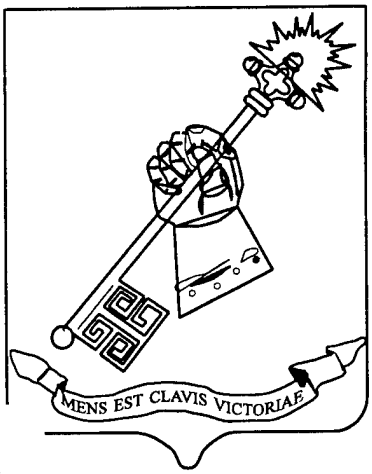
THE SSN AS A STRIKE PLATFORM FOR THE LITTORAL REGION

A Monograph
By
Commander Peter Lyddon
United States Navy



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ABSTRACT

THE SSN AS A STRIKE PLATFORM FOR THE LITTORAL REGION by Commander Peter Lyddon, USN, 40 pages.

In examining SSN operations, this paper first examines the traditional roles of the attack submarine, and then the evolution of its missions over the past five years to evaluate the impact of these changes on battle group and JTF operations. The paper then compares the SSN's capability to the Spruance-class destroyer; a common surface ship that is used for strike and shore bombardment operations. This paper then focuses on the issue of sea power from a coastal state's perspective and assess whether using the SSN in a strike role as the lead element to facilitate entry of follow-on maritime forces makes sense. SSN strike operations with submarine launched ATACMS are examined in the light of littoral demands and concludes that though SSNs can be capable of delivering ATACMS, this does not make the best use of the submarine's capabilities.

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Introduction

"The United States cannot be a land power beyond North America unless she is a sea power, and sea power has strategic meaning only insofar as it has influence on events on land."[1]

With the rise of a global maritime threat in the form of the Soviet Union and its nuclear ballistic missile submarines (SSBNs), the US Navy's "Maritime Strategy" was aimed at taking the fight to the Soviet Union and its SSBNs in their submarine bastions around the USSR. Because the Maritime Strategy was focused in part at destruction of the Soviet Navy at sea, it was generally referred to as a blue-water strategy. The primary weapon for the blue-water anti-submarine fight was the nuclear attack submarine (SSN). Though substantially reduced, the threat posed by Russia's SSBNs still exists and the SSN still has a mission to kill them should the need arise. However, due to the collapse of the USSR and the rise in regional threats, the US Navy shifted its focus from blue-water operations to operations in the littoral. The term "littoral" is defined in NDP-1 as "those regions relating to or existing on a shore or coastal region, within direct control of and vulnerable to the striking power of naval expeditionary forces." With the doctrinal change from the blue-water focus of the "Maritime Strategy" to the littoral focus of "...From the Sea," the SSN is broadening its mission to remain relevant.

In examining SSN operations, this paper will first examine the traditional roles of the attack submarine, and then examine evolution of its missions over the past five years to evaluate the impact of these changes on battle group and JTF

operations. The paper will then compare the SSN's capability to the Spruance-class destroyer; a common surface ship that is used for strike and shore bombardment operations. SSN strike operations in the littoral will be examined to assess whether they add to the four essential operational capabilities (command control and surveillance, battlespace dominance, power projection, and sustainment) the US Navy states are required for naval forces to continue accomplishing the roles, functions and anticipated missions of the future. Once these issues have been addressed, the paper will focus on the issue of sea power from a coastal state's perspective. This paper will then assess whether using the SSN in a strike role as the lead element to facilitate entry of follow-on maritime forces makes sense.

The SSN was designed primarily for Anti-Surface Warfare (ASUW) and Anti-Submarine Warfare (ASW) with additional tasking to gather intelligence and insert and extract special operations forces. As an ASW weapon and as a stealthy intelligence gatherer, the SSN has few equals. But those missions alone seem insufficient to justify the enormous price tag attached to building a new generation of SSNs. As the physical and budgetary size of the military departments shrink and demands for their services around the world continue unabated, the chorus of "do more with less" becomes ever more strident. As a result, none of the service branches can afford to maintain programs that are not truly multi-mission capable.

The submarine branch of the US Navy has traditionally kept the details of

its capabilities and employment secret. Until the looming budget axe threatened the continuation of programs such as Seawolf and New SSN (NSSN), the submarine force was reluctant to speak out publicly on what they brought to operations other than war (OOTW) and to conventional warfighting. The Navy's shift in focus to the littoral region forced supporters of the SSN to try to explain why it needed to exist at all. In the wake of budget cuts, DOD is planning to delay many major programs, including the third Seawolf (SSN-23) as well as the first two NSSNs. These nuclear programs are very expensive, roughly $3 billion for SSN-23 and $1.75 billion for each NSSN. In no small measure, the survival of these programs is due to heavy emphasis on expanding the submarine's non-traditional roles.

In a speech before the Submarine Technology Symposium at Johns Hopkins in May 1992, Dr James J. Tritten, then an Associate Professor of National Security Affairs at the Naval Postgraduate School, stated that there "should be increased emphasis on the submarine force for crisis response."[2] Two of the four areas he addresses are using the submarine for rapid response and shore bombardment/strike. Emphasis on long-range strike warfare with Tomahawk Land Attack Missiles (TLAM), 'presence' and Show-the-Flag missions appear to have superseded the stealthy missions of the past. Most recently, the US Navy successfully carried out a shipboard test launch of the Army Tactical Missile System (ATACMS) and embarked on a project to study the feasibility of launching ATACMS from submarines.[3]

The official Navy view of the attack submarine is that "the SSNs remain a flexible, stealthy and powerful quick response platform and an asset that can operate almost indefinitely in support of the Joint Task Force. Its ability to provide covert surveillance, communicate tactical information, control the surface and subsurface battlefields, and deliver strike weapons and special operations forces ashore make it a unique asset for implementing national policy."[4] An implied criterion for measuring the effectiveness of the SSN in the littoral is its ability to facilitate JTF operations.

The attack submarine has a history of being a very effective and efficient killer. World Wars I and II saw the submarine used to devastating effect both in terms of the amount of damage it caused and the manpower diverted to Anti-Submarine Warfare. From these auspicious beginnings, the submarine continued to develop, adding nuclear power, better sensors and splitting into two communities: nuclear powered attack submarines (SSN) and nuclear powered ballistic missile submarines (SSBN). Concurrent with US submarine development was the Soviet Union's development of extensive conventional and nuclear powered submarine forces. Because of the threat posed by Soviet SSBNs, US SSNs had a primary mission to seek and sink them. ASW became a primary mission in addition to its traditional anti-ship mission. However, since there is no longer a monolithic Soviet threat and most of their submarines are pierside rusting, US SSN's face a new threat: lack of relevance.

To stay in the fight, the attack submarine has taken on some new

missions, the most significant is conventional shore strike with the Tomahawk Land Attack Missile (TLAM). With the US Navy's shift in focus to the littoral and greater emphasis on amphibious warfare, a serious deficiency in Naval Gunfire Support (NGFS) was uncovered. The largest gun in the Navy's active inventory is the 5"/54, and it has a maximum range of about 11 nautical miles. The Marine Corps' continuing refinement of Amphibious Warfare doctrine led to its current emphasis on Operational Maneuver From the Sea (OMFTS), which entails amphibious assault from beyond the horizon to take the enemy completely by surprise. To support OMFTS the Navy needs to get high volume fires into the amphibious objective area and the Navy needs weapons with greater range to do it.[5]

Army Corps commanders were faced with a similar need. They needed to be able to strike targets throughout their operating area quickly and without placing further demands on limited Air Force assets. The result is the ATACMS, a short-range tactical ballistic missile. In its quest for a rapid solution to limited naval surface fire support capability, the Navy embarked on a program to improve the range of the 5"/54 gun and to seek other solutions that can add to its capabilities. One avenue under investigation is adapting ATACMS to shipboard use, and a successful test launch was completed in February 1995.

The submarine community has now begun a study to determine the feasibility of launching ATACMS from submarines. The basic concept of operations entails using the submarine as the initial vehicle for crisis response,

leading other naval and amphibious forces into the crisis region. Once there, it would remain at periscope depth to maintain constant communication and use its 15 ATACMS to strike critical targets which would facilitate entry of the following naval forces. However, it sacrifices stealth, one of its principle strengths, to carry out the mission. More importantly though, this concept of operation assumes that there will be no surface or subsurface threat to contend with. Additionally, once the naval forces are on station, the SSNs would conduct other missions while the ships provided the high volume firepower to win the fight.

Though the SSN is an extremely capable platform, its limited missile capacity dictates that every missile should be aimed at the highest payoff targets within reach. Shortening that reach by substituting ATACMS for TLAM places the submarine in a vulnerable position, at periscope depth in shallow water, and denies its ability to strike into the depth of the operating area. The submarine's true strength lies in its ability to use its stealth to clear the littoral waters of enemy ships and submarines and strike high payoff targets at long range. These actions will enable surface and amphibious forces to move into the littoral waters to deliver their high volume of fires and put troops on the beach. Though SSNs can be capable of delivering ATACMS, this does not make the best use of the submarine.

Background

The submarine was first used as a weapon of war in September 1776

against a British ship anchored off Staten Island. Though the attack was unsuccessful, it caused much alarm in the British fleet.[6] It would take considerable technical development and the First World War to begin to demonstrate the submarine's true lethality. Though originally shunned by the great naval powers as simply a raider or coastal defender, the submarine eventually caught the world's attention for its capacity to inflict a significant level of damage for its small numbers. Two world wars provided the proving grounds for the submarine's technical and tactical development and the first glimpses of a potential to affect the strategic level of war at relatively low cost. The adoption of nuclear power and other technical developments in sonar, radar, communications and weapons overcame the traditional vulnerabilities of limited endurance, slow submerged speeds and poor ability to search independently.

The lessons learned from German, Japanese and US operations in WWII are significant for they highlight dramatic doctrinal differences in the execution of submarine warfare. All submarines faced limited underwater endurance and a limited ability to search large areas even while surfaced. To overcome this problem, the Germans adopted wolfpack tactics to allow groups of submarines to spread out to search a large area and then converge when one submarine reported contact. Though initially effective, the drawback to that technique was that it relied on extensive centralized command and control with a commensurate heavy reliance on radio communication. The Japanese Navy did not have an effective submarine strategy; their submarines were used piecemeal against warships, and

in such diverse tasks as land bombardment and shore resupply operations. Though the Japanese did not use wolfpack tactics, they still relied heavily on extensive radio communications. In both cases, the radio transmissions were easily exploited by Allied direction finders and code breaking, resulting in the submarines literally telegraphing their position to the enemy.[7] Submarine construction and crew production in Germany and Japan could not keep up with the losses. In contrast, the U.S. installed radar in its submarines giving them an edge in search capability, and though faced with poor submarine force performance due to unreliable torpedoes and an overly cautious centralized doctrine early in WWII, rapidly developed an effective strategy with decentralized control.[8] Combined with poor Japanese ASW, the U.S. *guerre de course* against Japan destroyed their merchant marine.[9] Its effectiveness can be measured in terms of manpower devoted to the task, only 1.6 percent of the US Navy's total manpower accounted for over 55 percent of Japanese maritime losses.[10] The failure of the German *guerre de course* was directly attributable to an effective allied ASW effort. It is worth remembering though, that despite the tremendous allied ASW effort, German submarines continued to sink ships until the end of the war.

By June 1945 the destruction of the Japanese merchant marine and Navy was essentially complete and the main effort for US submarines shifted to a penetration of the Sea of Japan to cut the final trade routes with China. Codenamed Operation Barney, it began on June 4th and ended June 25th. What

made penetrating the Sea of Japan difficult was four mine belts blocking the Tsushima Straits. Three wolfpacks of three submarines penetrated the Sea of Japan, one wolfpack per day beginning 4 June. Each submarine was equipped with a new FM sonar which was sensitive enough to accurately plot the floating mines and allow the submarines to steer clear. By June 7, all of the boats were clear of the minefields. The boats had orders to withhold fire until sunset on the 9th of June to give the three wolfpacks time to take their stations in the north, middle and southern parts of the Sea of Japan. Between then and June 20, they sank 27 Japanese merchants and one submarine. One submarine, USS Bonefish, was lost to Japanese ASW when it penetrated Toyama Bay, "a relatively shallow and confined body of water," to sink a ship.[11]

Operation Barney's real objective was psychological. By attacking into the Sea of Japan which was also known as "Hirohito's Lake," Admiral Lockwood who was then Commander, Submarines, Pacific Fleet, wanted to convince the Japanese that they had lost control of their own waters and were now totally isolated from the rest of the world.[12] The penetration was one of the most successful operations of the war and it cut seaborne commerce to a trickle.[13] With the operation complete and sea-borne commerce effectively stopped, submarines began harassing attacks against shore installations with their deck guns and, for the USS Barb, an experimental 5-inch rocket launcher.[14] The effect of these strikes was minimal and though rocket launchers were mounted on three other submarines, it was done simply as an expedient to give the vessels

something to do since there was no shipping to attack.[15] The concept was carried on to the early development of the guided missile submarine which was abandoned in 1961 in favor of the Polaris ballistic missile submarine.[16] These developments presaged submarine-launched Harpoon anti-ship missiles and Tomahawk anti-ship missiles (TASM), systems that were designed to destroy enemy shipping at long range.

The missions performed by the submarine in WWII were focused primarily on destroying ships; merchants and supply ships first, then combatants.[17] Following that, they were used to deliver and recover special forces personnel, search and rescue of downed airmen and in a limited intelligence gathering role. Notably, though submarines were used as defensive screens for the battle fleets at Midway in June 1942 and the Marianas in June 1944, the submarine was generally not used as part of the surface fleet, functioning instead in an autonomous role or in wolfpacks.[18] Moreover, ASW was not a primary mission for the submarine unless coincidence brought it into contact with an enemy submarine.

Though the submarine demonstrated particular cost effectiveness in terms of damage wrought compared to losses sustained in the two world wars, it suffered from a number of serious shortcomings that needed to be overcome to truly unleash its full capabilities.[19] The reality of WWII submarines is that they were surface vessels capable of submerging, and once submerged suffered from slow speed, limited underwater endurance and poor sensors. The development of

the nuclear powered submarine solved the problem of limited underwater endurance and speed, giving it the capability to go anywhere anytime, generally at greater speed than non-nuclear powered surface ships. Nuclear power also provided energy to power increasingly sophisticated combat systems and sensors.

The missions US submarines perform today can be broadly described by six categories: Sea Superiority, Strike, Surveillance, Special Operations and Forward Presence. Sea Superiority is achieved by sea control and sea denial operations. These operations focus on eliminating enemy submarines and surface ships, planting mines, and conducting operations that control the seas by denying the enemy's naval forces the use of their own waters. Armed with long range precision cruise missiles and heavyweight torpedoes, the submarine places all sea and many land targets at risk. Because of their stealth, submarines can remain on station in littoral waters without alerting or provoking an adversary. Stealth also allows the submarine to attack from any axis at the time and place of its choice even without sea or air superiority.

The principle benefit of submarine strikes that destroy enemy ships, submarines and land targets is that it reduces the risk of enemy attack on US or coalition follow-on forces. The submarine can also transmit real-time intelligence while providing maritime and littoral surveillance, and it is the only covert intelligence platform that can take immediate offensive action if required. In terms of Special operations, it can clandestinely insert small groups of special operations forces ashore to support amphibious assault or raids, provide target

spotting for sea-based fires, conduct sabotage and collect tactical intelligence. Finally, the submarine can provide forward presence by participating in combined operations and exercises, port visits and military to military exchanges. Of all these missions, strike is getting the most publicity and attention. Though strike bears little passing resemblance to the shore bombardment missions of WWII, it is useful to differentiate the two missions. In its broadest sense, shore bombardment is Naval Gunfire Support (NGFS), a heavy volume of fire delivered to an amphibious landing area to clear the specified area of enemy opposition (or at least weaken it) prior to the assault force coming ashore. Strike is more specifically directed at previously identified targets, and is delivered by aircraft or missile.

The Army has long recognized a need for a quick response fire system to strike deep into a Corps operating area without placing additional demands on limited Air Force strike assets. The ATACM system fills that need. ATACMS is an inertially guided surface to surface missile with a range well over 100 kilometers (54 NM) which is launched from the army's Multiple Launch Rocket System (MLRS). The Block I missile carries a warhead of approximately 950 M74 anti-personnel/anti-materiel (APAM) munitions and is designed to destroy unarmored targets through the depth of the Corps and echelons above corps operating areas. A significant strength is that it requires only a target grid coordinate for launch.[20] Though 54 NM is a comparatively short range for a missile by navy standards, the range can be increased to 300 kilometers (162 NM)

by decreasing the warhead size to 275 bomblets.[21]

In the days of the "Maritime Strategy" and focus on the Soviet threat, the SSNs long range strike capability with Harpoon, TASM and TLAM was not contingent upon extensive two way communication. As a result, SSNs rarely spent much time in two way communication and had a fairly limited communication suite. Since 1990 that has changed dramatically and SSN combat suites are becoming more capable of integrating and disseminating data with other battlegroup forces.[22] Shore and air based sensor data as well as command and control information can be relayed to the submarine at periscope depth. In terms of striking power, the SSN carries a mix of torpedoes, Tomahawk, Harpoon and mines. Specific weapons loadout varies according to the mission, but in general the improved Los Angeles class SSN can carry 28 weapons plus 15 in their vertical launch system (VLS) tubes. The VLS tubes are normally reserved for Tomahawk missiles.

In comparison, the ship most likely to fill the strike role and occupy the gun-line for shore bombardment is the Spruance Class destroyer. It carries two 5"/54 guns with 1200 rounds in the magazine, a 61 tube VLS launcher, and Harpoon anti-ship missiles in a separate launcher.[23] Though the Ticonderoga Class (Aegis) cruisers also have two guns, VLS launchers and Harpoon and are capable of providing shore bombardment, their primary function is in the realm of Anti-Aircraft Warfare (AAW) and Theater Ballistic Missile Defense (TBMD). Not to say that they cannot perform both missions simultaneously, but their VLS

launchers carry a preponderance of air defense missiles.

One of the strengths of Naval Gunfire Support (NGFS) is that it can quickly deliver a high volume of accurate firepower. Current capabilities of the 5"/54 is a maximum sustained rate of fire of 30 rounds per minute per gun. Though this is a high rate of fire, the range of the weapon as currently configured on ships is about 21 kilometers (11 nm).[24] For a sea-based system this is inadequate to really support an amphibious operation beyond the initial beach landing. Depending on the extent of shoal or shallow waters, ships may have to stand several miles offshore. North Korea presents some unique challenges because its shoal waters can extend beyond NGFS range. The Navy has demonstrated ranges of 40 nautical miles (74 km) using improved ammunition with the current 5"/54, and is experimenting with extended range guided munitions (ERGM) that can range out to 63 nautical miles (117 km), but will require modification to the gun and barrel. ERGM is a rocket assisted round with GPS/INS guidance and a warhead of 72 M80 submunitions. The Navy's objective is to have this capability deployed by 2001.[25] Concurrently, the Navy is evaluating ship launched ATACMS and a variant of the Navy Standard Missile to provide additional long range fires in the form of surface to surface missiles. The first shipboard ATACMS was launched in February 1995.[26] Additionally, the Navy is studying the feasibility of submarine launched ATACMS (SLATACMS) for the future. Discussion has already surfaced over using the submarine in a 'quick-strike role' to provide the JTF commander a weapon with longer range

than naval guns but a much shorter time of flight than TLAM.[27]

Requirements

The Navy has two responsibilities in order to assure its ability to carry out its strategy in support of the National Military Strategy. The first is to maintain fleet readiness and the second is to ensure future force capabilities.[28] In the simplest terms, this equates to short and long term requirements. For the Navy, the long term is significant because it takes between five and ten years from Congressional approval to vessel deployment. Most major combatants have a useful lifespan of twenty to thirty years with another ten to fifteen years of service through the Service Life Extension Program (SLEP). Because of this long lead time and long life, each vessel class needs to have the maximum design flexibility and adaptability built in to allow for growth and changes in combat systems. This flexibility enables the vessels to remain relevant despite changes in warfighting, national security needs and future strategic concepts. Since naval vessels are essentially weapons, the term relevant is used to denote usefulness and appropriateness for the task at hand.

In 1992, the Navy published a new strategic concept in ...From the Sea. In it, the Navy shifted its focus from global blue-water operations to power projection in the world's littoral regions. The Navy's latest strategic concept document, Forward...From the Sea, updates and expands the concept articulated in the 1992 paper based on additional guidance from the administration regarding the role of the military in national defense.[29] It provides the basis for an

overarching naval doctrine which highlights the importance of forward deployed forces that "...provide the critical operational linkages between peacetime operations and the initial requirements of a developing crisis or major regional contingency."[30] The operational linkage is provided through forward deployed forces, and should conflict erupt, these forces can, among other things, provide forcible entry and establish a protective cover to enable follow on forces to move in. The document is clearly focused on the littoral and joint littoral warfighting.

The Navy's 1995 program guide describes joint littoral warfighting as follows:

> "Joint littoral warfare is military operations conducted from the sea in coastal regions to impose one's will on an adversary. It encompasses projection - or the threat of projection - of force inland, from the sea, to attain an operational or strategic objective. Joint littoral warfare is unique in that its geography is marked by a confluence of the sea, land and air environments into a single battlespace. It encompass the area extending from the shore to the open ocean and the area inland from the sea that can be supported and influenced directly from the sea. Thus joint littoral warfare requires extraordinary integration of and cooperation among sea, land and air forces."[31]

Littoral warfare requires gaining command of the sea close to the shore. The Navy then needs to project power inland and it can do it in two ways; with fires (air or gun delivered) or with troops (Marines or Army). To project power with gunfire or troops, navy ships need to get fairly close to the shoreline. To get close to the shoreline, enemy opposition needs to be cleared out of the waters of the amphibious operating area, and his ability to strike seaward needs to be blunted. Thus, before the first person in the assault force crosses the beach line, the navy must have successfully fought each of its warfare tasks.

Naval Warfare Tasks as defined in NWP-1 are listed as functions that include both sea control and power projection through the three areas of subsurface, surface and air warfare. The fundamental warfare tasks are Anti-Air Warfare (AAW), Anti-Submarine Warfare (ASW), Anti-Surface Ship Warfare (ASUW), Strike Warfare (STW), Mine Warfare (MW) and Amphibious Warfare. AAW aims at destruction of enemy air platforms and airborne weapons, whether launched from air, surface, subsurface, or land platforms. ASW and ASUW focus on destruction or neutralization of enemy submarines and the destruction or neutralization of enemy surface combatants and merchant ships respectively. STW is aimed at destruction or neutralization of enemy targets ashore through the use of conventional (or nuclear) weapons. MW consists of control or denial of seas and harbors by laying minefields or destroying enemy minefields. Amphibious Warfare is attacks launched from the sea by naval forces and landing forces embarked in ships to achieve a landing on a hostile shore. It includes fire support of troops in contact with enemy forces through the use of close air support or shore bombardment.[32]

The Navy's Surface Fire Support (NSFS) mission relates directly to Amphibious warfare. Naval Surface Fire Support is the coordinated use of sea-based weapon systems, together with naval aviation, to provide fire support for expeditionary operations. As stated in NWP3-09.11M:

> "The mission of Naval Gunfire is to support landing force units during an amphibious operation by destroying, neutralizing or suppressing shore installations that oppose the approach of ships and aircraft, defenses that

> may oppose the landing force and defenses that may oppose the post-landing advance of the landing force."[33]

Thus the Navy's interest in fire support ashore spring directly from Marine Corps requirements for Amphibious Warfare and Operational Maneuver From the Sea (OMFTS). Specific fire support requirements are a minimum range of 41 nautical miles and a desired range of 63 nautical miles. As currently visualized, fire support ships stand 25 nautical miles offshore and can range up to 16 nautical miles inland.[34]

Acknowledging that fiscal resources are dwindling, Forward...From the Sea states that limited naval assets need to be focused on the highest and most immediate priorities and challenges. Since the thrust of the document is aimed at naval forces enabling follow on forces in the littoral, joint littoral warfare is the highest and most immediate priority. NDP-1 defines the littoral region as "those regions relating to or existing on a shore or coastal region, within direct control of and vulnerable to the striking power of naval expeditionary forces."[35] In more practical terms, this area extends from 60 statute miles inland to 200 nautical miles seaward.[36] Much of the water in this region is less than 600 feet deep and is characterized by extreme variability in the ocean environment.[37] The littoral region is a challenge to oceanographers who acknowledge "...large, very important deficiencies in our knowledge."[38] In the simplest terms, all the deep water predictive models that were developed since World War II are largely useless in the shallow water environment. The primary reason for this is that the

water conditions change very rapidly and generally do not behave in the same manner as the comparatively homogeneous waters of the deep ocean. All this goes to say that there are serious problems with shallow water tactical oceanography, and though there is considerable effort being placed in devising methods to work in that environment, there are no easy solutions.[39]

Because of the shallower water, sonar condition are generally poor and difficult to predict, mobility and speed are not as useful as in the open ocean, and the environment favors a small conventional submarine. "..a diesel-electric submarine on electric motors alone...is virtually silent over the full band of sonic frequencies: it is therefore a near-perfect listening platform and safe from passive detection."[40] Our SSNs do not routinely practice ASW in shallow water.[41] For the submarine commander operating in the littoral, he won't have as easy a time with ASW as he does beyond the 100 fathom curve.

SLATACMS

For the moment, let us turn away from the ASW problem and turn to SLATACMS itself and the reasoning behind the Navy's interest in the weapon. The fundamental question is: What unique characteristics of submarine launched ATACMS (SLATACMS) justify their development and employment? Volume of firepower is not an issue since the intention is that other platforms with larger magazines will provide the quantity needed to win the fight. What SLATACMS brings is early accurate firepower before air or sea superiority has been achieved, thereby creating an opening for platforms that can bring greater volume of

firepower to bear. In the simplest terms, SLATACMS would be used to blind an enemy and blunt his most dangerous weapons to reduce the risk to the main battle force approaching the area. By operating close to shore at periscope depth, the submarine can maintain continuous communication and truly be on call. Operationally, this "presents no problems and has been well demonstrated to be executable."[42] For example, coastal cruise missiles placed in a straight or mobile SAM launchers positioned in anticipation of carrier or cruise missile attack are excellent targets for SLATACMS. Due to the cumbersome mission planning requirements for current TLAM and its planned upgrades, SLATACMS provides a much faster response.

Why use SLATACMS when there are other delivery platforms such as TACAIR and TLAM? There are several reasons. First, because of its ballistic trajectory and supersonic speed, it is very survivable compared to the slower cruise profiles for TLAM and TACAIR. Second, its anti-personnel and anti-material (APAM) warhead covers a wider area than TLAM, thereby giving it a better kill probability than TLAM. It also has very simple targeting requirements unlike TLAM and TACAIR. SLATACMS cannot provide volume firepower, but it should be able to improve the survivability of aircraft crossing the beach, a significant factor in an age of very expensive aircraft and pilots. Third, SLATACMS offers a deterrent tool to the Joint Force Commander's or political decision maker's toolkit. The presence of theater ballistic missiles that an enemy cannot detect, target, or counter presents the enemy with a capability he has to

assume is present. If necessary, he can be told of its presence either verbally or though a demonstration strike against his facilities. Furthermore, the presence of a covert deterrent force quietly communicated to the aggressor nation allows that nation to "save face" in the eyes of other nations by backing down or accepting a negotiated settlement without being faced down by a US CVBG. Such face saving could be a major influence in some cultures where the leader must be seen to be firmly in control.

Fourth, SLATACMS adds significantly to special operations insertions and raids. While these forces normally rely on speed, mobility and concealment to achieve their mission, there is always the potential of being detected. If they are infiltrating to destroy a target, they can infiltrate and call for fire once the target has been pinpointed rather than carry explosives in themselves. Should they be detected at any time during infiltration or extraction, they have a ready platform that can provide fire support. This allows the special forces to travel light and perhaps allow for greater flexibility ashore by allowing the team to devote the firepower it carries to self-protection or protection of their objective in the case of a Search and Rescue mission or a Non-combatant Evacuation conducted by a small Marine raid team that does not have much air support.

A related argument involves the evolving Marine doctrine of Operation al Maneuver From the Sea. OMFTS implies flexible, over-the-horizon assault emphasizing rapid, surprise attack which could benefit from a near-shore covert strike capability conducted immediately prior to arrival of the forces to destroy

the enemy's critical missile batteries, and surveillance and C4 nodes. If the assault force objective changes, the benefit of a GPS targeted weapon becomes obvious.

Fifth, there are relatively minor modifications required for the missile and SSN. Heat dissipation problems associated with ship launched ATACMS (assuming launch from the VLS tubes) are not a factor because the missile would not ignite its rocket motor until clear of the water. The modifications will allow the same VLS launcher to shoot both ATACMS and TLAM with no modifications required when reloading with the other weapon. The modifications to the missile would apply to both submarine and ship, thereby creating a "Navy" missile. The SSN C4I architecture that is developing in concert with battlegroup capabilities supports incorporation of SLATACMS.[43]

Qualitative insight gained from this year's JMA wargame used as an assessment tool are that Navy TBMs can be a significant player by presenting the enemy with a totally different threat that is very difficult to counter.[44] Basically, it takes all the problems associated with finding and destroying land-based TBMs and further complicates it by placing it at sea and submerging it. The submerged TBMs complement Naval Surface Fire Support by providing a fires capability before sea or air superiority is established, and can help establish that superiority by destroying high payoff targets that will enable follow on forces to more easily establish air and sea superiority. Launching the SLATACMS is generally considered safe in the littoral because most Coastal States have limited ASW

capability. Once the follow on forces are established in the area, SLATACMS utility diminishes.[45]

Analysis

We have looked at the littoral strictly from the US perspective as a major naval power. To gain an understanding of what to expect in that arena we need to get an appreciation of the perspective of a littoral state. Commodore Jacob Børresen proposed a number of definitions and a strategy for the coastal state.[46] Generally it is a small or medium sized state with a coast on the ocean.[47] Some coastal states possess resources on their continental shelf and waters that represent a source of wealth or political power. These states may not have the resources or choose not to create and maintain a bluewater navy capable of exercising control on the open ocean. They therefore cannot compete on the high seas with naval powers such as the US, Great Britain, France or Russia. There are also states that derive no particular economic or political benefit from their waters. For these states, the coast simply represents a front door for a potential adversary and therefore needs to be protected[48]. Commodore Børessen further defines the coastal state: "To the extent that the threat from the sea is a significant factor in the military strategical situation of such a state, that state falls within my definition of a Coastal State."[49] This latter part of Commodore Børessen's definition is the most useful since state size alone doesn't contribute to which category a country falls into. Since the focus of military planning is on potential threats, this is a practical definition for it allows a differentiation between the

threat and non-threat states. For our purposes then, let us define a Waterfront state (avoiding the term littoral for the sake of clarity) as one that has no maritime component to its military strategy, and the Coastal State as one that has a maritime component to its military strategy. Finally, to further differentiate levels of capability, there are states that are Naval Powers. These are states that have all the characteristics of Coastal States but also have the will and capability to independently project power and threaten Waterfront and Coastal States as well as other Naval Powers. Figure 1 gives a representative sample of states that fall into the various categories, and is based upon statements made by their naval commanders.[50] The list is far from all inclusive, but serves to illustrate that the majority of nations bordering the sea fall into the Coastal State category. Within the Coastal State category there is a wide variety of capabilities. Some states such as Ghana and Peru have much smaller and less capable navies than China and India who are reaching toward Naval Power capabilities.[51]

Naval Power	**Coastal State**	
France	Argentina	Mexico
Russia	Canada	North Korea
Great Britain	Chile	Norway
US	China	Pakistan
	Egypt	Peru
Waterfront State	Ghana	Portugal
Burma	India	South Africa
Ethiopia	Indonesia	Spain
Guyana	Ireland	Sweden
Somalia	Italy	Thailand
	Japan	

Fig 1. Categories of states

The Coastal State maintains its sovereignty within its territorial waters. Against another Coastal State, it can maintain its sovereignty within these waters.

However, against a Naval Power bent on projecting its power into the Coastal State's waters, the Coastal State generally can only mount a local defense.[52] Seapower for the Coastal State is exercised differently than that of the Naval Powers. A coastal navy will generally operate close to shore where it can use available terrain for concealment as well as establishing a series of refueling and rearming points. An additional benefit of staying close to shore is that they can be supported by their air force and army.[53] Though they may only operate fast patrol boats with surface to surface missiles or mines, the weapons technology available today is sufficiently cheap and potent enough to be a threat to the Naval Powers. Witness the effect of the Exocet missile on unprepared shipboard defenses of USS Stark, the damage caused by vintage floating mines to the USS Nicholas, USS Princeton and USS Tripoli, and the numbers of sorties kept on SUCAP alert during the Desert Shield and Desert Storm to protect the carrier battle groups from the threat of enemy missile boat action. The Coastal State knows that it cannot win outright against a Naval Power; however, it can work to delay and disrupt the naval power's actions through harassing raids, mining and the threat of these actions. The purpose of these actions is also to dampen the Naval Power's resolve by inflicting damage and some casualties. An idea that is also echoed by Captain Menon.[54] If the Coastal State operates submarines, they can pose a fairly significant threat naval operations and in particular, amphibious operations. An obvious rejoinder is that not all coastal states operate submarines, which is a true statement. However, there are about 44 navies that operate

conventional submarines (SSK) and are all capable of posing a threat to a Naval Power operating in their littoral waters.[55] To minimize that threat or to ignore it is saying that the enemy is not capable of thinking or using his forces in an effective manner.

The February 1995 National Security Strategy identifies two high threat regions, the middle east Persian Gulf region and the Korean peninsula.[56] With regard to regional instability, the National Military strategy specifically states that "challenges are posed by Iraq, Iran, and North Korea, each of which is an imminent threat to the security of its neighbors and region."[57] Two of the three principle protagonists in these regions, Iran and North Korea, operate SSKs. Iraq has two Kilo class SSKs, and North Korea has a large though old fleet of submarines composed of four Whiskey class, twenty Romeo class, ten Foxtrot (SS) and four Golf II diesel-electric ballistic missile (SSB) submarines. They have another sixteen old submarines pending delivery from Russia. Though the last fourteen submarines were supposed to be sold for scrap, the vessels were towed intact to North Korea where some will probably be used for cannibalization to keep their fleet in operation.[58] Though these submarines are old, the North Korean littoral waters lend themselves to a fairly static submarine defense were the latest technology may not be terribly important to mount effective sea-denial operations.

The threat posed by third world diesel-electric submarines (SSK) in the littoral is not insignificant. The environment favors the defender, and assuming

the defender is intelligent and attempts to leverage his submarines through deception and decoys, sanitizing an area will be a time consuming and difficult task.[59] Though the US Navy cannot ignore the possibility of large scale open ocean warfare, the likelihood of it happening is remote. Russia is not likely to suddenly reconstitute its naval forces and aggressively deploy them, and though China's navy is growing, it is not yet a bluewater threat. SSK's represent the most likely threat, and they will be found in the shallow and congested waters of the littoral areas. For the CinC, this means that OPLAN time lines must fit ASW capability to dominate the subsurface arena in areas where there is a submarine threat.[60] Unlike the cruisers, destroyers and frigates, amphibious warfare ships have no *in situ* ASW capability beyond the human eye.

In March 1993, an article was published in the Russian General Staff Journal that reported on future capabilities of space-based reconnaissance and in particular, a network of satellites expected to be deployed by the turn of the century. This network will provide near real-time detection and targeting data of both surface ships and submarines. This follows previous statements and articles beginning in 1988 that described space based capability to detect submerged submarines. In succeeding years, the professional soviet journals described enough improved capabilities that Dr Nguyen, a CNA researcher, could pick out and describe first, second and third generation systems.[61] It appears that Russia's second generation systems, those that are currently in orbit, can accurately locate and track submerged submarines. Though not explicitly stated, the second

generation systems can probably only detect submarines at or near periscope depth. Russia's continued interest in deploying satellites appears pragmatic since they "would compensate for the effects of cutbacks in the number of airborne reconnaissance assets and naval platforms."[62] If cash-hungry Russia chooses to augment its arms sales with satellite data, Coastal States, particularly those with traditional Russian ties, may find a comparatively inexpensive way to get practical intelligence that will help them defend their waters, particularly if they know that their actions are stirring US interest.

As currently envisioned, the US submarine will spend all its time at periscope depth to allow for constant communication to facilitate quick reaction SLATACMS strike. Though a feasible mission profile, it places the submarine in a bad position, in shallow water with little room to maneuver and vulnerable to detection.[63] Additionally, periscope depth is not the best depth for conducting ASW, nor will the relatively short tether associated with ATACMS range give the submarine the freedom it needs to maneuver.

Though the concept of operation is to provide additional firepower to initially establish the AOA, the SSN using ATACMs doesn't have enough and it is too short in range. The first and most important task is to clear the area of threat submarines and to stay clear of mines. Though most small navies may have only one or two subs, until they are accounted for, they pose a significant threat to the amphibious group. Staying clear of mines poses a challenge for the SSN. If mines are of the vintage floating variety like those used in the Persian

Gulf during Desert Shield and Desert Storm, the submarine's sonar can see them. If more sophisticated mines are used, such as the types that lay on the sea floor, submarines may have great difficulty seeing them. The simplest solution in that case is to avoid the mined area. If the stated purpose of the SSN is to help kick the door in for the amphibious group, the two things they can do to help is first, use their TLAM with its far greater range to destroy an initial target set such as port facilities or command and control centers while the submarine is transiting to the area. Shoot targets that will help establish the conditions for the submarine's success in the AOA. Even if there is no submarine threat in the intended area, the TLAM is still a preferred weapon, again for its range and payload. The Navy acknowledges that the primary drawback to submarine launched fire support is limited volume of fires, hence there is no intention of keeping the submarine on a fire support tether once the initial assault has begun.[64]

Future carrier battle groups are expected to deploy with 225 TLAMs carried by cruisers, destroyers and SSNs.[65] One of the great advantages of the TLAM is that it combines a large payload with very long range. This means that when it is carried by a multi-mission platform, that platform can carry out its other missions in addition to its STW mission without sacrificing its mobility.[66]

Conclusion

Though the SSN is an extremely capable platform, its limited missile capacity dictates that every missile should be aimed at the highest payoff targets within reach. Shortening that reach by substituting SLATACMS for TLAM

places the submarine in a vulnerable position, at periscope depth in shallow water, and denies its ability to strike into the depth of the operating area. The submarine's true strength lies in its ability to use its stealth and firepower to clear the littoral waters of enemy ships and submarines and strike high payoff targets at long range. These actions will enable surface and amphibious forces to move into the littoral waters to deliver their high volume of fires and put troops on the beach. Though SSNs can be capable of delivering SLATACMS, this does not make the best use of the submarine.

Small numbers of submarines in World War II affected the strategic level of war by sinking the ships that carried the materials necessary to conduct war. Through the subsequent years, the warfighting emphasis shifted to nuclear deterrence, and the Navy's maritime strategy placed greater emphasis on destruction of the Soviet SSBNs than on destruction of shipping. With the collapse of the Soviet Union and decline in the maritime threat it engendered, the US Navy refocused its efforts to the littoral regions of the world. Without the monolithic Soviet threat, the requirement for large numbers of SSNs has declined. For the remaining SSNs the number of missions they perform has increased steadily as they look for ways to remain a relevant weapon system.

Over the past five years, the most dramatic change in SSN missions is the move from ASW and ASUW to strike warfare. As a result, the SSN is now almost continually present in direct support of a battle group, a mission that was generally performed infrequently in the past.

Prior to Desert Shield and Desert Storm, the SSN did not play a direct role in the land battle. Since then, with the capability to launch long-range TLAM strikes against land targets, the SSN has become part of the JTF commanders tool box. It gives the JTF commander additional platforms from which to launch precision strikes from a variety of axes. In the case of the SSN, it is also a stealth platform that has multi-mission capabilities. Its major drawback as a strike platform is that it carries a comparatively limited number of strike weapons. As such, it lends itself to precision strikes against high payoff targets, targets that can influence the future fight rather than tactical targets that tend to be much more numerous and mobile.

The concept of operation for the SLATACMS-carrying SSN is that it would precede the amphibious group to clear the way into the littoral area. While waiting for the follow-on forces, it would remain at periscope depth to maintain communication and provide on-call fires. Once the amphibious group is in position, the SSN would not participate in the assault fire support plan, it would go off and conduct other missions. The Navy acknowledges that volume of fires is not what the SSN can provide, rather, it provides early quality fires to enable entry of follow-on naval forces. The follow-on naval forces will provide volume fires from surface ships such as the Spruance-class destroyer.

The SSN is an effective multi-mission platform, but to use it as a rapid reaction strike platform is not especially efficient because that mission places the submarine in a visible and vulnerable position where it cannot defend itself or

maneuver to best advantage. At periscope depth, the submarine is vulnerable to visual sighting. As demonstrated in WWII, aircraft alone accounted for 247 of the 781 U-boats sunk during the Battle of the Atlantic.[67] As both Comodore Børessen and Captain Menon articulated in their views of Coastal State sea denial strategies, there would be a reliance on air force and army to support naval operations. In this case, maritime patrol aircraft would be a significant threat to the submarine operating at periscope depth, particularly since part of the argument for using SLATACMS hinges on the submarine as a lead element before air or sea superiority has been achieved. Another possibility is that Coastal States such as North Korea or Iran might be able to purchase satellite intelligence from Russia to help in their sea-denial effort.

The NSS and NMS identify the Persian Gulf and Korean peninsula as the areas that pose the highest threat to regional stability. Iran and North Korea operate diesel-electric submarines. The common wisdom is that "The submarine in concert with some specific national intelligence and communication systems, provides the best answer to the vexing problem of keeping an enemy submarine in port, out of the littoral game."[68] Though it may be true, it assumes that the US submarines will be on station prior to the enemy getting his submarines out of port, and that the enemy will not have access to similar sorts of information on the movement of US submarines. The British submarines did not keep the Argentinean submarines bottled up in port during the Falklands war, and it is presumptuous to believe that US submarines will do much better in either of the

two highest threat regions.

For the US to win the littoral fight, we need to be able to get forces ashore and then support them. Captain Linder, USN, wrote a story that postulates a future war with Korea in which the US suffers tremendous losses to ancient diesel-electric submarines because of our focus on putting firepower ashore at the expense of conducting ASW first. Though he presents a hypothetical scenario, he makes the point that protection of US shipping requires an all-services effort, and more importantly, that the next major conflict will not be as benign as the Desert Storm experience.[69]

Samuel Huntington wrote in the 1950's that the task of the US Navy "...is not to acquire command of the sea but rather to utilize its command of the sea to achieve supremacy on land. More specifically, it is to apply naval power to that decisive strip of littoral encircling the Eurasian continent. This means a real revolution in naval thought and operations.."[70] Though the US Navy only really began to think about such a strategy in 1992 with ...From The Sea and refined the direction in Forward ...From The Sea, the revolution in thought needs to go beyond simply adding technology to vessels. While the SSN is an extremely capable platform, using it as a platform to deliver short range tactical strike is a waste of a valuable asset. As noted in Forward...From the Sea, limited naval assets need to be focused on the highest and most immediate priorities and challenges. Littoral warfare is the priority and it is a challenge, particularly for ASW. Though not every Coastal State possess submarines, the desire to acquire

them is present. As Coastal States lay greater claims to territorial seas and exclusive economic zones, the task of defending their waters becomes more complex and demanding. Submarines are a powerful deterrent tool and states that do not operate them probably will as soon as they can make the down payment. In addition, SSK technology is continually improving, Air Independent Propulsion systems are in production, and combat suites grow in sophistication.

ASW is a perishable skill that requires continuous practice. Training time is finite, and every mission added detracts from existing missions. The limited weapon capacity of the SSN dictates that every weapon it carries has to be applied to targets that reap the greatest benefit. Shore strike with a long-range weapon enhances the SSN's ability to dominate ASW and ASUW by destroying naval and other important facilities before the submarine reaches territorial or exclusive economic zone waters.

Operation Barney demonstrated the submarine's ability to penetrate Japan's home waters and bring shipping to a halt. Following that, USS Barb demonstrated that submarines can bombard the shore at short range with their deck guns or launch rockets at shore targets, but the effects achieved were nothing more than harassment. The submarine's real impact on the war effort was the destruction of the Japanese merchant marine. Perhaps one of the major lessons learned from the Battle of the Atlantic in WWII and from just about every Navy ASW exercise since then is that "If one thing has been learned, the hard way, about anti-submarine warfare it is that every possible system must be

deployed continuously and vigorously: even then a proportion of submarines will get through the defenses."[71]

The SSN can deprive a nation of the seaborne movement of raw materials needed to sustain war, destroy its navy, or collect intelligence electronically or through deployment of special forces without ever needing to surface. The SLATACMS missile is a very capable weapon. However, at approximately the same cost as a TLAM, the TLAM offers greater options for employment.[72] Submarine survival depends on remaining covert; using SLATACMS jeopardizes the SSN's stealth. If the Navy is really interested in putting conventional ballistic missiles to sea, perhaps converting some of the Trident SSBNs to a conventional role would fill that requirement.

In the quest for relevance, searching for new weapons and tactics is appropriate. The SSN is a capable multi-mission platform but to sacrifice its main strengths in a quixotic tilt to maintain an illusion of vital importance to joint warfighting is foolish. In their role of shore strike Mr Hanley notes that "SSNs are not essential to the area commander-in-chief's concept of operations...the absence of submarines would not substantially alter his plans."[73] The SSNs relevance lies in its ability to destroy enemy ships, submarines and critical targets while remaining undetected in a battlespace where sea and air superiority have not been achieved. Keeping the sea-lanes open to following forces and subsequent logistics support ships will be a matter of utmost concern to the area commander-in-chief.

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17. Blair, Silent Victory p 879. The total US submarine force personnel represented 1.6 percent of the US Navy and accounted for 55 percent of Japan's maritime losses. The United States Strategic Bombing Survey report stated "The war against shipping was perhaps the most decisive single factor in the collapse of the Japanese economy and logistic support of Japanese military and naval power. Submarines accounted for the majority of vessel sinkings and the greater part of the reduction in tonnage."

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