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Derek A. Trinque, Lieutenant Commander, U.S. Navy

Paper Advisor: Professor Ronald Ratcliff

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14. ABSTRACT

Sea Basing is a viable concept for the projection of joint forces, even in the presence of a naval mine threat. Operation IRAQI FREEDOM shows that the United States will not always be able to rely on host nation support and basing. Sea Basing offers an alternative to basing forces ashore in host nations. A Sea Base is inherently joint, and less vulnerable to attack than land-based forces.

Despite the relative security of Sea Basing, area access denial weapons can threaten the Sea Base. Primary among these threats are naval mines. The widespread proliferation and simplicity of mines make them an ideal weapon for a weak coastal state. The U.S. Navy has a checkered past with respect to mine warfare, but ongoing innovations have potential to improve mine countermeasures throughout the fleet.

To counter the mine threat, commanders can attempt to prevent mines from being laid, avoid laid mines, clear the mines, or choose to operate in mined waters after assessing the risk. Prevention of minelaying requires permissive ROE, and persistent ISR. Avoiding mines requires persistent ISR. Mine clearance requires a significant amount of time.

Naval planners and JFCs should continue to pursue the development of Sea Basing capabilities. By ensuring future expeditionary forces are compatible with Sea Basing, and improving the organic MCM capability of naval forces, commanders and force planners can greatly improve the flexibility of joint power projection.

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Sea Basing: Persistent Power Projection in the Face of the Naval Mine Threat

by

Derek A. Trinque
Lieutenant Commander, United States Navy

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

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09 February 2004

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INTRODUCTION

Sea Basing is part of the U.S. Navy's Sea Power 21 vision that will enable joint forces to project and sustain persistent credible power in many parts of the world where the United States does not enjoy host nation assistance. Sea Basing, however, is threatened by robust, inexpensive naval mines, which put the whole concept in jeopardy. Joint Task Force (JTF) commanders and naval planners can overcome that threat through focused prior planning; more permissive rules of engagement (ROE) to prevent minelaying; persistent intelligence, surveillance, and reconnaissance (ISR); and by assembling the right mix of capabilities when forming the future Sea Base.

This paper will present a brief description of Sea Basing and the advantages it can convey to a JTF commander. It will then describe some of the challenges facing the concept of Sea Basing, and the major threats to a Sea Base. After presenting an illustrative example of a Sea Base's potential, the paper will present recommendations to enable Joint Force Commanders (JFCs) to project sea-based forces despite the threat of mines.

One of the primary threats to the Sea Base is naval mining. While no navy can directly compete with the U.S. Navy, mines can bring a tremendous asymmetric advantage to even modest coastal states. Advancing mine technology has rendered more of the world's seas mineable, including of course the littorals, but also deeper waters near the littorals. These are areas where the U.S. Navy would likely want to position sea based forces. By mining or threatening to mine those waters, even a modest coastal state could deny or delay access to joint forces operating from a Sea Base. Unfortunately, mines are an old threat, one that the U.S. Navy has neglected through its history. Continued neglect of mine warfare, specifically mine countermeasures (MCM) could nullify the promises of Sea Basing.

Commanders and naval planners can overcome the threat of mines and reap the benefits of sea based joint forces. Prevention of mining is the most effective means of removing the mine threat. This can be accomplished through destruction of mines in storage and of minelaying craft. Avoidance of mined waters is the next most efficient way to defeat the mine threat, and is predicated upon dedicated, persistent ISR of mines and minelayers, in order to determine the extent of minefields. Mines, once laid, can be cleared, but the commander must be willing to allot significant time to MCM forces. More advanced mines are harder to find and harder to clear, increasing the time required for MCM. Finally, a commander can always accept the risk of operating in potentially mined waters.

Joint Force Commanders can take steps to maximize the benefits of sea-based forces. First, ROE must be examined to determine when the JFC can order the destruction of mines in storage and the destruction or capture of ships and boats suspected of laying mines. Second, commanders must be provided adequate ISR resources to support MCM in order to determine the extent of the potential mine threat. Third, commanders must become better informed about the deliberate nature of MCM, in order to allow MCM forces sufficient time to clear mined waters with an acceptable degree of confidence. Lastly, U.S. Navy leaders must provide Combatant Commanders with forces that can easily assemble into a Sea Base, complete with adequate MCM capability.

SEA BASING PROVIDES ASSYMETRIC ADVANTAGES

Operation IRAQI FREEDOM highlighted the need for Sea Basing. The Commandant of the Marine Corps, General Michael Hagee, noted that Kuwait's support was indispensable to the operation, but that other states, including Austria, Belgium, Saudi

Arabia, and Turkey, refused to support American efforts. "Every sovereign country has to decide what is in its national interest, and they decided it was in their national interest not to support some of the things we wanted to do. My sense is that access is going to become more difficult in the future," Hagee said.[1]

Combatant Commanders have a vested interest in the successful development and employment of the Sea Basing concept, because of the Sea Base's inherent jointness. Turkey's refusal to permit the staging and advance of the U.S. Army's Fourth Infantry Division through Turkish territory is but the most recent example of the difficulty an ally can impose upon U.S. military operations. Other recent examples include the French and Spanish refusal to grant overflight to U.S. Air Force bombers during the strikes against Libya in 1986, and the refusal of most North Atlantic Treaty Organization (NATO) nations to grant staging rights for American forces resupplying Israel in the 1973 Arab-Israeli War. While the U.S. Central Command (CENTCOM) was able to use bases in Kuwait and Qatar to overcome a lack of Saudi basing support for Operation IRAQI FREEDOM, one should not assume that America will always be able to find suitable bases in a crisis.

Sea Basing will "maximize the ability of the naval services to conduct sustained, persistent combat operations from the maritime domain and minimize the limitations imposed by reliance on overseas shore-based support."[2] Much debate has ensued about the physical form a sea base will take, with speculation running from a collection of ships working together to large, mobile offshore bases (MOBs, the speculative "floating airfields"). The Defense Science Board viewed Sea Basing as "a complex system of capabilities which would serve to capture not only the power and flexibility of future CSGs [Carrier Strike Groups] and ESGs [Expeditionary Strike Groups], but also the superb capabilities envisioned

for MPF(F) [Maritime Prepositioning Force (Future)] squadrons." The Board further stated that the MOB was too platform-centric an idea, and lacked flexibility and scalability, two advantages of the Sea Basing concept in general. Instead, the Board envisioned a Sea Base consisting of an ESG; a CSG; a Maritime Prepositioning Group (MPG), which is a component of the MPF(F); specialized support vessels; and incorporated forces such as ground troops and other air assets. The future Sea Base will function as "fort, airfield, depot, barracks, command center and maneuver element – all able to exploit the maneuver space of the sea."[3]

Rather than a naval base, the Board sees the Sea Base as inherently joint, based upon:

- The ability of the seabase to serve as the joint force commander's location
- Its ability to serve as a dynamic base of operations for forces of all services
- Its ability to handle the logistics of all four Services plus special operations forces
- Its ability to support and sustain operations from the sea of all four Services[4]

Sea-based forces are less vulnerable to attack than land-based forces. Large, static depots and bases on land are at risk from missile, mortar, and commando attacks. Forces based at sea, while not invulnerable, are much more difficult to locate and target than are those on land. This increased protection makes the Sea Base an ideal station for command and control elements, logistics forces, and tactical aircraft. In short, the Sea Base offers the JFC operational flexibility to overcome basing rights, force protection, and operational maneuver issues.

Technical issues remain to be solved, such as improvements in at-sea cargo handling capabilities in seas up to sea state 4 (moderate breeze (11-16 knots), small waves (1 meter), with some whitecaps[5]), a capability the Board sees as crucial to the Sea Base's ability to project and sustain forces ashore. Additionally, current ship designs do not fully support the potential of the future Sea Base. As a logistics centerpiece to the Sea Base, Maersk Line's

proposal to convert twelve very large container ships into logistics platforms to support Sea Basing shows promise.[6] While the converted ships do not fully meet the Board's recommended performance specifications, they could represent the beginning of spiral development of the Sea Base logistics capability.

Another challenge is airlift. Current strategic airlift assets are not capable of operating from a Sea Base as envisioned by the Board. However, airlift concepts under development, such as a quad-tilt rotor aircraft and large blade helicopters, would allow airlift of heavier equipment than is now possible, as well as afford the commander more latitude in the positioning of the Sea Base.[7]

THREATS TO THE SEA BASE

Sea Basing's most promising characteristic is that it allows U.S. joint forces access to areas in which host nation bases are not available. However, forces based at sea are susceptible to several access denial threats. Cruise missiles, launched from coastal defense stations or small surface craft, are a widely proliferated threat. The submarine, due to its stealth, is an even more powerful tool for access denial. An unlocated hostile submarine is routinely one of the most pressing concerns of any naval commander. While these systems pose serious threats to any sea based force, the mine threat is much more pervasive for several reasons. Mines are cheaper and more widely stockpiled than any other access denial weapons. They require far less training to employ than other weapon systems, especially submarines. Lastly, potential adversaries know that the U.S. Navy has consistently ignored the mine threat throughout its history.

Naval mines are and will remain a potent area access denial weapon. Like the unlocated submarine, the very threat of mining gives naval commanders pause. While no other navy can compete with the U.S. Navy in direct combat power, mines offer even the humblest coastal state a chance to damage or sink an American ship, thereby delaying any littoral operations planned or in progress. Potential adversaries will reasonably seek any asymmetric advantage they can find, and U.S. Navy difficulties with mines are well documented. For example, the Confederacy, with its vastly inferior navy, made exemplary use of mines to delay and frustrate Union littoral operations in the Civil War.

During the Korean War, North Korea mined the port of Wonsan, using junks, sailing vessels, and other modest vessels as minelayers. The mines delayed an American amphibious assault for so long that by the time mines had been sufficiently cleared the South Korean Army had captured Wonsan without the help of the amphibious forces. After this embarrassment, the Commander, Amphibious Task Force, Rear Admiral Allen Smith, remarked, "we have lost control of the seas to a nation without a Navy, using pre-World War I weapons, laid by vessels that were utilized at the time of the birth of Christ."[8]

In recent years, mines have seriously damaged three U.S. Navy ships in the Arabian Gulf. In 1988, USS *Samuel B. Roberts* (FFG 58) was nearly sunk after striking an Iranian SADAF-02 contact mine. The mine, with an estimated cost of $1,500, caused $96 million in damage. During the 1991 Gulf War, USS *Tripoli* (LPH 10) struck an Iraqi LUGM-145 moored contact mine. This $1,500 mine caused $3.5 million in damage. The same day, USS *Princeton* (CG 59), hit an Italian-made Iraqi Manta mine. The $10,000 mine caused $24 million damage.[9] The mere threat of mines in the Khawr Adb Allah waterway during

Operation IRAQI FREEDOM, delayed the opening of the port of Umm Qasr for over 36 hours.[10]

The U.S. Navy had to relearn these lessons after forgetting its previous encounters with mines, dating from the first effective use of mines during the Civil War. The Center for Naval Analyses depicted the Navy's historical mine countermeasures (MCM) cycles as shown in Figure 1:

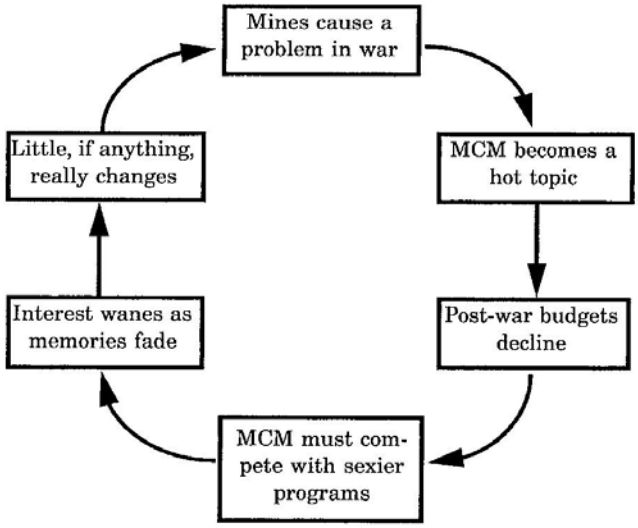

Figure 1: U.S. Naval MCM action cycle (Lyons, Baker, Edlow, Perin, 2)

CENTCOM and Naval Forces, Central Command (NAVCENT) should have been better prepared for the mine threat during Operations DESERT SHIELD and DESERT STORM in the face of a known mine threat. American commanders were aware that the Iraqi Navy was mining the northern Arabian Gulf, but did not track the minelayers when they got underway. After the mines were laid, little effort was expended to locate them. Rather, the American commanders acted on limited intelligence and faulty assumptions about the nature of Iraqi mining tactics. Poor intelligence and risky assumptions were merely

symptoms of a lack of understanding and respect for the Iraqi mine threat. Surveillance of minelayers and potential minefields was assigned a low priority, and as a result, the Navy knew nothing of the true nature of the Iraqi minefields.[11] The result was the operational loss of two large and very expensive ships and the inability to conduct a planned amphibious assault.

The Navy claims to have learned the lessons of DESERT STORM. For example, the published U.S. Naval Mine Warfare Plan states, "Mine warfare is indeed a core warfighting competency of the naval services. It is essential to operational planning, training exercises, and joint littoral warfighting."[12] This importance is not new. It was demonstrated when amphibious landings at Wonsan and Kuwait, separated by 40 years, were each cancelled due to mining.

Mines are widely proliferated. While the 1907 Hague Convention VIII places limits on the acceptable use of mines, there are no restrictions on mine possession. In addition to the large number of mines present in inventories worldwide, most of the world's key waterways are mineable. Moored mines can function in up to 300 meters of water, and rocket-assisted rising mines can function in up to 2,000 meters of water, making much of the world's oceans mineable. These mineable waters include most of the areas where the United States might wish to conduct military operations in some future contingency, such as the Arabian Gulf, the Strait of Hormuz, the Taiwan Strait, the Red Sea, the Adriatic Sea, the Yellow Sea, the Korea Strait, and coastal areas of the Sea of Japan.[13] North Korea is a particular threat. Currently, the North Korea People's Navy (KPN) uses copies of Russian moored mines, such as the M-KB, that can be laid in waters up to 300 meters deep.[14] As a nation with no conventional defense against the U.S. Navy, North Korea can be expected to

continue to pursue more advanced mines, including those designed for more extreme depths. The KPN also possesses the fourth-largest submarine force in the world and a sizeable fleet of small combatants and amphibious landing craft. Any of these vessels could be used to lay mines. The North Koreans, as previously noted, have also demonstrated the ability to lay mines from non-naval vessels. Minelaying is an established part of North Korean operational art, and existing defensive minefields are manned by observers trained to call in artillery fire on vessels, including MCM vessels, disabled by the mines therein.[15]

The mine threat will not be removed by international law. It is in the interest of vulnerable coastal states to maintain any asymmetric advantage available. Mines are arguably the best such advantage. Further, abolition of mines is not in the United States' interest, or in the interest of many friendly nations. Finland is only one example of a nation which depends upon mines for sea frontier defense. Finland has made clear its intention to resist any attempt to prohibit naval mines.[16] Even if such a treaty were implemented, the United States, drawing on lessons learned from efforts to curb proliferation of weapons of mass destruction and ballistic missile technology, could not blindly assume a littoral environment free of mines.

DEFEATING THE MINE THREAT

The fact that most of the world's oceans are mineable makes mines a serious threat to the Sea Base. Stationing the Sea Base farther from land (and hence in deeper water) reduces the threat of mines and other attacks. However, stationing the Sea Base farther from shore will reduce the operational reach of sea based force. The placement of the Sea Base is thus a tradeoff between self defense and operational utility. Current planning envisions the Sea

Base closing to 25 nautical miles from the shore for an initial assault, conducted by airlift. Heavier equipment such as tanks, and bulk liquid loads such as fuels and potable water must be transferred by surface lighter after a port or beach has been secured. For these heavier transfers, the Sea Base will need to move much closer to the shore, perhaps as close as three nautical miles.[17] The ships comprising the Sea Base are vulnerable to mines during the assault and the ship-to-shore resupply and reinforcement. The lighters hauling materiel ashore from the Sea Base are vulnerable to mines throughout their mission.

Since the Sea Base will likely operate in mineable waters, naval forces will have to first conduct MCM operations to determine, with an acceptable confidence level, the absence of mines. Combatant Commanders' staffs must understand the painstaking nature of MCM. The original amphibious assault planned for Operation DESERT STORM required a 200 square nautical mile area to be cleared of mines. Naval planners reported to the CENTCOM staff that this operation would take an estimated 40 days. The CENTCOM staff expressed surprise at the length of the MCM operations, and the amphibious landing was eventually reduced drastically in scale, eventually taking the form of a small raid on Faylaka Island.[18]

There are four general ways to defeat the mine threat:

- prevent the enemy from laying them in the first place,
- avoid the mines,
- clear the mines,
- "press on" and accept the risk.[19]

The most effective way to counter mines is to prevent them from being laid at all. This can be accomplished by increased ISR of mine production, transportation, and storage facilities, and of potential minelaying craft; and by ROE designed to be permissive of strikes against these facilities and craft. The Combatant Commander may find these ROE difficult to secure from higher authority. Mines are often laid well in advance of an expected assault,

and the U.S. may not wish to appear overly aggressive early in a crisis. Alternatively, the U.S. may wish to delay belligerent action until such time as it is ready to fully engage an enemy. For this very reason, U.S. Naval forces were prohibited from conducting MCM operations earlier in Operations DESERT SHIELD and DESERT STORM.[20]

Minelayers are often innocuous craft, as demonstrated by North Korea in 1950. Rules of engagement supporting a contraband scheme, whereby naval forces search suspected ships for mines as they leave territorial waters, are less aggressive than armed strikes. Such a contraband scheme requires time and significant forces. Additionally, there is no legal basis to prevent a state from mining its own waters. Such defensive mining is always permitted under the 1907 Hague Convention VIII.

Since prevention is such a potent way to eliminate the mine threat, the Combatant Commander should press for ROE permitting strikes against and seizures of minelayers. In a crisis situation, allowing mines to enter the water can only complicate the JTF's mission. The 1991 Gulf War is a prime example of a lost opportunity to prevent mining. The fact that the United States and its allies successfully consummated the war without the Marines' amphibious assault has blunted the lesson that Iraqi mines substantially changed CENTCOM's operations plan. Future war plans may not have the operational flexibility to recover from such a setback.

Avoiding mines is the next best countermeasure. Avoidance is predicated upon knowledge of the mine locations. Here again, ISR is the best resource. The Combatant Commander may have a much greater control over ISR assets and tasking than he would over ROE, although many ISR assets are "low-density, high-demand," like RC-135 Rivet Joint and E-8 JSTARS aircraft. The quickly increasing availability of unmanned aerial

vehicles (UAV), some specifically designed to provide persistent ISR, will give the commander more tools to track minelayers. The key here is that the location and activity of adversary minelayers must be high on the commander's critical information requirements (CCIR) list. If the JFC cannot obtain ROE permitting the destruction of mines and minelayers, he should ensure that vessels suspected of laying mines are closely tracked while underway. Since the mines will have been laid along the general track of the minelayer, Sea Base ships and lighters can easily avoid the mines later. Persistent, numerous, less expensive ISR assets, such as UAVs, would assist the commander in this regard, since a joint force could conduct continuous surveillance of suspected minelayers, without sacrificing surveillance against other adversary forces. Such UAVs could be controlled from the Sea Base. The data collected by the UAVs would be fused and disseminated to allow commanders to direct forces around mined waters.

Even with more vigorous ISR capabilities, mine avoidance may not always be possible. Choke points such as the Korea Strait and Strait of Hormuz are mineable. Joint Force Commanders may not have the option of avoiding those waters. In these cases, the mines must be cleared.

The Navy is developing new technologies to more rapidly identify mines, which may offer the JFC a new range of options for MCM. At the same time, mines themselves are growing more sophisticated. Fiberglass casings, found on mines such as Sweden's Rokan, make the weapons much more difficult to detect by sound navigation and ranging (SONAR). The JFC must have potent MCM capabilities inherent in the sea base. Organic MCM ability is being built into the newest Flight IIA *Arleigh Burke*-class AEGIS guided missile destroyers (DDGs), the planned Littoral Combat Ship (LCS), and the MH-60S multimission

helicopter. The distribution of MCM capacity throughout the U.S. Navy will allow CSGs and some ESGs to conduct their own MCM. These operations could be conducted as a Sea Base was being assembled for an operation.

If forced to conduct mine clearance operations, the commander must provide sufficient time and resources to allow MCM forces to clear waters with the required confidence. During Operations DESERT SHIELD and DESERT STORM, naval planners estimated that MCM forces would be able to clear five to nine square miles of water *per day*.[21] At some point in time, the commander may have to "press on" through whatever mine risk remains.

Preparation, through ROE, ISR, and adequate time for clearance operations, is key to reducing the risk to a manageable level. Each of these factors must be assessed against the potential threat. A coastal state with a well-developed mining plan and large stockpiles of mines will require more permissive ROE to prevent minelaying, a greater fraction of ISR assets dedicated to locating mines, and more time dedicated to mineclearance.

THE NORTH KOREAN PROBLEM

As an illustrative example, assume that North Korean aggression against South Korea necessitates U.S. intervention. A Sea Base would offer Commander, U.S. Forces Korea (CUSFK) potent command and control, logistics, and power projection capability. The Sea Base could also maneuver to deny the DPRK knowledge of the location of an impending strike. In deciding to use a Sea Base, CUSFK would decide which capabilities he needed. These tailored needs would determine the makeup of the Sea Base, and dictate which of the potential components would be assembled offshore. Certainly an Expeditionary Strike Force

(ESF), composed of several CSGs and ESGs, would form the core of the Sea Base's power projection capability. Having more than one aircraft carrier would allow the Sea Base to conduct round-the-clock flight operations almost indefinitely. Multiple ESGs would assemble, giving the Sea Base the ability to project a brigade-sized force ashore, using advanced vertical and waterborne assault craft to take the Marines and Soldiers to their objectives. Advanced ships from the MPF(F) would supply the entire endeavor, using their ability to selectively transfer needed supplies, even in adverse weather conditions.

All this capability is contingent on the ability of the Sea Base to operate securely off the coast of Korea, and safely move personnel and their material ashore to some objective chosen by CUSFK. To do this, the Sea Base requires effective MCM. In order to assure access against the DPRK mine threat, CUSFK would need to act as early as possible, beginning with the initial decisions going into the makeup of the Sea Base. The commander would have to ensure adequate MCM resources are available. Two USN MCM vessels are permanently forward deployed to Japan, where they are readily available for tasking, but additional capability would be needed. The Sea Base ships would need considerable organic MCM resources. Littoral Combat Ships configured for MCM, DDGs equipped with the remote minehunting system (RMS), and MH-60S helicopters will be capable enough for the job, but the commander must bear in mind that the DDGs will be called upon to conduct air defense, ballistic missile defense, anti-submarine warfare, maritime interdiction operations, and other tasks; and that the helicopters will be tasked with anti-submarine warfare, logistics, personnel transfers, and search and rescue missions. The danger is that the competing demands placed on the organic MCM assets will impede their ability to actually conduct MCM.

In addition to assembling the right forces to form the Sea Base, the commander must dedicate sufficient ISR priority to MCM. The U.S. military knows the DPRK has extensive defensive minefields.[22] The commander would need to dedicate enough ISR missions to the localization and classification of these minefields. This would allow sea-based forces to avoid the mines or, if this proved impractical, to more efficiently clear the mines. There will always be competing demands for ISR coverage. Despite the rapid growth in ISR capability, the U.S. military's demand for information on the adversary will always outstrip the capacity of available assets. MCM must receive a high priority for ISR, to ensure safe operation of the Sea Base and safe movement of personnel and materiel ashore.

The commander must also press for ROE allowing destruction of mines in storage, and destruction or capture of vessels assessed to be minelayers. The commander would of course have to balance the benefit conferred, namely preventing the DPRK from expanding and reseeding its minefields, against the risk of escalation. In striking this balance, CUSFK should remember that the most effective counter to mines is to prevent their placement, and that any mine destroyed ashore or captured while still on board a minelaying craft will save MCM forces valuable time.

RECOMMENDATIONS

The U.S. Navy must escape the cycle of enthusiasm and neglect for MCM. In the modern era of joint operations, MCM is not just a naval problem. Joint commanders must understand the mine threat, and take action to ensure joint forces can operate safely from a Sea Base, despite the use of mines as an access denial weapon. Key actions include establishment of ROE to allow interdiction of minelaying, the dedication of sufficient ISR

assets to the MCM problem, and emphasis of MCM through the Planning, Programming, and Budget System (PPBS).

Permissive ROE can do more to moderate the mine threat than any other action. By granting permission to destroy mines in storage or capture minelaying vessels before they can lay their mines, commanders can greatly improve the capability of the Sea Base to project power ashore. These actions are potentially inflammatory, and the commander must carefully judge when the benefit gained by destroying or capturing mines is worth the risk of escalation. When the benefit is worth such a risk, the commander must swiftly order decisive action to prevent minelaying.

The ISR capability available to JFCs will continue to grow. As it does, so will the demand for ISR coverage. The commander must ensure that persistent coverage is dedicated to adversary mine warfare forces. This will allow commanders to know where the mines are at all times, greatly facilitating later action to prevent expansion or reseeding of existing minefields. Knowledge of mine placement will also ease mine avoidance, which may be preferable to mine clearance in some circumstances. Adequate ISR can allow a sea based commander to project forces confidently even in mineable waters.

Combatant Commanders, the end-users of the Navy's MCM forces, have a responsibility to ensure the Navy develops and maintains ample MCM capability. Combatant Commanders can ensure MCM capabilities are sufficient to support Sea Basing by making MCM a clear priority in the annual Integrated Priority Lists (IPLs) they submit to the Chairman of the Joint Chiefs of Staff (CJCS). This programmatic "pull" from the Combatant Commander "customers" could help mine warfare escape the cycle of interest and disinterest depicted in Figure 1.

Specifically, the Navy should continue to advance the organic MCM capability of CSGs and ESGs, through the RMS installed in later DDGs and the MH-60S helicopter. Sufficient MCM modules for the LCS should be forward deployed to areas where MCM operations may occur, such as the Middle East and western Pacific. Since these platforms are all designed to fulfill multiple missions, the Combatant Commanders should ensure there are enough of each to cover all tasking effectively.

The Navy should also expand the RMS installation project to include the new amphibious ships of the *San Antonio* (LPD 17) class. These ships, like all "amphibs" will operate relatively close to land as they send Marines to their objectives. Since the ships will operate in waters that are likely to be mined, an organic MCM capability would be a wise supplement.

CONCLUSION

Mines present a potent threat to Sea Basing. Just as they did in the middle of the nineteenth century, mines represent a powerful tool for a weak maritime power to employ against an otherwise strong maritime power. The U.S. Navy has learned the hard lessons of MCM several times in its history. Despite this blemished record, U.S. joint forces can operate a Sea Base effectively in the face of a robust mine threat. Commanders, when assembling a Sea Base, must ensure they demand ample MCM capabilities.

Intelligence, surveillance, and reconnaissance can greatly improve the performance of MCM forces. The ISR capabilities resident in a Sea Base, including a potentially large number of UAVs, can simplify MCM greatly, but only if enough of the ISR focus is placed on MCM.

Permissive ROE, allowing early destruction of mines and their delivery platforms, can also ease the MCM burden. A decision to adopt aggressive ROE is always a balancing act, but the JFC must bear in mind the great investment in time involved in MCM. Any "pre-emptive" MCM, through strikes or capture, will greatly speed the mine clearance process, and the ability of the Sea Base to move loads unsuitable to air transport.

The Sea Base represents a critical future capability of U.S. joint military forces. It can assure access to areas where host nation support is unavailable or inadequate to the assigned task. It can greatly improve the flexibility of joint forces, by allowing the JFC to position and relocate the base to the location most advantageous to him. While mines can threaten joint forces' ability to use Sea Basing, ISR, ROE, and the right combination of forces will allow JFCs to use Sea Basing as a persistent force projection and sustainment capability, even in the face of a mine threat.

NOTES

[1] John Terino, "Sea basing need highlighted by Iraq war, official says," Aerospace Daily, 208 (October 28, 2003): 3.
[2] Department of the Navy, "Naval Transformation Roadmap: Power and Access…From the Sea," 24.
[3] Defense Science Board, Report of the Task Force on Sea Basing (Washington: August 2003), 45, 73-74, 19, 38.
[4] Ibid., 9.
[5] National Climatic Data Center, "Marine Beaufort Scale" <http://lwf.ncdc.noaa.gov/oa/climate/conversion/beaufortsea.html> [17 January 2004].
[6] Maersk proposed the Military Sealift Command (MSC) lease large, 6,600-container capacity "S-Class" ships. These ships could be converted in under twelve months to afloat forward staging bases, capable of operating rotary-wing or vertical/short take-off and landing (VSTOL) aircraft, and selectively offloading cargo from any of the containers on board. Stephen M. Carmel, "A Commercial Approach to Sea Basing – Afloat Forward Staging Bases," U.S. Naval Institute Proceedings (January 2004): 78-80.
[7] Defense Science Board, 67.
[8] Tamara M. Melia, "Damn the Torpedoes": A Short History of U.S. Naval Mine Countermeasures, 1777-1991 (Washington: Naval Historical Center, 1991), 76.
[9] Department of the Navy, U.S. Naval Mine Warfare Plan (January, 2000), 31.
[10] Nick Brown, "What Lies Beneath," Jane's Navy International, June 1, 2003.
[11] Melia, 6-9.
[12] U.S. Naval Mine Warfare Plan, 1.
[13] Committee for Mine Warfare Assessment, National Research Council, Naval Mine Warfare: Operational and Technical Challenges for Naval Forces (Washington: National Academy Press, 2001), 19.
[14] Jane's Underwater Warfare Systems, 2002-2003, 313-314.
[15] Jane's Sentinel Security Service, China and Northeast Asia, North Korea, Navy, posted June 16, 2003.
[16] Brown.
[17] Defense Science Board, 41-42.
[18] H. Dwight Lyons, Eleanor A. Baker, Sabrina R. Edlow, and David A. Perin, The Mine Threat: Show Stoppers or Speed Bumps? (Alexandria, VA: Center for Naval Analyses, July, 1993, 6. Bruce F. Russell, The Operational Theater Mine Countermeasures Plan: More Than a Navy Problem. (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1995), 19.
[19] Lyons, et al, 15.
[20] Ibid., 9.
[21] Ibid., 6.
[22] Jane's Sentinel Security Service, China and Northeast Asia, North Korea, Navy, posted June 16, 2003.

BIBLIOGRAPHY

Adkins, Arthur A. and David P. Burnette. Solving the Mine Countermeasures Problem: a Matter of Focus and Priority. Newport, RI: Center for Naval Warfare Studies, 1996.

Borden, Steven A. Mine Countermeasures: A Comparative Analysis of US Navy Mine Countermeasures 1999 Vs. 2020. Carlisle, PA: U.S. Army War College, April 2000.

Brown, Nick. "What Lies Beneath." Jane's Navy International, (June 1, 2003). < http://80-www4.janes.com.ezlib.nwc.navy.mil/K2/doc.jsp?t=Q&K2DocKey=/content1/janesdata/mags/jni/history/jni2003/jni00730.htm@current&QueryText=%3CAND%3E%28%3COR%3E%28%28%5B80%5D%28what+%3CAND%3E+lies+%3CAND%3E+beneath%29+%3CIN%3E+body%29%2C+%28%5B100%5D%28%5B100%5D%28what+%3CAND%3E+lies+%3CAND%3E+beneath%29+%3CIN%3E+title%29+%3CAND%3E+%28%5B100%5D%28what+%3CAND%3E+lies+%3CAND%3E+beneath%29+%3CIN%3E+body%29%29%29%29&Prod_Name=JNI&> [December 2, 2003].

Bucchi, Mike and Mike Mullen. "Sea Shield: Projecting Global Defensive Assurance." U.S. Naval Institute Proceedings, (November 2002).

Carmel, Stephen M. "A Commercial Approach to Sea Basing – Afloat Forward Staging Bases." U.S. Naval Institute Proceedings, (January, 2004): 78-80.

Clark, Vern. "Projecting Decisive Joint Capabilities." Naval Institute Proceedings, (October 2002).

Committee for Mine Warfare Assessment. Naval Mine Warfare: Operational and Technical Challenges for Naval Forces. National Research Council, Division on Engineering and Physical Sciences, Naval Studies Board. Washington: National Academy Press, 2001.

Defense Science Board. Report of the Task Force on Sea Basing. Washington: 2003.

Department of the Navy. U.S. Naval Mine Warfare Plan, 4th ed. Washington: January, 2000.

_____. Naval Transformation Roadmap: Power and Access: From the Sea. no date. <http://www.oft.osd.mil/library/library_files/document_202_naval_transformation.pdf> [16 January 2004].

Edlow, Sabrina R. and Julia D. Thibault. Mainstreaming Mine Warfare and the Transition to Organic MCM Capabilities -- Implementation Plan. Alexandria, VA: Center for Naval Analyses, April 2000.

Hartmann, Gregory K. with Scott C. Truver. Weapons That Wait: Mine Warfare in the U.S. Navy, Updated edition. Annapolis: Naval Institute Press, 1991.

Lyons, H. Dwight, Eleanor A. Baker, Sabrina R. Edlow, and David A. Perin. The Mine Threat: Show Stoppers or Speed Bumps? Alexandria, VA: Center for Naval Analyses, July 1993.

Melia, Tamara M. Damn the Torpedoes: A Short History of U.S. Naval Mine Countermeasures, 1777-1991. Washington: Department of the Navy, Naval Historical Center, 1991.

Moore, Charles W. Jr., and Edward Hanlon, Jr. "Sea Basing: Operational Independence for a New Century." U.S. Naval Institute Proceedings, (January 2003).

Russell, Bruce F. The Operational Theater Mine Countermeasures Plan. Fort Leavenworth, KS: U.S. Army Command and General Staff College, School of Advanced Military Studies, 1995.

Terino, John. "Sea Basing Need Highlighted by Iraq War, Official Says," Aerospace Daily, 208 (October 28, 2003): 3.

Watts, Anthony J., ed. Jane's Underwater Warfare Systems, 14th Edition (2002-2003). Alexandria, VA and Coulsden, Surry, UK: Jane's Information Group. 2002.

Work, Robert O. The Challenge of Maritime Transformation: Is Bigger Better? Washington: Center for Strategic and Budgetary Assessments, 2002.