situations which, for whatever reason, could lead to confrontation, conflict, and the war nobody wants.

The immediate result of enacting a confidence-building regime, such as the one proposed by the Allies, would be to make the European military situation more predictable and stable. It would not obviate the need for strong defense capabilities and it would not reduce the military potential of either side. But it would reduce the element of uncertainty surrounding military activities. It would reduce the risk that a country caught off guard by a sudden, unexplained military operation might react, or overreact, in a way that could start a chain of events leading to war. This regime would make military behavior more predictable, giving planners and decision-makers time to calculate their response, and lower the risk of miscalculation, misinterpretation and mistake. These risks are increased by pressures of time and the need to make decisions with insufficient information.

Such a confidence-building system would not guarantee peace. No agreement in itself will prevent war. But if a confidence-building system were in place, any country, by breaking the announced pattern, would be sounding an alarm, warning others that a threat to the security of Europe might be in the offing and permitting steps to be taken to cope with the situation. This early, clear warning of a potential threat could be especially important for the democracies, which need time for political decisions required to initiate a military response to a threat.

In addition, an effective confidence-building system would help prevent or at least raise considerably the political costs of suddenly mounting a military activity in response to an unexpected political development in Europe. Short of conditions threatening actual war between East and West, this regime would be particularly effective in restricting the possibilities of threatening or using force for political intimidation.

If enacted, a set of confidence-building measures such as those proposed by the Western Allies would contribute to a more secure Europe. It would make the risk of confrontation and conflict less likely. Perhaps equally important, in the long run, it could provide a solid foundation for even broader, more significant forms of military cooperation. Eventually, such a system and its successors could lead to easing some of the sharper edges of confrontation in the East-West relationship, little by little replacing confrontation with cooperation.

COUNTERFORCE AT SEA

The Trident II Missile

Robert S. Norris

Nuclear missile submarines traditionally have been viewed as "good" nuclear weapons because their invulnerability at sea provides an assured retaliation to Soviet nuclear attack, and they do not pose a threat to the Soviet nuclear force structure. Until now, this view of submarines has been justified, but the future role of submarines will change in a critical way if, in the Fiscal Year 1987 military budget, Congress decides to begin procurement of Trident II sea-launched ballistic missiles (SLBMs). Like its SLBM predecessors, the Trident II will provide the United States an invulnerable retaliatory nuclear force, but its high accuracy and powerful warheads will, for the first time, enable U.S. submarines to threaten Soviet missile silos and other hardened military targets. The result will be a far more dangerous strategic environment, all at great financial expense.

Fortunately, the U.S. SLBM modernization program provides an attractive and far less expensive alternative. The Trident I missile, already being deployed on U.S. submarines, offers more security at a savings of $35-40 billion. But this argument is almost never heard. With over $7 billion appropriated so far (almost all for research and development), Trident II has had an easy time on Capitol Hill. Congress is normally hesitant to deny money for research and development programs because this stage is mistakenly seen as benign or worthy of support for what it may bring in the future. By the time money must be voted to buy the weapon, so much momentum has been generated, and pressure brought to bear by various constituencies, that the weapon's purchase becomes inevitable.

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The Navy's Trident II has kept a low profile. Like all weapons systems it is has been subjected to the normal oversight and authorization process, which deals with programs piecemeal and in isolation. But the comprehensive picture rarely comes into view and the large questions have not been asked. What is the total scope and cost of the program? What military role will Trident II play and how will it fit with other strategic and nonstrategic nuclear weapons? How will the Soviet Union perceive it? What are the arms control implications? And how do we rate the alternatives? It is time to address these questions.

The Trident II (or D-5) missile is part of the larger Trident weapon system that includes Ohio-class submarines, Trident I (or C-4) SLBMs, and the bases and shore facilities that support them. By the year 2002, according to one Navy chart, a fleet of twenty-four Ohio-class submarines, operating from bases in Bangor, Washington, and Kings Bay, Georgia, will carry 576 Trident II SLBMs, with approximately 5,184 nuclear warheads. (See Figure I.)

With the submission of the Fiscal Year 1987 military budget, the Navy will request funds to buy the first batch of an estimated 958 Trident II missiles, including those used as spares and for tests. The total bill for the missiles and warheads, assuming a force of twenty-four submarines, will be approximately $52 billion, with budget requests over the next decade averaging at least $3.5 billion a year. (See Table I.) The submarines and other parts of the program will cost an additional $51 billion. (See Table II.) Conceivably, the Navy will want more than twenty-four submarines.

The overall Trident program is quickly moving forward. Twelve Poseidon submarines have been converted to carry the Trident I missile. These subs will be retired

Table I
THE COST OF TRIDENT II

The Trident II missile will be the most expensive strategic weapon the United States has ever bought. The table below shows the Navy's cost estimate (as of April 17, 1985) for 790 missiles for seventeen submarines.[a]

Fiscal Year	*RDT&E*	*Procurement*	*Military Construction*	*Total*
1983 & prior	681.7	—	—	681.7
1984	1,452.7	—	79.3	1,532.0
1985	2,035.4	162.9	82.4	2,280.7
1986	2,156.2	582.0	144.1	2,882.3
1987	1,713.7	1,865.6 (27)	37.3	3,616.6
1988	1,232.1	2,668.7 (72)	13.1	3,913.9
1989	732.1	2,778.8 (72)	25.8	3,537.0
1990	372.7	2,719.6 (72)	108.9	3,201.2
to completion	—	16,286.0 (517)	189.4	16,475.4
Total	10,376.9[b]	27,063.6 (760)[c]	680.3	38,120.8[d]

Source: "U.S. Navy Trident II Missile Data Sheet" reprinted in Jonathan E. Medalia, *Trident Program*, Congressional Research Service, Issue Brief IB73001, June 27, 1985, Appendix A.

a. *In millions of current dollars.*
b. *Includes funds for thirty research, development, testing and evaluation (RDT&E) missiles. The first of approximately twenty flat-pad test launches is planned for January 1987 from Cape Canaveral. The other ten R&D missiles will be fired from an SSBN beginning in March 1989.*
c. *Figures in parentheses refer to number of missiles. A force of twenty-four SSBNs would require approximately 958 missiles, bringing the total cost to $46.2 billion, based on a unit cost of $48.3 million per missile.*
d. *This figure does not include Department of Energy costs. For 958 missiles, an additional $4-5 billion of Department of Energy costs must be added for some 3,000 W88 warheads.*

by the end of the century and replaced by Ohio-class subs. To date thirteen Ohio-class submarines have been authorized in fiscal years 1974 through 1986. The fourteenth will be requested in the FY 1987 budget and a request for one submarine a year can be expected at least through FY 1993 and probably to 1997 or beyond. The sixth submarine, the *USS Alabama*, will deploy early in 1986. The seventh, the *USS Alaska*, began sea trials on September 18, 1985, and the eighth, the *USS Nevada*, was launched on September 14, 1985. The first eight submarines are being equipped with Trident I SLBMs and will be retrofitted with Trident II missiles starting in 1992. The ninth Ohio-class SSBN will be the first to carry Trident II missiles, with a scheduled initial operation date of December 1989.

Full program costs and fleet size are sometimes difficult to compute. The Navy stopped reporting at the end of 1984 the $17 billion cost of the first eight Trident submarines in its quarterly Selected Acquisition Reports to Congress, the key bookkeeping account Congress uses to keep track of weapon costs. Dropping this item from the report makes the program seem cheaper. The cost of warheads produced by the Department of Energy is also frequently overlooked. Each Trident I W76 warhead is estimated to cost approximately $650,000. Over 3,000 warheads comes to $2 billion. The cost for an approximately equal number of larger Trident II W88 warheads is $4.5 billion.

The Navy has not yet publicly stated exactly how many submarines it wants, and has benefited by being vague about ultimate fleet size. Its refusal to tell Congress and the public has led to confusion over the scope and cost of the program. If the Navy had originally stated that Trident was going to be the costliest strategic weapon program ever and that the total bill would be over $100 billion, more notice might have been taken. As it has turned out, the Navy has incrementally added a submarine a year, divided the program into several elements, not included all costs in the estimates it does provide, and never answered the question of how large a force it wants or how expensive it will be.

SLBM capabilities have improved significantly since the first nuclear missile submarine, the *USS George Washington*, was deployed in late 1960. The *George Washington* carried sixteen Polaris A-1 missiles, each with a 1,200 nautical-mile range and a single warhead with a circle error probable (CEP), the common measure of missile accuracy, of one nautical mile. Ohio-class submarines will eventually be equipped with twenty-four Trident II missiles, each capable of delivering some eight to fourteen multiple independently targetable reentry vehicles over 4,000 nautical miles to land within approximately 500 feet[1] of their targets. (See Table III.)

Rear Admiral William A. Williams, former director of the Navy's Strategic and Theater Nuclear Warfare Division, told Congress in 1981, "The Trident II missile will add an entirely new dimension to our sea-based capability."[2] That new dimension, and Trident II's most significant characteristic, will be the ability to hit the hardest of Soviet targets in fifteen minutes or less after being launched.

The pursuit of ever more accurate ballistic missiles has been a continuing imperative for three decades, driven by technological advances and precision targeting requirements of nuclear war plans. Trident II's capabilities can be largely attributed to an eight-year Improved Accuracy Program, in which over 800 techniques were proposed and reviewed. It will employ improved submarine navigation and missile guidance systems, including an enhanced stellar inertial guidance system, wherein the missile fixes its position on the stars to correct its flight. Improved submarine navigation and stellar guidance systems aid in increasing SLBM accuracy by adjusting for position problems inherent in submarine launches. Research on a manuevering reentry vehicle is funded and could be a future option.

Missile lethality is also determined by warhead yield. High precision in conjunction with high explosive power will greatly increase the probability of destroying even very hard targets. The Navy has decided to use two reentry vehicles on Trident II missiles: the new 475-kiloton[3] Mk5/W88 and the 100-kiloton Mk4/W76, currently used on the Trident I. Each D-5 missile will carry only one type of warhead, though the warhead complement on individual submarines will vary. SSBNs can be loaded differently to fit the complex targeting requirements of the Single Integrated Operational Plan, the central U.S. nuclear war plan. Combining heavy and light warheads with different yields on the same launch platform gives war planners great flexibility.

The number of warheads carried on the Trident II missile will depend on the missile's range. During early stages of development the Navy considered giving the D-5 missile a range of up to 6,000 nautical miles, but decided to increase payload instead. Some congressmen mistakenly believe Trident II is programmed for a greater range than Trident I and argue vociferously that we need it for that reason.[4] By reducing the number of reentry vehicles the range of both missiles can be increased to 6,000 nautical miles, but at full payload both have approximately a 4,000 nautical-mile range. As Admiral Williams told Congress, "The C-4 has a very comfortable range."[5]

Even if the range of the Trident II is established, the number of warheads it will carry is still difficult to estimate because of the mix of reentry vehicles, but for illustrative purposes several reasonable assumptions can be made. The D-5 on average will probably carry at least a dozen of the smaller Mk4s or eight Mk5s. The majority of the missiles, perhaps a three to one ratio, will be loaded with the heavier Mk5s, because if more Mk4s were used the Navy would be seen as undercutting its case for the Mk5, if not for the whole Trident II program.

Based on these assumptions, an average Trident submarine would carry 216 warheads. A force of twenty-four submarines would carry 5,184 warheads. These figures represent a several fold increase in the number of U.S. ballistic missile warheads available to strike Soviet hard targets. About two-thirds of the fleet would routinely be on patrol, giving the United States a significant counterforce capability at sea at any given time.

Trident II by itself may not be enough to disarm the Soviet Union, but in concert with other strategic and non-strategic programs, all with high accuracy, it will create an entirely new strategic condition. Trident advocates choose to see the missile in isolation, whereas in fact it will be integrated in war plans with the MX, Pershing II, Midgetman, stealth cruise missiles and bombers, and eventually British Trident II forces. Hence, the Soviet Union will soon be faced with large numbers of weapons capable of threatening their fixed, hard military targets, including nuclear forces and command, control and communications facilities. Added to this "hard target kill" capability, Trident II missiles will have the short—approximately fifteen minute—flight time shared by all SLBMs. An improved fire control system will also allow the submarines to launch larger salvos more quickly. Some estimate that all twenty-four missiles of a Trident sub could be fired in less than ten minutes. These factors undoubtedly paint a threatening picture in the minds of the Soviets: large numbers of hard-target warheads arriving with little warning or time to evaluate an attack and make decisions.

Under these conditions, the Soviets must consider the possibility of a U.S. preemptive first strike. Indeed, the United States has not repudiated such an option, and pressures could build during a crisis that might force such a decision. From the Soviet viewpoint, this problem is accen-

A Soviet Trident II?

Jeffrey I. Sands and Robert S. Norris

Most milestones of the nuclear arms race achieved first by the United States were eventually matched by the Soviet Union. How soon will the Soviets have a comparable SLBM force equivalent to the Trident II? From the available evidence, it appears the United States is at least a decade ahead.

The current most advanced Soviet MIRVed SLBM is the SS-N-20, 60 of which are now on three Typhoon SSBNs, a submarine sometimes compared to the U.S. Ohio-class SSBNs. The SS-N-20 is comparable to the Trident II in some characteristics, notably fuel, length, weight, range and throwweight. However, in the most significant area, accuracy, the Trident I is twice as accurate as the SS-N-20 and the Trident II is planned to be four times as accurate.

A new SLBM, the SS-NX-23, is now being flight tested and is expected to enter the Soviet force in early 1987. It is planned for Delta IV SSBNs and may replace the SS-N-18 on Delta IIIs. Both the SS-N-18 and SS-NX-23 are liquid fueled, a hallmark of Soviet ballistic missile technology, but generally considered to be inferior to solid-fuel propulsion. The CEP estimate for the SS-NX-23 is approximately the same as that for the U.S. Poseidon SLBM.

Given past Soviet practice, both the SS-N-20 and the SS-NX-23 are likely to be modified and improved by the end of the decade. But even if those modified missiles become twice as accurate, they will still be only half as accurate as the Trident II.

A possible candidate for a Soviet Trident II may be a new missile for a new class of SSBN. According to the 1985 National Intelligence Estimate, a new class of SSBN is projected to be launched in the early 1990s, though there was no mention of a new SLBM in development. By the mid-1990s, the NIE projects that the Soviets might have 400 warheads on the new class of SSBN (or 40 missiles on two boats). Even if that timetable is kept and a new missile as accurate as Trident II is introduced, a Soviet Trident II force will be at least a decade behind that of the United States.

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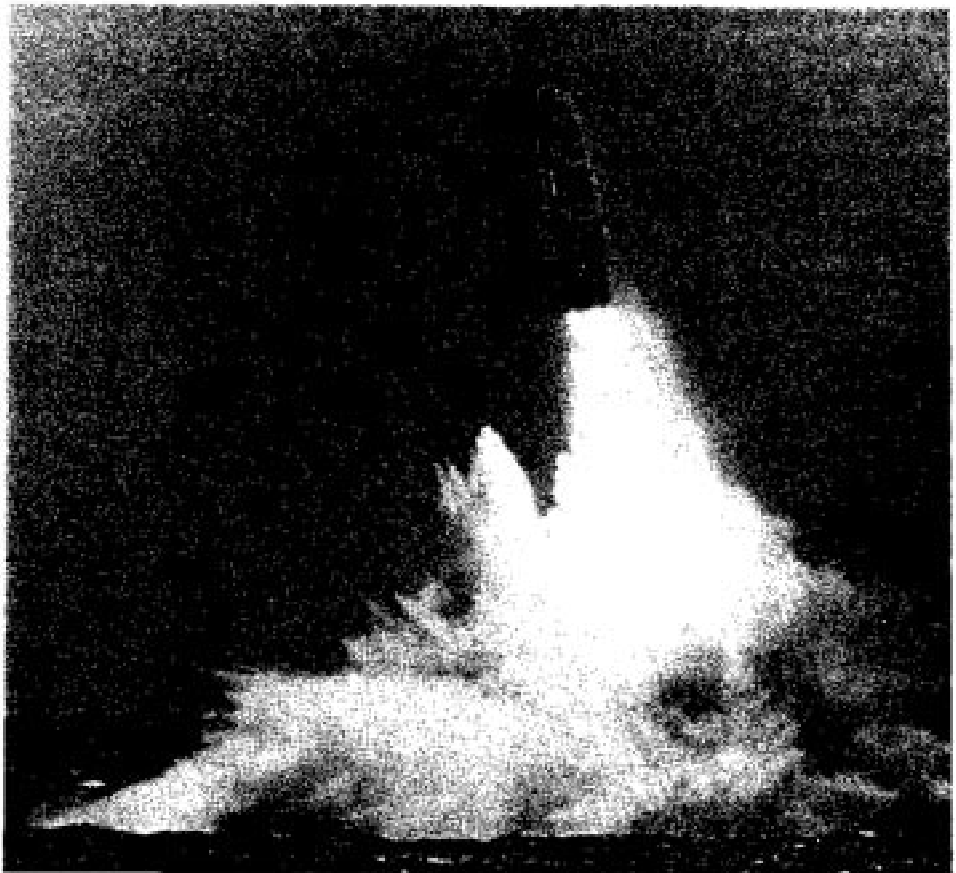
Estimated Characteristics and Capabilities of Current Soviet MIRVed SLBMs

	SS-N-18	*SS-N-20*	*SS-NX-23*
Length (feet)	46.25	49.2	55.6
Diameter (inches)	72	87	71
Weight (lbs.)	44,000-67,200	134,400	78,400
Throwweight (lbs.)	1,800-2,900	5,600	3,360
Range (nautical miles)	3,500-4,300	4,480	4,590
Reentry vehicles	single, 3 or 7 MIRV	6-9 MIRV	6+ MIRV
Yield (kilotons)	450 (single) 200 (MIRV)	200+	250
CEP (nm/ft)	.76/4,620	.27-.3/ 1,640-1,825	.32/1,950
Submarine	Delta III	Typhoon	Delta III/IV
Initial Operational Capability	1978	end 1983	1987
Fuel	liquid	solid	liquid

tuated by U.S. intentions to "render ineffective the total Soviet (and Soviet-allied) military and political power structure through attacks on political/military leadership and associated control facilities," as was stated in Pentagon policy guidance.[6] U.S. nuclear forces could quickly knock out Soviet command centers and communications installations, weakening the Soviet ability to retaliate. Under this "decapitation" scenario, the possibility of restraining or terminating a conflict before it fully escalates would be remote, because Soviet leaders would be unavailable or unable to negotiate an end to the fighting.

The most logical, if dangerous, Soviet response is to implement procedures to launch-under-attack or on-warning so their nuclear forces would not be destroyed. In the face of more accurate ballistic missiles the trend on both sides has been to move in this direction. The Soviets issued warnings that they would be forced to adopt such options in response to the deployment of Pershing II. The United States has repeatedly stated that "launch-on-warning is an option we have and must maintain,"[7] and that it enhances deterrence by keeping the Soviets uncertain about what we would do. Even more ominous is the prospect that such U.S. counterforce capabilities could increase the Soviet incentive, in an intense crisis, not only to launch first, but to launch a lot for fear the United States was about to do so. This "hair trigger" situation, which each superpower is forcing upon the other, heightens the risk that war will start inadvertently through accident or miscalculation. The deployment of Trident II will intensify this situation.

Another Soviet response would be to restructure their nuclear forces in more survivable basing modes, placing greater emphasis on sea-based and land mobile-based systems. The Soviets are, in fact, already moving in this direction. But having just completed a huge investment in large, fixed ICBMs—missiles that intimidate the United States and symbolize to the Soviets their arrival as a superpower—the Soviet Union is likely to keep them around for some time. For the foreseeable future, additional survivable Soviet nuclear forces will only augment their current fixed one.



Test launch of a Trident I (C-4) missile from a submerged submarine. The Trident II, a larger and more accurate missile, will replace Trident I by the end of the century. According to Norris, the U.S. could save $35–40 billion and maintain a more stabilizing SLBM force if it keeps the Trident I.

A number of important arms control considerations should also figure in the Trident debate. The most immediate implication of the overall Trident program is that, to stay within a critical SALT II sublimit, the United States must dismantle MIRVed missiles as new Ohio-class submarines are added to the fleet. The United States would have exceeded the 1,200 MIRVed missile sublimit when the seventh Trident sub, the *USS Alaska*, began sea trials in September 1985, but President Reagan chose to stay within the limit temporarily by dismantling a Poseidon submarine. Figure I shows U.S. SSBN force levels, with and without SALT, to the end of the century. The Navy projects that the Trident program will continue unabated even with SALT II limits, although compensating Poseidon retirements will come at a faster rate if SALT II is retained. Whether Reagan will continue to dismantle older Poseidons as new Tridents are deployed is unknown, particularly after the SALT II limits officially expire on December 31, 1985.

The United States has good reason to stick with SALT II. The agreement pro-

Table II

TRIDENT PROGRAM COSTS

($ billions)

24 SSBNs[a]	$45.2
958 Trident II SLBMs	$46.2
6,500 warheads for Trident I and II[b]	$ 6.6
Backfits for Trident I and Trident II[c]	$ 5.5
Total	**$103.5**

a. Includes 595 Trident I SLBMs and bases at Bangor and Kings Bay.
b. Department of Energy costs
c. Trident I on 12 Lafayette/Franklin SSBNs ($3.6) and Trident II on eight Ohio SSBNs ($1.9)

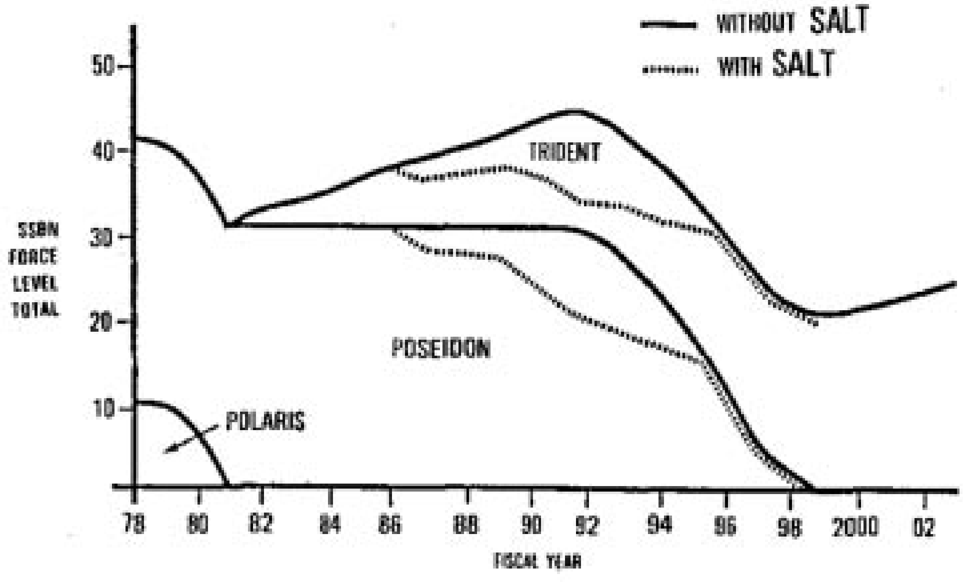
vides for a substantial SSBN force while placing limits on U.S. and Soviet strategic launchers. Though Trident II is not specifically affected by the SALT II Treaty, the missile may create problems for the Navy if SALT II counting rules are applied in a future deep-reductions agreement. The SALT II agreement determined that a missile would be counted as carrying the maximum number of warheads used in the missile's tests. Under this rule, if the D-5 were tested with twelve warheads it would be counted with twelve, even if most D-5 missiles carried only eight or fewer warheads. Ohio-class submarines, carrying twenty-four missiles as opposed to the Poseidon's sixteen, would quickly run up against the warhead limits of a START-type agreement, meaning that only a small fleet of Trident submarines could be deployed. Under the proposals now being offered by the United States and Soviet Union, the U.S. will only be allowed to have ten or twelve Trident subs, with six or seven on patrol at any one time. If the antisubmarine warfare threat to SSBNs becomes more serious, then the Navy may find it has placed too many eggs in one basket.

All of these computations may be academic. If SALT is allowed to expire and new agreements are not reached, Trident II and other nuclear systems will go forward with no restrictions at all. Current Reagan policies appear to preclude an arms control deal with the Soviets in the near future. In those technologies where the administration claims the United States is behind (e.g., ICBMs, antisatellite weapons, nuclear testing), whatever the evidence to the contrary, the administration is unwilling to negotiate until the United States catches up. In those technologies where the United States is markedly ahead (e.g., SLBMs), the administration does not want to negotiate away an advantage.

An alternative to the Trident II exists: The Trident I. The Navy has sought to downplay the improvements that have been incorporated into the Trident I because of the troubling questions it could raise about the need for Trident II. The Trident I also benefited from the Improved Accuracy Program. According to *Aviation Week*

FIGURE I

SSBN FORCE LEVELS



Source: U.S. Navy

Table III

CHARACTERISTICS AND CAPABILITIES OF U.S. SLBMS

	Polaris A-1	*Polaris A-2*	*Polaris A-3*	*Poseidon C-3*	*Trident C-4*	*Trident D-5*
Length (feet)	28.5	30.75	32.3	34.1	34.1	44.5
Diameter (inches)	54	54	54	74	74	83
Weight (lbs.)	28,500	30,000	35,700	65,000	73,000	130,000
Throwweight (lbs.)	c.1,000	c.1,000	1,100	3,300	2,900	5,075
Range (nautical miles)	1,200	1,500	2,500	2,500	4,000	4,000 +
Reentry vehicles (average)	1 MK 1	1 MK 1	MRV x 3 MK 2	MIRV x 10 MK 3	MIRV x 8 MK 4	MIRV x 10-12 MK4/ 8 MK5
Warhead/Yield (kilotons)	W47/600	W47/800	W58/200	W68/50	W76/100	W76/100 W88/475
RV weight (lbs.)	875	c.875	c.250	c.200	212	c.440(MK5)
CEP nm/ft	1/6,000	.5/3,000	.5/3,000	.28/1,700	.27/1,640- .125/750	.07-.10/ 425-600
Dates Deployed	11/60-10/65	6/62-11/74	9/64-2/82	3/71-	10/79-	12/89-

and Space Technology, "Guidance accuracy for the C-4's Mk4 reentry system is . . . under 1,000 feet circular error probable at 4,000 nautical miles, well below the 1,500-feet goal."[8] At ranges less than 4,000 nautical miles the accuracy is even better.[9] A Pentagon report to Congress stated that, "Trident I missile system accuracy is now about the same as Minuteman III operational accuracy."[10] Trident I tests during 1983 consistently achieved CEPs of 750 feet.[11] Many in Congress are apparently unaware of these developments and the Navy is doing little to advertise them, for it would raise the central question over the wisdom of spending $50 billion to gain a few hundred feet better accuracy.

Trident I's accuracy is sufficient to meet many of the Navy's targeting needs, but its lower yield warhead does not pose the silo-busting or decapitation threat of the Trident II. It is already deployed on seven Ohio-class SSBNs and has been retrofitted on twelve Poseidon SSBNs. Of the current 648 SLBMs, 55 percent are Trident I missiles and seem to be satisfactory to the Navy. They are as survivable as Trident II, mostly paid for, and far cheaper to outfit on the rest of the Ohio fleet. At $19 million each, instead of $48 million for each Trident II missile, the cost to outfit sixteen more Ohio-class SSBNs with Trident I would be $10 billion for missiles and warheads. In a time of soaring deficits and level military budgets, a $35–40 billion savings is not insignificant.

Unfortunately, too little attention is being paid to the Trident story. The Navy's submarines are not as controversial as the major Air Force weapons and, because submarines are not land based, they are less of a "backyard" issue. In Congress, Trident II has acted as a safety valve in the heated politics of the MX missile. It has allowed many congressman to appear tough on defense issues by voting *for* something after voting against the MX.

It is time to reevaluate Trident II, its role in the evolving U.S. counterforce strategy, and its impact on U.S. security. Under the Reagan administration the chief rationale for Trident II has shifted from the traditional argument of SSBN survivability to the "need" for large amounts of hard-target kill capability, defined now as the *sine qua non* of deterrence. U.S. security is presumably enhanced the more the Soviet Union is threatened. The real, rather than the intended, result of such logic will be that both sides will end up less secure. Advocates never tire of saying how counterforce strengthens deterrence, but never ask if too much weakens it. With Trident II's addition, the erosion of deterrence will fully set in. Though time is short, an outright ban on Trident II and on a future Soviet counterpart in an arms control deal would make both nations more secure.

1. Clarence A. Robinson Jr., "Congress Questioning Viability of MX ICBM," *Aviation Week and Space Technology*, March 22, 1982 p.18. Also, U.S. Congress. Congressional Budget Office, *Modernizing U.S. Strategic Forces: The Administration's Program and Alternatives*, May 1983, p.84.
2. U.S. Senate Armed Services Committee. *Strategic Force Modernization Programs*. U.S. Government Printing Office 1981, p.187.
3. Clarence A. Robinson, Jr., "Parallel Programs Advance Small ICBM," *Aviation Week and Space Technology*, March 5, 1984, p.17.
4. See for example, Rep. Dickinson, *Congressional Record*, June 19, 1985, H4466 and Rep. Stratton, *Congressional Record*, May 17, 1984, H4116.
5. U.S. Senate Armed Services Committee. *Strategic Force Modernizations Programs*, op. cit., p.167.
6. Richard Halloran, "Pentagon Draws Up First Strategy For Fighting a Long Nuclear War," *New York Times*, May 30, 1982, p.12.
7. U.S. Senate Armed Services Committee, *FY 1982 Department of Defense Authorizations*, Part 7, p.3834.
8. *Aviation Week and Space Technology*, May 30, 1983, p.41.
9. U.S. Senate Armed Services Committee, *FY 1985 Department of Defense Authorizations*, Part 7, p.3426.
10. William M. Arkin, "Sleight of Hand with Trident II," *The Bulletin of Atomic Scientists*, December 1984, p.6.
11. *Ibid.*

Why We Need Counterforce at Sea

Walter B. Slocombe

No nuclear weapons system, and indeed no old one, can in any fundamental sense be considered a "good" thing. However, generalized attacks by advocates of arms control on the Trident II, D-5 program are overstated and misdirected.

From the arms control and stability point of view, the desirable attributes of a nuclear weapon system should be that it is *survivable* so that there is no incentive to attack it, readily *verifiable* so that it can unambiguously be taken into account in agreements (and, indeed so that even without agreements it does not lend itself to uncertainty about the size of the other side's force), and finally that its capability is *not such as to present an avoidable threat* to the other side's deterrent forces, which could create an incentive to attack in a crisis.

The Trident II missile, like its submarine-launched predecessors, is conceded by even its severest critics to satisfy the first two criteria, but it is denounced for violating the third by bringing to the submarine force a degree of accuracy sufficient to threaten Soviet silos, missile launch-control facilities, nuclear storage areas, communication centers and other hardened targets.

No doubt we would all be better off if no nuclear systems had such capabilities. But the hard fact is that guidance technology has reached the point where all new systems will inevitably have substantial hard-target capability, or at any rate, will be perceived to have it by those against whom they are aimed. Possession of this capability by intercontinental-ballistic missiles (ICBMs) in fixed launchers is, of course, one of the main strategic stability problems of the age. Perhaps less well recognized is that bombers, which have long had high accuracy with gravity bombs, will have even better accuracies in the coming years with cruise missiles and other high precision standoff weapons. Indeed, some argue that guidance accuracies will improve to a point when attacks on hardened facilities with conventional weapons will become feasible. It is, therefore, scarcely surprising that any newly developed submarine missile will have greater accuracy that its predecessors.

If one judges, as have successive U.S. administrations—though many have dis-

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