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Threat Assessment Brief

Analysis on Effective Policy Responses to Weapons-Related Security Threats

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The Complex and Increasingly Dangerous Nuclear Weapons Geometry of Asia

Asia is home to four of the world's nine nuclear-armed states, each of which is increasing the size and technological sophistication of its own nuclear arsenal. While much of the world's attention is focused on efforts to halt the nuclear and missile tests of North Korea,[1] the nuclear arsenals and ambitions of India, Pakistan, and China also pose significant dangers and deserve more attention.

Pakistan is believed to be increasing its stockpile of fissile material at the fastest rate of any nuclear-weapon state. The threat of a nuclear war originating from an interstate conflict between India and Pakistan, or from acquisition by terrorists of fissile material or nuclear weapons stored in these countries, remains dangerously high. The nuclear dynamics between India and Pakistan would be difficult to manage, even if the countries were part of a closed-loop system, but they are not. While Pakistan's nuclear arsenal is designed to counter India's conventional and nuclear forces, New Delhi measures its own nuclear weapons program against that of China. Beijing, in turn, judges the adequacy of its nuclear arsenal against the threat it perceives from the United States' strategic offensive and defensive capabilities. And in its efforts to mitigate the ballistic missile threat from North Korea, the United States and its allies in the region are expanding their strategic and theater missile defense capabilities.

The complicated nuclear weapons geometry of Asia thus extends from the subcontinent to the other side of the world. In order to fully understand how the pace and direction of nuclear proliferation can be influenced, the interconnections of these countries must be considered, along with the kinds of nuclear weapons they have at their disposal.

HIGHLIGHTS

- A cross-border conflict between nuclear-armed India and Pakistan poses a serious threat of nuclear war.
- The presence of terrorist organizations in Pakistan raises significant concerns about the prospect of unauthorized access to Pakistan's nuclear arsenal.
- China plays a critical role in fueling South Asia's nuclear arms race:
  - as the outside country most responsible for Pakistan acquiring nuclear and missile technology; and
  - as the country against which India measures its own nuclear weapons profile.
- The United States has a significant impact on the South Asian nuclear threat as well, both direct and indirect:
  - as the foreign country that most influences the size and shape of China's nuclear arsenal; and
  - as a major player in efforts to halt global fissile material production and in managing the terms of global nuclear cooperation with India.

HIGHLIGHTS (cont.)

- Creating and sustaining a robust nuclear security and stability dialogue between India and Pakistan is key to mitigating South Asian nuclear threats and should be a top priority of U.S. diplomacy.
- U.S. security policies toward Asia should include the following elements:
  - Acknowledging that no state can be made invulnerable to nuclear weapons;
  - Avoiding U.S. missile defense deployments that provoke increases in strategic offenses;
  - Advocating a moratorium on further numerical increases in nuclear forces and a halt to fissile material production for weapons;
  - Discouraging the development and deployment of tactical nuclear weapons and nuclear weapons on naval ships; and
  - Leveraging Indian and Pakistani interest in expanding peaceful nuclear cooperation to achieve international arms control objectives—such as increasing accessions to the Comprehensive Test Ban Treaty.

Background

With over 1.3 billion inhabitants each, China and India together contain more than a third of the world's total population. In recent years, they have both experienced high rates of economic growth and rank near the top in the size and expenditures of their military establishments. In the early years following World War II, both of these Asian giants maintained unambiguous denunciations of nuclear weapons use and possession. It was only after receiving nuclear threats from the United States during the Korean War and the Taiwan Strait Crisis of 1954-55 that China decided to pursue its own bomb—a decision reinforced by China's sometimes violent border disputes with the nuclear-armed Soviet Union in the 1960s.

In spite of Moscow severing all nuclear technological cooperation with its erstwhile ally in 1959, China was able to conduct its first nuclear test explosion in 1964, leading to its recognition as one of five nuclear weapons states under the nuclear Non-Proliferation Treaty (NPT), which was concluded in 1968.

The Sino-Indian relationship has gone through several phases during the last seven decades. The two countries ultimately came to blows over a border dispute in 1962—a dispute, which continues today. India's humiliating loss of territory in that conflict, along with China's 1964 nuclear test, goaded New Delhi into its own pursuit of nuclear weapons, culminating in India's "Smiling Buddha" nuclear weapon test in 1974—disingenuously labeled a "peaceful nuclear explosion."

The bilateral relationship between India and Pakistan, meanwhile, has been built on the fractured terrain of British India—split between its Muslim and mostly Hindu constituencies in May of 1947. The states' painful birth left grievances on both sides, sewing hostility and revanchism, which spilled over into four wars (1947, 1965, 1971, 1999), numerous skirmishes, and the formation of Bangladesh. In spite of India's widening demographic and military advantages over Pakistan, it was New Delhi that first decided to conduct an underground nuclear test—becoming the first state to do so outside the five original NPT nuclear-weapon states. And it was again India that triggered the 1998 round of nuclear testing by detonating at least three devices[2] in mid-May.

Already disadvantaged in the South Asian military balance, Pakistan's relative position suffered further from its bifurcation in 1971 when Bangladesh was created out of East Pakistan. By 1984, Pakistani scientists claimed to have achieved a nuclear weapons capability and there is good reason to believe that China tested a Pakistani-designed derivative of an earlier Chinese device (CHIC-4) at its Lop Nor Nuclear Test Site in May of 1990.[3]

However, Pakistan's capability was not demonstrated to the world until the end of May 1998, shortly after India tested for a second time, when Pakistan conducted multiple (probably two[4]) detonations over a two-day period. India's nuclear detonation thus spurred a Pakistan already incentivized to develop its own nuclear weapons. The tests of both countries that year played a critical role in launching the nuclear arms buildup on the subcontinent that continues to this day.

China

China currently holds some 230 nuclear warheads in its operational inventory.[5] (See Table 1.) Beijing appears to size and structure its nuclear forces according to an evaluation of what is needed to pose unacceptable losses to the United States in response to an American attack. There is little evidence that China is very concerned with Indian nuclear forces—or with the massive nuclear arsenal of Russia, which from a technical standpoint, potentially poses a

Greg Baker/AFP/Getty Images

China's DF-31A ICBMs, shown here in a Beijing parade on September 3, 2015, have doubled the number of Chinese warheads that can target the U.S. mainland and have significantly reduced China's vulnerability to a counter-force attack.

much larger threat.

China's minimum nuclear force structure and no-first-use doctrine have remained remarkably stable over time. For more than two decades, the Chinese only maintained the capability to target some twenty nuclear warheads on the United States, approximately one percent of the U.S. nuclear warheads that could be targeted on China. Even China's research and development work on sophisticated weapons – such as enhanced radiation, anti-satellite, and prompt global strike systems – seems to have been driven more by a desire to avoid technological surprises from a potential enemy rather than by an intention to deploy asymmetrical weapons to assure that enemy's defeat in the event of war.[6]

Only in recent years has China begun to move toward acquiring the kind of full spectrum deterrent long deployed by Russia and the United States. (See Table 4.) Only in the last decade did it deploy road-mobile missiles that could target the U.S. mainland. Only last year did it start deploying multiple, independently-targetable (MIRVed) warheads on its DF-5 (CSS-4) intercontinental ballistic missiles (ICBMs); only this year is China projected to initiate sea-going patrols of its nuclear ballistic missile submarines (SSBNs).[7] Yet, while each of these steps may be considered slow motion reactions to threats from U.S. military developments, such as missile defense deployments and ongoing improvements in the accuracy, speed, and reach of conventional attack systems, each is likely to have a cascading impact on the strategic decisions of India and Pakistan.

Chinese leadership beliefs about the role of nuclear weapons are unique among nuclear-weapon states and have appeared stable over time.[8] Since conducting its first nuclear test in 1964, China has professed adherence to a categorical no-first-use pledge in which it promises to use nuclear weapons only in response to suffering a nuclear attack. China has repeatedly said that it will not use or threaten to use nuclear weapons against non-nuclear-weapon states and that it will not engage in an arms race. According to Chinese statements, the purpose of the country's nuclear arsenal is to avoid "nuclear blackmail" and respond to nuclear strikes. China has not viewed nuclear weapons as tools for war-fighting; it has professed the principle of "limited development" of nuclear weapons and states that the country aims for a "lean and effective" force.[9]

Given its relatively limited view of the utility and role of nuclear weapons, China has prioritized political control over operational flexibility, leading to a strict and

Table 1: Chinese Nuclear Forces, 2016

TYPE	NUMBER OF LAUNCHERS	RANGE (KILOMETERS)	WARHEADS PER LAUNCHER (OR BOMBS PER AIRCRAFT)	NUMBER OF WARHEADS
LAND-BASED BALLISTIC MISSILES				
DF-4	~10	5,500+	1	~10
DF-5A	~10	13,000+	1	~10
DF-5B	~10	~12,000	3	~30
DF-15	?	600	1	?
DF-21	~80	2,150	1	~80
DF-26	?	4,000+	1	?
DF-31	~8	7,000+	1	~8
DF-31A	~25	11,000+	1	~25
DF-41	N/A	?	N/A	N/A
SUBTOTAL	**~143**			**~163**
SUBMARINE-LAUNCHED BALLISTIC MISSILES				
JL-2	(48)	7,000+	1	(48)
AIRCRAFT				
H-6	~20	3,100+	1	~20
CRUISE MISSILES				
DH-10	~250	1,500?	1	?
DH-20?	?	?	1	?
TOTAL				**~183 (260*)**

Source: Hans M. Kristensen and Robert R. Norris, "FAS Nuclear Notebook: Chinese Nuclear Forces, 2016," Bulletin of the Atomic Scientists.

*The total stockpile includes warheads for the DF-26, those waiting dismantlement, and a small inventory of spares.

highly centralized command-and-control system and a relatively restrained deployment posture. China's nuclear warheads have long been believed to be unmated to their delivery systems and stored in separate locations. A nuclear strike can only be ordered by China's Central Military Commission. China did not develop an early warning system and, according to some experts, the country's nuclear war plans anticipate that, after enduring an adversary's nuclear strike, China's leaders might wait days or even a week before launching a retaliatory strike.[10]

Some Chinese officials are now calling for the development of an early-warning system and for China to place its nuclear weapons on a higher state of alert.[11] Although there is not yet evidence that China's political leadership has altered any of its core beliefs about nuclear weapons, nor that the newly-created PLA Rocket Force command implies a change in nuclear doctrine, the modernization and expansion of Chinese nuclear weapons may be harbingers of such changes down the road.

China is undertaking a modernization and expansion of its nuclear arsenal. Over the last decade China has added more than 50 nuclear warheads to its ICBM forces capable of hitting the U.S. mainland; within another decade, the number could well exceed 100.[12]

China's current stockpile of fissile material is sufficient to sustain this expansion. However, a sprint to strategic parity with the United States and Russia, as some have predicted, would require additional investments in new fissile production facilities. China is believed to have stopped producing highly enriched uranium (HEU) by the end of the 1980s and plutonium, which it reportedly uses in the primaries of its nuclear weapons, at the beginning of the 1990s. It retains a stockpile of military plutonium at an estimated 1.8 metric tons,[13] which would permit it to build no more than 250-450 additional nuclear warheads. Resorting to warheads drawing only on HEU from its stockpiles of some 18 metric tons, would allow China to create some 600 warheads, but it would probably need to resume nuclear testing to validate the reliability of any new warhead designs.

In spite of augmenting the quantity of its nuclear weapons, China's modernization efforts have focused more on qualitative changes.

In spite of augmenting the quantity of its nuclear weapons, China's modernization efforts have focused more on qualitative changes. Just over ten years ago, most of China's nuclear-armed missiles and all of its ICBMs were liquid-fueled, silo-based, and each capable of carrying only one very heavy warhead. Today, China's missiles are increasingly solid-fueled, road-mobile, and capable of carrying multiple warheads.

China already possesses four SSBNs, with a fifth hull currently under construction, although they are not yet conducting nuclear deterrence patrols. Together, these submarines will provide China with the capability to have at least one vessel conducting patrols at all times. However, these Type 094 *Jin*-class, second-generation submarines are much noisier than the submarines in Western and Russian fleets and cannot be considered secure. Moreover, basic aspects of the 094's design seriously limit China's potential for significantly reducing these vessels' acoustic signatures.[14] Consequently, unless they are armed with a much longer-range follow-on to the 7,000 km-range JL-2 SLBM and operate out of bastions close to China's coasts, their vulnerability in open oceans to U.S. and allied submarines are likely to prevent them from providing a reliable retaliatory capability against the U.S. mainland.

Chinese statements have been most vocal about the perceived threat of U.S. ballistic missile defense (BMD) deployments. At an April 2016 joint press conference with his Russian counterpart, Chinese Foreign Minister Wang Yi criticized the possible deployment to South Korea of the U.S. Terminal High Altitude Area Defense (THAAD) ballistic missile defense system, stating that it would: "directly affect [the] strategic security of Russia and China…add[ing] fuel to the fire of an already tense situation and even possibly wreck the regional strategic balance."[15] A decision to deploy THAAD was announced in Seoul on July 8.

Chinese fears do not appear generated by U.S. regional BMD capabilities in isolation, but rather on the perceived combined threat posed by integrated missile defense networks and by offensive systems that could potentially make strategic BMD feasible following a disarming first strike. Advanced U.S. intelligence-surveillance-reconnaissance (ISR) capabilities could aid in identifying and tracking China's nuclear missiles. Conventional precision strike capabilities would lower the operational and political costs of a U.S. attack. In such a scenario, strategic missile defenses would allow the United States to intercept the few Chinese ICBMs surviving. Chinese officials have argued that the bolstering of U.S. BMD capabilities is a "driver for a range of its modernization efforts."[16]

Regardless of the drivers, this modernization presents potential risks to strategic stability as well as to proliferation. China's deployment of additional solid-fuel, road-mobile missiles and the development of an SSBN force increases doubts that China would be able to maintain its longstanding policy of keeping missiles unmated with their warheads. The small, relatively noisy, and vulnerable SSBN force presents unique command-and-control challenges for a country that has prioritized strict supervision of its nuclear weapons. Onerous authorization requirements for nuclear use by submarine commanders could jeopardize the availability of these assets in certain wartime scenarios when continuous communication is difficult. A larger, more sophisticated Chinese nuclear arsenal, at a higher alert level, could also spur both horizontal and vertical proliferation by potentially prompting Japan or Korea to consider their own nuclear programs or motivating India to further expand its growing nuclear arsenal.

India

India currently holds some 120 nuclear warheads in its operational inventory. (See Table 2.) Even though India has now flight-tested ballistic missiles that can reach over the Himalayas to target China's largest cities, it remains a regional nuclear weapons power. Although India has long aspired to build a nuclear triad, its nuclear forces today still essentially constitute a dyad based on attack aircraft carrying gravity bombs and short- and medium-range ballistic missiles, mostly based on land. During the next decade, it is likely that India will be able to deploy significant numbers of longer-range, land-based ballistic missiles, the *Agni*-4 (3,500+ km range) and *Agni*-5 (5,200+ km range), which will be able to cover targets throughout China.

India's nuclear-capable, surface-ship-launched tactical ballistic missile, the *Dhanush*, and the K-15 *Sagarika* submarine-launched ballistic missile have been validated in flight tests, but are not yet fully operational. Moreover, their relatively short ranges (350 km and 700 km, respectively) practically limit them to contingencies relevant only to Pakistan. Although India has already flight-tested the longer-range (3,500 km) K-4 submarine-launched ballistic missile (SLBM), the missile does not appear compatible with India's first nuclear-powered ballistic missile submarine, the *Arihant*, which has just

Table 2: Indian Nuclear Forces, 2015

TYPE	NUMBER OF LAUNCHERS	RANGE (KILOMETERS)	WARHEADS PER LAUNCHER (OR BOMBS PER AIRCRAFT)	NUMBER OF WARHEADS
AIRCRAFT				
Mirage 2000H	~32	1,850	1	~32
Jaguar IS/IB	~16	1,600	1	~16
SUBTOTAL	**~48**			**~48**
LAND-BASED BALLISTIC MISSILES				
Prithvi-2	~24	250	1	~24
Agni-1	~20	700+	1	~20
Agni-2	~8	2,000+	1	~8
Agni-3	~4	3,200+	1	~4
Agni-4	N/A	3,500+	1	N/A
Agni-5	N/A	5,200+	1	N/A
SUBTOTAL	**~56**			**~56**
SEA-BASED BALLISTIC MISSILES				
Dhanush	2	350	1	2
Sagarika	(12)	700	1	(12)
K-4	N/A	~3,000	1	N/A
SUBTOTAL	**2 (14)***			**2 (14)***
TOTAL				**~106 (118)***

*The number in parenthesis includes 12 warheads possibly produced for the first SSBN for a total stockpile of roughly 118 warheads.

Source: Hans M. Kristensen and Robert R. Norris, "FAS Nuclear Notebook: Indian Nuclear Forces, 2015," Bulletin of the Atomic Scientists.

SSGT Mathew Hannen/USAF

The Indian Air Force *Shamsher* (SEPECAT Jaguar), pictured during a 2004 exercise in Alaska, is one of two types of attack aircraft used by India for delivering nuclear bombs.

finished sea trials. Only the fourth SSBN to be built in the current series will definitely be able to accommodate the K-4's dimensions and that submarine is at least a decade away from being constructed.[17]

India's stockpile of fissile materials is estimated to include 5.7 tons of weapon-grade plutonium for non-civilian purposes and 3.2 tons of HEU – although part of India's HEU is reserved for naval propulsion. India continues to produce fissile materials for weapons, operating a plutonium production reactor (Dhruva) and a uranium enrichment facility (Bhabha Atomic Research Reactor) that are not subject to International Atomic Energy Agency safeguards.[18] India is also suspected of significantly expanding its uranium enrichment capability through transformation of a rare material plant (near Mysore) and construction of large new facilities (in Challakere).[19]

Due to technical realities and doctrinal inclinations, India's nuclear forces will remain an inherently second-strike system against China and Pakistan for the foreseeable future – even if it is perceived otherwise in Islamabad. Moreover, tight control over India's operational nuclear force by civilians and the oversized role of the Defence Research and Development Organization (DRDO) over new nuclear weapons development imply that military necessity is unlikely to be the principal driver of nuclear weapons policy. Instead, modernization unplugged from policy purpose, bureaucratic maneuvering, and foreign policy objectives will continue to play an outsized role.

More than is the case with India's two potential nuclear antagonists, New Delhi wields its nuclear weapons to enhance its prestige and to gain leverage for winning "a seat at the high table" among the NPT nuclear-weapon states.[20] India used its special status very effectively to secure Washington's support for the Indo-U.S. nuclear deal of 2005, enacted into law in 2008, and to seek a Nuclear Suppliers Group waiver for India to commence civilian nuclear trade. Critics of the deal noted that India had acquired the benefits accorded to NPT signatories without joining the treaty and without making concessions on important arms control objectives such as Comprehensive Test Ban Treaty (CTBT) ratification.

Equating nuclear weapons prowess with prestige also means that India will be tempted to pursue technological advances in its capabilities whether or not they are required to assure the viability of its nuclear deterrent. As Rajesh Basrur and Jaganath Sankaran conclude in a recent analytical compilation published by Stimson Center,[21] however lacking in urgency or impetus derived from deterrence strategy, India is likely to proceed in a quest for MIRVs, regarding China's pursuit of BMD and MIRVs as sufficient incentive. DRDO has hinted that MIRVing is already underway and that variants of the *Agni*-5 can carry up to three warheads.

As India's "strategic enclave" of politicians and scientists,

spurred by visions of grandeur, drive toward technological parity with China, they may destabilize nuclear relations with Pakistan.[22] A larger, MIRV-ed Indian nuclear force, buffered by a future ballistic missile defense system, may increase Pakistani fears of a disarming first strike by India. In a manner echoing the ongoing action-reaction dynamics of the U.S.-China nuclear relationship, this could motivate Islamabad to accelerate its nuclear buildup, threatening stability on the subcontinent and ultimately undermining Indian security.

Pakistan

Pakistan currently holds some 130 nuclear warheads/bombs in its operational inventory. (See Table 3.) Their mission is relatively straightforward. Whatever the role of national pride in motivating their initial development, Islamabad wields them today primarily to compensate for the growing conventional military superiority of India. As India increases its conventional military edge and economic power, Pakistan will rely more and more on its nuclear forces to counter conventional threats from India.

ISPR

Pakistan declared successful this October 2011 test of the *Babur* (Hatf-7) ground-launched cruise missile, and claimed a 700 km range, twice the estimate of the U.S. intelligence community. Each *Babur* launcher carries three missile tubes, but the missiles may be armed with either nuclear or convention warheads.

Although its population and economy are significantly smaller than those of China and India, Pakistan is the Asian state expanding its fissile material production most rapidly. As of the end of 2014, Pakistan was estimated to have accumulated a stockpile of about 0.19 tons of plutonium and 3.1 tons of HEU. With four reactors (Khushab-I, -II, -III, and -IV) now believed to be operational,[23] Pakistan is adding 0.04 tons of weapons grade plutonium to its inventory annually. Pakistan has at least one centrifuge plant (Kahuta) for uranium enrichment and may have a second (Gadwal), but there is uncertainty about their operational history and current status.[24]

Like India, Pakistan currently uses aircraft and land-based short- and medium-range ballistic missiles as delivery vehicles for its nuclear weapons. Pakistan has six types of operational nuclear-capable ballistic missiles and at least two more under development. It has also deployed nuclear-capable, air-launched cruise missiles, is testing ground-launched cruise missiles, and apparently plans to develop and deploy sea-launched cruise missiles (SLCMs) as well. With India as its only potential nuclear opponent it does not need and is not pursuing either intermediate-range ballistic missiles (IRBMs) or ICBMs.

Pakistan's introduction of the *Nasr* (Hatf-9) ballistic missile is probably the most destabilizing technological development in the nuclear arsenals of the subcontinent. With a range of only 60 km, the *Nasr* is designed for tactical use, possibly on Pakistani territory in the event of an Indian conventional attack. Military planners in Pakistan are convinced of its utility by the advocacy of some Indian planners for a "Cold Start" doctrine that would permit Indian forces to seize territory in response to a provocation before Pakistan had a chance to fully mobilize. It is not clear that such an Indian doctrine has been operationalized, but the relatively small size of the Pakistsani missile and warhead, the necessity of authorizing its early use, and need for forward deployment are all worrisome aspects of tactical weapons.

It is infeasible for Pakistan to mimic India in developing and deploying SSBNs armed with SLBMs. Neither can Pakistan rapidly enhance its ISR capabilities, or aspire to ballistic missile defenses. But active Indian pursuit of BMD and MIRVs is likely to elicit a Pakistani response, however onerous the burden on Pakistan's economy.

Islamabad's objective will be to deprive New Delhi of any reasonable expectation that India could avoid a devastating nuclear response in the event of war with Pakistan. In pursuit of this objective, Pakistan would be likely to seek a combination of indigenous development and acquisition

Table 3: Pakistani Nuclear Forces, 2015

TYPE	NUMBER OF LAUNCHERS	RANGE (KILOMETERS)	WARHEADS PER LAUNCHER (OR BOMBS PER AIRCRAFT)	NUMBER OF WARHEADS
AIRCRAFT				
F-16A/B	~24	1,600	1	~32
Mirage III/V	~12	2,100	1	~16
SUBTOTAL	**~36**			**~48**
LAND-BASED BALLISTIC MISSILES				
Abdali (Hatf-2)	few	180	1	few
Ghaznavi (Hatf-3)	~16	290	1	~16
Shaheen-1 (Hatf-4)	~16	750	1	~16
Shaheen-1A (Hatf-4)	—	900	1	N/A
Shaheen-2 (Hatf-6)	~8	1,500	1	~8
Shaheen-3 (Hatf-?)	—	2,750	1	N/A
Ghauri (Hatf-5)	~40	1,250	1	~40
Nasr (Hatf-9)	~6	60	4	~6
SUBTOTAL	**~86**			**~86**
CRUISE MISSILES				
Babur (Hatf-7)	~8	350	3	~8
Ra'ad (Hatf-8)	—	350	1	N/A
SUBTOTAL	**~8**			**~130**
TOTAL				**~130**

Source: Hans M. Kristensen and Robert R. Norris, "FAS Nuclear Notebook: Pakistani Nuclear Forces, 2015," Bulletin of the Atomic Scientists.

of foreign technology. It would almost certainly increase its nuclear-armed cruise missile forces[25] and enhance the penetration capabilities of its ballistic missiles (most likely the *Shaheen*-2 and *Shaheen*-3).[26] The latter task could be accomplished by deploying penetration aids such as decoys and chaff, and by deploying multiple warheads per missile, aimed at the same target. Toward these ends, Pakistan would likely solicit technological help from China, its only reliable ally.

Alone among Asian nuclear-weapon states, Pakistan faces serious challenges to the security of its nuclear weapons stockpiles. Terrorist groups like Lashkar-e-Taiba, the Pakistani Taliban, and the al-Qaeda affiliate Jaish-e-Mohammed, operate out of Pakistan and are supported by some elements of the Pakistani government, like the Inter-Services Intelligence directorate (ISI). While most activities of these groups are focused on targets in disputed Kashmir, India proper, or Afghanistan, some groups also oppose the Pakistani government and are implicated in brazen attacks against centers of Pakistani military activity. Past sponsorship (or tolerance) by Islamabad of terrorist groups based in Pakistan have led some experts to label Pakistan as the world's most active state sponsor of terrorism.[27]

Pakistan's Strategic Plans Division (SPD) acts as the

secretariat of the National Command Authority and is responsible for the management and administration of the country's nuclear weapons stockpile. By most accounts, the SPD is very professional with regard to its maintenance of rigorous security procedures for handling and stockpiling nuclear weapons, including the vetting of personnel. SPD officers have also apparently been avid students of U.S. nuclear weapons security practices and claim measures similar to U.S. permissive action links (PALs) to avoid unauthorized access to nuclear systems. Moreover, Pakistan is believed to store its nuclear warheads separately from their delivery vehicles.[28]

Yet Pakistan's development of smaller, nuclear armed missiles, such as the *Nasr*, internal tensions between civil and military authorities, and the continuing operation of terrorist groups inside the country raise justified concerns about the theft of fissile materials, nuclear warheads, or even nuclear-armed delivery vehicles. In recent years, militants have launched attacks on or near four of the 15 facilities believed to be associated with Pakistan's nuclear program.[29] Moreover, transport of nuclear material and even mated nuclear weapons is reported to occur via civilian-style vans, without noticeable defenses, in the regular flow of traffic rather than in armored, well-defended convoys.[30]

From Belligerence to Common Cause

The three nuclear arsenals analyzed above are sized differently and employed under different doctrines. They exist in different states of maturity and in different political contexts. The three countries harbor seemingly irreconcilable differences—over possession of the state of Kashmir, control over the islands in the South China Sea, or over the drawing of the Sino-Indian border in the Himalayas—contributing to the perception that nuclear weapons are necessary to protect the vital interests of the weaker state in each bilateral relationship. India and Pakistan have never acquiesced to what they consider assignment to second-class status when the NPT designated China as a "legitimate" nuclear-weapon state.

In spite of their differences, these three countries have more in common with each other's approach to arms control than with those of Russia or the United States. China, India, and Pakistan form a tacit alliance within the community of nations—continuing to build their arsenals up and resisting any involvement in negotiated reductions as the first four nuclear-weapon states reduce their larger arsenals.

Even pending resolution of the core issues which divide them, China, India, and Pakistan must also recognize their mutual interest in avoiding nuclear weapons use. According to a National Resources Defense Council study in 2001, a "limited" nuclear exchange involving detonation of only ten Hiroshima-size nuclear weapons over ten major cities in India and Pakistan would kill or severely injure well over four million people.[31] According to an updated study by the International Physicians for the Prevention of Nuclear War in 2013, an exchange of 100 weapons (less than half of the existing Indian and Pakistani arsenals) would not only kill 20 million people within one week, but also ultimately put some two billion people at risk worldwide due to starvation brought on by the climatic effects of nuclear use.[32]

Given the nature of nuclear weapons, no state that possesses them can afford to ignore the stability imperatives of the nuclear age. Nuclear arsenals need to be sized and structured so that they are neither vulnerable to a disarming first-strike nor capable of initiating one. Those responsible for these arsenals must recognize the acute danger of military clashes between nuclear-armed states and to resist the illusion that introducing nuclear weapons into a conventional conflict can somehow control the escalation to greater use of nuclear weapons. A series of policy prescriptions flow from this understanding.

Mitigating Threats to Stability

India and Pakistan must regularize and intensify their high-level contacts to negotiate a resolution of political and security issues.

High-level contacts between New Delhi and Islamabad have been intermittent and inadequate to avoid and manage crises. The bilateral relationship requires sustained efforts to resolve differences, supplemented by measures to build confidence and improve channels of communication and cooperation.

Nuclear stability in Asia would be enhanced if the nuclear-weapon states admit their vulnerability to their nuclear-armed adversaries.

The United States should lead the way, acknowledging its vulnerability to Chinese nuclear weapons as it does with regard to Russian nuclear weapons. As recently confirmed by Brad Roberts, former deputy assistant secretary of defense for nuclear and missile defense policy, the United States has never officially accepted the principle of mutual vulnerability with regard to China, nor made up its mind about the applicability to China of U.S. strategic missile defenses.[33]

U.S. admissions of vulnerability to Chinese nuclear weapons could be construed by its Asian allies as weakened

Table 4: Nuclear Weapons Delivery Systems, 2015/2016

DATE	UNITED STATES	CHINA	INDIA	PAKISTAN
AIRCRAFT				
Fighter/Attack	currently deployed		currently deployed	currently deployed
Heavy Bombers	currently deployed	status uncertain		
BALLISTIC MISSILES				
SRBMs		status uncertain	currently deployed	currently deployed
MRBMs		currently deployed	currently deployed	currently deployed
IRBMs		currently deployed	currently deployed	
ICBMs	currently deployed	currently deployed		
SLBMs	currently deployed	status uncertain*	under development	
CRUISE MISSILES				
Air-Launched	currently deployed	status uncertain	status uncertain	under development
Ground-Launched		status uncertain	status uncertain	currently deployed
Sea-Launched			status uncertain	status uncertain

SRBM = short-range ballistic missile (< 1,000 km)
MRBM = medium-range ballistic missile (1,000–3,000 km)
IRBM = intermediate-range ballistic missile (3,000–5,500 km)
ICBM = intercontinental ballistic missile (> 5,500 km)
SLBM = submarine-launched ballistic missile

* "China will probably conduct its first SSBN deterrent patrol [with JL-2 SLBMs] in 2016," according to the U.S. Defense Department, "Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2016," p. 26.

Sources: Hans M. Kristensen and Robert R. Norris, "FAS Nuclear Notebook: Chinese Nuclear Forces, 2016," Bulletin of the Atomic Scientists; "FAS Nuclear Notebook: United States Nuclear Forces, 2016," Bulletin of the Atomic Scientists; "FAS Nuclear Notebook: Pakistani Nuclear Forces, 2015," Bulletin of the Atomic Scientists; and "FAS Nuclear Notebook: Indian Nuclear Forces, 2015," Bulletin of the Atomic Scientists.

extended deterrence, but this need not be the case. Admission of U.S. vulnerability to Soviet/Russian nuclear forces has been officially acknowledged since negotiation of the 1972 Anti-Ballistic Missile Treaty, without noticeable harm to extended deterrence for NATO members. Careful management through appropriate consultation and measures of reassurance should achieve similar results with U.S. allies in Asia.

India should reject the doctrinal concept of "Cold Start," which is based on the dubious assumption that a quick, short-warning Indian attack on Pakistan in response to a future terrorist provocation could avoid Pakistani use of nuclear weapons. Pakistan in turn should realize that its use of tactical nuclear weapons against Indian forces—even if only employed on Pakistani territory—is unlikely to prevent Indian retaliation in kind. Resolving differences over Kashmir through the barrel of a gun is no longer an option.

Any decisions on deployment of missile defenses should carefully weigh the impact on third parties and be accompanied by measures to allay concerns.
U.S. improvements to its strategic and theater missile defenses against North Korea will inevitably be interpreted by Beijing as jeopardizing China's nuclear retaliatory capabilities against the United States and used to justify enhancements to China's strategic offensive arsenal to ensure that U.S. defenses can be penetrated. China's recent deployment of MIRVs has been influenced by U.S. missile

defense trends. Enhancements to U.S. missile defenses could also make it more likely that China would introduce strategic defenses into its own arsenal. China has flight-tested such systems at least three times since 2010.[34]

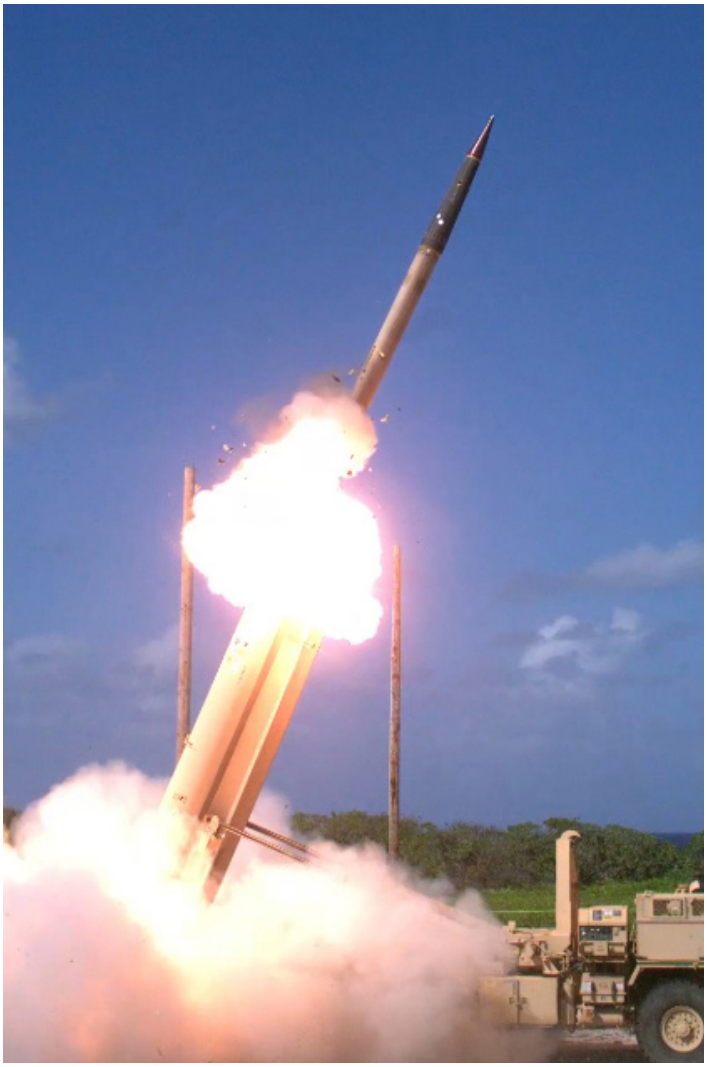
Any Chinese deployment of missile defenses will factor into New Delhi's calculations of how many strategic warheads are needed to constitute a credible deterrent. Likewise, India's active missile defense program has already been cited by Islamabad as requiring the augmentation of Pakistani offensive missile programs. In this way, U.S. policies have a cascading effect on nuclear strategies across East and South Asia.

Rational deliberation and reflection on the historical experience of the United States and the Soviet Union during the Cold War should lead to negotiating limits on strategic missile defenses -- the only approach to the missile offense/defense relationship, which will not lead to aggravating the arms race.

The United States should seek a mutual freeze on the number of operational warheads deployed by India and Pakistan and on their production of fissile material. India and Pakistan have a rough balance in the number of deployed nuclear weapons. A numerical freeze would retain this balance. China should be invited to participate in a freeze as well, although such an invitation will only enjoy reasonable prospects if the United States can restrain its military modernization efforts in a way meaningful for Beijing. Both India and Pakistan should follow China's example in halting fissile material production. While Pakistan's stockpile of plutonium is substantially less than India's, a freeze on weapons numbers should obviate Pakistan's perceived need to continue its steady increase.

Deploying Indian and Pakistani nuclear weapons at sea and tactical weapons on land will create more problems for stability than it will solve; New Delhi and Islamabad should negotiate a ban on such systems. As mentioned, Pakistan's introduction of a very short-range ballistic missile with nuclear warheads is destabilizing for a number of reasons, but particularly given the disconnect between Indian and Pakistani understandings of the nuclear red-lines in any potential conflict. Such weapons should be retired from the inventory.

It was the vulnerability of fixed-site land-based systems, which first compelled the U.S. and Soviet militaries to deploy strategic missiles at sea, but both India and Pakistan have mobile land-based systems, which are less vulnerable to pre-emptive attack. The stability argument for sea-basing in South Asia is therefore less compelling than it was in the U.S.-Soviet Union context during the Cold War.



U.S. Missile Defense Agency

A U.S. Terminal High Altitude Area Defense (THAAD) interceptor is launched on Nov. 1, 2015, from a THAAD battery located on Wake Island. Although THAAD will be deployed in South Korea and oriented against the threat from North Korea, the Chinese Foreign Minister said it would "directly affect" China's strategic security.

The commingling of nuclear and conventional weapons would be especially problematic for Indian surface ships with *Dhanush* nuclear-tipped ballistic missiles or future Pakistani submarines with nuclear-tipped, land-attack cruise missiles. In a crisis, an attack on conventional capabilities could be mistaken as being directed against nuclear capabilities. And during a conventional war, the nuclear-armed vessels could easily be put in a use-it or lose-it situation. Both countries should therefore agree to a ban of naval nuclear weapons in the interests of mutual stability.

As noted above, India's sea-based systems cannot be brought to bear against China, the nuclear threat of most concern to New Delhi, for at least another decade. Moreover, China is probably at least a decade away from

being able to employ its SSBNs effectively against the United States. This interval should allow both India and China to use limits on future potential as leverage to achieve other security benefits from each other.

Command-and-control challenges, such as figuring how to best delegate authority to naval commanders at sea, would be difficult for both India and Pakistan. Time will be needed to develop the technology for reliable means of communication and personnel procedures to assure firm control by national command authorities. In the meantime, nuclear weapons should be kept on land.

The United States Navy currently deploys no nuclear-armed cruise missiles. Although Russia does, such systems are not critical to the viability of its deterrent. It would very much be in U.S. interests for Washington to propose a multilateral ban on such weapons. Agreement to a ban on nuclear-armed SLCMs by Russia, China, and the United States before SLCMs get a foothold in South Asia would constitute a powerful and timely nonproliferation achievement.

It would be constructive for India and Pakistan to formalize their* de facto *moratoria on nuclear testing and for the United States and China to ratify the Comprehensive Test Ban Treaty (CTBT).
Neither Pakistan, India, nor China is contemplating ending its *de facto* moratorium on nuclear testing, but some future desire for a weapons enhancement could provide a strong incentive to resume testing. The time is ripe, therefore, to consolidate the nonproliferation advantages of reinforcing the CTBT regime and to use U.S. influence over access to peaceful nuclear cooperation as leverage. India's willingness to subscribe in June to the Hague Code of Conduct Against Ballistic Missile Proliferation shows that such leverage can be effective given New Delhi's ongoing campaign to secure the benefits of membership in the Nuclear Suppliers Group.

If Pakistan and India would formally join the CTBT or convert their unilateral moratoria into a legally binding agreement, this would significantly strengthen the taboo against nuclear testing. It would thereby suppress worst-case projections of future qualitative advances in their nuclear arsenals, relieving nuclear arms race pressure on both Pakistan and India.

U.S. ratification of the CTBT would likely lead to China's ratification of the treaty. With U.S. and Chinese ratification, pressure would be significantly increased on the other six hold-outs whose ratification is required for the treaty to enter into force. Ratification of the treaty would increase barriers to developing new warheads, helping to limit the possibility of both quantitative and qualitative adjustments to these countries' nuclear forces.

[T]he fact that nuclear weapons programs are often pursued more for reasons of prestige and status than military necessity offers grounds for believing that outside actors can make a difference.

Conclusion

The many past setbacks in diplomatic efforts to resolve differences between Pakistan, India, and China provide sobering reminders of Washington's limited ability to directly affect the sovereign decisions taken in Islamabad, New Delhi, and Beijing on matters considered existential. Yet the fact that nuclear weapons programs are often pursued more for reasons of prestige and status than military necessity offers grounds for believing that outside actors can make a difference.

The complicated nuclear geometry of Asia is connected to the United States in multiple ways. Since U.S. actions will have a cascading effect on China, India, and Pakistan, making the right decisions in Washington can significantly enhance the stability of relations between these three Asian nuclear powers and move the world in a safer direction as a consequence.

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