On January 9, 2017, Pakistan’s Inter-Services Public Relations (ISPR) announced that the country had successfully carried out the first-ever flight test of a nuclear-capable, submarine-launched cruise missile (SLCM)—the Babur-3, a variant of the Babur-2 ground-launched cruise missile.1 With the introduction of the Babur-3, Pakistan seems headed toward adding a sea leg in the coming decade to complement a nuclear force structure that previously relied solely on land-based missiles and aircraft-delivered weapons.

According to ISPR’s announcement, the Babur-3’s test was conducted from a submerged platform at an undisclosed location off the country’s southern coast on the Arabian Sea. The missile, it said, “is capable of delivering various types of payloads and will provide Pakistan with a Credible Second Strike Capability, augmenting deterrence.”2 In particular, Pakistani officials have suggested that existing land-based forces could be located by adversaries early in a crisis and hence might not survive a concerted disarming attack. In March 2015 remarks in Washington, D.C., retired General Khalid Kidwai, the erstwhile and inaugural head of Pakistan’s Strategic Plans Division for more than fifteen years, acknowledged that “a second strike can again take the form of something which is based on land as well, if there’s a survivability. But that is not assured.” Kidwai continued that the “assured second strike capability comes from being sea based.”3 Pakistan has long declared that it seeks only “minimum deterrence,” but from the outset of

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the overt nuclear weapons program, Pakistani commentators have been quick to add that “the size of Pakistan’s arsenal and its deployment pattern have to be adjusted to ward off dangers of preemption and interception.” Since 2013, official Pakistani pronouncements have added that any credible deterrent must confront the “full spectrum” of possible threats.

A sea-based element would be just the most recent Pakistani move to enhance its nuclear arsenal, as Pakistan’s search for credibility increasingly vitiates the “minimum” component of its declared nuclear doctrine. Policymakers in the United States and India alike have decried Pakistan’s fast-expanding nuclear arms stockpile, which is thought to be among the most rapidly growing in the world. Pakistan is estimated to possess approximately 130–140 nuclear warheads, with sufficient fissile material to produce up to twice that number. As analysts Michael Krepon and Toby Dalton have detailed, “Since 1998, as perceived and real disparities between Indian and Pakistani conventional military capabilities began to grow, Pakistan has built up its bomb-making capacity at a pace exceeding India’s.”

It is not simply concerns about Pakistan frittering away its resources in a wasteful arms race with India that motivate outside interest. Rather, a larger arsenal occurs in the context of widespread internal violence in Pakistan, much of it targeting state and military institutions. In 2016 alone, there were serious, multi-casualty attacks on a police training college, a military cantonment, a paramilitary base, a bus carrying government employees, a tax office, a polio vaccination center, a university, and a hospital, alongside numerous others against non-governmental targets. Moreover, Pakistan has struggled to contain radicalism within the military and other security forces. Thus, every additional nuclear warhead increases the risk that a bad actor might obtain access to immense destructive capability.

A sea-based portion of the nuclear arsenal might, at first glance, appear reassuring and even as a stabilizing development in Pakistan’s arms competition with India. After all, such weapons would be assigned to vessels that would operate away from shore, physically separating the devices from all of Pakistan’s domestic troubles. Moreover, unlike Pakistan’s interest in so-called tactical nuclear weapons for use on the battlefield, the added survivability of sea-based nuclear weapons would appear to decrease any “use-or-lose” pressures that might lead to early nuclear escalation of a conventional conflict with India. While not entirely incorrect, such an analysis is radically incomplete and as a result overly optimistic. Naval nuclear weapons bring with them new dangers, and their basing mode at sea does not eliminate many dangers that sea-based weapons share with land-based forces.
This essay makes four primary points. First, all available evidence indicates that Pakistan is serious about developing a sea-based nuclear force. Second, there will be strong incentives for Pakistan to maintain sea-based nuclear weapons at higher readiness in peacetime and crisis than land-based weapons, and as a result the dangers of unauthorized use could increase. Third, sea-based weapons may worsen crisis stability, despite some survivability advantages they may have over land-based forces. Fourth, the danger of theft or sabotage of sea-based nuclear weapons may in fact be larger than other portions of the Pakistani nuclear arsenal. These dangers, when combined with the extraordinary cost of a sea-based leg, lead to substantial questions as to whether such a development is ultimately beneficial for Pakistani security.

Pakistan’s Naval Nuclear Aspirations

In the immediate aftermath of its May 1998 overt nuclear tests, Pakistan seemed content with keeping its nuclear arsenal on shore. As part of a broader “strategic restraint regime” within months of the test, Islamabad proposed a bilateral India–Pakistan ban on nuclear-armed submarine-launched ballistic missiles (SLBMs) to U.S. and Indian interlocutors. At the time, such a proposal was attractive to Pakistan since India’s interest in sea-based missiles and a nuclear-powered submarine to carry those missiles was widely reported. An SLBM ban could have both eliminated a prospective Indian capability while also showing responsible Pakistani stewardship to a concerned Clinton administration. The asymmetry of potential concessions perhaps explains why the proposal went nowhere. In subsequent years, Pakistan periodically reoffered variants of the idea with similar null results, suggesting as recently as May 2016 a proposal at the United Nations to declare the Indian Ocean a “nuclear free zone.”

Pakistan began to create the organizational apparatus necessary to pursue nuclear deployments at sea shortly after its overt nuclear breakout. It established a Maritime Technologies Complex (MTC) sometime prior to October 2000 and placed it under the National Engineering and Scientific Commission (NESCOM), an organization with broad responsibilities including conventional and nuclear weapons technologies. By 2004, the Pakistan Strategic Plans Division, in briefings to international audiences, referenced a Naval Strategic Forces Command. In 2008, Vice Admiral Asaf Humayun, who served as head of the MTC from 2002–2006, stated publicly that the “navy is fully capable of deploying strategic weapons on the sea,” but also stated that “so far the government had not decided to …” In 2012, Pakistan announced the “formal establishment” of the Naval Strategic Forces Command along with the inauguration
of its headquarters facility, and publicly named Vice Admiral Tanveer Faiz as commander. Unsurprisingly, Faiz’s naval career included substantial submarine experience.

This organizational apparatus appears to have substantially predated any actual naval nuclear capability. As late as 2015, Kidwai indicated that Pakistan was working its way through a list of requirements necessary to field a maritime nuclear force. “A submarine is just a platform, but beyond the submarine you’d need a number of other things. Communications with the weapon itself, and so on and so forth,” Kidwai observed. During that same event, Kidwai, describing Pakistan’s progress toward a sea-based deterrent as a “work in progress,” added that multiple components would need to come into place first for Pakistan to field this capability fully: “There will be a time when there will be a platform as well. There will be a time when there will be a weapon. There will be a time where there will be a communications part of it coming into place.”

As will be discussed in detail below, Pakistan already owns multiple French-origin submarines capable of launching cruise missiles—though whether launch tubes initially designed for French Exocet or U.S. Harpoon anti-ship cruise missiles can be repurposed easily is not known. Pakistan is also acquiring Chinese-origin submarines, which could in theory be designed to accommodate a Pakistani-origin delivery vehicle from the outset. So Pakistan appears to be making substantial progress on a platform for a submarine-launched weapon.

The January 2017 test suggests that Islamabad is on its way to the second requirement: the weapon itself. The cruise missile is merely the delivery vehicle and would only be useful for nuclear missions if Pakistan had a miniaturized nuclear warhead design capable of fitting atop the new Babur-3. Given a paucity of nuclear weapons testing, such miniaturization might be difficult without outside, presumably Chinese, technical assistance.

The third requirement—communications—may already be in place. Typically, countries communicate with submarines via Very Low Frequency (VLF) or Extremely Low Frequency (ELF) arrays, since transmissions at such wavelengths can penetrate seawater. Pakistan commissioned a VLF array near Karachi in November 2016, two months before the Babur-3 test. The VLF facility would permit a Pakistani submarine to receive messages while still underwater, though VLF transmissions can only be received by submarines in relatively shallow water within approximately 10 meters of the surface.

Collectively, these organizational and technological developments demonstrate that Pakistan’s naval nuclear moves are not just symbolic. Rather, in the near- to medium-term, Pakistan will likely have all of the components necessary to deploy nuclear weapons aboard submarines.
Sea-Based Weapons and Assertive Control

Peter Feaver, a scholar of civil-military relations, has observed that “leaders want a high assurance that [nuclear] weapons will always work when directed and a similar assurance the weapons will never be used in the absence of authorized direction.” Navigating this “always-never dilemma” is the central challenge for nuclear weapons states. Too much emphasis on ensuring nuclear weapons will always be used when needed can make it easier for unwanted use—be it accidental or unauthorized—to occur. A state worried about always being able to use weapons after an attack might ensure that the military controls the weapons, that those weapons are dispersed, and that military commanders are pre-delegated to use weapons—or at least have the physical capability to do so—in the event of a surprise adversary attack. Conversely, too much emphasis on preventing unwanted use can make decapitation attacks by an adversary against the national command authority more dangerous. The military might not control weapons in peacetime or, if it did, might not have the physical capability to launch weapons absent a code that could only be issued by the national leader. If that national leader and his immediate successors were killed in an attack and communications were disrupted more widely, states worried about never experiencing unwanted use might have weapons that “fail safe” in the event of a surprise attack. The weapons might still exist, but would be useless absent codes no longer retrievable because of enemy action.

While sea-based nuclear weapons are not immune from adversary counterforce attacks—that is, attacks that seek to destroy weapons prior to their launch—they are generally perceived to be less vulnerable than land-based (especially immobile) nuclear missiles or aircraft-delivered nuclear weapons that must be carried from a limited number of air fields. Thus an adversary first strike could, in theory, eliminate land-based and aircraft-delivered weapons, and the last surviving element of a potential second strike would be any nuclear weapons at sea. Given their comparative stealth, sea-based nuclear weapons may be easier to neutralize indirectly—through attacks on a relatively fixed number of command and control targets—rather than directly through antisubmarine warfare.

Over the last fifteen years, Pakistan has appeared to be more concerned with never permitting unwanted use than it was with always being able to use nuclear weapons when needed. It historically employed three physical safeguards to prevent the unauthorized use of nuclear weapons: it first stored its nuclear warheads in partially disassembled form—meaning certain components, such as the
triggers, were kept separate from the fissile material cores; second, it kept those warheads de-mated from the missiles, requiring technicians to attach the warhead on the missile prior to use; and third, it developed the functional equivalent of permissive action links (PALs), which require a code to be entered in order to arm the weapon for use.

This system of physical constraints was buttressed by procedural ones. Most notably, informed Pakistani commentators occasionally discussed the existence of a “two-man rule” or even a “three-man rule” in certain circumstances, where the concurrence of two or three separate individuals was required to prepare a weapon for use. While there was ambiguity about the roles of these individuals, there were reasons to suspect they might be representatives from distinct strategic organizations. Thus the will of the National Command Authority might be distributed through distinct communication channels to prevent unauthorized use. Referring to an analogous set of safeguards in the Indian context, policy analyst Ashley Tellis argued this distribution and separation of components serves as a “super PAL,” reinforcing confidence that weapons can never be used absent a national decision to do so.

It would be difficult to maintain these constraints if nuclear weapons were deployed aboard submarines. In the Pakistani context, this would mean nuclear-armed cruise missiles, like the Babur-3—a comparatively small delivery vehicle, with an equivalent small nuclear warhead, stored aboard a cramped submarine. In theory, if the cruise missiles were launched from torpedo tubes (rather than dedicated vertical launch tubes) one could keep warheads partially disassembled and de-mated. This might preserve some of the logic of the “three-man rule,” where at least one technically proficient individual would have to agree to a launch in addition to any individuals with access to the arming codes. While possible in theory, we are aware of no other nuclear weapons state to have implemented such a cumbersome step in their deployment of nuclear weapons at sea.

If anything, history suggests that states have sought fewer impediments rather than more for sea-based nuclear weapons. This tendency reflects the role that sea-based nuclear weapons play as the most survivable portion of a nuclear arsenal. In fact, nuclear weapons at sea are more survivable than the command-and-control networks that would be utilized to authorize their launch. Weapons that require a code from central authorities might be neutralized through a decapitation strike on political and military leadership. To avoid this outcome, the United Kingdom, for example, has never had permissive action links on its
submarine-launched weapons and instead relies on procedural controls akin to the “two-man rule” above to verify that a launch is authorized. Similarly, the United States did not have the equivalent of permissive action links on its submarine-launched weapons until after the end of the Cold War.

To date, Pakistani officials have been adamant that nuclear weapons will remain under centralized control, even in circumstances where the logic for pre-delegation is compelling. Whether they will persist with such an approach for their sea-based weapons may depend on the incentives they would likely encounter in crisis and war, but the experience of other nuclear states with sea-based weapons suggests there will be a powerful temptation to impose fewer constraints governing authorized use so as to reduce the potential incentives for enemy decapitation strikes against Pakistan.

Crisis Instability and Intrawar Deterrence

Crisis stability is commonly defined as a measure of the incentives for countries in a crisis not to attack first. The more that a preemptive strike is advantageous, the less stable is any crisis characterized by reciprocal fear of attack. Any such Pakistani fears might be ameliorated somewhat by India’s stated doctrine of no-first-use of nuclear weapons. But India’s declaratory doctrine is not as comforting as it once was, given vocal public questioning as to its wisdom by prominent Indian leaders such as former Strategic Forces Command head B. S. Nagal in 2014, or then-Defense Minister Manohar Parrikar in 2016. Additionally, retired National Security Advisor Shivshankar Menon’s 2016 memoirs argue that India’s no-first-use commitment might not apply if a nuclear adversary “had declared it would certainly use its weapons, and if India were certain that adversary’s launch was imminent.”

Sea-based weapons, if invulnerable, should discourage first strikes, since their residual capability would survive any first strike and could then be used against the attacker. In practice, however, there are three reasons sea-based weapons might be destabilizing.

First, all plausible Pakistani nuclear use scenarios emerge out of a conventional war. While the most recent, limited India–Pakistan conflict in 1999 (Kargil) did not involve hostilities at sea, earlier wars in 1965 and 1971 did. In an all-out war, the larger Indian Navy would, at a minimum, seek to contain Pakistani surface vessels and submarines to their ports or Pakistan’s littoral waters. The Babur-3,
with a stated range of 450 kilometers, cannot reach any major Indian city from the waters near Karachi, the closest possible home port. Any Pakistani submarine would have to leave Pakistani littoral waters in the face of substantial Indian anti-submarine warfare activities in order for its cruise missiles to reach even the closest Indian cities, such as Ahmedabad (550 kilometers from Karachi) or Mumbai (850 kilometers from Karachi).

It would be difficult if not impossible for an Indian Navy surface ship, submarine, or maritime reconnaissance aircraft to know if a detected Pakistani submarine has a strategic or conventional mission. The Indian Navy would almost certainly attempt to destroy any submarine they encounter. If Pakistan had low confidence in the survivability of its land-based weapons, any indications that its submarines were being targeted might generate use-or-lose pressures.

Pakistan’s sea-based weapons are not the only portion of the force vulnerable to conventional attack that might cause inadvertent escalation. Indian military interlocutors have been adamant that dual-use short-range systems, such as the 60-kilometer-range Pakistani Nasr missile, would be targeted if identified on the battlefield. Similarly, any gravity bombs or air-launched cruise missiles in Pakistan’s arsenal would rely on Pakistani aircrafts capable of carrying them. Any Indian Air Force air superiority campaign might degrade the air leg of the Pakistani triad.

Pakistan’s sea-based weapons, though, would generate more fears of inadvertent escalation than existing long-range, land-based mobile systems. These systems, such as the Shaheen family of missiles, would be far away from the battlefield and at little risk of accidental or inadvertent targeting by Indian airpower. Only a conscious decision by Indian leaders to attempt a conventional counterforce campaign to disarm Pakistan would lead to the destruction of land-based missiles, and even that would prove extremely challenging for India’s airpower given the long distances involved and Pakistan’s ability to conceal mobile missiles. In contrast, Indian civilian leaders and military officers might order aggressive anti-submarine warfare for purely conventional military reasons, and have the unintended effect of attacking Pakistan’s last line of nuclear deterrence.

The second reason why sea-based weapons might be destabilizing is because, in contrast to land-based mobile missiles, the peacetime berthing locations of Pakistan’s submarines will not be and cannot be secret. Pakistan’s adversaries will know where all submarines not on patrol are, and will have some ability to observe changes in their readiness with satellite imagery. In deep crisis, Pakistan would have strong incentives to “flush” all available submarines from port. India would have a short window in which conventional or nuclear counterforce attacks on the submarine force would be possible, creating incentives for New Delhi to strike first. While there are analogues with Pakistani aircraft and land-based missiles, there are considerably more potential airfields where nuclear weapons might be stored in peacetime and even more locations from where
Pakistani aircraft could operate. Mobile, land-based missiles meanwhile could be based from multiple locations, the exact number of which India could have little confidence in knowing, and they could be dispersed to essentially unlimited numbers of possible launch locations. Submarines in port, therefore, likely represent the most enticing strategic first strike target in Pakistan.

A portion of the force could certainly be kept on constant deterrent patrol, but this will no doubt raise the intensity of Indian antisubmarine activities in peacetime as Indian submarines, surface vessels, and maritime reconnaissance aircrafts attempt to track each Pakistani submarine leaving port for the duration of its patrol. Additionally, unlike the massive U.S. Navy Ohio-class submarines converted to carry up to 154 cruise missiles, each Pakistani submarine would likely hold only a handful of cruise missiles. While the United States can assure massive retaliation so long as even one of its missile submarines survives, Pakistan at best would only be able to reach a few targets along the Indian coastline with a few weapons. The danger to coastal cities such as Mumbai should not be dismissed lightly, but if Indian decision makers believe nuclear war is nearly inevitable, the temptation would be powerful to eliminate the bulk of Pakistan’s submarine force in port, even if one submarine on deterrent patrol remains.

Third and finally, even if India were to avoid striking submarines while in port, it would have strong incentives to destroy communications facilities that could transmit to the submarines while on patrol. Most importantly, this would include Pakistan’s new VLF facility near Karachi, which would have very distinct features due to the antenna. These incentives are amplified to the extent that India believes Pakistan will maintain centralized, assertive control of even seabased weapons. Rather than going through the difficult work of anti-submarine warfare, India could neutralize weapons aboard the submarine by blocking the ability of Pakistan to transmit the code necessary to arm the warheads. Fears of exactly such attacks led to the delegation of launch authority to submarine commanders in the United States and United Kingdom, and may eventually do so in Pakistan as well. Alternative solutions, such as retrofitting aircrafts to be able to transmit VLF messages, are also costly.

If they surface (or more accurately if they expose an antenna above the surface), submarines can pick up broadcast messages from a broader array of potential wavelengths. So, destroying VLF communications alone would not be a certain solution for India, but it would increase the vulnerability of submarines if they cannot stay submerged to receive launch orders. As with any conventional attacks on submarine berthing locations, Pakistan would have no choice but to assume that India was attempting to degrade its sea-based deterrent if India attacked VLF transmission facilities, just as India would be foolhardy not to do so early in a conflict even if its goals were solely to impair Pakistan’s conventional submarine threat.
Increased Dangers in Port from Non-State Actors

Pakistan has been engaged in a civil war since 2001, when Pakistan’s decision to permit U.S. basing in and transit through its territory to support the U.S. occupation of Afghanistan angered radical Islamist militants. Since then, Pakistan has lost more than 60,000 people to terrorist-related violence. While terrorists in Pakistan have largely preferred attacking soft targets to generate civilian casualties, over 6,700 security force personnel have been killed in either terrorist attacks or counterterrorist operations. While other nuclear weapons states have experienced insurgencies on their peripheries in recent decades—notably Russia and India—none have experienced this degree of state-directed violence in their territorial core.

It is unsurprising that some of this terrorist violence has targeted sensitive military installations that may be associated with Pakistan’s nuclear weapons program. Notably, facilities associated with Pakistan’s Atomic Energy Commission (PAEC) near Dera Ghazi Khan were attacked in 2003 and 2006, air force bases at Sargodha and Kamra were attacked multiple times between 2007 and 2012, a large facility associated with ordnance production at Wah was attacked in 2008, and a bus carrying workers for Khan Research Laboratories (the entity responsible for uranium enrichment in Pakistan) was attacked in 2009. Of these attacks, only one involved militants gaining access to protected areas: an attack on Minhas Air Base near Kamra in 2012. In the other instances, the attacks were against comparatively less sensitive targets, such as the attacks against PAEC facilities in Dera Ghazi Khan that are unlikely to contain fissile material, or were attacks on the perimeter of a sensitive installation that did not breach that perimeter.

While it is widely suspected that military installations at Sargodha, Kamra, and Wah might contain nuclear materials, it is not known with certainty if that is the case. This is in part because they represent only part of a large range of bases and facilities that could conceivably store weapons in peacetime or be associated with their production. This secrecy regarding the location of Pakistan’s nuclear weapons generates tremendous advantages in protecting Pakistan’s arsenal from adversary counterforce attack or non-state actor attempts to steal or sabotage that arsenal. As political scientist Jordan Seng observed, “Just as it is hard to hit what cannot be seen, it is hard to steal what cannot be found.”

Naval facilities for berthing submarines are not hard to find. They will regularly host submarines with nuclear weapons on board, submarines with nuclear weapons being loaded or unloaded, and offloaded nuclear-capable cruise missiles and their associated warheads. Depending on whether Pakistan seeks to deploy many nuclear weapons-carrying submarines in a crisis, or merely recycle nuclear weapons on only a few submarines, a Pakistani naval base could easily host
dozens of nuclear warheads—perhaps the largest single stockpile of warheads in Pakistan.

While gravity bombs or possibly air-launched cruise missiles, to be delivered by ground attack aircraft, might be based near one of at least six different air bases (Minhas, Peshawar, Masroor, Shahbaz, Rafiqi, and Mushaf), submarine-launched nuclear weapons must be stored at one of two places that routinely serve as home ports for submarines: the Pakistan Naval Dockyard in Karachi or the Jinnah Naval Base in Ormara. In fact, since the Pakistan Navy has announced it intends Ormara to serve as the primary home port for submarines, it is almost certain that nuclear weapons would be stored there. This presents challenges both from a survivability and a security standpoint.38

Pakistan today only has five submarines that could possibly carry cruise missiles (three Agosta 90B and two Agosta 70 submarines).39 It is reportedly set to acquire eight Type 041 Yuan-class submarines from China, but even if that acquisition occurs, at most Pakistan might have thirteen submarines that would dock in an extremely small number of berths at just one or two ports, which would be easily identifiable given commercially available satellite imagery.40

This is especially worrisome because Pakistan Navy facilities have been targets of terrorist attacks, and have demonstrated some vulnerability to such attacks. In May 2011, Tehreek-e-Taliban Pakistan (TTP) militants attacked Pakistan Naval Station Mehran, the headquarters of the Pakistan Navy’s Naval Air Arm. In September 2014, the Pakistan naval ship Zulfiquar, a Chinese-built variant of the People’s Liberation Army-Navy’s Type 054 frigate, came under attack while docked at the Karachi Naval Dockyard by al Qaeda-affiliated attackers with the assistance of Pakistani naval officers. Both cases suggest reasons for concern that the Pakistan Navy can adequately secure sea-based nuclear weapons.

**Naval Station Mehran Attack**

On May 22, 2011, the headquarters of the Pakistan Navy’s Naval Air Arm, Pakistan Naval Station Mehran, was attacked by at least four TTP militants. Located near Karachi, the provincial capital of Sindh province, Naval Station Mehran is also among the Pakistani military’s largest installations, and sits adjacent to the Pakistan Air Force Faisal air base. The militants, who were heavily armed, had come prepared specifically to target expensive Pakistani naval assets that were at the naval base. They breached the security perimeter in a location that would have permitted them to attack the adjacent air force base, but apparently
sought to target more expensive naval assets. The attackers managed to storm multiple aircraft hangers at Naval Station Mehran and successfully destroyed two Lockheed P-3C Orion anti-submarine and maritime surveillance aircrafts. After a tense standoff lasting nearly eighteen hours, the Pakistani military managed to regain control of the base. At least thirteen Pakistani security personnel were killed and fourteen more wounded in the attack. Early reports suggested two of the attackers managed to escape.

The Mehran attack in May 2011, however, should not have been surprising to Pakistani security officials. The Pakistan Navy had already experienced attacks in late April near Karachi. Three bomb attacks on buses carrying Pakistani navy officials in Karachi occurred during the week of April 25: two bomb attacks on April 26 had killed four people and injured as many as 56; fifteen people were also wounded in an April 28 attack. A Reuters report on the attack at the time noted that “the navy may have been targeted because it is seen as less well-defended than the army and the air force which are leading the fight against militants.” Moreover, the attackers displayed familiarity with the Mehran base that strongly suggested insider help. Pakistani press reports indicated that at least some navy officials were taken into custody in the aftermath of the attack on suspicion of having aided the attackers, though their subsequent fate is not evident in open sources. While the degree of insider help remains unclear, the overall security arrangements and response were poorly managed, resulting in the subsequent court martial of three Pakistan Navy officers for negligence.

Pakistani Navy Ship Zulfiquar Attack

A catastrophic event, such as the Mehran attack, can spur organizational learning and reform, making future such catastrophes less likely. If Mehran raised issues of perimeter security and personnel reliability, then a subsequent attack reinforced doubts about the Pakistan Navy’s ability to detect insider threats. On September 6, 2014, heavily armed militants attacked the Karachi Naval Dockyard in an attempt to seize and commandeer the PNS Zulfiquar, one of ten frigates in the Pakistan Navy. The militants were with al-Qaeda in the Indian Subcontinent (AQIS, or Qaidat al-Jihad fi Shibbi al-Qarrat al-Hindiya), an organization that had been formally announced as a branch of the transnational jihadi group by Ayman al-Zawahiri just days before the attack—on September 3, 2014. The attack on the frigate lasted for several hours before the Pakistan Navy ultimately repelled it.
In the days after the attack, an AQIS statement released by Usama Mahmoud, a spokesperson for the group, noted that the “Naval officers who were martyred on Saturday in the attack in Karachi were al-Qaeda members.” The statement added that they were “trying to attack American marines and their cronies,” and continued, “[The attackers] had taken over control of the ship and were proceeding to attack the American carrier when they were intercepted by the Pakistan military … These men thus became martyrs. The Pakistani military men who died defending enemies of the Muslim nation, on the other hand, are cursed with hell.”

In a probable first for the Pakistani government, the country’s defense minister, Khawaja Asif, acknowledged that Pakistani naval officers were complicit in the attack on the frigate. “Without assistance from inside, these people could not have breached security,” he observed in a statement delivered to the country’s parliament. A Wall Street Journal report at the time of the attack noted that Pakistani authorities had initially tried to suppress the fact that the attackers had attempted to seize the Zulfiquar. In May 2016, a Pakistan Navy tribunal sentenced five naval officers to death for their involvement in the attack, with the five convicted of mutiny, conspiracy, carrying weapons in the dockyard, and having links to terror groups. The Pakistan Navy investigation concurred with the al-Qaeda assertion that the attackers had tried to hijack the vessel to attack U.S. Navy refueling vessels.

Non-Pakistani Examples
The dangers of sea-based nuclear weapons are not unique to Pakistan, though they are exacerbated by the specifics of Pakistan’s nuclear force structure combined with perhaps the most dangerous internal security environment ever faced by a nuclear weapons state. The Mehran and Zulfiquar cases cause concern that Pakistani militants might target nuclear-armed vessels at the Pakistan Navy Dockyard in Karachi or the Jinnah Naval Base in Ormara. Other examples beyond Pakistan underscore the need for worry. They suggest non-state groups possess the intentions and capabilities to penetrate security around naval installations with nuclear weapons, while also showing the difficulty of even well-resourced, determined states to prevent them from being able to do so.

The British government, for instance, has suffered regular embarrassment and harassment from anti-nuclear weapons activists. In 1988, three activists breached the fence at HM Naval Base Clyde near Faslane. The trespassers intended for one activist to swim to one of the Royal Navy’s nuclear-armed Polaris submarines, while the other two activists acted as decoys to draw away security. Instead, their breach of the fence was unnoticed by sentries and failed to trigger alarms, which permitted the three activists to walk unmolested to where HMS Repulse was docked. They snuck aboard the submarine and made their way to its
control room, where one of them was reported to have joked, “We’re from the Peace Camp and we’re hijacking this submarine. Take us to Cuba.” Since all three were unarmed, they were finally detained by the surprised submarine crew. Prime Minister Margaret Thatcher was “utterly horrified” and, among other changes, altered the rules of engagement to emphasize the permissibility of lethal force if there was a danger of sabotage to nuclear warheads or nuclear-armed submarines. Six years later, Greenpeace activists using a tug boat and several inflatable boats emplaced cables and fishing nets across the channel in an attempt to prevent the nuclear-capable submarine HMS Vanguard from leaving Faslane for its first patrol. The effort was quickly neutralized by the Royal Navy and Ministry of Defence police boats, though it did delay the Vanguard for more than an hour.

While there is a whimsical element to the anti-nuclear activists’ actions, other groups have had less peaceful intentions. During their civil war with Russia, Chechen rebels developed a plan to send a team to seize a nuclear submarine in port near Vladivostock. The plan sought to detonate explosives attached to the submarine’s reactor and its nuclear-tipped missiles. The plan would seem far-fetched, were it not for the 1988 Clyde base episode that showed attackers could breach even sophisticated security arrangements with limited resources. Additionally, the presence of Islam Khasukhanov in leadership echelons of the Chechen rebels lent the plot greater weight, since he had served as a captain in the Russian Navy and was once second-in-command of a nuclear submarine.

There is ample evidence that terrorist groups have been willing to use ships and diving gear to undertake terrorist attacks, making the task of securing naval facilities considerably more challenging than merely securing the territorial perimeter. In the South Asian context, the Liberation Tigers of Tamil Eelam used divers on multiple occasions in the 1990s to launch attacks and appear to have been successful in sinking Sri Lankan Navy boats in at least one instance. The U.S. Navy appears to take the underwater diver threat to U.S. nuclear submarines seriously, investing in an elaborate program to use marine mammals to identify and neutralize any divers found operating in naval ports, complementing traditional patrol boats. From Pakistan, Lashkar-e-Taiba terrorists—almost certainly aided and abetted by Pakistani intelligence services—trained in basic maritime skills and subsequently hijacked an Indian fishing vessel in order to navigate into Mumbai harbor undetected to attack that city in November 2008. Outside of South Asia, there have been several deadly suicide attacks by boats laden with explosives: on the USS Cole in Yemen in 2000, on the Limburg oil tanker in Yemen in 2002, and on the Khawr Al Amaya and Al Basrah oil terminals in Iraq in 2004. In 2014, the Palestinian terror group Hamas apparently used divers to reach Zikim Beach north of the Gaza Strip, where they quickly encountered Israeli Defense Forces.
All of these examples suggest that it is possible for non-state actors to breach the security that nuclear weapons states erect to protect submarines and naval installations with nuclear weapons. The fact that there is nothing inherently easier about protecting naval installations compared to their air force and army counterparts, combined with the fact that in the Pakistani context there would be far fewer potential naval sites with nuclear weapons, means that acquisition of submarine-launched nuclear weapons may increase the danger of theft or sabotage of those devices. This danger is amplified even further if Pakistan follows the pattern of past nuclear-weapons states in maintaining their nuclear weapons at higher states of readiness in peacetime than other nuclear forces in order to ensure survivability. Any attacker able to gain access to a naval nuclear weapon might encounter a device with few built-in technical barriers to prevent detonation.

**Conclusion**

The first flight test of the Babur-3 cruise missile in January 2017 imbues Pakistan’s plans to develop a naval nuclear force with a previously unseen degree of seriousness. While concerns about nuclear stability between India and Pakistan have gravitated understandably to the latter’s pursuit of battlefield nuclear weapons, ultimately Pakistan’s pursuit of a sea-based nuclear force also introduces considerable new nuclear risks in South Asia. We have shown that the introduction of sea-based weapons intensifies incentives for Pakistan to pre-delegate nuclear use authority and maintain higher weapons readiness in peacetime, factors increasing the odds of unauthorized use. Similarly, a Pakistani sea-based nuclear deterrent increases India’s incentives for a preemptive counterforce strike in a time of crisis—a prospect that merits serious consideration given evidence that Indian planners may perceive preemptive counterforce strikes as permissible against its nuclear neighbor despite India’s no-first-use doctrine. We have further underlined that militants have targeted Pakistan Navy facilities in recent years and that Pakistani naval staff have been compromised; these factors increase the odds that Pakistan’s sea-based arsenal could be prone to theft by dangerous non-state actors. Finally, we have documented cases of better-resourced nuclear weapons states failing to secure their sea-based nuclear assets from non-state groups.

Our analysis leaves one overwhelming policy implication: Pakistan, like other nuclear states with a sea-based deterrent, can either choose to have submarine-launched weapons that are totally secure or readily usable in a real crisis. It is likely
to choose the latter of these options, leaving it no choice but to make compromises on nuclear weapons security that leave open an unacceptably large possibility of unauthorized weapons’ use or theft. As a result, Pakistan’s security is better served by adhering to its post-1998 nuclear force structure, which relies primarily on land-based mobile systems that are moderately survivable, less costly, and less susceptible to the security drawbacks presented by an additional sea-based leg to the country’s nuclear force. In the end, neither Pakistan itself nor the country’s nuclear weapons are safer with a move to sea.

Notes

2. Ibid.


control devices (CCDs) were installed, but they achieved the functional equivalent of a permissive action link by requiring the submarine commander to have an externally-provided code prior to enabling a missile launch.


34. The Ohio-class cruise missile submarines are not directly comparable to a future Pakistani nuclear-carrying submarine, since U.S. nuclear weapons are carried aboard ballistic missile submarines (SSBNs). The math is comparable, however. U.S. SSBNs have 20 to 24 SLBM launchers, with each SLBM capable of carrying up to 8 warheads. While they can carry nearly 200 warheads, in practice U.S. SSBNs have an average load-out of about 100 warheads (4 to 5 warheads per missile). Hans M. Kristensen and Robert S. Norris, “United States Nuclear Forces, 2017,” Bulletin of the Atomic Scientists 73, no. 1 (2017): 52.


36. Clary, “The Safety and Security of the Pakistani Nuclear Arsenal;” Clary, Thinking about Pakistan’s Nuclear Security in Peacetime, Crisis, and War; also see Shaun Gregory, “The Terrorist Threat to Pakistan’s Nuclear Weapons,” Counter Terrorism Center Sentinel 2, no. 7 (July 2009).


40. Farhan Bokhari, “Pakistan to Build Half of Type 041 Submarine Fleet in Country,” Jane’s Defence Weekly, October 7, 2015; Angela Meng and Minnie Chan, “Beijing Eyes Bigger


53. “We’re Hijacking this Submarine. Take Us to Cuba,” Nuclear Information Service, December 29, 2016, http://www.nuclearinfo.org/blog/nuclear-information-service/2016/12/%E2%80%9Cwere-hijacking-submarine-take-us-cuba%E2%80%9D.


