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FIRST USE AT SEA:
MARITIME FORCES AND NUCLEAR ESCALATION

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Introduction

In recent years, two developments regarding nuclear weapons have been in the forefront of arms control concerns. The first is the modernization of the Warsaw Pact (WP), and North Atlantic Treaty Organization (NATO), land-based theatre nuclear capabilities beginning with the Soviet Union's deployment of the SS-20 Medium Range Ballistic Missile (MRBM), followed by the NATO decision to deploy American Ground-Launched Cruise Missiles (GLCM) and the PERSHING II MRBM. The second concern is the Reagan administration's Strategic Defense Initiative (SDI), raising fears of a new arms race in space.

While attention has thus far been focused on the ground and towards the heavens, a significant nuclear arms build-up has continued to gain momentum on, over, and under the seas. Both the United States and, especially, the USSR have deployed a wide variety of maritime tactical nuclear-weapons systems (MTNW) and both are planning improvements in their capabilities. These weapons are found on surface vessels and submarines, as well as on land- and sea-based maritime aircraft. Fired from these "platforms," MTNWs have as their primary task the destruction of the enemy's surface, subsurface, and aerial maritime forces. Some of these weapons can also be employed in an anti-land theatre capacity. In addition, there are a number of sea-based weapons systems that, although nominally classified as strategic, can fulfil certain theatre and even tactical roles.[1]

This paper explores the maritime tactical nuclear weapons postures of the United States and the Soviet Union in the context of the NATO/Warsaw Pact strategic balance. It argues that because of the nature of these weapons and the character of the opposing maritime warfare doctrines and strategies, the first use of nuclear weapons in any NATO/WP conflict is more likely to take place at sea than on land. The paper further argues that, given the

circumstances under which MTNW would be employed and the difficulty of distinguishing tactical, theatre and even strategic sea-based nuclear threats and usages in what would be the unprecedented fog and fear of a war in Europe, it is extremely doubtful that a nuclear exchange could be confined to the seas. Finally, the paper points out that despite the danger of first use at sea and the attendant danger of general escalation, there is little prospect for arms control agreements covering MTNWs. This situation adds a maritime dimension to NATO's "nuclear dilemma."

Maritime Nuclear Weapons

Maritime nuclear weapons constitute an important element of the strategic, theatre, and tactical nuclear arsenals of the superpowers. At the strategic level there is the submarine-launched ballistic missile (SLBM) fired from a nuclear or conventionally powered (in the case of some Soviet SLBMs) ballistic missile submarine (SSBN or SSB). For the most part, SLBMs are not considered first-strike weapons because they lack the accuracy of land-based intercontinental ballistic missiles (ICBMs). Recent improvements in SLBM accuracies and continued MIRVing (the placement of multiple independently targeted re-entry vehicles in the warhead) may well give SLBMs hard-target capabilities. Such is believed to be the case with the American TRIDENT II SLBM. Because of their own relative invulnerability, SLBMs have been considered secure second-strike weapons which contribute to nuclear stability by providing a devastating response to a first strike by either the USSR or the U.S. against the other's land-based systems.

Far more numerous in terms of the weapons themselves and the platforms from which they can be launched are maritime theatre (anti-land) and tactical

nuclear weapons. Indeed, given the wide deployment of these weapons amongst what are commonly classed as "conventional" or "general purpose" maritime forces, it is almost impossible to distinguish between nuclear and conventional maritime forces. Tactical and theatre nuclear weapons have been deployed on the maritime forces of both superpowers for more than thirty years. The kinds of sea-based nuclear weapons each has developed reflects the different primary missions assumed by the opposing forces in the post-war era. With its global "trans-oceanic" commitments, the United States has postured its maritime forces to project force ashore and to secure the sea lines of communication (SLOC) between the U.S. and its allies.[2] The projection role was first assumed entirely by attack aircraft carriers (CVA and CVAN for nuclear powered), while SLOC protection was assumed by a variety of surface vessels, submarines and land- and carrier-based aircraft with an emphasis on anti-submarine warfare (ASW).

Anxious to enhance its projection capabilities, as well as to secure its place in the Cold War military rearmament against the growing dominance of the United States Air Force (USAF), the U.S. Navy (USN) began developing and deploying relatively small nuclear bombs for delivery against land targets by carrier-based aircraft. By 1954, CVA of the U.S. Mediterranean 6th and Atlantic 2nd fleets had nuclear weapons on board for their A3D and A4D strike aircraft. In 1957 the USN's Commander-in-Chief Atlantic Fleet (CINCLANTFLT) reported that his "capability for delivery of atomic weapons had increased dramatically."[3] A 1961 report by the U.S. Commander-in-Chief, Naval Forces Europe (CINCUSNAVEUR), noted that "an optimum CVA SACEUR [NATO's Supreme Allied Commander Europe] scheduled Program Atomic Strike Plan ... was effective."[4] Not only was the USN planning to use its nuclear weapons against land targets in support of the land/air battle, it was arguing that the

best way to secure the SLOC against Soviet submarines and aircraft was to attack naval bases with nuclear weapons at the outset of hostilities.[5] Following deployment of the POLARIS and later POSEIDON SSBN with their SLBM, the CVAs were withdrawn from a major strategic strike role. However, they retained a tactical and theatre nuclear capability and role in NATO plans.

Nuclear weapons were also to be used directly against submarines, as the USN developed air-dropped ASW bombs. A 1956 report by CINCLANTFLT noted that his forces has achieved an "atomic depth capacity."[6] In support of the USN's nuclear ASW efforts, the NATO infrastructure programme included the construction of nuclear storage facilities near allied ports. By 1962 there were eight such atomic underwater weapons depots.[7] In subsequent years, the USN deployed four nuclear ASW systems: the B-57 air-dropped bomb; and ASROC surface-launched anti-submarine rocket torpedo; the SUBROC submarine-fired rocket torpedo; and a non-rocket-assisted torpedo, the ASTOR (which was withdrawn because of technical difficulties). The three remaining systems are scheduled for replacement by the end of this decade with more advanced nuclear ASW systems.[8]

A nuclear-armed surface-to-air (SAM) missile, the TERRIER, was deployed on USN cruisers and destroyers in the 1960s. A more recently developed STANDARD-2 SAM to replace the TERRIER will be capable of carrying a conventional or nuclear warhead and can be used against aircraft or missiles.[9]

The USN did not exploit the potential for nuclear-armed surface-to-surface or air-to-surface missiles (SSMs, ASMs) or sea-launched cruise missiles (SLCMs) for tactical use, but the Soviets did. In the 1950s, two nuclear SLCMs, the REGULUS and the SNARK, were deployed but due to their large size, inaccuracy, and unreliable performance they were abandoned in favour of the

SLBMs. When the Israeli destroyer ELATH was sunk by a single Soviet SS-N-2 STYX SCLM, the U.S. increased the pace of its SLCM programme.[10] First to be developed and deployed was the HARPOON missile, capable of being delivered by surface vessel, submarine, or aircraft. Currently it only operates in the conventional mode, but the USN has requested funds to configure it to carry a nuclear warhead.

The major American SLCM programme is the TOMAHAWK, a surface- and subsurface-launched anti-ship weapon also capable of land attack at ranges approaching 2,500 km. In October 1981 President Reagan approved procurement of "several hundred" nuclear-armed TOMAHAWKS, whose deployment began in June 1984. Although capable of striking at surface forces, the TOMAHAWK is increasingly being regarded primarily as a second-strike reserve theatre/ strategic nuclear weapon to supplement longer-range strategic weapons.[11]

With the exception of the French carrier-based SUPER ETENDARD fighter aircraft, no other non-U.S. NATO maritime weapons platform is known to definitely carry an MTNW. The P-3C, NIMROD and ATLANTIC long-range patrol maritime planes used by several NATO nations are capable of delivering the U.S. B-57 nuclear ASW depth bomb, and it is believed that their crews are given training for this.[12]

As indicated by the tables in Appendix I, the USSR has long emphasized nuclear SSM and ASM for its maritime forces. This reflects the primary missions of those forces, namely sea denial. The Soviets would seek to destroy NATO surface forces, especially the USN's attack carriers, and disrupt NATO SLOC. With the development of their own SSBN forces, they also place a high premium on protecting their SSBN from U.S. ASW forces.

The SS-N-1 SCRUBBER has been followed by a steady development of newer

missiles. By the early 1980s, the Soviets had more than 100 surface and 400 submarine nuclear-capable SLCMs as well as between 600 and 700 nuclear-capable ASMs. The OSCAR-class nuclear cruise-missile attack submarine (SSGN), carries 24 SS-N-19s with a range of 460 km.[13] Under the Strategic Arms Limitation Treaties (SALT I and II), limits were placed on the number of Soviet and American SLBMs. As newer generations of Soviet SLBMs have been deployed, the USSR appears to be refitting older class SSBN, such as the YANKEE, with SLCMs.[14]

For both the U.S. and the Soviet Union MTNWs are especially attractive, providing two major offensive advantages over conventional weapons in a conflict at sea. First, there is no need for multiple hits. One nuclear SSM would be sufficient to sink the largest of surface ships or submarines, while defenders would require 100% capabilities to avoid being destroyed. Second, even near detonations of nuclear warheads, as in the case of ASW weapons, could be enough to neutralize a potential threat. On the defensive side, nuclear-armed SAMs directed against aircraft and missiles could destroy them and even if no direct hits were achieved against ASM armed bombers, an aerial nuclear blast would compel attacking bombers to scatter, preventing a concentrated attack. High altitude blast would also seriously degrade electronic sensing systems in or out of the water. A further benefit of MTNWs is that the substitution of a relative few of them for larger numbers of conventional warheads eases magazine requirements.[15]

A further political advantage for the United States in terms of its growing MTNW posture is that these weapons can be included in the American contribution to NATO's nuclear posture without the difficulties associated with foreign basing. Indeed, one of the options considered by NATO as a response to

Soviet SS-20 deployment was to rely upon an expanded USN SLCM capability in European waters. This would have avoided the public relations problems of the GLCM and PERSHING II deployments.[16] Allied governments, including Canada's, which join with the USN in dedicating forces to NATO's collective maritime posture, represent such contributions as being necessary for conventional deterrence, which they are. However, given that the wide deployment of MTNWs makes it nearly impossible to distinguish between nuclear and conventionally capable American maritime forces, allied maritime contributions to collective security bolster the USN's sea-based nuclear capability. For example, the U.S. would be able to count upon allied-wide ASW surveillance in any nuclear ASW campaign.

While possessing a number of technical and political advantages, MTNWs are not without certain disadvantages. Because of the danger of shock waves and release of radiation, they cannot always be used in the vicinity of friendly forces, except in the case of deep-water ASW detonations. While this problem has been partially overcome by the adaptation of missiles for tactical strikes at sea, it will not always be possible to use an MTNW safely. Thus many NATO and Warsaw Pact MTNWs can be made dual capable. Advances in sensing and homing that allow for a more exact location of the enemy target and greater kill probabilities have somewhat lessened the need for nuclear-armed maritime tactical nuclear weapons.

Aside from these technical disadvantages, MTNWs also carry all the operational employment encumbrances associated with other types of tactical nuclear weapons. In both the Soviet and American cases, use of these weapons is subject to strict higher military and political control because of the risk of escalation. While commanders at sea may have the pre-delegated option to use

MTNWs if they are used against their forces first, initial use would require recourse to these higher authorities. For this reason alone, maritime forces would need to deploy both conventional tactical weapons and MTNWs.

MTNWs, Deterrence and Nuclear War Fighting

Maritime tactical nuclear weapons are part of the nuclear arsenals of the United States and the Soviet Union. The main function of those arsenals is deterrence of aggression. The ability of nuclear weapons to deter is based not only upon a general threat to inflict unprecedented destruction, but on a nuclear war-fighting capacity, hence the concern with first-strike capabilities, counterforce and multiple strategic options. At the theatre and strategic levels where any use of nuclear weapons would carry with it catastrophic consequences, there appears to be little practical distinction between weapons that deter aggression because of their military utility and those that do so because they threaten unacceptable damage.

At the tactical level, however, more of a distinction can be made. While the use of tactical nuclear weapons in Europe would certainly result in large-scale civilian death and destruction, these weapons appear to have a greater utility in the conduct of military operations because of the relatively lower extent of the expected collateral damage. They still have an important deterrent function, deterring both the use of enemy tactical nuclear weapons and conventional aggression. Moreover, their use would still be restrained by the fear of escalation. However, in comparison with theatre and strategic systems, tactical nuclear weapons come closer to pure nuclear war-fighting weapons, a view that causes great concern because of the possible temptation to employ them in a first-use capacity, in hopes of waging a "limited" nuclear

war.

Maritime tactical nuclear weapons have an even greater pure nuclear war-fighting quality about them. Except for deterring the use of other MNTWs, they would seem to contribute very little to the general deterrent function associated with nuclear weapons. As indicated above, they can be extremely useful for the conduct of operations at sea. And used solely against targets at sea, MTNWs would cause almost no collateral civilian damage or casualties from the initial blast. Employed against surface forces and aircraft, there would be some release of radiation into the atmosphere, but this would constitute less of a threat to civilian populations than the use of tactical nuclear weapons on land.

Aside from considerations of specific national strategies or doctrines, the nuclear war-fighting advantages of MTNWs make them seem highly attractive as first-use weapons -- weapons used without necessarily leading to escalation to the nuclear level on land. To be sure, the threat of such escalation would be considered. However, in making the decision to use MTNWs against opposing forces at sea, political leaders could be persuaded that first use might not be the initial step in an uncontrollable nuclear war because of the nature of these weapons and the enviornment in which they would be used. When this consideration is coupled with the wide deployment of MTNWs among conventional maritime forces, the likelihood of first use at sea appears all the more probable.

Limiting nuclear-weapons use to the tactical level at sea would be possible provided both sides engaged in an intra-war exercise in restraint based upon the mutual threat of further escalation. However, there are other characteristics of maritime nuclear weapons that suggest that escalation will follow the first use

of MTNWs. In the first instance, there is only a hazy distinction between tactical and theatre maritime-weapons capabilities. Used against another surface vessel, an SSM is a tactical weapon. But some SSMs, in particular the longer-range SLCMs, are fully capable of strikes against land targets. The USN's TOMAHAWK SLCM will be able to hit Soviet shore facilities as part of a theatre counter-force strike. It could also be used in the strategic capacity against cities such as Moscow and Kiev when fired from the Norwegian or North Seas. The next generation of Soviet SLCMs will be able to strike targets in Europe and the U.S. from a variety of ocean locations. Even short-range Soviet SLCMs could be used in a strategic capacity. For example, much of the American urban-industrial and military target system is vulnerable to Soviet SLCMs with ranges under 500 km.[17]

Of particular concern to arms control advocates is the USN's tactical nuclear ASW capacity. Some have argued that once these weapons are used at sea against attack submarines (SSN), it will be a short step to employing them in a strategic capacity against Soviet SSBN even before the outbreak of a wider nuclear exchange, as part of a damage-limitation effort.[18]

Not only can MTNWs be used in a theatre and strategic capacity, but SLBMs could also be employed for uses other than strategic strikes against the U.S. and Soviet homelands. It is believed that some older-generation Soviet SSBs, such as the GOLF-class deployed in the Baltic Sea, whose SLBMs do not exceed 600 km in range, would be used for theatre strikes in Europe in support of Soviet ground forces.[19] There is some speculation as well that the SLBMs of the older YANKEE-class SSBN would be employed in a tactical capacity similar to that of a SLCM for strikes against U.S. carrier task-forces at sea. Even without a direct hit, such strikes could debilitate the carriers and especially

their crews.[20]

While the U.S. does not have the kind of medium-range SLBMs possessed by the Soviets, it has earmarked a portion of its strategic SSBN forces for use in Europe. This began with the initial deployment of the POLARIS to European waters in the early 1960s. In 1975, the United States assigned several POSEIDON SSBN, carrying MIRVed SLBMs, to NATO. These weapons are said to be capable of "selective, discriminatory attacks on targets close to the battle front designed to stop the Warsaw Pact forces...." SACEUR incorporates the available POSEIDONs into his GSP (General Strike Plan), which is coordinated with the SIOP (the Single Integrated Operational Plan that governs the use of U.S. strategic weapons).[21]

The British SSBN force is also available to SACEUR with targeting of its SLBMs coordinated with the GSP and the SIOP. The U.K., however, reserves the right to hold back its sea-based strategic forces for "national" tasks in the event of a nuclear exchange in Europe. In some ways this would be similar to Churchill's holding back of a part of the RAF fighter forces during the Battle of France for protection of England. If Western Europe fell quickly under a Soviet conventional and tactical nuclear assault, the U.K. would want to retain a force capable of deterring the Soviets.

French SSBNs, on the other hand, are not earmarked for NATO use. They are said to serve as a deterrent against Soviet use of nuclear weapons against France itself. NATO does not include the French or British SSBN forces in its negotiation position on intermediate-range nuclear forces (INF) with the Soviets. The Soviets do, however, consider these forces on par with their own land-based theatre-nuclear capabilities. American SLBMs assigned to SACEUR fall under the Strategic Arms Limitation Treaties, but the U.S. does not include them in

calculations of the theatre balance for arms-control purposes. (Nor does it include its carrier-based nuclear-capable aircraft. Neither do the Soviets, for that matter, include their land-based nuclear-capable attack aircraft.)

Still another type of strategic weapon that can be employed in a tactical capacity is the bomber. The Soviet Union maintains a large inventory of what are classed as "medium"-range bombers assigned to anti-shipping and ASW roles, using nuclear weapons. The U.S. does not have a similar capacity. However, there are now plans to employ the existing B-52G strategic bomber, and the forthcoming B-1 bomber in a maritime tactical role. In 1982 the USAF and the U.S. Navy concluded an agreement that, among other things, provided for the use of modified B-52Gs carrying HARPOONs in an ASM mode to protect the fleet from Soviet surface forces and their SSMs. According to its 1985 report to Congress, the USAF plans to have between 30 and 52 B-52Gs based in Main and Guam.[22] When deployed, the B-1 strategic bomber may also be given a maritime role. It can carry 24 HARPOONs internally and 14 externally.[23]

Scenarios of escalation are discussed below. Yet it seems evident from this brief overview of maritime nuclear weapons that the use of MTNWs against targets at sea would likely precede the first use of any other nuclear weapon in a NATO/Warsaw Pact conflict. This is so both because of the nature of the ocean environment and because these weapons are fully integrated into conventional maritime forces to an extent not duplicated in ground forces, and even land-based airforces. In a land/air European conflict it would be possible to send conventional forces into battle without nuclear weapons. At sea, given that MTNWs are always, at least partially, deployed on board in peacetime, the commitment of major conventional forces would mean the commitment of large numbers of nuclear-armed surface ships and submarines as well as nuclear-

capable land- and carrier-based aircraft. To be sure, many of the MTNWs noted above are dual capable, yet the platforms from which they are fired will likely have both conventional and nuclear warheads for these weapons.

Once tactical nuclear weapons get employed at sea, even if only against other targets at sea, the dividing line between tactical and theatre usage, and even between theatre and strategic usage, of nuclear weapons will become increasingly hard to maintain, given the commitment of theatre and strategic forces to sea-based nuclear roles. Both sides may know that, for example, SLCMs are not being used against land targets; but once they are being widely used against high-value maritime forces, there will be little assurance that they will not be soon employed in theatre and strategic capacities.

First Use at Sea: Scenarios of Escalation

Maritime tactical nuclear weapons lend themselves well to theories of limited nuclear war. The logic of such a statement is that both the U.S. and the USSR would deliberately escalate to the MTNW level at sea, before the use of nuclear weapons on land, in order to conduct a nuclear campaign in a relatively safe and controlled environment. As Laurence Martin observed, the North Atlantic would be turned into a kind of Western Desert for a soldiers' war which "one supposed, would be more likely to remain within the bounds of a regulated policy contest than one that wrought destruction on homelands and civilians even if only as the collateral effect of a would-be intra-military contest."[24] Being more controlled, the war could also be terminated easier, presumably on terms favourable to the victor at sea.[25]

While never apparently widely embraced, such logic did find its way into USN studies and plans. In the early 1960s, Secretary of the Navy Paul H. Nitze

initiated the War-At-Sea studies, which examined the implications of a solely maritime war "where the objective is to coerce the antagonist solely by maritime pressures...land, overland airspace and inland waters are, in general, taken as sanctuaries." In such a war, without concurrent land combat, "the political objectives of the contestants are to be reasonably well defined and do not encroach upon the vital interests of any nuclear power. This is recognized by all of the major contestants."[26]

By the late 1960s, various War at Sea Operational Plans (OPLANS) were being drawn up by the USN. The Atlantic Fleet's OPLAN 2300 provided for fleet operations in contingencies involving the Soviet Union in which, among other cases, the United States wanted to implement "a controlled response to Soviet military aggression short of strategic nuclear attack." The plan called for a gradual escalation of naval actions towards the "highest intensity of operation" which would entail "the entire Atlantic Fleet in a complete confrontation with Soviet forces at sea in warfare short of the strategic use of nuclear weapons." Any steps taken by the fleet would be controlled by "rules of conduct and engagement reflecting national policy objectives."[27]

Since the War-At-Sea studies and OPLAN 2300, the American strategic nuclear and maritime superiority upon which the credibility of sea-based limited nuclear options ultimately rested has been eroded. This is not to say that first use at sea could not be the result of a carefully chosen escalatory step, by either side, but the option has certainly become less attractive to the NATO forces and finds little place in Soviet maritime doctrine. A far more likely set of scenarios for first use at sea begins with consideration of the opposing maritime strategic interests of NATO and the Warsaw Pact and the probable course of a conventional war at sea waged in conjunction with a land/air

conflict in Europe. Here first use takes place not as part of some regulated policy contest on the seas, but rather as the result of it being perceived, amidst the fog and uncertainties of war, as the inevitable and necessary next step.

The maritime forces of the opposing alliances share with all other elements of the respective strategic postures a large measure of uncertainty as to how, when, and for what duration they might be used in actual conflict. NATO's maritime forces are tasked with supporting other elements of the collective posture in a war of indeterminate length and character--a war, according to the Western view, that will be forced upon it by Soviet aggression. Thus NATO views the maritime role of conveyance and projection as part of the defensive reactions it would undertake. NATO above all seeks to make use of the sea for these purposes.

The Soviets view their own maritime tasks as equally defensive. But the emphasis for Soviet conventional and theatre/tactical nuclear maritime forces would be one of sea denial: that is, to deny NATO use of the seas as the West mounts what would in its view be a maritime counter-offensive.

The classic scenario painted by NATO officials is the "battle for the Norwegian Sea." Under this scenario the Soviets move against Norway either as an isolated limited attack or as part of a more general offensive that would include the Central Front in Germany. NATO must move maritime forces towards the Norwegian coast in conjunction with an airlift of allied forces into Norway, which does not allow the permanent stationing of foreign forces on its soil in peacetime. As NATO moves its maritime forces close to Norway, the Soviets would direct their maritime forces against the combined NATO fleets. They would do this for three principal reasons: first, attacking NATO maritime forces would protect Soviet ground and air forces already in Norway; second,

the Soviets would want to protect their SSBN forces still in northern coastal waters; and third, attacking NATO maritime forces would open the way for the movement of the Northern Fleet into open seas as a further means of consolidating the positions in Norway.

For NATO, the movement of the Soviet northern fleet into open waters would raise further problems relating not only to the defence of Norway, but the entire allied position in northern and central Europe. Should the Soviets succeed in denying NATO use of the Norwegian Sea, it would open the way for the movement of their submarine and naval air forces further south towards the Atlantic sea lines of communication. This in turn might prevent NATO from being able to execute an early and sustained sealift of reinforcements to the Central Front.[28]

In the Mediterranean, NATO maritime forces would also be concerned with securing the SLOC and with projection of force ashore, especially in support of Greece and Turkey. The airpower would come from the powerful U.S. Sixth Fleet which is earmarked for SACEUR's operational command as his STRIKFORSOUTH (Striking Force South) upon declaration of a reinforced alert. These aircraft would be employed mainly to support the land/air battle, if necessary with nuclear weapons.

The Soviets' maritime tasks in the Mediterranean will again be mainly those of sea-denial and defence of the USSR from sea-based attacks.[29]

The American ships and aircraft moving to support the allied land/air position will carry nuclear weapons. But under NATO's strategy of flexible response, the initial tasks will be solely conventional. Indeed, the Alliance is relying upon the success of the conventional SLOC protection campaign to partially help it sustain conventional resistance on the ground by allowing

massive reinforcement and resupply of the land/air forces. This, it is hoped, will prevent a collapse and a situation wherein NATO would have to choose between surrender and nuclear escalation:

> In preventing a crisis from developing into war, or even in limiting a war to the conventional level, the NATO navies...might well prove decisive. They might even help induce the national leaders on both sides to meet at the conference table rather than take the alternative route of escalation.(30)

This optimistic prediction assumes that the NATO maritime forces will gain the upper hand at sea and do so quickly enough to have an impact on the land/air war. However, assessments suggest that NATO will not be able to achieve control of the SLOC on a scale necessary to allow for reinforcement for at least several weeks, given Soviet sea-denial capabilities. U.S. carrier forces will also find it difficult to move close enough to land in order to support the land/air battle.[31]

Maritime forces operating under NATO commands would in principle be subject to strict political control, ultimately by the Atlantic Council and/or the Military Committee.[32] Current NATO rules of engagement restrict allied ships from firing any weapon first, only allowing commanders to return enemy fire "in keeping with NATO's defensive strategy."[33] In an on-going conventional war, the Alliance would likely attempt to apply these rules to the first use of an MTNW.

However, given recent assessments about the likely character of the war at sea, the Alliance may find it ncessary to authorize the use of MTNWs, particularly in an ASW capacity in order to bring its maritime forces to the aid of the land/air battle in time. Under the NATO policy of not disavowing

"first-use," the initial use of nuclear weapons at sea cannot be ruled out and may appear as an acceptable risk given the nature of the maritime environment. Such a decision could also be more readily forthcoming from the Alliance's collective decision-making process than a decision to initiate first use on land.

On the other hand, under the threat that such usage would automatically lead to escalation, on land as well as at sea, NATO's collective leadership may refrain from authorizing first use at sea. It could be as well that under the pressure of war, the entire collective decision-making process breaks down.

Yet even if the Alliance could not collectively authorize its forces to employ MTNW in a first-use capacity, the U.S. could take that step unilaterally. After all, its forces constitute the bulk of NATO's maritime striking power and contain its most highly valued vessels, the CVANs. Moreover, all the major NATO maritime commanders, with the exception of CINCHAN (Commander-in-Chief Channel), are American admirals who, simultaneously with their NATO roles, command USN fleets in the Atlantic and Mediterranean.

U.S. Naval doctrine has not dealt extensively with the use of MTNWs. In part this reflects the relatively lower priority these weapons have had in the evolution of the post-war maritime posture when compared to that of the Soviets. It also reflects the general view expressed in public statements that the United States regards the use of nuclear weapons as a last recourse. Typical of this view is the following comment made by a former Sixth Fleet commander to a Congressional committee:

> They fire a series of weapons, maybe three or four nuclear warheads. They do a certain amount of damage to us, maybe they sink a couple of ships. Are we going to respond right then with nuclear weapons? I think we will swallow a lot, as

> national policy, before we take that initial nuclear weapon step.(34)

The employment of MTNWs, especially in a first-use capacity, would be a major step for the USN and subject to Presidential authorization. But such approval would be easier to obtain for first use at sea if the alternative, as pictured for the President, were a long and costly conventional war at sea that also endangered U.S. ground forces in Europe. Here again, the relative safety of the ocean environment for first nuclear use would weigh heavily in any decision.

Unilateral first use at sea by the U.S. could also result from the adoption of a more forward maritime strategy such as that being advocated by the Reagan administration's Secretary of the Navy, John Lehman. Under this approach the United States would respond to Soviet aggression anywhere by seeking to engage Soviet maritime forces on a global basis. Rather than using its forces to primarily support a continental land/air battle, the USN would "horizontally" escalate by hitting the USSR where it is still inferior to the U.S., at sea. The new strategy aims at bringing the Soviets to the peace table by inflicting significant losses on their maritime forces, including their bases for land-based maritime aviation. Such an approach is not entirely inconsistent with an emphasis on maritime support for a NATO land/air effort. Its supporters argue it "should force the Soviets, historically dominated by continental horizons, to concentrate more resources on homeland defence and possibly less on interdiction of U.S. sea lanes."[35]

Critics of this strategy argue that it would involve a more offensive campaign at sea than would be necessary to protect allied SLOC. Furthermore, it is pointed out that a horizontal escalation of this magnitude, a global maritime offensive, would shortly lead to vertical escalation as the USN

employed its growing MTNW capabilities, especially the TOMAHAWK SLCM. This in turn would elicit a Soviet nuclear response at sea.[36]

Apprehension about a Soviet response probably accounts for a good deal of the skepticism concerning Lehman's strategy, even within the Pentagon. The main reason for this fear is the acknowledgement that Soviet maritime forces are better suited to conduct nuclear attacks at sea than are American. Secretary of Defense Caspar Weinberger has gone so far as to warn the USSR that: "It will be U.S. Policy that a nuclear war beginning with Soviet nuclear attacks at sea will not necessarily remain limited to the sea."[37]

While the Soviets, with their interior lines of supply and communication, would be less dependent on maritime forces to achieve a conventional victory in a European war, they too might resort to nuclear first use in order not to lose the war at sea. Such a loss would strengthen NATO's land, and pose a threat to the Soviet homeland, as well as the SSBN forces kept near its coasts.

It appears that the Soviets still regard their maritime forces as inferior to those of the West, especially in the conduct of a protracted conventional conflict at sea. Thus Soviet naval writings stress the need to launch coordinated attacks on NATO forces, emphasizing submarines and land-based aircraft as the primary means of conducting such strikes. The writings also stress the need for surprise, a pre-emptive attack before or just after the outbreak of hostilities, which saturates NATO forces. Given Soviet capabilities, these massive attacks could be either conventional or nuclear. Soviet exercises and professional writings do emphasize the potential use of tactical nuclear weapons at sea and Soviet vessels are configured to operate in a nuclear environment.[38] As a study prepared for the United States Defence Nuclear Agency (The Soviet Navy Declaratory Doctrine for Theatre Nuclear Warfare) noted, the Soviet Navy has

"apparently faced up to nuclear warfare and incorporated it in their operational doctrine to an unusual degree." This approach stands in contrast to that of western naval forces which, despite recent suggestions about horizontal escalation, still "consider the use of nuclear weapons as the ultimate recourse."[39] According to the study:

> (T)he Soviet Navy declaratory doctrine makes little differentiation between the conduct of theatre naval warfare at the conventional or nuclear level...The current pattern of Soviet naval operations does not necessitate a marked shift from a conventional to a nuclear mode and has inherent in it a considerable degree of flexibility it evidently sought.(40)

However, the study also points out the use of nuclear weapons at sea is strictly subjected to the highest political and military authorities. In the event of a conventional land/air war in Europe, those authorities may subordinate maritime actions to the requirements of the land campaign. If the land effort is going well at the conventional level, "there could be a willingness to accept considerable losses at sea before a nuclear threshold was perceived by the central leadership." Moreover, because the Soviets generally tend to discount the possibility that nuclear war can be limited, even to the seas, their maritime forces would not be allowed to initiate the use of nuclear weapons at sea "before their forces were postured and ready to use them in the land campaign."[41]

Even given this caution on the part of the Soviet leadership, the option would be open, especially in view of its generally superior MTNW posture, to initiate nuclear war beginning at sea, once Soviet ground forces are ready. And it is widely accepted that Soviet ground forces, like their maritime forces, are better prepared for nuclear war than those of NATO.

But regardless of prior doctrinal statements or assumptions on the part of both the U.S. and the USSR, the expected intensity of a conventional war at sea will itself provide circumstances conducive for first use of nuclear weapons by either side. The compressed time-frame and time constraints under which each will be operating will also contribute to the likelihood of first use at sea. Moreover, while commanders at sea will be formally subject to higher political authorities in their first use of nuclear weapons, their isolation and concern for the safety of their forces may convince them that they ought to fire their MTNWs before it is too late.

A key consideration is the fact that the conventional war will be fought with nuclear-armed and nuclear-capable maritime forces. Unlike the situation that may obtain on land, these forces will be subject to immediate conventional attack. The U.S. and its allies will be waging an ASW campaign against Soviet SSGNs carrying nuclear SLCMs. Nuclear-capable Soviet naval bombers will be firing conventional ASM against nuclear-capable ships and will in turn be fired upon.

American surface ships carrying the TOMAHAWK SLCM may find themselves subject to attack even as they perform conventional roles such as serving as escorts for merchant ships. What this means is that an intense conventional war at sea will degrade both sides' ability to conduct nuclear strikes at sea. There will thus be a great pressure to "use them or lose them." Better to strike first with nuclear weapons against opposing maritime forces than wait until the capacity to do so is greatly diminished. Once diminished, your own MTNW capability and the safety of your entire maritime forces will be that much more threatened by nuclear attack from enemy forces. Faced with a massive conventional ASM attack upon its surface forces, the USN would be

tempted to employ the nuclear capabilities of its TERRIER missiles which would disrupt an air assault without having to score a series of direct hits. To hold back might mean loss of the TERRIERs as their platforms are sunk or disabled. The impetus to follow this line of reasoning, in the heat of an unprecedented struggle at sea, will be reinforced by the knowledge that first use at sea will not immediately result in civilian damage and casualties.

Once nuclear weapons are being used at sea in a tactical capacity, the aforementioned close connection between tactical, theatre and strategic sea-based nuclear systems would fuel escalation. If American B-52Gs took off over the Norwegian Sea to attack Soviet surface forces with HARPOON ASMs, would this not be viewed by the Soviets as a possible strategic attack on the USSR? If Soviet SSGNs appeared off the U.S. eastern seaboard, could Washington safely assume that Soviet SLCNs would be used only in an anti-ship capacity and not against land targets? With NATO mounting a major ASW campaign, would the Soviets be assured that their SSBN would not be subjected to attack? Could the Soviets leave the French and British SSBN forces alone, since they can be used in a theatre capacity, and even against the USSR itself?

With both sides tempted to attack the other's sea-based nuclear systems because of their potential for theatre and strategic land strikes, both sides might also be tempted to use these systems in these capacities before they are lost. Should the Soviets see NATO's ASW campaign, especially if it turns nuclear, as a threat to their SSBN force, they might decide to employ their SLBMs. Equally, if the U.S. finds its surface ships in serious danger of being eliminated by Soviet MTNWs, it might want to employ its carried-based aircraft and TOMAHAWK SLCMs against their intended land targets.

Thus the same use-them-or-lose-them, destroy-them-or-be-attacked-by-them

thinking applied to MTNWs would be applied to theatre and strategic nuclear weapons at sea. Indeed, since some MTNWs are capable of theatre and strategic roles, and some theatre and strategic platforms are capable of tactical strikes, even an intense conventional war at sea will heighten escalatory pressure for the first use of sea-based nuclear weapons in a theatre or strategic capacity. For example, Soviet naval doctrine envisions attacks on U.S. carriers "even at the conventional level in order to eliminate or blunt their nuclear strike potential."[42] Should it find its CVANs under concentrated conventional attack, the U.S. may well choose to use them in a nuclear role even if only against Soviet maritime-aviation land bases.

With the use of sea-based systems against land targets, for whatever reason, it is difficult to imagine that further escalation would not soon follow.

MTNWs and Arms Control

One of the central paradoxes of nuclear weapons is that "they can prevent aggression only if there is a possibility that they will be used, but we do not want to make them so usable that anyone is tempted to use one."[43] As the preceding discussion indicates, not only are maritime tactical nuclear weapons quite "usable," there would be strong temptations and incentives for their employment in a first-use capacity in the event of a NATO/Warsaw Pact conventional war that included major engagements at sea. Once they are used, or their use by opposing forces is perceived as being imminent, there could well follow an uncontrolled nuclear exchange beginning with attacks by and on sea-based nuclear weapons systems.

Despite the danger thus posed by MTNWs, they have never been, nor are

they likely to be in the near future, the subject of arms control agreements.

The only category of sea-based nuclear weapons expressly forbidden by treaty is that covered under the 1972 United Nations sponsored multilateral Treaty on the Prohibition of the Emplacement of Nuclear Weapons of Mass Destruction on the Seabed and Subsoil Thereof. Article V of the Treaty commits the nuclear powers to help prevent an "arms race" on the seabed.[44] Since neither the USSR nor the U.S. appears to be developing seabed nuclear systems, the agreement does little to contain an arms race under, over, and on the ocean surface.

Through the SALT process, SLBMs have become the subject of arms control agreements, though certainly not in any way that has reduced their capabilities and importance. The only other sea-based system mentioned in the SALT agreements was the sea-launched cruise missile. Here the concern was less over the capacity of SLCMs to perform anti-shipping roles as it was with the growing potential of these weapons for theatre and strategic strikes. This would render SLCMs indistinguishable from other strategic weapons with consequent unfavourable effects on stability and arms control.

While recent arms control moves relating to SLCMs have not directly addressed their role as MTNWs, a review of these moves points out the grave difficulties that would be encountered in trying to control maritime tactical nuclear weapons.

A Protocol of the unratified SALT II agreement prohibited both the U.S. and the USSR from deploying GLCMs and SLCMs capable of ranges in excess of 600 km. Research and development was allowed to go forth and the Protocol was set to expire on 31 December 1981. In his letter of transmittal, Secretary of

State Cyrus Vance stressed that the agreement "will not affect the U.S. cruise missile program since such systems will not be ready for deployment before the expiration of the Protocol."[45]

In October 1981, President Reagan approved procurement and deployment of several hundred nuclear-armed TOMAHAWK SLCMs with ranges greater than 600 km. Their mission was described as constituting a "secure reserve force"; in other words, a second strike theatre/strategic nuclear role.[46] Actual deployment began in June 1984.

The new round of Soviet-American arms-control negotiations, which began in March 1985, will probably address the SLCMs, among other matters. In the meantime there has been a measure of concern within the U.S. Congress about the possible destabilizing effects of unrestrained SLCM deployment, and its effects on the prospect of future arms-control agreements.[47]

On 31 May 1984, the House of Representatives passed an amendment to the 1985 Department of Defense Authorization Act banning deployment of nuclear SLCMs. This had no immediate effect since deployment in 1984 had been previously authorized. On 19 June 1984, a Senate amendment called for discussions with the Soviets on SLCM arms-control verification. Still, there was reluctance in Congress to slow down the U.S. SLCM program. A September 1984 House-Senate Conference Committee agreement on the 1985 authorization (which was signed by the President) contained none of the previously proposed restrictions on SLCM nuclear development. The decision to delete restrictions was based upon the existing Soviet SLCM capability, thus the need for an opposing deterrent, and "the absence of existing reliable means whereby the presence (or absence), range, warhead or capabilities of sea-launched cruise missiles, can be verified." The conferees did, however, direct the President to

report on two things:

> First, describe an arms control method by which it would be possible to determine whether a cruise missile designed to be launched from a naval vessel is conventionally armed or nuclear armed and by which it would be possible to effectively verify an arms control limitation on the number of cruise missiles that are armed with nuclear warheads and deployed on naval vessels. Second, state whether the Joint Chiefs of Staff and the Director of Central Intelligence have agreed that the method described would be a high-confidence method as applied by the United States to cruise missiles of another nation and would be an acceptable method for use when applied by another nation to cruise missiles of the United States.(48)

There are serious doubts as to whether any workable verification system is possible once SLCMs are deployed. National means are considered unworkable given that from the outside it is impossible to tell if a SLCM is conventionally or nuclear armed. Moreover, SLCMs can easily be stored out of sight and can be deployed on a number of different platforms. Thus any negotiated numerical limits would require either on-site inspection or "counting rules." Counting rules assume that each platform holds the maxium number of SLCMs, and this would be the numerical limit. However, this would actually have the effect of inflating the number of SLCMs permitted to each side. Therefore, although it would be difficult to negotiate, a total ban on SLCMs might be easier to verify than some future numerical ceiling.[49]

A ban on SLCMs would, though, have to include more than long-range weapons of the American TOMAHAWK and Soviet SS-NX-21 type. If only these were prohibited, both sides would still be able to maintain an array of short-range SSMs for anti-shipping purposes. The Soviets would be most anxious to do so given their dependence upon these weapons to offset western maritime superiority. However, this would leave a great deal of uncertainty because

SLCMs of less than 600 km. range could still be used against land targets. As noted above, much of the United States but none of the Soviet urban industrial and military targets are vulnerble to SLCMs with ranges of less than 600 km. As former Secretary of Defense Harold Brown and Lynn Davis have noted: "To provide symmetrical limits, a future arms control agreement would need to cover SLCMs with a range greater than about 200 km."[50]

Without a comprehensive ban, on-site verification would seem to be the only way to verify any agreement limiting numbers of nuclear-armed SLCMs. Heretofore, both the U.S. and the USSR have rejected on-site verification, preferring to rely on national means. In the case of SLCMs, on-site inspections would mean opening up hundreds of surface ships, submarines, aircraft, and storage facilities to representatives of the other superpower or of some mutually agreed upon third country or international organization. In February 1985, Secretary of the Navy Lehman told a Congressional committee that the Navy "stands ready to allow Soviets or other parties to inspect weapons on its ships" to determine if they are nuclear or conventionally charged, if this could be negotiated.[51] Despite this willingness, such negotiations seem improbable.

Moreover, even if on-site inspections were possible as part of an agreement limiting the number of nuclear-armed SLCMs, the very existence of these weapons, as legitimized by this agreement, could be viewed as destabilizing. This would be because of the continued confusion as to whether or not the SLCMs were for tactical, theatre or strategic usage. Since both sides would assume the worst, that these are strategic-capable weapons, the incentives for maritime escalation would continue to be great. Thus, according to some critics of the U.S. program, the deployment of SLCMs, in whatever numbers, "will only further contribute to the mistaken belief that a nuclear war can be controlled

or won, when in actuality any use of nuclear weapons will more likely result in a massive and mutually devastating exchange."[52] The difficulties associated with achieving an arms-control agreement covering SLCMs are even more daunting in the case of MTNWs. How would it be possible to distinguish between a nuclear or conventionally armed ASW rocket, ASM or SAM? Even if limits were placed on the number of MTNWs, it would take almost continual on-site inspection to verify compliance, given the number of the nuclear-capable delivery methods and platforms. If counting rules were applied, the number of MTNWs allowed each side would be nearly limitless, since large ships can store dozens of missiles and scores of nuclear warheads. How could the MTNW capability of a carrier be controlled? Limits would have to be placed on the number of nuclear-capable aircraft on board. Then there would be the question of ranges. Long-range delivery is essential for the safe use of some nuclear MTNWs such as ASMs or ASW weapons where the object is to destroy the enemy platform before it has the opportunity to destroy the attacking platform. And, any possible agreement would not stop all research and development of newer MTNWs as a hedge against non-compliance by the other party.

Given these considerations, arms-control agreements covering MTNWs seem extremely unlikely and even those that might be possible, and which assume a willingness on the part of both sides to allow on-site inspection, would not do away with this class of nuclear weapons. In this sense, arms-control agreements would have the same effect on MTNWs that the SALT process has had on strategic nuclear weapons. Far from providing a process directed toward their gradual elimination, SALT has had the tendency to "build nuclear weapons ever more firmly into the international system."[53]

NATO's Maritime Nuclear Dilemma

The absence of realistic prospects for significant reductions in American and Soviet MTNW arsenals is not, of course, unique. There appears to be little hope of arms-control agreeements covering land-based tactical nuclear weapons in Europe. In order to reduce the danger of first use on land, NATO has adopted the view that it must maintain and continually improve its conventional war-fighting capabilities. This will help deter a Soviet conventional attack. If deterrence fails, it will allow the Alliance to deny to the Soviets early decisive conventional victories, thus helping to raise NATO's nuclear threshold. Prevented from achieving such victories, the Warsaw Pact might be persuaded to seek a negotiated end to hostilities rather than exercising its nuclear option.

The contradictions, ambiguities and dilemmas of this "flexible response" strategy are well known. The NATO governments are only too aware of them, but they agree to disagree on flexible response's ultimate wartime meaning in order to preserve a measure of allied unity. It is clear that all hope the uncertain card of flexible response will never have to be played; for there is little doubt that conventional resistance could be the medium through which either side would initiate nuclear war as well as the hedge against this fateful step.

At sea, conventional force building as a means to lower the nuclear threshold, in the absence of reductions in tactical nuclear-weapons arsenals, is an even more uncertain approach to avoiding first use. Here conventional forces constitute even less of a hedge, for two reasons. First, without significant limits on MTNWs, conventional maritime force building would only increase the number of NATO nuclear-capable weapon platforms, thereby compelling the Soviets to further augment their already superior MTNW posture.

Second, for the purposes of conducting a major conventional war at sea, the maritime balance still favours NATO, unlike the situation with regard to conventional land/air forces. Thus early successes by NATO at sea could compel the Soviets to initiate MTNW usage just as early Soviet successes in the conventional land/air war would increase the likelihood of NATO first use on land.

This does not mean that at sea, as on land, NATO can afford not to sustain and improve its conventional capabilities as a further means of raising the nuclear threshold. The Alliance's need to be able quickly to make use of the seas to support the land/air war exceeds that of the Soviets' to deny NATO such use. This asymmetry is directly related to an imbalance in conventional land/air forces that greatly favours the Soviets. Nevertheless, in emphasizing its need for maritime conventional war-fighting capabilities, NATO heightens the risk of nuclear first use even as it hopes to reduce it.

The risk must be accepted given the Alliance's dependence upon maritime support for a credible conventional posture. Accepting the risk also means maintaining and augmenting the American MTNW posture. These weapons are required both to afford a measure of deterrence against Soviet first use at sea and, should deterrence fail, a means of responding at sea at the tactical nuclear level. This is so even though MTNWs provide less of a deterrence and are more likely to be used than land-based tactical nuclear weapons. Such is NATO's maritime nuclear dilemma, a dilemma that appears even more intractable than that which the Alliance faces on land.

Ultimately, it is not the technical problems of verification that make control of MTNWs unlikely, but instead the military advantages of their continued deployment. The dangers inherent in MTNW as tempting first-use

weapons are the dangers of war itself, any war between NATO and the Warsaw Pact. As such, lessening the danger is inseparable from broader efforts to avoid confrontations of all types between the two sides. For once war comes, or appears to be inevitable, the nuclear war-fighting capabilities of these weapons may be viewed, by both sides, as too important not to exploit at the earliest possible moment.

Notes

[1]The classification of nuclear weapons as tactical, theatre, or strategic has always been somewhat inexact; this is especially so for sea-based weapons. For the purposes of this paper, all nuclear weapons systems whose primary task is the destruction of enemy forces on, under, or over the seas in order to directly influence the outcome of specific sea battles, are designated as tactical. The MTNW designation holds regardless of range (usually under 500 kilometres) and warhead kilotonnage (usually below 10 KT).

Theatre nuclear weapons are typically systems with ranges in excess of 200 km and with warhead yields of anywhere from three to 400 KT. Theatre weapons are used in a specific geographic region, e.g., Europe, and are not capable of intercontinental delivery. Their primary mission is to indirectly influence the outcome of battles, mainly land battles, by striking at rear logistical and support targets and at the opposing side's theatre nuclear forces. For the purposes of this paper, all sea-based nuclear weapons systems capable of non-intercontinental land-attack will be considered theatre and this could include some MTNWs.

Strategic nuclear weapons are those capable of intercontinental strikes, such as long-range bombers, Intercontinental Ballistic Missiles (ICBMs) and Submarine-Launched Ballistic Missiles (SLBMs). The warhead yield of these weapons is usually in high kilotonnage or megatonnage range and they have as their primary missions the destruction of the enemy's strategic nuclear weapons forces and the crippling of his war-making capacity through strikes at urban industrial targets. For the purposes of this paper, strategic weapons will include SLBMs and strategic bombers. Some sea-based weapons systems, classified as MTNW and/or theatre, such as carrier-based aircraft and Sea-Launched Cruise Missiles (SLCMs), can be employed against inland urban-industrial targets and land-based strategic systems, thereby performing strategic-strikes roles even without long-range intercontinental delivery of their atomic warheads.

The above classifications are based upon, but do not exactly follow, those found in the following sources: J.H. Neuman, Nuclear Forces in Europe: A Handbook for the Debate (London: International Institute for Strategic Studies,

1982); Jeffrey Record, U.S. Nuclear Weapons in Europe: Issues and Alternatives (Washington: Brookings Institution, 1974); and Stockholm International Peace Research Institute, Tactical Nuclear Weapons: European Perspectives (New York: Crane Russak, 1978).

[2]Samuel P. Huntington, "National Policy and the Trans-Oceanic Navy," United States Naval Institute Proceedings (USNIP) 80 (May 1954).

[3]United States Navy, Operational Archives, Washington Navy Yard, Washington, D.C., (OA), Command File-Post 1 January 1948, (CF), Annual Report of the Commander-in-Chief Atlantic Fleet, 1 July 1956-30 June 1957, p. 35.

[4]OA, CF, Report of Operations and Conditions of Command Commander-in-Chief U.S. Naval Forces Europe, 1 July 1960-30 June 1961, pp. 1-18.

[5]For the role of the Navy in early American nuclear war plans see David A. Rosenberg, "'A Smoking Radiating Ruin at the End of Two Hours': Documentation on American Plans for Nuclear War with the Soviet Union, 1954-1955," International Security 6 (Winter 1981/82):9-12; and Anthony C. Brown, ed., Operation World War II: The Secret American Plan Dropshot for War with the Soviet Union, 1957 (London: Arms and Armour Press, 1978), pp. 163, 204-5, 210-11.

[6]OA, CF, Annual Report of the Commander-in-Chief Atlantic Fleet, 1 July 1955-30 June 1956, p. 31.

[7]Ibid., 1 July 1961-30 June 1962, p. 5.

[8]For an historical account of the U.S. Navy's nuclear ASW posture see Joel J. Sokolsky, "The U.S. Navy and Nuclear ASW Weapons," USNIP 110 (December 1984).

[9]Thomas B. Cochran, et al. Nuclear Weapons Databook, vol. 1, U.S. Nuclear Forces and Capabilities, (NWD) (Cambridge, Mass.: Ballinger, 1984), p. 273.

[10]Ibid., p. 172.

[11]Charles A. Sorrels, U.S. Cruise Missile Programs: Development, Deployment and Implications for Arms Control (New York: McGraw-Hill, 1983), p. 83; NWD, 1:185.

[12]Ibid., p. 63.

[13]Sorrels, U.S. Cruise Missile Programs, p. 125.

[14]Washington Post, 23 February 1985, p. 14.

[15]Norman Polmar, "The U.S. Navy: Tactical Nuclear Weapons," USNIP 109 (July 1983):126.

[16]David C. Elliot, Decision At Brussels: The Politics of Nuclear Forces, Discussion Paper no. 97, California Seminar on International Security (Santa Monica: August 1981), p. 11.

[17]Harold Brown and Lynn Davis, "Nuclear Arms Control, Where Do We Stand?" Survival 26 (July/August 1984):152

[18]See for example, Barry R. Posen, "Inadvertent Nuclear War? Escalation and NATO's Northern Flank," International Security 7 (Fall 1982):43. For arguments in favour of a strategic-ASW posture for the USN, see Hamlin Caldwell, "The Empty Silo--Strategic ASW," United States Naval War College Review 34 (September/October 1981); and David B. Rivkin, "No Bastions for the Bear," USNIP 110 (April 1984).

[19]Bryan Ranft and Geoffrey Till, The Sea in Soviet Strategy (Annapolis, Md.: Naval Institute Press, 1983), p. 173.

[20]Carl H. Clawson, "The Wartime Role of Soviet SSBNs--Round Two," USNIP 106 (March 1980):68.

[21]Stockholm International Peace Research Institute, Tactical Nuclear Weapons: European Perspectives (New York: Crane Russak, 1978), p. 115; New York Times, "U.S. Assigns More Missile Submarines to the Defense of NATO," 18 June 1975; U.S. Congress, Senate Committee on Foreign Relations, Staff Report, U.S. Security Issues In Europe: Burden Sharing and Offset, MBFR, and Nuclear Weapons, 93rd Cong. 1st sess. (Washington: U.S. Government Printing Office, December 1973); James R. Schlesinger, "The Theater Nuclear Force Posture in Europe" in Nuclear Strategy and National Security: Points of View, ed. R.J. Ranger and Roger Labrie (Washington: American Enterprise Institute, 1977).

[22]United States, Department of the Air Force, FY 85 Report to the 98th Congress of the United States (Washington: Department of the Air Force, January 1984), p. 6.

[23]Sorrels, U.S. Cruise Missile Programs, p. 35.

[24]Laurence W. Martin, The Sea in Modern Strategy (London: Chatto & Windus, 1965), p. 87.

[25]On this point, see Desmond P. Wilson and Nicholas Brown, Warfare at Sea: Threat of the Seventies, Professional Paper no. 79, Center for Naval Analysis (CNA) (Arlington, Va.: 4 November 1971).

[26]United States, Department of the Navy, War-at-Sea, Vol. I, p. 2, IV-10. The full study remains classified. These quotations are taken from extracts made available to the author by the Office of the Chief of Naval Operations under the U.S. Freedom of Information Act.

[27]OA, CF, Annual Report of the Commander-in-Chief Atlantic Fleet, 1 July 1966-17 June 1967, pp. 12, 150.

[28]On importance of the "Battle of the Atlantic" see C. Bertram and J.J.

Holst, New Strategic Factors in the North Atlantic (Guildford, U.K.: IPC Science and Technology Press, 1977); Kenneth Myers, North Atlantic Security: The Forgotten Flank?, Washington Papers 6, no. 62 (Beverly Hills: Sage, 1979); Paul Nitze, Leonard Sullivan, and the Atlantic Council Working Group on Securing the Seas, Securing the Seas: The Soviet Challenge and Western Alliance Options (Boulder, Colo.: Westview Press, 1979); Rear Admiral Sayre A. Swartztrauber, "The Potential Battle of the Atlantic," USNIP 105 (May 1979); Admiral Harry Train II, "Challenge At Sea: Naval Strategy for the 1980s," NATO's Fifteen Nations 27 (1982); Lars B. Wallin, ed., The Northern Flank in a Central European War (Stockholm: Swedish National Defence Research Institute, 1982); and Robert G. Weinland, Northern Waters: Their Strategic Significance, Professional Paper no. 328, CNA (Alexandria, Va.: December 1980).

[29]On the Mediterranean see: Ranft and Till, The Sea in Soviet Strategy; John L. Underwood, Conflict in the Eastern Mediterranean Memorandum 79-1240, CNA (Alexandria, Va.: August 1979); Desmond P. Wilson, The U.S. Sixth Fleet and the Conventional Defense of Europe, Professional Paper no. 160, CNA (Arlington, Va.: September 1976); Admiral Horacio Rivero, "The Defence of NATO's Southern Flank," Journal of the Royal United Services Institute for Defence Studies 117 (June 1972); Colonel Norman L. Dodd, "Allied Forces Southern Europe," The Army Quarterly and Defence Journal 114 (April 1984); Alan Maiorano, "A Fresh Look at the Sixth Fleet," USNIP 110 (February 1984); Idem, "Black Sea Prophecy," USNIP 111 (January 1985).

[30]Hans Garde, "The Influence of Navies on the European Central Front," USNIP 102 (May 1976):165.

[31]See for example: United States Congress, Congressional Budget Office (CBO), Planning U.S. General Purpose Forces: The Navy (Washington: CBO, December 1976); Carnegie Panel on U.S. Security and the Future of Arms Control, Challenges for U.S. National Security, Assessing the Balance: Defense Spending and Conventional Forces, A Preliminary Report, Part II (Washington: Carnegie Endowment for International Peace, 1981); North Atlantic Assembly Papers, NATO Anti-Submarine Warfare: Strategy, Requirements and the Need for Co-operation, Report of the Subcommittee on Defence Co-operation (ASW) (Brussels: North Atlantic Assembly, 1982); Nitze et al., Securing the Seas.

[32]NATO's major maritime commanders are the Supreme Allied Commander Atlantic (SACLANT) and the Commander-in-Chief Channel (CINCHAN). SACEUR also has several subordinate commanders in charge of allied maritime forces such as the Commander-in-Chief Naval Forces South (COMMAVSOUTH), the Commander Baltic Approaches (COMBALTAP) and other regional naval commanders, for example Commander Allied Naval Forces North Norway (COMMAVNON).

[33]New York Times, 2 April 1984.

[34]Testimony by Admiral G.E. Miller, United States Congress, House, Committee on International Relations, Subcommittee on International Security and Scientific Affairs, Hearings, First Use of Nuclear Weapons: Preserving Responsible Control, 94th Cong., 2nd sess. (Washington: U.S. Government Printing Office, March 1976), p. 78. See also Joseph Douglas and Amoretta

Hoeber, "The Role of the U.S. Surface Navy in Nuclear War," USNIP 108 (January 1982); T. Wood Parker, "Theatre Nuclear Warfare and the U.S. Navy," U.S. Naval War College Review 35 (January-February 1982); and Polmar, "The U.S. Navy," p. 125.

[35]Keith A. Dunn and William O. Staudenmaier, Strategic Implications of The Continental-Maritime Debate, Washington Papers 12, no. 107, Center for Strategic and International Studies, Georgetown University (New York: Praeger, 1984), p. 9.

[36]William Arkin, "Nuclear Weapons at Sea," Bulletin of Atomic Scientists 39 (October 1983).

[37]As quoted in ibid., p. 7.

[38]Sorrels, U.S. Cruise Missile Programs, p. 127; Polmar, "The U.S. Navy," p. 126.

[39]BDM Corporation, The Soviet Navy Declaratory Doctrine for Theatre Nuclear Warfare, prepared for the Director, Defense Nuclear Agency (Washington: 30 September 1977), (BDM), p. 43.

[40]Ibid., p. 42.

[41]Ibid., p. 27.

[42]Ibid., p. 28.

[43]The Harvard Nuclear Study Group, Living with Nuclear Weapons (New York: Bantam Books, 1983), p. 34.

[44]William Epstein, The Last Chance: Nuclear Proliferation and Arms Control (New York: The Free Press, 1976), pp. 187-88.

[45]United States, Department of State, Bureau of Public Affairs, SALT II Agreement, Selected Documents, no. 12a (Washington: U.S. Government Printing Office, June 1979), p. 8.

[46]Sorrels, U.S. Cruise Missile Programs, p. 83.

[47]The following account of U.S. Congressional actions regarding SLCM arms control is drawn from Russell S. Hibbs, "An Uncontrollable Tomahawk?," USNIP 111 (January 1985). See also North Atlantic Assembly, Military Committee, Draft General Report on Alliance Security, presented by Mr. Michael Forrestal, M.P., Rapporteur, Document AB 194, MC(84)8 (International Secretariat, November 1984); and Sorrels, U.S. Cruise Missile Programs.

[48]Hibbs, "An Uncontrollable Tomahawk?," p. 69.

[49]Ibid.

[50]Brown and Davis, "Nuclear Arms Control," p. 152.

[51] Washington Post, 7 February 1985, p. 28.

[52] Hibbs, "An Uncontrollable Tomahawk?," p. 69.

[53] Laurence Martin, "The Role of Military Force in the Nuclear Age," in Strategic Thought in the Nuclear Age, ed. Laurence Martin (Baltimore: Johns Hopkins University Press, 1979), p. 6.

APPENDIX I

The tables in this Appendix cover the maritime nuclear weapons systems discussed above. The sources are as follows: Jane's Weapons Systems 1984-85, Jane's Fighting Ships, 1984-85 (London: Jane's Publications Co. Ltd., 1984); The Military Balance 1984-85 (London: International Institute for Strategic Studies, 1984); Thomas B. Cochran, et al., Nuclear Weapons Databook, Vol. I, U.S. Nuclear Forces and Capabilities (Cambridge, Mass.: Ballinger, 1984); Charles A. Sorrels, U.S. Cruise Programs: Development Deployment and Implications for Arms Control (New York: McGraw-Hill, 1983).

The following abbreviations and acronyms are used:

ALCM	Air Launched Cruise Missile
ASM	Air-to-Surface Missile
ASW	Anti-Submarine Warfare
CBA	Carrier-based Aircraft capable of land strikes
DC	Dual Capable, can carry either nuclear or conventional warhead
IOC	Initial Operational Capability
KT	Kilotonnage (of nuclear warhead)
MB	Medium Range Bomber
MIRV	Multiple Independently Targeted Re-entry Vehicles
MPA	Maritime Patrol Aircraft
MRV	Multiple Re-entry Vehicles
MT	Megatonnage
SAM	Surface-to-Air Missile
SLCM	Sea Launched Cruise Missile
SLBM	Sea Launched Ballistic Missile
SSB	Conventionally Powered Ballistic Missile Submarine
SSBN	Nuclear Powered Ballistic Missile Submarine
SS-N	Designation for Soviet Naval Missiles (NX for experimental)
VSTOL	Verticle Short Take-off and Landing Aircraft

TABLE 1

U.S. Surface and Submarine Theatre/Tactical Nuclear Weapons Systems

SYSTEM	IOC	NUMBER	TYPE/MISSION(s)	RANGE, km	PLATFORM(s)	WARHEAD, in KT, MT
TOMAHAWK	1983	48	SLCM/surface-to-surface; surface-to-land	2,500	cruisers, submarines, destroyer, frigates	1 x 200 - 250 KT, DC
SUBROC	1965	325	rocket assisted torpedo/ASW	50	submarines	1 x 1 - 5 KT
ASROC	1961	±800	rocket assisted torpedo/ASW	11	cruisers, destroyers frigates	1 x 1 KT, DC
TERRIER	1956	±300	SAM	40	aircraft carriers, cruisers, destroyers	1 - 1 KT, DC
HARPOON	1977	1,000+	ASM, SSM anti-ship	ship/sub, 50; air, 190	cruisers, destroyers, frigates, submarines bombers fighters, MPA	nuclear warhead under development, currently deployed in conventional mode
STANDARD-2 [in nuclear mode]	1982	900+	SAM/anti-aircraft, anti-missile	104	cruisers, destroyers	currently conventional only - planned nuclear warhead will be low KT
ASWSOW	forth-coming		ASW stand-off weapon to replace SUBROC		submarines	nuclear warhead under development

TABLE 2

U.S./NATO Nuclear Capable Maritime Aviation

AIRCRAFT (U.S.)	IOC	NUMBER	TYPE/MISSION	RANGE, km	NUCLEAR WEAPON
A-6E	1963	170	CBA	595-1810	3x B28/43/57/61 bombs, HARPOON
F-4	1961	144 (Navy)	sometimes used as CBA	1060-1610	3 x B43/57/61 bombs; air to air GENIE
A-7	1967	300	CBA	1000+	4 x B28/43/57/61
F/A-18	1985	1366 planned	CBA	1350	2 x B57/61
S-3A	1974	110	carrier MPA/ASW	3700	1 x B57 (in depth charge mode)
SH-3	1961	104	carrier and destroyer based Helicopter/ASW	1000	1 x B57
P-3C	1969	200	land-base MPA/ASW	2500	2 x B57; HARPOON
AV-8B	1985	65	land-ship based VSTOL ground attack	200-1000+	1 x B61

Table 2, cont'd

Table 2, cont'd

AIRCRAFT (NATO)	IOC	NUMBER	TYPE/MISSION	RANGE, km	NUCLEAR WEAPON
SUPER ETENDARD [France]	1980	36	CBA aircraft	1,500	2 x AN-52 1S KT bombs
P-3C Netherlands Norway	1969	18	land-based MPA/ ASW	2,500	ASW nuclear-capable i.e., U.S. B57 depth bomb
NIMROD U.K.	1969	28	land-based MPA/ASW	9,000	B-57 capable
ATLANTIC France W. Germany Italy	1965	55	land-based MPA/ASW	n.a.	B-57 capable

TABLE 3

Nuclear Capable USN Surface Ships and Attack Submarines

Type/Class	Number of Ships	Nuclear Weapons
Battleships	1	(HARPOON), (TOMAHAWK)*
Cruisers	(28)	
Ticonderoga	1	ASROC, (HARPOON), (TOMAHAWK), (STANDARD)
Virginia	4	ASROC
California	2	ASROC
Truxton	1	ASROC, TERRIER/(STANDARD)
Belknap	1	ASROC, (HARPOON) (TERRIER/(STANDARD)
Josephus Daniels	8	ASROC, TERRIER/(STANDARD-2ER), (HARPOON)
Bainbridge	1	ASROC, (HARPOON) TERRIER/(STANDARD)
Leahy	9	ASROC, TERRIER/(STANDARD)
Long Beach	1	ASROC, TERRIER/(STANDARD)
Destroyers	(71)	
Burke (DDG-51)	0	(VL-ASROC), (STANDARD-ER), (HARPOON), (TOMAHAWK)
Kidd	4	ASROC, (HARPOON)
Farragut	10	ASROC, TERRIER/(STANDARD)
Decatur	1	ASROC
Charles F. Adams	23	ASROC
Spruance	31	ASROC, SH-3 Helicopter (B57)
Forrest Sherman	2	ASROC
Frigates	(87)	
Oliver Hazzard Perry	26	(HARPOON)
Brooke	6	ASROC
Knox	42	ASROC, (HARPOON)
Garcia	10	ASROC
Glover	1	ASROC
Bronstein	2	ASROC
Patrol Combatants	(6)	
Pegasus	6	(HARPOON)
Submarines		
Los Angeles	21	SUBROC (HARPOON) (TOMAHAWK)
Liscomb	1	SUBROC (HARPOON)
Narwhal	1	SUBROC (HARPOON
Sturgeon	37	SUBROC (TOMAHAWK)
Permit	13	SUBROC (HARPOON)

* Forthcoming in nuclear mode

TABLE 4

NATO Strategic Systems Capable of Theatre/Tactical Tasks

SYSTEM	IOC	NUMBER	TYPE	RANGE, km	WARHEAD	THEATRE/TACTICAL USE
U.S. POSEIDON C-3	1971	40	SLBM from SSBN	46,000	10 x 40-50 KT	40 is number of C-3 assigned by U.S. to NATO. Said to be available for theatre use on SACEUR targets on patrol in Mediterranean and Atlantic
B-52G	1983	30-52	B-52 strategic bomber fitted with HARPOON missile for anti-ship role	12,000	will have nuclear armed HARPOON	USAF programme to provide USN with long-range anti-ship capability
Britain POLARIS A-3	1967	64	SLBM	4,600	3 x 200 KT MRV	British SLBMs said to be earmarked for SACEUR TARGETS
France MSB S M-20	1977	80	Medium range sea launched ballistic missile	3,000	1 x 1MT M-4 to be MIRVed in 1985	Part of independent French nuclear forces

TABLE 5

Soviet Surface/Submarine/Aircraft

Maritime Tactical/Theatre Nuclear Weapons Systems

SYSTEM	IOC	NUMBER	TYPE/MISSION(s)	RANGE, km	PLATFORM(s)	WARHEAD
SS-N-3 SHADDOCK	1962	296	SLCM anti-ship	450	cruisers, submarines	1 x 350 KT (800 KT and 1 megaton also reported, DC
SS-N-7 SIREN	1968	88	SLCM anti-ship	45	submarines	1 x 200 KT, DC
SS-N-9	1968	200	SLCM anti-ship	280	coastal patrol	1 x 200 KT, DC
SS-N-2 SANNDBOX	1973	96	SLCM Anti-ship	550	submarines, cruisers, carrier VSTOL aircraft	1 x 350 KT, DC
SS-N-14 SILEX	1974	216	ASW Rocket	55	cruisers	?
SS-N-15	1982	396	rocket torpedo/ASW	45		
SS-N-16	1962	306	rocket torpedo/ASW	n.a.	submarines	?

Table 5, cont'd

Table 5, cont'd

SYSTEM	IOC	NUMBER	TYPE/MISSION(s)	RANGE, km	PLATFORM(s)	WARHEAD
SS-N-19	1980	88	SLCM anti-ship	500	battle cruisers, submarines	1 warhead, DC
SS-NX-21	forth-coming		SLCM anti-ship anti-land	3,000	submarine, Sierra	
SS-NX-22	1984-1985	28	SLCM anti-ship	n.a.	cruisers, destroyers	1 warhead, maybe dual capable
SU W-N-1	1975	10	Rocket/ASW	30	aircraft carrier/ helicopter	5KT?
MINES	n.a.		ASW mine			5-20 KT
AS-2 KIPPER	1961	90	ALCM/anti-ship	200	MB	1 KT range
AS-3 KANGAROO	1961	100	ALCM/anti-ship	650	MB	1 x 800 KT

Table 5, cont'd

Table 5, cont'd

SYSTEM	IOC	NUMBER	TYPE/MISSION(s)	RANGE, km	PLATFORM(s)	WARHEAD
AS-4 KITCHEN	1962	up to 830	ALCM/anti-ship	300-800	MB	1 x 200 KT
AS-S KELT	1965		ALCM/anti-ship	160	MB	1 x 200 KT
A-6 KINGFISH	1977	up to 820	ALCM/anti-ship	250	MB	1 warhead 350 KT
DEPTH CHARGES	n.a.	n.a.		n.a.	surface ships	known to exist

TABLE 6

Soviet Nuclear Capable maritime aviation

AIRCRAFT	IOC	NUMBER	TYPE/MISSION	RANGE, km	NUCLEAR WEAPONS
TU-16 BADGER	1955	190	MB/ anti-ship	4,800	1-2, AS-2, AS-5 AS-3, AS-6
TU-22 BLINDER	1962	35	MB/ bomber; anti-ship	4,000	1 x AS-4
TU-22	1974	105	MB/anti-ship	8,000	1 or 2 AS-4
TU-142 BEAR F	1972	50	MPA/ASW	11,500	2 bombs
I1-38 MAY	1970	50	MPA/ASW	7,200	2? bombs
BE-12 MAIL	1965	90	MPA/ASW	4,000	2 bombs

TABLE 7

Nuclear Capable Soviet Attack/Cruise

Submarines and Surface Vessels

Type/Class	Number	Nuclear Weapons
Submarines		
Cruise Missile	50 & 18 (building)	
Oscar	3	SS-N-19
Papa	1	SS-N-15/16
Charlie II	6	SS-N-7, SS-N-15/16
Charles I	11	SS-N-7
Echo II	29	SS-N-3, SS-N-12
Juliet	16	SS-N-3
Whisky	2	SS-N-3
Attack		
Mike	1 & ?	(SS-NX-21)
Sierra	1 & ?	(SS-NX-21)
Alfa	6	SS-N-15/16
Victor III	18 & ?	(SS-N-21)
Victor II	7	SS-N-15/16
Victor I	16	SS-N-15/16
Tango	18 & ?	SS-N-15/16
Surface Vessels		
Aircraft Carriers		
Kiev	3 & 1	SS-N-12, SS-N-3
Battle Cruisers		
Kirov	2 & 2	SS-N-19, SS-N-14
Helicopter Cruisers		
Moskva	2	SUW-N-1
Cruisers		
Slava	2 & 1	SS-N-12

Table 7, cont'd

Table 7, cont'd

Type/Class	Number	Nuclear Weapons
Cruisers (cont'd)		
Kara	7	SS-N-14
Kresta II	10	SS-N-14
Kresta I	4	SS-N-3
Kynda	4	SS-N-3
Destroyers		
Sovremenny	7	SS-N-22
Udaloy	8	SS-N-14
Frigates		
Krivak I & II	33	SS-N-14
Patrol Boats		
Nanucka I & II	24	SS-N-19

TABLE 8

Soviet Strategic Systems Capable of Theatre/Tactical Tasks

SYSTEM	IOC	NUMBER	TYPE	RANGE, km	WARHEAD	THEATRE/TACTICAL USE
SS-N-5 SERB	1964	45	SLBM	1,400	1 x 1MT	Carried on Golf II SSB, 6 in Baltic for theatre use
SS-N-6 SAWFLY						Found on YANKEES SSBN not yet converted to SSN. Believed capable of theatre land attack and tactical attacks on surface forces.
Mode 1	1968	368	SLBM	2,400	1 x 1MT	
Mode 2	1973			3,000		
Mode 3	1974			3,000	2 warheads	