

## MOVING BEYOND THE INDIA-PAKISTAN NUCLEAR STANDOFF

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South Asia has become one of the regions that highlight the crisis of the nuclear nonproliferation regime, posing a serious challenge to global security. Along with North Korean and Iranian nuclear and missile programs that have been undermining the nonproliferation regime for many years, the nuclear and missile standoff between India and Pakistan raises grave concerns within the international community.

### INTRODUCTION

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A host of supplementary issues that fuel the arms race further exacerbate the situation. The smoldering Kashmir conflict, which has sparked armed clashes between India and Pakistan numerous times in the past, may escalate to nuclear strikes in the future. Terrorist threats in the region also increase the likelihood of an armed conflict and may provoke an interstate military confrontation at any given moment. In addition, religious strife and internal political instability in Pakistan, which may grow in the aftermath of the 2014 withdrawal of U.S.-led international coalition troops from Afghanistan, may increase regional tensions.

As a result of these factors, the two states have not adequately cooperated on reducing nuclear risks and have effectively failed to develop any meaningful treaty relations in this field. The problems that have been plaguing Indian and Pakistani nuclear programs since their initial stages make matters worse. Their nuclear facilities appear vulnerable; their command,

control, and attack-warning systems are somewhat ineffective; and their official nuclear doctrines are fluid, especially as they relate to the conditions and methods of using nuclear weapons.

The overall lack of progress on arms reduction, as well as apathy and occasionally escalating tensions in the Russia-U.S. dialogue on missile defense and nuclear disarmament, do not help to improve the situation. The current Ukrainian crisis, which has led to a level of deterioration in Russia's relations with the West unseen in the last few decades, also plays a negative role. Moscow's and Washington's diminished capacity to jointly influence New Delhi's and Islamabad's policies on nuclear arms control is one of the side effects of this crisis.

Currently, there are very few incentives and opportunities for South Asians and for external actors to reduce the escalating missile and nuclear standoff between India and Pakistan. There are no proposals for resolving this issue that would enjoy the support of the leading nuclear powers and the international community, even at a theoretical level.

### ABOUT THE AUTHORS

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## INDIAN AND PAKISTANI PRODUCTION OF WEAPONS-GRADE NUCLEAR MATERIALS

Anatoly Dyakov

The International Panel on Fissile Materials estimates India's and Pakistan's nuclear stockpiles at 60–80 weapons and 200 weapons, respectively. Both states are capable of increasing their nuclear potential.<sup>1</sup> The fissile material stockpiles generated in both countries may allow them to produce a significantly higher number of nuclear weapons than estimated by the International Panel on Fissile Materials.

### India

India's existing production facilities may have allowed New Delhi to generate  $2,400 \pm 900$  kilograms of 30-percent-enriched uranium ( $800 \pm 300$  kilograms in 90-percent-enriched equivalent). India's weapons-grade plutonium stockpiles are estimated to be  $540 \pm 180$  kilograms.<sup>2</sup>

India's enrichment facilities are estimated to operate at a capacity of 19,000–32,000 separative work units (SWU).<sup>3</sup> (See table 1 for a list of India's facilities.) India is capable of producing 460–700 kilograms of 40-percent-enriched uranium a year.<sup>4</sup> India's annual weapons-grade plutonium production capability is estimated to be 140 kilograms, giving it the means to produce

approximately 30 nuclear weapons per year should it decide to weaponize all of its fissile material.

India is likely to continue increasing its fissile materials production capacities for both civil and military nuclear programs. For instance, the Chitradurga uranium enrichment plant, which is currently under construction, will be capable of producing both low-enriched uranium for the nuclear power industry and highly enriched uranium for weapons and submarine fuel.<sup>5</sup>

### Pakistan

According to expert reports, Pakistan has generated  $3,200 \pm 1,200$  kilograms of highly enriched uranium and  $170 \pm 50$  kilograms of weapons-grade plutonium, which is sufficient to produce 200 nuclear weapons.

Pakistan's enrichment facilities are estimated to have the capacity of 35,000–75,000 SWU (see table 2 for list of facilities). The country is capable of producing 200–300 kilograms of 90-percent-enriched uranium a year. Pakistan's weapons-grade plutonium production is estimated to be 12–24 kilograms a year. After the Khushab-3 and Khushab-4 reactors are launched, Pakistan's production capacity will increase to 25–50 kilograms of plutonium a year.<sup>6</sup>

**Table 1: India's Fissile Material Production Facilities**

Location	Description	Production Start
Mumbai (Bhabha Atomic Research Center—BARC)	uranium enrichment plant	1980
Ratehalli	uranium enrichment plant	1990
Chitradurga	uranium enrichment plant	under construction
BARC	industrial reactor CIRUS	1960 (shut down in 2010)
BARC	industrial reactor Dhruva	1985
BARC	Power Fast Breeder Reactor, PFBR (500 MWe)	2013 (?)
Chennai, Narora, Karpakar	13 heavy water reactors, 9 of which are not safeguarded by the IAEA)	
Trombay	radiochemical plant	1964 /1983
Tarapur	radiochemical plant (1st construction stage)	1978
Tarapur	radiochemical plant (2nd construction stage)	2011
Kalpakkam	radiochemical plant (1st construction stage)	1998
Kalpakkam	radiochemical plant (2nd construction stage)	2013 (?)

**Table 2: Pakistan’s Fissile Material Production Facilities**

Location	Description	Production Start
Kahuta	uranium enrichment plant	1982
Gadval	uranium enrichment plant	1990
Khushab-1	industrial reactor	1998
Khushab-2	industrial reactor	2010
Khushab-3	industrial reactor	2012 (?)
Khushab-4	industrial reactor	2014 (?)
Rawalpindi (Pakistan Institute of Nuclear Science and Technology — PINSTECH)	radiochemical plant (1st construction stage)	1998
PINSTECH	radiochemical plant (2nd construction stage)	2006
Chashma	radiochemical plant	under constuction

## INDIA'S AND PAKISTAN'S CURRENT NUCLEAR ARSENAL DEVELOPMENT

*Petr Topychkanov*

Both India and Pakistan seek to develop their own versions of the nuclear triad, which incorporates an air force, land-based ballistic missiles, and sea- and air-based missile systems.

### India

According to a January 2014 report from the Press Information Bureau of India’s government, the Strategic Forces Command’s arsenal includes the Agni-I, Agni-II, Agni-III, Prithvi-I, and Prithvi-II missiles (see table 3).<sup>7</sup> This list does not include the Prithvi-III missile, which was in the process of being put into service as of March 2003, according to India’s then defense minister George Fernandes. However, it appears this process has not been completed.

The estimates on the number of these missiles vary significantly. According to the data published by the International Institute of Strategic Studies, India may have around 30 Prithvi-type missiles, 80–100 Agni-I, 20–25 Agni-II, and some Agni-III missiles.<sup>8</sup> All of these missiles are assembled at the Bharat Dynamics Limited state-run facility, which is currently increasing its production capacity.

A number of publications mention the possibility of using multipurpose Mirage 2000H fighter jets to deliver nuclear weapons (India has around 40 such jets in service, in addition to around

80 Jaguar IS Shamsher jets and around 200 Su-30MKI aircraft).<sup>9</sup> The importance of this component of India’s nuclear triad should not be exaggerated because the country still lacks air-based nuclear cruise missiles, as well as a modern air and missile defense system that would reliably protect strategic aircraft.

While India currently lacks the sea component of the nuclear triad, significant efforts are being made to develop it. The development of submarine-launched ballistic missiles (SLBMs) tops the priority list. India tested its K-15 Shourya missile (code-named B05) several times. The missile’s range is 750 kilometers (approximately 466 miles), and its payload is estimated to be 500–1,000 kilograms. Besides, the K-4 SLBM missile, with a 3,500-kilometer range (about 2,174 miles) and an approximate 1,000-kilogram payload, is being developed. These missiles can be deployed on the INS Arihant (S-2) nuclear submarine, which was officially inaugurated in 2009. The Arihant’s sea trials commenced in 2012.<sup>10</sup>

According to the new general director of India’s Defence Research & Development Organization, who assumed office in 2013, some of the major areas for missile development are: equipping ballistic missiles with multiple and maneuverable re-entry warheads and developing long-range surface-to-air missiles and long-range cruise missiles that can be launched from land, air, and sea.<sup>11</sup> Indian researchers are also interested in developing intercontinental ballistic missiles. In 2011, the Defence Research & Development Organization suggested that the government should put an end to its voluntary moratorium on developing

**Table 3. India's Arsenal of Ballistic Missiles**

Missile	Range, km	Payload, kg	Service-entry Date
Prithvi-I	150	1000	1998
Prithvi-II	350	500—700	2003
Agni-I	700	1000	2003
Agni-II	2000	1000	2003
Agni-III	3000	1500	2010—2011

**Table 4. Pakistan's Arsenal of Ballistic Missiles**

Missile	Range, km	Payload, kg	Service-entry Date
Hatf-I/1A/1B	70/100/100	500	1989, 1995, 2001
Hatf-II (Abdali)	180	500	2002 (?)
Hatf-III (Ghaznavi)	290	500	2004 and 2007
Hatf-IV (Shaheen-I)	700	500	2003
Hatf-V (Ghauri)	800—1500	1300	2003
Hatf-VI (Shaheen-II)	over 1000	500—800	2008 (?)

missiles beyond the range of 5,000 kilometers (around 3,106 miles). Even though the authorities did not agree to it then, they might in the near future.

### Pakistan

Similar to India's arsenal, land-based ballistic missiles are Pakistan's main nuclear delivery vehicles (see table 4). Pakistan continues to work on modernizing most of the rockets in its arsenal.

In addition, Hatf-VII (Babur) and Hatf-VIII (Ra'ad) cruise missiles, as well as the shorter-range Hatf-IX (Nasr) ballistic missile, are in their development stages.

Hatf-VIII was tested from Mirage III and JF-17 fighter jets. These jets may in fact become the core part in the air component of Pakistan's nuclear triad.

Hatf-VII cruise missiles have both land- and sea-based versions. The land-based missiles were first tested in 2005, while the sea-based tests have not been conducted yet. It has been speculated that Pakistan is working on developing a submarine-launched

cruise missile based on Hatf-VII.<sup>12</sup> The missile can be deployed on the new 039-A and 0-39B (Yuan class) diesel-electric submarines that are manufactured in China. It has been reported that Islamabad and Beijing are close to signing an agreement on the sale of six of these submarines.<sup>13</sup> It's possible that agreement prompted Pakistan to open its Naval Strategic Forces Command headquarters in 2012.

The Hatf-IX missile system, which was first tested on April 19, 2011, raises concerns from some observers. They believe that deploying the four-tube, Hatf-IX ballistic missile system on the ground during a potential India-Pakistan conflict will significantly increase the risk of using nuclear weapons in the region.<sup>14</sup>

The lack of missile production capacities appears to hamper Pakistan's capability to develop its nuclear arsenal. Western analysts believe that Pakistan can independently manufacture the airframe, motorcases, solid propellant grains, nozzle, and warhead sections but has to import other components from China and North Korea.<sup>15</sup> If this is indeed the case, then without foreign assistance, Pakistan's limited resources will not

allow it to successfully compete in a nuclear race against India, which boasts a developed military-industrial complex.

Moreover, in developing its military potential, India has to be mindful of nuclear threats coming from both Pakistan and China. Thus, the disparities between India's and Pakistan's military-industrial complexes and their military and political environs will result in an ever-increasing imbalance between their nuclear arsenals. In the absence of bilateral agreements, this growing imbalance may prompt Pakistan to take asymmetric steps to compensate for its perceived vulnerability.<sup>16</sup> Only dialogue between the two countries can help reduce the threats to regional stability.

## PROSPECTS FOR INDIA-PAKISTAN ACCORDS

*Alexei Arbatov*

Moving from bilateral to multilateral nuclear disarmament will be the most complex issue in nuclear disarmament for the foreseeable future. The issue's complexity will increase exponentially as a result of the factors that complicate cooperation between Russia and the United States currently.

If the multilateral format does become possible at some point, it will probably not result from other nuclear states joining the Russia-U.S. negotiations. Rather, additional and primarily bilateral forums will be created by states that are engaged in mutual deterrence (that is, by Russia, engaged in mutual deterrence with the United States, the United Kingdom, France, and China; or by China, engaged in mutual deterrence with the United States and India). Under favorable political conditions, this could create infrastructure for further negotiations, as in the case of the Soviet Union and the United States in the 1960s.

Nuclear arms control negotiations are predicated on *quid pro quo*. For instance, Israel and North Korea have no basis for such negotiations, nor do the United Kingdom or France and the United States. Other countries—the United States and China or the United Kingdom and Russia—do have issues to negotiate, but their nuclear arsenals are too asymmetrical to come to an agreement that is supposed to be based on relative parity, thus implying equal compromise.

In this respect, India and Pakistan are an absolutely unique pair of states, a bipolar duo of sorts in a multilateral, nuclear

balancing act that includes nine nuclear states and a few nuclear-threshold states. In fact, the relationship between India and Pakistan is that of mutual nuclear deterrence, and their nuclear arsenals are roughly comparable. There is a certain nuclear parity between the two; all the asymmetries and differences notwithstanding, they are still more comparable with each other than with the other nuclear states, with the exception of Russia and the United States. Indeed, Russia and the United States have historically constructed their arms control and reduction negotiations on this very basis.

The risk that nuclear weapons will be used in South Asia is very high. This provides an enormous incentive for facilitating the start of a dialogue, which could then be followed by practical negotiations on arms control between India and Pakistan.

As forty years of Russia-U.S. negotiations bear out, the nuclear arms that are subject to agreements are radically different from the same arms that are not governed by any agreements, transparency measures, or limitations. Nuclear weapons, with their colossal political weight, pose a much less serious threat to the global order if they are subject to agreements than otherwise. Restrictions, along with confidence-building and transparency measures, also reduce the likelihood of nuclear-weapon use by clarifying the intentions of both sides, thus decreasing the possibility of an unwarranted reaction to a potential threat. In addition, arms limitation agreements allow states to confidently predict the long-term strategic situation so that they can plan their military programs effectively, conserve their resources, and set their negotiation priorities.

As for India-Pakistan relations, there are political tensions and an enormous trust deficit between the parties, which complicates the commencement of a serious dialogue. Trust, however, will not emerge out of the blue; it is generated through conducting negotiations, concluding agreements, and verifying their implementation. Initially, there was no trust between the Soviet Union and the United States either, until nuclear arms talks began in earnest. In spite of numerous disagreements and even, on occasion, serious rifts between the parties, their mutual trust in the strategic sphere increased significantly over forty years. The negotiation process and resulting agreements have been instrumental in effecting this change.

Of course, one has to consider actual facts on the ground in the case of India and Pakistan. Unrealistic projects would

be counterproductive, but paying excessive attention to political reversals at the expense of military calculus should also be avoided. The questions of systems, forces, and strategies will inevitably come to the fore as soon as actual negotiations get under way.

While political relations and, at the very least, a minimal level of trust are extremely important in the course of negotiations, the reverse is also true. The negotiation process itself is an essential tool for improving political relations and confidence; it is not just some abstract struggle for the ideals of nuclear disarmament.

The extremely complex circumstances that surrounded the start of strategic dialogue between the Soviet Union and the United States are instructive. The dialogue began at the height of the Cold War and global competition between the East and West. In 1968, Warsaw Pact troops entered Czechoslovakia. The United States was in the middle of its war in Vietnam. In 1972, the United States bombed Hanoi on the eve of signing the Anti-Ballistic Missile Treaty and the first Strategic Arms Limitation Treaty (SALT I) at a summit in Moscow. If the meeting between then U.S. president Richard Nixon and then Soviet Union general secretary Leonid Brezhnev had been aborted, the negotiations might not have been restarted for quite a while, if ever. After all, global tensions had continued to increase steadily after the 1970s, reaching their peak with the Soviet Union's invasion of Afghanistan, the deployment of American medium-range missiles in Europe, and the start of then U.S. president Ronald Reagan's Strategic Defense Initiative.

Nevertheless, the summit did take place, marking the first instance of *détente* and the start of a historic process of strategic arms control and reduction.

Thus, the problems plaguing strategic relations between the two South Asian nuclear powers should not be overstated. They would not be the first to embark on the path of strategic dialogue. The problems they are facing can be overcome with political will on both sides, as the experience of other countries suggests.

Pakistan and India could choose to use the 1987 Intermediate-Range Nuclear Forces Treaty (INF) between the Soviet Union and the United States as a model for their strategic relations. The two South Asian countries may sign such a treaty in order

to set an equal upper limit for the number of certain types of missiles, rather than the more ambitious (and unrealistic) goal of eliminating these missiles. Based on the details and understandings formulated in the INF Treaty, as well as the treaty's control and counting rules, India and Pakistan could reach an agreement on limiting ground-based ballistic and cruise missiles with ranges of 500 to 5,500 kilometers (about 310–3,417 miles). These systems currently account for most missiles and nuclear arms in the arsenals of the two states. Initially, only an agreement limiting the number of medium-range missiles (1,000–5,500 kilometers, approximately 621–3,417 miles) could be pursued.

At the same time, such an agreement would not encompass air and naval forces or intercontinental ballistic missiles. India may use these permitted forces as an additional component in its strategic balance with China. Pakistan would have the right to acquire similar systems, but it would most likely not exercise this right since it has no adversaries apart from India.

Yet another issue relates to third-party states in the regional nuclear equation. In the context of the nuclear standoff in South Asia, Pakistan is not India's only concern. India also worries about China, but China will not participate in trilateral negotiation because its efforts are directed at deterring the United States. India, then, is second on China's priority list (while Russian forces are presently not China's concern).

Such a multivector approach has historical precedents. Russia and the United States have thus far conducted bilateral negotiations, including SALT I and the Strategic Arms Reduction Treaty, even though both powers sought to deter China as well. In addition, Russia has also tried to deter the United Kingdom and France. However, multilateral negotiations between India, Pakistan, and China do not appear feasible, just as negotiations between Russia, China, and the United States, or between Russia, the United States, the United Kingdom, and France are infeasible.

However, China-U.S. negotiations on nuclear arms control might serve as an additional security guarantee for India if it decides to limit certain classes and types of its nuclear weapons through an agreement with Pakistan. Similarly, agreements between Russia and the United States serve to strengthen the military security of China, the United Kingdom, and France, although these states are not directly part of these agreements.



## CONCLUSIONS

Alexei Arbatov

A nuclear arms control agreement between India and Pakistan and its subsequent United Nations ratification may hypothetically raise a number of legal issues. India and Pakistan are considered “problematic” states whose nuclear status is not recognized by the existing body of international law, which is predicated upon the 1968 Nuclear Non-Proliferation Treaty (NPT). Any attempt to officially recognize these states as nuclear-weapon states (through amendments to the NPT) could undermine the NPT-based nonproliferation regime.

Recognizing India and Pakistan as nuclear-weapon states would mean that any country with a successful nuclear program may avoid all the costs associated with running such a program if it joins the NPT and the nonproliferation regime as a nuclear power, thus gaining a substantial military and political advantage. Such a turn of events could lead to uncontrollable nuclear proliferation.

Official recognition of a hypothetical agreement between India and Pakistan would not necessarily amount to a formal legal recognition of their status as nuclear-weapon states. Yet, a de facto recognition of such a status may serve as an extra incentive for these states. In any event, the positive effect of including these states in the nonproliferation regime would offset the possible legal hurdles. The same rationale applies to their joining the Comprehensive Nuclear Test-Ban Treaty, as well as the proposed Fissile Material Cut-off Treaty, if it is eventually signed.

The role of nuclear deterrence in South Asia is yet another issue. The fact that both India and Pakistan have nuclear weapons threatens to escalate any bilateral conflict into a full-blown nuclear war with devastating effects. At the same time, some experts talk of the deterrent role nuclear weapons play in general and on the Indian subcontinent in particular. The question is not easy to answer. Having nuclear weapons does make states more cautious. However, nuclear deterrence is not a guarantee against armed conflicts. If such a conflict indeed occurs (such as the 1999 Kargil War, which happened after the two countries had already conducted nuclear tests), it could lead to far more catastrophic consequences—both regionally and globally.

Which factor will prevail is to a large extent a matter of the circumstances at the time of the conflict. To make the situation

worse, neither side has an official nuclear doctrine, which makes it harder to define their views and procedures for using nuclear weapons, thus largely leaving the answer to this fateful question to chance and making it contingent on the unpredictable developments of a possible conflict.

On the whole, South Asia’s political complexities, military confrontation, and arms race make it more vulnerable to a possible nuclear conflict than any other region.

Against this backdrop, some emerging trends in India-Pakistan relations leave room for optimism. At this time, New Delhi and Islamabad are testing political waters, trying to gain a greater understanding of each other’s nuclear agendas and military preparations. The fact that each side adheres to its unilateral moratorium on nuclear testing is also a positive development. New Delhi and Islamabad signed a number of agreements on confidence-building measures, which testified to their negotiating capabilities.

A number of urgent steps to stabilize bilateral relations and prevent a nuclear conflict would further facilitate this process. For instance, both states could agree to partial transparency of their nuclear arsenals, specifically as it relates to their structure and deployment. In this context, they could sign a verifiable agreement on the nondeployment of nuclear forces in border zones. Mutual commitment not to deploy nuclear weapons on disputed territories would also help to lower the risk of nuclear confrontation. Reducing missile combat readiness (that is, legalizing the existing practice of storing delivery vehicles and nuclear warheads separately), as well as issuing notifications of such changes during military training exercises, would also be helpful.

At this time, Indian authorities believe in strictly multilateral nuclear arms control and disarmament talks that would include all nuclear-armed states and take place under UN supervision. This position serves propagandist rather than practical purposes and is used as a pretext for not engaging in bilateral negotiations. For its part, Pakistan does not seek such negotiations either.

This stance offers some opportunities for the Big Five states and international organizations that can act as mediators in bringing greater stability to the nuclear aspect of India-Pakistan relations. In addition to helping the parties to improve their bilateral dialogue, these actors can help to develop multilateral communication on a wide variety of security issues in South Asia.

## NOTES

<sup>1</sup> “India,” International Panel on Fissile Materials, last modified February 4, 2013, <http://fissilematerials.org/countries/india.html>; “Pakistan,” International Panel on Fissile Materials, last modified February 3, 2013, <http://fissilematerials.org/countries/pakistan.html>.

<sup>2</sup> “India,” International Panel on Fissile Materials.

<sup>3</sup> According to Rajaraman’s assessment, in 2010, the total capacity for producing enriched uranium was 19,000–32,000 SWU a year. R. Rajaraman, “Fissile Material in South Asia” (lecture, International School on Disarmament and Research on Conflicts, Trent, Italy, January 13, 2011), [http://www.isodarco.it/courses/andalo11/paper/ISO11\\_Rajaraman\\_SouthAsia.pdf](http://www.isodarco.it/courses/andalo11/paper/ISO11_Rajaraman_SouthAsia.pdf).

<sup>4</sup> At this enrichment capacity, India could produce about 78–155 kilograms of weapons-grade uranium a year (it can be assumed that it would take approximately 193 SWU to produce 1 kilogram of weapons-grade uranium at 90 percent enrichment), with the tails enrichment level of 0.3 percent. See: Arjun Makhijani, Lois Chalmers, and Brice Smith, “Uranium Enrichment: Just Plain Facts to Fuel an Informed Debate on Nuclear Proliferation and Nuclear Power,” Institute for Energy and Environmental Research, October 15, 2004, <http://ieer.org/resource/disarmamentpeace/uranium-enrichment/>.

<sup>5</sup> Nevertheless, Srikumar Banerjee, the chairman of India’s Atomic Energy Commission, said in an interview that the country’s existing sites are more than adequate for supplying India’s emerging submarine fleet. He explained not making the Chitradurga plant an IAEA-safeguarded facility by India’s intention to possibly use it for military purposes. Srikumar Banerjee interview by Saurav Jha, CNN-IBN, Nov. 26, 2011, <http://ibnlive.in.com/news/enrichment-capacity-enough-to-fuel-nuke-subs/206066-61.html>.

<sup>6</sup> It will allow to Pakistan produce 6–12 warheads a year (it can currently produce 3–6 warheads).

<sup>7</sup> “India Successfully Test Fires Agni-IV,” Press Information Bureau, January 20, 2014, <http://pib.nic.in/newsite/PrintRelease.aspx?relid=102610>.

<sup>8</sup> *The Military Balance 2014* (London: International Institute for Strategic Studies, 2014), 241.

<sup>9</sup> *Ibid.*, 244; Bates Gill, ed., *SIPRI Yearbook 2012: Armaments, Disarmament and International Security* (Oxford: Oxford University Press, 2012), 334.

<sup>10</sup> According to media reports, the hull of the second nuclear submarine, INS *Aridhaman* (S-3), was ready for launch in March 2014. The *Aridhaman* is being outfitted now. The hull of the third nuclear submarine, S-4, is being built, while construction of the fourth submarine, S-5, may have been started. Rajat Pandit, “Post-accident, lens on nuclear submarine projects,” *Times of India*, March 10, 2014, <http://timesofindia.indiatimes.com/india/Post-accident-lens-on-nuclear-submarine-projects/article-show/31758017.cms>; “INS-Aridhaman mishap: Submarine safe; DRDO orders immediate inquiry,” *Daily Bhaskar*, March 9, 2014, <http://daily.bhaskar.com/news/NAT-TOP-shocking-one-civilian-worker-two-others-injured-in-nuclear-submarine-mishap-in-v-4544815-NOR.html>.

<sup>11</sup> Y. Mallikarjun, “Long-range SAMs, cruise missiles for all platforms: Avinash Chander,” *Hindu*, June 3, 2013, <http://www.thehindu.com/news/national/longrange-sams-cruise-missiles-for-all-platforms-avinash-chander/article4775965.ece>.

<sup>12</sup> Feroz Khan, *Eating Grass: The Making of the Pakistani Bomb* (Stanford: Stanford Security Studies, 2012), 248–249.

<sup>13</sup> “Pakistan set to get Chinese submarines,” *Nation*, March 2, 2014, <http://nation.com.pk/national/02-Mar-2014/pakistan-set-to-get-chinese-submarines>.

<sup>14</sup> Rajaram Nagappa, Arun Vishwanathan, Aditi Malhotra, *HATF-IX / NASR - Pakistan’s Tactical Nuclear Weapons: Implications for Indo-Pak Deterrence* (Bangalore: National Institute of Advanced Studies, 2013), x.

<sup>15</sup> Michael Elleman and Mark Fitzpatrick, “Third-State Missile Threat Assessment,” in *Missile Defense: Confrontation and Cooperation*, eds. Alexei Arbatov, Vladimir Dvorkin, and Natalia Bubnova (Moscow: Carnegie Moscow Center, 2012), 98.

<sup>16</sup> Asymmetric measures can include electronic warfare and sabotage operations targeting strategic assets of India. Maria Sultan, “Strategic Transitions in South Asia and the Impact of Ballistic Missile Defenses,” in *Ballistic Missiles and South Asian Security*, eds. Pervaiz Iqbal Cheema and Muneer Mahmud (Islamabad: Islamabad Policy Research Institute, 2007), 17–52.

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