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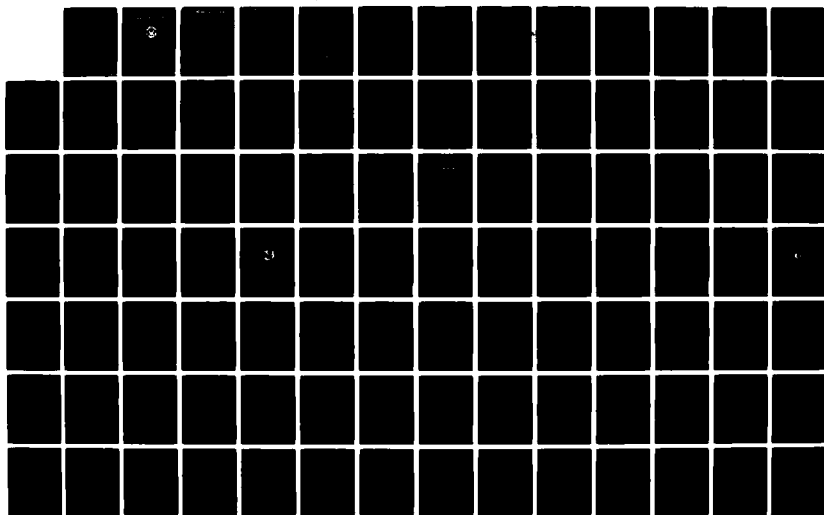
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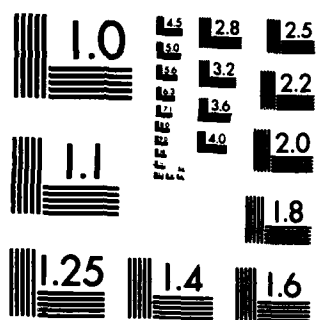
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SSBN SURVIVABILITY:
A TIME FOR CONFIDENCE-BUILDING MEASURES?

by

James A. Hayes

December 1982

Thesis Advisor:

Donald C. Daniel

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Historical and technological imperatives have led both the United States and the Soviet Union to array their strategic nuclear forces in triads of air, land, and sea launched ballistic missiles. This thesis will focus on the sea-based legs of the American and Soviet triads, examining a series of confidence-building measures (CBMs) that may be considered during the Strategic Arms Reduction Talks (START) that are underway in Geneva. Some proponents have argued that these CBMs, if implemented, would strengthen each side's belief in		

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the invulnerability of nuclear-powered, ballistic missile launching submarines (SSBNs), thereby increasing strategic stability. These proposals seek to increase confidence in SSBN survivability by managing both the employment of anti-submarine warfare (ASW) forces and the development of technology that could be specifically directed against SSBNs. This thesis will consider the possible effects that five different CBMs could have on U.S. perceptions of SSBN survivability. These changes in perception will be measured against the costs that might be exacted in other areas (e.g., tactical anti-submarine warfare) by agreeing to the CBMs.



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SSBN Survivability:
A Time for Confidence-Building Measures?

by

James A. Hayes
Lieutenant Commander, United States Navy
B.A., Northwestern University, 1971

Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

Historical and technological imperatives have led both the United States and the Soviet Union to array their strategic nuclear forces in triads of air, land, and sea launched ballistic missiles. This thesis will focus on the sea-based legs of the American and Soviet triads, examining a series of confidence-building measures (CBMs) that may be considered during the Strategic Arms Reduction Talks (START) that are underway in Geneva. Some proponents have argued that these CBMs, if implemented, would strengthen each side's belief in the invulnerability of nuclear-powered, ballistic missile launching submarines (SSBNs), thereby increasing strategic stability. These proposals seek to increase confidence in SSBN survivability by managing both the employment of anti-submarine warfare (ASW) forces and the development of technology that could be specifically directed against SSBNs. This thesis will consider the possible effects that five different CBMs could have on U.S. perceptions of SSBN survivability. These changes in perception will be measured against the costs that might be exacted in other areas (e.g., tactical anti-submarine warfare) by agreeing to the CBMs.

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I. INTRODUCTION

Historical and technological imperatives have led both the United States and the Soviet Union to array their strategic nuclear forces in triads of air, land, and sea launched ballistic missiles. Deterrence theory holds that neither side can rationally launch a first strike with these weapons if it must conclude that enough opposing forces would survive such a strike to launch a crippling retaliatory blow. Strategic stability is affected by the strength of this percept---a perception that can be weakened by the real or apparent vulnerability of any leg in either side's triad. The SALT process has attempted to provide a negotiated foundation for mutual confidence in weapons capabilities and, to a lesser degree, strategic intentions.

This thesis will focus on the sea-based legs of the American and Soviet triads, examining a series of confidence-building measures that may be considered during the Strategic Arms Reduction Talks (START) that are underway in Geneva. Some proponents have argued that these CRMs, if implemented, would strengthen each side's belief in the invulnerability of nuclear-powered, ballistic missile launching submarines (SSBNs), thereby increasing strategic stability. These proposals seek to increase confidence in SSBN survivability by managing both the employment of anti-submarine warfare (ASW) forces and the development of technology that could be specifically directed against SSBNs.

None of the proposals that will be examined is new, since they have all been discussed in the open literature since the early 1970s.

However, because they may well become part of the START agenda, they merit another look. The currency of these measures is demonstrated by a speech that Leonid Brezhnev made to the 17th Congress of Soviet Trade Unions on March 16, 1982, in which he said that the Soviet Union considered it "possible to agree that the missile submarines of the two sides should be removed from their present extensive combat patrol areas and that their cruises should be restricted by limits mutually agreed to." He went on to say that Moscow was willing to "discuss the matter of spreading confidence-building measures to the seas and oceans, . . ."¹

This thesis will consider the possible effects that five different CBMs could have on U.S. perceptions of SSBN survivability. These changes in perception will be measured against the costs that might be exacted in other areas (e.g., tactical anti-submarine warfare) by agreeing to the CBMs.

The thesis is divided into five chapters that rely exclusively on open, unclassified sources of information. After this brief introduction, the second chapter reviews American and Soviet strategic doctrine in the context of the SALT (Strategic Arms Limitation Talks) record. It will be argued that the U.S. doctrine that provided the underpinnings for Washington's approach to SALT has evolved since those talks were concluded. This change in doctrine will necessarily affect the approach that the U.S. takes during START. Despite this shift in doctrine, however, the SALT record is well worth examining because the agreements that those talks concluded, as well as those that were almost reached, will serve as a point of reference for START.

The third chapter will focus on current SSBN and ASW developments so that the implications of the CBMs discussed in the fourth chapter will be easier to understand. Both the hardware capabilities invested in the SSBNs of the American and Soviet navies and the roles and missions that are assigned to these forces will be outlined. Since confidence in SSBN survivability is directly related to the effectiveness of the ASW forces that can threaten those submarines, this chapter will also look at the nature of the ASW threat that confronts each side's SSBNs.

Chapter IV looks at the five ASW-related, SSBN CBMs that are the subject of this thesis. The specific threat to SSBN survivability that each CBM aims to ameliorate is described, and the details of the proposal itself are examined. Following that, the negotiability and desirability of each CBM is considered from the American perspective, using the background provided in the previous two chapters as a starting point. The fifth, and final, chapter provides a quick summary of the negotiating position that the U.S. will probably take on each of the five CBMs should they be brought up at START.

FOOTNOTES FOR CHAPTER I

- ¹"Documentation," Survival, July/August 1982, p. 185, provides excerpts of Brezhnev's speech.

II. THE STRATEGIC AND NEGOTIATING CONTEXTS

A. INTRODUCTION

In 1947 George Kennan's Mr. 'X' article characterized the U.S. and USSR as being adversaries in a long-term struggle. Although there has been considerable debate since Kennan's initial thesis concerning both the nature of the Soviet challenge and what the U.S. response should be, that the Soviet Union is an enduring threat to U.S. interests has not been seriously doubted. Successive strategic doctrines adopted by the U.S. since the end of World War II have been built around nuclear weapons. As a consequence, U.S. strategic doctrine and weaponry have necessarily changed in response to an evolving Soviet threat. This process of adjustment and accommodation has been shaped by an assessment of Soviet capabilities and intentions, and it has been constrained by a variety of domestic budgetary and political concerns. The inexorable press of technology has also played a significant role in animating the strategic competition between the superpowers. Although a given combination of weapons can support a variety of strategic doctrines, the technical characteristics of nuclear weapons necessarily limit the range of strategies that are practicable.

This chapter will provide the strategic and negotiating contexts for subsequent chapters by contrasting U.S. and Soviet perspectives on a variety of issues in the debate that has surrounded the Strategic Arms Limitation Talks (SALT). This brief, chronological review will serve two ends. First, it will highlight some fundamental differences between the

U.S. and Soviet approach toward solving the most basic questions of national survival. Second, on a more specific level, it will point out how these talks have affected U.S. and Soviet strategic force levels. The SALT record is important because it will be taken as a precedent in evaluating any bilateral SSBN confidence-building measures (CBMs) that may be proposed during the current round of strategic arms negotiations. Before beginning the review of the SALT record, the concepts of deterrence and stability will be examined, since the meanings attributed to these terms necessarily shape the assumptions that are made in arms control negotiations.

B. DETERRENCE AND STABILITY

Jordan and Taylor have described two general categories of nuclear deterrence: prewar and war-fighting. They note that the prewar deterrence school has predominated in the U.S. since the mid-60s, observing that "by 1969 U.S. policy-makers had reached the conclusion that neither side could 'win' by striking first. . . . MAD seemed to be an acceptable nuclear policy to both. It was assumed by Americans that, with no possibility of 'winning' in any meaningful sense, stability would prevail at the nuclear strategic level even during crises involving the superpowers."¹

The second school, war-fighting deterrence, says that the Soviet Union can be best deterred by a U.S. posture that demonstrates the capability to fight and win. Jordan and Taylor outline the argument offered by advocates of a war-fighting doctrine:

- (1) it is uncertain that Soviet leaders would be deterred from striking first by the threat of a second strike against their population and industrial centers, especially if they thought they had acquired the capability of destroying in a first strike a large

part of the U.S. nuclear retaliatory force; (2) the choice of responding to any kind of Soviet first strike by annihilating Soviet cities presents an American president with an option he might fear to take in view of the consequent destruction of U.S. cities; (3) should the Soviets hold or develop a theory of victory in nuclear war, the United States would be unprepared to conduct such a war; and (4) U.S. programs designed to deter against Soviet attack through MAD would not permit America to fight a nuclear war and survive.⁴

So, although the aim of both of these strategies is deterrence of nuclear war, they go about it in very different ways. When the SALT record is considered below, it will be argued that the U.S. held to the assumptions of the first school throughout the negotiations, while the Soviets probably followed the second. However, it will also be suggested that U.S. strategic doctrine has evolved to something that looks more like the war-fighting school since the SALT II negotiations.

The concept of strategic stability is often used to describe the relative strength of deterrence and also to predict the effect that various policies might have on deterrence (i.e., stabilizing or destabilizing). Fritz Ermath has outlined the U.S. understanding of strategic stability at the time of SALT I, describing it as a condition in which:

. . . incentives inherent in the arms balance to initiate the use of strategic nuclear forces and, closely related, to acquire new or additional forces are weak or absent. In an environment dominated by powerful offensive capabilities and comparatively ultimate values, i.e., societies, stability was thought to be achievable on the basis of a contract of mutually vulnerable societies and survivable offensive forces. Emphasis on force survivability followed, as did relative uninterest in counter-force, active, and passive defenses.⁵

Ermath speaks of stability as it applies to the use and the acquisition of nuclear weapons. The latter is also referred to as "arms race stability." John Coyle has described arms race stability more extensively as existing when "The situation as perceived does not

encourage increased nuclear force buildup to take advantage of a weakness or rectify one."⁴ In other words, there are no "windows of vulnerability" on either side.

Gay Hammerman reviewed the mass of literature relating to stability, and noted a distinction between "ordinary" strategic nuclear stability and stability relating to the use of nuclear weapons in a period of crisis:

If strategic nuclear stability may be defined as a low probability of strategic nuclear war, crisis stability may be defined as a high probability of avoiding a nuclear strategic war that appears in danger of breaking out despite the fact that neither side actively wishes it. To put it another way, crisis stability is the low probability that one side will launch a first-strike attack under the special circumstances of heightened tension and hostility between the two sides. Among analysts and officials who write about crisis stability, it seems generally agreed that more is required to achieve it than to achieve ordinary strategic nuclear stability (or deterrence stability)--more invulnerability, more management skill, more effective intelligence and C3, and perhaps additional missiles for a side inferior in numbers.⁵

Weapons that are vulnerable to a pre-emptive strike are not crisis stable, since they put their owner in the position of "using or losing" them. Such weapons increase the incentives for both launch-on-warning and first strike doctrines. Hammerman notes that crisis and arms race stability do not necessarily coincide, as is the case where the "land-mobile MX missile may be bad for arms race stability because of its verification problems, but as a weapon with high survivability and relatively low provocativeness, it is very good for crisis stability."⁶

Hammerman has nicely summarized the tenets of the "orthodox stability doctrine" of the 70s in a vulnerability/invulnerability matrix reproduced here as Figure 1.

**US-Soviet Nuclear Strategic Stability as Expressed
in a Vulnerability/Invulnerability Matrix**

United States Soviet Union	Society vulnerable Retaliatory force invulnerable	Society vulnerable Retaliatory force vulnerable
Society vulnerable Retaliatory force invulnerable	No advantage to either side Stable	Political and military advantage to Soviet Union; Soviet first-strike counterforce attack possible
Society vulnerable Retaliatory force vulnerable	Political and military advantage to US; US first- strike counterforce attack possible	Strong temptation for surprise counterforce attack by both sides <u>Highly Unstable</u>



= most desirable condition for both sides

Source: Gay Hammerman, Analytic Research on Strategic, Tactical
and Doctrinal Military Concepts, p. 69.

Figure 1

This concept of stability was a part of the foundation upon which the U.S. approach to SALT rested.

C. SALT I

1. Background

U.S. recognition in the late 60s of the existence of a growing Soviet second strike capability necessitated a change in the rationale

for, and targeting priorities of, U.S. strategic nuclear forces. By that time Secretary of Defense McNamara had come to articulate a strategic doctrine that acknowledged this shifting balance. He argued that for nuclear war to be deterred, Moscow would have to be convinced that enough U.S. weaponry would survive a Soviet first strike to inflict unacceptable damage on the Soviet society in a retaliatory blow.⁷ Since unacceptable damage was defined as destroying one fifth to one quarter of the Soviet population, and one half of its industrial and economic base,⁸ emphasis shifted from counterforce to countervalue targeting. However, McNamara's assured destruction went one step further by suggesting that deterrence would be strengthened if both sides were secure in the knowledge that each had a survivable second strike capability--the mutual element of MAD.

Although the Johnson Administration's attempt to begin strategic arms negotiations with the Soviet leadership was set aside because of the Soviet invasion of Czechoslovakia, Thomas Wolfe, among others, has noted that the MAD formulation was to become the organizing principle of the U.S. approach to SALT.⁹

2. SALT I Limits

SALT I included two separate agreements. The first of these, the ABM Treaty (anti-ballistic missile), although subject to periodic review, has no expiration date. In it, the U.S. and Soviet Union agreed to limit the maximum number of ABM batteries that they would deploy to two. One battery could protect the national capital, the other an ICBM launching complex. A 1974 amendment to the treaty reduced the number of permissible ABM batteries to a single battery sited at one of the earlier locations.¹⁰

Unlike the ABM Treaty, the Interim Agreement on Strategic Offensive Arms had a five-year span. Its scope was limited to ICBM and SLBM launchers in operation or being constructed in 1972. As the U.S. Arms Control and Disarmament Agency (ACDA) has summarized:

. . . In 1972, the United States had 1,054 ICBMs and 656 SLBMs; The Soviet Union, 1607 ICBMs and 740 SLBMs. Both sides were permitted to expand their SLBM forces up to 710 and 959, respectively, but only by dismantling an equal number of older ICBM launchers or launchers of SLBMs on older submarines.¹¹

Although U.S. superiority in MIRV technology, warhead accuracy, and heavy bombers was supposed to offset the numerical advantages given to the Soviets,¹² Henry Jackson realized that these unequal ceilings could lead to actual or perceived Soviet strategic superiority. Jackson introduced an amendment to the effect that future iterations of SALT should not codify Soviet numerical advantages.

3. U.S. Assumptions and SALT I

Strobe Talbott has compared SALT to a chess game where both players attempt to play to a draw, since playing to win would be an attempt to seek "'unilateral advantage' or 'strategic superiority'," which would "violate the rules of parity and stability."¹³ Thomas W. Wolfe has observed that many Americans assumed that Soviet attitudes toward SALT were essentially the same as those of the U.S. He lists what these shared goals were thought to be:

. . . (1) to freeze the strategic balance at the level of parity; (2) to stabilize mutual deterrence; (3) to regulate the strategic competition so as to reduce its resource costs, lower the risks of accidental nuclear war outbreak, and discourage the need for new cycles of improved strategic weapons systems.¹⁴

Wolfe notes that these goals never enjoyed unanimous support on either side; however, they are a good reference point in examining Soviet

attitudes, which were seen to differ from those of the U.S. as time went on. Soviet goals in SALT were linked to the "detente diplomacy" that sought to consolidate Soviet strategic gains by slowing down a possible U.S. response to the Soviet buildup of the 60s.¹⁵ The extent to which Soviet strategic doctrine and goals converged with those of the U.S. is a matter of some debate in the literature interpreting SALT. This debate is highlighted below.

4. SALT I and Soviet Acceptance of MAD

Raymond L. Garthoff has argued that by the time SALT was being considered, the Soviet political and military leadership had come to accept the principle of mutual deterrence.¹⁶ As typical of this appreciation, he points to the opening statement by the Soviet delegation to SALT:

. . . evidently, we all agree that war between our two countries would be disastrous for both sides. And it would be tantamount to suicide for the ones who decided to start such a war.¹⁷

Garthoff documents his contention with Soviet military and political writings that either reflect concern over the devastating consequences of nuclear war or suggest that the Soviet leadership is well aware of the state of mutual deterrence that exists between the U.S. and USSR. As he explains:

Mutual deterrence in Soviet writing is usually expressed in terms of assured retaliatory capability which would devastate the aggressor, because this foundation (rather than 'mutual assured destruction' capability) is more responsive to ideological sensitivity over the idea that the Soviet Union could be considered a potential aggressor and thus needs to be deterred--only adversaries . . . are described as potential aggressors. . . . In addition, this formulation avoids identification with the specific content of the American concept of 'mutual assured destruction,' . . .¹⁸

Although Garthoff concedes that Soviet political leaders support the idea that deterrence requires a strong combat capability in their programmatic statements, he notes that they do not go on to discuss "meeting requirements for waging and winning a war."¹⁹ Garthoff implies that a significant divergence may exist between Soviet military and political decision-makers on matters of strategic doctrine.

In contrast, Fritz Ermath argues that the Soviets did not subscribe to a strategic concept based on mutual deterrence in SALT. In explaining the rationale behind Soviet acceptance of the ABM Treaty, a treaty that is frequently cited as prima facie evidence of Soviet acceptance of mutual deterrence, Ermath points out that other motives were probably at work:

. . . It is much more probable, however, that the agreement was attractive to Moscow because superior U.S. ABM technology plus superior U.S. ABM penetrating technology would have given the United States a major advantage during the mid-to-late 1970s. In a unilateral sense, the Soviets saw the ABM agreement as stabilizing a process of strategic catch-up against a serious risk of reversal. But it did not mean acceptance of the U.S. stability principle.²⁰

Stanley Sienkiewicz stresses that although the Soviet military does not enjoy unilateral decision-making power in the area of national security affairs, the Soviet military does dominate virtually all aspects of the national security process. This means that the range of acceptable decisions to Soviet security problems is determined by the professional military.²¹ Sienkiewicz contrasts the Soviet approach to national security problems, which emphasizes solutions devised by the military, to that taken by the United States, where civilian strategists predominate. As he remarks, "The notion of sufficiency or parity, on the other hand, is not merely an American invention. It is more importantly

a civilian invention."²² At the negotiating level, Sienkiewicz points out that Soviet acceptance of the U.S. formulation of deterrence would require them to admit that Soviet ICBMs had violated the principles of deterrence by threatening America's Minuteman force. As he concludes, for the Soviets to accept the notion that neither side should threaten the other's retaliatory forces "would have a major impact upon the most important Soviet strategic modernization programs, and none of consequence upon U.S. programs."²³ Sienkiewicz is talking about the Soviet ICBM force. Since Soviet ICBMs were attaining a counterforce capability versus U.S. ICBMs, official acceptance of MAD would have put the Soviets in the position of admitting that their ICBM program was inconsistent with this commonly accepted strategic doctrine.

Benjamin Lambeth has made a similar observation by noting that:

. . . For Soviet planners, the very idea of 'control' is anathema because of its implied relegation of Soviet security to imposed arrangements requiring conscious Soviet self-denial and reliance on the uncertain prospect of reciprocal enemy 'good behavior.' This reluctance to countenance such restraints is a natural outgrowth of the Soviet Union's rejection of such Western concepts as 'stability,' 'mutual deterrence,' and 'essential equivalence,' . . . This intellectual outlook largely accounts for the emphasis placed by Soviet military doctrine on the importance of maintaining a capability for fighting a nuclear war in the event deterrence fails and substantially explains the massive efforts the Soviets have undertaken over the past decade to expand and modernize their strategic and general-purpose forces.²⁴

If U.S. and Soviet strategic doctrines are fundamentally different, as indeed they appear to be, what implication does this have for the success of arms control agreements between the superpowers?

Sienkiewicz concludes that failure to reach a common understanding between the U.S. and USSR on strategic doctrines does not necessarily preclude meaningful arms negotiations, since the Soviets have proven

capable of reaching agreements that may vary from their military doctrine (he cites the ABM Treaty). He also recognizes the possibility that some agreements might be desirable from the U.S. perspective that would not conflict with Soviet doctrine.²⁵ Richard Burt puts it simply by commenting that the ABM Treaty demonstrated "that nations can sometimes reach agreement for very different reasons." He goes on to warn that since arms control "is not a substitute for unilateral defense initiatives, then the political price of negotiating the fielding of new systems must be measured against the security that will be gained from their deployment."²⁶ A few general impressions concerning SALT I's political price are worth considering before moving on to SALT II.

5. Political Costs of SALT

Vernon Aspaturian's analysis of SALT I's parity formulation points to the strategic and political import of these negotiations:

. . . The parity of SALT I was thus ascriptive and also normative in the sense that the United States indicated that its policies and behavior would correspond to a condition of parity rather than superiority and that furthermore the United States was willing to allow an ascriptive parity to be transformed into actual equality. The superior qualitative [sic] ceilings permitted Moscow in SALT I with respect to size and number of ICBMs and number of SLEMs, without demanding a freeze on qualitative improvements were the bona fides that the United States extended to Moscow to demonstrate its sincerity.²⁷

Aspaturian notes that the ceilings in SALT I were high enough to allow the Soviets to make considerable strides within the limits of the treaty, especially since it was "politically unlikely that the United States could achieve and sustain the allowable ceilings," and there were "no corresponding domestic restraints upon the Soviet side."²⁸ Aspaturian comments that criticisms of the ceilings in SALT I are really criticisms

of Kissinger's "diplomatic ineptness." Expecting the Soviets to seek parity as an end in itself, which would have required them to limit their efforts to the level that domestic U.S. political constraints allowed for American forces, was unrealistic. Aspaturian faults the U.S. for not holding up its end of the parity formulation (failing to build to the allowed limits).

While a case could be made in the arcane language of megatons and kill probabilities that U.S. forces remained more than sufficient for deterrence, there were other, important, ramifications of agreeing to Soviet strategic parity. As Wolfe stresses in discussing the political importance of the whole SALT process:

. . . What a gradual accession of strategic advantage to the Soviet Union could mean thus needs to be measured more in political than in narrowly military terms. Although not quantifiable, the political effect of SALT outcome suggesting to other countries that U.S. strategic power could be expected to decline relative to that of the Soviet Union in the years ahead would certainly not be to inspire confidence in America's standing in the world, but might well be to damage it badly. In some sense, a phenomenon akin to the 1978 decline of the dollar abroad could set in--an inexplicable flight of confidence despite a basically strong U.S. economy.²⁹

The unintended effects that arms control agreements can have on allies must be one of the criteria that is used in evaluating such agreements. The SSBN survivability CBMs that will be examined in Chapter IV will touch on the possible effects that some of those measures could have on U.S. allies. Nonetheless, SALT I was an interim agreement that recognized the need for future negotiations.

D. SALT II

1. Background

Although discussion on SALT II began in November of 1972, the Vladivostok Accord, signed by Ford and Brezhnev in November of 1974, was the first concrete step made in negotiating SALT II. The accord answered Jackson's earlier concerns about numerical equality by providing for equal aggregate limits of 2,400 strategic nuclear delivery vehicles and a 1,320 limit on MIRVed launchers, along with other negotiating principles.³⁰ This early progress evolved into the long record of negotiations that became the SALT II legacy. President Carter's 1977 attempt to vary from the Vladivostok formulation with his proposal for deep cuts was unacceptable, and probably confusing, to the Soviets. Among other things, Carter's proposal called for: a reduction of the Vladivostok aggregate of 2400 delivery vehicles to 2000 or 1800; a reduction in the MIRV limit of 1320 agreed to at Vladivostok to 1200 to 1100; a limit of 550 MIRVed ICBM launchers; and, a freeze on new or modernized ICBMs, as well as a prohibition on testing new ICBMs.³¹ By the time Carter signed SALT II with Brezhnev in June of 1979, the provisions of the 1974 accord were very much in evidence, along with a host of sub-ceilings on various systems. With the Soviet invasion of Afghanistan casting doubt on Moscow's good intentions, and considering the uphill pull that would be required to get a two-thirds vote favoring SALT II in the Senate, Carter asked the Senate to defer further consideration of SALT II.

2. What SALT II Would Have Required

Although SALT II was never ratified, both the U.S. and USSR have substantially abided by its terms, and they will likely continue to

follow it while the current (START/INF) negotiations are underway.³² Since the Soviet Union's leadership is not subject to change every four years, Moscow's approach to SALT can be more deliberate and consistent over time than Washington's. The Soviet Union may not be very flexible, at least initially, in varying from the understandings on strategic arms that they thought they had reached with Washington in the arduous SALT II negotiations. For these reasons, a short discussion of SALT II's major provisions is important.

SALT II was to have three parts: 1) a treaty based upon the guidelines of the Vladivostok Accord; 2) a three-year protocol, expiring on 31 December 1981, which stated that mobile ICBM launchers would not be deployed, that long-range (greater than 600 kilometers) sea and ground launched cruise missiles (SLCMs/GLOMs) would not be deployed, and that air-to-surface ballistic missiles (ASBMs) would not be flight tested; and 3) a joint statement of principles and basic guidelines for subsequent negotiations.³³ Other specific provisions of SALT II need not be rehearsed here.³⁴ However, it is important to note that SALT II was far more ambitious and complex than SALT I had been, and its statement of principles for future negotiations, which speaks to strategic arms reductions and resolution of the protocol issues (i.e., gray area weapons), suggests that the ongoing negotiations will be even more difficult.

3. Driving the Soviets to Sea

Thomas Wolfe has argued that in SALT I the U.S. "cashed in its Safeguard [ABM] chip, not only assuring the Soviets that the prospect of area defense was largely foreclosed, but also ruling out the possibility of a viable site defense of the U.S. Minuteman force." He suggests that

the U.S. got little in return in SALT I to allay its major concern over U.S. ICBM vulnerability.³⁵ Nonetheless, SALT, since the 1974 Vladivostok Accord, has been seen as offering the potential to ameliorate the Soviet threat to the ICBM leg of the U.S. strategic triad. Aside from the possibility that the Soviets might agree to either numerical or throwweight limits on their ICBMs, this potential rests on the possibility that the negotiating process can encourage the Soviets to move more of their strategic forces to sea. Presumably, the reduced payload and accuracy of sea-based systems would limit them to a second strike, countervalue role, thereby leaving U.S. ICBMs relatively more survivable. Wolfe notes that the Vladivostok Accord's freedom-to-mix provision allows any combination of systems under the 2400 aggregate ceiling. This would permit the Soviets to move strategic forces out to sea if survivability became a real concern.³⁶ Of course, until the Soviets perceive their land-based forces as being vulnerable, little incentive exists for them to move in that direction.³⁷ And, even if they do come to perceive such a vulnerability, there are other solutions to the problem (e.g., land-mobile ICBMs).

Strobe Talbott explains that the U.S. pursued a new-types ban on ICBMs more actively than such a ban on SLEMs during the SALT II negotiations because of this desire to lure the Soviets out to sea. Several factors seem to militate against the realization of this goal of moving more of the Soviet triad out to sea at the expense of their land-based systems.

In considering the possibility of dismantling vulnerable weapons systems as a way to achieve strategic equivalence, Richard K. Betts notes that from the Soviet perspective, such proposals for ICBMs are:

. . . politically fanciful, at least for the 1980s. Massive investment in ICBMs makes it hard for the Soviets to divest,

especially when the disparity in antisubmarine warfare (ASW) capabilities favoring the United States makes the sea-based elements seem less inherently secure to them than to us.³⁸

Another factor, beyond the U.S. ASW threat and Soviet sunk costs in ICBMs, could make increased reliance on a sea-based deterrent unattractive to the Soviets. Seen in the context of bureaucratic politics, Soviet Navy gains in SSBNs/SLEMs could well be constrained by the budgetary effects that such gains would have on the other branches of the Soviet military, particularly upon the Strategic Rocket Forces (SRF). Although Admiral Gorshkov has been successful in increasing the size of the Soviet Navy's SSBN force, this does not appear to have been at the expense of the SRF, which has also been modernized.

Finally, improved technology may invalidate the underlying supposition that moving the Soviet deterrent to sea will translate into a more secure ICBM force for the U.S. With U.S. development continuing on the counterforce capable Trident II SLEM, it is reasonable to conclude that the Soviets will also be capable of achieving improvements in SLEM accuracy and yield, which may eventuate in another threat to fixed, land-based U.S. ICBMs.³⁹

4. PD-59 and Arms Control

PD-59, the countervailing strategy, was signed by President Carter on July 25, 1980. Although this targeting doctrine, which includes up to 40,000 Soviet targets, can be seen as the natural follow-on to the Schlesinger Doctrine of flexible nuclear options that was embodied in NSDM 242 (1974), PD-59's emphasis on Soviet military targets, as opposed to economic and industrial targets, caused it to be seen as a war-fighting strategy.⁴⁰

Desmond Ball has pointed out the effect that PD-59 had upon the U.S.'s approach to arms control:

Much of the opposition to the original draft of PD-59 that was prepared in early 1979 was based on arms control arguments. In particular, Secretary of State Vance believed that formal approval of the 'new' doctrine would endanger the prospects for SALT II. President Carter's endorsement of PD-50 on August 14, however, signalled the death knell of the arms control stance of his administration; according to that directive, arms control was to be pursued only insofar as it served broader U.S. national security interests. In an environment of increasing Soviet military capabilities, the technological momentum which produced greater counterforce potential and more sophisticated C3 systems proved irresistible. Under the Reagan administration there will be no attempt at resistance; instead, the concepts that are embodied in NSDM-242, the NUWEP and PD-59 will be pursued to even further extremes.⁴¹

By the time the Reagan administration took office, the orthodox stability doctrine, which had been the underpinning for U.S. arms control, was in a state of transition. Hammerman notes that "orthodox stability depends upon cooperation by the Soviet Union in creating vulnerable populations for both sides."⁴² In light of the Soviet strategic buildup of the 1970s, the U.S. had apparently concluded that such cooperation was not forthcoming.

E. START

1. Lowered Expectations in SALT/START

Christoph Bertram sees arms control as a means to "control military competition"--a framework of management in the context of strategic nervousness.⁴³ This attitude toward the possible usefulness of SALT is similar to one that Thomas Wolfe has described as being the middle ground between those who view SALT as the way to end the arms race and those who see it as a dangerous waste of time. He says that this school:

. . . gives SALT good marks as a kind of continuous diplomatic institution useful for 'registering' changes in the strategic

balance . . . and for trying to establish broad parameters within which future U.S.-Soviet strategic competition may operate.⁴⁴

However, Bertram is a little more ambitious. He goes on to recommend an alternative approach to arms control that would limit missions (e.g., agreeing not to develop a first strike capability or an effective strategic ASW capability against SSBNs), rather than concentrating on quantitative limits that seek to reconcile fundamental asymmetries as the SALT negotiations have.⁴⁵

Although arms control may still be important as a framework for managing strategic competition, many commentators have noted that the experience of SALT II has lowered the expectations for future talks. Wolfe sounds a weakly optimistic note:

But, if SALT cannot be expected to usher in the millenium, neither can it be considered a fruitless endeavor. Politically, so long as a kind of imperative exists to keep SALT alive, the spillover effect will also help to keep Soviet-American relations from breaking down, which could--in turbulent times--prove to be one of SALT's more important contributions.⁴⁶

The political imperative for such talks waned in the face of Soviet activity in Afghanistan and Poland; however, domestic support in the U.S. for arms control negotiations has been waxing over the past year.

2. The Current Administration

If SALT I and II have been less than favorable to U.S. security interests, as President Reagan certainly believes, how might the U.S. approach future negotiations? Wolfe describes two schools of thought on how to go about influencing the Soviets in arms negotiations:

. . . The first holds that the United States can best persuade the Soviet Union to move in the right direction by the setting of a good example, by the practice of 'restraint' in its own strategic programs and by advancing serious SALT proposals that do not 'threaten' legitimate Soviet strategic interests. The

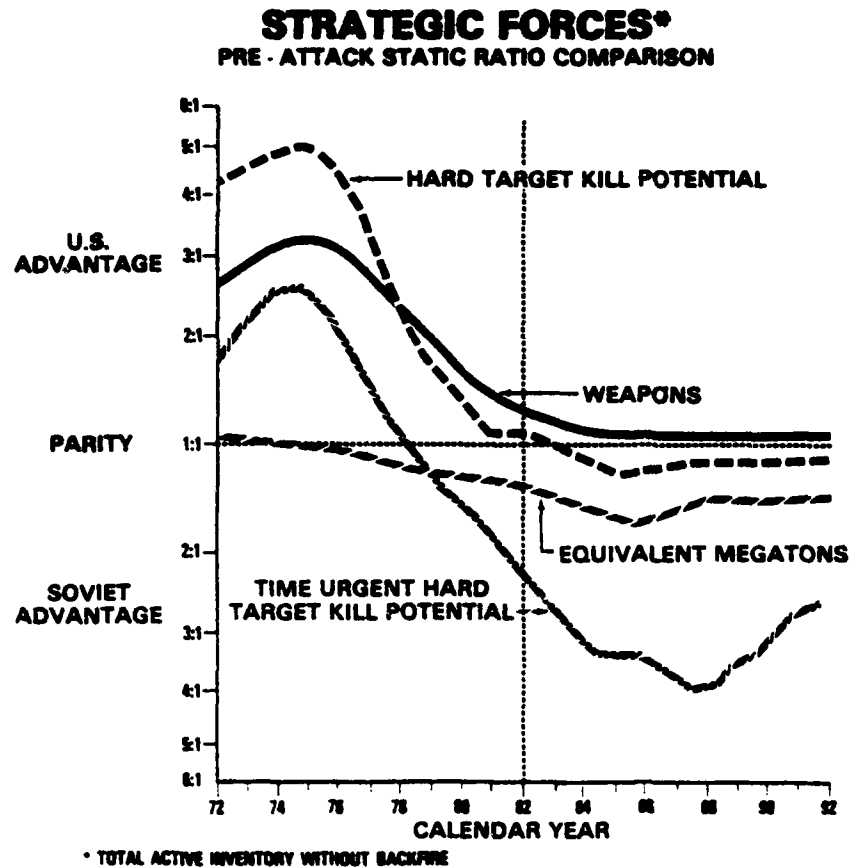
second view holds that real incentives to bring the Soviets to enter meaningful SALT agreements must pose unpalatable consequences for failure to do so. These would include giving unequivocal evidence of U.S. resolve to carry out whatever unilateral measures might be needed to ensure its security and that of its allies, including programs that could threaten Soviet strategic assets.⁴⁷

Reagan belongs to the second school.

President Reagan outlined his zero option for European nuclear weapons and his concept for strategic cuts under the START rubric in a speech before the National Press Club on November 18, 1981. His START proposal calls for significant reductions. If accepted, it would limit both the U.S. and USSR to a total of 850 ICBM/SLEM launchers, deploying a total number of warheads not to exceed 5000.⁴⁸ While these proposals may have been viewed, at least initially, by the Soviet Union as being impractical in the same way Carter's deep cuts of 1977 were, Reagan has backed them by a series of actions calculated to demonstrate U.S. resolve.

Figure 2⁴⁹ demonstrates unfavorable trends for the United States in four measures of strategic weaponry. President Reagan's response to these trends has been to increase U.S. efforts in strategic weapons--to strengthen each leg of the triad. His decision to go ahead with 100 MX missiles, the Trident II (D-5) missile, 100 B-1 bombers while continuing R&D on a "stealth" bomber, as well as a program of ballistic missile defense R&D,⁵⁰ place him squarely in the second of Wolfe's two schools. His related decision to continue with U.S. production of the neutron bomb is consistent with this overall approach.

Strategic Forces Comparison



Source: JCS Military Posture Statement for FY83
(Washington, D.C.: GPO, 1982, p. 23)

Figure 2

Procurement of these weapons systems would be consistent with PD-59's emphasis on flexibility. These new systems can also serve as potential "bargaining chips" (incentives) that may persuade the Soviet Union that the U.S. intends to redress the strategic balance. This can come about as the result of a negotiated settlement at START that could reduce Soviet weaponry to such an extent that the need for new U.S. weapons would be obviated. Failing a negotiated settlement, the U.S. could proceed with procurement of a sufficient quantity of new weapons to unilaterally redress the balance. In any event, the new weapons are a key element in the current U.S. administration's approach to arms control negotiations. For instance, in the wake of the House disapproval of the MX request, Rowny (head U.S. negotiator at START) explained "We're building a new missile so that when we come down to these lower levels they [USSR] are not left with powerful weapons and we're left with puny ones."⁵¹

As to the arms control effort itself, Reagan has symbolized his dissatisfaction with SALT II by appointing two of its most vocal critics to head up the START and INF delegations in Geneva. Edward Rowny, who is in charge of the START delegation, was the JCS representative to SALT II. He resigned just before the signing ceremonies to show his concern over the agreement.⁵² Paul Nitze, leader of the INF talks, has long been an advocate of a hard-nosed approach to negotiating with the Soviets. As further evidence of his unwillingness to foreclose any U.S. options, Reagan decided not to resume talks with Britain and the Soviet Union on the Comprehensive Test Ban Treaty. Such a treaty could possibly interfere with U.S. testing of new weapons.⁵³

3. Arms Control and U.S. Security

The length of time that was required to negotiate SALT II far exceeded what had been required to reach the Interim Agreement of 1972. The transition to the Carter Administration may explain part of this delay, but in large measure it can be attributed to the fact that SALT II had to deal with more substantive issues than SALT I did. With this experience as prologue, it seems reasonable to anticipate that START negotiations may extend to the end of the decade, unless they break off in frustration or a change in U.S. or Soviet leadership brings about new imperatives. Further, the progress of START is implicitly linked to the INF talks--talks that are attempting to handle some difficult problems that were set aside in SALT II in order to bring those earlier negotiations to a close. Statements made by Eugene V. Rostow, ACDA's Director, to the effect that the U.S. is looking for new ways to count strategic weapons, and hints that National Technical Means may have to be supplemented by some form of on-site inspection to verify future agreements, adumbrate a long period of negotiations.⁵⁴ Rostow's answer to a rhetorical question points out that the current administration does not intend to raise any false expectations:

Are we going to reach an agreement with the Russians? I do not know and I will not promise.⁵⁵

Whether Reagan will feel pressured to demonstrate progress in arms control before the 1984 election remains to be seen. However, as Joel S. Wit notes, "future arms limitation efforts should seek, among other objectives, to manage the transition into a strategic environment dominated by counterforce weapons."⁵⁶

FOOTNOTES FOR CHAPTER II

- ¹Amos A. Jordan and William J. Taylor, Jr., American National Security (Baltimore: The Johns Hopkins University Press, 1981), pp. 225-225.
- ²Ibid. Jordan and Taylor's discussions of deterrence concepts cites Colin S. Gray, "Nuclear Strategy: The Case for A Theory of Victory," International Security, Summer 1979.
- ³Fritz Ermath, "Contrasts in Soviet and American Strategic Thought," International Security, Fall 1978, p. 145.
- ⁴John P. Coyle, "SSBNs and the Strategic Balance," in Measuring the Strategic Balance, Anthony H. Cordesman, ed., prepared by the Office of Civilian Assistant to the Deputy Ass't to Deputy Sec'y of Defense, prepared for IISS, June 24, 1976, p. 15, cited by Gay Hammerman in ANALYTIC RESEARCH ON STRATEGIC, TACTICAL AND DOCTRINAL MILITARY CONCEPTS The Concept of Stability, T. N. Dupuy Assoc., 3 Oct. 1980, prepared for Defense Nuclear Agency, DNA 5472F, p. 69.
- ⁵Hammerman, p. 69.
- ⁶Ibid., p. 65.
- ⁷Thomas W. Wolfe, The Salt Experience (Cambridge, Mass.: Ballinger Publishing Co., 1979), p. 7.
- ⁸U.S. Department of Defense, Annual Report to Congress FY 1969, p. 50.
- ⁹Wolfe, p. 7.
- ¹⁰Donald G. Brennan, "Arms Treaties with Moscow: Unequal Terms Unevenly Applied?," Agenda Paper No. 3 (New York: National Strategy Information Center, Inc., 1975), p. 8.
- ¹¹U.S. Arms Control and Disarmament Agency (ACDA), Arms Control 1979 Publication 104 (Washington: Government Printing Office, 1980), p. 11. This translated to 62 modern SSBNs for the Soviets and 44 for the United States.
- ¹²Ibid.
- ¹³Strobe Talbott, Endgame (New York: Harper & Row, Publishers, 1979), p. 18.
- ¹⁴Wolfe, pp. 247-248.

- ¹⁵ Ibid.
- ¹⁶ Raymond L. Garthoff, "Mutual Deterrence and Strategic Arms Limitation in Soviet Policy," International Security, Summer 1978, p. 112.
- ¹⁷ Ibid., p. 126.
- ¹⁸ Ibid., p. 124.
- ¹⁹ Ibid.
- ²⁰ Ermath, "Contrasts in Soviet and American Strategic Thought," p. 146.
- ²¹ Stanley Sienkiewicz, "SALT and Soviet Nuclear Doctrine," International Security, Spring 1978, p. 91.
- ²² Ibid., p. 92.
- ²³ Ibid., pp. 98-99.
- ²⁴ Benjamin S. Lambeth, "Arms Control and Defense Planning in Soviet Strategic Policy," in Arms Control and Defense Postures in the 1980s, ed. Richard Burt (Boulder, Colorado: Westview Press, 1982), p. 63.
- ²⁵ Sienkiewicz, "SALT and Soviet Nuclear Doctrine," p. 99.
- ²⁶ Richard Burt, "Defense Policy and Arms Control: Defining the Problem," in Arms Control and Defense Postures in the 1980s, pp. 6-7.
- ²⁷ Vernon V. Aspaturian, "Vulnerabilities and Strengths of the Soviet Union," in The Conduct of Soviet Foreign Policy, ed. Erik P. Hoffman and Frederic J. Fleron, Jr. (New York: Aldine Publishing Co., 1980), p. 698.
- ²⁸ Ibid., p. 699.
- ²⁹ Wolfe, pp. 254-255.
- ³⁰ U.S., ACDA, Arms Control 1979, pp. 11-12.
- ³¹ Wolfe, p. 72.
- ³² U.S. Congress, House, Briefing of the Subcommittee on International Security Affairs of the Committee on Foreign Affairs, Review of Administration Initiatives on Strategic, Theater, and Conventional Arms Control 97th Cong., 1st Sess., Nov. 26, 1981.
- ³³ U.S., Department of State, "SALT II Agreement," Department of State Selected Documents No. 12A, dated June 18, 1979.

- ³⁴U.S., ACDA, Arms Control 1979 provides a good summary of these provisions; Grant Joseph Caughey's, "Naval Implications of the Strategic Arms Limitation Talks," (Master's thesis, Naval Postgraduate School, 1980), traces the possible impact of SALT on U.S. Navy development programs.
- ³⁵Wolfe, pp. 17-18.
- ³⁶Ibid., p. 193.
- ³⁷Ibid., pp. 256-257.
- ³⁸Richard K. Betts, "Strategic Equivalence," Air University Review, November-December 1981, p. 25.
- ³⁹The implication of the U.S. acquisition of SLBMs with a counterforce capability will be touched on in Chapter III. The desirability of these weapons relates directly to the earlier discussion in this chapter concerning strategic and crisis stability. Predictably, there is a wide range of opinion on counterforce SLBMs; for instance, Gary L. Guertner argues that such weapons are destabilizing and unnecessary in "Strategic Vulnerability of a Multinational State," Political Science Quarterly, Summer 1981; Joel Wit finds them to be an attractive strategic option in "American SLEM: Counterforce Options and Strategic Implications," Survival, July/August 1982.
- ⁴⁰Desmond Ball, "Counterforce Targeting: How New? How Viable?," Arms Control Today, February 1981, pp. 1-2.
- ⁴¹Ibid., p. 9.
- ⁴²Hammerman, p. 3.
- ⁴³Christoph Bertram, "The Future of Arms Control: Part II," Adelphi Papers Number 146 (London: The International Institute for Strategic Studies, 1978), p. 10.
- ⁴⁴Wolfe, pp. 246-247. Wolfe notes that Richard Burt typifies this school of thought: SALT is seen to be of some symbolic-political value, but it does not lessen the need for unilateral strategic decisions.
- ⁴⁵Bertram, pp. 17-19.
- ⁴⁶Wolfe, p. 263.
- ⁴⁷Wolfe, p. 255.
- ⁴⁸San Jose Mercury, December 11, 1982.
- ⁴⁹JCS Military Posture Statement for FY 83, p. 23, reproduced in "The Strategic Nuclear Balance and the Present Status of SALT/START Talks," by David Yost presented at Monterey Ground Zero Panel Discussion of 23 April 1982.

- ⁵⁰ DOD, Annual Report to the Congress Fiscal Year 1983, pp. III-57 through III-66 detail these problems.
- ⁵¹ San Jose Mercury, December 11, 1982.
- ⁵² Strobe Talbott, "Finally, a START on Arms Curbs," Time, July 12, 1982, p. 12.
- ⁵³ San Jose Mercury, July 20, 1982.
- ⁵⁴ U.S. Congress, House, Review of Administration Initiatives on Strategic, Theater, and Conventional Arms Control, passim.
- ⁵⁵ Ibid., p. 18.
- ⁵⁶ Joel S. Wit, "American SLBM: Counterforce Options and Strategic Implications," Survival, July/August 1982, p. 173.

III. THE OPERATIONAL CONTEXT

A. INTRODUCTION

Although the SSBN plays an important role in the strategic triads of both superpowers, the approaches that American and Soviet planners have taken in structuring their SSBN forces and in defining SSBN roles and missions do differ in significant ways. The degree to which SSBNs are perceived as being vulnerable is necessarily based upon an assessment that each side must make of the other's anti-submarine warfare (ASW) capabilities. As with force structure and missions, differences in U.S. and Soviet ASW capabilities lead to an asymmetrical assessment of the seriousness of the threat to SSBNs. Some of the basic differences in SSBN force structure and vulnerability will be examined in this chapter in order to provide a point of reference for Chapter IV's consideration of possible bilateral measures that may be proposed to build confidence in SSBN survivability. Such confidence is a function of the inherent capabilities of SSBNs as limited by the effectiveness of the ASW forces arrayed against them. The first two sections of this chapter will look at the role of the SSBN in the American and Soviet navies by outlining the strategic capabilities imbedded in the hardware of each force, and by examining how SSBNs are employed in peacetime and how they may be used during war. The final section will consider the relative vulnerability of U.S. and Soviet SSBNs by focusing on the problem of strategic ASW--the threat to SSBN survivability that confidence building measures would seek to ameliorate.

B. U.S. SSBNs

1. Capabilities

Even though the United States is allowed as many as 44 SSBNs with 710 ballistic missile launchers under the provisions of SALT I, current and projected U.S. SSBN levels are far below this limit. In 1982 the sea-based leg of the U.S. strategic triad comprised 31 operational SSBNs with a total of 496 launchers. This drop from the longstanding figure of 41 SSBNs with 656 launchers is explained by DOD's decision to remove the ten remaining Polaris SSBNs (Ethan Allen and George Washington classes) from the strategic role, during FYs 80 and 81, before their Ohio-class replacements were in commission.¹ The first two SSBNs of this class, each of which carries 24 Trident SLBMs, have since been commissioned, and the lead ship, USS Ohio (SSBN 726), will soon begin its first operational patrol. Funding has already been authorized for a total of nine Ohio-class SSBNs. Two more are requested in the FY 83 budget, which forecasts a completion rate of one SSBN each year from 1984 through 1987.²

There are only two basic types of submarine launched ballistic missiles now carried in the U.S. fleet: Poseidon (C-3) and Trident I (C-4). The Poseidon (C-3) became operational in 1971. By 1978, 31 SSBNs had been converted to Poseidon with its MIRVed (multiple independently targeted reentry vehicle) warhead and 2,500 NM range.³ The Trident I (C-4) is the follow-on to Poseidon. Its 4,000 nm range is a significant increase, and a stellar-aided inertial guidance system allows the MIRVed Trident warhead to achieve greater accuracy, along with its increased payload.⁴ The physical dimensions of the Trident I are compatible with the Poseidon launchers: a program has been underway since the late

70s to refit twelve of the newer Poseidon SSBNs with the Trident I missile. The first of these C-4 equipped Poseidons deployed in October of 1979 and the twelfth Poseidon to be so refitted will be completed in FY 1983.⁵ Table I summarizes U.S. SSBN force structure and capabilities as they will exist in 1983.

Even with its improved accuracy and larger payload, the Trident I is not adjudged to have a counterforce kill capability against hardened targets such as ICBM silos. However, a follow-on to Trident I, Trident II (D-5), is now being developed. With a tentative IOC of 1989,⁶ this missile will make use of the full launcher space available in the Ohio-class SSBNs. This increase in payload will be complemented by an improved guidance system whose exact nature has yet to be determined.⁷ The net effect of these gains translates into an SLEM with a hard-kill, counterforce capability.⁸ Although some unclassified government sources indicate that the D-5's range will be essentially the same as the C-4's,⁹ estimates as high as 6,000 nm appear in the open literature.¹⁰ These variances stem from technical decisions which still have to be made in trading off payload for range.¹¹

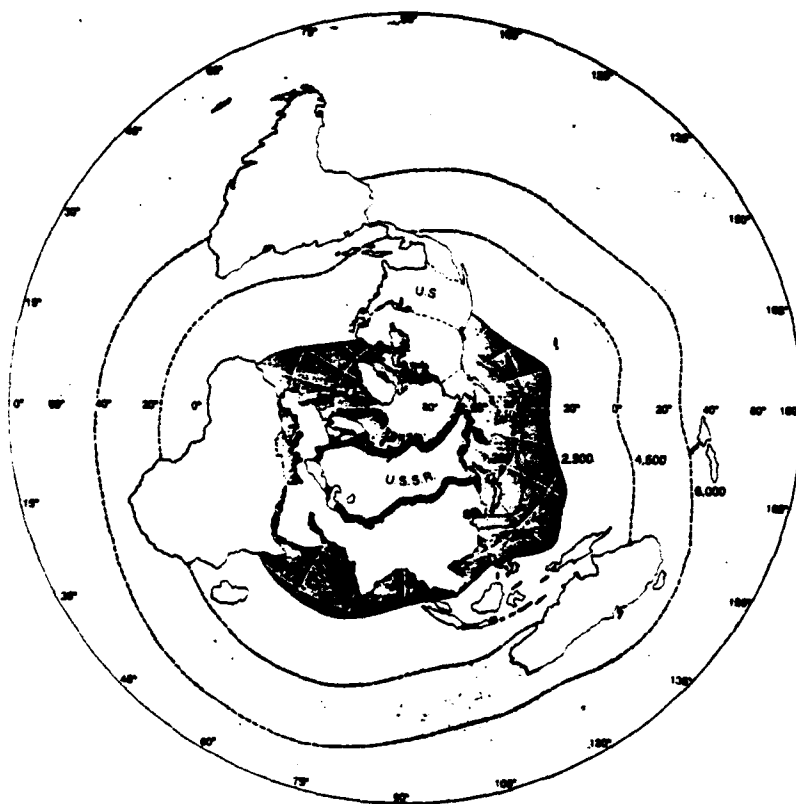
Figure 3 depicts the sea areas from which successive U.S. SLEMs of increased ranges can reach strategically important targets in the Soviet Union. These ever-increasing ranges have given the SSBN force greater operational and targeting flexibility, while vastly complicating the ASW problem for the Soviet Union. Taken together, Table I and Figure 3 provide a thumbnail sketch of the hardware limits of the U.S.'s SLEM force. With these limits as a backdrop, U.S. SSBN employment practices can be considered.

TABLE I
U.S. SSBN/SILBM FORCE LEVEL CHARACTERISTICS 1983

<u>SILBM (IOC)</u>	<u># SSBNs (Launchers)</u>	<u>MIRVs</u>	<u>RANGE (NM)</u>	<u>Launcher Sub-Totals</u>	<u>Targetable Warheads</u>
Poseidon (C-3) (1970)		10	<u>2,500</u>		
19 La Fayette (16)				304	3,040
Trident (C-4) (1979)		8	<u>4,000</u>		
12 Benjamin Franklin (16)				192	1,536
2 Ohio (24)				<u>48</u>	<u>384</u>
TOTAL 33				TOTAL 544	TOTAL 4,960

Sources: (1) The Military Balance 1981-1982
(2) SIPRI Yearbook 1982

Possible U.S. SLBM Launch Areas



NOTE: Contours are based on U.S. SLBMs of varying ranges. Targets are assumed to be population and industrial centers within 200 miles of the Soviet border.

Source: Herbert Scoville, "Missile Submarines and National Security" in Progress in Arms Control?, Readings from Scientific American (San Francisco: W. H. Freeman and Company, 1979), p. 73.

Figure 3

2. Peacetime Deployment

Although the open literature does not provide a detailed picture of U.S. SSBN operations, enough information is available to outline their employment. Their peacetime contribution takes the form of deterrent patrols in which the submerged SSBN proceeds to a patrol station, where it loiters in a state of readiness. At any given moment, approximately 55 percent of U.S. SSBNs are operating at sea.¹² Soviet awareness of this large, survivable force is thought to strengthen strategic nuclear deterrence. The high operating tempo of the U.S.N.'s SSBNs is achieved by a carefully orchestrated maintenance program coupled with the assignment of two rotating crews (blue and gold) to each SSBN. Crews are exchanged when the SSBN returns to port at the end of its 60-day patrol for several weeks of training and maintenance. Trident submarines will have a 70-day at sea period followed by 25 days of refit in port. Crew endurance is considered to be the dominant limiting factor for these submarines.¹³

All 31 of the Poseidon SSBNs are operated in the Atlantic/Mediterranean areas,¹⁴ which means that there will be no operational SSBNs in the Pacific until Ohio makes her first patrol from the new Trident base in Bangor, Washington. The 4,000 nm range of the C-4 allows it to reach all Soviet targets from the Atlantic, and "almost all" of them from the Pacific.¹⁵ Aside from the increase in patrol time, the longer range missile has reduced the U.S.N.'s dependence on overseas SSBN bases as points for crew exchange and maintenance. Use of the SSBN facility at Guam was stopped in the fall of 1981, and Rota has not been used for SSBNs since 1979 (at Spain's request). Holy Loch, Scotland is still in use;

however, Kings Bay, Georgia will be the upkeep site for East Coast Tri-dents, including the 12 Poseidons equipped with the C-4.¹⁶

U.S. SSBN operations stress covertness. This goes beyond the submariner's penchant for painting over the hull numbers of his boat. At the operational level it means that the SSBN on patrol remains aloof from the rest of the fleet, since any interactions with surface units would increase the chances of the SSBN's location being disclosed. Command and control systems for SSBNs may offer a vigilant adversary a remote chance of discovering a U.S. SSBN. Although SSBNs can communicate while submerged by trailing a long wire antenna or a communications buoy, as well as through other systems that require them to operate either near the surface or to break the surface with a communications mast,¹⁷ there is some slight concern that the Soviets may develop new technologies that could make trailed antennas detectable.¹⁸ Command and control does not present a serious problem for peacetime SSBN operations; however, this question becomes a critical issue when the SSBN's wartime employment is considered.

3. Warfighting Role

After describing the U.S. strategic nuclear force posture as being one that will achieve crisis stability, the DOD's Annual Report FY 1983 goes on to stress that "U.S. forces will be capable under all conditions of war initiation to survive a Soviet first strike and retaliate in a way that permits the United States to achieve its objectives."¹⁹ This posture is consistent with the tenets of PD 59, which emphasize the importance of having a multiplicity of nuclear targeting options. Beyond their peacetime deterrent role, U.S. SSBNs have the "wartime missions of

strategic and theater nuclear strikes, as well as deterrence of further escalation."²⁰ These missions reflect a shift from the countervalue (anti-cities) role that was assigned to the SSBN during the years when U.S. strategic doctrine was based on mutual assured destruction.

The FY 83 Arms Control Impact Statements argue that current SSBN/SLBM programs will not only provide the most survivable elements of the U.S. strategic forces, but that:

These programs go beyond strict replacement of the present SSBN/SLBM force in that they are intended to maintain the survivability of U.S. strategic submarines and provide increased capabilities for these survivable forces. Such steps to improve sea-based retaliatory capabilities are particularly important in view of the current strategic imbalance with the Soviet Union and the increased capability of Soviet strategic forces against the U.S. strategic forces--especially U.S. fixed land-based ICBMs.²¹

Predictably, Trident II's projected capability has not met with unanimous approval. Those arms control advocates who class any weapon with counterforce potential as destabilizing see the Trident II as leading the U.S. toward a first-strike doctrine, or at least toward a point where Moscow might conclude that the U.S. had such a doctrine. As the SIPRI 1979 Yearbook argues:

If survivability of both the submarines and their communications system cannot be guaranteed, then there will be an increased temptation to adapt the SLBM system as a whole for use in a first-strike counterforce role. In other words, the SLBMs will be re-directed against the missile silos and other strategic weapons of the other side, instead of against cities, and preparations will be made for launch of SLBMs to take place as part of the opening move of nuclear attack. A counterforce doctrine is inherently destabilizing in that it creates pressures for both sides to launch preemptive attacks, while the second-strike doctrine, despite all its faults, does have defensive connotations, and does seem to have a stabilizing effect.²²

Pressure to shift to a first-strike doctrine, then, is seen as a function of SSBN survivability and command and control reliability.

The ASW threat to SSBNs will be considered in the final section of this chapter, but it's worth noting in passing that a disabling first strike against U.S. SSBNs does not seem to be an immediate threat. As to the command and control problem that would confront the National Command Authority (NCA) following a nuclear strike, this is a very real, and enduring concern--a problem that already faces all three legs of the triad. The so-called decapitation of the NCA following a nuclear strike was apparent during exercises conducted by the Carter administration.²³ The FY 83 budget request evinces a series of programs directed at correcting these CCC&I (Command, Control, Communications and Intelligence) deficiencies. Nonetheless, since perceptions play such a key role in the calculus of deterrence, the considerable effort that the U.S. Navy has put into building a redundant command and control system for the SSBN should demonstrate Washington's commitment to reserving the SSBN force for the retaliatory roles described above. This elaborate network will not be rehearsed here;²⁴ however, the Navy's TACAMO (take charge and move out) aircraft are a highly visible example of this commitment. The TACAMO (EC-130) is intended to be the primary means of communicating nuclear release orders from the NCA to the SSBNs, even in the event that land-based systems have been destroyed. To this end, a TACAMO is continuously airborne in the Atlantic, and 18 more of these aircraft are going to be deployed to provide coverage for the Pacific's growing Trident fleet by mid-83.²⁵ The SIPRI assessment cited above implies that the opposing triads are in a stable balance, but other interpretations are possible. The FY 1983 Arms Control Impact Statement concludes that the Trident II provides a "hedge against vulnerability of other legs in the Triad,"

and that this "SLEM would also enhance crisis stability insofar as it would contribute to an enduring retaliatory force that could inflict damage across the spectrum of Soviet targets."²⁶

C. SOVIET SSBNs

1. Capabilities

Under the provisions of SALT, the USSR is allowed 62 "modern" ballistic missile launching submarines and as many as 950 launchers. Use of the qualifier "modern" reflects a rather confusing counting regimen, in which the Yankee and Delta classes of SSBNs are tallied to reach 62, while the 950 SLEM figure is arrived at by counting all Soviet SLEM launchers starting with the SS-N-5, excluding the 39 SS-N-5s that are carried on the diesel powered G-II submarines.²⁷ This means that the launchers in 71 Soviet submarines are counted against the SALT limits.²⁸ Unlike the U.S. Navy, the Soviet Navy (VMF: Voenno-Morskoi Flot) has been at its SALT limit since 1980. Staying at this level has required the Soviets to remove seven Yankees from the strategic role to compensate for the addition of Delta IIIs, even though the removed Yankees had some years of service life remaining.²⁹ The discussion that follows will emphasize Yankee and Delta SSBNs because they carry the majority of the VMF's strategically significant SLEMs (note: Table II summarizes Soviet SSBNs/SLEMs).

Introduced in 1968, each SSBN of the Yankee class is capable of a submerged launch of 16 SS-N-6s. Having peaked at 34 boats in 1974, the Yankee class now numbers about 23.³⁰ The liquid-fueled SS-N-6 originally had a 1300 nm range, but subsequent modifications have succeeded

in pushing the range out to 1600 nm. The Military Balance 1981-1982 still indicates that some of the shorter range variants (mods 1 & 2) are in use,³¹ but presumably these less capable missiles are being phased out with the Yankees that are removed from the strategic role. One Yankee became a one submarine class, the Yankee II, when it was equipped with 12 of the VMF's first solid-fueled SLBMs--the 2700 nm, MIRV tested SS-NX-17.³²

The first of the Soviet Deltas appeared in 1973, fitted with 12 SS-N-8s, a two-staged, liquid-fueled SLBM whose 4,000 nm range was a significant advance.³³ The Delta II followed in 1976, carrying 16 of the SS-N-8s. In 1978 the Delta IIIs and their 16 SS-N-18s became operational, marking the beginning of MIRVed SLBMs in the VMF. Although the SS-N-18 has been flight-tested with as many as seven reentry vehicles,³⁴ The Military Balance 1981-1982 credits this 4,000 nm plus missile with three reentry vehicles.³⁵ Unclassified DOD sources state that the SS-N-18 has three different versions that offer flexibility in payload and range with a choice of 1, 3, or 7 MIRVs possible.³⁶ These and other Soviet SSBN/SLBM characteristics are summarized in Table II. The yields of Soviet SLBMs are generally higher than those of the U.S. but they are not as accurate as American SLBMs. After pointing out the speculative nature of some of the figures used in their lethality computations, The SIPRI Yearbook 1979 credited the U.S. SLBMs with "vastly greater effectiveness" in hard target kill potential.³⁷ However, the SIPRI calculations of 1978 do not include the SS-N-18, a significant addition to Soviet SLBM lethality. Also, it should be remembered that the Soviets have invested their hard kill capability in ICBMs.

TABLE II

SOVIET SSBN/SLEM FORCE LEVEL CHARACTERISTICS 1982 a)

SLEM (IOC) # SSBNs (Launchers)	MIRVs	Launcher Sub-Totals	RANGE (NM)	Targetable Warheads
SS-N-5 (1963) 6 Hotel II (3)	N/A	18	<u>600</u>	18
SS-N-6 (1968-73) b) 1 Golf IV (5) 23 Yankee (16)	N/A	5 368	<u>13-1600</u>	6 368
SS-N-8 (1973) 1 Golf III (4) 1 Hotel III (6) 18 Delta I (12) 4 Delta II (16) c)	N/A	5 6 216 64	<u>4,300</u>	4 6 216 64
SS-NX-17 (1974) 1 Yankee II (12)	N/A	12	<u>2,700</u>	12
SS-N-18 (1978) 16 Delta III (16)	3 d)	256	<u>4,500</u>	768
TOTAL: 71		TOTAL 950		TOTAL 1462

Modern: 62 (Only Y & D SSBNs are counted under the SALT SSBN Limit)

NOTES: a) SALT Accountable

b) 3 different mods of SS-N-6 are in service.

c) 2), p. 4, states that there are 11 Delta IIs and a "corresponding drop in D-I boats."

d) Although 1, 3, or 7 warheads are possible, 3 is used for computational ease.

Sources: 1) SIPRI Yearbook 1982

2) The Military Balance 1981-1982

3) Understanding Soviet Naval Developments, 4th ed.

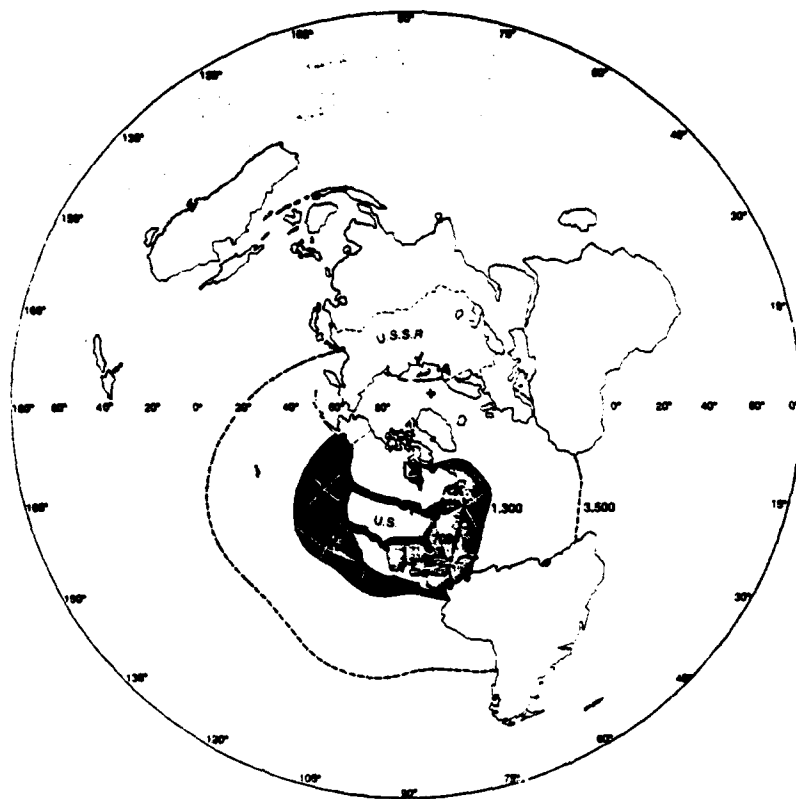
Even though the VMF continues to build Delta IIIs, in 1980 they launched a new class of SSBN designated as the Typhoon.³⁸ This SSBN is expected to become operational in the mid-1980s, equipped with 20 new SLEMs (SS-NX-20) carried forward of its sail. This solid-fueled, MIRVed missile is expected to be at least as capable as the SS-N-18.³⁹ Typhoon is also notable for its size. At 25,000 tons, it is the world's largest submarine, but as Daniel and Neely note, "America's Ohio (SSBN-726)-class Trident submarine has four more launchers on a platform two-thirds of the 'Typhoon's' size."⁴⁰ Figure 4 depicts the sea areas from which Soviet SLEMs of varying ranges can strike strategically significant targets in the United States. Deltas can strike targets in the U.S. from the relative safety of Soviet home waters, while Yankees would have to break through Western ASW chokepoint defenses to hit the U.S., if they were not in position before the start of hostilities.

Table II and Figure 4 provide a broad summary of the hardware capabilities of the VMF's fleet of SSBNs. Although there are obvious parallels between the U.S. and Soviet SSBN/SLEM programs, the Soviet Navy's operational use of its force is markedly different from that of the United States Navy.

2. Peacetime Deployment

The Soviet Navy is divided into Northern, Baltic, Black Sea, and Pacific Fleets. This division is driven by Soviet geography--a factor that commentary on the Soviet Navy invariably mentions. Commander Clyde A. Smith, U.S.N., sees five constraints on Soviet naval power:⁴¹

Possible Soviet SLBM Launch Areas



NOTE: Contours based on Soviet SLBMs of varying ranges. Targets assumed to be within 200 miles of U.S. border.

Source: Herbert Scoville, "Missile Submarines and National Security" in Progress in Arms Control, Readings from Scientific American (San Francisco: W.H. Freeman and Company, 1979), p. 75.

Figure 4

1. the vastness of the Soviet Union
2. the geographic fragmentation of the Soviet Navy into four fleets and one "squadron"
3. the existence of narrow straits through which her fleets must pass to reach the open oceans
4. the northerly orientation, in latitude, of the Soviet Union
5. the distance of her fleets from major world oceans and shipping lanes.

However, the VMF has been able to compensate for these constraints to a degree, in some cases turning them to its advantage. The VMF's SSBN employment strategy has been shaped by geographic limits, but the Soviet Navy has made a virtue of necessity by using their geography to operational advantage. For instance, the SIPRI Yearbook 1982 suggests that the "Typhoon may be deployed under the ice of the Arctic Ocean, as further protection against U.S. anti-submarine tactics."⁴² Also, Hamlin Caldwell, a senior naval analyst with BDM Corp., has pointed out that the U.S.'s acoustic advantage "counts for less in shallow Soviet home waters (where SSBNs may be) where all sonar performance is degraded and our margin of relative superiority shrinks proportionately."⁴³

With the exception of the diesel-powered Golfs in the Baltic, Soviet SSBNs are split in about a two-to-one ratio between the Northern and Pacific Fleets. The Military Balance 1981-1982 counts 45 SSBNs in the Northern Fleet and 24 in the Pacific Fleet.⁴⁴ As Daniel explains in commenting upon the emphasis given to the Northern Fleet: "This is probably due to Soviet conceptions of wartime and peacetime geographic priorities, and to the fact that important naval design or production facilities are located in the western USSR."⁴⁵ A quick review of Soviet

peacetime SSBN operations reveals a pattern that is very different from that of the U.S.N.

The Yankee class began patrolling the Atlantic in 1968, "periodically coming within range of U.S. cities," and in 1971, Yankee patrols began in the Eastern Pacific, posing a threat to cities on the west coast of the United States.⁴⁶ As Figure 4 shows, the longer range SLEMs carried in the Deltas means that they are on station while in their home waters. However, in contrast to U.S. practice, and despite the larger number of SSBNs in the Soviet inventory, only ten to fifteen percent of this force is actually out at sea on any given day. The Soviet Armed Forces Review Annual 1980 translated this percentage into an average at sea force of "nine or more Yankee and Delta SSBNs, and one older diesel-powered Golf."⁴⁷ The FY 1983 U.S. Military Posture Statement notes the routine presence of Yankees in the western Atlantic and eastern Pacific, and it states that Deltas are "normally on patrol in the Greenland, Norwegian, and Barents Seas," and Delta I/III SSBNs are "routinely on patrol in the Pacific."⁴⁸ This relatively low peacetime operating tempo for SSBNs has been consistent, even during periods of heightened tension.⁴⁹

In commenting upon Moscow's willingness to allow 85 to 90 percent of its SSBN force to remain in port, where it is potentially vulnerable to a surprise attack, Joel S. Wit has suggested that the Soviet's low SSBN operating tempo is "largely due to a shortage of trained crews and to inadequate maintenance facilities."⁵⁰ Although it is true that the VMF has not adopted a blue and gold crewing concept for its SSBNs like that of the U.S.N., it seems likely that a lack of trained manpower would not prevent the Soviet Navy from keeping a higher proportion of its SSBNs at

sea in peacetime, if they calculated that the "correlation of forces" required such an action in order to deter the United States. A similar argument runs counter to the charge of inadequate maintenance facilities. While building something and making it work are not the same thing, given the demonstrated capacity of the Soviet industrial base to turn out a large fleet of nuclear submarines over a relatively short time, it seems unlikely that a lack of maintenance facilities would prevent the VMF from keeping more SSBNs at sea if it were deemed to be a strategic necessity. This is not to say that SSBN manning and maintenance do not present problems for the VMF, as indeed they do for the U.S., but rather, that these factors are not the overriding determinants of Soviet SSBN employment.

Part of the difference between U.S. and Soviet peacetime SSBN operations may be explained by the asymmetrical makeup of the superpower's strategic triads. U.S. planners have placed great emphasis on the SSBN's survivability to provide the underpinning for deterrence. Growing concern over the putative vulnerability of the Minutemen has led the U.S. to an even heavier reliance on its sea-based leg. The Soviets, however, rely most heavily upon their massive ICBM force in deterring the United States. Whereas America's inventory of strategic nuclear warheads shows 50 percent on SSBNs, 27 percent on bombers, and 23 percent on ICBMs, the Soviet Union deploys 72 percent of its warheads on ICBMs, 23 percent on SLEMs, and a scant 5 percent in bombers.⁵¹ At the operational level, it may be that the U.S.N.'s advantage in ASW makes the VMF less than sanguine about the open-ocean survivability of its SSBNs. At the most obvious level, the

Soviets probably do not think that a pre-emptive, out-of-the-blue strike against their SSBNs in port is a likely contingency.

3. Warfighting Role

The Soviet Navy's limited peacetime SSBN operating tempo, as well as its preference for keeping its more capable Deltas in the relative safety of waters close to the Soviet homeland, is consistent with Western estimates of the likely way that these SSBNs will be employed in the event of war. A Western consensus holds that the VMF will attempt to establish virtual sanctuaries in the Northern (Barents Sea area) and Pacific (Sea of Okhotsk) Fleet operating areas, where a preponderance of Soviet ASW forces and air cover would protect the largest portion of the Soviet SLEM force. From a strategic perspective, after a decade of debate, many analysts posit that this sanctuarized SLEM force will be withheld from any initial Soviet nuclear strike for use as an intrawar deterrent and for bargaining leverage during war termination negotiations. This assessment differs greatly from analyses of the 1960s that saw the VMF's SLEMs being used in conjunction with the SRF's (Strategic Rocket Force) ICBMs in a coordinated, all-out strike.

Detailing the evidence that supports the shift in the Western estimate of Soviet wartime SSBN employment is well beyond the scope of this chapter.⁵² Nonetheless, a brief description of how the VMF has come to rely on sanctuaries as a means of enhancing SSBN survivability will contribute to an understanding of the Soviet perspective on SSBN confidence building measures. Soviet SSBN strategy is necessarily related to and affected by their estimate of SSBN vulnerability. Further, Soviet SSBN withholding has implications for U.S. Naval forces, since such a practice

means that most Soviet ASW assets would not be directed against U.S. SSBNs, but instead, would be dedicated to defending Soviet SSBNs from U.S. ASW forces in what is termed a "pro-SSBN" mission.

The Soviet Navy's shift to a more forward deployment of its forces during the 1960s has been widely interpreted as being a defensive response to the U.S. Navy's threat of a nuclear strike, embodied in carrier based strike aircraft and Polaris SLEMs, on the Soviet homeland. This threat eventually required the VMF to move its defensive zone out to a 2500 nm radius--the range of the Polaris A-3 (IOC 1964).⁵³ Michael McGwire, a respected Soviet Naval analyst, sees this emphasis on countering the Polaris threat as having provided the impetus for Moscow's heavy investment in surface ASW forces in the 60s.⁵⁴ However, he says that the Soviets probably became increasingly aware of the limitations that their ASW forces faced in an open-ocean ASW mission against the Polaris threat. He also notes that U.S. press reports in 1967-1968 describing two new classes of American attack submarines gave Soviet planners great concern over the future survivability of their Delta SSBNs, which were to become operational in 1973-74. A third factor cited by McGwire in explaining the Soviet shift to SSBN sanctuaries concerns Soviet strategic doctrine: Soviet planners came to accept the possibility that a war with the West might be a protracted one with an initial conventional phase of some length, rather than a short, spasm nuclear war. As McGwire explains, the requirement to defend Soviet SSBNs until their SLEMs were expended led the Soviets

. . . to the concept of deploying the submarines in defended ocean bastions in the Greenland and Barents Seas and in the Sea of Okhotsk. . . . This led to a shift in ASW emphasis away from the eastern Mediterranean and Arabian Sea, to extending the inner defense zones of the Northern and Pacific Fleet areas and to providing them with watertight defenses.⁵⁵

Once the conventional phase of a war came to an end, these SSBNs would then be available to participate in the Soviet's first strike in accordance with their 60s mission of strategic strike.⁵⁶

An SSBN withholding strategy, however, takes the requirement for sanctuaries beyond the initial nuclear exchange. Admiral Gorshkov, Commander-in-Chief of the Soviet Navy, published a series of eleven articles in the Soviet Navy's professional journal, Morskoi Sbornik, over the period 1972-73. James McConnell's exegesis of these articles led him to conclude that:

. . . the content of the Gorshkov series reflects a Soviet political decision to withhold a substantial portion of their submarine-launched ballistic missiles (SLBMs) from the initial strikes in order to carry out 'deterrence' in war, conduct intrawar bargaining and influence the peace talks at the end of the war.⁵⁷

In a subsequent study, Robert Herrick's reading of open Soviet literature led him to conclude that Soviet SSBNs do not play any significant role with the SRF in an initial deep strike, further arguing that "a protracted SSBN-withholding strategy was in official force during the '60s and '70s without interruption and continues up to the present (mid-January 1980),"⁵⁸ and that this strategy would provide:

. . . some semblance of an adequate mission for the SSBNs to at least superficially compensate for their having only a minor 'operational' strike mission at coastal mission targets for the small part of the SSBN force maintained constantly on missile-launch station and a reserve, backup mission for deferred-strike in the contingency that the SMF fails to destroy its assigned targets for the initial nuclear exchange.⁵⁹

Although McGwire does not feel that the Gorshkov series supports McConnell's conclusion of a Soviet SSBN withholding strategy, he says that it is rather likely that some SSBNs would be withheld, because submarines are uniquely suited for such a role. McGwire stresses that

actual employment of Soviet SSBNs "will depend on evolving operational requirements, the course and nature of the war, and the opportunities to influence its outcome."⁶⁰

Before considering a representative warfighting scenario for Soviet SSBNs, a brief mention of Soviet command, control and communications needs to be made, since a strategy that contemplates withholding forces necessarily makes greater demands upon the CCC&I systems. Like the U.S., the Soviet Union has built a redundant communications system that includes extensive land-based, as well as satellite systems (Molniya Series).⁶¹ The SIPRI Yearbook 1979 indicates that the USSR is "probably heavily reliant on VLF for strategic communications, with a backup provided by HF and possibly by satellites."⁶² Their VLF system may be more extensive than that of the U.S.; however, the VMF does not have an SSBN communications system analogous to the U.S.N.'s TACAMOS.⁶³ The SIPRI assessment concludes that the "restricted variety of communication modes available to the Soviet missile submarine is an important factor in degrading overall system security compared with U.S. missile submarines."⁶⁴ This disparity may be overstated. The Soviet practice of keeping their SSBNs close to home cannot but help their ability to exercise positive command and control over these boats. Nonetheless, there is real uncertainty, on both sides, as to whether CCC&I systems can support any strategy of escalation. With this caveat understood, Soviet SSBN warfighting can be kept in perspective.

In considering how Soviet SSBNs would actually be employed in fighting a war, it is useful to group them by location and type. Caldwell sees four such categories:⁶⁵

1. Deltas would be withheld in their well-defended sanctuaries under the control of the General Staff for use in war termination;
2. Deployed Yankees would move in to strike soft military targets in the U.S. (e.g., SAC bases, SSBN bases, command and control facilities, etc.);
3. Yankees in Soviet home waters could be decoupled from inter-continental systems for use in theater operations in what McConnell has described elsewhere⁶⁶ as an independent Euro-strategic option; and,
4. Golfs and Hotels in the Baltic and Sea of Japan would be used in support of theater operations.

The preceding sections have outlined the deterrent and warfighting roles that the SSBN plays in the strategic planning of the superpowers. To highlight sources of insecurity that each side may harbor concerning the ability of its SSBNs to fulfill these roles, the following section will consider the ASW threat to the SSBN. The sense of urgency that either side attaches to establishing SSBN confidence building measures will be largely determined by its assessment of this threat.

D. ASW AND SSBN VULNERABILITY

1. Tactical vs. Strategic ASW

In theory, anti-submarine warfare can be divided into two distinct categories based on the targets it is directed against. ASW whose object is countering SSBNs is deemed to be strategic, while ASW that attempts to protect merchant shipping or naval forces from submarine attack (torpedoes and cruise missiles) is called tactical. ASW can be further divided into area and point defense operations; the former seeks to deny submarine access to large ocean areas through barrier operations

designed to protect sea lines of communications (SLOCs), for instance, while the latter attempts to defend transiting naval or merchant ships from submarine attack by providing an ASW screen whose layers of fixed and rotary wing ASW aircraft and hull borne sensors and weapons attempt to fend off (destroy) hostile submarines before they get within weapons range.⁶⁷ The theoretical distinction between tactical and strategic ASW is not so evident in practice. Area defense operations in the Greenland-Iceland-United Kingdom (GIUK) gap, for example, could take their toll on Soviet SSBNs in the process of screening NATO's Northern flank. Also, many of the sensors and weapons systems in the ASW inventory could be applied to either task. After discussing American and Soviet attitudes toward strategic ASW in general terms, this section will look at the ASW problem itself, from submarine detection through wartime destruction.

2. U.S. and Soviet Attitudes Toward Strategic ASW

To the extent that the concept of mutual assured destruction, with its emphasis on survivable retaliatory forces, has informed U.S. strategic doctrine, attempts to achieve the capability to simultaneously locate and destroy a large portion of Soviet SSBNs at sea have been seen as destabilizing and at cross purposes with MAD. For this reason, U.S. ASW policy, at least in the unclassified sources, has attempted to portray the American ASW effort as being supportive of a tactical, not strategic mission. This has created a certain amount of ambiguity in the U.S. Navy's ASW posture.

Although the DOD counted strategic ASW as a Navy task prior to 1965, since that time it has not been an openly stated mission.⁶⁸ Nonetheless, a 1978 Congressional report stated that U.S. ASW policies have

consistently stressed damage limitation (i.e., anti-SSBN operations) as one of the Navy's sea control missions, despite official reluctance to openly discuss strategic ASW.⁶⁹ The report goes on to explain that some of this ambiguity is inherent, since the U.S. Navy's forward ASW strategy against Soviet attack and cruise missile submarines in wartime would also be a de facto anti-SSBN operation--the U.S.N. sees all submarines as fair game during war. Even though Deltas no longer have to transit the ASW gauntlet that the U.S. and its NATO allies have established across the GIUK gap, the report states "it is unlikely that the United States, despite high risks, will permit either Soviet SSBN's or SSN's a safe sanctuary inside the GIUK gap. Major assignments of the U.S. attack submarine force include not only barrier operations along the periphery of forward areas, but offensive operations in forward areas."⁷⁰ Also, since Yankee SSBNs may use their SLEMs tactically against U.S. carriers, operations against Yankees could be construed as tactical ASW.⁷¹ The report argues that the ambiguity between strategic and tactical ASW missions has also been reflected in procurement policies: "Strategic ASW has improved and acquired a strategic warfighting potential concomitantly with tactical ASW improvements."⁷² So, although open U.S. statements concerning ASW may not have differentiated between tactical and strategic, ASW,⁷³ Soviet SSBN employment practices suggest that the VMF has perceived itself as being vulnerable to the U.S.N.'s potential for strategic ASW.

Unlike the U.S.N., the Soviet Navy has not been reluctant to openly state the importance of strategic ASW. Admiral Gorshkov has written that:

The effect of naval warfare on the course of the war as a whole will be manifested primarily by the degree to which the Navy's capability to destroy land targets and to undermine the strategic nuclear potential of the enemy at sea is realized.⁷⁴

Despite the frequent emphasis given by the VMF to the anti-SSBN mission in official writings, and notwithstanding Gorshkov's claim that "on the basis of the latest advances of science, technology, and production, the mission to repulse and disarm [the U.S. SSBN threat] was accomplished successfully,"⁷⁵ there are real limits to the VMF's strategic ASW capabilities. Some of these limits were suggested in the earlier discussion concerning the Soviet Navy's SSBN withholding strategy--a strategy that led the VMF to a pro-SSBN mission. The high proportion of Soviet ASW assets dedicated to this mission would not be available for an anti-SSBN role. As Nitze and Sullivan have remarked in commenting on the VMF's ASW defense zones,

This concept has little relevance to the problem of detecting Western SSBNs outside these areas, since the Soviets lack any real open ocean ASW capability--although they seek to develop one. Meanwhile, there have been numerous reports over the last ten years that the Soviets are attempting to trail Western SSBNs with their nuclear submarines.⁷⁶

The U.S. N.'s relative advantage in strategic ASW capabilities will become apparent in the review of the phases of the ASW problem that follows.

3. The ASW Problem

Countering a submarine threat, ASW's object, follows a logical path from detection and classification of a submarine as hostile, through localization, ultimately ending in an attempt at destruction. The intelligence effort that may alert ASW forces to a submarine's expected movement can be considered as a preliminary or supporting phase. In peacetime, and possibly during some transitional periods in wartime, a lengthy tracking phase during which ASW forces remain in contact with a target submarine may follow localization. A wide variety of ASW sensors, fitted in an equally diverse number of platforms, are brought to bear in

prosecuting the ASW mission. This treatment will only touch on those American and Soviet ASW systems that can be brought to bear in the strategic ASW problem. For this reason, neither carrier-based nor surface ship ASW systems will be considered, even though they could play a role against SSBNs under some circumstances.

a. Detection

While the initial detection of a submarine is the first phase of the ASW problem, detection is something that also takes place in subsequent phases of the problem, because the shorter range sensors on air and seaborne localization platforms must acquire and refine a target submarine's position to an accuracy that is within the limits of the weapon that will be used against it. ASW systems are designed to detect changes caused in the ocean environment by a submarine's presence--they are classed by how or what they sense. These sensors include:⁷⁷

1. Acoustic--the majority of operational systems fall into the acoustic category, relying on underwater sound (discussed below).
2. Non-Acoustic
 - a) Magnetic--a submarine creates a magnetic field that varies from the earth's magnetic field. Short-range sensors taking advantage of this phenomenon are in use on airborne systems, and magnetic detectors placed on the sea-bottom at chokepoints could be feasible.
 - b) Electromagnetic (EM)--a ship in seawater creates its own low frequency EM field, which is potentially detectable.
 - c) Thermohydrodynamic--The relatively warm water discharged from a submarine's machinery cooling system or the mixing effect of its wake creates thermal anomalies at the surface that may be detected by infra-red systems. Also, effects created at the ocean's surface (e.g., change in wave pattern or height) may become detectable by satellite radar sensors or land-based OTH-B radars (over-the-horizon-back scatter).

- d) Contaminant wakes--The nuclear reactors that power SSBNs leave trace neutrons/radionuclides in their wake, which may be detectable. For instance, Newsweek has reported that in 1974 U.S. intelligence became aware of a Soviet surface vessel successfully tracking a Soviet submarine by contamination in its wake (a crash program determined that U.S. submarines could not be tracked by the same method--at that time).⁷⁸
- e) Direct detection--Blue-green lasers have the ability to penetrate clear water to 100 meters. Continued laser research could make some form of laser detection system practicable.

With the exception of magnetic anomaly detectors, these non-acoustic technologies are all in the R&D stage. Both the U.S. and USSR have extensive, highly secretive, R&D programs that have been attempting to come up with a "breakthrough" in submarine detection for some time; however, for the present, ASW is built around acoustic systems.

Acoustic systems are categorized as being either active or passive. Active devices transmit an acoustic signal and then wait to receive a return echo reflected by a target submarine's hull. Active devices are generally of shorter range than passive devices, and they have the disadvantage being obvious to their potential targets. Passive devices listen for sound in water using hydrophones. The operating machinery aboard a submarine and the cavitation caused by its rotating propeller are detectable sources of sound that make up a submarine's acoustic "signature"; because the physical condition of propulsion and auxiliary machinery and propellers varies with each submarine, passive acoustic information can be distinct enough not only to identify the class to which a submarine belongs, but also to identify the individual submarine being tracked.⁷⁹

The simplified description of acoustic detection given above should not leave the impression that ASW is a simple problem. The technical

complexity of acoustic sensors and processors suggests the difficulty involved in making use of sound in water. The velocity of a sound wave (about 5000 feet/sec.), as well as the path it takes, is highly variable, depending upon the temperature, pressure and salinity of the water through which it passes. Sea bottom and surface conditions cause sound waves to be reflected and the presence of various biological and gaseous elements in sea water can cause sound waves to be absorbed.⁸⁰ Techniques for forecasting the ocean environment are constantly improving, but a submarine trying to avoid detection can take advantage of water conditions, making it very difficult for an adversary to locate it. Further, the trend toward a noisier ocean and quieter SSBNs (U.S. SSBNs are still quieter than Soviet SSBNs) makes the problem of passive detection increasingly difficult.

The U.S.'s forward ASW strategy relies heavily on its sound surveillance system (SOSUS) for initial detection of Soviet submarines. This passive system consists of fixed arrays of hundreds of hydrophones on the ocean bottoms that transmit acoustic information to shore-based centers, where high speed computers process the data and analysts examine it for evidence of a submarine's presence. SOSUS arrays exploit the USSR's unfavorable naval geography. They are reported to be located

. . . along both U.S. coasts to the Caribbean Sea and into the Gulf of Mexico; in the passages between: Bear Island and the northern shore of Norway; Greenland, Iceland, and the southwestern shore of Spain; in the English Channel and around Gibraltar; near Italy and Turkey; along the Aleutian Island chain and the Kurile Basin to Japan; between Japan and Korea; and close to Hawaii and the Philippine Islands.⁸¹

By combining the information from several arrays, a submarine's position can be determined to an accuracy of within 50 nm in the Atlantic,⁸²

and New York Times has stated, for instance, that SOSUS detects every submarine that enters the Atlantic from Murmansk.⁸³ Concern over SOSUS vulnerability in wartime has prompted the U.S. Navy to develop both a mobile array that can be covertly deployed in crisis areas to provide acoustic information (RDSS--Rapidly Deployed Surveillance System),⁸⁴ and a towed hydrophone array (SURTASS) that will be trailed from specially designed surface ships (T-AGOSs).⁸⁵ As for the Soviets, they appear to have a hydrophone array from the Kola Peninsula to Spitsbergen to protect the Barents Sea, and they may have a system in the Kuriles;⁸⁶ however, these limited, defensive systems do not compare with the extensive SOSUS network. Information provided by SOSUS allows an aircraft (P-3) or attack submarine (SSN) to be sent on a "vectored intercept" to more accurately locate a submarine--the transition from initial detection to localization.

b. Localization

(1) Aircraft. The U.S. Navy has twenty-four operational squadrons of maritime patrol aircraft, each of which has nine P-3B/Cs, as well as two training squadrons and twelve reserve squadrons.⁸⁷ These squadrons deploy to both the Pacific and the Atlantic/Mediterranean. Although it is common for a P-3 to be provided with SOSUS contact information, these aircraft are fully capable of unassisted open ocean area search and submarine detection/classification. Its listing under the localization rubric is for convenience, since the P-3 is capable in all three phases of the ASW problem. The P-3C has a flight endurance of up to 16 hours and a patrol radius of 2380 nm. These aircraft carry a variety of active and passive sonobuoys (48 externally loaded and 1 internally loaded) that they drop into the oceans to detect/localize

submarines.⁸⁸ This process is aided by an onboard digital computer. The sonobuoys relay acoustic data to the P-3 where it is analyzed by highly trained operators. The P-3 has a MAD (magnetic anomaly detection) boom, which it extends to help in localizing a submarine. It also has a surface search radar capable of detecting submarine periscopes, as well as electronic equipment that can alert it to any use of radar by a surfaced submarine.

The Soviet Navy's primary air ASW assets consist of fifty TU-95 Bear Fs and a like number of IL-38 Mays.⁸⁹ Neither of these approaches the sophistication of a P-3. The 1500 nm radius of the IL-38s limits them to the Soviet ASW defensive zone, and while the Bear F's 3-4,000 nm range is sufficient for open ocean ASW, the small inventory of these aircraft means that a sustained effort to locate U.S. SSBNs would not be practicable.⁹⁰ Soviet airborne ASW versus U.S. SSBNs is handicapped by the lack of a detection system comparable to SOSUS, by the large ocean areas that they would have to search to locate U.S. SSBNs, and by the relatively limited number of assets that they have available. What assets they do have would probably be used in the ASW defense of Soviet SSBN sanctuaries.

While the disparity between Soviet and American air ASW assets is significant, the VMF's deployment of its Deltas in heavily defended ASW sanctuaries does mitigate the impact that this imbalance might otherwise have on strategic ASW. For example, a P-3 attempting to prosecute a Soviet SSBN in one of these areas would be very vulnerable to surface and air-launched missiles, notwithstanding its recently acquired ability to defend itself from surface attack by using Harpoon surface-to-surface missiles. The SSN is more suited for strategic ASW in a hostile theater of operations.

(2) SSN. Covertly operating at the same depths as the quarry it seeks, the nuclear attack submarine is a most capable system for tactical and strategic ASW. In an anti-SSBN role, SOSUS or intelligence (e.g., AGIs, satellites, etc.) may give the estimated position of a target SSBN to the SSN, or the SSN may attempt to patrol the approaches to an adversary's SSBN bases, seeking to gain contact with an SSBN shortly after it puts to sea.

The U.S. Navy has about eighty SSNs. Although some of these attack submarines are now tasked with direct support missions, in which they are one element in the coordinated ASW defense-in-depth of a carrier battle group,⁹¹ the majority is still dedicated to forward ASW operations. The FY 1977 Authorization for Military Procurement noted that the SSN "often puts itself in and operates in areas which are very contiguous with the home bases of an adversary."⁹²

The overlap between tactical and strategic ASW that is inherent in the U.S.'s forward ASW strategy has been noted. The Navy's Los Angeles-class (SSN-688) attack submarine was developed to support U.S. aircraft carriers by countering the Charlie (SSGN) and Victor (SSN) classes that the VMF began commissioning in the late 60s,⁹³ but it could also be employed in anti-SSBN operations. With funding for thirty-nine SSN-688s already authorized, and fifteen more requested in the FY 83 budget,⁹⁴ the Los Angeles-class will eventually outnumber the thirty-seven Sturgeon-class attack boats.

The Los Angeles' digital sonar system (AN/BQQ5) is a significant improvement over earlier analog sonars, particularly in its passive detection capability, even in the face of acoustic countermeasures

designed to spoof sonars.⁹⁵ The AN/BQQ-5 will be backfitted into the Sturgeon-class SSNs during future overhauls. In 1978, a Congressional report claimed that "The result of U.S. superiority in digital computer technology and electronics may be an SSN capability to trail Soviet submarines without their knowledge."⁹⁶ However, this may be an exaggeration, since decoying, deception, and the support of submarines friendly to the SSBN could readily frustrate an attempt at passive trailing.

The Los Angeles-class is also going to be fitted with Tomahawk cruise missiles. Initially they will be fired from the 688's four existing torpedo tubes, but new construction 688s are being modified to include a vertical launch system in their bows, which will also be backfitted in earlier 688s.⁹⁷ Since the Tomahawk has both land attack and anti-ship versions, U.S. SSNs could acquire a variety of missions that would capitalize on the targeting flexibility inherent in cruise missiles. In some sense these new missions could be seen as competing with the SSN's carrier support mission and any anti-SSBN mission.

The diversity of the Soviet Navy's non-strategic submarine force makes it somewhat more difficult to categorize than the U.S. Navy's. Of 190 attack submarines in its inventory, 52 are nuclear powered (SSNs), with the remainder being diesel boats (SSs). The VMF also has 69 cruise-missile launching submarines: 47 are nuclear-powered (SSGNs) and 22 are diesel boats.⁹⁸ The VMF's cruise missile launching submarines are designed for use against U.S. carriers and major combatants, while the majority of the attack submarines are dedicated to the pro-SSBN (i.e., anti-U.S. SSN) missions in the Soviet ASW defensive zones discussed above.

While the U.S. has only recently included the direct support mission for submarines, the VMF has long shown a preference for operating its submarines with other forces in coordinated ASW. For example, Polmar suggests that once a Soviet SSN detects an opposing submarine, it "would probably withdraw to permit surface or air attack without risk to the Soviet submarine."⁹⁹ Of course, Soviet general-purpose submarines would also be used to help other VMF units get past the GIUK gap so that they could perform missions in other theaters.

Nonetheless, despite the varied and capable weapons carried in the VMF's 250 plus general-purpose submarines, in the context of the strategic ASW mission against U.S. SSBNs, this force would be largely ineffectual. At the tactical level, the same acoustic advantage that U.S. SSBNs enjoy over those of the VMF shows up in a comparison of attack submarines: Soviet SSNs are noisier and their sensors are of shorter ranges. The strategic reasons that explain the security of U.S. SSBNs on patrol in the open ocean have been detailed above in the comparison of U.S. and Soviet employment practices and detection capabilities. However, Soviet ASW forces would present a formidable problem for U.S. SSNs on an anti-SSBN mission within the Soviet defensive zone.

c. Kill

Localization platforms carry the weaponry to sink submarines. The P-3 can hold up to 12 Mk 46 torpedoes, and the U.S. Navy's attack submarines typically have four, 21 inch torpedo tubes from which they launch either the Mk 48 torpedo or a submarine rocket (SUBROC). The Mk 46 is a short, acoustically guided torpedo, while the Mk 48, a much heavier and longer torpedo, combines wire guidance with active/passive

acoustic search to make it 'probably the most capable torpedo in service with any navy.'¹⁰⁰ U.S. SSBNs carry these torpedoes for self-protection. The Soviet's IL-38 May carries torpedoes in its weapons bay and the Bear F has both torpedoes and ASW depth bombs. All of the VMF's submarines have torpedoes, and some newer classes (Alfa, Victor, and Tango) may carry ASW missiles (SS-N-15/SS-NX-16).¹⁰¹ The SS-N-15 is estimated to have a nuclear capability and range similar to SUBROC, while the SS-NX-16 is more along the lines of an acoustic torpedo.¹⁰² Both sides also have ASW mines that could be used for chokepoint barriers. The U.S. Navy's CAPTOR is a bottom anchored, deepwater mine that acoustically detects hostile submarines, and then fires a Mk 46 torpedo.¹⁰³ The VMF stresses mine warfare and is capable of laying mines from a wide variety of platforms. A barrier of mines could be laid to augment the ASW defense of Soviet SSBN sanctuaries.¹⁰⁴

The single-shot kill probability of any of these torpedoes is less than one. After commenting on the "good news" that the Mk 48 torpedo can search out almost twenty times more ocean volume than its Soviet competition can, Captain Patton (a former SSN C.O.), points out the "bad news" that because of the Soviet's appreciation of overwhelming firepower they would "consider it a beneficial trade-off if a Soviet 'Victor'-class nuclear powered attack submarine (SSN) emptied her torpedo room in return for one Los Angeles-class SSN kill when the latter platform's one-bullet attack was made with a torpedo with a defective exploder mechanism."¹⁰⁵ "One-bullet" may be hyperbole, but others have also pointed to a possible U.S. shortfall in this area. Caldwell has said that firepower "is the primary deficiency of the U.S. Navy attack submarine force," noting that the U.S.'s first-line

attack boats only have four torpedo tubes, arguing that to make "strategic ASW and a forward strategy work we need a true tactical missile attack submarine that can carry and quickly launch a lot of weapons at a wide range of targets afloat and ashore."¹⁰⁶ There has also been some speculation that the advanced lightweight torpedo being developed to replace the Mk 46 may not have enough explosive punch to penetrate double-hulled Soviet SSBNs/SSNs.¹⁰⁷ The greater firepower of nuclear ASW weapons allows them a larger margin of error in their firing solution, but there is not much operational experience with these weapons. The point is that even after a submarine is localized its destruction cannot be considered to be a certainty.

4. SSBN Vulnerability to a Preemptive Strike

Even if the probability of kill in a scenario in which an SSN launches a surprise attack against an SSBN that it has succeeded in localizing were very high, as it well may be, the difficulties inherent in attempting to translate this one-on-one capability into the potential for a coordinated, preemptive attack against an adversary's entire SLEM force would be very great indeed. The uncertainties involved in each of the phases of the ASW problem would have to be multiplied together to come up with the overall probability of success of an attempt at preemption. Nonetheless, the confidence-building measures that will be considered in Chapter IV deal more with perceptions of vulnerability than they do with actual capabilities.

The survey of the ASW problem in the foregoing sections leads to the conclusion that the United States enjoys a real advantage in ASW vis-a-vis the Soviet Union. Confidence in U.S. SSBN survivability has been a

consistent and frequent theme in open U.S. sources. The Fiscal Year 1983 Arms Control Impact Statements note that existing U.S. SSBNs "possess an extremely high degree of survivability. No impending Soviet ASW development seems likely to pose a significant threat to Trident."¹⁰⁸ The survivability of Soviet SSBNs in the face of an improving U.S. ASW capability is a matter of some speculation. A 1978 Congressional report notes the U.S.'s potential for strategic ASW may be destabilizing in the context of a strategic doctrine based on mutual assured destruction.¹⁰⁹ Even if U.S. strategic doctrine has evolved past MAD, as Chapter II argues, measures that may assure either side of the survivability of its SSBNs could still contribute to strategic stability. If START were to achieve a schedule of reductions in the superpower triads, SSBN confidence-building measures could take on added importance, since the perceived vulnerability of any leg in a quantitatively smaller triad would be of even greater strategic significance.

The ASW related confidence-building measures that will be considered in Chapter IV address two areas of potential SSBN vulnerability--the first of these is that one side will develop the capability to preemptively destroy the other's SSBNs in what Richard Garwin has described as "an attack without warning and so concentrated that the force is entirely gone before the government learns of the problem and can launch those missiles against strategic or military targets."¹¹⁰ Garwin has identified several tools that, if acquired by either side, could eventuate in this capability:¹¹¹

1. area search--the ability to search large ocean areas, localize enemy submarines, and destroy them in a time urgent fashion.

2. trailing--maintaining a continuous SSN trail on an adversary's SSBNs in order to be in a position to strike on command.
3. belling--covertly tagging an enemy SSBN as it leaves port with a device which would disclose the SSBN's location.

The second concern that SSBN confidence-building measures address is the problem of crisis management and controlling escalation of conventional war--whether or not to attempt to avoid the attrition of SSBNs during conventional war. Chapter IV will examine a series of proposals in detail that have been suggested as a way of lessening the potential threat to SSBN survivability in these two areas (note: the belling problem will not be treated--adequate protection against this threat is a function of each side's physical security program.)

FOOTNOTES FOR CHAPTER III

- ¹U.S., Joint Chiefs of Staff, United States Military Posture for FY 1983, p. 72. Two of these SSBNs have been dismantled; the remaining eight are being converted to attack submarines (SSNs). The FY 83 Arms Control Impact Statements note (p. 53) that these eight submarines were still accountable under SALT since they were "operational."
- ²U.S., Department of Defense, Annual Report to the Congress Fiscal Year 1983, p. III-59.
- ³U.S., Congress, Committees on Foreign Relations and Foreign Affairs of the Senate and House of Representatives respectively, Fiscal Year 1983 Arms Control Impact Statements, Joint Committee Print, 97th Cong., 2d sess., 1982, pp. 40-41.
- ⁴Ibid., p. 39.
- ⁵U.S., DOD, Annual Report FY 1983, p. III-59.
- ⁶Ibid.
- ⁷Joel S. Wit, "American SLBM: Counterforce Options and Strategic Implications," Survival, July/August 1982, pp. 164-166 discusses possible guidance systems for D-5.
- ⁸FY 1983 Arms Control Impact Statements, p. 59.
- ⁹Ibid., p. 41.
- ¹⁰International Institute for Strategic Studies, The Military Balance 1981-1982 (London: IIIS, 1981), p. 3, cites this figure.
- ¹¹Wit, pp. 166-168 describe several warhead options for Trident II.
- ¹²Stockholm International Peace Research Institute, SIPRI Yearbook 1979 (London: Taylor and Francis Ltd., 1979), p. 393.
- ¹³FY 1983 Arms Control Impact Statements, pp. 35-36.
- ¹⁴Norman Polmar, The Ships and Aircraft of the U.S. Fleet, 12th ed. (Annapolis: Naval Institute Press, 1981), p. 20.
- ¹⁵FY 1983 Arms Control Impact Statements, pp. 34-35.
- ¹⁶Ibid.
- ¹⁷SIPRI, SIPRI Yearbook 1979, pp. 395 ff. discuss these systems.

- ¹⁸U.S., Congress House, Committee on International Relations, Evaluation of Fiscal Year 1979 Arms Control Impact Statements, Congressional Research Service, 95th Cong., 2d sess. (Washington, D.C.: Government Printing Office, 1978), p. 106.
- ¹⁹U.S., DOD, Annual Report FY 1983, p. I-17.
- ²⁰FY 1983 Arms Control Impact Statements, p. 31.
- ²¹Ibid., pp. 45-46.
- ²²SIPRI, SIPRI Yearbook 1979, p. 390.
- ²³Thomas Powers, "Choosing a Strategy for World War III," Atlantic Monthly, November 1982, pp. 95-96.
- ²⁴SIPRI, SIPRI Yearbook 1979, pp. 305-315 explain this network in some detail.
- ²⁵U.S., DOD, Annual Report FY 1983, p. III-69.
- ²⁶FY 1983 Arms Control Impact Statements, p. 59.
- ²⁷IISS, The Military Balance 1981-1982, p. 10.
- ²⁸SIPRI, SIPRI Yearbook 1982 (London: Taylor and Francis Ltd., 1982), p. 276.
- ²⁹Donald C. Daniel and Theodore A. Neely, Jr., "Their Navy in 1981," U.S. Naval Institute Proceedings, Soviet Navy Issue, October 1982, p. 109.
- ³⁰SIPRI Yearbook 1982, p. 276.
- ³¹IISS, The Military Balance 1981-1982, p. 105.
- ³²Ibid.
- ³³Department of the Navy, Office of the Chief of Naval Operations (CNO), Understanding Soviet Naval Developments, 4th ed. (Washington, D.C.: Government Printing Office, 1981), p. 41.
- ³⁴U.S., Department of State, "SALT II Agreement," Department of State Selected Documents No. 12A, dated June 18, 1979, p. 36.
- ³⁵The Military Balance 1981-1982, p. 105.
- ³⁶U.S., DOD, Soviet Military Power, p. 59, appended to Annual Report FY 1983.
- ³⁷SIPRI, SIPRI Yearbook 1979, p. 353.

- ³⁸CNO, Understanding Soviet Naval Developments, p. 41.
- ³⁹Daniel and Neely, "Their Navy in 1981," p. 109.
- ⁴⁰Ibid.
- ⁴¹Commander Clyde A. Smith, U.S. Navy, "Constraints of Naval Geography on Naval Power," Naval War College Review, Sep-Oct, 1974, p. 2.
- ⁴²SIPRI, SIPRI Yearbook 1982, p. 268.
- ⁴³Hamlin Caldwell, "The Empty Silo-Strategic ASW," Naval War College Review, Sep-Oct 1981, p. 12.
- ⁴⁴IISS, The Military Balance 1981-1982, p. 13.
- ⁴⁵Donald C. Daniel, "Navy (VMF)," in Soviet Armed Forces Review Annual 1980, ed. David R. Jones (Gulf Breeze, Florida: Academic International Press, 1980), p. 202.
- ⁴⁶CNO, Understanding Soviet Naval Developments, pp. 15-16.
- ⁴⁷Daniel, "Navy (VMF)," p. 204.
- ⁴⁸U.S., JCS, United States Military Posture for FY 1983, p. 107.
- ⁴⁹House, Committee on International Relations, Evaluation of FY 1979 Arms Control Impact Statements, p. 104 cites the FY 1978 Military Procurement Authorization in contrasting U.S. and Soviet SSBNs during the 1973 Yom Kippur War: U.S. SSBNs were surged, but Soviet SSBNs were not.
- ⁵⁰Joel S. Wit, "Advances in Antisubmarine Warfare," Scientific American February 1981, p. 37.
- ⁵¹SIPRI, SIPRI Yearbook 1982, p. 269.
- ⁵²See James M. McConnell "Military-Political Tasks of the Soviet Navy in War and Peace," pp. 183-210 for a thorough discussion of the withholding role for the Soviet SSBN, and Michael McGwire, "Naval Power and Soviet Ocean Policy," pp. 171-182 for a contrasting view in U.S., Congress, Senate, Committee on Commerce and National Ocean Policy Study, Soviet Ocean Development, S. Res. 222, 94th Cong., 2d sess (Washington, D.C.: Government Printing Office, 1976).
- ⁵³Robert Waring Herrick, Soviet Naval Strategy (Annapolis: United States Naval Institute Press, 1968) is an early work treating the defensive mission of the VMF.
- ⁵⁴Michael McGwire, "A New Trend in Soviet Naval Developments," International Defense Review 5/1980, pp. 675-680.

⁵⁵Ibid., p. 676.

⁵⁶Norman Polmar and Norman Friedman, "Their Missions and Tactics," United States Naval Institute Proceedings, October 1982, p. 35.

⁵⁷McConnell, "Military-Political Tasks of the Soviet Navy in War and Peace," p. 183.

⁵⁸Robert Warring Herick, "A Protracted Withholding Role for Soviet SSBNs?," part III, final report on Soviet Naval Mission Assignments, 15 January 1980, ONR Contract N00014-77-C-0708, p. 199.

⁵⁹Ibid., p. 200.

⁶⁰McGwire, "Naval Power and Soviet Ocean Policy," p. 182.

⁶¹U.S., DOD, Soviet Military Power, p. 19.

⁶²SIPRI, SIPRI Yearbook 1979, p. 409.

⁶³Ibid.

⁶⁴Ibid.

⁶⁵Caldwell, pp. 5-7.

⁶⁶James McConnell, The Interacting Evolution of Soviet and American Military Doctrines, CNA Paper (CNA) 80-1313.00 (Washington: Center for Naval Analysis, Plans and Policies Program Program Division, 19 September 1980).

⁶⁷SIPRI, Tactical and Strategic Antisubmarine Warfare (Cambridge: The MIT Press, 1974), pp. 34-37.

⁶⁸U.S., Congress, House, Evaluation of Fiscal Year 1979 Arms Control Impact Statements, p. 113.

⁶⁹Ibid.

⁷⁰Ibid., p. 114.

⁷¹Ibid. Also, see Lieutenant Commander Carl H. Clawson, Jr., "The Wartime Role of Soviet SSBNs--Round Two," United States Naval Institute Proceedings, March 1980, pp. 64-71 for a discussion of this role and the Soviets SS-NX-13 program of the mid-70s.

⁷²U.S., Congress, House, Evaluation of Fiscal Year 1979 Arms Control Impact Statements, p. 113.

⁷³In this regard it is interesting to note that U.S., DOD, Annual Report FY 83, p. III-23 includes the Delta and Typhoon SSBNs among the reasons why the U.S. cannot be complacent in "pursuing several programs that will strengthen our capability to defeat the undersea threat."

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- 75 Cited by Roger D. Speed, Strategic Deterrence in the 1980s (Stanford: Hoover Institution Press, 1979), p. 56.
- 76 Paul H. Nitze and Leonard Sullivan, Jr., Securing the Seas (Boulder, Colorado: Westview Press, 1979), pp. 92-93.
- 77 The information that follows is drawn from Speed, pp. 56-62 and SIPRI Yearbook 1979 pp. 440-442.
- 78 "The War Beneath the Seas," Newsweek, February 8, 1982, pp. 36 & 38.
- 79 Thomas F. Burns, The Secret War for the Ocean Depths (New York: Rawson Publishers, Inc., 1978), pp. 66-77.
- 80 SIPRI, SIPRI Yearbook 1979, p. 428.
- 81 House Committee on International Relations, Evaluation of Fiscal Year 1979 Arms Control Impact Statements, p. 110.
- 82 Ibid.
- 83 Drew Middleton, "Navy Seeks New Devices to Fight Submarines," New York Times, July 4, 1977, p. D2, cited by House Committee on International Relations, Evaluation of FY 1979 Arms Control Impact Statements, p. 110.
- 84 SIPRI, SIPRI Yearbook 1979, pp. 435-437
- 85 DOD, Annual Report FY 1983, p. III-28 states that funds for 12 of these ships have been appropriated for FY 84.
- 86 Joel S. Wit, "Are Our Bombers Vulnerable?," United States Naval Institute Proceedings, November, 1981, pp. 62-64.
- 87 Polmar, The Ships and Aircraft of the U.S. Fleet, pp. 275; 296.
- 88 Ibid.
- 89 IISS, Military Balance 1981-1982, p. 13.
- 90 Wit, "Are Our Bombers Vulnerable?," p. 64.
- 91 Polmar and Friedman, "Their Missions and Tactics," p. 39.
- 92 House Committee on International Relations, Evaluation of Fiscal Year 1979 Arms Control Impact Statements, p. 115.

- ⁹³Polmar, Ships and Aircraft of the U.S. Fleet, p. 24.
- ⁹⁴U.S., DOD, Annual Report to the Congress FY 1983, p. III-24.
- ⁹⁵House Committee on International Relations, Evaluation of Fiscal Year 1979 Arms Control Impact Statements, p. 109.
- ⁹⁶Ibid., pp. 109-110.
- ⁹⁷U.S., DOD, Annual Report to the Congress FY 1983, pp. III 28-29.
- ⁹⁸IISS, The Military Balance 1981-1982, p. 12.
- ⁹⁹Polmar, "Their Missions and Tactics," p. 39.
- ¹⁰⁰Polmar, The Ships and Aircraft of the U.S. Fleet, p. 34.
- ¹⁰¹IISS, The Military Balance 1981-1982, p. 12.
- ¹⁰²Jean Labayle Couhat, Combat Fleets of the World 1980-81 (Annapolis: United States Naval Institute Press, 1980), p. 531.
- ¹⁰³Polmar, The Ships and Aircraft of the U.S. Fleet, p. 329.
- ¹⁰⁴Lieutenant Commander Ted S. Wile, U.S. Navy, "Their Mine Warfare Capability," United States Naval Institute Proceedings, October, 1982, p. 150.
- ¹⁰⁵Captain James H. Patton, Jr., U.S. Navy, "The Good, the Bad, and the Best," United States Naval Institute Proceedings, July 1982, p. 106.
- ¹⁰⁶Caldwell, p. 12. Of course, these four tubes can be reloaded with weapons carried in the SSN's torpedo magazine, but the time involved in reloading could be a problem in certain tactical situations. Also, since the space available for ASW and other weapons is limited, a trade-off must be made among weapons for competing missions (i.e., torpedoes, SUBROC, Harpoon, and Tomahawk).
- ¹⁰⁷Captain W. R. Ruhe, United States Navy (Retired), "Future Antisubmarine Weapons," United States Naval Institute Proceedings, July 1981, p. 126.
- ¹⁰⁸Committees on Foreign Relations and Foreign Affairs, Fiscal Year 1983 Arms Control Impact Statements, p. 58.
- ¹⁰⁹U.S. Congress, House, Evaluation of Fiscal Year 1979 Arms Control Impact Statements, p. 113.
- ¹¹⁰Richard L. Garwin, "ASW and the Future Navy," a paper for the Colloquium on Science and Disarmament Institut Francais des Relations Intrenationales, January 15, 1981, p. 7.
- ¹¹¹Ibid.

IV. CONFIDENCE BUILDING MEASURES FOR SSBN SURVIVABILITY

A. CONFIDENCE BUILDING AND NAVAL ARMS CONTROL

Confidence building "involves the communication of credible evidence of the absence of feared threats."¹ This art has long been practiced by statesmen and strategists; however, in its current usage, the concept of CBMs was given formal expression in 1975 in the Final Act of the Helsinki Meeting of the Conference on Security and Cooperation in Europe (CSCE). Signatories to the Final Act agreed to notify each other prior to staging any troop maneuvers in Europe that involved more than 25,000 men in order to promote "mutual understanding and the strengthening of confidence, stability and security."² Jonathan Alford, Deputy Director of IISS, has explained that two kinds of reassurance are sought through CBMs:

The first is essentially continuous and related to the willingness of potential adversaries to demonstrate publicly their non-aggressive postures and generally defensive concerns by opening their internal affairs to examination. . . . The second is designed to operate primarily in times of crisis. As a result of measures agreed between the parties, both should know that they are less vulnerable to the dangers of a surprise attack because they are assured of warning.³

Alford goes on to categorize CBMs as being either subjective or objective. Both types seek to shape perceptions concerning an adversary's intentions; however, a subjective CBM (e.g., exchanging observers), per se, does not restrain activity, whereas objective CBMs (i.e., those which "place physical limits on what each side can do in peacetime") aim at codifying good intentions through actual constraints.⁴

Although CSCE's Final Act of 1975 was limited to ground forces, Helsinki's confidence-building approach could be applied in analogous ways to naval forces. Richard Haass, of the Bureau of Politico-Military Affairs in the U.S. Department of State, sees three areas for such an approach:

. . . the establishment of procedures or 'rules of the road' to lessen the chance of accidental conflict and reduce opportunities for intimidation and harassment of an adversary's vessels; the requirement that prior notification be provided for designated naval activities (inventory changes, transits, or deployments in a given area, port calls, exercises, etc.) such as the notices that are given before certain ground maneuvers under the CSCE (Helsinki) Final Act; and, if CBMs are defined in their broadest sense, the introduction of actual constraints on the use of naval or sea-based forces, in which case they become tantamount to activity controls.⁵

This chapter will examine two types of CBMs. The first type, deployment restrictions on naval forces, falls into Haass' "broadest sense" and Alford's "objective" categories. The second type, naval inventory controls, limits either the quantity or the characteristics of hardware that may be constructed. All of these CBMs address some aspect of possible SSBN vulnerability. The proposals either aim at ensuring that trends in strategic ASW capabilities do not eventuate in either side being able to conclude that a pre-emptive strike against its own or its adversary's SSBNs is possible, or they attempt to insulate SSBNs from unintended attrition that could lead to an inadvertent escalation of hostilities at some point on the spectrum of conflict from crisis through general nuclear war.⁶

Attempts at controlling the size and deployment of naval forces are not new. Some agreements have regulated the types and quantities of ships that nations have been allowed to construct (e.g., the Washington

and London Naval Treaties of 1922 and 1930), while others have limited the deployment of naval forces in key areas (e.g., both the Rush-Bagot Treaty of 1817 for the Great Lakes and the Montreux Convention of 1936 for the Black Sea are still in force).⁷ Deployment controls can be abrogated quickly, while the effects of inventory restrictions would take some time to reverse, insofar as the lead time of ship construction programs is considerable. Abrogating either type of agreement could be an escalatory step that might provoke an undesirable response. The SSBN survivability CBMs that will be dealt with in this chapter are listed in Table III, which reflects the general divisions of deployment and inventory controls.

TABLE III			
SSBN SURVIVABILITY CBMS			
<u>Deployment of ASW Forces</u>		<u>Inventory</u>	
Where forces cannot go	What ASW forces do	What is built	How much is built
SSBN Sanctuaries	No SSBN trailing	No plunging RVs No large, fixed active sonars	Ceilings on #SSNs

The proposals listed in Table III have been discussed in the literature since the early 70s, so none of them qualifies as a new idea; nonetheless, some of them may be introduced in the strategic arms limitation negotiations now underway in Geneva. Past commentary on these measures has generally started with the assumption that both sides adhere to a strategic doctrine based on mutual assured destruction.⁸ Since U.S. strategic doctrine and force capabilities continued to evolve during and

after the SALT II negotiations (discussed in Chapters II and III), another look at these proposals seems worthwhile. Even though this evaluation will evince the American perspective, the U.S.'s outlook is necessarily conditioned by a calculation of the impact that these CBMs would have vis-a-vis the Soviet Union. These CBMs will be considered in the context of bilateral negotiations between the U.S. and the USSR. Before turning to the individual confidence-building measures, the approach that will be followed in judging these proposals will be outlined.

B. EVALUATING CBMS FOR SSBN SURVIVABILITY

Three aspects of each CBM will be treated. First, the proposal itself will be described. The specific threat to SSBN survivability that the CBM addresses will be considered, and the details of how the measure might work in practice will be suggested, highlighting any complexities inherent in a given type of CBM. Second, the negotiability of each CBM will be assessed. Three questions will be looked at under negotiability: a) Verifiability--Can compliance with the CBM be determined in a timely fashion, and, if not, what are the consequences?; b) Enforceability--What sanctions can be exacted in the event of non-compliance?; and, c) Symmetry--Does the measure require the same sacrifices from both sides?⁹ These concerns reflect the legacy of SALT II. The relative importance of each of these questions will vary with each CBM considered. For instance, given the existing asymmetries between U.S. and Soviet force structure, missions, and geography, a one-for-one correspondence in the requirements and outcomes of some proposals may not be possible or desirable; yet, with the Jackson amendment that followed SALT I as precedent, any proposal that deals with numerical limits, (e.g., restricting the number of

SSNs) would probably have to demonstrate symmetry to gain U.S. support. This symmetry does not necessarily include a requirement for exact numerical equality; however, any agreement that would be open to the charge of being asymmetrical in the Soviet's favor, for whatever reasons, would have a hard time gaining U.S. acceptance.

Finally, and most importantly, the desirability of each CBM will be weighed. As Haass cautions:

Ultimately, however, any discussion of CBM involving naval forces raises a fundamental question: Is it in American (or Western) interests to have naval forces constrained? Even if naval CBM could be negotiated, would they be desirable? Analysis prompts caution, particularly over those naval CBM which limit flexibility and activity.

. . . to constrain in naval forces in the name of building confidence begs a key question: Confidence on whose part?¹⁰

Desirability, then, becomes a calculation of the costs and benefits. The operational cost involved in a proposal, the variance that it would require from the status quo described in Chapter III, must be compensated for by the increase in confidence and stability that would follow from entering into such an agreement. Alford has explained two ways in which CBMs can build confidence:

. . . . They promote confidence in one's ability to defend oneself if threatened (that is, self-confidence) and confidence that the other side is not, in fact, intending to threaten (that is, mutual confidence). There must be interaction between the two, producing a downward spiral. . .¹¹

A CBM must also be measured against its contribution to and consistency with the overall strategic doctrine that it supports (see Chapter II). Again, apparent divergence between strategic doctrine and a given CBM can only be tolerated if the CBM makes an unequivocal contribution to a state's sense of security. These calculations, intrinsically

subjective and imprecise, are complicated even further by the need to consider the impact that agreements may have on regional stability. As was noted in Chapter II, the political fallout from SALT was in many ways more significant than the numerical ceilings that were established. A similar concern must be taken into account in gauging the desirability of CBMs to insure that they would not give unintended signals to America's allies.

C. CBMS

1. Establish SSBN Sanctuaries

a. The Proposal

Richard L. Garwin, of IBM's Thomas J. Watson Research Center, has written frequently about the possibility of establishing sanctuaries as a means of increasing the perceived survivability of SSBNs in their deterrent role. In 1972, he noted that in his opinion "such submarines are probably adequately survivable in the absence of a new agreement," going on to say, however, that such an agreement would "allay exaggerated fears that our Polaris-Poseidon fleet might suddenly be neutralized by a drastic advance in the effectiveness of antisubmarine warfare."¹² The "exaggerated fears" cited by Garwin were presumably part of the rationale behind the U.S.'s decision to develop Trident--a decision which had already been made at the time that Garwin wrote. In any event, he saw SSBN sanctuaries as offering both a means of reducing the feasibility of a pre-emptive strike against the SLBM deterrent in peacetime and as a way to avoid the unintended attrition of SSBNs during conventional war.

This proposal envisions "the creation of wide ocean sanctuaries in which ballistic missile launching submarines of one side or another would

be free to patrol, but which would be closed to ASW or underwater surveillance forces of the other side."¹³ A second feature of these havens would provide for the safe passage of SSBNs to these areas during periods of conventional war in order to limit their attrition.¹⁴ Garwin comments that such sanctuaries would have to be "large compared with the range of ASW detection and attack devices," but not so large as to "interfere with merchant shipping lanes or with deployment or transit routes for naval vessels, including SLEMs."¹⁵ He also points out that the ASW forces of other countries might present some problems, since a bilateral agreement between the U.S. and USSR could not exclude such forces from sanctuaries established in international waters. In addition to the ASW forces of other countries, the sanctuary picture is muddled further by the fact that both France and England operate SSBNs. Working out these details, and others, would be a difficult problem for anyone actually tasked with negotiating such an agreement. Some of the obstacles to concluding a sanctuary arrangement are considered below.

b. Negotiability

Even the most obvious questions concerning SSBN sanctuaries suggest that they would be difficult to negotiate. For instance, would sanctuaries be established in both the Pacific and Atlantic, and, if so, would their distance from an adversary's shore be a function of the range of the least capable SLBM in the sanctuary owner's inventory? Would the prohibition against ASW surveillance require the U.S. to dismantle portions of the SOSUS network? Would sanctuaries established in international waters have to be reconciled with or sanctioned by the emerging Law of the Sea? The sanctuary sizing and location problem will

be touched on in connection with the proposal to ban the testing of plunging RVs, which addresses the vulnerability of SSBNs to a barrage attack by ballistic missiles if they are known to be in an ocean area of a given dimension. Apart from these inherent problems, what can be said about the questions of verifiability, enforceability, and symmetry of SSBN sanctuaries?

Brian McCue has commented that the "verifiability of the sanctuary would depend upon how much the owner was willing to spend on patrolling it with aircraft and other ASW assets of his own. For once, that which is to be verified would be readily accessible to the verifier. . ."¹⁶ Ease of verification would depend upon where the sanctuaries were located. For example, if the sanctuaries were placed in open ocean areas, it seems clear that the Soviet Union's ASW capabilities (see Chapter III) would not permit the VMF anything approaching certainty in detecting sanctuary violations. However, since the open ocean far from each superpower's coastline is the least likely area to be selected for SSBN sanctuaries (discussed below), McCue's verifiability assessment is accurate.

In considering how a sanctuary agreement might be enforced it seems reasonable to differentiate between enforcement in peacetime and during conventional war. Peacetime complaints about alleged violations of SSBN sanctuaries would likely be referred to SALT's Standing Consultative Committee (SCC), or a similar body, for review and disposition. Proving a violation in such a forum would be a difficult proposition in the face of a flat denial by the accused that any violation took place. As to sanctions, repeated violations would probably lead to the treaty's abrogation. In any case, this deliberative approach to handling violations

would certainly be preferable to any scheme giving a sanctuary owner the right to conduct attacks on unidentified submarine contacts, especially if the sanctuary is not recognized on a multilateral basis.

During a conventional war, a different approach would be taken. The safe passage of SLEMs to their sanctuaries has already been mentioned. Garwin has explained that such a provision would require ASW forces engaged in tactical operations to distinguish SSBNs from attack submarines. He suggests that this problem could be resolved by having the SSBN proceed on the surface or tow a buoy while submerged that emitted a special signal identifying the submarine as an SSBN enroute to its sanctuary (ASW forces could request the submerged SSBN to surface for positive identification).¹⁷ The scenario that Garwin had in mind in 1972 probably saw Soviet Yankees being allowed to transit the GIUK gap during a period of conventional war. This scenario has been overtaken by events: given the advent of the Deltas and their longer range SLEMs, it doesn't seem likely that a sanctuary beyond the GIUK gap would be desired by the Soviet Union, much less acceptable to the U.S. However, even in the context of a sanctuary very near to a nation's SSBN bases, some provision for SSBN passage might have to be made if avoiding the unintended attrition of SSBNs were considered to be desirable--compliance with a safe passage provision would turn on each side's fear of escalation and reprisals in kind for any sinking of an SSBN. As to ASW forces penetrating an adversary's sanctuary during conventional war, the agreement creating the sanctuaries could provide for a shift from the peacetime SCC regime for redressing sanctuary violations. Even without such a provision, all attack submarines would be fair game if there were a conventional war going on in Europe. SSBN

sanctuaries would be more heavily defended during any war, and neutral ASW forces (especially SS/SSNs), if any remained, could only insure their survival by remaining clear of such areas.

Can an SSBN sanctuary proposal meet the test of symmetry? McCue concluded that the "symmetry criterion is impossible to meet, because there are no two pieces of identical geography anywhere in the world," observing that the parties would have to accept that their sanctuaries were "essentially equivalent."¹⁸ Nonetheless, locating and sizing the sanctuaries to give the appearance of symmetry or "essential equivalence" does not seem to be the primary stumbling block that would stand in the way of reaching such an agreement. Rather, there are some basic strategic and operational asymmetries, discussed below, that may make any sanctuary less than desirable from the U.S.'s perspective.

c. Desirability

Although the complexity inherent in negotiating bilateral SSBN sanctuaries (outlined above) could make achieving such an arrangement problematic, complexity is not a sufficient cause for rejecting such a proposal out of hand, even though the negotiating environment described in Chapter II is already overtaxed. Indeed, complicated agreements have been reached before, and if both superpowers found it in their interest to conclude a sanctuary agreement, technical complexity would not stand in the way. In any case, the effect that such an agreement would have on U.S. security interests must be the overarching criterion in deciding whether an attempt to achieve a sanctuary agreement would be worth the candle.

At the most basic level, the threat that SSBN sanctuaries are purported to solve is not an urgent one for the U.S. Navy. American SSBNs are not perceived as being vulnerable to the Soviet Union's ASW forces for all the reasons described in Chapter III. The U.S. has added to this sense of invulnerability over the years by developing SLBMs of increased range, which have allowed SSBNs greater flexibility in the choice of ocean areas for their deterrent patrols. Agreeing to limit SSBNs to designated sanctuaries would involve a dramatic shift in U.S. SSBN employment practices--a shift whose effect might well be to diminish, rather than increase, American confidence in the survivability of its SLBM force.

In contrast, such an arrangement would be consistent with Soviet peacetime SSBN employment practices, as well as with the VMF's wartime withholding strategy. A bilateral sanctuary agreement would amount to de jure recognition of the de facto SSBN sanctuaries that the VMF has attempted to establish in its ASW defensive zones.

Beyond the immediate change that SSBN sanctuaries would require in U.S. SSBN deployments, American policy-makers would have to consider the long-term effects that adopting such a program might have on its allies. For example, if the Soviets were given SSBN sanctuaries in the Barents Sea on the Atlantic side and in the Sea of Okhotsk, Sea of Japan, or other near waters on the Pacific, there could well be some impact on the regional stability of the Nordic tier and that of the Far East. It would probably not be a dramatic shift, but rather an incremental series of changes whose effect might only become apparent after many years.

John Jorgen Holst, Under-Secretary of State for Defense in Norway, has spoken of this possibility and has gone on to relate it to the problem of access to ocean resources:

. . . For example, sanctuary could be envisaged for Soviet D-class SSBN's in the Barents Sea, and this would presumably entail a commitment by Western ASW forces not to enter the sanctuary zones, and, in particular, to exclude them from their maritime surveillance envelopes. But such a change of pattern could affect the geopolitical viability of continued Norwegian alignment and involvement in the NATO system of maritime surveillance. Pressures for expanding 'sanitization' to include the littoral areas as well could increase with expanded civilian presence in the SSBN sanctuary in connection with oil and gas production on the continental shelf. The sanctuary could thus become the basis for expanded claims to preferential access to resources and modification of the dividing lines on the continental shelf.¹⁹

In the Pacific case, U.S. agreement to a Soviet SSBN sanctuary might well be seen as inconsistent from the Japanese perspective, since the U.S. has been pressing Japan for several years to increase its defense expenditures in order to balance off Soviet maritime growth in the Pacific.

Beyond knowing that its own sanctuary is not being violated, each side might also have an interest in having the other side's SSBNs patrol in sanctuaries. This interest is not based on any concern for SSBN survivability; rather, it is driven by the desire not to have an adversary's SSBNs in forward positions that result in improved SLBM accuracy, and reduced time of flight.²⁰ Of course, SSBNs not restricted to sanctuaries could move forward. The sanctuary proposals discussed in the literature only prohibit ASW forces from entering such areas: they do not say that SSBNs must stay in the sanctuaries. Although sanctuaries are being considered in relation to SSBN survivability, Soviet interest in such sanctuaries seems to have been animated primarily by a desire to keep U.S. SSBNs as far as possible from Soviet shores in order to lessen the potential for a surprise attack.

The Soviets have made a number of proposals over the years relating to naval arms control. In 1974, for instance, Brezhnev called for the

withdrawal of ships carrying nuclear weapons from the Mediterranean. Calhoun and Petersen note that implementing this proposal "would achieve a long-standing goal of the Soviet political leadership and the Navy-- pushing the seaborne threat to the USSR further from Soviet shores."²¹ They also point out that past Soviet naval arms limitation proposals have been timed to influence ongoing SALT negotiations (especially in connection with the forward-based systems issue).²² Brezhnev recently made another naval arms limitation proposal that is consistent with this pattern (i.e., timed to influence START). His proposal and the White House response summarize the opening positions of both sides on SSBN sanctuaries.

In an address that Brezhnev gave to the 17th Congress of Soviet Trade Unions on 16 March 1982, he stated:

. . . We would be prepared, for example, to agree to a mutual limit on operations of naval fleets. In peacetime, we would consider it possible to agree that the missile submarines of the two sides should be removed from their present extensive combat patrol areas and that their cruises should be restricted by limits mutually agreed upon. We would also be prepared to discuss the matter of spreading confidence-building measures to the seas and oceans. . . . In short, we are in favor of the greatest possible area of the world's oceans becoming a zone of peace in the nearest future.²³

A statement issued by the White House rejected Brezhnev's offer:

President Brezhnev's proposal to place limits on the operations of missile submarines is also not a serious proposal. . . . Reducing their area of operations in the world's oceans would increase their vulnerability and erode our confidence in their deterrent capability. The Soviet proposal, therefore, is entirely self-serving. Having made a large fraction of our land-based ICBM force vulnerable through their large ICBM build-up, the Soviets in this proposal are attempting to reduce the confidence we have in the sea-based leg of our deterrent.²⁴

In short, as the present U.S. administration sees it, Haass' key questions on CBMs--"Confidence on whose part?"--can be answered relative to the SSBN sanctuaries proposal: Not the U.S.'s.

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SSBN SURVIVABILITY: A TIME FOR CONFIDENCE-BUILDING
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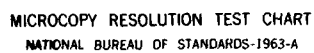
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The White House response reflects the fact that the U.S. enjoys an ASW advantage vis-a-vis the Soviet Union. Nonetheless, if the USSR were to press for SSBN sanctuaries, Washington could define such a proposal as being a U.S. concession that would require an offsetting tradeoff by the Soviet Union in some other area of U.S. concern (e.g., reducing the Soviet ICBM threat in line with the longstanding U.S. goal of "driving the Soviets to sea"). One such concessionary proposal that the U.S. might find possible to entertain if the Soviets offered a significant quid pro quo is outlined below.

As noted, the sanctuary proposals discussed in the literature only require that ASW forces stay out of the designated havens: they do not restrict SSBNs to patrolling in the sanctuaries, but only say that if SSBNs choose to patrol in these areas they will not be monitored by ASW forces. So, although the Soviet interest in sanctuaries may be so closely intertwined as to be inseparable from Moscow's desire to keep U.S. SSBNs as far away from the Soviet Union as possible, the U.S. would not agree to any arrangement that restricted U.S. SSBNs to patrol in designated sanctuaries for all the reasons stated in the White House reply to Brezhnev's offer.

If the Soviets were still interested in SSBN sanctuaries with restrictions on U.S. SSBNs defined as non-negotiable, then the U.S. might consider agreeing to half a sanctuary. It is termed half a sanctuary because the U.S. perception of SSBN survivability would not be heightened by a sanctuary agreement. Under such a proposal the U.S. would agree to keep its ASW forces out of certain ocean areas whose locations are suggested below. Similar sanctuaries could also be set up on the U.S. coasts in

the interest of symmetry, but it would be explicitly stated that the U.S. would not restrict its SSBNs to those locations.

Where might the U.S. find it acceptable to restrict its ASW forces from routine peacetime operations? It could not be in an area that overlapped with tactical U.S. ASW missions (e.g., the Barents Sea). The Kara Sea might be one possible location for a Soviet SSBN sanctuary. The eastern end of the Barents Sea is marked by the island of Novaya Zemlya: the Kara Sea lies to the east of this island. Because Soviet SSBNs leaving Murmansk would have to transit the Barents Sea, which would not be off limits to U.S. ASW surveillance, a safe passage arrangement would require Soviet SSBNs to proceed on the surface along designated coastal routes until they arrived at their sanctuary. As to the Pacific coast, a similar arrangement might be possible in the northern half of the Seas of Japan or Okhotsk.

Some might reasonably raise the objection that the narrowness of the proposal outlined above would not prompt the Soviets to offer much to reach such an agreement, especially since the VMF may feel relatively confident that it can already defend the proposed areas from U.S. ASW forces. For instance, ice conditions in the Kara Sea make it only "occasionally penetrable by powerful icebreakers" eight months out of the year.²⁵ As Caldwell noted (cited above), the performance of acoustic systems is degraded under the ice. Whether or not these same ice conditions would be an obstacle to a Soviet SLEM launch from the Kara Sea is another question. In any case, Soviet ASW capabilities are clearly more threatening in these close-in areas than they are in the open sea.

Finally, even if the Soviets were interested in such a limited proposal, the tradeoff that they would have to offer in return would have to be a significant one to overcome strong U.S. resistance to placing any restrictions on ASW forces.

2. Ban the Testing of Plunging RVs

a. The Proposal

A ballistic missile (ICBM/MRBM/SLEBM) equipped with plunging re-entry vehicles has the potential to be an effective ASW weapon. Because the lethality of nuclear weapons is so much greater than that of conventional weapons, a greater margin of error in localizing a target submarine is acceptable, if it is going to be attacked with a nuclear weapon. Indeed, both the U.S. and Soviet Navies already have nuclear capable ASW weapons (e.g., the U.S. SUBROC and the Soviet SS-N-15) that are designed to take advantage of this feature in order to assure a higher probability of kill in an ASW mission; however, these relatively short-range weapons are delivered by platforms that have already localized their target's position with a fair degree of accuracy. Because the payload carried by an ICBM's re-entry vehicle (in the megaton range for Soviet RVs) is so much greater than that of the short-range weapons (e.g., SUBROC is about 1 kt),²⁶ an even greater margin of error in the estimated position of a submarine targeted with such weapons would be possible. Two different approaches, which depend upon how well the target's position is known, could be taken in using ballistic missiles against submarines. Before considering these, brief mention will be made of how nuclear weapons kill submarines.

In commenting upon the possible effects of a subsurface nuclear blast on an SSBN, Lieutenant Commander Carl H. Clawson, Jr., U.S. Navy (retired) has estimated that

. . . a nuclear weapon burst at a depth of 1,000 ft. would create an intense shock wave traveling at about the speed of sound through water. The lateral distance at which a one-megaton burst could overstress and collapse a deeply submerged submarine hull is unknown. A rough estimate would be 3-5 nautical miles, with the aspect angle of the burst from the ship varying this distance. The shock (water hammer) effect could be critically severe for an extended distance, damaging delicate inertial instruments and components on both missiles and the submarine. If so, the launch suppression requirement would have been met. A grid pattern salvo of missiles could enlarge the interdictory damage radius and area.²⁷

The physics involved in an underwater blast are beyond the scope of this discussion, but it should be noted that the depth of water, the depth at which the blast takes place, and the depth of the target submarine are all variables that can either magnify or reduce the shock effect. For a nuclear warhead from a ballistic missile to yield the most effective results in an anti-SSBN role, then, it must be specially designed to withstand the impact of hitting the water's surface, only detonating when it reaches a predetermined depth--a "plunging RV." As Clawson notes, there is some uncertainty as to the precise effects that these weapons would have.

Returning to the two approaches that could be taken in using ballistic missiles in a ASW mission, the first of these assumes that a rough estimate (i.e., within a 15 nm radius) of a submarine's position is available. Roger Speed has described a theoretical scenario in which the peacetime U.S. SSBN force at sea would be susceptible to a barrage attack by Soviet ICBMs if the Soviets knew their positions to such an accuracy:

. . . if only the seventeen SSBNs are detected, it may take 150 1-MT warheads to barrage the area in which the submarines are thought to be located. (This assumes that the SSBNs patrol at five knots, that their initial positions are known within a radius of 15 nm, and the warheads arrive one hour after detection.) If there are 100 total targets (only seventeen actually being submarines), the Soviets will have to use about 800 warheads to cover the area of uncertainty. They could, in theory, do this with 100 SS-18 ICBMs and still have around 1,300 ICBMs left.²⁸

Since the Soviets do not know the position of U.S. SSBNs to such an accuracy, this approach does not seem to threaten the future survivability of the U.S.'s sea-based deterrent in the absence of any breakthrough in Soviet ASW capabilities. At first glance, the possibility of the U.S. threatening the small number of Soviet SSBNs that are routinely at sea with such an attack seems more realistic; however, this possibility evaporates in the face of the retaliatory blow that it would trigger from the Soviet's ICBM force. It is also worth noting that since U.S. ICBM/SLEM development programs have emphasized smaller warheads of higher accuracy, the U.S. inventory is ill-suited for scenarios that envision expending a lot of 1 MT warheads to destroy submarines (only warheads on the 54 Titan II and the 450 Minutemen II have yields in the MT range). Such is not the case with Soviet inventory, which exhibits a large variety of warheads in the megaton range.

The second approach to using ballistic missiles in an anti-SSBN role involves barraging a large ocean area in which SSBNs are known to be operating. For instance, if the superpower's SSBNs were confined to sanctuaries, calculations would have to be made to estimate the vulnerability of such ocean areas to a barrage attack. Brian McCue has made such calculations for several ocean areas. Assuming a lethal radius of 3.5 miles for a one megaton weapon, he translated this into a lethal

area of 38 square miles for each equivalent megaton (EMT: yield to the two-thirds power) detonated in an ocean area. He then divided the area of possible sanctuaries by 38 to arrive at the number of EMT that would be required to barrage them. He added 35% to each calculation to compensate for both the warhead overlap that is required to cover an area with circles and to allow for missile inaccuracy.²⁹ (As a technical matter, it still remains to be determined if fratricide would limit the effectiveness of these closely spaced RVs.) His results are reproduced in Table IV.³⁰

TABLE IV
SANCTUARY VULNERABILITY

<u>Sanctuary</u>	<u>Area (1k sq. nm.)</u>	<u>EMT</u>
Aral Sea	20	711
Caribbean Sea	566	20,108
Caspian Sea	115	4,086
Great Lakes	75	2,664
Gulf of Mexico	528	18,758
Hudson Bay	356	12,647
Sea of Okhotsk	439	15,596

Source: Brian Gerald McCue, "The Threat to the SSBN: Unilateral and Bilateral Responses" (Master's Thesis, Massachusetts Institute of Technology, 1980), p. 64.

McCue notes that "these sanctuaries do not appear to be so vulnerable."³¹ Indeed, projections of 1982 EMT totals that Paul Nitze brought forth in 1979 during the congressional hearings on the SALT II Treaty estimated a total of about 4,300 EMT in the total U.S. strategic triad

versus about 8,000 EMT in the Soviet's arsenal.³² Although current figures may vary somewhat from Nitze's projections, the inescapable conclusion must be that barraging is not a practicable approach because it requires far too many weapons. Even if SSBNs were concentrated in the areas listed in Table IV, the total weaponry of either superpower would prove inadequate to the task of barraging its adversary's SSBNs, with the exception of the three most unlikely SSBN operating areas of the Aral and Caspian Seas and the Great Lakes.

Given the U.S. Navy's wide ocean SSBN employment pattern and the relative invulnerability that these boats enjoy from Soviet ASW detection, neither of the ballistic missile attack methods cited above constitutes an urgent threat to U.S. SSBN survivability. When placed in the context of the overall strategic balance between the U.S. and the Soviets, these approaches do not seem particularly threatening to the Soviets either, for all the reasons given in the earlier discussion explaining why the Soviets feel comfortable with so many of their SSBNs in the ostensibly vulnerable position of being in port.

Despite the fact that the plunging RV may not be high on either side's list of threats, confidence-building deals with perceptions, and a program for developing plunging RVs might prompt some concern. Also, the potential for the tactical use of IREMs/ICBMs against ships at sea has not been lost upon the Soviets. In commenting upon statements made by the Soviet Defense Minister in 1972 to the effect that the SRF had the capability to attack ships at sea, Norman Polmar observed that

. . . the large payloads of Soviet ICBMs permit very large thermo-nuclear warheads with a large radius of destruction to compensate for submarine movement during missile flight; or possibly a terminal guidance system for localization could be developed.³³

As noted in Chapter III, The VMF's SS-NX-13 program of the early 70s, although never operationally deployed, was estimated to have a tactical mission against carriers and possibly SSBNs at sea, and Clawson has suggested that the 2-3 warheads on the SS-N-6 Mod 3s "could be optimized for deployment in a submerged burst footprint more suited for submarine interdiction."³⁴ It also should be noted that even a warhead not specifically designed for an optimal subsurface burst (i.e., one that is not a plunging RV) would still create a significant underwater shock wave if it were detonated at or near the water's surface.

The proposal to ban the testing of plunging RVs aims at assuring each side that their SSBNs (possibly all submarines) will not have to contend with another threat. An inferential leap is involved here: the assumption is that plunging RVs would not be deployed without being tested. This problem will be touched on again when the verifiability of such a ban is considered. With the foregoing as prologue, what can be said of the negotiability of this proposal?

b. Negotiability

Before looking at the verifiability, symmetry, and enforceability of a ban on the testing of plunging RVs, it seems useful to consider how such a proposal might find a place on the START agenda. The U.S.'s failed attempt to conclude an agreement during SALT II to ban the testing of SLEMs in a depressed trajectory mode may serve as a paradigm for a test ban on plunging RVs. In September of 1978 the American delegation (Warnke) caught the Soviets off guard with a proposal to ban the testing of depressed trajectory SLEMs. The U.S. reasoned that such a capability, if acquired, would be destabilizing because the shortened

time of flight of these SLEMs would make them suitable for surprise attacks. Strobe Talbott describes the Soviets as initially reacting to this surprise proposal with "raised eyebrows and stiffened backs;" however, he goes on to say that "after considerable haggling, the Soviets said they might consider a ban on depressed trajectory missiles--if it was part of a comprehensive treatment of the problem of sneak attack, including severe limits on antisubmarine warfare (ASW)."³⁵ If the issue of plunging RVs comes up, it is apt to be linked to other proposals relating to the problem of surprise attacks (q.v., Brezhnev's March 1982 speech), just as the earlier proposal to ban the test of depressed trajectory SLEMs was.

Would an agreement to ban the testing of plunging RVs be verifiable? Although the monitoring of missile testing has become an institutionalized feature of SALT (i.e., the prohibition against encrypting missile telemetry); verifying whether or not a plunging RV had been tested would be somewhat more challenging. McCue suggests getting around this problem by a treaty provision that "tested RVs use a conventional explosive to self-destruct on or before hitting the water."³⁶ Such a restriction does not appear watertight. For example, in a test involving several RVs a plunger or two could be included without the required conventional explosive device. If monitored and challenged, the lack of an explosion could be explained away by the offending party as a malfunction. Even assuming that a test ban could be verified, a plunging RV seems like a possible candidate for development without any extensive test program. Given the experience that both sides already have with ASW weapons that pass from air to water, detonating at predetermined depths, it seems plausible that either side might be able to develop a casing and fuze for a

plunging RV with a reasonable degree of confidence in its operability even without any full operational test of the RV.

As to the symmetry of a plunging RV test ban, McCue's conclusion that it would be symmetric since it requires the same thing of both sides seems to be a reasonable one. McCue goes on to note that the "utility of plunging RVs would arguably be greater for the USSR than for the U.S., because the USSR has more RVs and more adversary SSBNs at which to shoot them than does the U.S."³⁷ McCue's statement assumes peacetime deployment rates, which would not necessarily apply during a crisis, and which certainly would not apply during a conventional war. Also, since the barrage tactic is really not a usable option for either side, an argument could be made that because the U.S.'s ASW capabilities put it a lot closer to Speed's scenario in which the positions of an adversary's submarines are known to an accuracy of 15-20 NM than the Soviets are, Speed's tactic might offer more potential for the U.S. than it does to the Soviets. Enforceability of such a treaty would rest on the fear that its abrogation by one side would be matched by the other, possibly contributing to a worsening of overall relations between the two countries.

c. Desirability

Since the U.S. has not had any apparent interest in developing a plunging RV,³⁸ an agreement to ban their testing would not appear to involve any significant operational cost on the American side. So, on the face of it such a treaty seems desirable from the U.S. perspective, since it could eliminate a potential threat to U.S. submarines. This should not be overstated, however, since the threat addressed by such a ban is not an urgent one for U.S. SSBN survival, and because the ban on testing would

only be a partial assurance that such an RV was not in the Soviet inventory (a plunging RV could be developed without test or tested covertly). Nonetheless, the plunging RV ban would be a worthwhile agreement, unless its acceptance by the Soviet Union were made contingent upon other, more restrictive proposals that the U.S. could not support.

3. Ban Active Sonar Trailing of SSBNs by SSNs

a. The Proposal

In considering whether any nation's SLEM force could become vulnerable to "near-simultaneous destruction," Rathjens and Ruina concluded in 1973 that such a development was not likely, but that the "more worrisome possibility" for achieving such a capability was invested in nuclear attack submarine.³⁹ The theoretical scenario is straightforward enough. All of an adversary's SSBNs are located and then trailed by attack submarines. These trailing SSNs are then in a position to strike preemptively, either on command or at a predetermined time. Of course, translating this hypothetical scenario into an operational capability would be difficult indeed.

The first problem relates to detecting and localizing the SSBNs so that they could be trailed. As Rathjens and Ruina note:

. . . while trail might be initiated as a result of search and localization of missile launching submarines in the open ocean, the more likely possibility is to pick up the missile-launcher as it leaves port or when it passes through narrow straits, e.g., the Strait of Gibraltar, the Dardanelles, the Strait Juan de Fuca, or the entrance to Chesapeake Bay.⁴⁰

Solving this problem would be difficult for either superpower; however, because of the differences in peacetime SSBN employment practices, ASW capabilities, and geography described in Chapter III, the solution appears

to be more distant for the Soviet Navy than it would be for the U.S. Navy. With today's peacetime operating tempo, the VMF would have almost twice as many SSBNs (much quieter at that) to locate than would the U.S.N., and this with neither the benefit of an open ocean detection system like SOSUS or air ASW assets comparable in quantity or quality to the U.S. Navy's P-3 inventory. Establishing a trail at chokepoints is also not an even match because of the Soviet Union's unfavorable naval geography, although this has been mitigated somewhat by the Delta's peacetime employment pattern--a pattern that would require U.S. SSNs to penetrate the Soviet ASW defensive zones if an attempt were going to be made to trail the Deltas. Since Holy Loch, Scotland is the only remaining overseas support base for U.S. SSBNs, and because the C-4 SLEM allows the Soviet Union to be targeted from waters that don't require C-4 equipped SSBNs to transit restricted waters (e.g., the U.S. could keep C-4 equipped SSBNs outside the Mediterranean), the opportunities for establishing a trail on U.S. ballistic missile launching submarines as they pass chokepoints or as they begin their deterrent patrols from overseas bases have narrowed markedly for the Soviets since Rathjens and Ruina wrote.⁴¹ This should not be overstated. Although it may be a longer trip, nothing would prevent the VMF from relocating their previous overseas effort to the coasts of the United States.

The second problem inherent in the peacetime tracking scenario would also be a challenging one. Even if detected, could all of an adversary's SSBNs be kept under constant trail? As Garwin wrote in 1973, "Starting from the present, the creation of a capability for high-confidence trailing of enemy ballistic missiles submarines would not be easy and might not even be feasible."⁴² After dismissing passive tracking techniques as

"doomed to failure" in any attempt to maintain a reliable, simultaneous track on all SSBNs, Garwin posits that a high frequency sonar (i.e., 100 KHz to 1 MHz) "Mounted on a specialized trailing vehicle (submerged, on the surface or airborne), . . . could provide a detailed picture of the quarry every few seconds. The tracker could therefore sail in formation with the quarry without fear of collision."⁴³ Garwin pointed out that no such specialized tracking vehicle was in use then (nor has one been deployed since), noting that the

. . . chief difficulty in this type of active tracking seems to lie not in maintaining tracking but in ensuring that a tracker is assigned to every ballistic-missile-launching submarine . . . Obviously the other side will seek to avoid detection by employing various stratagems.⁴⁴

Even if the detection problem were solved, Garwin's assessment of the ease with which a submarine might be actively tracked seems overly optimistic, and inconsistent with other things that he has written that reflect his awareness of the difficulties involved in tracking. Just as a submarine can avoid detection by the "various stratagems" that Garwin refers to, submarines also have tactics to shake an active trailer. Beyond the problems already touched upon, command and control of a pre-emptive strike would also put great demands on existing systems, and even if everything else were well-coordinated, there is no assurance that each trailing SSN would be able to sink its assigned SSBN. However, despite the remoteness of the continuous active trailing threat, Garwin concludes that "It would nonetheless be valuable to reach an early agreement to eliminate fear of this threat, which seems to have no utility other than to threaten the survival of the strategic deterrence."⁴⁵

Before considering whether a ban on active sonar trailing would be a desirable way to increase confidence in SSBN survivability, the negotiability of such a proposal will be looked at.

b. Negotiability

Garwin argues that a ban on active trailing would be readily verifiable since "It should not be difficult for a submarine that is being tracked to recognize that it has (or has not) at all times a companion at a distance of a few hundred to a few thousand meters."⁴⁶ Certainly this is the case, although the picture might be a little more complicated in areas where the ASW forces of several nations might be operating. As in the case of the sanctuary proposal, the non-superpower ASW forces would complicate any bilateral agreement.

The agreement would be symmetric in the sense that it would require the same thing of both sides, although in some sense this may not be true at the operational level. U.S. emphasis on covertness in acoustic operations has led to increased use of passive tracking techniques and equipment. If it is true as some have claimed (noted above) that the BQQ-5 sonar on the Los Angeles-class attack boats may result in the ability of U.S. SSNs to maintain a passive track on Soviet submarines, then the U.S. might not lose anything from an active trailing ban. Even if this passive capability is still not at the point of meeting all of Garwin's earlier requirements for a continuous track to pre-emptively attack SSBNs,⁴⁷ it seems clear that U.S. SSNs on peacetime operations, especially any that might have the tracking or identification of the VMF's SSBNs as their object, would not be apt to give away their presence by using active sonar, which could be likened to a car blowing its horn while in a tunnel. On

the other hand, given the fact that Soviet passive acoustic detection capability lags that of the U.S. coupled with the quieter submarines that the Soviets must track, if the VMF were to attempt any tracking, it would likely be forced to use active sonar. So, an agreement to ban active trailing would not upset the U.S.'s passive acoustic programs, while Soviet SSNs might find their capability versus U.S. SSBNs to be even more limited than it already is if they were to agree to the ban.

As to the enforceability of a ban on active tracking, violations of the no active trailing ban could be referred to the SCC in much the same manner as was discussed for sanctuary violations. An alternative approach that would require an SSBN to identify itself to the active tracker and to request that tracking cease does not seem workable, since it is hard to imagine an SSBN admitting its identity under any circumstances. Although passive analysis of an SSBN's acoustic signature should permit a tracker to confirm what type of submarine he is tracking, thus eliminating the need for an SSBN to identify itself as an SSBN, enough real or feigned ambiguity could exist so that a submarine commander subsequently cited with unauthorized tracking of an SSBN could simply say that he thought he was tracking an attack submarine. However, this ruse would have a short half-life.

c. Desirability

Given current U.S. and Soviet ASW capabilities and SSBN employment practices, agreeing to a ban on active trailing would not, on the face of it, involve much in the way of operational costs for either side. From the Soviet perspective, it seems doubtful that they have

counted themselves as being very successful in attempts at actively tracking U.S. SSBNs, so they would not be giving up much by agreeing to a ban. From the U.S. perspective, since the U.S. Navy has not been accused by the Soviets of attempting to actively trail any of the VMF's SSBNs, a ban on active SSN trailing would not seem to involve any dramatic shifts in current practice. But, this points to a basic problem with the peacetime ban on active trailing of SSBNs: it attempts to build confidence in an area that does not seem to be a source of great insecurity about SSBN survivability, especially on the part of the U.S.

Because the active trailing ban does not speak to any U.S. insecurity, it seems likely that the U.S. would not initiate such a proposal. If the Soviets were to propose the ban, the U.S. could be expected to balk at agreeing to it for fear that this seemingly low-cost agreement would be a foot in the door for more restrictive bans directed at passive tracking operations (e.g., limiting SOSUS or restricting P-3 flights).

4. Limit the Number of SSNs

a. The Proposal

A more stringent restriction than the ban on active trailing has been proposed as a way to lessen the possible threat of a pre-emptive strike against SSBNs, a threat which would exist if SSNs could bring all SSBNs under simultaneous trail. Rather than relying on an easy to abrogate treaty such as the trailing ban, some have suggested that the inventory of SSNs could be limited to a level that would meet a nation's needs for conventional war, but which would not be sufficient to undertake an SSBN trailing program. As Feld and Rathjens explain:

. . . Whether the number exists, and if so what it is, would depend on the numbers of U.S. missile-launching submarines,

their characteristics and those of Soviet SSKs, and the capabilities of complementary and/or supporting Soviet systems. An agreement to limit the number of missile-launching submarines of each side up to a level less than N times the number of missile-launching submarines on the side of an adversary would go far toward eliminating concerns about trailing if N were less than unity; and this might be true even if N were as large as two or three.⁴⁸

Determining how many SSNs might actually be required to initiate an all-out attempt at continuous SSBN trailing is a difficult problem. Understandably, the answer to this question would vary widely with the assumptions that are made in defining the problem. For instance, McCue calculated that the U.S. would need some 455 SSNs if it wanted to be in a position to conduct a covert, passive trail of the 75 SSBNs that he credited the VMF with at the time he made his calculations. For an active trail, using SSNs equipped with Garwin's hypothetical, high frequency, TV-image sonar, McCue arrived at the figure of 142 SSNs. McCue's assumptions for the passive figure included a requirement for three SSNs to track each SSBN (based on a "comment from a Pentagon official"), and they also entailed a large group (over 300) of waiting submarines, poised at sea to intercept and trail any and all Soviet SSBNs sitting in port that might be sortied. The substantially lower figure for the hypothetical active trackers results largely from the fact that McCue assigns only one of these SSNs to each SSBN to be tracked.⁴⁹

McCue's figures are somewhat fanciful. Certainly if the U.S. were to attempt a routine, covert, peacetime trailing program, it would not keep 300 submarines at sea (even if they existed) on the odd chance that Soviets might surge their remaining SSBNs. Also, the U.S.'s SOSUS/P-3 ASW team didn't figure into McCue's calculations. His active trailing

figure is admittedly hypothetical, since it is based on a non-existent tracking system. Even with a large number of SSNs dedicated to a tracking scheme, McCue points out that "submarines could make use of territorial waters and their geography so as to escape from port without allowing adversary submarines to acquire them and start tracking."⁵⁰

Program analysts could unquestionably develop a complex model of SSBN trailing that would incorporate a wider range of variables and assumptions than were included in McCue's relatively simple equations. But, even if the analysts' answers were better than McCue's, it would only be the first half of the question. The second half would involve deciding how many submarines the U.S. Navy needs to fight a conventional war. Again, numerous variables and assumptions would come into play. These figures, and a similar set for the VMF, would necessarily be considered in any attempt to negotiate limits on the SSN. The range of uncertainty inherent in such calculations would probably be large enough to accommodate widely differing policy recommendations.

With a ratio as low as two U.S. SSNs to each Soviet SSBN, the U.S.N. would be allowed 124 SSNs, a figure that far exceeds the current and projected U.S. SSN inventory. Conversely, the Soviets would be allowed 66 SSNs under a two to one ratio. Since the Soviet inventory includes 52 SSNs and 47 SSGNs (see Table V), the figure of 66 would require the VMF to reduce its inventory, because the U.S. would certainly insist that both SSNs and SSGNs be counted. The problem of deciding on what to count will be considered below.

b. Negotiability

A treaty limiting the number of SSNs would be fairly easy to verify, since it is difficult to mask shipbuilding programs for very

long. Some cheating on the margin might be possible, but a rapid break-out, in which one side makes substantial gains on the other, would not be feasible. This is especially true on the U.S. side, where the Congressional debate surrounding the budget process would keep the Soviets well-informed of U.S. building programs. If entered into, an agreement limiting SSNs would continue in force as long as both sides calculated that it was in their interest to comply with the restrictions. Presumably, if one side were to abrogate the treaty by exceeding the SSN limits, the other would respond in kind.⁵¹

The primary obstacle to reaching an agreement to limit SSNs is the asymmetrical makeup of the existing Soviet and U.S. submarine fleets, which is summarized in Table V.⁵² The VMF's large inventory of nuclear and conventional cruise missile launching submarines, as well as its numerous diesel attack boats, is not matched by the U.S. Navy.⁵³

TABLE V		
U.S./SOVIET GENERAL PURPOSE SUBMARINES		
	<u>U.S.</u>	<u>USSR</u>
Attack Submarines:		
Nuclear (SSN)	79	52
Diesel (SS)	5	138
Total:	84	190
Cruise-Missile Subs:		
Nuclear (SSGN)	0	47
Diesel (SSG)	0	22
Total:	0	69
Source: IISS, <u>The Military Balance 1981-1982</u> , pp. 7 & 12		

McCue suggested getting around the symmetry problem by limiting the number of SSNs that either side could have to one-half of the number of SSBNs that its rival had. He proposed that this agreement be implemented slowly with a fifteen-year grace period for both sides to come into compliance (primarily through the attrition, without replacement, of older SSNs).⁵⁴ The draft that McCue wrote for his SSN proposal defined an SSN as "any submersible vessel, powered by the fission or fusion of elements, which is capable of destroying another vessel of its own kind through the use of undersea torpedoes or any other weapon whatsoever, and which is not an SSBN, is an SSN."⁵⁵

Despite his definition, McCue does not count the VMF's SSGNs in a table that he uses to show the current SSBN/SSN force levels--levels that would be the starting point for any SSN reductions under McCue's plan.⁵⁶ The omission of the SSGNs is hard to understand, since they all carry torpedoes that could be used against SSBNs, unless they are not counted because of speed considerations. For example, U.S. SSBNs enjoy a two-knot speed advantage on the twenty-three knot, E-II SSGNs, which means that a U.S. SSBN could gradually outrun a trailing E-II. However, the seventeen Charlie-class SSGNs would not suffer this speed disadvantage in trailing a twenty-five knot SSBN.⁵⁷ Whether or not the high level of self-noise that the Charlies would generate at such speeds would leave their sonars capable of a trailing task is another question. The SSGN issue is only mentioned to demonstrate that the asymmetries apparent in Table V, which are the results of the different roles and missions assigned to the U.S. and Soviet Navies, could not be glossed over as simply as McCue's proposal might suggest.

Leaving aside the question of who would initiate such a proposal, if SSN limits did manage to get on the already crowded START/INF agenda, it seems unlikely that any ambitious reductions would be negotiated in the first round of such talks. As was noted in Chapter II, many have faulted SALT for establishing limits that were so high as to be meaningless because they allowed each side to continue with its existing modernization programs. If SSN talks did not break off in a standoff over what in Table V was going to be counted, the most reasonable expectation would be that a short-term protocol codifying existing SSN levels and programs might be concluded, with a provision for talking about SSNs again in future negotiations. Given the inherent complexity in negotiating such an agreement, would it be desirable for the U.S. to make the attempt?

c. Desirability

Making the size of the U.S. Navy's SSN force a function of Soviet SSBN levels could be interpreted as an explicit admission that U.S. attack submarines have been developed primarily for an anti-SSBN mission. As Chapter II's discussion of strategic ASW (i.e., anti-SSBN) noted, the U.S.N. has been reluctant to differentiate among the various types of Soviet submarines in defining the mission of its own attack boats, preferring instead a wartime mission structure that sees all Soviet submarines as fair game.

In a 1971 Brookings staff paper on naval force requirements, Arnold M. Kuzmack stated that the U.S. maintains

. . . ASW forces to protect merchant ships carrying logistic support for our forces overseas and economic support for our allies and to protect other naval forces from attack by enemy submarines. (The possible mission of protecting the United States against submarine-launched ballistic missiles is intentionally omitted, since the ability of ASW forces to sink

significant numbers of ballistic-missile submarines, before they can launch their missiles appears to be nil.)⁵⁸

Kuzmack's pessimistic assessment of U.S. ASW capabilities against Soviet SSBNs may have been predicated on a scenario in which Soviet SLEMs are launched as part of a surprise attack against the U.S. However, the CEM to limit SSNs is addressed to the threat to SSBN survivability involved in a scenario in which either side makes an attempt to pre-empt the other's SLEM force using trailing SSNs. Although U.S. ASW capabilities would certainly give odds higher than nil in such an attempt, the scenario itself is unlikely given the present strategic balance (correlation of forces).

Irrespective of the U.S.'s stance on strategic ASW, the two broad missions outlined by Kuzmack in 1971 continue to provide the underlying rationale for the U.S. Navy's attack submarine program. For instance, the ASW barrier across the GIUK gap, which is intended to ensure that the resupply of Europe can take place during a NATO vs. Warsaw Pact conflict, would have to include a substantial number of SSNs to be effective. The second mission mentioned by Kuzmack, defense of naval forces, is at its most demanding level when placed in the context of defending a carrier battle group against the threat of a cruise missile attack launched by Soviet SSGNs. U.S. SSNs have been designed to meet these missions. As was mentioned earlier, the development of the Los Angeles-class attack boats was prompted by the threat embodied in the VMF's Charlie (SSGN) and Victor (SSN) submarines. Further, the concept of submarines acting in direct support of surface ships has been given increased emphasis in the U.S. Navy, as a complementary tactic to the indirect tactical ASW

support provided to surface ships by distant ASW barrier operations that attempt to counter an adversary's submarines as close to their source as is possible.

When the missions just discussed are juxtaposed with the submarine assets that the U.S. Navy has available, many might conclude that more, not fewer, SSNs would be required by the U.S. Navy if it is to be capable of fulfilling its warfighting missions, independent of any anti-SSBN goal. The aggregate numbers tallied in Table V would militate strongly against any proposal to limit SSNs, unless it was an "unequal agreement" that required far greater reductions of the Soviet submarine fleet than it did of the U.S. fleet. Such an agreement probably would not be acceptable to the Soviets. Finally, the trailing threat that the SSN CBM is intended to lessen is not one that the U.S. perceives as being a serious one. Restricting SSNs in the name of building confidence in submarine survivability does not answer any U.S. security needs, and it has the potential, depending on the numbers involved, to exacerbate the tactical ASW problems of defending other U.S. naval ships from the submarine threat and ensuring that SLOCs can be maintained.

5. Prohibit the Deployment of Large, Fixed, Active Sonars

a. The Proposal

If either superpower were able to conduct a near-simultaneous search of its adversary's likely submarine operating areas, the implications for SSBN survivability would be very serious. To be truly menacing, this capability would have to combine a very high probability of detection with the ability to classify and localize submarines to a very narrow range of uncertainty. Even with such a system in place, a method

of coordinating weapons delivery, possibly using a combination of the ASW weapons discussed in earlier sections, would have to be added to the detection system if it were to be used in an attempt to pre-emptively strike SSBNs.

Although an accurate area search system like the one outlined above does not exist now, Feld and Rathjens suggested in 1973 that "limitations on the deployment of large, fixed, active sonar arrays" might be a desirable confidence-building measure that could demonstrate that neither side was attempting to gain the capability to pre-empt the other's SLEM force.⁵⁹

Garwin noted in 1973 that:

Extensive experiments have been conducted over the last decade of fixed-active sonar systems, in which a sonar signal is generated in the few hundred hertz range, at multi-megawatt power levels, and with good angular definition, in order to attempt to detect submarines at ranges of hundreds of kilometers. First of all such installations are expensive. In addition, active sonar in general broadcasts its location, raising a question of physical vulnerability of the sonar system. Furthermore, a fixed active sonar provides the opposition with an example of the pulse whose echo the sonar is designed to receive, thereby in some ways easing very substantially the job of the opposition in spoofing or jamming the sonar system.⁶⁰

Feld and Rathjens admit that the "difficulties in practice would be enormous" in developing such systems, but they go on to say that this very real technical problem "is less relevant than the possibility that their deployment would arouse fears about the viability of the submarine which might involve an escalation in the strategic arms race."⁶¹ In other words, even ineffectual systems are seen by Feld and Rathjens as having the potential to prompt fears about SSBN survivability.

Since neither side has deployed any large, fixed, active sonars, could an agreement not to deploy them be a low-cost way of building

confidence? The negotiability and desirability of such a proposal are considered below.

b. Negotiability

Verifying compliance with an agreement banning large, fixed active sonars would not present a problem. First, since the task of putting such equipment in place would be a large-scale effort, it is doubtful that it could be done covertly. Second, since it would be an active system that would literally insonify the oceans, its use would be obvious. As with other of the CBMs that have been considered, enforcing such an agreement would rest on mutual restraint and the ability of the side that detected cheating to respond with a similar system or other countermeasures.

The ban on fixed, large, active sonars would be symmetrical, insofar as it would require the same thing of both sides: eschewing a system that has yet to be developed, in the same way that the U.S. and USSR foreswore full-scale deployment of ABMs in the ABM Treaty. It is worth noting that the practicality of such a fixed system is much less for the Soviet Union than it would be for the United States because Soviet geography does not offer as many potentially usable locations to site such sonars. There are other asymmetries that would make such an agreement undesirable from the U.S. perspective.

c. Desirability

On the face of it, the operational cost of agreeing to a ban on deploying large, fixed, active sonars would seem to be a minimal one for the United States. As earlier sections have pointed out, the U.S.N.'s

ASW program has increasingly emphasized passive detection techniques. The SOSUS network is a prime example of this emphasis, and the existence of this system probably means that the U.S. might be reluctant to discuss a ban on fixed, active sonars.

Since the U.S. does not have any apparent plans to deploy a fixed, active system, any attempt by the Soviets to discuss a ban on such sonars would be viewed by the U.S. as a stalking-horse for restrictions on other ASW sensors. If the U.S. were to agree to a ban on the fixed active system because they were perceived as being potentially destabilizing, it could set a precedent for discussions of analogous restrictions on passive fixed systems (SOSUS), and possibly mobile ASW systems (SURTASS/RDSS).

As Wit has explained:

The ability to monitor Russian missile-carrying submarines could therefore be considered stabilizing in that it deters surprise attack and enhances the survivability of U.S. strategic forces. Nevertheless, in pursuing these legitimate objectives the U.S. could acquire a capability that could be perceived as threatening the survivability of Russian ballistic-missile⁶² submarines and therefore could be construed as destabilizing.

Feld and Rathjens' suggestion (cited above) that the technical problems in deploying fixed, active sonars may be less important than the possible fears that these systems could give rise to seems to ignore the fact that the VMF already has such fears, since it has been confronted with the U.S. Navy's improving SOSUS network for many years. While this system does not approach the accuracy of the hypothetical active sonars under discussion (see Chapter III), its detection capability is probably one of the reasons that explain the defended sanctuary approach to SSBN operations that the Soviet Union has adopted. In a real sense, the VMF has

already taken unilateral actions to offset the threat that a bilateral agreement to ban large, fixed, active sonars is aimed at.

Because the fixed sonars ban does not address any immediate threat to either the U.S. or Soviet Navies, and since agreeing to such a ban could serve as a precedent (the foot in the door) for attempts to restrict U.S. systems that are important to tactical ASW (e.g., SOSUS, RDSS, etc.), the United States might be reluctant to even talk about, much less agree to, such a ban. The Soviet Union, however, might find the proposal very attractive for the same reasons.

FOOTNOTES FOR CHAPTER IV

- ¹Johan Jorgen Holst and Karen Alette Melander, "European Security and Confidence-Building Measures," Survival, July/August 1977, p. 147 cited by Abbott A. Brayton, "Confidence-Building Measures in European Security," The World Today, October 1980, p. 382.
- ²"Document on Confidence-Building Measures and Certain Aspects of Security and Disarmament, Included in the Final Act of the Conference on Security and Co-operation in Europe," reproduced in SIPRI, Arms Control: A Survey and Appraisal of Multilateral Agreements (London: Taylor and Francis Ltd., 1978), p. 121.
- ³Jonathan Alford, "Confidence-Building Measures in Europe: The Military Aspects," in "The Future of Arms Control: Part III," Adelphi Papers Number 149, ed. Jonathan Alford (London: The International Institute for Strategic Studies, 1979), p. 5.
- ⁴Ibid., pp. 5-10.
- ⁵Richard Haass, "Arms Control and the Indian Ocean" in Arms Control and Defense Postures in the 1980s, ed. Richard Burt (Boulder, Colorado: Westview Press, 1982), p. 146.
- ⁶There is another group of SSBN-related CBMs directed at ensuring that SSBNs are perceived as being second-strike weapons (e.g., not testing SLBMs in a depressed trajectory because it would reduce SLBM time of flight and strategic warning). Such CBMs will not be considered here except when they intersect with the ASW-related CBMs being examined.
- ⁷Barry M. Blechman, The Control of Naval Armaments (Washington, D.C.: The Brookings Institution, 1975), provides an highly readable survey of past controls and prospects for future naval arms control (general purpose Forces only).
- ⁸Brian Gerald McCue, "The Threat to the SSBN: Unilateral and Bilateral Responses" (Master's Thesis, Massachusetts Institute of Technology, 1980), proved to be a valuable source for the technical aspects of these proposals, but even though it was written in 1980, its starting assumptions are predicated on MAD.
- ⁹The framework selected here for looking at CBMs was suggested by McCue's thesis and by the FY 83 Arms Control Impact Statements. McCue identified five criteria that he felt were important aspects for evaluating treaties: 1) symmetry; 2) verifiability; 3) enforceability; 4) acceptable effect on non-signatories; and 5) satisfying domestic public opinion. Among the seven factors that the FY 83 Arms Control

Impact Statements examined in analyzing the probably impact of U.S. weapons systems on arms control issues, four proved useful in considering the SSBN CBMs: 1) consistency with U.S. arms control policy and related presidential decisions; 2) effect on global and regional stability; 3) technological implications of new weapons; and 4) verification.

¹⁰Richard Haass, "Confidence-Building Measures and Naval Arms Control," in Adelphi Papers Number 149, p. 28.

¹¹Alford, p. 3.

¹²Richard L. Garwin, "Antisubmarine Warfare and National Security," Scientific American, July 1972, p. 259.

¹³Richard L. Garwin, "The Interaction of Antisubmarine Warfare with the Submarine-Based Deterrent," in The Future of the Sea-based Deterrent, ed. Kosta Tsipis, Anne H. Cahn, and Bernard T. Feld (Cambridge: The MIT Press, 1973), pp. 115-119.

¹⁴Ibid.

¹⁵Ibid., p. 116.

¹⁶McCue, p. 75.

¹⁷Garwin, "The Interaction of Anti-submarine Warfare with the Submarine-based Deterrent," pp. 117-119.

¹⁸McCue, p. 75.

¹⁹Johan Jorgen Holst, "Prospects for Conflict Management and Arms Control in the North Atlantic," in New Strategic Factors in the North Atlantic, p. 137.

²⁰Roger D. Speed, Strategic Deterrence in the 1980s (Stanford: Hoover Institution Press, 1979), p. 98, for instance, suggests limiting SSBN patrol areas as a means of compensating for the susceptibility of bombers to a surprise SLBM attack.

²¹Anne Kelly Calhoun and Charles Petersen, "Changes in Soviet Naval Policy: Prospects for Arms Limitations in the Mediterranean and Indian Ocean," in Naval Power in Soviet Policy, ed. by Paul J. Murphy (Washington, D.C.: Government Printing Office, 1978), p. 237.

²²Ibid., pp. 234-237.

²³"Documentation," Survival, July/August 1982, provides excerpts, p. 185.

²⁴Ibid., p. 186.

- ²⁵U.S. Navy Hydrographic Office, Ice Atlas of the Northern Hemisphere (Washington, D.C.: U.S.N. Hydrographic Office, 1946), passim.
- ²⁶Ronald Pretty, ed., Jane's Weapons Systems 1981-1982, 12th ed. (New York: Jane's Publishing Co., 1981), p. 143.
- ²⁷Lieutenant Commander Carl H. Clawson, Jr., U.S. Navy (retired), "The Wartime Role of Soviet SSBNs--Round Two," U.S. Naval Institute Proceedings, March 1980, p. 69.
- ²⁸Speed, p. 157.
- ²⁹McCue, pp. 78-91.
- ³⁰McCue, p. 64.
- ³¹McCue, p. 88.
- ³²U.S., Congress, Senate, Committee on Foreign Relations, The SALT II Treaty Part 1, 96th Cong., 1st sess., 1979, pp. 467-469.
- ³³Norman Polmar, "Thinking About Soviet ASW," U.S. Naval Institute Proceedings, May 1976, p. 126 cited by Grant Joseph Caughery "Naval Implications of the Strategic Arms Limitations Talks" (Master's thesis, Naval Postgraduate School, 1980), p. 23.
- ³⁴Clawson, p. 68.
- ³⁵Strobe Talbott, Endgame (New York: Harper and Row, Pub., 1979), p. 208.
- ³⁶McCue, p. 118.
- ³⁷Ibid.
- ³⁸Jane's Weapons Systems 1981-1982, p. 11 gives a concise review of U.S. RV programs, none of which demonstrate any interest in plunging RVs.
- ³⁹G. W. Rathjens and J.P. Ruina, "Trident," in The Future of the Sea-Based Deterrent, pp. 64-65.
- ⁴⁰Ibid.
- ⁴¹For instance, it is reasonable to conclude that the Soviet AGIs (intelligence gathering ships) that used to loiter outside SSBN support bases, such as the one formerly located in Guam, could have played a role in helping the VMF to establish a track on U.S. SSBNs.

- ⁴²Garwin, "The Interaction of Antisubmarine Warfare with the Submarine-Based Deterrent," p. 98. Garwin's pessimism on passive tracking of SSBNs in an attempt to gain a capability to pre-empt is a question of numbers and weapons. He says that a passive approach to maintaining a "reliable track against routine evasive measures of the enemy submarine and in the face of normal sound velocity variations and sea noise would seem to require at least several tracking submarines for each quarry," going on to say that a kill at the longer ranges used in passive tracking might require a faster torpedo, explaining elsewhere that torpedoes fired at a long distance could give an SSBN the chance to fire its SLBMs.
- ⁴³Garwin, "Antisubmarine Warfare and National Security," p. 253.
- ⁴⁴Ibid., p. 255.
- ⁴⁵Ibid., p. 257. Garwin argues that while tracking exercises are useful for training during tactical ASW exercises, such tracking would not play a part in wartime conditions, when submarines would presumably be attacked shortly after localization.
- ⁴⁶Ibid., p. 259.
- ⁴⁷Richard L. Garwin, "ASW and the Future Navy," A paper for the Colloquium on Science and Disarmament Institut Francais des Relations Internationales, January 15, 1981, p. 12 still reflects Garwin's pessimism with regard to passive tracking systems saying that "it is far less likely that an effective trailing system could be developed with passive detection. . ."
- ⁴⁸B. T. Feld and G. W. Rathjens, "ASW, Arms Control and the Sea-Based Deterrent," in The Future of the Sea-Based Deterrent, p. 134. An SSK is an attack submarine.
- ⁴⁹McCue, pp. 65-70.
- ⁵⁰Ibid., p. 70.
- ⁵¹For the U.S., such a response would be contingent on the domestic political process with all that it entails.
- ⁵²IISS, The Military Balance 1981-1982, pp. 7 and 12.
- ⁵³The U.S.N. has added Harpoon surface-to-surface missiles (tube-launched) to the weapons loadout of its SSNs, and the Tomahawk cruise missile is being placed on the 688-class.
- ⁵⁴McCue, p. 109.

⁵⁵Ibid., p. 114.

⁵⁶Ibid., p. 108.

⁵⁷Jean Labayle Couhat, Combat Fleets of the World 1982/1983 (Annapolis: United States Naval Institute Press, 1982), pp. 606-607; 720-721 provide speeds for cited submarines.

⁵⁸Arnold M. Kuzmack, Naval Force Levels and Modernization (Washington, D.C.: The Brookings Institution, 1971), pp. 32-33.

⁵⁹Feld and Rathjens, p. 135.

⁶⁰Garwin, "The Interaction of Anti-Submarine Warfare with the Submarine-Based Deterrent," p. 97.

⁶¹Feld and Rathjens, p. 135.

⁶²Joel S. Wit, "Advances in Antisubmarine Warfare," Scientific American, February 1981, p. 40.

V. CONCLUSIONS

What, then, are the prospects for SSBN survivability confidence-building measures? Before turning to the five CBMs, two general observations that affect the U.S. outlook on all of these proposals should be reiterated.

First, as Chapter II explained, America's declaratory strategic doctrine no longer turns on the MAD formulation. U.S. planners are still committed to the deterrence goal; however, the creation of a more credible warfighting capability now seems to be in the ascendancy as the preferred means of assuring deterrence. In this regard, it could be argued that U.S. and Soviet strategic doctrines are based on assumptions about deterrence that are more similar now than they ever were during the SALT years. How does this affect the SSBN CBMs?

While the superpowers necessarily have a shared interest in managing the strategic competition and in avoiding nuclear war, deterrence based on warfighting capabilities would seem to rely more on unilateral actions to solve national security problems than it does on seeking solutions through negotiations. Bilateral agreements will still play an important role; however, in contrast to the SALT process, U.S. negotiations will be more concerned with maintaining the perception in Soviet eyes of a credible U.S. warfighting capability, than they will be with any attempt to maneuver Moscow into accepting U.S. strategic formulations.

The U.S. shift to a warfighting-based deterrence, which is neither complete nor accepted by all, has important implications for SSBN CBMs.

For instance, whereas a strategic ASW capability or a counterforce capable SLEM are inconsistent with MAD, both of these can be reconciled with a doctrine organized about warfighting deterrence, and both could be interpreted as being responsive to PD-59's emphasis on flexibility.

This notwithstanding, each superpower still has a selfish interest in the other's peace of mind--crisis stability is a desirable feature of the strategic environment. Weapons programs and force deployment practices that are unnecessarily provocative should be avoided. Thus, CBMs may still have a possible role to play, but they will not find acceptance if they constrain U.S. capabilities or options without noticeably increasing stability.

Chapter III's review of SSBN capabilities and vulnerabilities led to a second general observation: the U.S. Navy's ballistic missile launching submarines are relatively invulnerable to Soviet ASW forces. As a result, CBMs that aim at increasing the perception of SSBN survivability are not seen as an urgent concern from the U.S. perspective. These measures attempt to solve a problem that is largely non-existent for America's SSBN fleet. The U.S. triad has come to rest more heavily on its sea-based leg because of ICBM vulnerability: there is thus a natural skepticism concerning any measure that might affect current U.S. SSBN employment patterns, even if the effect were only a tangential one. As was noted, U.S. SSBNs carry one-half of America's strategic nuclear warheads, while the Soviet Navy has less than one-quarter of the USSR's warheads. Therefore, the U.S. is naturally more sensitive than the Soviet Union may be to the possible effects that agreements dealing with SSBNs can have.

Nonetheless, if Washington could gain concessions from the Soviets in other areas by agreeing to low-cost confidence-building measures, or if the U.S. perception of SSBN survivability could somehow be heightened by such proposals, CBMs would be worth considering. Of the five CBMs examined, only one appears to offer the prospect of heightening U.S. confidence. Although the threat of plunging RVs being used against U.S. SSBNs is certainly not too great, agreeing to such a ban would be desirable since it would foreclose a possible threat to U.S. submarines. However, this proposal is not likely to stand alone in START: rather, if it is on the agenda, the Soviets might well make its acceptance contingent on other proposals, much as they refused to entertain the U.S. proposal during SALT II to ban flight tests of SLBMs in depressed trajectories, unless it was linked to a series of measures relating to surprise attack. The ban on the testing of plunging RVs is worthwhile, but its overall significance is only marginal. Thus, the U.S. would probably be willing to make only marginal concessions to reach an agreement banning the tests.

Two of the remaining proposals were thought to entail little, if any, operational costs, per se. Nonetheless, banning the active sonar trailing of SSBNs by attack submarines and prohibiting the deployment of large, fixed, active sonars were both judged to be less than desirable because U.S. acquiescence to these proposals could set an unacceptable precedent for future negotiations. Specifically, this precedent could be used as a foot in the door in an attempt to restrict all submarine tracking operations (e.g., SOSUS/P-3s), a precedent which would adversely impact on the U.S. Navy's tactical ASW program. Of course, even if

such a precedent were set, follow-on proposals could be rejected; yet, because strategic arms negotiations have become a semi-permanent feature of the superpower relationship, U.S. negotiators must always be sensitive to agreements that may be used as an opening wedge to discuss unfavorable proposals in subsequent negotiations.

The two remaining proposals were judged, in and of themselves, not to be in the U.S. interest. An SSBN sanctuary proposal does not answer any U.S. security needs. Establishing sanctuaries would validate Soviet SSBN employment practices, while constraining U.S. ASW forces. Because of this, any U.S. discussion of sanctuaries would necessarily be a concession, requiring a tradeoff from the Soviet Union. The concept of agreeing to half a sanctuary was suggested as something the U.S. might consider if the Soviets were willing to offer significant compensation in other areas. However, it appears doubtful that Moscow would offer much for such a narrowly defined agreement. Even if the USSR were willing to make real concessions to reach the limited sanctuary agreement, the U.S. might still be reluctant to agree to a proposal restricting the movement of the U.S. Navy on or under international waters.

Finally, the concept of agreeing to somehow relate the inventory U.S. attack submarine to Soviet SSBN levels was rejected both in principle and because it would be a most difficult proposal to negotiate. After reviewing the tactical ASW missions assigned to U.S. SSNs, and looking at the assets that the Navy has available to fulfill these tasks, it was suggested that the existing number of SSNs may not be adequate for those tactical missions, quite apart from any use in an anti-SSBN role. The Soviet Navy's large submarine force does not arouse great concern over

the survivability of U.S. SSBNs; but it does challenge the U.S.N. in its tactical ASW missions of defending surface naval forces and ensuring that sea lines of communication can be maintained during a war. It was noted that for the U.S. to show any interest in restricting the SSN inventory, the proposal would have to be an unequal one that required the Soviet Navy to make substantial reductions while allowing the U.S. inventory to remain at its present level. The Soviet Union is not likely to agree to such a proposal.

The prospects for concluding any bilateral SSBN confidence-building measures during START therefore seem remote. Since the survivability of U.S. SSBNs does not hinge on such measures, and because many of the CBMs discussed above could have real or potential harmful effects on the U.S. Navy's freedom to pursue its tactical ASW missions, the SSBN CBMs discussed are not particularly desirable from the U.S. perspective. In a very real sense, both sides have taken a series of unilateral actions over the years to increase the survivability of their SSBN forces. This trend will continue, in all probability, and may be more constructive in terms of strategic stability than negotiated SSBN CBMs.

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