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NEW HORIZONS

ANTI-SUBMARINE WARFARE AS CRITICAL TODAY AS IT WAS DURING THE COLD-WAR ERA

By /par LCdr D.S. Stovel

Abstract

The presence of even just one enemy submarine can prevent the free movement of naval forces, thereby restricting the positioning of surface assets for primary tasks. Because acquisition costs are relatively low, the crew size is small, and their operational capability in littoral waters is so high, submarines are an attractive option to Third World nations interested in obtaining a defence and sea denial capability. ASW remains a key factor of sea control. ASW in the littoral environment, is just as, if not more, critical today than it was during open ocean ASW in the Cold-War era. Specifically, ASW plays a critical role in sea control, power projection, and direct support to land campaigns. The diesel submarine threat is a real and growing threat. Trends towards proliferation of platforms to Third World countries and rapid technological improvements of existing hulls makes the near term diesel submarine threat more dangerous. The modern conventional submarine is an attractive investment for nations seeking maritime security.

NEW HORIZONS
GLOSSARY

AIP	Air Independent Propulsion
ASW	Antisubmarine Warfare
EEZ	Economic Exploitation Zone
ISR	Intelligence, Surveillance and Reconnaissance
JFC	Joint Force Commander
LOC	Lines of Communication
MEU	Mission Essential Unit
MRC	Major Regional Conflict
ONI	Office of Naval Intelligence
RORO	Roll On/Roll Off
SLOC	Sea Lines of Communication
SSK	Conventional diesel submarine
USN	United States Navy
UWW	Under Water Warfare

> Diesel-electric submarines constitute a growing threat, one that can be difficult to detect and defend against in shallow water. Uncountered, these submarines can disrupt shipping and shut down vital sea lanes in littoral areas. Many navies now operate diesel submarines, and additional countries could well follow suit.[1]

It is not a coincidence that there is a continuing interest around the world in conventionally powered submarines. The littoral battlespace is the ideal environment for submarines and the potential return on the investment is enormous. A single torpedo from a hostile submarine can cause immediate operational loss of a Mission Essential Unit (MEU) and the impact of losing critical supplies, equipment or troops could jeopardize the operation and provoke adverse media coverage. The world relies heavily upon sea borne trade, will continue to do so in the future, and there is enormous potential to disrupt this traffic using submarines. Additionally, virtually any Western response to a crisis will require the use of sea borne heavy lift to transport the vast amount of material required by modern armies. The presence of even just one enemy submarine can prevent the free movement of naval forces, thereby restricting the positioning of surface assets for primary tasks.

Because acquisition costs are relatively low, the crew size is small, and their operational capability in littoral waters is so high, submarines are an attractive option to Third World nations interested in obtaining a defence and sea denial capability. This attraction is enhanced by the fact that conducting Anti-Submarine Warfare (ASW) against such a force in these waters is an expensive business involving a variety of naval and surveillance assets, long term training and experience and a considerable force infrastructure. On the other hand, maintaining a credible, submarine force has itself proved to be beyond the capabilities of seve3thefact 12 422.2272 14seve

Albania, and Libya have illustrated.[2] The migration of submarine warfare capability throughout the world is a fluctuating phenomenon.

Littoral ASW operations protect naval forces, and commercial and logistics shipping from enemy submarines, enabling naval forces to project power ashore, conduct strategic sealift operations, and control or interdict sea lines of communications (SLOCs) that affect littoral objectives. In the context of joint force operations, successful littoral ASW clears the undersea battlespace of hostile submarine influence and permits joint and combined forces to manoeuvre at will to best employ their assets at the time and place of their choosing. In limited regional conflicts, the loss or crippling of a key ship could disrupt joint or naval force operations. The political realities of many regional conflicts could allow an adversary to equate a stalemate at sea with a strategic victory.[3]

ASW remains a key factor of sea control. This paper will prove that ASW, in the littoral environment, is just as, if not more, critical today than it was during open ocean ASW in the Cold-War era.

> ...no military service can afford a campaign plan that is delayed or disrupted by an adversary's submarines. Increasingly dependent upon afloat prepositioned logistics, the Army, Air Force and every unified commander have a vested interest in achieving an ASW capability sufficient to counter the threat.[4]

To demonstrate the criticality of littoral ASW in today's operations the ASW mission will first be examined. Next, the littoral operating environment in which current operations occur will be defined. This will be followed by looking at the specific challenges of ASW within

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[2] Daniel Withers, Commander USN, Antisubmarine Warfare: Considerations for Future Operations in Third World Regions (Naval War College, Newport RI), 1992, p 16.

[3] Littoral Anti-Submarine Warfare Concept, Naval Doctrine Command, 1 May 1998.

[4] Integrated Anti-Submarine Warfare Roadmap. Developed by The OPNAV/Fleet Commander ASW Integrated Process Team, 27 January 1999.

the littoral and the proliferation of the Third World diesel submarine threat. Then, the advantage that the submarine holds over surface ships will be examined followed by exploring the changing themes of ASW from the Cold-War era to current operations. Finally, this paper will look at ASW in the littorals and it's significance to the Joint Force Commander, while providing considerations for the JFC proving that ASW is just as, if not more significant in today's operating environment. This paper will deal solely with the threat posed by conventional diesel submarines (SSKs) operating within the littoral.

Despite perceptions to the contrary, ASW is still a vital mission in the post Cold War world. The former Soviet Union continues to operate a formidable submarine fleet, albeit at a reduced tempo, and Third World navies collectively possess an enormous (see Table 1) conventionally powered submarine fleet. Emerging technology and the continued proliferation of sensors and weapons, project the ASW problem well into the future.

> ... developing nations desire submarine forces because they are a cost effective platform for the delivery of several types of weapons; they counter surface forces effectively; they are flexible, multimission platforms; they are covert and thus can be deployed with minimum political ramifications; and finally, they can operate with supporting escort.[5]

ASW must be kept in the forefront of military operational planning. Since the beginning of the twentieth century, submarines have been the weapon of choice for weaker naval powers that wish to contest a dominant power's control of the seas, or its ability to project power ashore from the sea.[6] "According to an unclassified report from the Office of Naval Intelligence (ONI), the worldwide submarine challenges, that the United State and its allies face today are more

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[5] "ASW: A Crucial Underpinning for Future Navy Missions," Tecnology for the United States Navy and Marine Corps 2000-2035, 1997. [http://stills.nap.edu/html/tech_21st/uw1.htm], Accessed 11 March 2002.

[6] Owen Cote and Harvey Sapolsky, "Antisubmarine Warfare after the Cold War," MIT Security Studies Program. June 1997, [http://web.mit.edu/ssp/Publications/confseries/ASW/ASW_Report.html].

diverse and more complex than at any time during the Cold War. They run the gamut from the highly sophisticated and unpredictable to the unsophisticated and irrational." [7] The ability of the JFC to operate in the littoral areas and, in particular, to utilize sea lift assets could be seriously diminished during future conflicts.

The littoral zone's environment has a significant impact on operations because of its physical limitations. A definition is easy to find: it is generally described as the inshore area from about 100nm seaward (near the continental shelf or 200 metre line) right up to a given

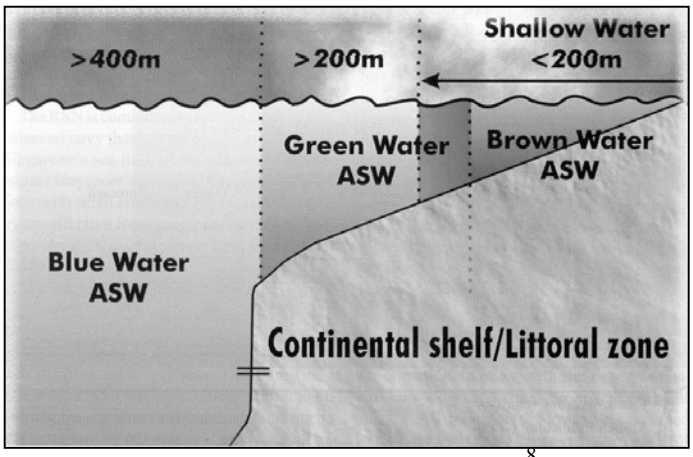

Figure 1 – Littoral Zone limits [8]

distance inland. The distance inland has been defined in Canada as "the area from open ocean up to and including the shore area, which must be controlled to support operations ashore."[9] The littoral zone is different because of the unpredictability of the physical conditions of the water column, proximity to land and shallow water. All these factors make submarine detection more difficult than in the open ocean. It is a misconception that littoral waters are always shallow. Although it is true that shallow waters are always in littoral areas, an examination of the

[7] Robert L. Pfaltzgraff Jr and Stephen E. Wright, The Role of Naval Forces in 21st Century Operations, Washington DC: Brassey's, 2000, p 10.

[8] Antisubmarine Warfare in Shallow Waters, Naval Forces 1/2000 Vol XXI, International Forum for Maritime Power, p 66.

[9] Canada, Department of National Defence. Adjusting Course: A Naval Strategy for Canada. Ottawa: Vanwell Publishing, 1996, p 166.

bathymetry[10] of potential regional conflict areas reveals that the littoral regions encompass the full range of depths from deep to shallow.

To illustrate by just two examples, consider first a potential conflict with the People's Republic of China (PRC) over the status of the Republic of China (ROC) on Taiwan. PRC submarines that would be of primary concern to naval forces would likely be engaged in antishipping operations or possibly threatening coalition carriers, combatants, and logistical supplies.[11] Such operations would likely occur east of Taiwan out to a radius of perhaps several hundred miles from the Chinese mainland. A look at the water depths in that region reveals that more than 80 percent of the water is deeper than 200 fathoms and only a tiny fraction is shallower than 100 fathoms, creating a challenging ASW environment.

The second example is a possible conflict with Iran over the closing or blockade of the Strait of Hormuz. Iran's submarines are based at Chah Bahar and can be expected to operate mostly south or southeastward from that base. Water depths of more than 100 fathoms are reached just 15 miles off the Iranian coast.[12] A characteristic that is commonly associated with littoral waters, however, is complexity, exemplified by much shorter scales of variability in both space and time compared to the deep waters of the open ocean. Important features of the littoral regions include tides, irregular and tide-produced internal waves, daily changing water conditions, variable bottom topography, and a cluttered acoustic and visual background-all of which make ASW operations more difficult. ASW in the littoral presents serious challenges and

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[10] Topography of the ocean bottom – there is a big difference in the possibility of detection and classification between a smooth bottom structure and a bottom whose topography varies a lot. A number of cliffs and hills resemble in shape a submarine close to or on the bottom, which results in a number of false contacts which have to be classified.

[11] Technology for the United States Navy and Marine Corps, 2000-2035 Becoming A 21st Century Force, Volume 7: Undersea Warfare, Committee on Technology for Future Naval Forces, National Research Council, 1997, p 10.

[12] Committee on Technology for Future Naval Forces, 1997, p10.

is a prime environment for conventional submarine operations. There is a definite potential for pre-positioning of enemy submarines prior to naval forces arriving in theatre and this type of threat could significantly delay operations.

The littoral zone has increasingly become the environment of choice for naval operations. The most recent conflicts in the Persian Gulf and the Adriatic Sea indicate that the littoral zone has replaced the open ocean as the primary focus of naval operations. The littoral zone has become the dominant area of operations for navies of the future. Over 70 percent of the Earth's population and 80 percent of the world's capitals can be found within 300 miles of a coastline.[13] Although the current 'War on Terrorism' is taking place within the land-locked country of Afghanistan, a sizeable portion of the combat power is being projected ashore from vessels operating within a littoral environment.

Having examined the littoral environment, this paper will not examine the capabilities that SSKs bring to an enemy force. In any future conflict with submarine-capable nations, initial engagements will likely involve littoral ASW. This is an enabling mission that must be carried out prior to the transit of heavy-lift forces through straits and choke points or landing forces ashore. Submarines provide a practical means by which the enemy can deploy to interrupt the flow of joint forces. "A lone submarine can do more damage in both a military and political sense than probably any other single conventional platform, naval or military."[14] Naval forces of the future must be able to rid the battle space of the threat posed by hostile submarines to allow for follow-on operations. But, to be able to do this, one must understand not only the littoral environment but also the operating capabilities of the enemy SSK.

Complicating the ASW problem is the modern, high technology, slow speed nuclear and

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[13] Milan N. Vego, Naval Strategy and Operations in Narrow Seas (London: Frank Cass, 1999), p 184.

conventionally powered submarines with low radiated noise levels and increasing weapons capabilities. "False contacts from debris and low confidence contacts arising from the operating environment illustrate the complexity involved."[15] The combined difficulties of littoral threats and undersea environments result in shortened detection ranges and more uncertain contact classification making for many abrupt engagements requiring shorter tactical response times compared to open water operations. In order for joint and/or multinational forces to succeed, littoral ASW must prepare the battlespace for other sea-borne forces by denying enemy submarine influence in an operating area. ASW today focuses on clearing adversary submarines from the operating area before the arrival of the high value platforms and providing escort services to those platforms throughout the operation.

Littoral ASW of the future requires the ability to deny adversary submarine influence over the entire joint operating area and supporting sea borne logistic routes without lengthy preparatory operations. ASW operations must be integrated with and conducted simultaneously with special force, mine countermeasure, theatre missile defence, and high-paced naval power projection operations. "Missions involving multiple threats are especially likely in Joint littoral operations, while ASW tactics will not be conducted in isolation, but will be required to coexist with tactics for other warfare areas."[16]

Within the littoral zone, one area of vital importance is the increased joint nature of military operations and the development of joint doctrine. The landward side of the littoral is where a Joint Force Commander (JFC) will likely find an enemy's center of gravity. Yet, the JFC's ability to establish operational reach and effective manoeuvre is contingent on controlling

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[14] Owen Cote and Harvey Sapolsky, p 9.

[15] Clark V. Brigger, LCDR USN, A Hostile Sub is a Joint Problem, United States Naval Institute of Proceedings July 2000 Vol 126/7/1,169, p51.

[16] Integrated Anti-Submarine Warfare Roadmap, Section V. (Integrated ASW Mission Capabilities), 27 January 1999.

the seaward side of the littoral.

> Conventional submarine sales are expected to double over the next decade, with an estimated sixty submarines being bought by twenty countries from shipbuilding firms in the former Soviet Union, Sweden, Germany, Australia, and Italy.[17]

Although SSKs are relatively slow and easily spotted during long voyages, they are well suited to operations in the littoral. One can conclude from an analysis of the political trends and potential threats that there is high probability that future conflicts will have a significant under water component.

> ... allied naval and joint forces face real and growing threats from submarines. Because of the stealth, lethality, and affordability of the submarine, it is becoming the weapon of choice in many countries looking for an asymmetric counter to superior naval forces.[18]

Some nations are losing the national infrastructure capability to support a realistic submarine warfare capability (Bulgaria and Albania for instance). However, some nations, with relatively robust economies and an increasingly sophisticated and capable population are actively pursuing programmes to acquire a submarine warfare capability; Iran and Singapore being recent examples.[19] Nations such as Iran and Singapore, would likely purchase modern new construction vessels for operations (vice for training/ familiarization purposes). The final assessment by Director General Intelligence (DG Int) is that overall world submarine inventories

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[17] Andrew F. Krepinevich Jr., The Role of Naval Forces in 21st Century Operations – The Impact of Precision Weaponry, Washington DC: Brassey's, 2000, p 199.

[18] Integrated Anti-Submarine Warfare Roadmap (Real Danger, Real Vulnerability), 27 January 1999.

[19] David Miller, The Silent Menance: Diesel-Electric Submarines in 1993, International Defense Review, August 1993, p 615.

are likely to decline over the next 20 years. However, the quality of the remaining boats and their crews will be much better than it is today.[20]

As with Canada, the modern conventional submarine is an attractive investment for nations seeking maritime security. Technological advances in propulsion, sensor and weapons performance, and sound quieting enable the conventional submarine of an adversary to challenge maritime forces access to littoral waters with strategic and operational value. The JFC, reliant on sea control and sealift to enable power projection ashore, will find operational planning and execution frustrated by this threat.

> The number of SSK's finding their way into Third World navies makes it inevitable that submarine warfare will be a feature of future regional conflict.[21]

USA	72 nuclear (54 SSN/18 SSBN)		
Russia	63 (49 (+3) nuclear, 14 (+2) diesel)	Netherlands	4
China	70 (6 nuclear, 64 diesel)	Egypt	2
North Korea	40 Midgett	Argentina	3
Germany	14 (+4)	Chile	2
France	17 (11 nuclear, 6 diesel)	Taiwan	4
India	17	Australia	6
Turkey	13 (+4)	Canada	4
Japan	15 (+4)	Israel	3
United Kingdom	16 (nuclear)	Poland	3
Norway	10	Portugal	2
Sweden	7	South Africa	2 (+3)
Italy	8 (+2)	Bulgaria	1
Greece	8	Columbia	2
Peru	6	Ecuador	2
Spain	8	Indonesia	2
Pakistan	9	Iran	3
South Korea	8	Venezuela	2
Denmark	5	Algeria	2
Brazil	5	Romania	1
Yugoslavia	1	Singapore	4

Table 1 - Current Operational Submarines (Estimates as of 2001-02)[22]
(NOTE: All submarines are diesel unless specified.)
Figures shown as (+ #) indicates planned building

[20] DG Int Report - Threat to Canadian Maritime Forces - A Look to 2025

[21] Anthony Preston, Undersea Warfare Naval Forces, No. 111, 1992, p 36.

[22] Janes Fighting Ships 2001-02

There is a growing preoccupation in defence literature with the increasing global market in conventional submarine procurement.[23] The number of navies operating these boats is relatively steady (between 40 and 45) whilst the total number of conventional submarines world-wide has reduced to, and stabilized at, approximately 205.[24] However, this simplistic view does not reflect the emerging trend of submarine technological diffusion. The modern global conventional submarine market is predominantly orientated around the widespread purchase of quiet, cost-effective and user friendly boats from the main suppliers: France, Germany, Sweden and Russia.[25]

To understand the challenges of ASW, it is necessary first to understand the nature of the submarine itself. The submarine is a sea-going vessel that is capable of delivering an offensive weapon, such as a mine, missile or torpedo, or landing 'special forces' ashore. It can also be used for covert intelligence gathering purposes. "A lone submarine can do more damage in both a military and political sense than probably any other single conventional platform, naval or military."[26] Its particular characteristic is that it relies upon its ability to conceal its presence in a theatre of operations by remaining beneath the surface of the sea for extended periods of time. Conventional diesel-electric powered submarines are vulnerable to detection and air attack when they surface at intervals to recharge their batteries. However, recent developments in Air Independent Propulsion (AIP) and modern high-density batteries, have significantly extended the

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[23] D. Foxwell, Submarine Proliferation Sends Navies Diving for Cover, Jane's International Defence Review, September 1997, p 30-9.

[24] This figure does not include any nuclear boats. The total number of submarines worldwide is approximately 685. See Run Silent -- Run Deep: Submarine Technical and Market Trends for the 21st Century, Naval Forces, January 1997, pp. 69-90.

[25] A. Watts, An Increased Role for Non-Nuclear Submarines: Market Trends and Prospects, Jane's Defence 199, and J-P. Coquinot, "Submarines on Loose Leash. Countermeasures?", Armada International, February 1997

[26] Owen Cote and Harvey Sapolsky, MIT Security Studies Program – ASW After the Cold War. MIT Security Studies Conference Series, p 9.

length of time between recharging, giving the conventional submarine increased performance and effectiveness.

> Modern non-nuclear submarines are both better than those deployed by the Soviets during the Cold War, and more widely available as defense industries that served their home markets during the Cold War now struggle to use exports to stay alive.[27]

Improvements in submarine quietening have resulted in significantly reduced detection ranges. The small, quiet conventional submarine operating in the acoustically complicated littoral environment is a difficult target to detect either passively or with active sonar. Future improvements in quieting and sensor performance, along with a predicted land-attack capability, will enlarge the hostile submarine's weapons range from the traditional thousands of yards (using torpedoes) to beyond the horizon (using anti-ship missiles).[28]

The return on investment in conventional submarines is potentially high. "A small force of submarines can be supported by a tiny portion of the population of any country."[29] The areas where smaller Third World conventional submarines might likely be deployed for defensive purposes would be in littoral waters, at navigational choke points, or within their exclusive Economic Exploitation Zone (EEZ). Over time, the operational challenges for them would become less demanding and familiarity with the underwater topography relatively quickly acquired. Used defensively and by taking advantage of the conditions in shallow littoral waters

[27] Dr. Owen R. Cote Jr., "The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines, March 2000. [http://www.chinfo.navy.mil/navpalib/ships/submarines/centennial/cold-war-asw.html#Fourth], Accessed 2 May 2002.

[28] ASW Summary (1995), 6; Department of the Navy, OPNAV N84, 1997 Anti-Submarine Warfare Assessment, Vol. 3, Intelligence Assessment: The Submarine Threat Out to 2016 (Washington, DC: 1997) p 145.

[29] Owen Cote and Harvey Sapolsky, p 9

of less than 100 fathoms, the SSK submarine presents a formidable challenge to both the surface vessels and submarines of any potential hostile force.[30]

The operational shift to the littorals presents a more difficult environment for coalition naval forces. The littoral region exhibits increased clutter from sea life, commercial shipping, and background ambient noise. This results in higher false alarm rates and greater weapons expenditures. To counter the environmental effects, fusion of data from acoustic and magnetic sensors with other nonacoustic sensors is finding increased emphasis.

Joint combined-arms ASW has historical precedent. The defeat of the U-boats in the Atlantic during World War Two was due in large part to the Allies' joint combined-arms ASW operations.[31] It is becoming increasingly clear that the next substantial Coalition naval expedition abroad -- the next Desert Storm -- may well face an enemy with submarines in its order of battle.

With the end of the Cold War, the threat definition is much less obvious and defensible than it has been over the past sixty years. Most analyses suggest that conflicts in the Asia Pacific region are quite possible. Equally likely, the next conflict involving the Canadian Forces will come from some completely unforeseen direction, as was the case in the Gulf and the Adriatic in the past, and the 'War on Terrorism' currently ongoing. However, in the most likely trouble spot, opposing force submarines have the potential to play a significant role. As a specific example, the Korean peninsula will be examined.

A capable navy may easily dismiss the threat of the North Korean submarine force, with its obsolete submarines. For the Joint Task Force (JTF) Commander in a major regional conflict

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[30] U. Ljungdahl, "Submarines and ASW in coastal waters" Naval Forces, No. V, 1993.

[31] Allied services employed were: US Navy, US Army Air Force, and US Coast Guard; Royal Navy and Royal Air Force; and Royal Canadian Navy and Royal Canadian Air Force;
Samuel E. Morison, History of United States Naval Operations in World War II, Vol. X. The Atlantic Battle Won: May 1943-May 1945 (Boston: Little, Brown and Company, 1956), p 361.

(MRC) involving North Korea, however, this submarine force could affect many operational level decisions. The Falkland Islands War showed that a small, tactically ineffective submarine force could impact the operational commander's decisions just by being at sea and unlocated. "The San Luis operated in the vicinity of the British task force for more than a month and was a constant concern to Royal Navy commanders. Despite the deployment of five nuclear attack submarines, 24-hour per day airborne ASW operations, and expenditures of precious time, energy, and ordnance, the British never once detected the Argentine submarine."[32]

In a Korean MRC, the North Koreans could do the same, except the North Korean submarine force is several times larger. From open source literature on U.S. ASW methods and littoral ASW problems, the North Korean submarine could learn how to remain undetected. Using this knowledge, the North Koreans could develop a submarine employment plan that can impact the JTF Commander's decisions involving operational design and operational function, such as movement, manoeuvre, protection, and logistics. In a worst case, the North Korean submarine threat could make all maritime operations so risky as to virtually suspend use of the seas in the Korean region until the threat is eliminated. The only effective way to counter this threat is to neutralize the submarines before they leave port. Failing in this, it becomes a time consuming and asset intensive operation to regain control of the sea or to provide protection for those ships in threatened areas.

There is nothing predicable in conflict. Given recent conflicts within the Arabian Gulf and the Adriatic Sea, it is prudent to assume that conventional submarines are more likely than not, now and in the future, to be operating in those areas where joint/combined naval forces might elect to project power. The emphasis is continuing to move away from large-scale

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[32] John Morgan, Capt USN, Antisubmarine Warfare: A Phoenix for the Future, [http://www.chinfo.navy.mil/navpalib/cno/n87/usw/autumn98/anti.htm] Accessed 11 February 2002.

maritime warfare and open-ocean operations in the North Atlantic. "From the perspective of joint warfighting, enemy submarines can significantly disrupt the flow of campaign essential forces and logistics."[33] The primary focus of future littoral operations and force projection, for which maritime forces are well suited, will be of significant importance. An adversary capable of denying the JFC littoral access gains a significant advantage. The JFC's ability to execute operational manoeuvre early is jeopardized; his freedom of action becomes restricted by the strategic and operational imperative to solve the submarine problem. In littoral operations the JFC faces mostly non-nuclear submarines, some outdated and poorly operated, others of advanced (quiet) design with competent crews. The threat will become more capable because a number of foreign shipbuilders--some Canadian allies--are willing to build submarines for virtually any customer. The Russian government in particular will do so to help keep the country's design bureaus, shipyards, and factories in business.[34]

When using the freedom of the seas to bring land, amphibious, sea and air assets to operate in conflict situations, naval surface combatants have to be given the fullest protection possible. The loss of any one of them to underwater attack could put the entire operation in jeopardy, not to mention the loss to power projection capability. A submerged adversary may also put the JFC's mission at risk by interdicting the JFC's sea lines of communication (SLOCs). Historical evidence indicates that this is a worthwhile option: 95 percent of all material, supplies, and equipment sent to a theatre of operations during large-scale conflicts of the twentieth century, including Desert Storm, went by sea.[35] The JFC needs to ensure control of

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[33] Integrated Anti-Submarine Warfare Roadmap – Section I. (Introduction), 27 January 1999.

[34] Worldwide Submarine Challenges, 1997 [http://www.fas.org/irp/congress/1997_hr/s970408c.htm] Accessed 11 March 2002.

[35] Forward…From the Sea: The Navy Operational Concept, p 9.

vital SLOCs in order to preserve operational sustainment. The modern conventional submarine seriously complicates the JFC's sea control and supply tasks.

We live today in an economically and politically interdependent world, in which information, capital, raw materials and manufactured goods must flow freely across borders and oceans. As an illustration, consider the amount of trade crossing through the waters surrounding the nations of the East Asia and Pacific region. In their 1996 analysis of the matter, entitled "Choke points: Maritime Economic Concerns in Southeast Asia," John H. Noer and David Gregory note that the peculiar geography of the Southeast Asia region "ensures that much of the region's domestic trade and virtually all coastal and intraregional trade moves by sea."[36]

Consider the potential consequences of SLOC closure. If countries making maritime claims that purport to limit freedom of navigation seek to impose those claims by force, or if conflict over the competing claims by at least six nations to the Spratly Islands in the South China Sea were to erupt into hostilities, commercial shipping would be the first to suffer.

Assured access to essential LOCs is crucially important. Commanders and staffs at every level consequently need intimate knowledge about the current status of roads, railways, seaports, airfields, inland waterways, and pipelines that facilitate fluid military operations and simplify logistical support. The capabilities, limitations, and vulnerabilities of primary routes attract constant attention, with particular concern for bottlenecks, bypasses, maintenance requirements, and possibilities for new construction.

The mission of the naval forces has changed since the fall of the Soviet Union and the end of the cold war. From a Mahanian force built to battle the Soviet navy, the United States has

[36] John H. Noer and David Gregory, Choke points: Maritime Economic Concerns in Southeast Asia, 1996.

transformed into a quick-reaction and power-projection force ready for engagement in the littoral regions of the world, as delineated in the "from the sea" white paper series.[37] Because the Soviet navy had the largest force of submarines in the world, some people have assumed that the world's ASW threat has gone away, or at least is much reduced. But the opposite is true.

Russia has not stopped producing submarines. Moreover, the proliferation of submarines and submarine technology sales to less powerful nations mean that nearly every littoral region around the world contains at least one potentially hostile navy with a submarine threat. More than 40 nations now operate submarines. The breakup of the Soviet Union accelerated this proliferation. Because of the prohibitive cost of nuclear-powered submarines, most force-building nations are buying diesel submarines.

The advance of technology has made diesel submarines extremely effective platforms capable of operating for many days, running virtually silent while on battery power. Recent advances have made it possible for diesel boats to recharge their batteries while remaining completely submerged instead of having to expose a snorkel to enemy search radars. This tactical windfall mends the Achilles' heel of the diesel submarine, and portends a complete revision of the anti-diesel search techniques that have been honed over 60 years.

Some argue that potential submarine adversaries are not really much of a threat. They have smaller, less capable submarines and their crews are inexperienced. Further, their maintenance facilities cannot support their fleets. These arguments are valid to some extent; however, a future adversary is likely to employ a submarine for coastal defence, territorial sea patrols, chokepoint intercept, special operations missions, intelligence gathering, and mining.

A single conventional submarine can have a disproportionate operational impact. In the

[37] David S. Magill, Commander USN, Antisubmarine Warfare: Still A Vital Mission, (Naval War College, Newport RI), 18 May 1992, p 19.

Falklands War for example, the large, modern British fleet sailed into contested waters against a smaller, sophisticated force. "The British expended more than 200 ASW weapons against the San Luis without scoring a hit."[38]

Some may argue that the most effective way to avoid the diesel submarine threat within the littoral is by use of strategic airlift vice sealift. Airlift provides a flexible, responsive means of rapidly deploying and sustaining forces in distant regions, while sealift allows the deployment of large numbers of heavy forces as well as fuel and supplies. Mobility forces are key to the deployment and sustainment of coalition forces in Major Regional Conflicts. Should a conflict erupt with little warning, coalition forces would want to respond promptly and with sufficient strength to help indigenous forces halt the aggression and restore the peace. Airlift, augmented by prepositioning, would carry out the initial deployments, which would consist primarily of aviation forces, light ground forces, and some heavier ground elements. The remaining heavy combat forces would follow by sea.

Although civil aircraft provide important capabilities, there are some essential characteristics they do not have. Most importantly, they cannot carry the full range of military equipment. Of the cargo that would have to be moved by air in a major regional conflict (including bulk cargo), only about 45 percent of the total tonnage would fit into the largest commercial cargo aircraft. Smaller aircraft could load only about 35 percent.[39] Examples of equipment that cannot be accommodated in commercial aircraft are tanks, air defense weapons, many helicopters, and most trucks. Additionally, civil aircraft cannot air-drop cargo or personnel or provide specialized capabilities, such as the very rapid off-load required in combat situations.

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[38] John R. Benedict Jr., "Third World Submarine Developments," The Submarine Review, October 1990, p53.

[39] 2001 Annual Defense Report – Mobility Forces [http://www.dtic.mil/execsec/adr2001/toc.html] Accessed 10 March 2002.

Commercial planes also require relatively long runways and specialized material-handling equipment and therefore cannot operate effectively on austere airfields.[40]

Sealift forces carry the full range of combat equipment and supplies needed to support military operations abroad. Sealift capacity comes from three sources: ships operating in

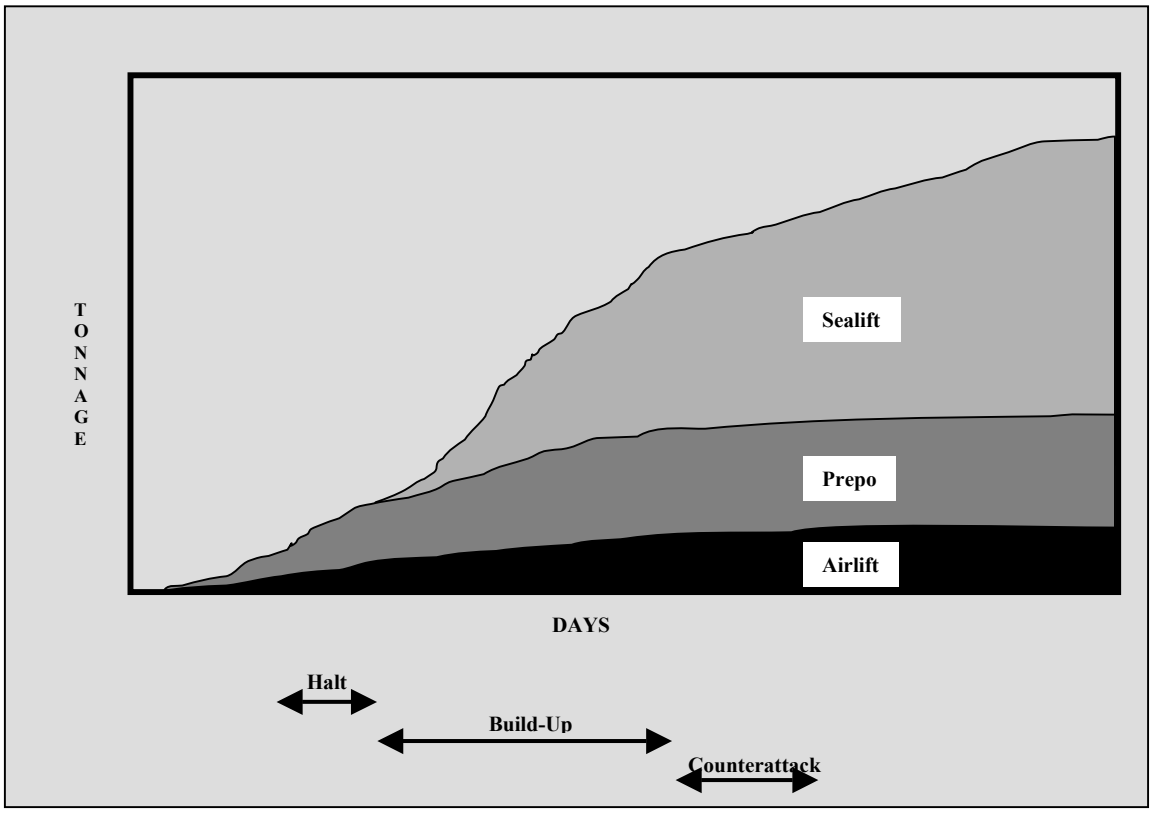

Figure 1 – National MRC Deployment[41]

commercial trade, commercial ships under long-term charter, and government-owned ships maintained in reserve status. These vessels provide three primary types of capacity: container capacity, which is useful primarily for moving supplies; roll-on/roll-off (RO/RO) capacity

[40] 2001 Annual Defense Report – Mobility Forces <http://www.dtic.mil/execsec/adr2001/toc.html> Accessed 10 March 2002.

[41] 2001 Annual Defense Report – Mobility Forces <http://www.dtic.mil/execsec/adr2001/toc.html> Accessed 10 March 2002.

(measured in square footage), which is needed to move the equipment of combat units; and tanker capacity, for fuels. In addition, the older breakbulk ships in the inventory can move both military equipment and supplies.

Future conflicts will be of a regional vice global scale and will focus on a littoral region. To sustain and swiftly project joint forces into and across the littoral will require that JFCs be prepared to quickly neutralize the submarine threat. ASW must, therefore, be seamlessly integrated into the joint force that will simultaneously conduct the operational protection missions of missile defence, air defence and mine warfare. A weapon of choice today for a nation wishing to dominate the littoral environment is the diesel-electric submarine. In the littoral region, its stealth, size, and fire power, particularly against critical vulnerabilities such as sealift, can be devastating to any adversary.

The operations of the Argentinean Type-209 diesel-electric submarine ARA San Luis during the Falkland Islands War highlights the significance of a littoral submarine threat to naval operations. For future participation in joint operations in the littoral environment, operational planners must carefully assess the risk posed by a capable regional submarine force. Third World submarine force capabilities are improving significantly as new submarine technology and advanced weapons systems are incorporated into many Third World submarine forces. Securing and maintaining control of the undersea littoral is a prerequisite for all subsequent enabling maritime operations and land operations of a sustained nature.

ASW embodies the essence of sea control, which in turn remains the foundation for global power projection. As most aptly stated by the USN Chief of Naval Operations, Admiral Johnson, “at the core of U.S. security requirements lies one prerequisite — sea control…. If we

cannot command the seas and airspace above them, we cannot project power to command or influence events ashore; we cannot deter; we cannot shape the security environment."[42]

In summary, this paper has proved that the diesel submarine threat is a real and growing threat. Trends towards proliferation of platforms to Third World countries and rapid technological improvements of existing hulls makes the near term diesel submarine threat more dangerous. The modern conventional submarine is an attractive investment for nations seeking maritime security. The ASW problem of today is more complex than it was during the Cold War. A single conventional submarine can have a disproportionate operational impact. The loss of a single mission essential unit can have significant impact on the JFC. Adversarial submarine operations could block or severely restrict the Joint Force Commander's ability to deploy, manoeuvre, or resupply troops. A submerged adversary may also put the Joint Force Commander's mission at risk by interdicting the sea lines of communication. As this paper has demonstrated, a key to ASW success is that it must be broadened from a Navy only mission to a theatre wide integration of joint assets. Future military operations will find the Joint Force Commander projecting power ashore from a littoral environment. The JFC's plans to establish sea control and to sustain strategic mobility must account for the modern conventional submarine operating in littoral waters.

[42] John Morgan, Capt USN, Antisubmarine Warfare: A Phoenix for the Future [http://www.chinfo.navy.mil/navpalib/cno/n87/usw/autumn98/anti.htm] Accessed 11 Feb 02.

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