Antisubmarine Warfare after the Cold War

By Owen Cote and Harvey Sapolsky

This report is a summary of an MIT Security Studies conference entitled Antisubmarine Warfare after the Cold War, organized by Harvey Sapolsky and Owen Cote, Director and Associate Director of the MIT Security Studies Program, and sponsored by Paris Genalis, Director of Naval Warfare in the Office of the Undersecretary of Defense for Acquisition and Technology. Held on June 11 and 12 in Lexington, Massachusetts, the conference sought to provide a fresh look at the question of whether or not antisubmarine warfare remains an essential mission area for the U.S. Navy.

We would like to thank Paris Genalis, Vice Admiral Albert Baciocco USN (Ret), Vice Admiral James Fitzgerald USA (Ret), Dr. John Hanley of the CNO's Strategic Studies Group, Rear Admiral Richard Pittenger USN (Ret), Commander James Foggo USN, Gerald McHugh, Ben Valentino, and Tim Wolters for their assistance with the conference and this report.

Executive Summary
The conference brought together an eclectic mix of academics, government officials, military officers, industry professionals, and policy analysts for two days of discussion and debate about the importance of antisubmarine warfare (ASW) after the Cold War. Several clear themes emerged.

First, little if any doubt was expressed concerning whether ASW remained an essential mission area for the U.S. Navy. In fact, several participants voiced the opinion that a robust capability in this mission area was simply a "fixed cost of doing business" for the Navy, something it could never afford to neglect at the expense of other missions. Just as the Navy is the enabling force for the other services, ASW is the enabling mission for the Navy.

Second, the challenge facing the Navy in the ASW mission area is complicated by the fact that it faces both radical geopolitical change with the end of the Cold War, and new technical and operational challenges posed by new generations of very quiet nuclear and non-nuclear submarines. The confluence of these two trends creates an environment in which it is both difficult and important to sustain investment in the ASW mission.

Continued investment in ASW is important not just because it is an important mission area, but also because the U.S. Navy needs to complete the adaptation of its ASW posture to the challenge posed by a truly quiet opponent. This adaptation began in the mid-1980s with the first forward deployments of very quiet Soviet submarines, particularly Akula SSNs, but was interrupted soon thereafter by the end of the Cold War. This sea change in America's external security environment eliminated much of the urgency, and therefore the resources, behind institutionalizing new approaches to ASW against very quiet submarines. These new approaches remain important because they resemble those necessary for dealing with the modern non-nuclear submarines that will increasingly populate the navies of potential aggressor states.

Despite these similarities, it has proven difficult for the Navy to sustain its investment in ASW, because the new threat is both quantitatively and qualitatively different than the Cold War threat in ways that make it harder to explain, and because other Navy missions have grown in relative importance in the new external security environment.

ASW investments are harder to justify because it is difficult to compare the threat of a few Iranian Kilo class diesel/electric submarines to that posed less than a decade ago by more than a 100 Soviet nuclear submarines. Further, it is also difficult to compare the interests at stake in a global conventional war for survival versus a lesser regional contingency fought for more limited aims. In the latter case, even in a major contingency like Desert Storm, the United States fights
far from home over less than vital interests. But this means that it is only willing to pay a blood price commensurate with those less than vital interests, which will make the United States very cost-averse when it does fight. This sets the standards of success for the U.S. military extremely high, creating the demand for quick victories and low losses.

But, given the capabilities of even one well-operated, modern submarine, as the Royal Navy encountered in the Falklands, quick, easy victories are hard to guarantee in ASW. A major conclusion of the conference was that the U.S. Navy needs to do a better job of explaining this difference between the Cold War ASW challenge and the post Cold War one. No opponent threatens to contest our ability to gain command of the seas as the Soviet Union did during the Cold War, but many potential opponents are developing the capability, paraphrasing John Keegan, to extract a price of admiralty that might be unacceptable.

Another reason why ASW investments are hard to sustain is the growth in importance of other naval missions. This matters because ASW is a multi-platform mission area performed by multi-mission platforms. Strike warfare, anti-air warfare, missile defense, and amphibious warfare have all grown in importance as the Navy has shifted its focus away from blue water and toward the littorals. Yet all or many of these missions are performed by the same air, surface, and submarine platforms that do ASW. It is natural that these platform communities should shift their focus, but in a time of declining resources, this shift has come at the expense of other missions, ASW being one of the main billpayers of late.

It was in acknowledgment of this trend that a new office focused on the ASW mission area was established last year in the Office of the Chief of Naval Operations. Another major conclusion of the conference was that this office needs to be given the support commensurate with the importance of its task. Regarding this task, as one attendee, a senior congressional defense expert, put it, "Before I came to this conference I didn't know what the Navy's post Cold War ASW strategy was because the Navy hasn't been speaking with one voice. My ultimate hope is that the Navy will come up with a coherent story and make the budget match that story."

The basis for these conclusions is described in more detail below. The report starts with a short discussion of ASW during the Cold War. This discussion establishes a context for current debates about ASW. Next, it introduces a series of questions which animate and guide these debates. It was with an eye toward addressing some or all of these questions that the conference was organized. Then we provide a brief description of the new approach used by the conference to explore these issues. Finally, in the main body of the report, we present a summary of the results of the conference in the form of answers to at least some of the questions which guided our effort.
ASW During the Cold War

The U.S. Navy emerged from World War II victorious in two undersea warfare campaigns. In the Battle of the Atlantic, U.S. and allied antisubmarine forces beat back the challenge posed to their sea lines of communication by Doenitz's U-boats, while in the Pacific, a prosubmarine campaign was waged by American submarines that cut the sea lines of communication within Japan's Greater East Asia Co-Prosperity Sphere. In the years immediately after the war, the U.S. Navy confronted a major challenge to its undersea warfare dominance. German submarine development, driven by the rigors of waging the Battle of the Atlantic against the Allies' increasingly potent ASW forces, had leapt forward during the course of WWII. By the end of the war, using snorkels, greater battery capacity, and better hull forms, the Kriegsmarine had deployed Type XXI submarines with vastly improved offensive performance while submerged. These came too late to influence the outcome of the war, but they were a harbinger of things to come, since their designs also fell into the hands of the Soviet Union.

Soviet submarines based on these German designs threatened to render obsolete much of the U.S. Navy's ASW posture, which had been focused on dealing with submarines that lost a substantial portion of their offensive capabilities when forced to submerge. At the same time, the Soviet Union, being a continental power, threatened to make the U.S. Navy's victorious submarine force irrelevant, since submarines were primarily useful as an anti-surface weapon against merchant shipping, and the Soviet Union could easily survive without merchant shipping.

Out of this challenge grew two initially separate innovations which, when brought together, formed one of the cornerstones of the U.S. Navy's Cold War ASW posture.

The first innovation involved the exploitation of passive acoustics to detect and track submerged submarines, using the sounds they generated as a signature. Passive sonars significantly increased the range at which submerged submarines could be detected compared to active sonar, allowing for very wide area searches by ocean-wide sound surveillance systems, which in turn could be used to accurately cue ASW platforms to localize and prosecute the submarine contact. The second innovation began with the embrace by the U.S. Navy's submarine community of ASW as its primary Cold War mission. Although this focus on ASW predated the introduction of nuclear power, its full potential was realized in the early 1960s when quiet nuclear submarines were developed that could hear their louder Soviet counterparts at much greater ranges than they themselves could be heard. This acoustic superiority lasted almost through to the end of the Cold War.
Submarines were certainly never the only ASW instrument during the Cold War. Maritime patrol aircraft also played a key role as undersea surveillance systems became fully operational in the early 1960s. Patrol aircraft offered speed that submarines lacked, making them particularly useful in the initial localization of a contact which could then be handed off to a platform with more endurance, like a nuclear submarine. The surface warfare community was slowest to change its traditional ASW methods, remaining dependent on active sonar and short range ASW weapons until the late 1970s. Then, in response to the deployment of more capable Soviet submarine-launched antiship missiles, surface combatants also embraced passive acoustics and long range, shipborne ASW helicopters.

By the early 1980s, all of the Navy's platform communities were being used successfully in ASW operations against Soviet submarines, and increasingly these operations demanded a high degree of coordination as Soviet submarines became quieter. Earlier in the Cold War, when U.S. acoustic superiority was still unchallenged, each platform community's ASW operations had been relatively independent of each other. This independence reflected a fairly natural division of labor based on the strengths and weaknesses of each ASW platform. Thus, submarines went forward into contested waters where other ASW platforms could not operate, maritime patrol aircraft used their speed to prosecute long range contacts generated by underwater surveillance systems, and surface combatants utilized their endurance to provide a local screen for battle groups and convoys.

The key to success in these relatively uncoordinated operations was maintaining a high degree of acoustic superiority over Soviet submarines. Ironically, that superiority began rapidly waning in the 1980s, just as the Cold War was ending, in an echo of the end of World War II. This "saved by the bell" ending to what was the third battle of the Atlantic was fortunate, but current trends in America's external security environment may confront the U.S. Navy with new ASW challenges not unlike those it avoided when the Soviet Union collapsed, albeit on a smaller scale.

First, the threat to American acoustic superiority resulting from the first Soviet deployments of the Akula in the mid 1980s may recur in today's security environment with the increasingly wide proliferation of modern non-nuclear submarines. Deployed relatively close to their homes, in or near littoral waters through which the United States may need to project power from the sea, these submarines pose a potentially formidable threat. With a competent crew and the kind of advanced weapons that are now widely available in global arms markets, a modern non-nuclear submarine deployed in its own backyard might become a poor man's Akula. Of even more concern is the fact that modern weapons, like wake homing torpedoes for example, tend to
reduce
the demands on submarine crews, making even less competent crews too dangerous to ignore.

Second, important elements of the American response in the mid 1980s to very quiet Soviet nuclear submarines are likely to be relevant to dealing with modern non-nuclear submarines. The key element of this response was to coordinate the efforts of the historically independent ASW platform communities. In coordinated ASW, a very quiet opposing submarine might first be detected as a transient contact at long range by off board ocean surveillance systems like SOSUS or SURTASS. This information might then be used to cue maritime patrol aircraft to rapidly search the possible contact area and localize the submarine within it. The prosecution of the contact might continue with platforms of higher endurance like submarines or surface ships, with the latter using its unique command and control capabilities to orchestrate a combined air, surface, and sub-surface effort culminating with the threat submarine being localized by several ASW helicopters, a tactical situation that even the best nuclear submarines cannot normally escape. At the same time, in the background, the off board sensors comprising the ocean surveillance system would be constraining the threat submarine's offensive capability by forcing him to keep his speed down and limiting his ability to communicate. These sensors could also be "reverse cued" by the prosecuting forces in case the latter lost contact with the target, creating higher probabilities that the target could be reacquired and the prosecution continued.

If such a coordinated approach to ASW has continuing relevance today, it needs to be a focus of both current training and future research and development. Concerns about the trends in these areas have recently provoked enough debate over ASW within the Navy and DOD to warrant a fresh look at this mission area.

**Post Cold War ASW Debates**

The following is a list of questions animating today's debates about ASW. They were used as the substantive focal point of Antisubmarine Warfare after the Cold War.

- During the Cold War, ASW forces helped ensure the U.S. Navy's ability to project power, to protect seaborne commerce, and to prevent nuclear attack against our homeland. Are any of these capabilities likely to be less important or irrelevant to U.S. national security in the future?
- If ASW is not high on the list of national security priorities now, could it be 5, 10, or 20 years
from now? What does history tell us about our ability to keep ahead of the ASW problem?

- If there is skepticism in the larger defense community about the future importance of ASW, what are its sources? Is some skepticism a result of a lack of basic technical or operational knowledge about ASW, a mission area that was purposely kept opaque during the Cold War?
  How might this veil be partially lifted in useful fashion? For example, how significant is the trend toward very quiet diesel-electric submarines with a very low indiscretion rate, operating in waters of all depths, at focal points which our ships must pass through or operate in? How different is this ASW challenge from the forward, blue water ASW operations against louder Soviet SSNs that characterized the Cold War?

- What effect is our superiority in most warfare areas having on the planning of potential adversaries? Is there evidence in the naval realm that we are driving them under the sea?

- What new ASW challenges will we face in the future if potential adversaries aggressively embrace the submarine as their main naval platform? What capabilities that we now take for granted might be threatened?

- Is ASW only a Navy problem? What happens when an adversary's submarines attack an amphibious assault ship loaded with U.S. Marines, or an Army prepositioning ship transiting through littoral waters? How acceptable politically will it be to lose a supporting U.S. Flag merchant ship in a Lesser Regional Contingency (LRC) or a Major Regional Contingency (MRC)? How about allied merchant ships or neutral vessels? Could ASW become like the Scud hunting missions of the Gulf War, where assets disproportionate to the military threat were devoted to a mission for important political reasons?

- Are the other services aware of the importance of ASW to their mission effectiveness? Would it be useful to raise the salience of the historically Navy-centric ASW mission in the joint planning environment? Are there characteristics of the ASW mission in the littoral environment that will make this change inevitable anyway?

- How well equipped are we to meet these challenges today? What are current ASW investment
levels and patterns? How deep have the cuts been in ASW force structure, infrastructure, readiness, and training since the end of the Cold War?

- Are there doubts concerning the skill levels and training achievable by foreign submarine crews, especially in developing countries. What can we learn from allied navies about the capabilities of a modern diesel electric boat with a well trained crew?

Certainly this was a very ambitious agenda, and not all of these questions were covered in equal detail. Before reviewing some of the suggested answers, we will briefly describe how the conference was set up to provide them.

A New Source of Feedback for Policymakers

Faced with the above questions, the conference sought to bring together participants with as many different perspectives as possible to discuss them. On the first day, presentations were given that focused on one or several of the key questions. These were punctuated by luncheon and dinner speakers who, respectively, described the origins of the conference and provided a senior practitioner’s view of the ASW problem. On the second day, the entire morning was devoted to free discussion and debate among all the conference participants of what had transpired on the first day.

One unique aspect of the conference was its attempt to include in one room a collection of individuals who would rarely convene under other circumstances. For example, both American and foreign naval officers were present, representing multiple platform communities within their respective services, as well as members of the U.S. Army, Air Force, and Marine Corps. There was substantial participation by the American retired naval community. Non-military experts in ASW were drawn from academia and from industry. Perhaps most important, an attempt was made to involve individuals knowledgeable in other areas of defense policy but relatively unfamiliar with the details of current debates about ASW. This was done in the hope that it would usefully broaden the debate about ASW and also give the experts a chance to present their case to a group without strong predispositions on the issues.

Another unique aspect of the conference was the amount of time devoted to unstructured, off the record debate. Here the purpose was to take an eclectic mix of individuals and encourage them to engage in more than the normal ten or fifteen minute Q&A after a presentation. This provided
a unique opportunity in a non-hierarchical setting for experts to be confronted by unanticipated questions, and for non-experts to get answers that would not normally be forthcoming in other venues.

It is important to emphasize that this effort was not designed to provide programmatic "guidance" to the Navy, or to critique ongoing analytical efforts regarding ASW. Rather, it was intended as an opportunity for the Navy and for OSD to get feedback on a series of questions about ASW and its importance from an alternate group of thinkers in an unpoliticized environment. To the extent that this new approach proves useful, it might be institutionalized.

Some Findings of the Conference

In this section, which forms the main body of the report, debates that the conference addressed are summarized in the form of a series of propositions and rebuttals that were presented by the conference participants.

There Is An ASW Threat

Clearly the ability of the U.S. Navy to control the seas remains vital to U.S. national security, and it is just as clear that ASW remains a key, if not the key sea control mission. No participant in the conference disputed either of these points. Instead, some argued that foreign submarine threats to this sea control capability are currently low, certainly compared to Cold War levels. Given this "threat holiday," and given the inheritance of Cold War ASW systems still present in the force, it was argued that there is no near term threat to our ASW capabilities that we could not safely counter.

The dominant reaction we saw to this argument was twofold. First, the issue is not whether the Navy could overcome any attempt to deny it sea control, but at what cost and in what timeframe. Second, a loud chorus of voices emphasized the fact that ASW systems do not equal an ASW capability, emphasizing the central importance of realistic training and local oceanographic knowledge in regions of potential conflict, and warning of the trends in both these areas. To focus on the second point here (more on the first point below), continued realistic training in the forward areas where contingencies might occur was described as being centrally important to the preservation of a robust ASW capability against even the smallest threats. Although modern weapons are becoming more user friendly, good weapons with unskilled operators can sometimes still be next to useless, while in the opposite case, well trained operators will often make bad weapons functional. Neither of these two situations is either desirable or, it was argued, necessary for U.S. ASW forces, which should aspire to maintain advantages over the enemy in both skill and technology.
Another common argument states that it is the foreign submarine crews which lack realistic training, even if they operate the best modern, non-nuclear submarines. This argument is ubiquitous in current debates about ASW. If the U.S. Navy will not face foreign submarines with aggressive leaders and well trained crews, able to extract maximum benefit from the advancing submarine technology that is increasingly available, than the availability and wide proliferation of that technology should be of less concern.

It may be useful in this context to remember three fairly unique characteristics of submarine warfare, each of which was raised in opposition to the above argument. First, a lone submarine can do more damage in both a military and a political sense than probably any other single conventional platform, naval or military. Second, one man - the submarine commander - can have enormous impact on the capability of that lone submarine. Third, a small force of submarines can be supported by a tiny portion of the population of any country. For example, the total Royal Netherlands Submarine Service consists of only 400 officers and enlisted in a nation of 15 million. This small cohort runs the home port, a school, a tender, and four modern, Walrus class submarines. If industry and other related civilian support sectors are included the number of individuals involved runs to 1500. In this opposing view, even small submarine forces can be a threat, especially when one abandons the assumption that the West has a permanent monopoly on the likes of Gunther Prien and Eugene Fluckey.

Even given the possibility of small, well trained submarine forces in the hands of potential adversaries, it is argued that these are overwhelmingly going to be non-nuclear submarines with significantly less capability than U.S. nuclear submarines. Given this disparity in capability, how could these submarines pose an important threat to American ASW forces? Such skepticism about the capabilities of non-nuclear submarines is quite common, and was also expressed at the conference.

The overwhelming answer to this question was that modern non-nuclear submarines are both better than their predecessors and more widely available as defense industries that served their home markets during the Cold War now struggle to use exports to stay alive. One reason that the submarines are better is because many decades of continual investment by countries like Germany and Sweden have finally paid off in the form of non-nuclear submarines with air independent propulsion (AIP) systems that make them true submarines rather than mere submersibles. These submarines still do not provide the mobility and endurance of a nuclear submarine, but they greatly reduce the indiscretion rate of a traditional diesel-electric submarine, which must expose a snorkeling mast to recharge its batteries every few days at a minimum,
and much more frequently if forced to operate at high speed.

Such submarines are also armed with better weapons and fire control systems. One particularly alarming development is the marriage made possible by the end of the Cold War of the air independent, non-nuclear submarine with the submarine-launched antiship missile. Armed with Harpoons or Exocets available from several western suppliers, these platforms can launch fire and forget missiles from over the radar horizon without the need for the noisy and battery draining approach run necessary for a traditional, torpedo-armed, diesel-electric boat. This threat circumvents the traditional ASW approach to dealing with very quiet diesel-electrics, i.e. to flood the ocean surface with radar and use speed to force the submarine to either run down its battery and expose itself in an attack run or stay quiet and defensive.

**ASW In A Major Regional Contingency**

Of even more concern is the scenario noted by several participants that would result when and if the U.S. Navy faces this kind of tactical threat in the midst of a time urgent deployment during the halting phase of a future major regional contingency. In the face of such a threat, three capabilities that we now assume as essentially given were questioned. First, is the assumption of casualty free power projection of naval and military forces to within line of sight of the coastline in the objective area; second is the assumption that this projection of power will be rapid; and third is the assumption that global trade flows can be kept insulated from the local disruptions caused by a major regional contingency.

Regarding casualties, even in a major regional contingency, the stakes for the United States are limited while those of its opponents are very high indeed. The opponent may be willing to run great risks and sustain high losses, while we will not. Faced with the possibility or the reality of losses at sea, we will stop and eliminate that threat before proceeding, and when that threat is submarine-based, its elimination will not be immediate and may take weeks.

A good analogy is to the great Scud hunt of Desert Storm. Thousands of sorties were diverted over several weeks from the air war during Desert Storm to hunt for SCUDs to little or no effect. From an ASW perspective, this experience is illuminating for both operational and political reasons.

Operationally, Scud hunting was like ASW. A large area needed to be searched for objects that easily blended into the background and only intermittently exposed themselves. Thus radar was
used to flood SCUD operating areas, unattended field sensors were also deployed, and aircraft were used to pounce on potential contacts. This was a protracted, extremely asset intensive endeavor, characterized by false alarms, high weapon expenditures, and low success rates. In short, a SCUD launcher was most likely to reveal itself by successfully launching its weapon, just as sinking ships are often the only reliable indication that there is a submarine in the neighborhood.

The political lessons of the SCUD hunt also apply to ASW. Before the war, the SCUD had rightly been dismissed as a serious military threat, but once they began landing in Israel, the political imperative to allocate scarce resources to at least appear to counter this threat rapidly overwhelmed these narrow military calculations. The same political pressures would be brought to bear on ASW forces facing active enemy submarines, but unlike Scuds, which remain terror weapons without much military utility, submarines are a deadly serious military threat as well as a political one. Therefore, it will not do to simply appear to be addressing the ASW problem with a major allocation of resources. Real results will have to be forthcoming before commanders will be willing to risk valuable seaborne assets, be they Navy aircraft carriers, Marine amphibians, or Army sealift ships.

A delay of several weeks during the halting phase of an MRC might not be a war stopper all by itself, but it is important to understand the consequences for current time phased force deployment list (TPFDL) timelines, which assume closure of millions of square feet of pre-positioned sealift within the first two weeks of the start of an MRC. This would transform a rapid deployment into a slow one, throw the deployment timelines of all the services askew, and open a window of indeterminate size at the outset of a conflict in which the enemy can operate unmolested except by those opposing forces already in theater, assuming they do not need an open sea line of communication to sustain themselves.

**ASW Is Not Only A Navy Problem**

Again, one response was to simply argue that delay would be an acceptable outcome in this scenario as long as the eventual outcome was still guaranteed. Interestingly, this argument provoked a series of questions about the views of the other services and the relationship between the Navy's ASW planning process and the Joint planning environment. One question was whether the other services need to look at their own ASW requirements, as it were, and gain a voice through the joint arena in setting those requirements and the investment levels needed to support them. Another question concerned whether the Navy needed to look at the possible benefits of encouraging such a development in one of the few mission areas that has heretofore remained completely outside the joint requirements process.
In the first case, a presentation was made concerning the increased investments being made by the post Cold War Army in its rapid, strategic mobility capabilities, including a large, sea-based, pre-positioning force and a greatly expanded, surge sealift fleet. These are programs whose ships are paid for by the Navy based on requirements generated in the Joint planning environment. This reflects a trend in which more and more of available Service funding is apportioned in response to requirements validated by organizations like the Joint Requirements Oversight Council (JROC), and these organizations naturally focus on joint warfighting capabilities. This makes it harder to fund Service specific requirements, and ASW has historically been considered a Navy specific mission area by dint of its monopoly on undersea warfare. One answer to this conundrum was to argue that ASW is simply a cost of doing business for the U.S. Navy under any budgetary circumstances. Another was to further explore how the new, increasingly powerful joint planning environment could be used to create added leverage in support of funding for ASW.

Regarding the vulnerability of global trade flows to interdiction, there was little debate about the vulnerability of lone, unescorted merchant ships to submarine attack. This is obviously not a new phenomenon, although the same modern information systems that allow shippers to track the location of their cargos in real time while in transit may also increase the opponent's ability to locate ships to attack. The new argument is that the role of merchant shipping in today's global economy has fundamentally changed, making a given level of disruption more harmful than in the past. This change results from the deepening reliance of industry on a global, just-in-time, intermodal transportation system with the large container ship at its core. These ships carry vastly more cargo than did the breakbulk freighters of yore, and they move these cargoes under much stricter time deadlines. Disruption in those deliveries could have rapid and far reaching ripple effects in a national economy like the United States, much as did the August, 1997 shut down of UPS, which plays a similar role in other sectors of the economy.

Some participants in the conference were skeptical that a small submarine force could ever cause major damage to an economy the size of the United States', never mind the global economy. The important point is that vulnerability can not simply be measured in gross economic terms, but must include an assessment of the larger political effects caused by those losses on a complex, tightly coupled intermodal transportation system. As with casualties, the American public may have a very low tolerance for economic disruption resulting from distant conflicts fought over less than vital interests.

**ASW And The U.S. Navy's Post Cold War Crisis Of Relevance**
These debates about different threats in turn provoked questions concerning how it could be possible for the Navy to be underinvesting in ASW given its historic and continuing importance. Here, a large part of the answer turned out to be that the Navy faces a new operating environment in which it is increasingly relevant and therefore in demand. Unlike in the post WWII era when the Navy was searching for a mission, it has been inundated with new missions in the post Cold War era, and these new missions compete with ASW for resources.

This has serious consequences for ASW because, as noted above, ASW is a multi-platform mission area performed by multi-mission platforms. As the Navy's strike warfare, anti-air warfare, missile defense, and amphibious warfare capabilities have grown in importance in the nation's military strategy, the Navy has shifted its focus away from an emphasis on blue water sea control toward power projection and land control in the littorals. Yet these missions must be performed by the same platforms that perform ASW - the air, surface, and submarine communities, all supported by the ocean surveillance community. It is natural that the Navy's platform communities should shift their focus, but in a time of declining resources, this shift inevitably comes at the expense of other missions performed by those platforms.

This "multi-mission pull" increasingly makes ASW compete with strike warfare and theater air and missile defense for the same resources and training opportunities. The other mission areas are winning these battles and pulling the Navy's major platform communities away from ASW, particularly in the aviation and surface warfare branches.

This shift in orientation is occurring at a time when technology increasingly demands that ASW be a coordinated, "combined arms" exercise if it is to succeed. All elements of the Navy's ASW posture must be maintained to succeed in the fight against quiet submarines, but all three of the Navy's major platform communities perceive that their survival in the new security environment depends to some extent on their success in performing other missions. The costs in terms of ASW capability associated with this multi-mission pull may be highest in the aviation community, which is struggling to find the resources to recapitalize the carrier air wing and Marine vertical lift capabilities. Fixed and rotary wing ASW platforms have an enormous role to play in coordinated ASW, but the money to support these forces is scarce.

Another more subtle but real cost may be incurred by the Navy if it continues to let its ocean surveillance community and its support for basic oceanographic research atrophy. A senior retired U.S. naval officer noted the importance to ASW of a detailed understanding, in real time, of the ocean environment and the ability to exploit this operationally. Confirming this, a British submarine officer noted the difficulties his service encountered in the Falklands as a result of the
absence of such an understanding, including an almost complete inability to make useful sonar range predictions.

**ASW And The Revolution In Military Affairs**

Another consequence of multi-mission pull is operational, and will grow in significance to the extent that the Navy embraces new "net-centric" warfare schemes that seek to exploit the Revolution in Military Affairs at sea. Net-centric warfare exploits the fact that platforms and sensors can be netted together with wideband communication links to form a system or net that is greater than the sum of its parts.

A good example is the Navy's Cooperative Engagement Capability (CEC) which links together air and missile defense assets in ways that allow one platform to guide a missile launched by another at a target first detected by a third. CEC and other systems like it are easiest to imagine for operations by widely dispersed platforms on the surface and in the air, where detection ranges extend out to the horizon and supporting wideband communication links are relatively easy to arrange, neither of which is a characteristic of the undersea environment, where detection ranges against a very quiet target are short and wideband communications all but non-existent. Thus, above the surface, the trend is for platforms to disperse, while ASW operations against quiet submarines still require a higher degree of concentration. This does not mean that a net-centric approach to ASW will not eventually be developed, but it may mean that in the interim the operational commander at sea will increasingly face a dilemma about how he deploys his platforms, since the demand for the many missions they each perform is likely to arise concurrently rather than sequentially.

**Speaking With One Voice On ASW**

A third consequence of the Navy's traditional platform-centered organization is political. Such an organization is more prone to speaking with several voices, making it difficult for the outside observer to divine a single message. This tendency was exacerbated in the ASW mission area when OP-07 and OP-71, the integrated warfare area sponsor for ASW, were reorganized out of existence during the Navy's post Cold War shift in focus toward the littorals. There was much discussion of the consequences of this in the context of the Navy's approach to justifying its post Cold War ASW posture.

For example, as one participant noted, the Navy seems to keep changing the public rationale for its submarine force level requirement, starting with the need to hedge against a resurgence of a blue water Russian nuclear submarine force, then moving to the need for battle group support, and increasingly now focusing on ASW against quiet non-nuclear submarines in shallow,
littoral waters. At the same time, in other contexts and in juxtaposition to the first set of arguments, the Navy takes other measures or makes other arguments which seem to indicate a different set of priorities, like turning off undersea surveillance systems used for tracking submarines, or dragging out the acquisition of submarine communication systems needed for wide band connectivity with the rest of the Fleet, or touting the value of other ASW platforms in operations against quiet submarines in shallow, littoral waters.

Several participants, particularly those expert in defense issues other than ASW, found the seeming confusion in the Navy's public diplomacy on this issue and other's like it conducive to skepticism about the true value it placed on ASW in general. Warranted or not, it is clearly important that this perception exists, and it will remain difficult to sustain investment in ASW as long as it continues.

Conclusions

Since the beginning of the 20th Century, submarines have been the weapon of choice for weaker naval powers that wish to contest a dominant power's control of the seas, or its ability to project power ashore from the sea. This is because submarines have been and are likely to remain the weapon system with the highest leverage in a battle for control of the ocean surface. No other individual platform compares to a modern submarine, whether nuclear or non-nuclear, in its ability to combine a potent offensive punch with the ability to evade counterattack by opposing forces.

Today, the steady proliferation of modern, non-nuclear submarines, fueled by "export or die" imperatives in Western defense industries, and the cost-averse politics of fighting distant wars over less than vital interests conspire to make it both important and difficult for the U.S. Navy to maintain a robust ASW posture in the post Cold War security environment. This fundamental reality of naval warfare creates a series of challenges for the U.S. Navy.

The biggest challenge is to explain the threat posed by even small numbers of modern non-nuclear submarines. ASW practitioners instinctively understand this threat but often founder in making it credible to a wider audience in comparison to the Cold War threat, which consisted of more than 100 Soviet nuclear submarines. The key variable left out of this comparison concerns the willingness of the United States to incur costs in a conflict. In a battle for survival,
which is the battle for which we prepared during the Cold War, one is willing to sacrifice much to achieve success. In battles fought over lesser interests, which are the only battles that the United States will likely face in the current security environment, one is willing to sacrifice much less, if at all. Under such circumstances, even one opposing submarine has the capability, if unchecked, to frustrate the Joint Force Commander's intent.

Another challenge for the Navy is to communicate to its consumers in the other services how different ASW is from other warfare areas. Even when successful, as the Royal Navy was in the Falklands, ASW is usually a protracted, platform intensive exercise in which the threat is not eliminated but simply held at bay. This has significant consequences for both operational and budgetary planners who, in the post Goldwater-Nichols Defense Department, increasingly reside outside the Navy. Joint Force Commanders used to decisive engagements that last for several days and end with clear outcomes need to be prepared for engagements that may last weeks without clear resolution. Likewise, budget planners used to warfare areas in which you buy one platform to counter one opposing platform need to be prepared for a situation in which the exchange rate is much less favorable. This may require that the Navy increasingly use the joint arena to get both the warfighting CINCs and the other services more involved in the process of generating and funding ASW requirements.

A final challenge is for the Navy's individual platform communities to find an organizational means of more closely coordinating their operational and budgetary planning without sacrificing the benefits in terms of innovation that can result from having semi-independent platform sponsors. Meeting this challenge is important for three reasons. First, ASW against modern submarines demands a coordinated, all arms approach involving all the Navy's platform communities. Second, the trend toward net-centric warfare schemes in support of the strike, expeditionary, air, and missile defense warfare areas needs to be leavened by the potentially countervailing demands of the antisubmarine warfare area. Third, better coordination among the platform communities is important in order to limit the political costs that can occur when multiple constituencies vie for the same, limited resources.

In the past, the Navy has used integrated warfare area sponsors to balance the perspectives of the individual platform communities, and it has recently begun the process of reestablishing such a sponsor for ASW in response to some of the challenges described above. This process almost certainly needs to be completed with the appointment of a Flag level officer with appropriate staff and resources to lead this office so that it can stand alongside the platform sponsors and provide the single voice for ASW needed by the Navy.