

Conceal or Reveal?

Managing Clandestine Military Capabilities in Peacetime Competition

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In the modern era, many elements of military power depend on secrecy for their battlefield effectiveness—assets we call “clandestine capabilities.” Yet, this secrecy makes these capabilities difficult to exploit for political purposes: keeping the capability concealed removes it from the calculus of other actors, making it useless for deterrence or other aims. Clandestine capabilities can thus pose a trade-off between military and political utility.

The international relations literature has, by and large, denied that any trade-off is possible. Rather, concealment of clandestine capabilities is the dominant state behavior. James Fearon famously argues that, in a crisis, states “have an incentive to exaggerate their capabilities in an attempt to do better in bargaining.” Their rivals therefore “have no reason to believe them,” unless they observe a costly signal that hidden capabilities are likely to affect war outcomes. Simply telling an adversary about an unanticipated source of military advantage is likely to be met with incredulity. Yet, states find effective costly signaling of military capabilities to be close to impossible: “Explaining how they planned to win a war might seriously compromise any such attempt by changing the likelihood that they would win.” Thus, to the extent that clandestine capabilities influence the military balance, information about them is likely to be in short supply, leading to bargaining failure and war.¹

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1. James D. Fearon, “Rationalist Explanations for War,” *International Organization*, Vol. 49, No. 3 (Summer 1995), pp. 398, 400, doi.org/10.1017/S0020818300033324.

This conclusion is troubling, because clandestine capabilities have become an increasingly salient part of modern military competition over time. The past three decades have witnessed a revolution in remote sensing, which is being fully exploited for military applications via the increased diversity, persistence, and sensitivity of sensors. Manned and unmanned platforms now collect targeting intelligence from the ground, air, sea, and space. Advanced data fusion technology can integrate different types of signatures into a holistic picture, often in real time. Prompt and precise munitions allow the fruits of this intelligence to be used against all classes of targets across the breadth of the globe.² However, many of these tools are recessed or hidden, and the locations, capabilities, and operational possibilities of sensor complexes are opaque.

Moreover, traditional electronic warfare is now being supplemented with cyberwarfare, either of which can hamstring an adversary's ability to respond effectively by attacking its command, control, and communications. U.S. cyber capabilities, such as Project SUTER, may "be able to produce false positives or other misleading data in the air defense system, or even to hijack the system entirely. This attack method is much more subtle than traditional electronic warfare and may not even be perceptible."³ Cyber capabilities are likewise hidden from view: in a not-for-attribution discussion, one U.S. analyst noted that even in classified war games, some cyber capabilities were so tightly held that it was impossible to get all participants "read in" to the required compartments. As a result, certain capabilities appeared only as "magic faerie dust" in the war games.⁴

The rising salience of clandestine capabilities is reflected in policymaker interest in the subject. In 2016, David Ignatius reported that "Pentagon officials say they decided over the past year to reveal some formerly top-secret weapons programs because the disclosure would complicate Russian and Chinese military planning. But they say they have concealed other programs to preserve warfighting effectiveness in any future conflict."⁵ Former Deputy Secretary of Defense Robert Work has said publicly, "We will reveal for deter-

2. For an excellent discussion of these changes, see Keir A. Lieber and Daryl G. Press, "The New Era of Counterforce: Technological Change and the Future of Nuclear Deterrence," *International Security*, Vol. 41, No. 4 (Spring 2017), pp. 32–35, 37–46, doi.org/10.1162/ISEC_a_00273.

3. Austin Long and Brendan Rittenhouse Green, "Stalking the Secure Second Strike: Intelligence, Counterforce, and Nuclear Strategy," *Journal of Strategic Studies*, Vol. 38, Nos. 1–2 (February 2015), pp. 24–25, doi.org/10.1080/01402390.2014.958150. See also U.S. Air Force, "Suter Program Briefing" (Wright Patterson Air Force Base, Ohio: Suter Program Office, n.d. but circa early 2000s).

4. Austin Long interview with U.S. government analyst, January 2015.

5. David Ignatius, "America Is No Longer Guaranteed Military Victory. These Weapons Could Change That," *Washington Post*, August 16, 2016, https://www.washingtonpost.com/opinions/global-opinions/america-is-no-longer-guaranteed-military-victory-these-weapons-could-change-that/2016/08/16/004af43e-63d2-11e6-be4e-23fc4d4d12b4_story.html.

rence, and we will conceal for war-fighting advantage. There are a lot of things in the budget that we don't talk about because we want to preserve that in case, God forbid, deterrence fails and we do come to a conflict of arms."⁶ However, the mechanics of how to navigating this trade-off are far from clear to Pentagon managers, with one high-level defense official stating that managing clandestine capabilities is "one of the truly difficult challenges for us in the twenty-first century."⁷

If international relations theory is right that concealment of clandestine capabilities is the dominant behavior among states, then the world is headed for a future with nasty military shocks and untimely discoveries of hidden doomsday machines. But are political advantage and warfighting effectiveness always and everywhere contradictory? When does a genuine trade-off between signaling information about the military balance and concealing clandestine capabilities arise? When will states signal, and when will they conceal? What are the conditions for effective signaling and concealment?

In this article, we aim to answer these questions, qualifying the dominant conclusions of the existing literature. We argue that the military and political utility of clandestine capabilities were most sharply opposed in the crisis and wartime settings that have been the focus of previous scholarship. In peacetime interactions, however, a dilemma between signaling and concealing clandestine capabilities can emerge. Peacetime signaling will often be more informative and more effective than in crisis or wartime situations, opening the path toward several potential long-term political benefits that might be worth the military costs.

Within the context of long-term peacetime military competitions, we propose that states are more likely to signal clandestine capabilities in two circumstances. First, the less unique the capability, the more attractive signaling is relative to concealment. Second, the less responsive the adversary is anticipated to be at implementing countermeasures, the more likely states are to reveal the clandestine capability. In both cases, signaling increases in attractiveness as the military costs of revelation decrease. We test these propositions with a two-part study of U.S. strategic antisubmarine warfare (ASW) during the Cold War, which meets the conditions of our theory, while in many respects providing a "hard test."

6. Dan Lamothe, "The Killer Robot Threat: Pentagon Examining How Enemy Nations Could Empower Machines," *Washington Post*, March 30, 2016, <https://www.washingtonpost.com/news/checkpoint/wp/2016/03/30/the-killer-robot-threat-pentagon-examining-how-enemy-nations-could-empower-machines>.

7. Author interview with senior Pentagon official, August 2016.

We begin by providing a concept and definition for clandestine capabilities, as well as a brief discussion of what constitutes signaling. Next, we survey the treatment of clandestine capabilities in the extant literature, noting the preponderant assumption that states will not signal secrets about the military balance. We then lay out an argument that peacetime competition is a key condition for states to find the political benefits of signaling attractive, followed by an argument about the variables that keep military costs down and make signals more likely. Subsequently, we describe our research design and predictions. Three sections then evaluate our hypotheses against evidence from U.S. Cold War strategic ASW. We conclude with implications for policy and future research.

Defining Clandestine Capabilities

Clandestine capabilities are elements of military power that depend on secrecy for their effectiveness. Conceptually, the key feature of a clandestine capability is that successful countermeasures can sharply degrade its military value, usually because the capability depends on some enemy vulnerability than can be repaired once it is discovered.

Not all military secrets are clandestine capabilities. Some military capabilities do gain operational benefit from covert development and deployment, yet do not experience a sharp drop-off in effectiveness once they are discovered and countermeasures devised. To qualify as a clandestine capability, the right countermeasures must hold the potential to turn a successful engagement into a failure, or a turkey shoot into a tough fight, and be known to do so in advance.

Compare two examples from land warfare. Suppose one state clandestinely introduces a tank with a new, more powerful main gun, hoping to shift the military balance in its favor. If its adversary discovers this capability and responds with improved armor on its own tanks, this might eliminate some or all of the tank's increased capability, but it does not thereby make the tanks disappear. They still exist and factor into the military balance as they have always done. In contrast, if a state has secret plans to strike with all its tanks at the critical weak point in its adversary's lines, its rival might eliminate the value of these plans with a simple adjustment in force deployment. In the former case, the secret tanks lose some of their efficacy but still provide military utility; in the latter case, the value of the secret plans drops to zero. Only the latter is a clandestine capability in the sense we mean.

Likewise, not all military signals are communication about clandestine capabilities. Military parades or other public displays of new hardware usually oc-

cur without any fear that the newly revealed capabilities could be sharply degraded; indeed, they are often intended as statements of national prestige, or gross economic arms-building ability, rather than as communication about military advantages.

We argue that a state signals, or reveals, a clandestine capability when it takes steps that credibly communicate previously concealed information about the military balance to other states. To be credible, signals must convey information about changes in the military balance—that is, they must demonstrate the military effectiveness of the clandestine capability in question. The great risk of such signals is that they will help the target discover the vulnerabilities on which the clandestine capability in question depends, leading it to rectify those weaknesses and erase the military balance advantage provided by the clandestine capability.

What a credible signal looks like will vary according to the technical characteristics of different capabilities. In some cases, merely revealing the existence of a new weapon might credibly communicate military strength. For example, a state with a small, secret, and vulnerable nuclear arsenal that openly tested a weapon for the first time would be credibly signaling a major military balance change, while also risking preemptive attack. More frequently, states will need to demonstrate the operational effectiveness of a clandestine capability. Calling a new aircraft stealthy proves little. Demonstrating that it can evade enemy radar detection communicates much more. And occasionally, clandestine capabilities must be used at scale to affect the military balance, compelling states to signal their prevalence within a force—for example, that they can construct a whole fleet of stealth aircraft. Of course, the more information that is communicated, the more incentive adversaries will have to invest in counter-stealth capabilities. A state that based its whole aerial concept of operations on having undetectable aircraft could find itself facing disaster if its aircraft suddenly became detectable.

Security Studies Literature on Clandestine Capabilities

Existing scholarship, insofar as it treats clandestine capabilities, does not anticipate that states will have reasons to signal them. Crisis bargaining scholarship in the rationalist tradition has affirmed Fearon's conclusions above about the dominance of concealing military secrets over signaling them. Branislav Slantchev has stressed the importance of surprise-attack capabilities for crisis bargaining, arguing that they can provide rational incentives for feigning

weakness during strategic bargaining and can also lead to preventive war.⁸ Likewise, Dong Sun Lee connects preventive war to military strategies of maneuver that rely on deception and good intelligence capabilities opaque to outside observers.⁹ Many formal models have illustrated the general link between uncertain military capabilities and violent bargaining failure.¹⁰

To the extent that the bargaining literature does address signaling with military assets, it is overwhelmingly focused on signaling resolve, rather than military power. Indeed, the literature tends to elide this important distinction entirely. As Slanchev notes, most studies define “a strong actor” as “one with a large expected war payoff. Valuation of the issue (high), costs of fighting (low), probability of winning, and military capabilities (large)” are often “lumped together to produce an aggregate expected payoff from fighting (high), which in turn defines the actor’s type (strong).”¹¹ Signals are given primarily by the refusal or acceptance of different sorts of peace terms, and communicate generic bargaining strength without differentiating its source. When the sources of bargaining strength are broken out, the variable most often discussed is resolve, intentions, or the cost of war.¹²

The literature on military deception during wartime not only notes the disincentives for signaling, but also emphasizes the importance of communicating false information about clandestine capabilities. A number of authors emphasize the battlefield value that comes from concealing military secrets, especially surprise attack.¹³ Newer work emphasizes the potential for deception

8. Branislav L. Slanchev, “Feigning Weakness,” *International Organization*, Vol. 64, No. 3 (July 2010), pp. 357–388, doi.org/10.1017/S002081831000010X; and Bahar Leventoglu and Branislav L. Slanchev, “The Armed Peace: A Punctuated Equilibrium Theory of War,” *American Journal of Political Science*, Vol. 51, No. 4 (October 2007), pp. 755–771, doi.org/10.1111/j.1540-5907.2007.00279.x.

9. Dong Sun Lee, *Power Shifts, Strategy, and War: Declining States and International Conflict* (New York: Routledge, 2014).

10. Mark Fey and Kristopher W. Ramsay, “Uncertainty and Incentives in Crisis Bargaining: Game-Free Analysis of International Conflict,” *American Journal of Political Science*, Vol. 55, No. 1 (January 2011), pp. 149–169, doi.org/10.1111/j.1540-5907.2010.00486.x; and William Reed, “Information, Power, and War,” *American Political Science Review*, Vol. 97, No. 4 (November 2003), pp. 633–641, doi.org/10.1017/S0003055403000923.

11. Branislav L. Slanchev, “Military Coercion in Interstate Crises,” *American Political Science Review*, Vol. 99, No. 4 (November 2005), p. 542, doi.org/10.1017/S0003055405051865.

12. See, for example, Jessica Chen Weiss, “Authoritarian Signaling, Mass Audiences, and Nationalist Protest in China,” *International Organization*, Vol. 67, No. 1 (January 2013), pp. 1–35, doi.org/10.1017/S0020818312000380; and Keren Yarhi-Milo, “In the Eye of the Beholder: How Leaders and Intelligence Communities Assess the Intentions of Adversaries,” *International Security*, Vol. 38, No. 1 (Summer 2013), pp. 7–51, doi.org/10.1162/ISEC_a_00128.

13. Barton Whaley, *Stratagem: Deception and Surprise in War* (Boston: Artech House, 2007); and Richard K. Betts, *Surprise Attack: Lessons for Defense Planning* (Washington, D.C.: Brookings Institution Press, 1982).

in cyberspace, and its ambiguous effects on the offense-defense balance.¹⁴ Some of the deception literature also gives attention to a state's political incentives to conceal or exaggerate its military strength, rather than communicate about it.¹⁵

A welcome recent strand of work has shifted emphasis toward the ability of states to communicate with secret information, by signaling outside the public eye. Austin Carson and Keren Yarhi-Milo illustrate how secret military actions can be used to signal a desire to control escalation or to credibly convey resolve or reassurance.¹⁶ However, this scholarship continues to focus on communication about resolve and intentions, rather than about the military balance. Even Robert Jervis's *The Logic of Images in International Relations*, which remains the most thorough examination of secrecy and signaling, largely concentrates on deceptive communication about strategic intentions.¹⁷

Three research efforts have directly studied the trade-off that we examine between signaling information about the military balance and concealing it. By and large, they endorse the conclusions of the literature surveyed above or else focus on conditions outside the scope of direct military competition.

Robert Axelrod has written on "resources for surprise" during wartime that are akin to our definition of clandestine capabilities: assets of military value that degrade rapidly after they are used, such as spies, double agents, counter-intelligence, code-breaking, and the introduction of new weapons systems in battle. Axelrod's conclusion mirrors that of other rationalists such as Fearon in arguing that states should hold back their secret capabilities as long as possible to maximize their military impact; concealment remains the dominant behavior for standard military reasons. Moreover, Axelrod does not analyze the

14. Erik Gartzke and Jon R. Lindsay, "Weaving Tangled Webs: Offense, Defense, and Deception in Cyberspace," *Security Studies*, Vol. 24, No. 2 (2015), pp. 316–348, doi.org/10.1080/09636412.2015.1038188.

15. Barton Whaley, "Covert Rearmament in Germany, 1919–1939: Deception and Misperception," *Journal of Strategic Studies*, Vol. 5, No. 1 (March 1982), pp. 3–39, doi.org/10.1080/01402398208437101; and John J. Mearsheimer, *Why Leaders Lie: The Truth about Lying in International Politics* (Oxford: Oxford University Press, 2013), pp. 25–44.

16. Austin Carson, "Facing Off and Saving Face: Covert Intervention and Escalation Management in the Korean War," *International Organization*, Vol. 70, No. 1 (Winter 2016), pp. 103–131, doi.org/10.1017/S0020818315000284; Keren Yarhi-Milo, "Tying Hands Behind Closed Doors: The Logic and Practice of Secret Reassurance," *Security Studies*, Vol. 22, No. 3 (2013), pp. 405–435, doi.org/10.1080/09636412.2013.816126; and Austin Carson and Keren Yarhi-Milo, "Covert Communication: The Intelligibility and Credibility of Signaling in Secret," *Security Studies*, Vol. 26, No. 1 (2017), pp. 124–156, doi.org/10.1080/09636412.2017.1243921.

17. Robert L. Jervis, *The Logic of Images in International Relations* (New York: Columbia University Press, 1989).

political utility of using these assets to signal. Indeed, the animating assumption of his study—that once a resource for surprise is “burned” its value disappears—implies there can be no such utility.¹⁸

Allison Carnegie and Austin Carson study the intelligence sources and methods problem, which they call “the disclosure dilemma”; the intelligence capabilities they reference are often clandestine capabilities in our sense of the term, when they have a military application. They show that states often hesitate to reveal their private information for fear of damaging future collection. Their central argument is that international organizations can alleviate this problem by authenticating private state intelligence, thus producing political benefits through increased international cooperation in areas such as non-proliferation, trade, and international justice.¹⁹ In contrast, our emphasis is on signaling in a fundamentally competitive military environment, where there are no organizations to intermediate.

Kevin Lewis, in an obscure research note for RAND on “deliberate capability revelation,” treats clandestine capabilities as a competitive military problem and defines them as we do.²⁰ We share some of his conclusions about the importance of peacetime bargaining benefits over crisis benefits, and more systematically theorize and test them below. Still, Lewis’s primary vision for “signaling” clandestine capabilities is deception rather than reliable communication about the military balance, thus inducing overestimation and exaggeration in adversary assessments.²¹

In short, current research explains why states conceal their clandestine military capabilities and why they communicate deceptively about them. It also accounts for incentives to signal resolve and intentions, and even how states might do so with secret information. Yet, it lacks an explanation for why states might signal genuine information about their secret military assets. Signals of such capabilities are seen as self-defeating, because enemy countermeasures will remove both their military and political utility. The literature’s bottom line is that states are heavily incentivized to keep their clandestine capabilities secret.

18. Robert Axelrod, “The Rational Timing of Surprise,” *World Politics*, Vol. 31, No. 2 (January 1979), pp. 228–246, doi.org/10.2307/2009943.

19. Allison Carnegie and Austin Carson, “The Disclosure Dilemma: Nuclear Intelligence and International Organizations,” *American Journal of Political Science*, Vol. 63, No. 2 (April 2019), pp. 269–285, doi.org/10.1111/ajps.12426.

20. Kevin N. Lewis, “Getting More Deterrence Out of Deliberate Capability Revelation” (Santa Monica, Calif.: RAND Corporation, 1989).

21. See, especially, *ibid.*, pp. 28–30.

When States Might Signal Clandestine Military Capabilities

We aim to qualify the conclusion that states have strong incentives to maintain the secrecy of their clandestine capabilities. The military efficacy and political utility of clandestine capabilities are not always contradictory. The literature to date has focused mostly on crisis and wartime interactions, where the military costs of signaling are large and its political benefits are difficult to obtain. By contrast, signals will be more informative and more effective during peacetime competition, allowing a dilemma to arise between signaling and concealing clandestine capabilities. States might pursue at least three types of benefits in such a competition: improved general deterrence, adversary resource diversion, and diplomatic concessions or strategic adjustments.

Crisis signaling about clandestine capabilities faces serious challenges. Political payoffs in crisis situations are liable to be substantial and attractive, as they regard war, peace, and other major decisions of foreign policy. For new information about clandestine capabilities to have an impact on bargaining over such large stakes, however, the capabilities in question will have to be especially significant for war outcomes. After all, states that have deliberately selected into a risky and war-prone confrontation will probably have a political calculus that is immune to merely marginal changes in the military balance. Moreover, gains in one crisis might be reversed in a later showdown: the target state may take military countermeasures in the interim that attenuate the newly exposed clandestine capabilities. Even if the other difficulties with signaling discussed in the literature are overcome, states will be unlikely to signal clandestine capabilities, unless they are confident that gains from an initial crisis revelation can be codified in an enduring status quo. An enduring status quo could be defined by a formal, public agreement or perhaps a less formal agreement (such as the U.S.-Soviet agreement on the status quo regarding Cuba following the Cuban missile crisis).

Wartime signaling of clandestine capabilities is likely to be even more difficult. The fog and friction of war make it the “noisiest” environment for signaling: getting the attention of the target state’s intelligence apparatus and successfully communicating the desired message are likely to pose major challenges. Furthermore, in wartime, states will be strongly tempted to gain political returns from their military capabilities through the simple expedient of military victory. The literature’s expectation that states at war will prefer to prioritize military efficacy over political signaling seems warranted.

Peacetime military competition, on the other hand, seems like a more prom-

ising arena for signaling clandestine military capabilities. Military signals in peacetime are likely to be more informative than their crisis or wartime counterparts. In crisis or war, the target state will be focused on the short-run military balance. However, during peacetime, target states will be attuned not only to the short-run impact of clandestine capabilities, but also to their implications for long-run trends. In response to peacetime signals, states might update their views on the future development of arms races, the trajectories of revealed technologies, or the relative efficiency of each side at military competition—all of which could alter policy.

Military signaling is also likely to be more effective during peacetime competition, in the sense that the information conveyed has a greater chance of securing political benefits relative to alternatives. Unlike wartime, there is no substitute policy like military victory primed to provide political gains. Likewise, although the problem of getting the target to understand a signal is never trivial, peacetime provides more time, opportunity, and signal clarity for successful communication.

Similarly, compared to a crisis, there are a greater number of smaller, more diffuse political benefits available from peacetime signaling. Lower stakes reduce the degree to which signaled capabilities must shift the military balance to change target state behavior. The variety of possible benefits increases the number of goals for which states might find signaling attractive. Three such goals suggest themselves.

First, successful signals of clandestine capabilities could enhance general deterrence—that is, the deterrence of crisis situations. States will be less willing to accept an immediate crisis over non-vital interests until they feel they have a handle on the near-term balance, the medium-term technological trends, and their long-run ability to compete. Signals of clandestine capabilities will, at minimum, create uncertainty about these quantities. As Lewis notes, new information about the military balance can produce surprise and confusion in the target state, prompting questions about the efficacy of its intelligence and evaluative apparatus.²² Such uncertainty breeds caution about selecting into crises. For instance, the United States planned to respond very cautiously to prospective crises in Korea, Berlin, and Indochina in 1950–51 when the nuclear balance was uncertain, but shifted toward a much more

22. *Ibid.* Note that Lewis is focused on the effects of false information, but true information would have the same, or even increased, effect.

aggressive posture by 1952, when the U.S. military advantage had become overwhelming.²³

Second, signaling clandestine capabilities could serve to divert the target state's military resources. A revelation of an unexpected weakness in some aspect of the military balance is likely to cause a surge of resources to deal with the problem. This diversionary dynamic can reduce the target state's investment in other areas that the signaling state finds particularly troubling. For example, the resources that Imperial Germany devoted to its inefficient struggle against Great Britain's relentless technological pace in the Anglo-German naval race could have been used in preparing for the decisive ground battle in Europe. Eventually, Germany halted the competition, but not before Great Britain and its allies had reaped substantial diversionary reward.²⁴

Third, signals of clandestine capabilities can force diplomatic concessions and strategic adjustments by less efficient competitors. To return the military balance to equilibrium, less efficient competitors will be forced to invest more and more resources just to keep pace with the newly signaled capabilities, and even these efforts may be unable to stop the trend in the balance from worsening. If overall resource constraints begin to exert serious pressure on the ability of target states to keep up, or military signals begin to identify them as less successful competitors, they will have incentives to solve the problem by altering their diplomacy.

Whatever the ultimate cause of the Soviet Union's revolution in foreign policy at the end of the Cold War, Moscow certainly felt this kind of military pressure in its last decade. As we argue elsewhere, the final phase of the Cold War was characterized by the Soviets' dawning realization of their inability to compete with the United States indefinitely. As they learned more and more about U.S. capabilities, Soviet political, military, and defense industrial figures became deeply pessimistic about their economic, technological, and political ability to maintain the military balance.²⁵

Peacetime competition is thus a key condition for a dilemma between signaling and concealment. Signaling clandestine capabilities is more attractive during peacetime than during crisis or war: signals are more informative and

23. Marc Trachtenberg, *History and Strategy* (Princeton, N.J.: Princeton University Press, 1991), pp. 115–132.

24. David D'Lugo and Ronald Rogowski, "The Anglo-German Naval Race and Comparative Constitutional 'Fitness,'" in Richard Rosecrance and Arthur A. Stein, eds., *The Domestic Bases of Grand Strategy* (Ithaca, N.Y.: Cornell University Press, 1993), pp. 70, 88–89.

25. Brendan Rittenhouse Green and Austin Long, "The MAD Who Wasn't There: Soviet Reactions to the Late Cold War Nuclear Balance," *Security Studies*, Vol. 26, No. 4 (2017), pp. 617–620, doi.org/10.1080/09636412.2017.1331639.

more effective compared to alternative means of making political gains. The greater effectiveness of signals permits three types of potential benefits if states reveal their clandestine capabilities: improved general deterrence, adversary resource diversion, and diplomatic concessions or strategic adjustments.

A Model of Signaling Clandestine Capabilities

If peacetime military competition provides the conditions under which states might obtain political benefits from signaling clandestine capabilities, then the key question is: When do those benefits outweigh the military costs of signals? We argue that the costs of exposing military secrets will vary with the characteristics of specific clandestine capabilities. We propose two such characteristics: the degree to which a given capability is unique and the degree to which the adversary is responsive.

A unique clandestine capability is one whose military impact is effectively irreplaceable if it is compromised, making its revelation for political purposes risky. A capability whose effects could be readily duplicated or replaced in the face of enemy countermeasures, on the other hand, is one that is likely to be more useful for both signaling and fighting. For example, Hamas uses tunnels from Gaza to attack Israel during periodic clashes.²⁶ Compromising the clandestine nature of any particular tunnel is not necessarily all that damaging, and might be sacrificed to prove a point. Even compromising the existence of a tunnel network does not compromise the unique value of tunnels, though the revelation of a major combat role for such tunnels might.

In contrast, during the early 1980s, the United States is reported to have been able to exploit a vulnerability in the Soviet nuclear command and control system with a program known as CANOPY WING. As it might have allowed the United States to disrupt Soviet nuclear launch commands, such a capability was unique and supremely valuable.²⁷

The degree to which taking countermeasures against a clandestine capability is easy or difficult will also influence state decisions about whether to risk revelation. Several features of the innovation in question might influence

26. For example, Terrence McCoy, "How Hamas Uses Its Tunnels to Kill and Capture Israeli Soldiers," *Washington Post*, July 21, 2014, <https://www.washingtonpost.com/news/morning-mix/wp/2014/07/21/how-hamas-uses-its-tunnels-to-kill-and-capture-israeli-soldiers>.

27. Benjamin B. Fischer, "CANOPY WING: The U.S. War Plan That Gave the East Germans Goose Bumps," *International Journal of Intelligence and Counterintelligence*, Vol. 27, No. 3 (2014), pp. 431–464, doi.org/10.1080/08850607.2014.900290; and Fred Kaplan, *Dark Territory: The Secret History of Cyber War* (New York: Simon and Schuster, 2016), pp. 12–20.

adversary responsiveness. The speed with which countermeasures can be implemented will affect the period of time during which military advantage might carry political weight. The expense required to undertake countermeasures might affect the degree to which they can be implemented across an entire force, or whether they can be implemented at all. The target's technical and organizational skill will also influence the effectiveness of countermeasures.

For instance, apparently after the Soviet Union learned that the United States had penetrated its command and control in the early 1980s, it was quickly replaced by upgraded systems—a relatively fast and not incredibly expensive fix.²⁸ Yet, as of 2015, the U.S. military did not always systematically fix known vulnerabilities in the commercial software it uses, indicating even “easy” fixes are sometimes difficult.²⁹

We hypothesize that the uniqueness of a clandestine capability and the difficulty of responding to it with countermeasures will influence a state's incentive to reveal or conceal it. All else equal, the less costly the military repercussions of a military capability being countered by the enemy, the more likely a state is to signal rather than conceal. Thus, the more unique a clandestine military advantage is—or, put another way, the less another capability can replace or substitute for it—the less likely states are to reveal it; the more they anticipate that adversaries can quickly respond with countermeasures, the less likely states are to signal their clandestine capabilities.

However, these hypotheses should not be read as describing situations that eliminate the trade-off we purport to resolve. States continue to face ongoing risks to signaling clandestine capabilities, even when the costs are low enough to make signaling reasonable. A rational decision to signal might nevertheless result in failure, forfeiting both military advantage and political benefit. A state's calculation about the adversary's responsiveness might be wrong; or the signal might fail to penetrate the adversary's political calculations while attracting the attention of its military authorities; or the hoped-for political gains might fail to materialize. In short, we are describing circumstances under which states will make calculated gambles, not situations in which the ultimate success of signaling is certain.

28. See Fischer, “CANOPY WING”; and Steven J. Zaloga, *The Kremlin's Nuclear Sword: The Rise and Fall of Russia's Strategic Nuclear Forces, 1945–2000* (Washington, D.C.: Smithsonian, 2002), p. 202.

29. Joe Gould, “Official Warns of DoD's Sloppy Cyber Hygiene” (Vienna, Va.: Defense News, June 24, 2015), <https://www.defensenews.com/2015/06/24/official-warns-of-dod-s-sloppy-cyber-hygiene>.

Research Design and Predictions

In the remainder of this article, we evaluate our propositions against empirical evidence, using the case of U.S. strategic ASW during the Cold War.

RESEARCH DESIGN

The case of U.S. Cold War strategic ASW provides a useful test because it fits the conditions under which the model applies. First, the model depends on the target state updating its views of the military balance. Strategic ASW taps directly into state assessments of the nuclear balance, which was widely recognized as the most significant element of military power during the Cold War. Second, strategic ASW was an especially salient military mission in determining the Cold War nuclear balance: the importance of survivable forces for nuclear deterrence made the vulnerability of ballistic missile submarines to attack a key component of nuclear net assessment. Third, the case contains a number of clandestine military capabilities. Indeed, much of the analytic community and informed public during the Cold War, and even today, consider ballistic missile submarines (SSBNs) to be practically invulnerable. Yet, during the Cold War, this was not so: the United States held an intermittent, but substantial and serious military advantage over the Soviet Union in strategic ASW. This advantage was obscured at times by military secrecy. Fourth, superpower strategic ASW constituted a long-term competition played out over decades. According to the arguments above, this represents the most likely condition for finding that decisionmakers contemplated options beyond simple concealment of clandestine capabilities.

At the same time, U.S. Cold War strategic ASW is also, in another sense, a “hard case.” The dominant theory of nuclear weapons—mutual assured destruction (MAD), or the “theory of the nuclear revolution”—argues that nuclear weapons stalemate the military balance. According to this perspective, once states obtain survivable second-strike forces, they can no longer be “stronger” than one another.³⁰ In any event, even dissenters from MAD tend to agree that indexes of strategic power are at least quite difficult to change.³¹ Efforts to change the strategic balance through just one leg of the triad should be close to meaningless.

30. See, for example, Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca, N.Y.: Cornell University Press, 1989), pp. 1–45.

31. For some recent dissents from MAD, see Lieber and Press, “The New Era of Counterforce”;

Attempts to attack the least vulnerable leg of the strategic triad seem especially futile. In the extremely unlikely event that some sort of real undersea advantage could be obtained, the risk of attacking adversary nuclear forces during wartime would make the threat to use that advantage close to incredible.³² Strategic ASW therefore seems like a least likely case in which to observe signals of clandestine capabilities. Thus, if the model can explain the change in ASW signaling during the Cold War, analysts should be more confident that it will extend to cases of technology where the military balance is easier to change during peacetime and easier to exploit during wartime—that is, most other cases.

The features of the Cold War undersea competition also make it less likely that alternate variables explain the observations. We divide the case into two parts: the 1960s–70s, when U.S. leaders chose to conceal the United States' clandestine ASW advantages; and the era of the "maritime strategy" during the late 1970s and 1980s, when they signaled those advantages. Longitudinal division imposes an imperfect, but real set of controls on other potentially perturbing variables. The broad features of the Cold War and U.S. domestic politics remain the same across the two cases. Each case cuts across multiple administrations, eliminating another possible source of variation. The nature of the military mission, the technology involved, and the identity of competing military bureaucracies on each side are held constant.

PREDICTIONS

The model makes three basic predictions about how U.S. signaling of ASW capabilities should change over the course of the Cold War. First, U.S. signaling efforts will correlate with changes in the uniqueness of particular clandestine capabilities and the perceived ability of the Soviet Union to respond with countermeasures. Signaling will be more likely for less unique capabilities and for capabilities where the adversary is poorly positioned to respond quickly and effectively. Concealment of clandestine capabilities will be more likely when they represent unique military advantages, and when the adversary is well positioned to counter revealed capabilities with a quick response.

Green and Long, "The MAD Who Wasn't There"; and Matthew Kroenig, "Nuclear Superiority and the Balance of Resolve: Explaining Nuclear Crisis Outcomes," *International Organization*, Vol. 67, No. 1 (Winter 2013), pp. 141–171, doi.org/10.1017/S0020818312000367.

32. See, for example, Richard L. Garwin, "Will Strategic Submarines Be Vulnerable?" *International Security*, Vol. 8, No. 2 (Fall 1983), pp. 52–67, doi.org/10.2307/2538595; and Barry R. Posen, *Inadvertent Escalation: Conventional War and Nuclear Risks* (Ithaca, N.Y.: Cornell University Press, 1991), pp. 129–158.

Second, process evidence should exist showing that key decisionmakers are concerned with the model's key variables. They should reason in terms of the uniqueness of clandestine capabilities and the responsiveness of the adversary to revelation. If signaling is considered, policymakers should display an interest in one or more of the three peacetime benefits identified above: general deterrence, adversary resource diversion, and/or adversary strategic adjustment.

Third, there should be a plausible case that improving the adversary's information about the military balance yielded, or could have yielded, political benefits. A full test of this prediction would require access to Russian archives that are presently unavailable. But if clandestine capabilities were important, there should be clear evidence that they contributed to a U.S. military advantage. If those capabilities were signaled, there should be evidence of policy changes commensurate with those desired by Washington. If capabilities were concealed, there should be evidence that Moscow was responsive to the information it did have about the military balance.

After a brief discussion of ASW operations and underwater acoustics, each half of the case is divided into six parts. We begin by describing the elements of the undersea balance, followed by singling out the clandestine features of that balance. Next, we provide evidence that the United States did indeed possess a meaningful military advantage in strategic ASW during that period. Subsequently, we test the hypotheses that policymakers will think in terms of capability uniqueness and adversary responsiveness and, if appropriate, in terms of the political benefits signaling might provide. This allows us to make a prediction for whether they will signal or conceal their capabilities, which is the subject of the penultimate section. Finally, we provide evidence that information about the undersea balance had political value, and thus that the Soviets made policy adjustments to whatever information they had about it.

ASW Basics: Operations and Acoustics

Strategic ASW requires platforms and sensors that can detect underwater signatures, classify specific signatures as submarines, locate the targeted submarine precisely, and attack it.³³ A random search of wide ocean areas for submarine signatures is extraordinarily inefficient, however, because detection is unlikely unless sensors are "cued" where to look. Moreover, even if detected

33. A good description of this process can be found in Donald C. Daniel, *Anti-submarine Warfare and Superpower Strategic Stability* (Urbana: University of Illinois Press, 1986), p. 19.

and classified, the target submarine may attempt to evade or otherwise disrupt the search process.

Cold War strategic ASW solved these challenges primarily with passive acoustics: using sensors that collected the noises emitted by nuclear submarines; analyzing these signatures to detect, classify, and track targets; then, if necessary, handing contacts off to platforms that could reacquire, localize, and maintain contact with the targets, while being prepared to attack.

The sound collected by passive acoustic sensors occurs across a spectrum of frequencies, much like radio. “Broadband” signatures occur across a spectrum of frequencies around which particular frequencies rise and fall in a random fashion around a mean; in submarines, these signatures tend to increase with speed. “Narrowband” signatures are sounds that occur continuously at one or more specific frequencies, or “tonals.” They are caused by machinery within a submarine or by the blade rate of its propellers; many of these tonals are speed independent.³⁴ Interpreting these signatures depends on separating the submarine signal from background ocean noise, most notably with narrowband signal processing aimed at isolating submarine tonals.³⁵

Detecting tonals depends on oceanic conditions: specifically, a sensor’s location relative to the thermal layer, which traps sound generated above and below it. Sounds received within the same layer as the source can be detected at a range of 10–15 miles, called the “direct path.” Sound emitted at a steep enough angle, however, can penetrate the layer to create the hydro-acoustic phenomenon known as the “deep sound channel,” where listening sensors can hear them from thousands of miles away.³⁶

Cold War Strategic ASW in the 1960s and Early 1970s

During the first half of the Cold War, the United States developed a marked and asymmetric advantage over the Soviet Union in the undersea balance, including the capability to find and potentially destroy Moscow’s entire sea-

34. See Tom Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy* (Lexington, Mass.: Lexington Books, 1987), pp. 265–271; Owen R. Cote Jr., *The Third Battle: Innovation in the U.S. Navy’s Silent Cold War Struggle with Soviet Submarines*, Naval War College Newport Papers No. 16 (Newport, R.I.: Naval War College Press, 2003), pp. 22–23.

35. Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, pp. 8–15, 293–305; and Cote, *The Third Battle*, pp. 22–24.

36. Daniel, *Anti-submarine Warfare and Superpower Strategic Stability*, pp. 31–32; Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, pp. 227–240; and Cote, *The Third Battle*, pp. 23–24. Other propagation paths are also possible, most notably convergence zones (which can recur every 25 to 30 miles) and bottom bounce (15 to 25-mile range).

based nuclear force. However, this dominance eroded when the Soviet navy changed its operating pattern for SSBNs, after the clandestine capabilities on which U.S. dominance depended were penetrated by Soviet intelligence.

As the model predicts, U.S. policymakers thought about the United States' clandestine capabilities for strategic ASW in terms of their uniqueness and probable Soviet responsiveness. In the 1960s and early 1970s, they judged these military secrets about strategic ASW to be highly unique, and the Soviets very likely to respond effectively to their revelation. As the model expects, policymakers therefore took a number of steps to conceal these capabilities. However, they were unable to prevent U.S. Navy cryptological operator John Walker from walking into the Soviet embassy in Washington during late 1967 and compromising U.S. clandestine capabilities. This Soviet intelligence triumph also reveals the importance Moscow gave to information about the Soviet navy's disadvantages in the undersea balance, suggesting its potential political value had Washington attempted a signaling campaign.

ELEMENTS OF THE UNDERSEA BALANCE

The U.S. strategic ASW advantage stemmed from technical innovations in passive acoustics; their integration into a successful operational concept; and the shortcomings of the Soviet SSBN force and doctrine. Together, these features of the undersea balance allowed the United States to obtain persistent peacetime surveillance of the entire deployed Soviet SSBN force, as well as the capability to pursue fleet-wide wartime trailing operations.

The most important element of the U.S. Navy's capability for strategic ASW was the Sound Surveillance System (SOSUS), a series of hydrophones attached to undersea cables that the U.S. Navy laid across the axis of the deep sound channel. SOSUS used signal processing to detect, classify, and track narrow-band tonals from thousands of miles away, often across entire ocean basins. Simultaneously, the U.S. Navy developed a force of multipurpose nuclear attack submarines (SSNs) that were optimized for passive acoustic ASW. Maritime patrol (VP) aircraft also participated in the ASW mission by dropping sonobuoys that recorded sound signatures.³⁷

The Soviet Union, by contrast, was able to achieve regular combat patrols with submarine launched ballistic missile (SLBM) armed submarines only in 1969, after the introduction of the Project 667A Navaga ("Yankee"). The Yankee carried sixteen R-27 ("SS-N-6") SLBMs with a range of 1,500 miles, requiring a long approach toward North America to achieve a firing position. Yankees

37. Cote, *The Third Battle*, pp. 25–26, 31–33.

were extremely loud relative to their U.S. counterparts, and patrol rates were limited, with no more than 10–15 percent of the force at sea most of the time.³⁸

U.S. operations integrated long-range SOSUS detection with the short-range trailing capabilities of SSNs and VP aircraft. To patrol within range of their targets, Soviet missile submarines had to endure prolonged exposure to SOSUS arrays placed increasingly far forward. SOSUS could detect, classify, and track incoming targets, and then use this data to cue operational forces into “SOSUS probability areas.”³⁹ After the contact was reacquired and localized, operational forces would trail it and hold it at risk of prompt destruction.⁴⁰

In 1973, however, the Soviet Union introduced the Project 667B Muerena (“Delta”) SSBN, armed with the R-29 (“SS-N-8”) SLBM. The SS-N-8 had a range of more than 5,000 miles; at that range the Delta force could hit the entire United States from the adjacent and adjoining seas to the Soviet Union, or even from its docks. This allowed the Soviet navy to draw the Deltas back into “bastions” located in the Barents Sea, the Sea of Okhotsk, and potentially elsewhere in Arctic waters. Such a deployment allowed the Soviets to protect their SSBNs with surface and air ASW forces and exploit geographic advantages that precluded the use of SOSUS or VP aircraft.⁴¹

CLANDESTINE ELEMENTS OF THE UNDERSEA BALANCE

The United States’ mastery of passive acoustic technology contained several clandestine elements that initially obscured the full extent of its dominance at strategic ASW. First, while the general existence of SOSUS was probably known to the Soviets, its exact operational capabilities were more obscure.⁴² Second, the U.S. Navy had a signal processing advantage: it knew what frequencies to listen for and the kind of sonar performance needed to detect them, and it had discovered a range of subtle tonals that varied by aspect and speed.⁴³ The Soviets had no comparable experience working with narrowband signal processing. Third, U.S. SSNs held an acoustic advantage over Soviet submarines, allowing them to fix their target at short ranges without counter detection, easing one of the largest challenges involved in trailing operations.⁴⁴ By covertly trailing new Soviet submarines out of port, U.S. SSNs were also

38. Zaloga, *The Kremlin’s Nuclear Sword*, pp. 117–118, 154–155. On Soviet submarine broadband sound levels, see Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, pp. 274–278.

39. Cote, *The Third Battle*, pp. 25–26.

40. *Ibid.*, p. 52.

41. *Ibid.*, pp. 63–67.

42. *Ibid.*, p. 47.

43. *Ibid.*, p. 25.

44. *Ibid.*, p. 50.

“uniquely able to collect and maintain [a] database of opposing signatures.” The Soviet navy had little ability to even appreciate the importance of such issues.⁴⁵

It is therefore doubtful that the Soviet navy understood how vulnerable their SSBNs were to U.S. clandestine capabilities in the 1960s. Robert Herrick’s in-depth study shows that only modest attention was devoted to the problem of protecting Soviet SSBNs from strategic ASW before the 1970s; much of the writing that does exist on the topic seems like a transparent attempt to claim greater resources for the Soviet navy’s surface fleet.⁴⁶ Similarly, the supreme importance of narrowband quieting against passive sonars, and the detachment of machinery from the hull needed to achieve it, appears to have been overlooked in Russian technical circles. As one Soviet submarine designer noted of the *Yankee*, “In the scientific and technical field we were not prepared to achieve low levels of noise. In the scientific field we poorly appreciated the nature of underwater noise, thinking that if a low-noise turbine reduction gear was made all would be in order.”⁴⁷ It seems unlikely that the Soviets could have initially grasped the means by which their SSBN fleet could be continuously trailed while deployed.

U.S. UNDERSEA MILITARY ADVANTAGES

The best evidence indicates that U.S. clandestine capabilities gave the United States a significant military advantage in strategic ASW.

Soviet SSBNs would have been highly vulnerable in a war before the mid-1970s. A highly placed former U.S. intelligence official, among the most cautious and circumspect of those we have talked to about the undersea balance, told us that during this period, “We could have taken out the entire deployed fleet on a signal.”⁴⁸ Such a capability was of great significance, as Owen Cote notes, because “the assumption on both sides appears to have been that Soviet SSBNs not already forward deployed on the far side of NATO’s ASW barriers when a war started would never even get into position to deliver their missiles against the United States.”⁴⁹ As we remark elsewhere, trailing operations be-

45. *Ibid.*, p. 49.

46. Robert W. Herrick, “Pro-SSBN Mission: The SSBN-Protection Mission,” Part 2, Final Report, Soviet Naval Mission Assignments (Arlington, Va.: Ketron, July 1979), <https://apps.dtic.mil/dtic/tr/fulltext/u2/b082798.pdf>.

47. Norman Polmar and Kenneth J. Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines, 1945–2001* (Washington, D.C.: Brassey’s, 2004), p. 169.

48. Authors’ interview with former senior intelligence official, August 24, 2016.

49. Cote, *The Third Battle*, p. 52.

came so “frequent that on at least three occasions in 1970 alone U.S. submarines collided with the Soviet submarines they were trailing.”⁵⁰

THE UNITED STATES’ VIEWS ON ITS CLANDESTINE ASW CAPABILITIES

During the 1960s and 1970s, U.S. clandestine capabilities for strategic ASW were unique. Moreover, U.S. policymakers thought the Soviet Union likely to respond quickly and effectively if these capabilities were revealed. As the model predicts, U.S. policymakers thought explicitly in terms of uniqueness and responsiveness.

As the term “unique” implies, U.S. clandestine capabilities for strategic ASW could not be easily replaced if countermeasures were taken. As Cote points out, SOSUS was “originally conceived as an intelligence asset.” Not only did approaching submarines inherently mean that Soviet nuclear capability was getting close to U.S. shores, but in an era where a general war was expected to escalate rapidly to a nuclear exchange, “such a submarine deployment was also considered a reliable source of warning of a larger, general attack.”⁵¹

The unique status of SOSUS was confirmed by U.S. arms control negotiators, who viewed it as a “vital element in our arms control equation with the U.S.S.R.”⁵² The warning of general war provided by SOSUS made it possible to pursue arms limitations that might have otherwise seemed dangerous; decisionmakers therefore worried about seabed disarmament proposals that might “entail an interpretation making the US Sound Surveillance System (SOSUS) illegal, with consequent severe impact on our antisubmarine warfare capability.”⁵³ When it was thought that a particular “Soviet ‘demilitarization’ proposal would knock out SOSUS,” it was firmly rejected. The capability was simply too unique an asset to tamper with.⁵⁴

Similarly, U.S. policymakers believed that the Soviet submarine force would be highly responsive to new information about U.S. advantages. U.S. military officials judged that the U.S. Navy’s technological lead stemmed from its abil-

50. Long and Green, “Stalking the Secure Second Strike,” p. 48.

51. Cote, *The Third Battle*, p. 47.

52. Memorandum from the Chairman of the National Security Council Under Secretaries Committee (Rush) to President Nixon, May 14, 1974, *Foreign Relations of the United States (FRUS), 1969–1976*, Vol. E-3: *Documents on Global Issues, 1973–1976* (Washington, D.C.: Government Printing Office [GPO], 2009), doc. 12, p. 13.

53. Memorandum from the Joint Chiefs of Staff to Secretary of Defense Clifford, April 15, 1968, *FRUS, 1964–1968*, Vol. 11: *Arms Control and Disarmament* (Washington, D.C.: GPO, 1997), p. 581.

54. Record of Meeting of the Committee of Principals, June 3, 1968, *FRUS, 1964–1968*, Vol. 11, p. 612.

ity to appreciate both the pro-SSBN and anti-SSBN problems simultaneously. As Secretary of the Navy Paul Nitze testified to Congress in 1965, “We have had the advantage of training against our own submarine forces, which as you know, have been in the forefront of both development and operational know-how since World War II. Thus, our own peacetime opposition has been perhaps more effective than a real enemy would be.”⁵⁵ Likewise, Robert Morse, the assistant secretary of the navy for research and development, argued before Congress in the same year that “the quieting of your own submarines comes in many ways from a consciousness of the anti-submarine problem.”⁵⁶

By implication, any increase in the adversary’s consciousness of the ASW problem was to be avoided at all costs—the Soviets would be too quick to respond. After all, Morse argued, “There are no secrets or no real magic in the technology we have used,” but rather “just a general overall attention to sound reduction, in every possible way.”⁵⁷ Revealing U.S. ASW capabilities could create, in the words of Adm. Edwin Hooper, “a touch and go situation,” once “one projects this very serious competition well into the future and sees the number of nuclear submarines the Soviet Union will probably build, [and] one notes the improvements that he can make.”⁵⁸ As Cote aptly summarizes, U.S. political and military leaders judged that the acoustic advantage was “evanescent, in that it was based mostly on dogged attention to engineering detail rather than any fundamental breakthrough.”⁵⁹ Risking the sources of the U.S. advantage—an appreciation for both halves of the ASW problem—by revealing its clandestine capabilities was just not worth it.

SIGNALING DECISIONS

As the model predicts, U.S. policymakers chose to keep the United States’ clandestine capabilities for strategic ASW as concealed as possible. With a unique military asset that could give warning of general war at risk, and any revelations likely to spur serious Soviet efforts to produce countermeasures, U.S. ASW capabilities were treated as vital military secrets.

U.S. policymakers worked to conceal clandestine ASW capabilities through operational restrictions on their use. As Cote notes, the United States’ “strategy was premised on the availability of SOSUS cueing for SSNs and VP, and these techniques needed to be practiced in peacetime, but unrestricted use

55. Cote, *The Third Battle*, p. 44.

56. *Ibid.*, p. 45.

57. *Ibid.*

58. *Ibid.*, p. 44.

59. *Ibid.*, p. 45.

of SOSUS in peacetime would in all likelihood reveal its capabilities to the Soviets." The solution, at least in the beginning, was to use SOSUS data "in such a way so as to mask the exact location of its arrays and their capabilities. For example, tactical forces used only passive techniques when they prosecuted SOSUS contacts of Soviet submarines, and many training exercises were conducted against either friendly or neutral targets."⁶⁰

Concealment efforts also complicated the efforts of Richard Nixon's administration to decentralize tactical intelligence away from policymakers in Washington and toward operators. During internal debates, one defense official asked about ASW: "What about the Sosus system—is that tactical intelligence or not? That should be left to the Services." A State Department representative quickly shot back: "That's a warning system."⁶¹ SOSUS was therefore kept under the control of national-level authorities.

The United States' concealment of its clandestine capabilities is further reflected in the extremely compartmentalized nature of intelligence about strategic ASW. In the Team B competitive intelligence experiment of the 1970s, ASW was removed as a topic at the insistence of Adm. Bobby Ray Inman, the director of naval intelligence, for fear of compromising the capability.⁶² A senior intelligence official, who was involved in supplying Team B with data, confirmed that Inman was worried, reporting that specific requests had been made by Team B for SSBN and SSN patrol areas.⁶³ Similarly, Robert Jervis notes that when he became a consultant to the Central Intelligence Agency in 1977, security concerns prevented him from reviewing all major reports produced for the deputy director for intelligence, who had been his colleague at Harvard University. He argues that these limitations were the result of two particularly sensitive sources that access would have required him to review, one of which was intelligence that supported ASW operations.⁶⁴

All the classification in the world, though, was unable to stop the Walker spy ring. Walker's spying probably allowed the Soviets to read, among others,

60. *Ibid.*, p. 47.

61. Minutes of Meeting, NSC Intelligence Committee, December 3, 1971, *FRUS, 1969–1976*, Vol. 2: *Organization and Management of U.S. Foreign Policy, 1969–1972* (Washington, D.C.: GPO, 2006), p. 565.

62. Brian J. Auten, *Carter's Conversion: The Hardening of American Defense Policy* (Columbia: University of Missouri Press, 2009), p. 119.

63. Authors' interview with former senior intelligence official, August 24, 2016.

64. Robert Jervis, *Why Intelligence Fails: Lessons from the Iranian Revolution and the Iraq War* (Ithaca, N.Y.: Cornell University Press, 2010), p. 7. The authors have also had discussions with Jervis on this question.

messages from SOSUS naval facilities and U.S. SSNs at sea.⁶⁵ As we argue below, this makes it highly likely that Soviet intelligence would have been able to glean information about U.S. capabilities for strategic ASW that would have been previously unavailable to them.

POLITICAL POTENTIAL OF INFORMATION ABOUT MILITARY ADVANTAGES

Consistent with the model, circumstantial evidence from the structure of Soviet naval programs and doctrine indicates that U.S. clandestine capabilities held considerable political value, even if that value was not deliberately exploited. Concurrent with Walker's spying, the Soviet Union changed the structure of its submarine-building and SLBM-building programs in an effort to retreat to the bastions. It did so more or less on the fly, while also apparently restructuring its naval doctrine.

One indication of the high priority that Moscow placed on the undersea balance after the Walker revelations was the deployment of the supercavitating "Shkval" torpedo. This torpedo could travel at high speed (200 knots) and was apparently deployed on Soviet SSBNs in 1977 as a means to counterattack covertly trailing SSNs. Essentially, when the Soviet SSBN detected a U.S. SSN launching a torpedo, it could fire a Shkval—which traveled much faster than a U.S. torpedo—toward the SSN with the intention of destroying or disrupting the attacking torpedo and/or the SSN that launched it. While the initial development of the Shkval apparently predated the Walker spy ring, it was technically challenging and appears to have been rushed into deployment (with only partial success) following the revelation of U.S. trailing operations.⁶⁶

The value the Soviets placed on rectifying their undersea disadvantages is also apparent in the development history of the SS-N-8 SLBM. The SS-N-8 had a testing period twice as long as its three liquid-fueled predecessors, the SS-N-4, -5, and -6s.⁶⁷ The missile was initially tested at a range of 3,000 nautical miles in 1969 and then withdrawn from testing, before reappearing at increasingly longer ranges over the next several years.⁶⁸ Pavel Podvig summarizes the creative engineering necessary to achieve the required range with a man-

65. See an overview of the Walker case in Sherry Sontag and Christopher Drew, *Blind Man's Bluff: The Untold Story of American Submarine Espionage* (New York: HarperCollins, 1998).

66. See Cote, *The Third Battle*, pp. 74–75; and "VA-111 Shkval/Shkval-E," *Jane's Naval Weapons*, August 2, 2017.

67. See chart in Pavel Podvig, ed., *Russian Strategic Nuclear Forces* (Cambridge, Mass.: MIT Press, 2001), p. 241. The addition of penetration aids may have also complicated development.

68. Michael McGwire, *Military Objectives in Soviet Foreign Policy* (Washington, D.C.: Brookings Institution Press, 1987), p. 416.

ageable size: "To reduce the missile's dimensions, the first-stage main engine and second-stage engine were immersed in the missile's fuel tanks. In addition, the nose section . . . was oriented backward and located in the cavity of the fuel tank. The missile's guidance system was located directly under the shroud, where the warhead is usually located."⁶⁹

The Soviet Union's determination to fix the undersea balance also required a variety of changes in the Yankee hull to produce the Delta, so that it could accommodate the SS-N-8. These were so hurried and, from a U.S. perspective, inefficient, that Western analysts were confused. When the Pentagon's director of research and engineering, John Foster, was asked whether the Yankee hull could be modified to carry the SS-N-8, he replied, "It could probably be done, but our guys wouldn't do it."⁷⁰ But Moscow did, and several years later, very highly placed U.S. intelligence sources would confirm that the Soviets had developed an entirely new doctrine that organized their entire fleet around the protection of their SSBNs in the bastions.⁷¹

This timing of these changes is further indicative that Moscow was responding to valuable information about the military balance. The first U.S. long-trail of a Yankee occurred in September 1969, about eighteen months after the Soviets gained the ability to read some U.S. naval communications.⁷² Coincidentally or not, this is also when the initial version of the SS-N-8 was withdrawn and the missile entered a period of delayed, incremental, and experimental testing. In the intervening period, the Soviets would probably have had the opportunity to observe a number of other submarine trails, as well as decode messages concerning SOSUS contacts that revealed the scale of its capabilities, its integration and synergy with VP and SSN forces, and possibly its location.⁷³ This inference is corroborated by one senior intelligence official from the period, who argued that Walker did such damage precisely because of his role decrypting SSN trailing operations.⁷⁴

Finally, the value of the information the Soviets obtained from Walker's spy ring can be seen in changing Soviet Yankee operations. SSBNs were increas-

69. Podvig, *Russian Strategic Nuclear Forces*, pp. 324–325.

70. McGwire, *Military Objectives in Soviet Foreign Policy*, p. 416 n. 22.

71. Christopher Ford and David Rosenberg, *The Admirals' Advantage: U.S. Navy Operational Intelligence in World War II and the Cold War* (Annapolis: Naval Institute Press, 2005), pp. 77–108.

72. The story of this trail can be found in Sontag and Drew, *Blind Man's Bluff*, pp. 180–196. Note the frequent communications between the trailing submarine and naval authorities in Washington, and the strange behavior of the Soviet Yankee late in its patrol period.

73. U.S. naval officers apparently obtained a Soviet chart of suspected SOSUS sites and "were surprised by the accuracy." See Mark Sakitt, "Submarine Warfare in the Arctic: Option or Illusion?" (Stanford, Calif.: Center for International Security and Arms Control, May 1988), p. 31.

74. Authors' interview with former senior intelligence official, August, 24, 2016.

ingly sent out with SSN escorts, in an effort to “delouse” any potential trailing U.S. SSNs.⁷⁵ According to one insider, the Soviets had been pulling “some of its best torpedo-armed nuclear-powered submarines out of the Mediterranean and deployed them to the western Atlantic, perhaps in an effort to provide protection for patrolling missile subs which until now have operated alone.”⁷⁶

Although a full evaluation must await declassified Russian sources, these changes offer at least some warrant for estimating that the military advantages provided by U.S. strategic ASW—essentially undermining a key prop in the Soviet Union’s secure second-strike force—were substantial. It is uncertain whether or how this advantage might have been exploited for political purposes if U.S. leaders had chosen to do so. The potential, however, was there.

Cold War Strategic ASW in the Era of the Maritime Strategy

The undersea balance in the late 1970s and 1980s is more difficult to assess, in no small part because of heavy classification about the clandestine capabilities on which the balance turned. Even so, substantial, if circumstantial, evidence suggests that the United States continued to hold a military advantage in strategic ASW, one with political implications.

As the model predicts, U.S. policymakers continued to think of the United States’ clandestine capabilities in terms of uniqueness and Soviet responsiveness, but these variables had changed since the 1970s. Changing expectations about the character of a superpower war made the warning functions of ASW capabilities less unique, while an additional decade and change of observing the Soviet navy raised questions about how responsive it was with the critical countermeasures. Moreover, U.S. policymakers also began to consider the political benefits of signaling, including resource diversion and pressure on the Soviets for political adjustment. As the model expects, the United States therefore unleashed an impressive signaling campaign. Although further archival work is needed for definitive confirmation, there are plausible links between changing Soviet policy and U.S. military signals of clandestine capabilities.

ELEMENTS OF THE UNDERSEA BALANCE

In the late 1970s, the United States developed a new operational concept for holding Soviet SSBNs in the bastions at risk. These anti-SSBN operations were at the heart of a broader effort that became known as the “Maritime Strategy”

75. Sontag and Drew, *Blind Man’s Bluff*, p. 299.

76. Cote, *The Third Battle*, p. 65.

during Ronald Reagan's administration.⁷⁷ Essentially, these operations would renew earlier efforts at continuous peacetime trailing of Soviet SSBNs, but now with the added difficulty of having to grapple with the Soviet boomer force near its home waters in any wartime attrition scenario. The wartime task could be accomplished either by setting up an ASW barrier directly outside SSBN home ports and picking the submarines off as they went out to sea, or if they deployed before such a barrier could be established, by searching for them in their deployment areas and attacking them over the course of a conventional war.⁷⁸

By 1980, the Delta program was complete at thirty-five long-range SLBM platforms, in addition to forty-odd shorter-range nuclear SLBM launchers of earlier generations that would still have to be accounted for in a war (if not necessarily in the bastions). Two new SSBNs were designed, the Project 667 BDRM Delfin ("Delta IV") and the Project 941 ("Typhoon"). The Delta IV was the first Soviet boomer to substantially quiet its narrowband tonals, while the Typhoon was designed to operate under the Arctic ice.⁷⁹ A fleet of some seventy SSNs could potentially escort the SSBNs, although only about twenty Victor IIIs were quiet. Looking to the future, the new Project 971 SSN ("Akula") would achieve quieting levels impressive enough to defeat SOSUS, at least initially, though only five were procured before the competition's end.⁸⁰

Estimating the character of the undersea ASW balance during the era of the Maritime Strategy is therefore very difficult. Contemporary Western analysts were almost uniformly pessimistic about an ASW war of attrition in the bastions.⁸¹ However, many underrecognized factors favored the United States. The Soviet SSBN force remained mostly loud, and even the quietest of its escorts faced an acoustic disadvantage vis-à-vis new U.S. Los Angeles-class SSNs, which was only enhanced by the powerful towed arrays of SOSUS-like

77. On the origins of renewed anti-SSBN operations in the late 1970s, see William J. Holland Jr., "Strategy and Submarine," *U.S. Naval Institute Proceedings*, Vol. 139, No. 12 (December 2013), pp. 48–53.

78. Cote, *The Third Battle*, pp. 64–65, 73–74.

79. On the Delta IV and Typhoon, see Polmar and Moore, *Cold War Submarines*, pp. 194–199.

80. On Akula's quieting, and the steps the U.S. Navy took to combat it, see Cote, *The Third Battle*, pp. 69–70, 76–78.

81. Classic criticisms include Ola Tunander, *Cold Water Politics: The Maritime Strategy and Geopolitics of the Northern Front* (London: Sage, 1989), pp. 61–65; Daniel, *Anti-submarine Warfare and Superpower Strategic Stability*, pp. 147–156; and Sakitt, "Submarine Warfare in the Arctic." By far the most searching and sophisticated analysis is found in Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*. Stefanick, however, is careful to condition his findings on precisely the factors discussed below.

hydrophones they deployed.⁸² The search problem was drastically limited by shallow water, ice, or excellent sonar conditions unfavorable to deployment.⁸³ For these reasons, the Delta force deployed only to bastions in the Barents Sea and the Sea of Okhotsk, each of which had disadvantages.⁸⁴ Most importantly, though, if U.S. SSNs could surge into the bastions before most Soviet SSBNs escaped, the problem would resemble the barrier strategy of the earlier period much more closely, rather than a search problem.

CLANDESTINE ELEMENTS OF THE UNDERSEA BALANCE

Adding to the difficulty of evaluating a strategic ASW campaign in the bastions was the degree to which U.S. capabilities for such an undertaking were clandestine. The Soviets had certainly come to understand the far-reaching capabilities of SOSUS, but other aspects of U.S. ASW operations were likely still obscure.

First, it is unclear how deeply the Soviets had grasped the acoustic superiority of U.S. SSNs: only the Victor III and Akula received major quieting efforts, and it is not obvious whether the Soviets understood the degree of U.S. acoustic dominance and the commensurate difficulty of using SSNs with different signatures as decoys for their SSBNs.⁸⁵

Second, U.S. ASW operations during the period of the maritime strategy were greatly enhanced by highly sensitive intelligence. Signals intelligence (SIGINT) interceptions of Soviet naval communications were a major part of this effort; some of these occurred through reported cable tapping operations in the Sea of Okhotsk and the Barents Sea, while others may have occurred through different interceptions.⁸⁶ Combined with cryptography, this intelligence allowed U.S. Navy Operational Intelligence to replace its daily report on open ocean Soviet submarine deployments with “in area/local area submarine operations and . . . Soviet submarine readiness.”⁸⁷ Intelligence also produced “some very significant HUMINT [human intelligence] penetration of senior echelons of the Soviet leadership.” This intelligence also provided data on Soviet command and control, plans for the use of reserve forces, and access to after action reports on naval exercises, all of which could be used to tailor U.S.

82. See the chart in Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, p. 49.

83. *Ibid.*, pp. 42–43. See also Polmar and Moore, *Cold War Submarines*, p. 176.

84. Podvig, *Russian Strategic Nuclear Forces*, p. 302.

85. See the chart in Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, p. 49; and Ford and Rosenberg, *The Admirals' Advantage*, p. 62.

86. On cable tapping operations, see Sontag and Drew, *Blind Man's Bluff*, pp. 227–282.

87. Ford and Rosenberg, *The Admirals' Advantage*, pp. 99, 101.

campaign plans. The Soviets likely did not understand how much their navy had been penetrated.⁸⁸

U.S. UNDERSEA MILITARY ADVANTAGES

Despite the difficulty of assessing the undersea balance during the period of the Maritime Strategy, there is at least suggestive evidence that the United States retained important military advantages in a strategic ASW campaign. Classification prevents open sources from giving the analysis needed for firm conclusions, but those with classified access make similar statements about the Soviet mind-set. As Cote bluntly points out, "There is considerable evidence that the Soviets themselves believed [an anti-SSBN strategy] would be effective . . . The contrast between [analytic] skepticism and Soviet behavior is striking because the latter clearly behaved as though the skeptics were wrong."⁸⁹ David Rosenberg argues that "the Soviets understood the implications of [public] statements [about the strategy] and exercises more quickly than many Americans, who only began to comment in detail on the implications of . . . strategic ASW in Soviet home waters after [Chief of Naval Operations (CNO)] Admiral [James] Watkins' article [on bastion operations] was published."⁹⁰

Similarly, Soviet military writing took note of renewed U.S. attention to its ASW capabilities. Soviet analysts of the United States coded the Reagan administration's military policy as a break from the past; a strategy focused on "direct confrontation," in part through nuclear superiority that aimed at a "disabling' counterforce strike." The role of a strategic ASW campaign for such a strategy was quickly noticed. In 1982, Adm. Boris Yashin argued that a new U.S. naval policy sought "to be in a position to threaten to attack the Kola peninsula in the Arctic where the Soviet Northern Fleet is based," and also noted the importance of U.S. naval exercises. Rear Adm. A. Rummyantsev argued in 1983 that "achieving superiority at sea would be impossible to imagine without developing the forces and resources of 'submarine warfare.'" The main mission of U.S. SSNs during a war would be "combating enemy submarines, primarily missile submarines, in combat patrol areas." Rummyantsev argued that U.S. SSNs "are now being introduced into the Arctic regions,

88. *Ibid.*, pp. 79–80.

89. Cote, *The Third Battle*, pp. 72–73.

90. David A. Rosenberg, "Process: The Realities of Formulating Modern Naval Strategy," in James Goldrick and John B. Hattendorf, eds., *Mahan Is Not Enough: The Proceedings of a Conference on the Works of Sir Julian Corbett and Admiral Sir Herbert Richmond* (Newport, R.I.: Naval War College Press, 1993), p. 162.

including the Barents, Greenland, and Norwegian seas,” and are drawing attention to yearly U.S. ASW exercises off the coast of Norway.⁹¹

Finally, we have every indication that U.S. naval leadership felt very confident in their ability to execute a challenging mission. The commanding officer of the Pacific Fleet in the mid-1980s, Adm. David Jeremiah, has spoken of the ability “to identify by hull number the identity of Soviet subs, and therefore we could do a body count and know exactly where they were. In port or at sea. If they were at sea, N3 [director for operations] had an SSN . . . [on them], so I felt very comfortable that we had the ability to do something quite serious to the Soviet SSBN force on very short notice in almost any set of circumstances.” Similarly, Vice Adm. Thomas Wilson argues that, in retrospect, “the knowledge that the Soviets had [was] that we were very good at our [operational intelligence] mission and therefore good at our operational mission of war at sea—ASW, protecting the carrier, projecting power . . . [Eventually] they realized we were good at finding them, [and] attacking them if necessary.”⁹²

THE UNITED STATES’ VIEWS ON ITS CLANDESTINE ASW CAPABILITIES

Consistent with the model’s expectations, U.S. policymakers continued to think about the clandestine capabilities of the United States in terms of uniqueness and adversary responsiveness. By the late 1980s, these variables were shifting: with the decline of SOSUS’s operational importance, strategic ASW secrets were less unique, while the Soviet Union’s failure to adapt fully to Walker’s information revealed that Moscow was less responsive than U.S. policymakers had anticipated in the 1960s. At the same time, U.S. policymakers began to contemplate the possible long-term benefits that could come from openly placing pressure on the Soviet defense posture.

By the era of the Maritime Strategy, the unique role that SOSUS and ASW more generally played in strategic warning had dissipated. Large nuclear forces on each side had convinced the superpowers that any war would be conventional in its initial phase. Soviet hopes therefore depended heavily on a quick and decisive campaign on the central front, giving Moscow strong incentive to avoid compromising strategic warning by surging its naval forces. The bastion strategy meant there was no longer any technical reason to quickly move SSBNs forward prior to a war, and thus, that U.S. long-range sensors de-

91. David Alan Rosenberg, “‘It Is Hardly Possible to Imagine Anything Worse’: Soviet Thoughts on the Maritime Strategy,” *Naval War College Review*, Vol. 41, No. 3 (Summer 1998), pp. 88, 90, 92, <https://digital-commons.usnwc.edu/nwc-review/vol41/iss3/7>.

92. Ford and Rosenberg, *The Admirals’ Advantage*, pp. 105–106, 107.

tecting them were no longer unique national assets that had to be protected at all costs.

U.S. decisionmakers had also come to revise their view about the effects of signaling ASW capabilities on Soviet responsiveness. Many additional years of watching the Soviet navy had raised real questions about whether it was organizationally, technically, and politically capable of a fleet-wide quieting program. Submarine noisiness was often “due to a large number of minor imperfections in equipment,” requiring “very tough—and costly—quality control at the subcontractor and shipyard levels.” As Cote notes, “The Soviet Navy clearly had more trouble than did the U.S. Navy in winning similar battles with its own shipyards, which in the Soviet system were part of other independent and powerful central ministries.” A massive campaign of improvements would also have to compete with the Soviet land-based ICBM force, which had, historically, been politically favored. Cote’s summary is apposite: there was at least “some evidence that the cost of achieving and maintaining acoustic parity for the bulk of its submarine force might exceed what the Soviets were willing to pay, both financially and politically.”⁹³

Finally, U.S. political and military leaders perceived the potential to gain some political advantages from signaling the United States’ clandestine capabilities. For example, a successful signaling campaign might divert Soviet defense resources and shape Soviet force posture to the U.S. advantage. Indeed, the Navy explicitly defended a “diversionary theory” of the Maritime Strategy. Adm. Kinnard McKee, director of naval propulsion, testified before Congress that a forward-deployed attack submarine force “provides the fleet commander with offensive and defensive leverage . . . It gives him the ability to dictate where the opposition must commit forces to protect themselves . . . forces them to commit resources to ASW forces that they would rather put in other places, and reduces their tactical flexibility . . . Finally, an attack submarine can alter the entire strategic posture and it has. The Soviet sea-based deployment posture is based on his concern for the opposition of U.S. submarines . . . We would like them to continue to have to deal with that. The bottom line is leverage.”⁹⁴

Moreover, enough U.S. pressure might ultimately bring about diplomatic concessions or strategic adjustment by the Soviet Union. One senior Reagan-era naval official confirmed this interpretation. The aim of the U.S. signaling campaign, he noted, was that “we wanted them eventually to see that the mountain was just too high, [with] their little economy . . . we wanted them to

93. Cote, *The Third Battle*, p. 72.

94. *Ibid.*, p. 71.

see that our economy was improving and that we were able to do this and yet we were not even breathing hard. They were absolutely flat out.” He also cited evidence obtained by U.S. intelligence: a 1986 memorandum “sent by the General Staff to the Politburo,” in the wake of Western naval exercises. The memo stated “that if the northern fleet and the northern air force were to protect the homeland in that region, and particularly all the nuclear assets in the Kola and White Sea area, that they would have to treble the defense budget, at least for that theater. That hit at a time was psychologically devastating and gave [Soviet leader Mikhail] Gorbachev a real hole card for doing what he wanted to do in perestroika and seriously making serious efforts to negotiate.”⁹⁵

SIGNALING DECISIONS

Consistent with the model’s predictions, in the era of the Maritime Strategy, the United States frequently chose to signal its clandestine capabilities rather than conceal them. Some of these signals were designed to demonstrate the U.S. potential for accomplishing the key tasks of an anti-SSBN campaign in the bastions without giving away critical secrets. Others were deliberately revealed, even at the risk of Soviet responses. Yet, some unique capabilities to which the Soviets might have been responsive remained concealed.

Policymakers in Washington first attempted to signal U.S. ASW capabilities obliquely. Cote notes that “on at least three occasions during the 1980s, the entire U.S. attack submarine force was flushed out of port and sent to sea in a matter of days,” and “one message that was probably received by the Soviets concerned the possibility that their SSBNs would lose a race to the Barents with U.S. SSNs.”⁹⁶ CNO Watkins testified before Congress about a worldwide SSN surge in 1984. As he would later put it to the same committee, “The Soviets expect us on warning to surge SSNs. They know we are going to the bastions. They know we can get inside their knickers before they can find us, and they don’t like it.”⁹⁷

Another signaling method was the use of exercises demonstrating other aspects of the bastion campaign. From at least 1983 onward, the U.S. Navy carried out ASW exercises under the Arctic ice, including the overt trailing and mock sinking of Soviet boomers.⁹⁸ Similar moves were made in the Pacific,

95. Authors’ interview with former senior U.S. Navy official, August 8, 2016.

96. Cote, *The Third Battle*, p. 76.

97. Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, p. 93.

98. Gregory L. Vistica, *Fall from Glory: The Men Who Sank the U.S. Navy* (New York: Touchstone, 1997), p. 214; Tunander, *Cold Water Politics*, p. 62; and Ford and Rosenberg, *The Admirals’ Advantage*, p. 94.

most notably in 1983 when a three-carrier task force ran twenty-four-hour-a-day operations across from the Soviet SSBN base on the Kamchatka Peninsula, probing Soviet air defenses, conducting ASW, sending groups off from the main fleet to evade Soviet surveillance, and even violating Soviet airspace.⁹⁹

The U.S. Navy would move to a more overt signaling posture in the mid-1980s. The most significant element of this posture was a decision to have CNO Watkins testify before Congress in open session about the sources of the U.S. acoustic advantage over the relatively quiet Soviet Victor III SSN. Despite its quieting, Watkins reported, “What we also learned was that where we had the towed array that covers the low-frequency band it was effective every time.” The lesson was that towed arrays were being accelerated into the fleet “so that we can go after propeller blade rates and the other things we have to get on a quiet submarine.”¹⁰⁰ By 1985, Secretary of the Navy John Lehman was giving off-the-record interviews in which he stated that Soviet SSBNs would be attacked “in the first five minutes of a war.”¹⁰¹ In 1986, the Maritime Strategy was rolled out publicly to much fanfare in a series of articles by top naval leadership in the journal *Proceedings*, with the anti-SSBN campaign as its centerpiece.¹⁰²

As the model expects, however, the unique aspects of U.S. ASW capabilities—its SIGINT and HUMINT intelligence penetrations—were never signaled. In fact, the existence of these penetrations is discussed only elliptically and episodically in the open literature.¹⁰³ These capabilities would also have been subject to the quickest Soviet response. The Soviets demonstrated this themselves when they found and removed U.S. cable taps of Soviet naval communications in the Sea of Okhotsk.¹⁰⁴ As in the 1960s–70s case, unique capabilities to which the Soviets might be responsive remained concealed.

POLITICAL POTENTIAL OF INFORMATION ABOUT MILITARY ADVANTAGES

Consistent with the model, there is at least some circumstantial evidence that Soviet leaders made political and military adjustments to U.S. signaling. Of course, the political effects of signaling about the undersea balance are difficult to disentangle from those of the larger strategic nuclear competition: the Soviets were under competitive pressure from many different sources during

99. Hoffman, *The Dead Hand*, pp. 64–65.

100. Cote, *The Third Battle*, p. 69.

101. Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, p. 96.

102. John J. Mearsheimer, “A Strategic Misstep: The Maritime Strategy and Deterrence in Europe,” *International Security*, Vol. 11, No. 2 (Fall 1986), pp. 23–25, doi.org/10.2307/2538957.

103. See, for example, Ford and Rosenberg, *The Admirals’ Advantage*, pp. 77–108.

104. See the account in Sontag and Drew, *Blind Man’s Bluff*, pp. 252–282.

the 1980s, so teasing out the causes of their reactions must necessarily be tentative. Nevertheless, at least three Soviet decisions from the period might plausibly have a specific connection to information gleaned about U.S. strategic ASW capabilities.

First, Moscow increasingly devoted naval resources to defending the bastions during the late 1970s and 1980s. As Cote puts it, “Regardless of how successful one assumes the Soviet bastion strategy to have been, it ended up consuming a substantial portion of the Soviet Navy, particularly its best attack submarines, to support a mission that American SSBNs conducted essentially alone.”¹⁰⁵ Moreover, the Soviets also built up military forces in the far north, suggesting an attempt to halt the Maritime Strategy by conquering its Norwegian support facilities.¹⁰⁶ Of course, any real effort to outflank the anti-SSBN campaign on land would have required shifting important ground forces to the north and away from NATO’s Central Front—a valued U.S. goal.

Second, much evidence suggests that the Soviet Union had received a powerful signal about its poor fitness for high-technology competition with the United States during the 1980s, including from the undersea struggle. The Soviet defense budget was being shifted away from procurement, operations, and readiness, and heavily toward the long-range research and development needed to keep the pace technologically with the United States. The change in Soviet naval operations was especially marked. Ship construction and delivery slowed; training was significantly reduced; and exercises outside Soviet home waters were almost entirely curtailed.¹⁰⁷ As the former Soviet analyst Vitaly Tsygichko concluded at a post-Cold War conference, the Maritime Strategy “made the Soviet military realize the significant technological gap that was widening between the USSR and the U.S. Gradually the Soviet military acknowledged that there was no way to close it, an acknowledgement that had huge implications.”¹⁰⁸

Indeed, a third example of the Soviet adjustments to the burdens of competition at the end of the Cold War was to roll out a number of arms control proposals. Naval arms control, and in particular arms control in the far north, was

105. Owen R. Cote, “Invisible Nuclear-Armed Submarines, or Transparent Oceans? Are Ballistic Missile Submarines Still the Best Deterrent for the United States?” *Bulletin of the Atomic Scientists*, Vol. 75, No. 1 (January 2019), p. 34.

106. For a contemporary account of these activities, see Jeffrey G. Barlow, *NATO’s Northern Flank: The Growing Soviet Threat* (Washington, D.C.: Heritage Foundation, 1979), pp. 1–18.

107. James T. Westwood, “Soviet Reactions to the U.S. Maritime Strategy,” *Naval War College Review*, Vol. 41, No. 3 (Summer 1998), p. 63.

108. Kjell Inge Bjerga, “Politico-Military Assessments on the Northern Flank, 1975–1990: Report from the IFS/PHP Bodø Conference of 20–21 August 2007” (Zurich: Parallel History Project, August 2007), p. 5.

conspicuous in its salience. In 1986, Politburo member Yegor Ligachev suggested that large-scale exercises be banned from the North, Norwegian, Barents, and Baltic Seas, and that Northern Europe be declared a nuclear-free zone. Gorbachev built on these proposals in 1987 during a speech in Murmansk, calling again for turning Northern Europe into a “zone of peace” and reducing military activities in all of the northern seas. More specifically, he suggested arms control for ASW forces, preclearing of any major naval exercises, and also the invitation of foreign observers to such exercises.¹⁰⁹

Conclusion

The existing literature on signaling has important lacunae surrounding clandestine capabilities. The literature predicts that states will focus solely on concealing or sending deceptive signals about these capabilities. We argue that this conclusion must be qualified: in long-term peacetime competitions, signaling can be efficient and effective enough to create a trade-off between signaling clandestine capabilities for political gains—such as enhanced general deterrence, adversary resource diversion, and bargaining concession—and concealment for the preservation of military advantages. We suggest that the uniqueness of a clandestine capability and the adversary’s anticipated responsiveness in countering it will be key considerations in whether states decide to signal or conceal. An in-depth analysis of U.S. strategic ASW during two Cold War periods substantiates the plausibility of these claims.

The argument has clear policy implications. The story of shifting military and political utility around strategic ASW in the Cold War could very easily be retold about a variety of clandestine capabilities today. Offensive cyber capability, for example, could have tremendous military utility, yet may be difficult to signal to adversaries without exposing the capability to relatively inexpensive countermeasures (e.g., updating software).¹¹⁰ The Stuxnet malware used to attack Iranian centrifuges likely fell into this category—it could not be revealed to coerce Iran without risking the software exploits it used being patched—as they eventually were.¹¹¹

However, as with late Cold War strategic ASW, there may be offensive cyber capabilities where the difficulty of countermeasures may merit some degree of

109. Westwood, “Soviet Reactions to the U.S. Maritime Strategy,” p. 82.

110. For discussion of strategic offensive cyber operations and countermeasures, see Austin Long, “A Cyber SIOP? Operational Considerations for Strategic Offensive Cyber Planning,” in Herbert Lin and Amy Zegart, eds., *Bytes, Bombs, and Spies: The Strategic Dimensions of Offensive Cyber Operations* (Washington, D.C.: Brookings Institution Press, 2019), pp. 105–132.

111. For an overview, see Jon R. Lindsay, “Stuxnet and the Limits of Cyberwarfare,” *Security Studies*, Vol. 22, No. 3 (2013), pp. 365–404, doi.org/10.1080/09636412.2013.816122.

revelation. Although there is insufficient information to fully judge the case, the revelation of alleged U.S. “left of launch” capabilities to interfere with North Korean missiles may have been a deliberate attempt to signal these capabilities in pursuit of bargaining utility.¹¹² Such signaling could have been intended to convince the North Korean leadership that “the mountain was too high” for them to succeed in their effort to develop intercontinental ballistic missiles, just as strategic ASW was intended to signal to the Soviets that they could not compete with the United States at sea.

More generally, in evaluating revelation of clandestine capabilities, U.S. policymakers should explicitly focus on the uniqueness of the capability and the difficulty of countermeasures. This recommendation appears to have been followed with some capabilities, such as the strategic ASW and anti-satellite capabilities, but it is unclear if this type of analysis is conducted systematically. Structured analysis of uniqueness and cost of countermeasures across the entire portfolio of clandestine capabilities might identify more capabilities for potential revelation. Such analysis is important if, as we hypothesize, clandestine capabilities are growing both quantitatively and qualitatively. If, instead, policymakers simply default in most instances to concealment, then the balance of capabilities is likely to become at least as opaque as the balance of resolve or intentions.

Opacity in the balance of capabilities would likely affect potential failure of deterrence or outbreak of war. Much would likely depend on the context of crisis, however. Although more research is needed, opacity of the balance could bolster deterrence if one or both states in a crisis perceive themselves to be seeking gains from the crisis outcome. According to prospect theory, actors in such situations are likely to be risk averse, so opacity about the balance might dissuade such an actor from seeking to resolve a crisis through war.

Conversely, actors that perceive themselves to be facing losses from a crisis outcome are likely to be risk acceptant. Here, opacity about the balance due to clandestine capabilities could be particularly problematic. A risk-acceptant actor would be aware of the array of clandestine capabilities that the actor possesses and unaware of such capabilities on the other side—and therefore discount the potential existence of such adversary capabilities. This calculation could lead to false optimism for a short, successful war as a means to resolve a crisis and prevent loss. This possibility alone merits further exploration of the challenge of clandestine capabilities.

112. See William Broad and David Sanger, “U.S. Strategy to Hobble North Korea Was Hidden in Plain Sight,” *New York Times*, March 4, 2017, <https://www.nytimes.com/2017/03/04/world/asia/left-of-launch-missile-defense.html>.