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Wueger, Diana

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India's Nuclear-Armed Submarines: Deterrence or Danger?

In April 2016, India took a momentous step forward in its quest to complete the nuclear triad.¹ INS *Arihant*—India's first indigenously-built, nuclear-powered ballistic missile submarine (SSBN)—launched its long-range nuclear-capable missile, codenamed the K-4, for the first time while submerged. Unveiled in 2009 for several years of trials, *Arihant* is the first of a planned five- or six-ship SSBN fleet to be introduced over the next half-century that will provide India with a secure and assured second-strike capability,² or the ability for a country to respond to a nuclear attack with its own nuclear counterstrike. While *Arihant* herself was conspicuously absent from February 2016's International Fleet Review at Vishakapatnam, the presence of a Russian submarine rescue vessel at the event suggested that India had other tasks for its newest boat. Several weeks later, officials confirmed that the submarine had completed deep-sea diving drills and weapons launch tests, and that "the submarine can now be commissioned at any time."³

The coming induction of INS *Arihant* into the Indian Navy's fleet presages a new era in South Asia that echoes the Cold War, when U.S. and Soviet submarines played high-stakes games of cat-and-mouse with one another. Naval nuclear reactors, first introduced to the U.S. submarine fleet in 1955 and to the Soviet fleet three years later, gave submarines the ability to stay fully submerged—and thus largely undetectable—for several months at a time while offering superior speed and a

Diana Wueger is a Faculty Associate for Research at the Naval Postgraduate School. The author is grateful to S. Paul Kapur, Christopher Twomey, Feroz H. Khan, Andrew Winner, and Joshua Rovner for their invaluable feedback on earlier drafts and presentations. The views expressed are those of the author and do not reflect the official policy or position of the Naval Postgraduate School, Department of Defense, or the U.S. Government.

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truly global reach. Fast attack nuclear-powered submarines (SSNs) could be configured for a range of missions, primarily anti-submarine warfare (ASW); anti-surface warfare (ASuW); and intelligence, surveillance, and reconnaissance (ISR). Meanwhile, fleets of SSBNs offered the assurance of a second strike in the event of nuclear attack. That secure second-strike capability was thought to cement mutually assured destruction, thus stabilizing the U.S.–Soviet deterrent relationship.⁴

By the end of the Cold War, the idea that ballistic missile submarines provided a critical deterrent function had remained intact since its initial conception in the

1950s. Indeed, this idea that submarine-based nuclear weapons are stabilizing now forms one of the central assumptions of nuclear strategy. By making nuclear assets harder to find, SSBNs ensure that even if an incoming counterforce first strike destroys a state's land-based weapons, its sea-based arsenal remains available for countervalue retaliation. (A counterforce strike targets an adversary's nuclear weapons, including related command-and-control infrastructure. A countervalue strike is a nuclear strike against a civilian target, such as a major population

center, and is expected to hold cities hostage by threatening to inflict unacceptable damage, thus engendering deterrence by punishment.)

But do SSBNs truly provide an unassailable second strike that deters absolutely, thus generating strategic stability? And does the logic that underpinned sea-based deterrence during the Cold War apply in South Asia, with political, geographic, and bureaucratic realities that differ dramatically from those of the U.S.–Soviet relationship? To answer these questions, this essay seeks first to illuminate the Cold War context in which these ideas took root and to assess how these ideas fit into India's current nuclear doctrine. In the second section, I examine the South Asian context in which India is operationalizing that doctrine via *Arihant*. Here, I address some of the regional implications of the introduction of sea-based deterrence in the Indian Ocean Region (IOR), particularly the effect on India's relations with China and Pakistan.

I argue that, contrary to prevailing wisdom, sea-based deterrence is unlikely to contribute significantly to strategic stability in South Asia, nor will it provide much benefit to India's overall strategic security. The geostrategic and operational realities of the South Asian theater differ significantly from those of the Cold War, and these differences, combined with bureaucratic inertia, resource constraints, and sharp asymmetries between actors, suggest that the addition of nuclear-armed submarines to the Indian Ocean will likely result in increased crisis instability and fuel the conventional and nuclear arms races currently underway in the region.

That submarine-based nuclear weapons are stabilizing is a central assumption of nuclear strategy.

Back to the Future: Classic Deterrence Theory Revisited

After the detonation of the first thermonuclear device in 1952, and with the memory of Pearl Harbor still fresh, the central challenge for U.S. nuclear strategists lay in devising a way to prevent a catastrophic nuclear first strike by the Soviet Union. The solution, at least in theory, was to develop a secure second-strike capability that would engender deterrence by punishment.

As long as a preemptive strike could destroy or significantly erode an enemy's nuclear force before the enemy could respond, such a first strike could remain an attractive option for military planners. Strategic stability could thus only be possible with an assured second-strike capability, which would guarantee that the first mover could not eliminate the threat of retaliation. The cost of failing to destroy the adversary's nuclear arsenal through a counterforce first strike was too high, the logic went; no rational actor would risk it.

To achieve this second-strike capability, strategic assets either had to be hardened so they would be difficult to destroy or they had to be mobile and concealable so they would be difficult to find. Bombers offered mobility, of course, but getting them in the air before a first strike would require sufficient advanced warning of incoming missiles—a serious technological challenge at the time. More promising was the potential for nuclear-armed submarines: in the subsurface realm, technology favored the defender. In 1959, *USS George Washington* became the world's first operational ballistic missile submarine. By 1988, the Soviet Union fielded 77 SSBNs, while the United States had 36.⁵

As the SSBN fleets grew, so did both sides' anti-submarine warfare (ASW) capabilities, particularly the United States'. But the quantities of submarines involved provided a measure of assurance; no matter how effective U.S. ASW was, the United States could never be entirely sure it could find and eliminate all Soviet SSBNs, particularly as quieting technologies improved. These quantities also lent credibility to claims of assured retaliation; even if a few boats were to experience mechanical failures or accidents, there were others still on patrol and many more prepared to get underway in a crisis. Especially for the Soviets, quantity obviated some of the quality problems they experienced.

India's Quest for the Triad

Historically, India's nuclear posture has rested on three precepts: the policy of no-first-use (NFU) of nuclear weapons; the goal of credible minimum deterrence; and the principle of robust civilian control of the nuclear arsenal, in part through the maintenance of weapons in a disassembled state.⁶ For India, the nuclear triad is a logical extension of its NFU principles. Rear Admiral Raja Menon, perhaps India's foremost expert on India's submarine force and its nuclear aspirations, has argued that only SSBNs offer an "unshakeable second strike" that increases the credibility

of NFU.⁷ Indeed, India's 2007 maritime strategy document stated: "Our 'No First Use' policy amply illustrates India's intentions of using the nuclear deterrent only as a retaliatory measure of last resort. The sea-based leg of the nuclear triad enables a survivable second-strike capability and is, therefore, a critical enabler for the nuclear doctrine of 'No First Use' to attain credibility ... The nuclear submarine option is the preferred arsenal for small nuclear forces."⁸

Scholars and journalists have advanced additional explanations for India's pursuit of a sea-based deterrent, ranging from a desire for prestige to bureaucratic-organizational rationales. There is certainly a prestige element in the hype surrounding *Arihant*, both national and naval. In its first published maritime doctrine, released in 2004, the Indian Navy had lamented its marginalization from India's strategic program, stating, "India stands out alone as being devoid of a credible nuclear triad."⁹ At *Arihant*'s July 26, 2009 launch, then-Prime Minister Manmohan Singh stated, "Today we join a select group of five nations who possess the capability to build a nuclear-powered submarine"—the five permanent members of the United Nations Security Council—and said that it was a "special achievement."¹⁰

Others have suggested that the development of India's first SSBN was more accidental than intentional. In "The Imagined Arsenal: India's Nuclear Decision-Making, 1973–76," Yogesh Joshi questions the belief prevalent among Indian strategists that the purpose of India's nuclear submarine program was deterrence-driven. The historical evidence suggests instead that "the entire focus of the nuclear submarine program was initially set on producing a viable 'compact nuclear reactor,' rather than designing the submarine in which it would be ultimately installed."¹¹ In a lecture at Lawrence Livermore National Laboratory in 2014, Vice Admiral Vijay Shankar suggested that the original goal of the program was a nuclear-powered—but conventionally armed—attack submarine (SSN), rather than an SSBN.¹² These varied accounts suggest that the SSBN program may be only loosely tied to India's strategic goals.

Officially, however, the strategic logic underpinning India's SSBN program extends directly from the 1950s Cold War logic laid out earlier in this essay. India's current maritime strategy document, *Enduring Secure Seas: Indian Maritime Security Strategy*, released in October 2015, explicitly references the Cold War in its explanation for India's pursuit of a nuclear triad: "Cold War experience has shown that reduction in the first-strike and increase in the second-strike (retaliatory) component considerably stabilises [sic] and strengthens deterrence."¹³

Regional Trends and Implications

While India views its pursuit of a sea-based nuclear deterrent as supporting its NFU policy, there are serious repercussions for relations with its regional

rivals. India's SSBN force may have serious effects on China and on Pakistan, including potentially jeopardizing both arms race stability and crisis stability. While it is unlikely that *Arihant* will induce major changes in China's naval or nuclear policies, it is also unlikely to achieve any of India's strategic aims vis-à-vis China. With Pakistan, however, *Arihant* and her sisters may generate a new vector for crisis instability. Furthermore, India's SSBN acquisition increases the pressure Pakistan feels to acquire its own triad, as well as driving Pakistan's desire for additional conventional naval capabilities.¹⁴

If Cold War-era deterrence theory holds true, we should expect India's SSBNs to prove stabilizing to its adversarial relationships with China and Pakistan, with two stipulations. First, in order to avoid undermining the NFU pledge, the submarine-launched ballistic missiles (SLBMs) on board must be imprecise enough that they are appropriate only for a countervalue strike and not for a counterforce strike. At this time, the K-4 and shorter-range K-15 likely meet this requirement.¹⁵ Second, the SSBN delivery system must be credible and safe in order to provide the assured second strike. If the second strike cannot be assured, the logic of the triad unravels.

This could be a good-news story for the region if the introduction of sea-based deterrence slows the conventional and strategic arms races occurring between India and Pakistan and, to a lesser extent, between India and China. If first-use incentives cease to exist, states should be less inclined to arms race, as strategic stability has been achieved and therefore there is no theoretical military utility to be gained by introducing additional nuclear weapons or systems.

The development of robust SSBN fleets did not seem to generate a sense of security on either side of the Cold War, however. Even as the superpowers pursued—and achieved—credible, assured, secure second-strike capabilities, they continued to develop new land- and air-based delivery systems, more advanced missiles, and better warheads. SSBNs did not prevent the United States or the Soviet Union from adopting expansive target sets and building several thousand nuclear warheads; at their peak, some estimates suggest the United States had over 23,000 devices, while the Soviets had 45,000. (To be sure, decisions regarding intra-country horizontal and vertical proliferation are not strictly rational. Outside influences such as bureaucratic politics, national prestige, and path dependence often conspire to generate upward pressure on arsenal size and diversity. Nevertheless, the notion that SSBNs preclude further nuclear arsenal growth is empirically unfounded.)¹⁶

**With Pakistan,
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SSBNs can generate demands for conventional anti-submarine warfare (ASW) assets.

There is evidence to suggest, however, that SSBNs can generate demands for larger arsenals of conventional ASW assets, offering an additional vector for regional crisis instability. When the Soviet Union introduced the Delta-I class of SSBNs, which carried new long-range ballistic missiles that could threaten the U.S. homeland from Soviet waters, the U.S. demand for SSNs for ASW purposes spiked dramatically. Before the Deltas were introduced, the U.S.

could detect Soviet submarines crossing the so-called Greenland–Iceland–United Kingdom (GIUK) gap, and could target them as they exited into the Atlantic Ocean. The Deltas, however, did not have to go beyond the range of Soviet air defense batteries; to hold them at risk would require a different ASW posture.¹⁷

While in an ideal world, adversaries would accept mutual vulnerability and decline to pursue one another's second-strike assets, the reality is that states seem unwilling to forgo ASW when faced with a potentially existential threat for which there might be a military solution. India is likely to experience just such a situation as Pakistan and China build up their attack submarine fleets.¹⁸ The need to conduct intelligence gathering on acoustic signatures and operating patterns of new adversary submarines and to defend against incursions into territorial waters also drives demand for conventional assets.¹⁹ Indeed, India is developing a new class of nuclear attack submarines, and is in talks with Russia regarding the lease of a second SSN.²⁰

An Indian SSBN also opens up questions about its command and control.

There is also the opportunity cost associated with a conventional submarine arms race. Outside of their ISR functions, attack submarines are primarily useful for blockades and high-end warfighting; they have little utility for counter-piracy operations or humanitarian assistance and disaster relief (HADR), which have been a significant part of the South Asian navies' mission sets in recent years. By

purchasing more submarines, states may shift resources away from these traditional roles and thus have fewer assets available that allow for gradations of force.

An Indian SSBN also opens up questions about potential changes to India's command and control procedures and preferences. Indian civilian leaders have historically been loath to give control of assembled nuclear weapons to the Indian armed forces, leading to the (perhaps now erroneous) belief that India's nuclear weapons are maintained in a "disassembled and dispersed configuration."²¹ For India's land-based weapons, the Defence Research and Development

Organisation (DRDO) maintains the nuclear warheads, while the delivery systems belong to the armed forces. This is obviously an unlikely configuration for a sea-based deterrent, and may reflect a shift in Indian attitudes toward assertive civilian control. Such a shift would be particularly troubling for Pakistan, which has come to expect that the Indian civilian government will keep the Indian military in check during crises.

Two related command and control issues are the “always-never dilemma” and the problem of maintaining communications with deployed submarines. The “always-never dilemma” refers to the challenge of ensuring that nuclear weapons are always ready for use but can never be launched accidentally or without the proper authorization. In the context of ballistic missile submarines, the problem of unauthorized launch becomes a technological question as much as a personnel surety issue. For submarines, constant communication may be undesirable, as many forms of communication make the submarine more likely to be detected. In the event of a crisis, the destruction of C2 nodes such as very-low frequency (VLF) or extremely-low frequency (ELF) stations could prevent SSBNs on patrol from receiving instructions.²² In the event of connectivity failure, the question of pre-delegation arises: if the political leadership cannot be reached, how should the forces respond? Who, if anybody, has launch authority?²³

Look East: The Challenges Posed by China

India’s initial decision to acquire nuclear weapons was driven in large part by its relations with China.²⁴ Since the disastrous 1962 Sino-Indian war, concerns about Chinese intentions and capabilities have undergirded Indian strategic thinking. The Sino-Indian border issues in Arunachal Pradesh and Aksai Chin have not yet been resolved, which leaves India uneasy and gives China the upper hand in bilateral negotiations, as it knows India would strongly prefer a compromise to a confrontation.²⁵ As China continues to grow economically and militarily, India finds itself in the uncomfortable position of trying to ward off potential Chinese aggression while not provoking China into an arms race.

Complicating this balancing act is India’s close trade relationship with China. These trade ties could offer a potential source of stability and cooperation in the future, but there is no guarantee that this process will not reverse itself. While China and India have good reasons to maintain their trade relationships now, they may find themselves in competition for the resources necessary for economic growth, particularly energy. In order to continue their rapid growth, India and China require secure access to oil. The volume of trade that passes through the Indian Ocean is staggering: roughly two-thirds of the world’s petroleum products transit this space, along with 50 percent of the world’s container traffic.²⁶

It is in the context of resource access and regional influence that China has been a significant factor in India's naval acquisition and modernization efforts. As China's maritime ambitions have grown and its navy has expanded, India has become increasingly concerned about what it perceives as a serious and growing threat to India's interests throughout the IOR. In 2009, former Chief of the Indian Navy Admiral Arun Prakash declared, "It is time for India to shed her blinkers and prepare to counter PLA Navy's impending power-play in the Indian Ocean."²⁷

China's increasing engagement with IOR states has India drawing redlines "with the goal of deterring Beijing from actions that infringe unacceptably on Indian interests as India interprets them."²⁸ Among these redlines, scholars James Holmes and Toshi Yoshihara identify three potential naval triggers of Sino-Indian hostilities: forward deployment of Chinese nuclear submarines to the Indian Ocean; the development of a network of Chinese naval facilities across the IOR; or a Chinese effort to keep India out of the South China Sea.

While it seems unlikely that any of these developments would lead directly to war absent other drivers, there is a great deal of consternation among Indian navalists about the threats posed by Chinese submarines. In 2013, for example, an Indian defense ministry report indicated that China had been sending attack submarines into the Indian Ocean with an "implicit focus" [on] undermining the

Indian Navy's [ability] 'to control highly-sensitive sea lines of communication.'"²⁹

There are few plausible scenarios for China to see benefits from a first strike against India.

Indian officials and scholars have indicated that India's pursuit of a sea-based deterrent is intended to deter China, but they have been less clear about precisely which Chinese actions or ambitions India's SSBNs could potentially deter. There is a disconcerting lack of conceptual clarity among Indian statements about the linkages—or lack thereof—

between increased Chinese naval activity in the IOR and the functions an Indian SSBN could perform. There is no causal mechanism by which an operational SSBN fleet could prevent China's naval expansion into the IOR along the lines Holmes and Yoshihara provide; it is simply not credible to expect India will conduct a first strike, thereby abandoning its NFU doctrine and inviting Chinese retaliation, simply because China forward deployed a handful of submarines in India's backyard.

What of deterring nuclear annihilation? While India may worry in the abstract about a Chinese first strike, there are few plausible scenarios in which China is likely to see itself as deriving benefits from a massive counterforce first strike against India. Even granting such a possibility, an Indian SSBN provides only a marginal additional deterrent value against China. Whether China would risk

Indian retaliation may depend on the future configuration of the K-4 missiles, how reliable China considers them to be, and how confident China is in its ASW abilities beyond the South China Sea.

With this in mind, the introduction of nuclear weapons at sea could be read as a positive development. China has an operational sea-based second-strike capability vis-à-vis India; if India can achieve mutual vulnerability with China via an SSBN fleet, it could be less inclined to pursue a larger land-based nuclear arsenal. However, India's 2007 maritime strategy belies the notion that the state will content itself with mutual vulnerability: "The increased presence of submarines in India's areas of interest, with weapons capable of striking military and strategic targets at standoff ranges, necessitates development of our sub-surface surveillance systems. These include both mobile and static systems, for use onboard ships, submarines, aircraft, and in vantage positions at sea."³⁰

On the positive side, an Indian SSBN fleet is unlikely to change China's nuclear force posture. As noted, estimates vary, but the total figure for the *Arihant*-class fleet is thought to be in the range of five to six boats. As Andrew Winner, a professor of strategic studies focused on South Asian security, notes, "China has lived with the vastly more substantial submarine presence embodied by the U.S. Navy for many years. It will understandably regard the seagoing Indian deterrent as a lesser included case for peacetime strategy."³¹

While China may not view India's SSBN as an immediate threat that requires significant force structure changes, China is likely to increase its surveillance efforts in the IOR so as to collect data about Indian SSBN operational patterns and acoustic signatures, with submarines being an obvious choice of ISR platform—exactly the sort of behavior India hopes to quash. As China improves its ASW capabilities and its ability to monitor the IOR from the various naval bases and ports it has helped build, India's patrolling SSBN will become less secure. This is likely to take several years, but if China's ASW abilities outpace India's shipbuilding and quieting abilities, the trend line points toward a less secure system—and thus a less assured second strike.

Look West: The Enduring Problem of Pakistan

After a series of wars and countless border skirmishes over the last 60 years, the India–Pakistan conflict remains unresolved and remarkably volatile. Pakistan's disadvantage against India in its conventional military capabilities has endured, and the conventional gap between the rivals is only growing as India invests heavily in new, more advanced weapons systems. India has also developed what is colloquially known as the Cold Start doctrine, which calls for a rapid but shallow incursion into Pakistan to deter Pakistan from supporting non-state actors. As Pakistan's ability to deter India conventionally has withered, it has

developed short-range, low-yield nuclear weapons that could be used against an Indian offensive column that crossed the international border in a Cold Start-style attack.³² The cold peace that endures between these nuclear-armed adversaries is fragile at best; another terrorist attack like the 2008 Mumbai siege could spark a war.³³

The main threat India faces from Pakistan is violent non-state actors.

Could an assured second strike stabilize the India–Pakistan dyad? It seems unlikely; the main threat India faces from Pakistan is violent non-state actors, while Pakistan's overriding fear is a conventional conflict that threatens Pakistan's survival. Neither of these concerns is necessarily obviated by India's possession of SLBMs. The myriad non-state actors in South Asia are unlikely to change in

response to the addition of sea-based nuclear weapons, and neither India nor Pakistan has the capacity to eliminate the threat they pose even before considering the added burden associated with modernizing and expanding the submarine services.³⁴

Should Pakistan acquire a triad in pursuit of parity with India, it is possible Pakistan could feel more secure about the survivability of its deterrent and thus its existential security. Given Pakistan's conventional weakness and its adoption of an asymmetric escalation strategy that relies on the threat of first use, however, it is more likely that Pakistan would simply add sea-based weapons to its arsenal while continuing its development of new delivery systems, both shorter- and longer-range missiles, and more warheads. Sea-based weapons do not resolve the credibility problem surrounding Pakistan's threat of early first use of nuclear weapons against Indian cross-border operations.

In reality, mutual vulnerability already exists in South Asia. Both India and Pakistan would be hard-pressed to eliminate their opponent's entire arsenal in a first strike; their ISR and targeting capabilities are simply not up to the task. Thus, both states already face the possibility of a countervalue second strike. Basing nuclear weapons at sea would contribute only marginally to the goal of arsenal survivability, especially if the submarines carrying them are noisy and easily found.

Furthermore, the deployment of Pakistani nuclear warheads aboard an Agosta submarine, the most commonly proposed configuration for a Pakistani sea-based deterrent, introduces the specter of inadvertent escalation. In a crisis, Indian ASW would not be able to tell conventionally-armed Agosta 90Bs from those carrying nuclear warheads, and could unintentionally strike a nuclear-armed boat. Given the history of mistrust, Pakistan may believe such an incident to be an intentional effort to degrade Pakistan's second-strike capabilities. On the

conventional arms race front, Pakistan has also indicated its interest in better ASW, both via new attack submarines and additional air assets. In April 2015, Pakistan concluded negotiations begun in 2011 with China over the purchase of six air independent propulsion (AIP)-equipped *Yuan*-class submarines.³⁵ AIP technology helps mitigate one of the biggest weakness of SSKs, the need to surface frequently to access atmospheric oxygen, thus providing these submarines the ability to stay submerged for longer periods of time.

Unintended Consequences

According to Rear Admiral Raja Menon, “nuclear subs earn their keep every day of the year. Ballistic missile submarines save nations on that one fateful day, when the enemy’s political leaders look at our SLBMs and stay their hand on the button.”³⁶ While an operational sea-based deterrent should hypothetically provide India with a greater sense of existential security vis-à-vis China, it is unlikely to cause India to abandon its pursuit of additional nuclear capabilities, suggesting that the introduction of an Indian SSBN does not offer the solution to India’s perceived security threats from China. An Indian sea-based deterrent does, however, exacerbate arms racing tendencies in Pakistan, even as its induction poses substantial challenges for the Indian political and naval establishments. Furthermore, while an Indian SSBN fleet could provide stability at the strategic or nuclear level under certain conditions, it is also likely to generate conventional maritime arms races in both dyads.

The growth of conventional naval arsenals could have potentially deleterious effects on crisis stability, particularly if they come into contact with strategic systems. It is here that the dangers of India’s pursuit of a sea-based deterrent are most pronounced. There are numerous risks inherent in sea-based nuclear arms, ranging from nuclear accidents to theft of fissile materials to crises that escalate to war. The degradation of command and control is especially problematic for submarines: who retains launch authority if a submarine loses contact with the national command authority? India has a strong tradition of civilian control of the nuclear arsenal, and Indian nuclear weapons have traditionally been understood to be kept de-mated and not available for immediate use. An SSBN, however, must carry both warheads and missiles. Some level of pre-delegation cannot be avoided if the system is to be effective, but this introduces new opportunities for the misuse of weapons. India has not yet explained how it intends to retain active civilian control over its SLBM arsenal.

In the event of a crisis, fear of a bolt-from-the-blue countervalue first strike could incentivize India’s adversaries to target the Indian SSBN. This could create “use it or lose it” pressures for India: either India uses the warheads

aboard the SSBN or it risks losing them to enemy ASW. Indeed, if these states are unwilling to accept a position of mutual vulnerability, the introduction of an SSBN capability will generate demand for improved attack submarine fleets, either to protect the SSBNs or for ASW, in India, Pakistan, and China alike.

There are numerous pathways by which submarines could be used provocatively without necessarily triggering an open conflict. Currently, there is little dialogue between India and Pakistan or China about how each side perceives naval, particularly subsurface, actions and how these states might mitigate worst-case thinking that could cause crises at sea to spiral. As the quantity and quality of submarines in the IOR—particularly those capable of carrying nuclear weapons or of tracking and killing other submarines—increases, there is a slim but growing danger of accidental or inadvertent escalation in both dyads. While SSBNs may offer some added stability at the strategic or nuclear level, they may exacerbate conventional maritime arms races that could lead to crises with strategic effects.

Notes

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