the IRGC and its unconventional warfare wing, the Quds Force, have developed relationships with armed Shiite groups throughout the Middle East. Should Iran provide these groups with G-RAMM, it could have a significant impact on future U.S. military operations in the Persian Gulf. In 2006, Hezbollah demonstrated how a guerrilla organization could exploit advanced military technologies when it used anti-tank guided munitions to wreak

---

[105] Cordesman and Klieber, *Iran's Ballistic Missile Capabilities: A Net Assessment*, pp. 130–132; Feickert, "Iran's Ballistic Missile Capabilities," pp. 2–5.

[106] Wehrey, et al., *Dangerous but not Omnipotent*, pp. 74–75.

[107] For additional information on Iran's potential to develop nuclear weapons and the potential implications of that decision, see Lynn E. Davis, Jeffrey Martini, Alireza Nader, Dalia Dassa Kaye, James T. Quinlivan, and Paul Steinberg, *Iran's Nuclear Future: Critical U.S. Policy Choices* (Santa Monica, CA: RAND Corporation, 2011); Judith S. Yaphe and Charles D. Lutes, *Reassessing the Implications of a Nuclear-Armed Iran* (Washington, DC: Institute for National Strategic Studies, National Defense University, 2005); Daniel R. Coats, Charles Robb, and Charles F. Wald, *Meeting the Challenge: When Time Runs Out* (Washington, DC: Bipartisan Policy Center, 2010); Patrick Clawson and Michael Eisenstadt, "Halting Iran's Nuclear Programme: The Military Option," Survival, Vol. 50, Is. 5, 2008; and Scott D. Sagan, "How to Keep The Bomb from Iran," *Foreign Affairs*, Vol. 85, No. 5, 2006.

havoc on Israeli armored formations. Hezbollah also hit an Israeli corvette, the INS *Hanit*, with an Iranian-supplied C-802 guided anti-ship cruise missile.[108]

Proxy warfare would likely be a key element of an Iranian effort to coerce Persian Gulf states to deny U.S. forces access to regional bases. Iran has proven its willingness to use terror attacks against Gulf states that have cooperated with the United States.[109] Even the threat of an armed insurrection by Iranian-backed Shiite groups could cause the Bahraini government to deny the United States full use of naval facilities in Manama. The uprisings by Shiites in Bahrain during the spring of 2011 were enough of a threat that Saudi forces crossed the causeway linking the two countries to intervene on behalf of the Sunni al Khalifa monarchy.[110] Much of Saudi Arabia's Shiite minority lives in its Eastern Province alongside many of its largest oil fields and refineries.[111] Although Iran's ballistic missiles may be too inaccurate to attack these facilities effectively at present, terror groups armed with G-RAMM or even simple explosives may be able to do so more effectively.

Proxy warfare would likely be a key element of an Iranian effort to coerce Persian Gulf states to deny U.S. forces access to regional bases.

Proxy groups armed with G-RAMM could also have a major impact on U.S. forces and forward operating locations. Using commercially obtained overhead imagery, unconventional forces could fix the coordinates of Persian Gulf port facilities, airfields, and fuel depots for guided mortar and rocket attacks. Unconventional forces could also use advanced man-portable air defense systems (MANPADS), such as the Russian-made SA-24 to attack U.S. aircraft transiting supposedly "friendly" airspace, and use ASCMs, antiship mines, or maritime IEDs against ships in the Suez Canal, Strait of Hormuz, and Persian Gulf sea ports of debarkation (SPODs).

MARITIME EXCLUSION CAPABILITIES

Many military strategists see the Taiwan Strait crisis of 1996 as the moment when the PRC's leadership decided to pursue an A2/AD strategy centered in part on denying U.S. aircraft carriers the ability to close within range of their air wings.[112] The ability of the United States to strike at land-based targets using seaborne

---

[108] Ibid., pp. 95–96; and Frank G. Hoffman, "Hybrid Warfare and Challenges," *Joint Forces Quarterly*, Issue 52, 2009, p. 37.

[109] For example, Iranian-sponsored terrorists bombed a Pan American Airways office and the Interior Ministry in Kuwait in late 1987. See Ward, *Immortal—A Military History of Iran and its Armed Forces*, p. 287.

[110] Jay Solomon, "Bahrain Sees Hezbollah Plot in Protest," *Wall Street Journal*, April 25, 2011, accessible online at http://online.wsj.com/article/SB10001424052748703907004576279121469543918.html; and Michael Slackman, "The Proxy Battle in Bahrain," *New York Times*, March 19, 2011, accessible online at http://www.nytimes.com/2011/03/20/weekinreview/20proxy.html?pagewanted=all.

[111] "The Shiite Question in Saudi Arabia," International Crisis Group, p. 1.

[112] Krepinevich, *Why AirSea Battle?*, pp. 13, 17–18.

airpower that is virtually independent of theater bases has been an important power-projection capability for the United States. The intervention of two U.S. carrier strike groups into the Taiwan Strait in 1996 demonstrated this capability rather clearly. Consequently, China has sought to undercut this U.S. advantage by investing heavily in weapons such as the Dong Feng 21D ASBM that are designed to prevent American carriers from deploying close enough to China to employ their fighters effectively.

Iran had similar watershed experiences during the "Tanker War" of 1987–1988 and Operation Praying Mantis in April 1988. The decisiveness with which the U.S. Navy dispatched Iran's conventional naval forces convinced Iran's leadership that an asymmetric approach would be the only effective means of countering America's Navy in the Persian Gulf. As a result, Iran began to acquire large numbers of small fast attack craft, anti-ship missiles, mines, submarines, and UAVs.[113] The following paragraphs briefly summarize these capabilities.

SURFACE COMBATANTS. Iran has acquired numerous small surface vessels over the last twenty years. Many of these vessels, such as the *Ashura*-class and *Tareq*-class craft, are small speedboats armed with machine guns or unguided rockets, although some have been modified to conduct minelaying operations.[114] Iran's smaller vessels typically carry MANPADS to defend against air attacks by rotary wing aircraft. During maneuvers in the Gulf, these smaller ships have fired a large number of rockets in the hopes of overwhelming defenses or distracting them from engaging larger anti-ship cruise missile or ASCM-carrying craft such as the *Azarahkhsh*-class and *Tondar*-class missile boats or the North Korean-produced IPS-16 missile/torpedo boat.[115]

UNDERSEA WARFARE. Iran has developed undersea warfare capabilities tailored to deny operational freedom of maneuver to foreign naval forces and civilian shipping in the Persian Gulf and Gulf of Oman. Iran has purchased three Type 877EKM *Kilo*-class submarines from Russia. Based at Bandar Abbas, these submarines are the most modern vessels in Iran's undersea fleet, and have the ability to carry torpedoes, mines, and possibly ASCMs.[116] Iran has exercised its Kilos in the Gulf of Oman, preparing them to act as a first line of defense against the

---

[113] Fariborz Haghshenass, "Iran's Asymmetric Naval Warfare," Washington Institute for Near East Policy, September 2008, p. 6., accessible online at http://www.washingtoninstitute.org/pubPDFs/PolicyFocus87.pdf.

[114] Ibid., p. 12.

[115] Ibid., p. 12.

[116] Haghshenass, "Iran's Asymmetric Naval Warfare," p. 13; and Talmadge, "Closing Time," p. 89. According to *Naval-Technology.com*, India has modified its Type 877EKM submarines to carry the Novator Klub missile system. "SSK Kilo Class (Type 877EKM) Attack Submarine, Russia," *Naval-Technology.com*, accessible online at http://www.naval-technology.com/projects/kilo877/.

U.S. Navy.[117] In addition to the Kilos, Iran maintains a fleet of small and "midget" submarines, including *Ghadir*-class and *Nahang*-class boats. Although these smaller submarines are capable of carrying torpedoes, Iran is more likely to use them for mining or special operations.[118] Iran has also acquired a variety of torpedoes for its undersea fleet, including wake-homing torpedoes and possibly an extremely fast supercavitating torpedo called the Hoot, which is purportedly a version of the Russian Shkval.[119]

MINE WARFARE. Iran has invested heavily in mines and minelaying platforms to deny U.S. naval units freedom of maneuver in the Persian Gulf and Strait of Hormuz. Iran is believed to possess 2,000 to 3,000 mines, though this number could grow over the next twenty years. This arsenal includes simple free-floating and moored contact mines, as well as more sophisticated bottom influence mines such as the Russian-made MDM-6 and the Chinese EM-52 rocket-propelled mine.[120] Strong currents in the Strait of Hormuz would likely carry all but firmly moored mines out into the Gulf of Oman. Bottom mines such as the MDM-6 and EM-52 (with respective maximum effective depths of 120 meters and 80 meters) may be of limited effectiveness in the deeper parts of the Strait of Hormuz.[121] If they became silted over by Gulf currents, those maximum effective depths would be further reduced. Consistent with a "maritime guerrilla warfare" strategy, Iran has outfitted a myriad of platforms to deploy mines, including many of its surface ships, submarines, and "commercial" vessels for clandestine minelaying operations.[122] Although Iran also possesses three RH-53D Sea Stallions which are capable of minelaying, they are unlikely to remain operational over the next two decades.[123]

ANTI-SHIP MISSILES. In addition to ship-launched ASCMs, Iran has acquired a large number of ASCMs which it deploys in batteries along its coast and on

---

[117] Haghshenass, "Iran's Asymmetric Naval Warfare," p. 13; Cordesman and Klieber, *Iran's Military Forces and Warfighting Capabilities*, p. 128; and Ward, *Immortal—A Military History of Iran and its Armed Forces*, p. 316.

[118] Haghshenass, "Iran's Asymmetric Naval Warfare," p. 13.

[119] Ibid., p. 14. Supercavitation creates a bubble of air within the water ahead of a torpedo, thereby decreasing drag on the torpedo and allowing it to travel at very high speeds. This would decrease the torpedo's run time to a target, but it is a "straight-runner," i.e., too fast and noisy to employ a guidance system to home to a maneuvering target.

[120] Talmadge, "Closing Time," pp. 91–92; and Cordesman and Klieber, *Iran's Military Forces and Warfighting Capabilities*, p. 120.

[121] Talmadge, "Closing Time," pp. 91; and Haghshenass, "Iran's Asymmetric Naval Warfare," p. 16. For an analysis of the characteristics of the Persian Gulf and Strait of Hormuz, see J. Kampf and M. Sadrinasab, "The Circulation of the Persian Gulf: A Numerical Study," *Ocean Science Discussions*, European Geosciences Union, May 12, 2005, pp. 129–164, accessible online at http://www.ocean-sci-discuss.net/2/129/2005/osd-2-129-2005-print.pdf.

[122] Haghshenass, "Iran's Asymmetric Naval Warfare," p. 16.

[123] Talmadge, "Closing Time," p. 89.

islands such as the Tunbs and Qeshm.[124] Iran's ASCM arsenal consists of a wide array of missiles, many of which were imported from China or derived from Chinese missiles. Iran's Chinese-made ASCMs include the CSS-N-2 Silkworm, CSSC-3 Seersucker (C-201), CSS-N-4 Sardine (C-801), and CSS-N-8 Saccade (C-802). Iran builds variants of the Silkworm and Saccade, which it calls the Raad and Noor respectively.[125] It also possesses several smaller types of ASCMs: the "Kosar," "Sedjil," and "Nasr," which are purportedly based on China's FL-6 and FL-10 light missiles.[126]

All of Iran's ASCMs are subsonic and relatively short-ranged. The most capable missile, the Saccade/C-802, has a range of 65 nm.[127] The maximum effective range of Iran's ASCMs may be limited more by their target acquisition radars than their on-board fuel capacity.[128] In keeping with its asymmetric maritime strategy, Iran could also use target data from submarines, small military and "civilian" vessels, and UAVs, provided these platforms have precision navigation and the ability to communicate with shore-based ASCM batteries.[129]

MARITIME AVIATION. Iran operates a small number of ASCM-armed aircraft such as the Su-24, Su-25, Embraer Tucano, and aging F-4 Phantoms.[130] Should these aircraft remain operational over the next two decades, they would be unlikely to survive long in a campaign against U.S. forces. During the Iran-Iraq War, Iran had success using "kamikaze" UAVs that essentially functioned as remotely piloted ASCMs.[131] This experience, combined with proliferation of unmanned aircraft technologies, helped to spur Iran's development of the Ababil and Mohadjer UAVs.[132] As with Iran's obsolescent piloted aircraft, these UAVs would be unlikely to survive engagements with the United States' technologically superior air defenses. Should they be fielded in great enough numbers, however, Iran may use them in kamikaze swarms with the aim of overwhelming U.S. shipboard defenses.

---

[124] Talmadge, "Closing Time," p. 101.

[125] Ibid., p. 102; and Haghshenass, "Iran's Asymmetric Naval Warfare," p. 15. Cordesman and Klieber disagree and suggest that the Raad may actually be a version of the C-801. See Cordesman and Klieber, *Iran's Military Forces and Warfighting Capabilities*, p. 116.

[126] Haghshenass, "Iran's Asymmetric Naval Warfare," p. 15; and Cordesman and Klieber, *Iran's Military Forces and Warfighting Capabilities*, pp. 117–118.

[127] Cordesman and Klieber, *Iran's Military Forces and Warfighting Capabilities*, p. 117; and Talmadge, "Closing Time," p. 101.

[128] Talmadge, "Closing Time," pp. 102–103.

[129] Ibid., p. 103.

[130] Haghshenass, "Iran's Asymmetric Naval Warfare," p. 17; Ward, *Immortal—A Military History of Iran and its Armed Forces*, p. 317; and Cordesman and Klieber, *Iran's Military Forces and Warfighting Capabilities*, pp. 87–89.

[131] Haghshenass, "Iran's Asymmetric Naval Warfare," p. 17.

[132] Frederic Wehrey, et al., *Dangerous but not Omnipotent*, p. 61.

AIR DEFENSES

ACTIVE DEFENSES. Air defense systems are yet another layer in Iran's A2/AD complex. Iran operates a mix of Russian-built SA-2, SA-5, and SA-15 (Tor-M1) systems, and may also have Chinese-built or domestically modified SA-2s as well as some remaining U.S.-built I-HAWK SAMs.[133] The most advanced of these systems, the short-range SA-15, is deployed at key nuclear facilities such as the complexes at Isfahan and Bushehr.[134] Iran has sought to upgrade its air defenses by purchasing Russia's S-300 missile system. Russia has, for the time being, canceled its planned sale of the S-300 to Iran in light of United Nations Security Council Resolution 1429, which levied sanctions against Iran as punishment for its intransigence during negotiations over its nuclear program.[135] Russia's sale of S-300s to Venezuela and Turkey suggests that Russia remains interested in exporting the system, and that Iran may be able to acquire it in the future.[136]

Shortfalls in Iran's C4 infrastructure prevent it from combining its disparate air defenses into an IADS.[137] Eschewing the C4 networks required to build an IADS would seem to agree with Iran's "mosaic defense" concept, which prizes individual initiative over top-down control.[138] In light of Iran's development of an extensive civilian fiber optics communications network, however, it would seem likely that Iran will make similar investments in a dedicated, hardened, and buried fiber optics network for military command and control.[139]

---

133 Cordesman and Klieber, *Iran's Military Forces and Warfighting Capabilities*, p. 97–99; and Ward, *Immortal—A Military History of Iran and its Armed Forces*, p. 317.

134 Cordesman and Klieber, *Iran's Military Forces and Warfighting Capabilities*, p. 100.

135 Glenn Kessler and Keith B. Richburg, "Russia halts sale of air defense missiles to Iran," *Washington Post*, June 12, 2010, accessible online at http://www.washingtonpost.com/wp-dyn/content/article/2010/06/11/AR2010061105248.html; and Colum Lynch and Glenn Kessler, "U.N. imposes another round of sanctions on Iran," *Washington Post*, June 10, 2010, accessible online at http://www.washingtonpost.com/wp-dyn/content/article/2010/06/09/AR2010060902876.html.

136 "Venezuela buys powerful missiles with Russian loan," *Reuters*, September 13, 2009, http://www.reuters.com/article/2009/09/14/venezuela-chavez-idUSN1346192820090914; "Iran out, but Russia Eyes Turkey for S-300," *UPI*, June 21, 2010, accessible online at http://www.upi.com/Business_News/Security-Industry/2010/06/21/Iran-out-but-Russia-eyes-Turkey-for-S-300/UPI-72321277143005/#ixzz1UQ3M6eqM.

137 Wehrey, et al., *Dangerous but not Omnipotent*, pp. 60, 97; Cordesman and Klieber, *Iran's Military Forces and Warfighting Capabilities*, p. 99; and Ward, *Immortal—A Military History of Iran and its Armed Forces*, p. 317.

138 Wehrey, et al., *Dangerous but not Omnipotent*, p. 57. In 2009, representatives of the Telecommunication Company of Iran reported that Iran had completed a national fiber optics network that exceeded 79,000 km of cable. See Mr. M. Sanaie and M. Shirazi, "Current Network Architecture And Services," briefing delivered to a United Nations' International Telecommunication Union in June 2009, accessible online at http://www.itu.int/ITU-D/asp/CMS/Events/2009/NGN-MICT/doc/Session3-Sanaei&Shirazi.pdf.

139 Riad Kahwaji and Barbara Opall-Rome, "Fiber-Optic Battle Lines," *Defense News*, June 2, 2008, accessible online at http://www.defensenews.com/story.php?i=3576376&c=FEA&s=SPE.

PASSIVE DEFENSES. Passive defense measures—such as using decoys, deception, hardening, deeply burying, camouflaging, and deploying mobile weapon systems—could reduce Iran's vulnerability to U.S. precision strikes.[140] Hardening, deeply burying, or employing mobile weapon systems limits the types of U.S. strike assets that can be used against them. Hardened or deeply buried targets generally require specialized heavy munitions, such as the GBU-28, a 5,000-pound class penetrating laser-guided bomb that can only be carried by the U.S. Air Force's F-15E and bombers. Should a target area be outside the range of the F-15E, or should Iran's air defenses remain intact, the United States could be limited to using its small inventory of stealthy B-2As to attack the most challenging hardened or deeply buried targets.[141] The flight time of standoff munitions such as the Tomahawk Land Attack Missile (TLAM) reduces their effectiveness against highly mobile SAMs, TELs, and ASCM launchers. The use of decoys and deception can also cause U.S. forces to waste sorties and costly precision-guided munitions on false targets.[142]

Passive defense measures—such as using decoys, deception, hardening, deeply burying, camouflaging, and deploying mobile weapon systems—could reduce Iran's vulnerability to U.S. precision strikes.

IRAN'S FUTURE A2/AD CAPABILITIES

The following section illustrates how Iran might to improve its A2/AD capabilities over time.

BALLISTIC MISSILES. Iran may upgrade its SRBMs with improved guidance and submunitions for attacking airfields and other large military targets. Despite these improvements, the CEPs of Iran's ballistic missiles could continue to limit their effectiveness against military point targets. Iran could also increase its TEL inventory and build pre-sighted firing positions with nearby hardened and buried "hide and reload sites," along with a large number of decoy launch sites to complicate U.S. counter-missile targeting. Combined, these actions would improve Iran's ability to conduct "shoot-and-scoot" firing missions and preserve its launchers for follow-on attacks.

WMD. Iran could develop weapons of mass destruction, including operational nuclear weapons, and deploy them on ballistic missiles.

---

[140] Ward, *Immortal—A Military History of Iran and its Armed Forces*, p. 318; and Wehrey, et al., *Dangerous but not Omnipotent*, pp. 52, 67.

[141] This is assuming a conflict would occur before the U.S. military can develop and field its next generation bomber, which should be capable of carrying munitions to attack hardened and deeply buried targets. See Robert Haffa and Michael Isherwood, "The 2018 Bomber: the Case for Accelerating the Next Generation Long Strike System," Northrop Grumman Analysis Center, August 2008, p. 11, accessible online at http://www.northropgrumman.com/analysis-center/paper/assets/The_2018_Bomber_the_case_for_a.pdf.

[142] Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report*, p. 124.

PROXIES. Iran could expand and deepen its network of proxy forces and arm them with G-RAMM. These irregular proxy forces could train with the IRGC and Lebanese Hezbollah, planning and rehearsing attacks against U.S. and partner military facilities in the Persian Gulf region. Lebanese Hezbollah or other proxies could prepare to conduct terror attacks in the United States and other NATO nations. Iran may also develop relationships with "hackers for hire," giving them an ability to conduct cyber attacks by proxy.

MARITIME EXCLUSION CAPABILITIES. To improve its ability to interdict ships entering and operating in the Persian Gulf, Iran could increase the range and integration of its sensors, upgrade its surface warfare platforms, expand the size of its undersea minelaying force and inventory of advanced mines, and acquire more advanced ASCMs. To support attacks against surface vessels at extended ranges, Iran could build over-the-horizon radars facing the Gulf of Oman and Arabian Sea. Iran could also improve its maritime UAVs and their networks, allowing them to serve as remote sensors for its land- and sea-based ASCMs. Iran could augment its fast-attack squadrons with Chinese-made *Houbei*-class catamarans armed with the supersonic YJ-83/C-803 ASCM or a similar type of advanced ASCM-equipped FAC that has proliferated over the last decade.[143] Iran could also upgrade sensors on its surface fleet—the effective range of many of their surface-to-surface missiles is limited by the range of their target acquisition radars—and acquire a ship-launched variant of the supersonic Klub ASCM, including the containerized Klub-K system. To improve its mine warfare capabilities, Iran might increase the size of its fleet of mini-submarines for covert minelaying, "civilian" vessels for clandestine minelaying, and its inventory of advanced influence mines.

AIR DEFENSES. Iran could make significant progress toward developing a more robust air defense network. Should the Russian S-300 remain unavailable, Iran could acquire HQ-9 SAM batteries–roughly the Chinese equivalent of the S-300 PMU-2—comprising eight launchers with four launch tubes and accompanying radars, vehicles, and spare missiles.[144] Iran might also build a hardened and buried fiber-optic network to link its air defenses and provide a common operational picture. In terms of passive defenses, it is likely that Iran will continue to bury and harden high-value assets such as nuclear facilities, missile manufacturing and storage sites, and C2 infrastructure. Iran may also build numerous decoys for key systems such as its ballistic and cruise missile launchers and SAMs. Iran

---

[143] For more on the *Houbei*, see Commander. John Patch U.S. Navy (Retired), "A Thoroughbred Ship-Killer," *U.S. Naval Institute Proceedings*, Vol. 136, No. 4, April 2010, pp. 48–53, accessible online at http://www.usni.org/magazines/proceedings/2010-04/thoroughbred-ship-killer.

[144] For more on the HQ-9, see Dr. Carlo Kopp, "CPMIEC HQ-9/HHQ-9/FD-200/FT-2000 Self-Propelled Air Defence System," *Air Power Australia*, August 2010, accessible online at http://www.ausairpower.net/APA-HQ-9-FD-FT-2000.html#mozTocId925694.

might also choose to co-locate many of its high-value targets in sensitive civilian areas in the hope of deterring U.S. airstrikes.

AN ILLUSTRATIVE IRANIAN A2/AD CAMPAIGN

The following is an illustration of how Iran might execute an A2/AD strategy in the 2020–2025 timeframe. The vignette assumes that Iran initiates hostilities with little or no warning. U.S. forces in the Persian Gulf region remain similar to those called for in the current defense program, with tactical aviation and supporting aircraft at al Udeid and al Dhafra, and U.S. surface vessels operating in the Gulf with Manama and Jebel Ali as supporting bases.

ATTRITE U.S. FORCES IN THE PERSIAN GULF. Iran will likely exploit the element of surprise to subject U.S. forces in the Gulf to a concentrated, combined-arms attack. Using coastal radars, UAVs, and civilian vessels for initial targeting information, Iranian surface vessels could swarm U.S. surface combatants in narrow waters, firing a huge volume of rockets and missiles in an attempt to overwhelm the Navy's AEGIS combat system and kinetic defenses like the Close-In Weapons System and Rolling Airframe Missile, and possibly drive U.S. vessels toward prelaid minefields. Shore-based ASCMs and Klub-K missiles launched from "civilian" vessels may augment these strikes. Iran's offensive maritime exclusion platforms could exploit commercial maritime traffic and shore clutter to mask their movement and impede U.S. counter-targeting.

While these attacks are underway, Iran could use its SRBMs and proxy forces to strike U.S. airfields, bases, and ports. Iran will likely seek to overwhelm U.S. and partner missile defenses with salvos of less accurate missiles before using more accurate SRBMs armed with submunitions to destroy unsheltered aircraft and other military systems. Proxy groups could attack forward bases using presighted guided mortars and rockets, and radiation-seeking munitions to destroy radars and C4 nodes. These groups could also provide Iran with on-scene bomb damage assessments (BDA) to determine whether follow-up strikes are necessary.

DENY SAFE TRANSIT THROUGH THE STRAIT OF HORMUZ. After initial attacks to attrite U.S. forces in the Persian Gulf, Iran will likely use its maritime exclusion systems to control passage through the Strait of Hormuz.

Mine warfare should feature prominently in Iranian attempts to close the Strait. As with many of its A2/AD systems, Iran could employ a combination of "smart" influence mines along with large quantities of less capable weapons such as surface contact mines.[145] Iran may deploy many of its less sophisticated

[145] Haghshenass, "Iran's Asymmetric Naval Warfare," p. 16; and Talmadge, "Closing Time," pp. 91–92.

mines from a variety of surface vessels, while it reserves its submarine force to lay influence mines covertly. Though Iran may wish to sink or incapacitate a U.S. warship with a mine, its primary goal is probably to deny passage and force the U.S. Navy to engage in prolonged mine countermeasure (MCM) operations while under threat from Iranian shore-based attacks. U.S. MCM ships, which typically lack the armor and self-defenses of larger warships, would be unlikely to survive in the Strait until these threats are suppressed.

Iran could deploy its land-based ASCMs from camouflaged and hardened sites to firing positions along its coastline and on Iranian-occupied islands in the Strait of Hormuz while placing decoys at false firing positions to complicate U.S. counterstrikes. Hundreds of ASCMs may cover the Strait, awaiting target cueing data from coastal radars, UAVs, surface vessels, and submarines. Salvo and multiple-axis attacks could enable these ASCMs to saturate U.S. defenses. Similar to the way in which Iran structured its ballistic missile attacks, salvos of less capable ASCMs might be used to exhaust U.S. defenses, paving the way for attacks by more advanced missiles.

Iran could disperse its FAC among the many small harbors and inlets opening onto the Strait, while smaller vessels, such as Boghammars, could hide amidst local commercial traffic. Smaller vessels could then sortie to conduct coordinated swarming attacks against vessels entering the Strait or attempting to clear mines.

Iran may use proxy forces to attack or hold at risk key air and sea ports of debarkation, logistics nodes, and staging bases with the objective of interrupting or preventing their use.

PREVENT OR IMPEDE THE DEPLOYMENT OF U.S. FORCES. While attempting to deny U.S. naval forces passage through the Strait of Hormuz, Iran will likely attempt to prevent or at least impede the deployment of other U.S. forces to the region. Iran may use proxy forces to attack or hold at risk key air and sea ports of debarkation, logistics nodes, and staging bases with the objective of interrupting or preventing their use. Iran could also launch missile and terrorist strikes against population centers and economic targets, and foment unrest among local Shia populations to deter Persian Gulf states from aiding the U.S. military.

DISRUPT U.S. MILITARY NETWORKS. In addition to its kinetic efforts to disrupt the flow of U.S. forces to the Persian Gulf, Iran may use indigenous cyber capabilities or mercenary "hackers for hire" to interfere with the U.S. military's networks, including the logistics networks that are critical to orchestrating force deployments and that currently rely on the Internet as opposed to a secure network (e.g., the Secret Internet Protocol Router Network, or SIPRNET).

ATTACK PERSIAN GULF ENERGY INFRASTRUCTURE. As part of a coercive campaign, Iran could choose to launch ballistic missile attacks against the oil and gas production infrastructure of its neighbors. This might be a difficult task considering that most energy infrastructure in the Persian Gulf is dispersed, redundant, and capable of being repaired quickly. More concentrated installations, such as

petroleum stabilization facilities, may present more lucrative targets. Iran could also use G-RAMM equipped proxies to attack oil and gas production infrastructure, although their effectiveness would depend on the ability of their munitions to destroy robustly built facilities.

EXPAND THE GEOGRAPHICAL SCOPE OF THE CONFLICT. Undoubtedly aware that the United States' ability to bring military power to bear is influenced by the demand for forces in other regions, Iran may seek to expand the geographical scope of a conflict in order to divert U.S. attention and resources elsewhere. Iran's terrorist proxies, perhaps aided by Quds Force operatives, could be employed to threaten U.S. interests in other theaters. Iran could conceivably leverage its relationship with Hezbollah to attempt to draw Israel into the conflict or tap Hezbollah's clandestine networks to carry out attacks in other regions.

Iran may seek to expand the geographical scope of a conflict in order to divert U.S. attention and resources elsewhere.

THE ROLE OF TIME. Both sides in a putative Persian Gulf conflict would likely prefer a rapid conclusion to hostilities. Iran, however, may be more vulnerable to the consequences of a prolonged conflict. While the United States, its partners, and the global economy would surely undergo hardships as the result of disruptions to the export of oil and gas from the Gulf, Iran's dependency on its energy exports and dearth of refining capacity are vulnerabilities that could be exploited by the United States.

MAJOR AREAS OF COMPETITION

The preceding assessment highlights several key operational challenges or "competitions" that may shape future U.S. military operations in the Persian Gulf.[146] Consistent with Iran's A2/AD strategy, these areas of competition are primarily asymmetric in nature.

Network versus Counter-Network Competition

Counter-network and counter-counter-network operations would likely be one of the key areas of competition in a Western Pacific A2/AD scenario. Iran, unlike the PRC, may not be able to match the United States in a symmetric competition involving long-range sensors and PGMs. Iran may tailor its A2/AD operations to sidestep that competition to a large degree by conducting coercive strikes against known fixed targets; attacking in swarms; leveraging passive measures such as hardening and deeply burying; and mobilizing key military systems to thwart U.S. precision targeting. Iran could also attack U.S. C4ISR infrastructure

[146] *AirSea Battle* used a similar construct. See Jan van Tol, et al., *AirSea Battle: A Point of Departure Operational Concept*, pp. 32–47.

asymmetrically using cyber attacks or proxy terrorist strikes against critical network facilities such as satellite ground control stations.

Rather than relying solely on kinetic and non-kinetic attacks against U.S. C4ISR battle networks, Iran will likely use deception and large numbers of decoys in the hope that U.S. forces will expend large numbers of its PGMs against false targets. In the maritime domain, this will include operating vessels and UAVs from cluttered littoral launching points to reduce the probability of being detected. Iran will also likely make use of "civilian" ships as minelayers, ISR assets and perhaps even as clandestine missile platforms. This may further confound U.S. targeting efforts given the United States military's desire to minimize collateral damage.

Missile Offense versus Missile Defense Competition

At present, ballistic missiles have a distinct advantage over kinetic missile interceptors in terms of their effectiveness and cost. In an *AirSea Battle* scenario in the Western Pacific, PLA ballistic and cruise missiles that are capable of striking fixed and mobile targets with precision may be the most pressing threat facing a U.S. military defending a handful of forward bases with kinetic interceptors. In contrast, while Iran may target U.S. bases and military forces with ballistic missiles, they may be more likely to use them to coerce Persian Gulf states to deny the United States the ability to use close-in bases.

This emphasis on coercion would place different stresses on U.S. forces than a campaign based primarily on defending against direct missile attacks on its bases. Defending the population centers and critical oil infrastructure of key Persian Gulf partners like Qatar, Bahrain and the UAE would likely be prohibitively expensive for Central Command to do alone, given the large areas needing coverage and the high cost of ballistic missile interceptors. Should Iran succeed in upgrading the accuracy of its ballistic missiles in the timeframe of this assessment, the U.S. military would have the dual challenge of defending point targets as well as large area targets. Furthermore, the threat of a WMD ballistic missile strike, especially if Iran fields an operational nuclear warhead, suggests that Central Command will need to conduct a concerted offensive counter-missile campaign to suppress Iran's missiles before they could be launched. This could force Iran into a classic "use them or lose them" dilemma, which would pose a dilemma of a different kind for the United States. The problem for U.S. planners becomes more acute as Iran is likely to have far more missiles than nuclear warheads. This means that the U.S. military would have to treat every Iranian missile launched as potentially carrying a nuclear payload. This would stress, and perhaps exhaust U.S. missile defenses. The only way to prevent this would be for the U.S. to destroy as many Iranian missiles as possible before they can be launched.

Of course, the U.S. military could also use ballistic missiles to its advantage. As a signatory to the Intermediate-Range Nuclear Forces (INF) Treaty, the United States is legally prevented from possessing ground-launched ballistic or cruise missiles ranging between 500 and 5,500 kilometers (270 and 2,970 nm, respectively).[147] Tactical surface-to-surface missile systems such as the Army's MGM-140 Army Tactical Missile System (ATACMS) are below the 270 nm threshold. Deployed in a distributed posture throughout the Gulf region—operated either by U.S. or a regional partner—the ATACMS could strike Iranian TELs and ASCM launchers that are within range to prevent them from launching their payloads or reloading after a launch. U.S. partners, unconstrained by the INF treaty, could operate longer ranged ballistic missiles.

Sea Control versus Localized Sea Denial

In an *AirSea Battle* scenario, the PLA would seek to deny the U.S. naval units operational freedom of maneuver across wide areas of the Western Pacific. In contrast, Iran would likely seek to deny the U.S. Navy's freedom to maneuver in the much more constricted waters of the Strait of Hormuz, the Persian Gulf, and possibly the Gulf of Oman. This competition has two subordinate competitions: mine warfare versus counter-mine warfare, and U.S. fleet defense versus Iranian swarming attacks.

Given the U.S. military's limited MCM capabilities, this might be the one area of competition where Iran could have a clear-cut advantage. Unlike the Western Pacific, where the large areas involved help mitigate the effectiveness of mining, the close confines of the Persian Gulf and Strait of Hormuz magnify the channelizing effect of mines. Iran could use mines to exert control over shipping, sever the SLOCs between the Persian Gulf and the Indian Ocean, and enhance the effectiveness of its swarming ASCM, UAV, and FAC attacks. The dearth of U.S. mine-clearance assets and their vulnerability to missile strikes in the close confines of the Strait of Hormuz, coupled with Iran's ability to continue re-seeding its minefields from shore or using clandestine platforms, could stretch Central Command's operational timelines for opening the Strait.

To overcome the capability limitations of its maritime exclusion capabilities, Iran might seek to exploit the narrow and shallow waters of the Persian Gulf and Strait of Hormuz by using the element of surprise, attacking in swarms at close range, and by attacking in or from cluttered littoral areas. These tactics would help erode the effectiveness of U.S. sensors while taking advantage of the willingness

147 "The Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles," United States Department of State, accessible online at http://www.state.gov/www/global/arms/treaties/inf1.html.

of Iranian naval forces to accept some attrition in order to inflict an "icon kill" of a major U.S. naval combatant.[148] Unlike the PLA's advanced ASBMs which could be launched at long ranges and use speed and maneuver to counter U.S. kinetic defenses, Iran could employ swarms of missiles launched from multiple points in close proximity to U.S. forces to surprise and overwhelm their defensive systems.

SUMMARY

The Iranian stratagems and capabilities described in this chapter seek to exploit the geographic and geostrategic features of the Persian Gulf to pose serious challenges to the United States' ability to project power into the region. Assuming the U.S. military has not changed its regional posture, operational concepts, and program of record capabilities, Iran could use its A2/AD complex to deny U.S. forces access to basing and freedom of maneuver in the Persian Gulf. In so doing, Iran may hope to delay U.S. military intervention long enough for Tehran to conduct acts of aggression or coercion, or raise the costs of intervention high enough to dissuade U.S. policymakers from taking action. If, however, the United States were to make prudent and affordable changes to its Persian Gulf force posture and develop capabilities to support an enabling operational concept, it could shift the balance in favor of U.S. power-projection forces. The nature and purpose of these changes are the subjects of Chapters 3 and 4.

[148] In other words, damaging or destroying a major U.S. combatant to demonstrate the U.S. military's vulnerability.

CHAPTER 3 > ELEMENTS OF AN OUTSIDE-IN ENABLING OPERATIONAL CONCEPT

Chapter 1 described an enabling concept as a set of integrated, overlapping lines of operation designed to ensure the U.S. military's freedom of action and create the conditions necessary to prevail against an A2/AD complex in the Persian Gulf region. Chapter 2 described principal components of projected Iranian anti-access and area-denial capabilities.

Chapter 3 begins by defining key assumptions to help bound the character of a potential conflict between the United States and Iran. It then outlines three major U.S lines of operation designed to overcome Iran's emerging A2/AD strategy. The chapter concludes by briefly summarizing operations that could be constituent parts of a broader campaign against Iran if an enabling concept is successfully executed. This broader campaign could include operations to destroy Iran's WMD complex; neutralize proxies that have been trained and equipped to commit acts of terror; and unconventional warfare to help set the conditions for toppling the Iranian regime.

KEY ASSUMPTIONS

Before describing candidate lines of operation that address the challenges summarized in Chapter 2, it is necessary to define key assumptions regarding the possible character of a future conflict between the United States and Iran. Given the differences between the geographic and strategic features of the Western Pacific and Persian Gulf, several of these assumptions necessarily differ from those outlined in CSBA's *AirSea Battle* report. Perhaps the most significant differences involve assumptions regarding Iran's more limited ability to degrade and disrupt U.S. C4ISR battle networks and the potential that Iran would threaten to employ WMD following a U.S. military intervention in the Persian Gulf.

PRIOR INTELLIGENCE AND WARNING (I&W) WILL BE LIMITED. This paper assumes that the United States will be responding to a contingency where Iran's military acts with little or no warning. Although it is logical to assume this constitutes the most stressing I&W case for testing an enabling operational concept, DoD cannot rule out the possibility that it may become involved in scenarios where others may act first to prevent Iran from threatening regional stability.[149] Thus, it will be important for DoD to test an enabling concept against a range of "road to war" cases.

An enabling concept must assume that U.S. forces deploying to the Persian Gulf in support of a contingency operation against Iran will need to fight to gain entry to the region.

IRAN WILL THREATEN TO USE WMD. In a future conflict with Iran, U.S. commanders must assume that Iran will threaten to use WMD. These threats may be focused on deterring a U.S. military intervention in the Persian Gulf, or preventing U.S. regional allies and security partners to provide basing and assistance to U.S. forces. For the purposes of this report, operations to counter Iran's WMD, including nuclear weapons and their critical infrastructure, are parts of a broader U.S. theater campaign and are not addressed as elements of an enabling concept.

NEITHER U.S. NOR IRANIAN TERRITORY WILL BE ACCORDED SANCTUARY STATUS. Although it must be assumed that U.S. sovereign territory will not be accorded sanctuary status during a conflict with Iran, it would be an overreach to assume that Iran's military will have the capability, at least in the near-term, to directly strike the U.S. homeland using conventional weapons with intercontinental ranges. Rather, it should be assumed that Iran will use indirect means such as terrorist attacks and offensive cyberspace operations to attempt to delay and disrupt U.S. military operations or threaten the U.S. population.

ALL OPERATING DOMAINS WILL BE CONTESTED. The United States must assume that Iran will seek to degrade and disrupt U.S. military operations in all domains, including space and cyberspace, and across the electromagnetic spectrum. Although Iran's cyberspace and counter-space capabilities are not as advanced as those fielded by the PLA, it is prudent to assume that U.S. theater battle networks, including communications, surveillance, and precision navigation and timing systems (PNT), will be disrupted or temporarily unavailable.

U.S. FREEDOM OF ACTION DURING INITIAL OPERATIONS WILL BE CONSTRAINED. This paper assumes that Iran will continue to mature an A2/AD strategy like the one described in Chapter 2, and that in the event of a conflict with the United States, Iran will employ a variety of A2/AD capabilities to delay or prevent effective U.S. military operations. Thus, an enabling concept must assume that U.S. forces

[149] This could include actions by a U.S. ally or partner to prevent Iran from developing operational nuclear weapons.

deploying to the Persian Gulf in support of a contingency operation against Iran will need to fight to gain entry to the region and maintain their freedom of action.

CLOSE-IN OPERATING LOCATIONS WILL BE AT RISK. From a political perspective, Central Command cannot assume that Persian Gulf states will permit U.S. forces to deploy to operating locations on their sovereign territory during the opening stages of a conflict with Iran. On the contrary, it is prudent to assume that Iran will succeed, if only partially or temporarily, to coerce its neighbors to deny access to U.S. forces. Moreover, it is plausible that domestic pressures will prevent some regional governments from directly supporting U.S. military operations. It should be assumed that Iran will seek to increase these pressures by conducting an aggressive propaganda campaign supported by acts of subversion to create popular opposition to U.S. military deployments.

From a threat perspective, it can be expected that Iran will use its regular and irregular military capabilities to attack U.S. forces already postured in the Persian Gulf. In other words, it must be assumed that U.S. forces will be at risk if positioned inside the reach of Iran's A2/AD threat ring at the start of a conflict.[150]

AN ENABLING OPERATIONAL CONCEPT IS NOT A SUBSET OF *AIRSEA BATTLE*. While this is not an assumption, it is important to stress that an enabling concept for the Persian Gulf should not be considered as a lesser-included case of an operational concept designed for a Western Pacific scenario. Operational concepts such as *AirSea Battle* and *Outside-In* must be tailored to the specific geographical and geostrategic characteristics of a region, the specific advantages a potential adversary could gain from its anti-access and area-denial operations, and the likely objectives of an adversary's leadership.

A CANDIDATE ENABLING OPERATIONAL CONCEPT

This section proposes three lines of operation to prevent the success of an Iranian anti-access and area-denial strategy and regain the U.S. military's freedom of action. They center on:

> Setting conditions to effectively deter or defeat Iranian coercion and aggression, while deploying U.S. forces to support initial operations against Iran from outside the reach of its anti-access threats;

> Operating from range to reduce the effectiveness of Iran's A2/AD complex by degrading its ISR capabilities and decreasing the density of its offensive and

[150] If available, dispersal bases located in the interior of the greater Arabian Peninsula may offer some measure of strategic depth for U.S. forward presence units.

defensive systems, including ballistic missiles, maritime exclusion capabilities, and air defense network; and

> Establishing localized air and maritime superiority when and where needed, including sea control through the Strait of Hormuz, to support follow-on force deployments and theater campaign operations.

The objective of the first line of operation is to establish a forward-deployed force posture that will reduce the U.S. military's exposure to Iran's anti-access capabilities and enable U.S. offensive and defensive operations from a posture of advantage. The second line prioritizes long-range operations to shrink the reach and density of Iran's A2/AD complex by destroying or neutralizing its key components, thereby increasing maneuver room for U.S. forces and decreasing Iran's ability to continue acts of aggression. In the last line, U.S. air, cyberspace, special operations, and maritime forces—including expeditionary amphibious units—would regain air and maritime superiority and conduct a theater-entry operation to reopen the Strait of Hormuz, thereby paving the way to achieve the strategic objectives of a broader warfighting campaign.[151]

Similar to CSBA's *AirSea Battle* concept for the Western Pacific, the lines of operation of an enabling concept for the Persian Gulf would have different execution timelines. The first and second lines may occur simultaneously with some offensive strikes against Iran beginning at the commencement of hostilities as opposed to delaying a counteroffensive until a lengthy force deployment phase is completed. Both lines would help set the conditions for successfully achieving the objectives of the third line of operation.

Positioning to Operate from Extended Range

> The proliferation of WMD and ballistic missiles means that our current strategy of pouring thousands of fighters and hundreds of thousands of troops into our enemy's back yard is no longer viable. The best hedge against the emerging threat is to shift as much of the power-projection burden as we can—as fast as we can—to long-range systems able to fight effectively from beyond WMD range.
>
> — General Horner[152]

Rather than immediately deploying a massive combined-arms force to bases that would be within the reach of many of Iran's anti-access systems, this assessment

[151] For example, these objectives could include enabling the flow of oil from the Gulf; preventing Iran from using WMD, including nuclear weapons; denying Iran access to materials needed to sustain military acts of aggression or coercion; and supporting through unconventional warfare operations a change in Iran's ruling regime.

[152] Horner, "What We Should Have Learned in Desert Storm, But Didn't."

proposes that DoD should create a posture that would reduce the threat to U.S. forces, extend the battlespace beyond the effective reach of Iran's offensive systems, and support operations from range to counter Iran's A2/AD complex, including its ISR elements.

Dispersing and Hardening Forward Presence Forces

Dispersing high-value forward presence units in the Persian Gulf to locations that would reduce their vulnerability to Iranian strikes and complicate Iran's planning is essential for creating an "outside-in" conventional deterrence posture. For example, high-value naval units such as a CSG or an ESG could reposition to areas in the Arabian Sea and other operating locations that are beyond the effective reach of most of Iran's land-based maritime sensors, coastal ASCMs, and fast attack craft. Similarly, it may be desirable for some U.S. units forward-based in Persian Gulf littoral states to disperse to alternate locations across the Arabian Peninsula, if possible, in order to reduce their vulnerability to ballistic missile and proxy attacks (see Figure 8). Maintaining a large number of suitable airfields from which U.S. aircraft could operate would also greatly complicate Iran's targeting problem and force Iran to spread its limited missile force over a larger number of targets.

Host nation hardening of key base facilities could also reduce the operational impact of ballistic missile or G-RAMM attacks and enable some U.S. combat aircraft to be based forward.[153] Adding kinetic and non-kinetic missile defenses to hardened bases would further reduce the effectiveness of Iranian missile strikes. Additional U.S. and partner missile defenses postured to defend critical population centers and oil infrastructure could also "harden" Persian Gulf states to coercive acts and improve the potential that U.S. forces will receive regional support in the event of a conflict.

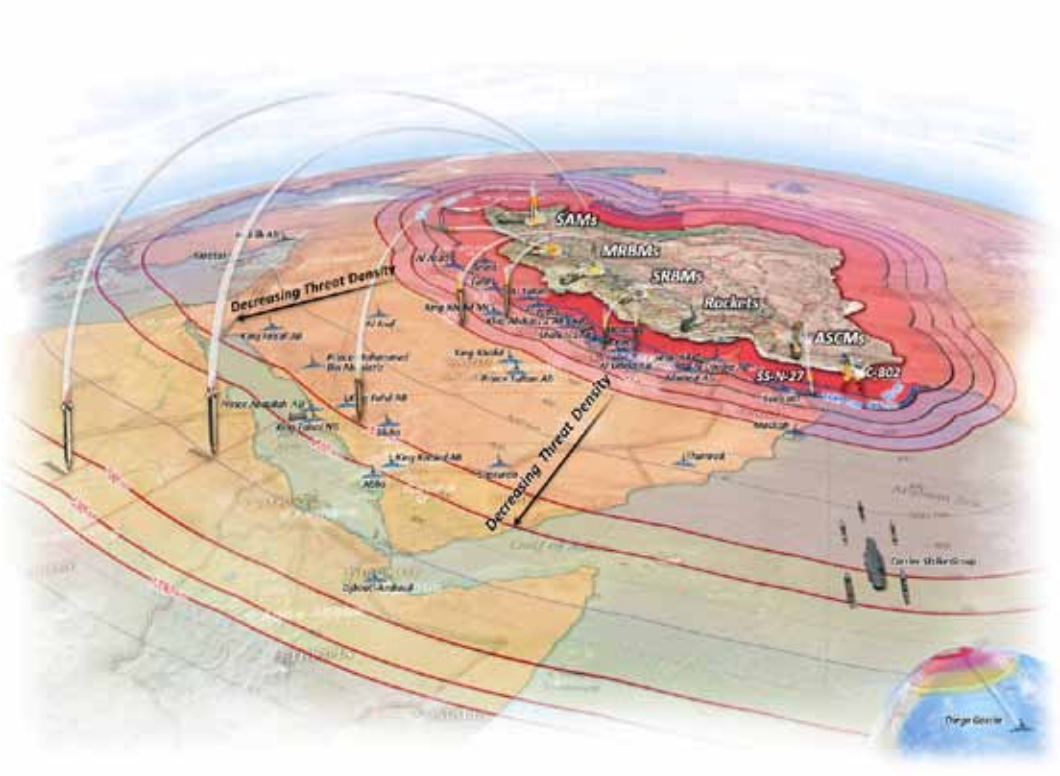
Evacuating large fixed installations during a developing crisis, or worse after hostilities have broken out, could lead to disaster. Such an evacuation during a crisis could severely undermine partner confidence in the United States' willingness and ability to defend them. Evacuating under fire would also be a hazardous undertaking. Assuming the United States does not intend to initiate hostilities with Iran (and thus gain the advantage of striking first), it seems advisable to relocate and disperse as many of these forward-based units and their critical functions as possible in peacetime to operating locations that are out of range of many of Iran's first-strike capabilities.

Thus, in the long run, Central Command should reconsider the value of maintaining large fixed installations in the Persian Gulf in peacetime, such as

DoD should create a posture that would reduce the threat to U.S. forces, extend the battlespace beyond the effective reach of Iran's offensive systems, and support operations from range to counter Iran's A2/AD complex.

[153] See John Stillion and Scott Perdue, "Air Combat Past, Present and Future," RAND PowerPoint presentation, August, 2008, pp. 9–13, accessible online at http://www.defenseindustrydaily.com/files/2008_RAND_Pacific_View_Air_Combat_Briefing.pdf.

FIGURE 8. DISPERSING FORWARD-BASED UNITS



the CAOC in Qatar and USNAVCENT Headquarters in Bahrain. Faced with the threat of Iranian ballistic missile attacks, in a crisis or conflict situation, host nations such as Qatar and Bahrain may refuse U.S. forces the use of their bases or facilities as staging locations for operations against Iran. These installations would also be lucrative targets for Iran. Similarly, an aircraft carrier or an amphibious assault ship in the Persian Gulf would be high-value targets for Iranian forces seeking to demonstrate the U.S. military's vulnerability. While it would be challenging for Iran to sink large naval combatants, U.S. naval forces could be forced into a "defensive crouch" whereby they are preoccupied with their self-defense rather than effectively conducting strike operations.

Of course, reducing Iran's targeting opportunities does *not* mean that the United States should completely remove its military presence from the Persian Gulf either before or during a developing crisis. Rather, an enabling concept of operations should include actions to *augment* the United States' deterrent and warfighting posture by deploying, where possible, forces possessing a small footprint

and that are difficult to target, such as special operations forces, ATACMS batteries, mobile missile defense batteries, UUVs, and possibly Littoral Combat Ships (LCS). Such deployments could both enhance U.S. combat capability and also reassure regional allies and partners.

Deploying To Achieve Positional Advantage

To address the risk of introducing U.S. forces inside Iran's anti-access envelope prematurely, this operational concept exploits the United States' advantage in conducting operations over extended ranges. For example, DoD's new long-range strike family of systems, when fielded, could deploy to staging locations around periphery of the Middle East, such as the Horn of Africa, Indian Ocean, Southern and Eastern Europe, and perhaps even the Black Sea/Caucasus region.[154] In addition to Air Force long-range surveillance and strike capabilities, Navy aircraft carriers equipped with low observable UCLASS with a combat radius of more than 1,200 nm could operate from the Arabian Sea to strike elusive mobile targets.[155] *Virginia*-class attack submarines (SSNs) and *Ohio*-class guided-missile submarines (SSGNs) armed with land attack cruise missiles could complement carrier strikes against fixed targets.

Operational Implications of an Outside-In Posture

As with any new concept for projecting military power abroad, the U.S. military should assess the potential advantages and disadvantages of shifting toward an outside-in posture compared to DoD's legacy force deployment framework for the Persian Gulf.

Perhaps the most important benefit is the potential to leverage the U.S. comparative advantage in long-range strike capabilities to reduce risk to U.S. forces. This is assuming, of course, that the U.S. military invests in sufficient surveillance and strike systems, and munitions to accomplish enabling concept missions effectively and within a reasonable period of time.

Second, deploying to fight from extended range could greatly complicate Iran's operational planning. Specifically, shifting the U.S. theater footprint from forward bases well within Iran's A2/AD threat ring to a "peripheral" posture would reduce Iran's ability to achieve a clear picture of the battlespace, and could induce Iran to develop expensive and highly vulnerable extended ISR capabilities.

---

[154] DoD has described its next long-range strike family of systems as an integrated set of penetrating strike, standoff strike, ISR, and airborne electronic attack capabilities. See, for example, Mitch Gettle, "Air Force, Navy team up for 21st Century fight," Air Force Public Affairs Agency, July 22, 2011, accessible online at http://www.af.mil/news/story.asp?id=123264966.

[155] For an assessment of the Navy's proposed UCLASS, see Mark Gunzinger, *Sustaining America's Strategic Advantage in Long-Range Strike* (Washington, DC: CSBA, 2010), pp. 68–70.

Third, ideally an expanded U.S. basing posture (to include naval forces capable of conducting ISR and strike operations at extended ranges) would enable attacks across the breadth and depth of Iran along multiple axes of attack. Employed in this manner, U.S. forces would further complicate Iran's planning and compel it to reduce its heavy concentration of defensive systems along the Persian Gulf and Strait of Hormuz, lest it leave other key assets undefended.

On the negative side, a force posture that requires land- and sea-based surveillance and strike capabilities to operate over longer ranges would reduce aircraft sortie rates and increase strains on the aerial refueling force. Increasing the use of advanced, survivable, manned and unmanned systems with greater mission persistence (in terms of both survivability and fuel capacity) for strike, surveillance, and airborne electronic attack could help mitigate these negative consequences. Increased emphasis on non-kinetic electronic warfare, directed energy, and offensive cyber capabilities that could disrupt, degrade, damage, or destroy Iran's A2/AD systems may help reduce strains on U.S. logistics networks and, in so doing, help reduce the cost associated with this new operational concept.[156]

From a posture of advantage, U.S. forces could seize the initiative and conduct sustained operations from all axes of attack to suppress, degrade, and destroy Iran's anti-access capabilities.

In summary, instead of deploying a large force into the Persian Gulf as occurred in the two Gulf Wars, an approach that would almost certainly lead to significant U.S. casualties in the event of an Iranian surprise attack, the United States could adopt a new deployment framework that enables its forces to *avoid* major damage from Iran's initial strikes, or at least greatly mitigate their effects. Of course, a deployment plan that expands the theater hinges on the availability of sufficient bases, and the development of forces capable of operating from greater ranges. It will also depend, in some cases, on the willingness of other states to grant overflight permission to U.S. forces operating from those bases to strike at Iran. This expanded posture is further addressed in Chapter 4.

Reducing Iran's A2/AD Threat Ring

Operating from a posture of advantage, U.S. forces could seize the initiative and conduct sustained operations from all axes of attack to suppress, degrade, and destroy Iran's anti-access capabilities (see Figure 9). The principal objective of these actions is to enable U.S. forces to operate at lower levels of risk from land and sea bases located closer to potential target areas, thereby increasing aircraft sortie rates, improving the ability of surveillance, strike, and airborne electronic

[156] For example, a high power microwave (HPM) directed energy weapon installed on an aircraft or a cruise missile could create effects that range from temporarily disrupting electronic systems such as computers to physically burning out systems that are not shielded against the high voltages generated by a HPM pulse. See Robert J. Capozzella, Lieutenant Colonel, *High Power Microwaves on the Future Battlefield: Implications for U.S. Defense* (Maxwell Air Force Base, AL: Air War College, February 17, 2010), accessible online at https://www.afresearch.org/skins/rims/q_mod_be0e99f3-fc56-4ccb-8dfe-670c0822a153/q_act_downloadpaper/q_obj_c3e8c3b9-690e-42ff-abf7-07c30972415a/display.aspx?rs=enginespage.

FIGURE 9. REDUCING THE THREAT RING

attack systems to penetrate deep into Iran, and setting the conditions for naval operations in Iran's littoral regions.

Winning the C4ISR Network/Counter-Network Competition

Although it seems likely that Iran's military will remain less dependent on long-range C4ISR capabilities compared to the United States, prevailing in the network versus counter-network competition should be a key part of this line of operations. Doing so would have a significant effect against Iran's missile campaign. Although Iran's missile batteries may still be able to target known fixed locations, without the means to gain an accurate picture of the battlespace, they would not know with certitude if targets of value were actually present at these locations. Denying Iran the ability to conduct battle damage assessments (BDA) would also help prevent it from determining the effectiveness of its missile salvos, especially if U.S. and coalition forces were operating in remote areas that could not be easily

monitored by Iranian agents living among the local population. Combined, these factors could greatly complicate Iran's targeting efforts and possibly force it to expend missiles against targets with little or no value. In other words, effective counter-network operations coupled with a dynamic U.S. force dispersal plan could help shift the "missile competition" in favor of the U.S. military.

Effective counter-network operations coupled with a dynamic U.S. force dispersal plan could help shift the "missile competition" in favor of the U.S. military.

PREPARATORY ACTIONS. U.S. efforts to win the network/counter-network competition should begin well before the onset of hostilities with Iran. Peacetime intelligence preparation of the battlespace centered on efforts to map Iran's C4ISR architecture will be critical to defining U.S. targeting priorities in the first days of conflict. Given sufficient warning, U.S. commanders could also increase the "depth" of their ISR capabilities in theater, e.g., by positioning surveillance assets to hardened or distributed bases in Southwest Asia; deploying additional undersea sensors at key locations in the Persian Gulf and Gulf of Oman; and possibly seeding small, inexpensive sensors that are capable of detecting ground units deploying to Iran's coastal areas.

A BLINDING CAMPAIGN. At the start of hostilities, U.S. forces should move aggressively to degrade, disrupt, and destroy Iran's C4ISR networks. U.S. counter-network operations should integrate long-range strikes, undersea warfare, electronic warfare, and offensive cyberspace operations against Iran's early warning radars, maritime surveillance systems, and C2 facilities.[157] Toward this end, bombers operating out of remote or peripheral bases and SSNs and SSGNs in the Arabian Sea would launch a first wave of kinetic strikes using precision-guided standoff weapons against Iran's fixed sensors and C2 nodes. U.S. special operations forces inserted into Iran could augment these strikes by disabling known C4ISR assets that are difficult to kill with standoff weapons, such as nodes in fiber optics networks. Degrading Iran's C4ISR networks and air defenses will help pave the way for U.S. Air Force and Navy penetrating aircraft to attack Iran's mobile radars, and command and control systems.

The U.S. military's counter-network operations should also exploit its comparative advantage in advanced systems capable of dominating the electronic spectrum. Conducting cyber strikes to degrade enemy C4ISR networks could reduce the effectiveness of Iran's offensive operations and reduce the threat to U.S. long-range systems penetrating hostile airspace. Long-range strike capabilities configured to counter early warning and target acquisition systems could prove crucial

[157] DoD defines electronic warfare as operations to secure and maintain freedom of action in the electromagnetic spectrum. Electronic warfare is subdivided into electronic attack, electronic protection and electronic warfare support. Electronic attack includes the use of electromagnetic energy, directed energy, or anti-radiation weapons to degrade, neutralize, or destroy enemy combat capabilities. See Joint Publication 3-13.1, "Electronic Warfare," January 27, 2007, pp. v–vi and I-2–I-4, accessible online at http://ftp.fas.org/irp/doddir/dod/jp3-13-1.pdf.

to the success of a blinding campaign.[158] Electronic jamming could also prevent "civilian" vessels from providing information about the location and disposition of U.S. Navy surface vessels and legitimate commercial cargo ships. Future directed-energy capabilities such as high powered microwave (HPM) weapons that damage, disrupt, or destroy electronic systems would provide U.S. commanders with a potentially "game-changing" weapon for crippling Iran's use of the electromagnetic spectrum.[159]

COUNTERING IRAN'S COUNTER-NETWORK OPERATIONS. Neutralizing Iran's ability to degrade the U.S. military's use of space and cyberspace will almost certainly be another important aspect of the network/counter-network competition. Although it is unlikely that Iran's counter-space capabilities will pose nearly as significant a threat to U.S. satellites as capabilities fielded by the PLA, it will be important to protect the U.S. military's space architecture—including vulnerable ground stations in the United States and abroad—from possible attacks, including attacks by Iran's terrorist proxies.[160] Iran could use ground-based jammers to disrupt GPS and space-based and airborne C4ISR, particularly around high-value targets. Since these jammers could affect GPS-guided munitions, their neutralization would be important in winning the network/counter-network competition.

Similarly, it should be anticipated that Iran and its proxies will conduct offensive cyber attacks. to exploit, disrupt, deny, and degrade networks needed to orchestrate U.S. force deployments and operations.[161] If successful, these attacks could extend Central Command's operational timelines significantly.[162] Moreover, Iran might attempt to employ cyber strikes to disrupt the control systems or data

---

[158] Although EC-130Hs have played a key role in Iraq and Afghanistan over the last decade, using this cargo aircraft-based weapons system for airborne electronic attack missions in high threat areas would likely result in high attrition levels. The Navy's EA-18G Growlers are more survivable than EC-130Hs, but may lack the range and persistence needed to operate in the northern part of the Persian Gulf, especially if they are operating from aircraft carriers that are located hundreds of miles from Iran's coastline.

[159] The term "directed energy" is used by the Department of Defense to describe a wide range of non-kinetic capabilities that produce "a beam of concentrated electromagnetic energy or atomic or subatomic particles" to "damage or destroy enemy equipment, facilities, and personnel" in the air, sea, space and land domains. DE devices are defined as systems "using directed energy primarily for a purpose other than as a weapon" that may include laser rangefinders and designators used against sensors that are sensitive to light. Finally, directed energy warfare includes "actions taken to protect friendly equipment, facilities, and personnel and retain friendly use of the electromagnetic spectrum." See Joint Publication 1-02, "Department of Defense Dictionary of Military and Associated Terms," November 8, 2010, pp. 108–109, accessible online at http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf.

[160] For a description of the PLA's counter-network capabilities, see *AirSea Battle*, pp. 27–29.

[161] These proxies could include states that decide to covertly support Iran by conducting cyberspace attacks against U.S. networks.

[162] *Department of Defense Strategy for Operating in Cyberspace* (Washington, DC: Department of Defense, July 2011), p. 3.

underpinning U.S. civilian power grids and telecommunications networks. These attacks could come in the form of false information, or they may be direct actions to disrupt or corrupt the flow of information. Thus, computer network defense (CND) operations that are integrated across the U.S. military's networks may be needed to prevent Iran from using cyberspace as part of a broader strategy to impose costs on the United States.

An integrated defense against Iranian counter-network operations should begin well before the onset of an actual conflict. Developing a detailed understanding of Iran's counter-network capabilities, especially its ability to create effects in cyberspace that may be difficult to attribute, would help U.S. commanders to develop an appropriate network defense battle plan. More tangibly, fielding an integrated, multi-layered network of space-based, airborne and terrestrial information capabilities would reduce U.S. vulnerability to counter-network attacks. This architecture could include high-altitude, very long endurance unmanned aircraft to act as airborne C2 nodes and conduct wide area surveillance in support of other systems penetrating deep into Iran. To reduce overall demand on U.S. C4ISR networks and improve early operations in communications-degraded areas, Central Command could use advanced manned platforms that have the independent ability to find, fix, track, and strike mobile targets.[163]

Central Command will need to sustain its counter-network operations at an appropriate level of effort throughout a campaign to prevent Iran from regenerating its C4ISR capabilities and adopting non-traditional work-arounds, such as relying on cellular telephone networks, reports from local populations, or using information collected through the Internet and from international commercial broadcasts. Similarly, the U.S. military should anticipate that Iran's efforts to degrade U.S. C4ISR capabilities will continue throughout the campaign. U.S. forces penetrating Iranian airspace should expect to operate under conditions of localized degradation of communications and PNT information from GPS.

Winning the Missile Competition

Reducing the enemy's capacity to launch missile attacks on U.S. and coalition forces, bases, and sensitive civilian infrastructure should be a major objective of an enabling operational concept. Given the difficulty of defending against missile salvos—especially if the United States is unable to reinforce its BMD posture before the start of hostilities—Central Command should weight its early efforts toward *offensive* operations to destroy or suppress ASCMs and ballistic missiles before they are launched; i.e., focus on killing the "archer" rather than the "arrows." Initiating offensive counter-missile strikes as early as possible will help

[163] Capabilities with this degree of autonomy have yet to be developed by DoD.

Central Command to seize the initiative, as compared to a defense-dominant operational concept that could cede the initiative to the enemy.

Central Command should expect to sustain counter-missile operations throughout the conflict, especially since enemy commanders may choose to husband their most capable ASCMs and ballistic missiles for the most lucrative targeting opportunities, or fire them only when it is reasonably certain that their launchers will not be destroyed in the process.[164] Given the difficulty in finding and targeting mobile TELs and ASCM launchers deployed by an enemy with excellent decoy and deception tactics, it is possible that an offensive counter-missile campaign may become more of a missile-suppression rather than missile-destruction effort.

Central Command should weight its early efforts toward *offensive* operations to destroy or suppress ASCMs and ballistic missiles before they are launched; i.e., focus on killing the "archer" rather than the "arrows."

OFFENSIVE OPERATIONS. Early offensive operations to degrade the missile threat at its origins would require reconnaissance and strike systems capable of operating at extended ranges and persisting in enemy airspace. Staging from generally secure locations, a future long-range strike family of systems—including stealth bombers, a low-observable and persistent UCLASS, air- and sea-launched standoff munitions, and airborne electronic attack capabilities—should accord priority to finding, fixing, tracking, and destroying Iran's missile forces and their supporting infrastructure. If available in theater, land-based systems such as the Army's air transportable and mobile Multiple Launch Rocket System (MLRS) armed with extended-range ATACMS could provide supporting counter-battery fires in all weather conditions.[165]

Since many Iranian missile launchers and their supporting capabilities will be mounted on mobile platforms, U.S. air, sea, and land-based counter-missile strikes will need timely, precise targeting information. Acquiring this information in non-permissive areas will be a major challenge for the U.S. military. In fact, the most difficult element of a counter-missile offensive against Iran may well be locating TELs and mobile ASCM launchers that have the capability to "shoot and scoot" quickly or are masked by the use of deception, camouflage and other concealment tactics.

Targeting information could be self-generated by highly persistent, penetrating strike platforms equipped with on-board ground moving target indicator (GMTI) systems, or provided by manned or unmanned stealthy surveillance

---

[164] It should also be expected that Iran will likely employ aggressive camouflage, concealment, and deception tactics to reduce the effectiveness of U.S. precision targeting against Iran's missile launchers and missile infrastructure.

[165] The Army Tactical Missile System ATACMS Block I unitary warhead variant can reach targets out to 300 kilometers. See "Lockheed Martin Successfully Validates ATACMS Missile Long-Term Reliability," February 26, 2009, accessible online at http://www.lockheedmartin.com/news/press_releases/2009/MFC_022609_Lockheed MartinsSuccessfully.html.

aircraft with sensor-to-shooter data links that compress the kill chain.[166] Special operations forces inserted into Iran using stealthy air and sea platforms capable of operating over extended distances could also help locate and designate high-value targets for airstrikes.[167] These capabilities, however, are either not a part of the U.S. military's current force, or are not numerous enough to sustain a counter-missile campaign over long distances against many hundreds, if not thousands of aimpoints in high-threat areas.

MISSILE DEFENSE OPERATIONS. Although a successful counter-missile offensive would decrease Iran's coercive power, it is highly unlikely that offensive operations alone will prevent Iran from launching ballistic and cruise attacks, especially if Iran initiates hostilities. Thus, a layered defense that can intercept ballistic missiles at all stages of their flight—boost/ascent, mid-course, and terminal—would be an important aspect of dealing with Iran's missile threat.

A ballistic missile may be most vulnerable when it is in its boost/ascent phase of flight, given its relatively low speed and high heat signature during that phase. According to General Robert C. Kehler, former Commander of the Air Force's Space Command, killing missiles in their boost/ascent phase would be a high priority, as it precludes the missiles from deploying countermeasures such as chaff and other decoys. It would also reduce the number of very expensive kinetic interceptors that would be needed to defeat enemy missile warheads during their terminal phase of flight and avoid unwanted collateral damage created by missile interceptions over friendly territory.[168]

Toward this end, the U.S. military has expressed interest in developing "air launched hit-to-kill" (ALHK) weapons that could be carried by air platforms capable of penetrating medium-threat and high-threat areas.[169] Assuming recent

---

[166] The "kill chain" is described by the U.S. Air Force as a six-stage cycle: find, fix, track, target, engage and assess, or F2T2EA. Creating such machine-to-machine interfaces could reduce kill chain timing.

[167] A new stealthy platform would be required to insert SOF by air into denied areas (see Chapter 4).

[168] General Kehler is now the Commander of the U.S. Strategic Command. See "Strategic Forces Subcommittee Hearing on Budget Request for National Security Space and Missile Defense Program," May 29, 2009, p. 10, accessible online at http://www.gpo.gov/fdsys/pkg/CHRG-111hhrg51958/pdf/CHRG-111hhrg51958.pdf.

[169] The Air Force has expressed interest in an ALHK missile that could be carried on a fighter or bomber. ALHK could be a derivative of a Terminal High Altitude Area Defense (THAAD) missile for intercepting ballistic missiles high in the atmosphere, or it could be a modified version of the AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM) for low atmosphere inflight intercepts. The Network Centric Airborne Defense Element (NCADE), a second concept proposed by industry, would marry an AMRAAM with an existing IR seeker head to create a ballistic missile interceptor that could cost approximately $1 million each. See http://www.airforcetimes.com/news/2009/06/airforce_fighter_missile_061609w/, and http://www.defenseindustry daily.com/ncade-an-abm-amraam-03305/. DoD has cancelled two programs over the last three years—the Airborne Laser, and the Kinetic Energy Interceptor programs—that were intended to develop systems to defeat ballistic missiles in their boost/ascent phase.

progress in directed energy research continues, in the next decade directed energy weapons mounted on platforms with sufficient power and cooling capacity to generate a sufficiently lethal beam of energy could provide another means of defeating ballistic missiles as they ascend into their ballistic trajectory.

Although land- and sea-based kinetic missile defenses will be a critical part of a U.S. counter-missile operation against Iran, given their close to prohibitive cost it is highly unlikely there will be enough of them in the Persian Gulf at the start of a conflict to defend against multiple missile salvos with a high degree of effectiveness. This will be especially true if threat conditions curtail resupply operations or if resupply is limited to strategic airlift. Moreover, current BMD systems and their interceptor missiles remain extremely expensive, creating the opportunity for Iran to use salvos of short-range and medium-range ballistic missiles to impose disproportionate costs on the United States. The Patriot Advanced Capability-3 (PAC-3) missile costs $3.3 million per copy, the Terminal High Altitude Area Defense (THAAD) missile $9 million each, and a single future Standard Missile-3 (SM-3) may cost $10–15 million.[170] At these prices, defending against a single salvo of twenty or thirty inbound missiles could cost well over $100 million, assuming two interceptors are fired at each incoming threat as indicated by the U.S. military's current missile defense doctrine.[171] Iran could increase this unfavorable cost-exchange ratio by launching inaccurate "dumb" missiles to force U.S. defenders to waste their expensive interceptors, opening the door for follow-on salvos of newer, more accurate weapons, or by using ballistic missiles with multiple independently targetable reentry vehicle (MIRV) warheads should it develop the technology to do so.

In the future, U.S. forces may be able to use a mix of kinetic interceptors and directed energy weapons to create a layered defense capable of interdicting swarms of ballistic and cruise missiles as well as G-RAMM. Directed energy weapons that are capable of self-generating a nearly infinite number of rounds for the cost of the fuel needed to create the requisite directed energy (e.g., electric solid-state lasers) could help shift the missile competition in favor of the United States. They would also help relieve the strain on the U.S. military's expeditionary logistics network and reduce the need for ships with a BMD mission to leave station for

---

[170] See "DoD News Briefing with Secretary Gates and Gen. Cartwright," September 17, 2009, accessible at http://www.defense.gov/transcripts/transcript.aspx?transcriptid=4479. During a news conference to explain DoD's European missile-defense system, General Cartwright explained that a PAC-3 costs about $3.3 million per missile; a SM-3 Block I, Mod A about $9.5–10 million; a SM-3 Block IB about $13–15 million; and a THAAD missile about $9 million per unit. These costs exclude the price of the missiles' launch platforms and supporting infrastructure.

[171] It is standard operating procedure to use multiple interceptors to achieve a high probability of kill against an incoming ballistic missile. See General Patrick O'Reilly, statement before the House Appropriations Committee Defense Subcommittee, April 2, 2009, accessible online at http://democrats.appropriations.house.gov/images/stories/pdf/def/Patrick_OReilly_04_02_09.pdf.

extended periods of time to rearm with kinetic interceptors. In other words, new directed energy missile defenses may give future commanders the means to *kill the arrows* as well as the archer, and do so with a cost-exchange ratio that favors the U.S. military far more than is currently the case.

Establishing Localized Air and Maritime Superiority

Creating Pockets of Air Superiority

During the opening stages of an air campaign against Iran, it would be important to establish "pockets" of air superiority sufficient to enable operations conducted within range of Iran's air defenses. This could be a particularly challenging task if the U.S. Air Force lacks sufficient close-in fighter bases and the Navy is unable to operate its carriers within a few hundred miles of Iran. Moreover, future U.S. counter-air operations against an Iranian IADS may not constitute a "roll-back" campaign in the traditional sense. Even though it is doubtful that Iran will field an IADS that approaches the sophistication of the PLA's air defense network in the near-term, it should be assumed that Iran will seek to husband its most capable mobile SAMs so they can be used against U.S. aircraft later in a campaign, in a manner similar to that employed by the Serbian forces during the 1999 Kosovo War. Rather than conduct a determined defense of all potential high-value target areas, Iranian SAM operators could control their radar emissions, frequently change their locations, and use decoys and camouflage to avoid detection and create pop-up "SAM ambushes."[172] Similarly, Iran may choose to hide some of its fighters in hardened shelters located deep in its interior to prevent their early destruction.

To counter Iran's "air defense network in being" tactics, the U.S. military could employ stealth platforms that are capable of avoiding detection, and use decoys and electronic warfare systems to spoof and goad enemy SAM operators into activating their radars and thus revealing their locations. DoD's new Miniature Air Launched Decoy (MALD) would seem to be particularly well-suited for this mission.[173] Even with these capability enhancements, the U.S. military should plan for a sustained effort to suppress air defense threats that may pop-up without warning throughout the course of an air campaign against Iran.

---

[172] It is not publicly known the extent to which Iranian SAM crews have been trained in these tactics.

[173] MALDs, which could be deployed on a variety of current and future aircraft, can penetrate approximately 500 nautical miles and replicate a false aircraft signature to confuse enemy air defenses. The MALD-Jammer (MALD-J), a variant of MALD, is designed to provide a loitering capability that will jam enemy air defenses.

Achieving Maritime Superiority: A Joint Theater Entry Operation

Tasks critical to reestablishing sea lines of communication in the Strait of Hormuz and Persian Gulf are likely to include suppressing undersea threats, defending against ASCMs and swarming fast attack craft, and clearing mines. This assessment finds that U.S. operations to clear mines should *not* entail deploying MCM assets into the Strait of Hormuz and Persian Gulf until Iran's A2/AD systems have been suppressed. Rather, U.S. and coalition forces should adopt an approach that establishes localized control of the airspace, suppresses Iran's FAC, coastal ASCM batteries and G-RAMM forces, and only then proceeds with MCM operations to reopen the Strait. Instead of looking at each of these tasks individually, the following section addresses them as part of a joint theater-entry operation designed to seize Iranian territory along the Strait of Hormuz's northern coast, key islands around the Strait, and the Gulf of Oman. These lodgments would be focused on suppressing threats against ships operating in the Strait of Hormuz and Gulf of Oman, rather than to create forward operating bases preparatory to a full-scale land invasion of Iran.

ARE FORCIBLE ENTRY OPERATIONS IN A2/AD ENVIRONMENTS FEASIBLE?

Some Defense Department leaders have publicly questioned the feasibility of conducting amphibious forcible entry operations in light of the proliferation of ASCMs and other precision-guided munitions. In August 2010, Secretary Gates challenged the Marine Corps to examine its doctrine and composition of its force while taking into consideration the emergence of these threats:

> Looking ahead, I do think it is proper to ask whether large-scale amphibious assault landings along the lines of Inchon are feasible. New anti-ship missiles with long range and high accuracy may make it necessary to debark from ships 25, 40 or 60 or more miles at sea.[174]

Robert Work and Frank Hoffman have observed that future amphibious assaults "will necessarily be different from those conducted in the past—primarily because the virtual monopoly the United States has long enjoyed in guided weapon battle networks is going away."[175] The article then outlined the basic elements

---

[174] See Robert M. Gates, "George P. Shultz Lecture," August 12, 2010, accessible online at http://www.defense.gov/speeches/speech.aspx?SpeechID=1498. In January 2011, Gates announced the cancellation of the Expeditionary Fighting Vehicle (EFV), a system that many considered as essential to future amphibious operations. As he did so, however, Gates was careful to note that the "decision does not call into question the Marines' amphibious assault mission." See http://www.defense.gov/speeches/speech.aspx? speechid=1527.

[175] Robert O. Work and Frank G. Hoffman, "Hitting the Beach in the 21st Century," Proceedings, Vol. 136, No. 11, November 2010, accessible online at http://www.usni.org/magazines/proceedings/2010-11/hitting-beach-21st-century. Robert Work is the Undersecretary of the Navy.

of a *joint theater-entry operation* to gain and secure lodgments ashore and enable the deployment of follow-on forces into an area of operations:

> Achieve air, sea, undersea, and battle-network superiority in an objective area;

> Neutralize an enemy's anti-ship capabilities and reduce G-RAMM threats ashore; and

> After sufficient preparation of the battlespace, conduct an amphibious landing, possibly supported by airborne troops, to create a lodgment ashore.[176]

Work and Hoffman explained that their use of the term "theater-entry operations" is intended to offer "a more appropriate context and argument for exploiting the contributions of amphibious warfare in this century," as compared to "forcible entry" that recalls amphibious forces storming a "contested shoreline a la Tarawa or Iwo Jima" during the Second World War.[177]

PREPARATORY OPERATIONS. Based on this framework, a joint theater-entry operation to gain control over the Strait of Hormuz and open the door to the Persian Gulf would first suppress longer-range anti-access threats—ballistic missiles, ASCMs, UAVs, FACs, and diesel submarines—that could be used against U.S. expeditionary forces in the approaches to an amphibious objective area. Other preparatory operations could include airstrikes to destroy IRGCN military facilities and forces located along the Strait of Hormuz and Gulf of Oman, especially its large air station, headquarters, and port facilities at Bandar Abbas. Likely targeting priorities would include navy vessels in port, piers, fuel and munitions storage, and C4ISR networks used to coordinate Iran's sea denial operations. U.S. long-range aircraft could also conduct offensive counter-mining missions against Iranian ports and harbors to severely hamper Iranian naval operations and help prepare the battlespace for an amphibious landing.

As joint air forces suppress Iranian extended-range systems that could threaten amphibious landing operations, Marine Corps expeditionary units along with Army airborne and air assault units and their supporting logistics infrastructure could deploy to suitable forward staging locations—if available—such as ports in Oman or even Djibouti.

---

[176] Ibid.

[177] Ibid. Work and Hoffman also note "that is not the model the Navy–Marine Corps team should prepare for or the mission the Department of the Navy should invest in." DoD's definition for forcible entry operations can be found in Joint Publication 1-02, "Department of Defense Dictionary of Military and Associated Terms," November 8, 2010, p. 144, accessible online at http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf.

These preparatory actions may require weeks, not days to complete.[178] Considering that it may take "somewhere between 45 and 60 days to assemble the ships"[179] needed to support a large amphibious assault force, there should be sufficient time to prepare the battlespace and enable an expeditionary fleet to close within twenty or thirty nautical miles of an objective landing area along Iran's sparsely populated southern coastline (see Figure 10).[180]

EXECUTING A JOINT AMPHIBIOUS LANDING. With preparatory actions completed, a force of two Marine Expeditionary Brigades (MEBs), supported by SOF and possibly Army airborne and air assault units, could seize and hold a lodgment at a time and location of Central Command's choosing.[181] An objective area for an amphibious landing should be located where enemy A2/AD threats have been suppressed, and may not be in proximity to "existing ports, airfields, and logistics infrastructure."[182] Immediately after landing, SOF, Marine Corps, and Army forces would concentrate their efforts on expanding their operating perimeter and preventing the enemy from closing within range to use G-RAMM weapons. Non-lethal capabilities and mobile high-energy laser weapons could help deny hostile forces access to key areas and create a defensive "barrier" against G-RAMM attacks. U.S. forces could then use this secure lodgment as a jumping-off point for follow-on assaults up the coastline of Iran to clear areas that could be used by the enemy to launch attacks against vessels in the Gulf of Oman and Strait of Hormuz, including vulnerable U.S. MCM forces.[183]

---

[178] See comments by Undersecretary Robert Work in *Small Wars Journal*, August 10, 2010, accessible online at http://smallwarsjournal.com/blog/2010/08/marine-corps-says-damn-the-gra/9: "In an anti-access environment where the enemy has a battle network capable of firing salvos of guided weapons, the initial phase of any theater entry operation will require achieving air, sea, undersea, and overall battle network superiority. This will mean this type of operation will be deliberate and take some time to develop. This does not mean 'damn the G-RAMM, full speed ahead.' It means, 'take your time, roll the G-RAMM threat back, and then land at a time and place of your own choosing.' No 10-day landings in this environment."

[179] See remarks by Lieutenant General George J. Flynn, U.S. Marine Corps Deputy Commandant for Combat Development and Integration, at a June 9, 2011 roundtable discussion on "The Future of Amphibious Operations and the Role of the U.S. Marine Corps," audio accessible online at http://csis.org/multimedia/audio-future-amphibious-operations-and-role-us-marine-corps.

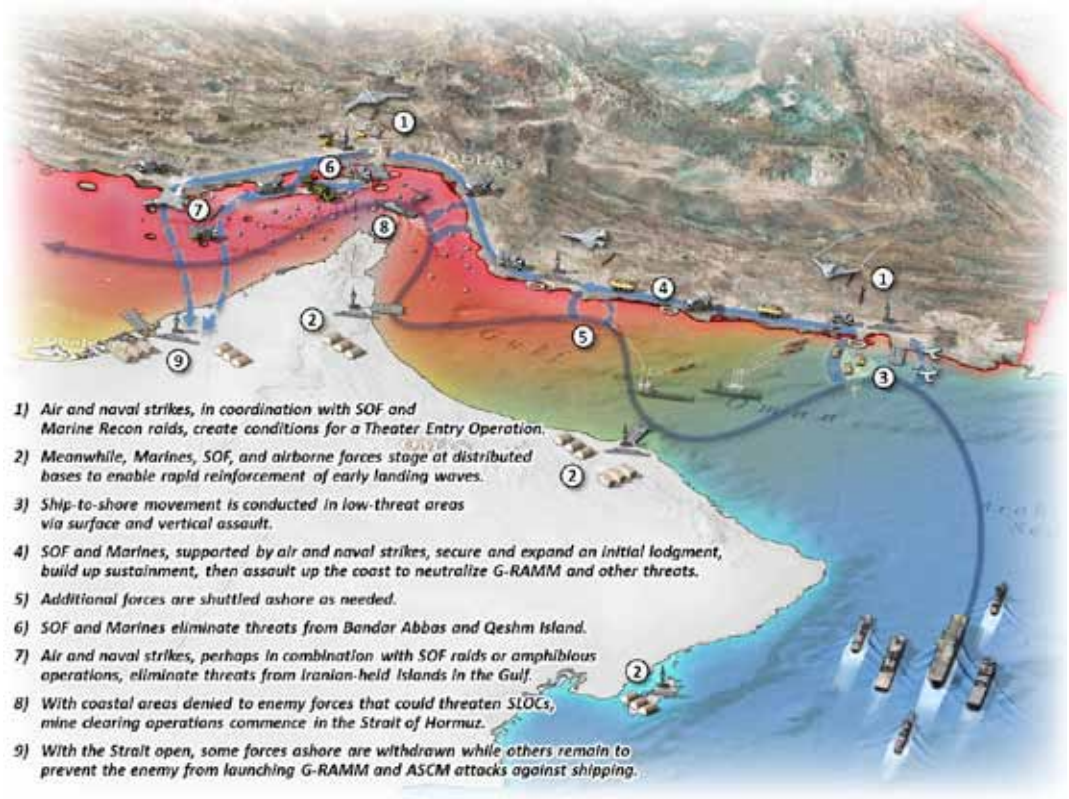
[180] The actual location of an amphibious objective area would be driven by a number of factors, including threat density, coastal terrain features, availability of a suitable natural or man-made harbor, tidal factors, etc. For illustrative purposes only, Figure 10 depicts an amphibious landing at a harbor on Iran's coast that is roughly across the Gulf of Oman from Muscat.

[181] Two MEBs are used as an example landing force, not to suggest or recommend a specific requirement.

[182] Work and Hoffman, "Hitting the Beach in the 21st Century."

[183] U.S. forces may be able to use Road 98 and Road 91 linking settlements located along Iran's southeastern coastline. Road 91 connects with Road 94 which leads sixty kilometers directly to Bandar Abbas, location of the IRGCN's main operating base on the Strait of Hormuz. As the crow flies, it is approximately 460 kilometers between Konarak and Bandar Abbas.

FIGURE 10. AN ILLUSTRATIVE JOINT THEATER-ENTRY OPERATION



Throughout a theater-entry operation, Air Force and Navy surveillance and strike aircraft, along with Army ATACMS stationed in the UAE or Oman, if available, could help suppress Iran's long-range ballistic missile and ASCM threats, provide close air support to expeditionary forces, and prevent enemy ground forces from massing to execute counterattacks.

SEIZING ISLANDS AT STRATEGIC LOCATIONS. In addition to creating lodgments on the Iranian coast, islands just inside the Gulf—including Abu-Musa, Sirri, Greater Tunb and Lesser Tunb—should be targeted by precision strikes and occupied by U.S. expeditionary forces as required (see item 7 in Figure 10).[184] If permitted to remain under the command of the IRGCN, these islands could be

[184] Iran has created a network of underground tunnels and missile bunkers on many of these islands, turning them into "static warships." See Fariboz Haghshenass, "Iran's Asymmetric Naval Warfare," Washington Institute for Near East Policy (WINEP), Policy Focus #87, September 2008, p. 18, accessible online athttp://www.metransparent.com/IMG/pdf/PolicyFocus87.pdf.

staging locations for operations to re-seed minefields and harass U.S. forces and civilian shipping transiting the Strait.

CLEARING THE PATH INTO THE PERSIAN GULF. Completing mine clearing operations would likely be a key task for Littoral Combat Ships equipped with MCM modules, UUVs, rotary wing aircraft, and supporting sensors. To prevent Iran from regenerating its maritime exclusion defenses, U.S. air forces would need to continue attacks against known mine storage and distribution sites, and destroy or suppress small craft, helicopters, submarines, and enemy "commercial" vessels capable of dispensing mines.

Although it is unknown to what extent Iran will expand its inventory of smart mines in the future, history has shown that even a small number of mines placed in shipping lanes "have been able to halt surface traffic when their presence was known."[185] Moreover, as mine countermeasure operations in 1991 and 2003 suggest, clearing large areas in the Strait of Hormuz and Persian Gulf of mines could require a month or even longer.[186]

OTHER POTENTIAL CAMPAIGN OPERATIONS

Although a full assessment of other lines of operation that may comprise a comprehensive Persian Gulf campaign plan is beyond the scope of this assessment, it is likely that they could include eliminating Iran's WMD capabilities, countering proxy groups equipped with G-RAMM, imposing costs on Iran, and conducting unconventional warfare. In terms of timing, these lines of operations might commence at the beginning of the conflict, as Iran's G-RAMM armed proxies and nuclear weapons would influence the way the United States thinks about projecting power to the Persian Gulf.

Combating Weapons of Mass Destruction

Barring an unforeseen change in the trajectory of its nuclear program, it should be assumed that Iran will possess a small number of operational nuclear weapons within the timeframe of this assessment, and may be prepared to use them in a variety of direct and indirect ways to bolster its A2/AD strategy.[187]

The threat of U.S. nuclear retaliation or expansion of U.S. war objectives to include regime change in Tehran may render direct Iranian nuclear strikes,

---

[185] Talmadge, "Closing Time: Assessing the Iranian Threat to the Strait of Hormuz," p. 90.

[186] Ibid., p. 97.

[187] Scott D. Sagan, "How to Keep the Bomb from Iran," *Foreign Affairs*, Vol. 85, No. 5, (Sept.–Oct., 2006), p. 45; and James. M. Lindsay and Ray Takeyh, "After Iran Gets the Bomb," *Foreign Affairs*, Vol. 89, No. 2, (Mar.–Apr. 2010), p. 33.

especially against U.S. forces, unlikely. However, should the Iranian regime feel sufficiently threatened, or if it should devolve control of its nuclear forces to subordinate commanders capable of employing these weapons on their own, it is possible that U.S. forces and forward installations may come under nuclear attack. Iran could also choose to supply one of its proxies with the means to conduct nuclear terrorism, or detonate a nuclear weapon in the upper atmosphere to create a high-altitude electromagnetic pulse (HEMP) to degrade or destroy unprotected electronic equipment and disrupt radio-frequency communications over a wide area. Although the effects of such a detonation could damage some Iranian systems operating within the HEMP field, the effects are likely to be far more detrimental to U.S. forces, which rely heavily on electronic systems and near-constant access to C4ISR networks. Since a HEMP detonation over the Gulf of Oman or Arabian Sea may not result in a large number of casualties, Iran may believe that it could conduct such an attack at less risk of a nuclear response from the United States.[188]

Regardless of the likelihood of Iran using nuclear weapons during a future conflict... the consequences of their use would be so grave that they cannot be discounted by U.S. planning.

Iran may also be inclined to use the threat of its nuclear weapons indirectly as a shield, behind which it may believe it could successfully pursue its hegemonic objectives. For example, if Iran possessed even a small number of nuclear weapons it might "be tempted to challenge its neighbors in the Persian Gulf to reduce their oil production and limit the presence of U.S. troops on their territories."[189] A nuclear-armed Iran may also feel emboldened to pursue a more concerted coercive campaign against its neighbors, or to support more aggressive actions by its network of proxies.[190]

Regardless of the likelihood of Iran using nuclear weapons during a future conflict, or the manner in which these weapons might be used, the consequences of their use would be so grave that they cannot be discounted by U.S. planning. Toward this end, the United States should take steps to deter an Iranian nuclear attack, prepare to deny it the ability to employ or transfer nuclear weapons to another state or proxy terrorist group, defend against nuclear-armed missile attacks should deterrence fail, prepare to manage the effects of nuclear attacks, and maintain a sufficiently robust portfolio of conventional and nuclear response options.

---

[188] Clay Wilson, "High Altitude Electromagnetic Pulse (HEMP) and High Powered Microwave (HPM) Devices: Threat Assessments," *Congressional Research Service*, July 21, 2008, pp. 9–11, 14–16, accessible online at http://www.fas.org/sgp/crs/natsec/RL32544.pdf.

[189] Lindsay and Takeyh, "After Iran Gets the Bomb," p. 36.

[190] Eric Edelman, Andrew F. Krepinevich, and Evan Braden Montgomery, "The Dangers of a Nuclear Iran," *Foreign Affairs*, Vol. 90, No. 1, Jan./Feb. 2011, p. 67; and Lindsay and Takeyh, "After Iran Gets the Bomb," pp. 34, 36.

Extended Deterrence

Deterring an Iranian nuclear strike against states in the Persian Gulf could be considerably more difficult than deterring an attack against U.S. forces operating in the region. Implementing an extended deterrence regime in the Middle East akin to that which the United States used to deter aggression against its European and Asian allies during the Cold War may be an appropriate U.S. response should Iran develop or obtain nuclear weapons.[191] However, the lack of a formal regional security institution in the Persian Gulf analogous to the North Atlantic Treaty Organization (NATO), combined with questions over how far the United States would be willing to go to unilaterally defend non-democratic Arab regimes, could undermine the credibility of extended nuclear deterrence.

The United States may be able to create a more credible deterrent posture and solidify its access to forward basing by tying its extended deterrence guarantees to the direct participation of Gulf powers in a conflict with Iran, to include the provision of basing access and the employment of their armed forces. In effect, this would make these states U.S. allies in the event of a war with a nuclear-armed Iran. Making the umbrella of extended deterrence contingent on such actions, rather than simply a one-sided guarantee, may increase American public support for a policy of extended deterrence. The possibility of losing this deterrent guarantee may also reduce the susceptibility of some Gulf states to Iranian coercion.

WMD Elimination

Despite these measures, nuclear deterrence may not hold during a future conflict with Iran. Given the opacity of the decision making process in Tehran, it may be difficult for U.S. commanders to avoid crossing the Iranian regime's "red lines" and unwittingly eliciting a nuclear response. Alternatively, should the regime devolve operational control of its weapons to subordinate commanders, the possibility exists that a rogue individual or small group of Iranian military personnel could launch a nuclear attack.[192] Such a scenario is far from fanciful since the IRGC would likely retain control of Iran's nuclear arsenal and the ranks of the IRGC contain a sizeable population of "ideologically indoctrinated true believers."[193]

Given that deterrence measures alone may not succeed, Central Command should be prepared to undertake efforts to deny Iran the ability to transfer or employ nuclear weapons. These efforts would likely be in conjunction with an ongoing U.S. line of operation to suppress Iranian ballistic missiles. Efforts to deny Iran the ability to use its nuclear weapons should be balanced against the desire

---

[191] Edelman, Krepinevich, and Montgomery, "The Dangers of a Nuclear Iran," p. 67.

[192] Ibid., pp. 73–74; Lindsay and Takeyh, "After Iran Gets the Bomb," p. 34; and Sagan, "How to Keep the Bomb from Iran," p. 53.

[193] Sagan, "How to Keep the Bomb from Iran," p. 53.

to not force the Iranian regime into an unstable "use them or lose them" position that may make a nuclear attack more likely. To that end, Central Command may wish to focus its initial counter-WMD efforts on destroying Iran's operational nuclear weapons and preventing weapons transfers, rather than on attacking Iran's nuclear weapons command and control links.

Defending Against WMD Attacks

A WMD elimination campaign would likely be hampered by a lack of adequate intelligence on the disposition of Iran's nuclear forces. Central Command should therefore consider establishing layered missile defenses around major U.S. installations and force concentrations, as well as key partner population centers within range of Iran's nuclear-armed ballistic missiles. These layered defenses could consist of airborne and seaborne systems such as Network Centric Airborne Defense Element (NCADE) and SM-3 missiles, respectively, as well as ground-based terminal defenses such as THAAD, PAC-3 and (if they prove feasible) future directed-energy systems.

Mitigating the Effects of a Nuclear Attack

Even though a multi-layered ballistic missile defense architecture could be more effective than a defensive network that relies on only one or two types of kinetic interceptors, it should not be assumed that it will be possible to interdict successfully every incoming missile. Iran could fire multiple salvos of missiles with conventional warheads against a given target to deplete its defenses before launching a follow-up attack with one or more nuclear-armed missiles. Iran may also resort to unconventional means of nuclear weapons delivery if it believes U.S. missile defenses to be sufficiently effective.

Given the improbability of defending against every attack, Central Command should seek to diminish the potential effects of a nuclear detonation by relocating critical theater assets to locations that are out of range of Iran's ballistic missiles and dispersing forces remaining in the Persian Gulf to complicate missile targeting.[194] In addition, Central Command should develop the ability to reconstitute its command and control networks in the event of a nuclear HEMP attack, and prepare to sustain operations, although at reduced tempo, in irradiated environments.

Together, steps taken to deter, deny, defend against, and diminish the effects of an Iranian nuclear strike could convince Iran's leaders that the use of nuclear weapons would not be worth the devastating consequences of a U.S. response. Regardless of the nature of a war with Iran, the United States will maintain its escalatory strategic advantage. Nevertheless, there would remain the possibility

[194] Potential U.S. military posture initiatives in the Persian Gulf region are discussed in greater detail in Chapter 4.

that Iran's regime or a rogue commander may choose to use a nuclear weapon against the United States or its regional partners regardless of the consequences. Given these considerations, the best course of action may therefore be to prevent Iran from acquiring nuclear weapons altogether.

Countering Proxy Groups Equipped With G-RAMM

Proxy warfare that combines advanced weapons with guerrilla tactics would be a key challenge for U.S. forces and host governments in the Persian Gulf. If employed in significant quantities, G-RAMM weapons could inflict high and potentially prohibitive costs on U.S. forces and infrastructure needed to sustain military operations in the Persian Gulf.

A line of operation to counter this threat would likely include three submissions: degrading and defending against the G-RAMM capabilities of Iran's proxies, preventing Iran from resupplying its proxies with advanced weapons, disrupting Iran's command and control links with its proxy groups, and supporting partners' counter G-RAMM efforts. Attriting proxy leadership and Iranian intelligence assets in partner states would likely be a follow-on mission, given the time and resource intensive nature of manhunting operations.

Defending Against G-RAMM Attacks

U.S. electronic warfare assets might be able to degrade the guidance systems that G-RAMM weapons depend on, while a mixture of directed energy and kinetic capabilities could provide active terminal defenses. U.S. manned and unmanned aircraft could establish hunter-killer air patrols to attrite and harry proxy forces, thereby preventing or disrupting G-RAMM attacks. These hunter-killer patrols could use a mixture of kinetic and non-kinetic weapons to interrupt attacks. Equipping aircraft with directed energy systems capable of destroying or degrading the electronics and sensors that G-RAMM systems rely on would be useful, especially in densely populated areas where kinetic weapons could create unwanted collateral damage. These counter-G-RAMM missions could be conducted by short-range, non-stealthy aircraft that deploy into the theater following the success of a joint theater entry operation, which would free up long-range, stealthy platforms to focus on other missions that require their capabilities.

On the ground, unattended sensors and antipersonnel weapons could prevent proxy forces from approaching U.S. operating locations. Partner forces, perhaps aided or advised by small U.S. SOF teams, could patrol base perimeters to further suppress G-RAMM attacks. Hardening forward bases, and particularly vulnerable assets such as aircraft and key single points of failure such as petroleum, oil and lubricant (POL) storage and handling facilities would also help protect against both G-RAMM and ballistic missile attacks.

Countering the G-RAMM capabilities of Iran's proxies should include operations to prevent Iran from providing them with material support. This has proven quite difficult in Iraq, especially since Iraq and Iran share a long border. It may be easier for the U.S. to use its air and sea control capabilities to interdict Iranian weapons shipments to more distant places such as Qatar, Bahrain, and Saudi Arabia.

Disrupting Command and Control

Enhancing the active and passive defenses of bases within range of G-RAMM threats is a necessary but insufficient response to countering proxy attacks. A more comprehensive approach would find U.S. and partner forces disrupting and degrading the ability of Iran and its agents to communicate with proxy groups and orchestrate their actions. Crucially, it should not be assumed that Iran's proxies are simply extensions of the Iranian state. Rather, Iran's proxies are likely to have their own goals and needs. Understanding these goals, and conducting operations to penetrate and exploit the communications links between Iran and its proxies could help U.S. forces to prevent coordinated attacks and break the cohesion between proxy groups and their sponsors in Tehran.

Building Partner Capacity

Augmenting the counterterrorism capacity of the United States' Persian Gulf partners in peacetime would be another means of reducing the potential for Iran's proxies to threaten regional stability. Should partner counterterrorism capacity be insufficient to combat Iran's proxies, Central Command may need to deploy selected SOF units to target these groups as well as Iranian agents supporting them. These missions are time and resource-intensive, however, and the U.S. SOF units and C4ISR assets needed to conduct them may be otherwise occupied supporting higher priority operations. Given the local political sensitivities involved with deploying a large U.S. force to many Gulf states, the principal form of U.S. cooperation may have to be in the form of intelligence support to partner forces.

Imposing Costs on Iran

As part of a broader campaign plan, Central Command could implement operations that would impose costs on Tehran and deny it the sustenance its wartime economy needs. Iran would be highly dependent on external sources to replace equipment and munitions consumed used during a large and/or protracted military operation against the United States and its coalition partners. Iran also relies on revenue generated by its oil and gas imports, which in turn are dependent upon access to the Persian Gulf and open seas. Thus, operations to prevent Iran from importing war supplies and exporting oil and gas would likely, over time, create pressures in the form of declining military capabilities and rising internal

opposition that may prove unbearable to the regime. If necessary, the United States would have the option to directly impose costs as part of a strategy to punish Iran by attacking its industrial base, energy infrastructure, and other targets that could cripple the Iranian state.

Setting Conditions for Unconventional Regime Change

Throughout a conflict, the United States could choose to implement a course of action designed to destabilize Iran's regime and set the conditions for a regime change from within. Perhaps coupled with actions to impose costs on Iran, U.S. special operations and air forces could conduct unconventional warfare (UW) supporting internal Iranian partisans to overthrow the regime.[195] Such an internal insurgency could have the added benefit of forcing Iran's leadership to divert military resources toward internal defense. The effectiveness of an unconventional warfare campaign would be highly dependent on leveraging existing internal opposition movements as occurred during operations against the Taliban in Afghanistan and Muammar Gaddafi in Libya.

[195] Doctrinally, unconventional warfare is defined as "those activities conducted to enable a resistance movement or insurgency to coerce, disrupt, or overthrow a government or occupying power by operating through or with an underground, auxiliary, and guerrilla force in a denied area. The United States may engage in UW across the spectrum of armed conflict from major campaigns to limited contingency operations." See Joint Publication 3-05, "Special Operations," April 11, 2001, p. II–9, accessible online at http://www.dtic.mil/doctrine/new_pubs/jp3_05.pdf.

CHAPTER 4 > INITIATIVES TO SUPPORT AN ENABLING OPERATIONAL CONCEPT

This report concludes by recommending changes to DoD's program of record that are needed to sustain the U.S. military's freedom of action against Iran's emerging A2/AD complex. Chapter 4 begins by addressing capability initiatives, and is roughly organized to parallel the discussion in Chapter 3. It proceeds to describe options for developing a forward basing posture to support an enabling operational concept. These recommendations represent a "first cut" at shifting U.S. defense priorities. They should be refined through more detailed analysis that includes war games, diplomatic engagement with partners in the region to determine what they can contribute and in what time frame, and enhanced intelligence regarding the Iranian military's long-term projected strengths and weaknesses.

RECOMMENDED CAPABILITY INITIATIVES

The items discussed below are not intended to be an exhaustive listing of all the capabilities that could be needed for future Persian Gulf power-projection operations. Instead, recommendations focus on major *new* capabilities that may have significant potential to help achieve the operational objectives described in Chapter 3. Some of these capabilities are under development, and should be augmented. Others are also part of the defense program, and need to be accorded priority in the face of major cuts to the defense budget. Still others are new capabilities that would need to become part of the Defense Department's program of record. Given the current dire fiscal environment, this assessment also identifies, where possible, capabilities that might be accorded reduced emphasis.

CAPABILITIES TO REDUCE IRAN'S A2/AD THREATS

Long-Range Penetrating Surveillance and Strike

The U.S. military should rebalance its thirty-year aircraft procurement plan to place greater emphasis on multi-mission capabilities with increased range, persistence, and survivability. Without new long-range penetrating surveillance and strike aircraft, namely an optionally manned bomber for the Air Force and a penetrating UCLASS for the Navy, it would be extremely difficult to conduct an enabling operational concept as envisioned by this report.

The U.S. military should rebalance its thirty-year aircraft procurement plan to place greater emphasis on multi-mission capabilities with increased range, persistence, and survivability.

NEW LONG-RANGE STRIKE BOMBER. The Department of Defense has announced that it will procure 80 to 100 new penetrating bombers, with an initial capability scheduled to be on the ramp in the mid-2020s. The decision to procure a significant number of new bombers is a welcome step toward halting DoD's slide toward a future force that is heavily weighted toward short-range aircraft that emerging A2/AD threats will render progressively less effective. Given projected resource constraints, the U.S. military should explore additional options for reducing its reliance on short-range surveillance and strike capabilities in favor of systems able to fight from extended range against A2/AD battle networks.[196]

FUTURE SEA-BASED UNMANNED SURVEILLANCE AND STRIKES. As DoD considers how it should prioritize resources for future unmanned aircraft, it will be important to strike the right balance between UAS capable of operating in permissive and non-permissive threat areas. Today, despite the fact that the overwhelming majority DoD's unmanned aircraft lack the attributes needed to survive in contested airspace, debate continues over where the U.S. military should place its emphasis.

For example, the Navy intends to field a UCLASS that could extend the reach and persistence of its aircraft carrier airwings. There are lingering questions, however, over UCLASS requirements and whether it should be more like a non-stealthy Reaper UAS than a surveillance and strike capability with low observable attributes needed to penetrate and persist in emerging A2/AD operational

[196] For an assessment of the desired capabilities and potential cost of a new optionally manned bomber, see Gunzinger, *Sustaining America's Strategic Advantage in Long-Range Strike*.

environments.[197] The Navy is already planning to develop the MQ-4C Broad Area Maritime Surveillance (BAMS) UAS to provide maritime ISR from land bases, and a sea-based, rotary-wing MQ-8B Fire Scout UAS that could operate for up to twelve continuous hours. Moreover, the Fiscal Year 2012 defense budget includes a funding request for a third UAS called the Medium-Range Maritime Unmanned Aerial System (MRMUAS) to provide sea-based ISR and strike in "permissive and/or semi-permissive environments."[198] These three unmanned systems will complement the 65 CAPS of non-stealthy Predators and Reapers that the Air Force is fielding. In light of program of record UAS investments and the emerging gap in unmanned aircraft that are able to support operations in non-permissive threat environments, the Navy should develop a stealthy UCLASS with sufficient range and persistence to support operational concepts envisaged by *AirSea Battle* and this report.[199]

Standoff Precision Strike Capabilities

As part of a balanced mix of precision strike capabilities, DoD should prioritize increasing the U.S. military's ability to conduct standoff strikes early in a campaign against Iran without the need to depend on land bases located in the immediate theater of operations.

CONVENTIONAL PROMPT GLOBAL STRIKE (CPGS). Capabilities that can support the conventional prompt global strike mission could be highly effective in attacking extremely high-value and time-sensitive targets from launch locations that are well outside Iran's A2/AD threat ring. For example, CPGS weapons could provide a useful niche capability to strike a limited number of very high-value, fleeting targets such as a nuclear weapon in transport or a ballistic

---

[197] DoD's Deputy Director for Unmanned Warfare has stated, "The specifics of the vehicle piece of that, I think to a large extent, will be driven by what the Navy and the OSD define for the initial capability set of UCLASS. For example, is it more like a Reaper capability—somewhat slower, straight wing, not very survivable? Or more like UCAS, [Unmanned Combat Air System] which is a much more survivable shape?" See Amy Butler, "Interview With DoD Unmanned Warfare Deputy," *Aviation Week*, August 26, 2010, accessible online at http://www.aviationweek.com/aw/generic/story.jsp?channel=unmanned&id=news/awst/2010/08/23/AW_08_23_2010_p62-246937.xml&headline=Interview%20With%20DoD%20Unmanned%20Warfare%20Deputy&next=0. For a description of all-aspect, broad-band stealth, see Gunzinger, *Sustaining America's Strategic Advantage in Long-Range Strike*, pp. 30–31.

[198] DoD's "Budget Item Justification" for the MRUAS is accessible online at http://www.js.pentagon.mil/descriptivesum/Y2012/Navy/0305237N_7_PB_2012.pdf. See the Navy's MRMUAS Request For Information to industry accessible online at https://www.fbo.gov/index?s=opportunity&mode=form&id=55ab6d1c 4b7069f2b43778234739125d&tab=core&_cview=0.

[199] For additional analysis on the need for a low observable aircraft carrier-based unmanned platform, see Thomas P. Ehrhard and Robert O. Work, *Range, Persistence, Stealth, and Networking: The Case for a Carrier-Based Unmanned Combat Air System* (Washington DC: CSBA, 2008); and Gunzinger, *Sustaining America's Strategic Advantage in Long-Range Strike*, pp.68–70.

missile battery preparing to launch a WMD warhead. Unfortunately, a prompt global strike ballistic missile or a hypersonic boost-glide conventional weapon with intercontinental range is likely to cost tens and potentially hundreds of millions of dollars apiece, making procuring a large number of them cost prohibitive.[200] Furthermore, using these kinds of CPGS weapons against time-sensitive but comparatively inexpensive targets such as TELs carrying conventional missiles would result in a cost-exchange ratio that would be extremely unfavorable to the U.S. military. That said, there are some standoff precision strike capabilities that merit greater emphasis.

The Navy should address the emerging shortfall in standoff strike weapons that can be delivered by its undersea fleet.

UNDERSEA PRECISION STRIKE CAPABILITIES. The Navy should address the emerging shortfall in standoff strike weapons that can be delivered by its undersea fleet (see Figure 11). All four of the Navy's SSGNs, which can carry up to 154 TLAMs each, will be decommissioned by 2028.[201] By 2030, these SSGN retirements, plus a planned decrease in the overall size of the SSN fleet, will shrink the Navy's undersea strike magazine by 60 percent.[202]

To reduce this projected shortfall, the Navy could integrate Virginia Payload Modules (VPMs) into twenty planned *Virginia*-class SSNs starting with the procurement of Block V hulls in 2019. VPMs with four large-diameter launch tubes each would more than triple the TLAM capacity of a single *Virginia*-class SSN from 12 to 40 missiles. Twenty VPM-modified SSNs would reduce the Navy's projected undersea strike shortfall by more than 75 percent, and provide commanders with greater operational flexibility and more distributed strike capacity compared to today's SSN and SSGN fleet. The Navy could modify ten *Virginia*-class SSNs with VPM modules for the cost of one new *Ohio*-like SSGN.[203]

Developing and fielding a Towed Payload Module (TPM) could be another option to increase the Navy's undersea strike capability at less cost than procuring

---

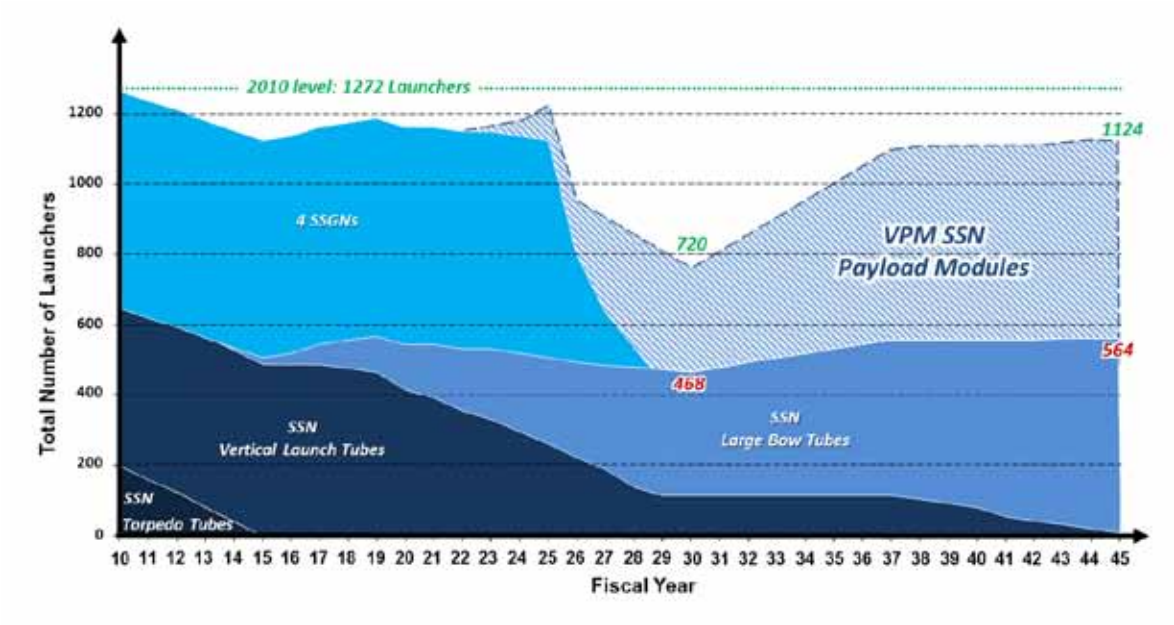
[200] For an excellent summary on CPGS alternatives, see Amy F. Woolf, *Conventional Prompt Global Strike and Long-Range Ballistic Missiles: Background and Issues* (Washington DC: Congressional Research Service, June 21, 2011), accessible online at http://fpc.state.gov/documents/organization/167962.pdf.

[201] A typical payload for an SSGN is 105 TLAMs.

[202] See Rear Admiral (RADM) Michael J. Connor, "Investing in the Undersea Future," *Proceedings Magazine*, Vol. 137/6/1,300, June 2011, accessible online at http://www.usni.org/magazines/proceedings/2011-06/investing-undersea-future. RADM Connor is Director of the U.S. Navy's Submarine Warfare Division. Of note, the Navy's SSN fleet will fall below its target force level of forty-eight boats in 2024 and will decrease to thirty-nine boats by 2030. See Ronald O'Rourke, "Navy *Virginia* (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress," *Congressional Research Service*, September 28, 2010, p. 6, accessible online at http://assets.opencrs.com/rpts/RL32418_20100928.pdf.

[203] A VPM will increase a *Virginia*-class SSN's payload from twelve to forty TLAMs. According to RADM Connor: "adding a payload module is a significant investment, adding about 20 percent to the cost of each ship. However, it is possible to stretch ten *Virginia* SSNs for the cost of a single new *Ohio*-like SSGN." RADM Michael J. Connor, "Investing in the Undersea Future," *Proceedings*, Vol.136, June 2011.

FIGURE 11. REDUCING THE UNDERSEA STRIKE MAGAZINE SHORTFALL



additional SSGNs. In theory, a TPM could be towed to an operating area and left on station to provide standoff fires on demand. The U.S. Navy will need to address a number of operational and technological issues before such a capability could be fielded, such as the creation of a suitable energy system to support long-duration missions; technologies to support autonomous operations; security of the platform and its payloads when disconnected from its tow vehicle; endurance and equipment reliability; and secure command and control systems.

C4ISR Network and Counter-Network Capabilities

AIRBORNE BATTLE MANAGEMENT AND C2. The U.S. military should develop a resilient airborne network to provide command and control for manned and unmanned systems operating in communications-denied environments. Specifically, DoD should field high-altitude, very long endurance stealthy unmanned aircraft that could act as airborne C2 nodes and provide targeting and enemy threat information to systems penetrating deep into Iran. The Navy and Air Force should also assess the feasibility of using secure line-of-sight data links between an optionally manned bomber, UCLASS, and other long-range strike capabilities to sustain human control of deep-strike operations.

DESIGN FOR INDEPENDENT OPERATIONS. To reduce an enemy's ability to disrupt the U.S. military's air campaign early in a conflict, DoD should design its new long-range strike family of systems to be capable of operating in communications degraded or denied environments with less need for information provided by off-board battle management networks.

DIRECTED ENERGY CAPABILITIES. The Air Force and Navy should develop and field new non-kinetic capabilities, including offensive cyber, directed energy, electronic warfare, and high power microwave applications, to disrupt, degrade, damage, or destroy the electronics-based systems that underpin enemy A2/AD battle networks.

Offensive and Defensive Counter-Missile Capabilities

DoD should prioritize the development and fielding of offensive and defensive capabilities that could change the unfavorable missile salvo cost-exchange ratio in the United States' favor.

OFFENSIVE CAPABILITIES. To support strikes against TELs and other mobile targets in high-threat areas, the Air Force and Navy should field low observable, highly persistent unmanned surveillance aircraft with secure data links to penetrating strike systems to compress the find-fix-track-target-engage-assess kill chain cycle. The Air Force and Navy should also jointly pursue joint air-launched kinetic weapons to interdict ballistic missiles in their boost/ascent phase of flight. Air Launched Hit-to-Kill or Net-Centric Air Defense Element capabilities carried by long-range platforms such as the Air Force's new bomber and the Navy's UCLASS could provide Central Command with a persistent boost-phase missile defense over Iranian missile launch areas.

NON-KINETIC MISSILE DEFENSES. The U.S. military should develop directed energy weapons with the potential to complement kinetic defenses against missile attacks. For example, it may be feasible to adapt existing chemical laser technologies developed for the now-cancelled Airborne Laser and Theater High Energy Laser programs to create ground-based, megawatt-class weapons to defend high-value forward operating locations such as airfields and sea ports of debarkation, and establish a missile defense cost exchange ratio that favors the U.S. military.[204]

[204] Although these systems would not be mobile, it is possible that they could be packaged into transport containers that could be deployed by air or sea.

Capabilities to Achieve Air and Maritime Superiority

Achieve Localized Air Superiority

Although it is hard to argue that DoD's planned fifth-generation fighter force will not sustain America's edge against projected air defense threats in the Persian Gulf, there is a case to be made that short-range fighters, absent the availability of close-in bases early in a conflict, will lack sufficient range and persistence to support U.S. forces operating deep inside Iran.

There are several options for addressing this capability shortfall. In the near-term, the U.S. military should integrate passive and active defensive systems on long-range aircraft to improve their survivability and reduce or eliminate the need for supporting fighter escorts. For the long-term, DoD's most recent thirty-year aircraft procurement plan reports "it is anticipated that a family of systems—mixes of manned and unmanned aircraft with varying stealth characteristics and advanced standoff weapons—will shape the future fighter/attack inventory."[205] As part of this family of systems, the Air Force and Navy should assess alternatives for new air dominance capabilities that would be less dependent on close-in theater bases and aerial refueling. Future air dominance systems may very well include a large aircraft more akin to a true "fighter-bomber" that possesses the capability to operate over longer ranges and carry significant payloads of air-to-air missiles, anti-radiation air-to-surface missiles, ALHK, and possibly directed energy weapons. Although it is highly unlikely that a sixth-generation aircraft will become available within the next twenty years, the Air Force and Navy have both expressed interest in exploring its potential attributes.[206]

Achieve Maritime Superiority

UNDERSEA SURVEILLANCE. The Navy should assess the potential for Large Displacement Unmanned Undersea Vehicles (LDUUV) to extend its undersea surveillance capabilities, improve intelligence preparation of the undersea

[205] The plan also reports the Navy has initiated an analysis to define a "Next Generation Air Dominance (NGAD) aircraft" to replace the F/A-18E/F. See "Aircraft Procurement Plan Fiscal Years (FY) 2012–2041," pp. 13, 16.

[206] The U.S. Air Force Aeronautical Systems Center has announced its intention to assess concepts and technologies for a "Next Generation Tactical Aircraft" that could reach an initial operational capability around 2030: "the envisioned system may possess enhanced capabilities in areas such as reach, persistence, survivability, net-centricity, situational awareness, human-system integration, and weapons effects," and should be "able to operate in the anti-access/area-denial environment that will exist in the 2030–2050 timeframe." See "Next Generation Tactical Aircraft (Next Gen TACAIR) Materiel and Technology Concepts Search," November 3, 2010, accessible online at https://www.fbo.gov/index?id=ea5679657b9297fe1871ed239e190c62.

battlespace, and reduce task loading on manned undersea systems.[207] LDUUV is envisioned by the Navy as an unmanned vehicle that could be launched and recovered from a pier or various naval platforms including submarines.[208] Though it will be too big to be launched from a torpedo tube, LDUUVs could fit in a submarine dry-deck shelter and the large vertical payload tubes on SSGNs and VPMs. A LDUUV could have significant potential as a cost effective means of increasing the U.S. military's situational awareness in the hazardous waters off the coast of Iran. According to Admiral Roughead:

> I believe that unmanned underwater systems become extensions to the submarine, can become extensions to aviation, manned or unmanned, as far as sensing the battle space. So if you were to ask me if you can extend your sensing area with unmanned systems my initial reaction is we can get there more cheaply than if I have to buy many of the more manned systems. That also reduces the risk to personnel. And it also reduces the cost of those personnel that we may have to have out who have limited duration, unlike unmanned systems do, that can be more persistent in the battle space.[209]

A number of critical technologies must be developed to enable LDUUVs to operate and survive in the littorals for the extended periods (greater than 70 days) desired by the Navy. Energy systems capacity must be improved by many orders of magnitude over the capabilities that exist today. Without the continuous communications other unmanned vehicles depend on, LDUUV's will require significantly more autonomy, including autonomous systems capable of operating in the complex ocean environment near harbors, shore, and high surface traffic locations. Additionally, endurance technologies must be pursued including those that reduce power usage, reduce biological growth, and improve component and systems reliability.

NON-KINETIC SHIP-BASED DEFENSES. The Navy should develop and field a ship-based, electric (solid-state) laser weapon to enhance fleet defense. The threats described in this assessment suggest that U.S. naval forces may not be able to operate in close proximity to Iran if challenged with salvos of ASCMS,

---

[207] According to the Office of Naval Research, new technologies may be able to "extend unmanned undersea vehicles endurance into months of operation time." See "Large Displacement Unmanned Undersea Vehicles," accessible online at http://www.onr.navy.mil/en/Media-Center/Fact-Sheets/Large-Displacement-Unmanned-Undersea-Vehicle.aspx.

[208] A large UUV has a displacement of approximately 20,000 pounds and a diameter greater than thirty six inches. See *The Navy Unmanned Undersea Vehicle (UUV) Master Plan* (Washington, DC: Department of the Navy, November 9, 2004), p. 67, accessible online at http://www.navy.mil/navydata/technology/uuvmp.pdf.

[209] "Chief of Naval Operations Adm. Gary Roughead delivers remarks at 2011 AUVSI Unmanned Systems Symposium and Exhibition," August 19, 2011, p. 7, accessible online at http://www.navy.mil/navydata/people/cno/Roughead/Speech/110819%20AUVSI.pdf.

swarming fast attack craft, and UAVs that could overwhelm current kinetic defensives. Apportioning additional surface units to defend the fleet and procuring additional ship-based kinetic defenses are not likely to provide cost-effective approaches to countering these challenges. Dedicating a greater share of the surface fleet to defensive missions will reduce its ability to support other critical missions, including precision strike.

Therefore, the U.S. Navy needs to develop and field a deep magazine of low cost-per-shot capabilities for surface ships as part of a layered defense against both swarming small boats and ASCMs. A leading candidate for such a capability is a ship-based solid-state laser weapon system. Recent technology breakthroughs and demonstrations establish that such a capability could be weaponized and fielded over the next decade.[210] Introducing a ship laser would dramatically improve the affordability of a layered counter-swarm, counter-ASCM defense, and reduce the average cost-per-shot and total cost of acquiring a full suite of kinetic and laser defensive systems. In terms of cost-per-shot, a ship-based laser would be almost free to operate, with no expendables and only the maintenance associated with solid-state optical systems. Moreover, fewer kinetic missiles would need to be acquired, used in training, and transported to replenish forward-deployed magazines.

AIR FORCE ASW AND ANTI-SURFACE WARFARE (ASUW) CAPABILITIES. To complement U.S. Navy capabilities, the Air Force should reconstitute its ability to support ASW and ASuW by equipping the next bomber to deliver anti-ship missiles and mines.[211]

Expeditionary Surveillance and Strike

FUTURE EXPEDITIONARY UNMANNED CAPABILITIES. The Marine Corps plans to procure a Group 4-class "expeditionary unmanned system capable of being operated and maintained from austere locations."[212] Similar to the Navy's stated need for a UCLASS that will "enhance the versatility provided by an aircraft carrier," a UAS could provide Marine Corps expeditionary units with an organic expeditionary surveillance and strike capability with significantly greater range

[210] The Navy has funded two solid-state laser technology development initiatives, the Laser Weapon System (LaWS) and the Maritime Laser Demonstrator (MLD).

[211] The Air Force has experience in such operations, as it once configured a small number of B-52s to deliver Harpoon anti-ship missiles.

[212] See "Aircraft Procurement Plan Fiscal Years (FY) 2012–2041," p. 10. DoD describes a Group 4 UAS as an unmanned aircraft that exceeds 1,320 pounds and operates below Flight Level 180. Current UAS in this Group include the MQ-1 Predator, MQ-8B Fire Scout, and the Navy's Unmanned Combat Air System (UCAS) demonstration aircraft.

and persistence than the F-35B.[213] The Marine Corps should consider the potential to reduce the cost of a new Group 4-class UAS by leveraging technologies developed for the UCLASS and other unmanned aircraft programs.

EXPEDITIONARY SHORT TAKE OFF AND VERTICAL LANDING (STOVL) CAPABILITIES. The Marine Corps should assess its future expeditionary strike requirements in light of emerging operational concepts for joint theater-entry operations. As operations in Iraq, Afghanistan, and most recently Libya have demonstrated, multi-mission STOVL aircraft on amphibious decks provide theater commanders with an alternative to employing a Navy aircraft carrier, especially in limited operations that do not call for the capabilities of a full-size aircraft carrier and its air wing.[214] The question remains, however, as to whether future amphibious operations will require stealthy F-35B STOVL fighters, especially given the F-35B's high unit cost. This would be especially true in the context of the operational concept presented in this paper, where A2/AD threats—including enemy air defenses and extended-range strike systems—are suppressed to permit amphibious landing operations.[215] While it is true that stealthy STOVL fighters could operate from expeditionary airfields in support of theater-entry operations, it is difficult to envision a case where a threat environment that requires the use of stealth would not also drive a need for strike aircraft with much greater combat radii than the F-35B.[216]

Amphibious Landing Operations

AMPHIBIOUS LIFT. The Department of the Navy should sustain sufficient expeditionary lift to support a joint theater-entry operation in the Persian Gulf. According to the Marine Corps, thirty amphibious ships are needed to provide operational lift for two MEBs, including equipment and consumables to sustain their operations for thirty days. Since three amphibious ships may be unavailable

---

[213] See the Naval Air Systems Command's UCLASS description accessible online at http://www.navair.navy.mil/index.cfm?fuseaction=home.display&key=A1DA3766-1A6D-4AEA-B462-F91FE43181AF.

[214] For a description of AV-8B operations off the USS Kearsarge (LHD 3) in support of Operation Odyssey Dawn, see Tom Kington, "Harrier Ops Making Case for F-35B," Defense News, March 28, 2011, accessible online at http://www.defensenews.com/story.php?i=6072569.

[215] DoD's latest Selected Acquisition Report projects the F-35's Average Procurement Unit Cost (APUC) as $132 million in Then Year (TY) dollars and $90 million in 2002 Base Year (BY) dollars. APUC is calculated by dividing the total procurement cost for the F-35 program by the number of units to be produced. These APUC estimates include procurement costs for the Air Force's F-35A as well as the Department of the Navy's F-35B and F-35C. Excluding the Air Force, the APUC for a Department of the Navy F-35 is approximately $152 million. Program Acquisition Unit Cost (PAUC) for the F-35 is projected to be TY $154 million and BY $110 million. PAUC is calculated by dividing the total cost of the F-35 program by the number of units to be produced. See "F-35 Selected Acquisition Report," Department of Defense, December 31, 2010, pp. 26, 38.

[216] The Marine Corps intends to operate five F-35C squadrons aboard Navy aircraft carriers.

on average due to maintenance, the Marine Corps maintains a requirement for a fleet of thirty-three amphibious ships.[217] The Navy is currently on a path toward twenty-nine amphibious decks, which would result in an operational lift deficit of four ships. It may be possible to partially mitigate this shortfall by ensuring future LHA Replacement ships are equipped with well decks to accommodate amphibious landing vehicles.[218]

AMPHIBIOUS COMBAT VEHICLE. The Marine Corps should develop and field a new Amphibious Combat Vehicle (ACV) to replace its nearly forty-year-old Amphibious Assault Vehicles. The ACV should be optimized for ground combat in a G-RAMM environment. One alternative for a future ACV might combine a ground combat vehicle with a separate transport vessel that would carry it ashore, as suggested by the Commandant of the Marine Corps.[219] This two-system approach may increase the standoff range of an amphibious landing force, decrease the time needed to deliver expeditionary forces ashore, and reduce the need to encumber a future ACV with the demanding requirements that plagued the EFV's development, such as combining the armor needed to survive IED attacks in a platform that could swim across the water over long distances at high speeds.

Counter-G-RAMM Capabilities

In addition to ground-based directed energy defense for fixed bases, the U.S. Army should prioritize the development of mobile solid-state laser defenses that could complement kinetic defenses against G-RAMM. Directed energy defenses may provide a more cost-effective means of defending against inexpensive G-RAMM threats than kinetic defenses, and could provide a forward-based, deep counter-G-RAMM magazine without the need for frequent resupply.[220]

The Army and Marine Corps should pursue air-delivered and ground-deployed capabilities such as advanced mines and other non-lethal systems that could create "barriers" to unconventional enemy forces attempting to employ G-RAMM against U.S. bases, surface vessels operating in littoral areas, and forces

---

[217] "Amphibious Ship Programs," p. 3.

[218] The first two LHA(R)s, the LHA-6 and LHA-7, will not have well decks in order to better accommodate F-35B operations. Future LHA(R)s may be equipped with well decks. See "Robert Work," *Defense News*, April 10, 2011, accessible online at http://www.defensenews.com/story.php?i=6200841&c=FEA&s=INT.

[219] General James Amos, Commandant of the Marine Corps, suggested considering such a two-part capability to replace the AAV and EFV. See "Amos: EFV Replacement Could Have Two Parts: Transporter And Vehicle," *Inside Defense*, August 2, 2011, accessible online at http://www.thedailybeast.com/newsweek/2009/04/10/the-few-the-proud-the-savvy.html.

[220] The Army is planning to demonstrate a static solid-state laser system in 2012.

supporting theater-entry operations.[221] Such capabilities may have significant potential to help create operational sanctuaries for U.S. expeditionary units tasked with creating lodgments during joint theater entry operations.

Other Capability Initiatives

Strategic Air Mobility

DoD should assess the impact of an emerging A2/AD threats in the Persian Gulf on its future strategic lift requirements. According to the Commander of the U.S. Transportation Command (USTRANSCOM), the Defense Department's latest Mobility Capabilities and Requirements Study (MCRS) concluded that the Air Force could reduce its strategic airlift fleet from the Congressionally-mandated 316 aircraft to a combination of 300 C-17s and modernized C-5s.[222] Although it is not publicly known if the scenarios assessed by the MCRS included cases where strategic airlift capabilities would be required to compensate for the loss of sea lines of communication though the Strait of Hormuz, it may be prudent to consider the implications of such a scenario before the C-17 production line is closed in 2014.[223]

SOF Insertion and Extraction

DoD should prioritize developing a stealthy aircraft capable of inserting and extracting SOF forces into denied areas to support unconventional warfare operations and precision strike missions against high-priority targets.[224] An assessment of such a system should include the risk involved in continuing to rely on rotary-wing and C-130-based capabilities to provide long-range SOF lift in a range of future operating environments.

---

[221] DoD defines a non-lethal weapon as "A weapon that is explicitly designed and primarily employed so as to incapacitate personnel or materiel, while minimizing fatalities, permanent injury to personnel, and undesired damage to property and the environment." See Joint Publication 1-02, p. 260. DoD's Non-Lethal Weapons Program is developing several promising directed energy technologies to complement the kinetic weapons inventory. For more information on non-lethal weapons technologies, see http://jnlwp.defense.gov/.

[222] Doing so would result in a savings of $1.2 billon. See "Statement of General Duncan J. McNabb, USAF Commander, United States Transportation Command Before the Senate Armed Services Committee Subcommittee on Seapower On The Strategic Airlift Fleet," July 13, 2011, pp. 1–2, accessible online at http://armed-services.senate.gov/statemnt/2011/07%20July/McNabb%2007-13-11.pdf.

[223] India has ordered ten C-17s, which will keep the C-17 production open until 2014.

[224] In 2010, Assistant Secretary of Defense Michael G. Vickers called for the "development and fielding of a more survivable, long-range SOF air mobility platform that exploits advances in signature reduction and electronic attack," pointing out that current C-130 SOF insertion/extraction aircraft will not survive in high threat areas. See John T. Bennett, "DoD: U.S. Needs Stealthy Airlifter," *Defense News*, March 8, 2010, accessible online at http://www.defensenews.com/story.php?i=4528377.

CREATING A POSTURE OF ADVANTAGE

> You may be surprised to know that the U.S. military presence near us is not power for the United States because this power may, under certain circumstances, become a hostage in our hands.
>
> — Former Iranian Defense Minister Ali Shamkani[225]

DoD has developed a posture in the Persian Gulf to support the rapid deployment of a large joint force to defeat major acts of aggression envisaged by analyses such as the one led by Dr. Wolfowitz in 1979. Although America's Persian Gulf posture served well as the foundation for Central Command's operations over the last thirty years, it may be ill-suited for the emerging security environment. Considering the panoply of threats that could be posed by a hostile Iranian regime, including weapons of mass destruction, this paper argues that the U.S. posture in the Persian Gulf, as currently constituted, may become more of a liability than an asset.

Although America's Persian Gulf posture served well as the foundation for Central Command's operations over the last thirty years, it may be ill-suited for the emerging security environment.

The Department of Defense should reassess America's military posture in light of these emerging threats. This assessment should consider the likelihood that Iran will use asymmetric approaches to hamper U.S. power-projection operations and coerce its neighbors, rather than conduct conventional large-scale acts of aggression similar to Iraq's invasion of Kuwait in 1990. It must also seek to create a posture that would assure continued U.S. access to the Persian Gulf and its energy resources in both peace and war, and enhance regional stability by reducing the incentives for Iran to launch a first strike. Finally, this assessment must consider posture initiatives that would support an enabling operational concept that will maintain the U.S. military's freedom of action in the region should deterrence fail. The following initiatives are intended to support these objectives.

Reducing the Vulnerability of U.S. Forces in the Gulf

Tailoring America's posture in the Persian Gulf to address emerging threat realities does not mean denuding the region of U.S. forces needed to support critical deterrence and assurance missions. On the contrary, it suggests that Central Command should continue to permanently station or rotationally deploy a small number of land-based forces to the region to act as a hedge against aggression or as a rapid-reaction force to support partner states. A future close-in posture should, however, seek to reduce the U.S. military's overall footprint on the ground while supporting missions such as missile defense, partner capacity building, and counterterrorism that would help regional partners to resist aggression by Iran and its proxies.

---

[225] Sagan, "How to Keep the Bomb from Iran," p. 54.

Hardening (particularly partner hardening) of close-in bases and missile facilities against missile or G-RAMM attacks could help protect U.S. and partner personnel and equipment in the event of an Iranian first strike. Additionally, base hardening could help dissuade Iran or its proxies from conducting acts of aggression by reducing their confidence in the likelihood of achieving a knockout blow. Toward this end, the DoD should work with host states and prospective host states to increase the number and quality of hardened shelters and support facilities at their bases. New missile defense sites could be constructed to withstand attacks by ballistic missiles or G-RAMM, and assets that are difficult to harden, such as radars, should be capable of rapidly relocating to complicate Iran's targeting.

DoD should also pursue host-state agreements to create a network of shared operating locations across the Arabian Peninsula that could be used to disperse units deployed to the Persian Gulf during a crisis. Playing a "shell game" by frequently moving U.S. forces between these expeditionary land bases, if they are available, would further complicate Iran's missile targeting.

Similarly, DoD should begin to shift its steady-state naval posture in the Persian Gulf. Today, expensive AEGIS ships execute presence missions out of necessity, since the Navy lacks significant numbers of smaller ships. By contrast, a future naval posture could emphasize the use of LCS, unmanned aircraft and surface and undersea systems as well as special operations forces to maintain a regional deterrence posture. Larger vessels such as AEGIS cruisers and destroyers would have a significant role to play during a conflict with Iran, but the increasing density of Iran's maritime exclusion capabilities may prevent them from deploying into the Persian Gulf at the outset of a conflict.

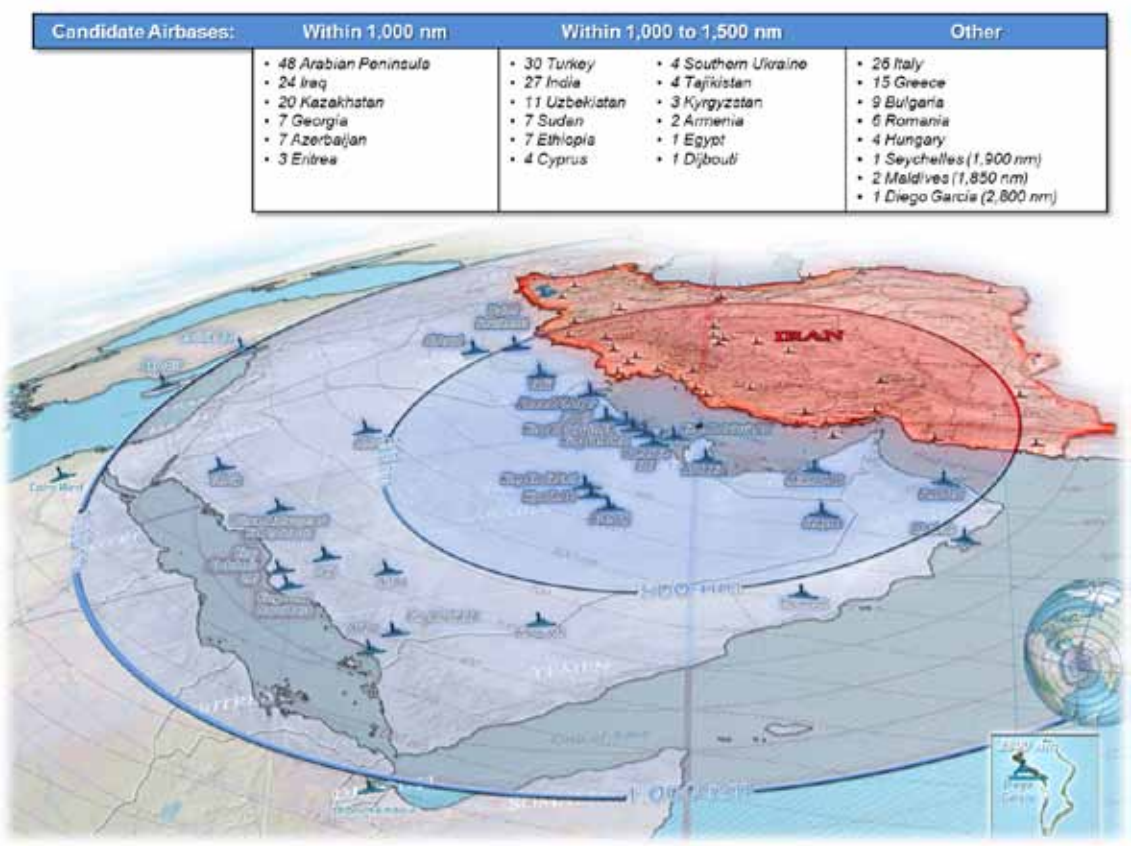
Developing a Posture to Fight from Extended Ranges

U.S. operational concepts for Persian Gulf contingencies over the last twenty years have relied upon deploying short-range tactical aviation and supporting assets to close-in air bases to establish air superiority and help achieve a "rapid halt" of enemy forces. In the future, Iran's A2/AD network could render large close-in air bases unusable at acceptable levels of risk, particularly in the first days of a conflict when Iran's capabilities will be at their zenith. Moreover, in an age of networked operations and the ability to "reach-back" to facilities that are located well outside a theater of operations, there may be less need to maintain critical command and control units close to Iran.

Creating a Diversified Posture

Instead of planning to deploy units to close-in bases that may bear the brunt of Iran's early strikes or may not be available in a crisis due to political reasons, DoD should create a more diversified posture that would allow the majority of

FIGURE 12. CREATING A DIVERSIFIED POSTURE



its initial forces to stage operations from areas that lie outside Iran's anti-access threat ring. There are hundreds of candidates for such staging bases, including existing civil and military airfields in Southern Europe, the Caucasus and Black Sea region, Central Asia, East Africa, Socotra, and the Seychelles (see Figure 12).

These operating locations could be smaller sites that are shared with U.S. allies and partners, rather than permanent, large overseas garrisons that are expensive to maintain. Moreover, these forward operating locations may not need the same degree of hardening and rapid-repair capabilities that would be required for bases that would be subject to Iranian ballistic missile, G-RAMM, and WMD attacks.

This diversified posture will require a concomitant focus on investments in systems capable of sustaining operations over long ranges, as well as supporting capabilities such as aerial refueling and survivable communications

and logistics networks. For example, the Department of the Navy and Central Command should consider alternative locations for the U.S. Naval Forces Central Command/Fifth Fleet Headquarters. Similarly, the Air Force, Navy and Central Command should assess alternatives to the CAOC which presently resides at al Udeid Air Base. These alternatives should include a sea-based operations center capable of rapidly relocating from the immediate Persian Gulf area to more secure distant operating locations.

Developing Regional Counter-A2/AD Networks

Creating a more diversified posture to fight from range could be perceived as a reduction in the United States' commitment to the Persian Gulf. The Department of Defense could offset this by building partner capabilities such as advanced target tracking radars; ballistic missile and air defense systems; short- and medium-range ballistic missiles; and frigates and corvettes for SLOC defense that could help maintain a favorable military balance in the Gulf.

Reinvigorating Alliances and Partnerships

The United States may be able to leverage a shift toward a new posture to strengthen its ties to states located outside the immediate Persian Gulf region. For example, moving to the periphery could help strengthen strategic relationships with states such as Djibouti, Georgia and the Ukraine, while also reinvigorating NATO by exploring additional contingency basing opportunities with countries such as Turkey, Bulgaria and Romania. Crucially, this could serve as a bridge between NATO's past as an Atlantic security organization and future security concerns. Before withdrawing additional military units from America's bases in NATO countries, it would seem wise to assess how they could support an enabling operational concept for the Persian Gulf as recommended by this paper.

A FINAL NOTE

America's current military posture and traditional operational concepts for projecting power to the Persian Gulf are based on decades-old assumptions that are becoming progressively less relevant in the face of emerging anti-access and area-denial capabilities that could challenge the U.S. military at sea, on land, in the air, and in cyberspace. Iran is developing and fielding such capabilities, including ballistic missiles, maritime exclusion systems, and WMD, which threaten U.S. vital interests: the stability of the Persian Gulf region and the security of its energy trade.

This assessment argues for the development of a new enabling operational concept—*Outside-In*—that exploits the U.S. military's ability to fight from extended ranges to counter Iran's emerging capabilities and preserve U.S. and partner interests in the Persian Gulf. The concept centers on deploying U.S. air and maritime crisis response forces to operating areas that are beyond the reach of most of Iran's anti-access systems. From this posture of advantage, the U.S. military could reduce the density of Iran's A2/AD forces and regain their freedom of action.

To implement this enabling concept, DoD will need to develop new capabilities and a diversified forward posture, neither of which are part of its program of record. Achieving this in an age of austerity will require defense planners to make difficult decisions; the U.S. military cannot meet the challenges that Iran could pose to America's vital interests in the Gulf by simply spending more to procure new capabilities. Operational concepts such as *AirSea Battle* and *Outside-In* can help inform these difficult decisions by providing the connective tissue between the Defense Department's strategic objectives on the one hand, and resource priorities on the other. Individually, these concepts can identify specific capability shortfalls and regional posture imbalances. In combination, they might also highlight broader areas where the U.S. military may have insufficient or excess capabilities.

Operational concepts such as *AirSea Battle* and *Outside-In* can help inform these difficult decisions by providing the connective tissue between the Defense Department's strategic objectives on the one hand, and resource priorities on the other.

Capabilities needed to support *AirSea Battle* and *Outside-In* have a remarkable amount of overlap. Both concepts emphasize the need to develop new long-range systems such as penetrating bombers and carrier-based unmanned aircraft; increase the U.S. Navy's undersea magazine of standoff munitions; and improve joint air and missile defenses. Capabilities to protect U.S. and partner C4ISR networks while denying or degrading an enemy's networks are crucial to warfighting operations in both the Western Pacific and Southwest Asia. The threat posed by ballistic missiles in both theaters underlines the requirement for new missile defense systems, such as land- and sea-based directed energy weapons, that may help create a more favorable cost-exchange ratio.

Operational concepts such as *AirSea Battle* and *Outside-In* could also help identify areas where the U.S. military might *reduce* its investments over time. For example, forces that require very large close-in theater footprints, are only suitable for operations in permissive and semi-permissive areas, or are limited to performing "niche" missions, may all be candidates for reduced funding. In summary, as the Department of Defense considers initiatives to rebalance its program of record while continuing to address existing and emerging security challenges, it should place greater emphasis on versatile systems that are capable of performing a range of missions in all threat environments, while reducing its emphasis on capabilities that are best suited for operations in permissive areas.

GLOSSARY

A2/AD	Anti-access/area-denial
AEA	Airborne electronic attack
ASAT	Anti-satellite (capabilities)
ASBM	Anti-ship ballistic missile
ASCM	Anti-ship cruise missile
ASW	Anti-submarine warfare
ASuW	Anti-surface warfare
BAMS	Broad Area Maritime Surveillance
BMD	Ballistic missile defense
C4ISR	Command, control, communications, computers, intelligence, surveillance, reconnaissance
CAOC	Combined air operations center
CAP	Combat air patrol
CBRN	Chemical, biological, radiological or nuclear
CEP	Circular error probable
CPGS	Conventional prompt global strike
GMTI	Ground moving target indicator
G-RAMM	Guided-rockets, artillery, mortars, missiles
IADS	Integrated air defense system
ICBM	Intercontinental ballistic missile
IRGCN	Iranian Revolutionary Guard Corps Navy
ISR	Intelligence, surveillance, reconnaissance
LACM	Land attack cruise missile
LCS	Littoral Combat Ship
LDUUV	Large Displacement Unmanned Undersea Vehicle
MCM	Mine countermeasures
MLRS	Multiple Launch Rocket System

MRBM	Medium range ballistic missile
PGM	Precision-guided munitions
PLA	People's Liberation Army
PNT	Precision navigation and timing
RPA	Remotely piloted aircraft
SAM	Surface-to-air missile
SLOC	Sea lanes of communication
SRBM	Short-range ballistic missile
SSGN	Guided-missile submarine
SSN	Attack submarine
TEL	Transporter erector launcher
TLAM	Tomahawk Land-Attack Missile
UAS	Unmanned aircraft systems
UCAS	Unmanned Combat Air System
UCLASS	Unmanned Carrier Launched Airborne Surveillance and Strike System
UUV	Unmanned underwater vehicle
WMD	Weapons of mass destruction

Center for Strategic and Budgetary Assessments
1667 K Street, NW, Suite 900
Washington, DC 20006
Tel. 202-331-7990 · Fax 202-331-8019
www.CSBAonline.org