

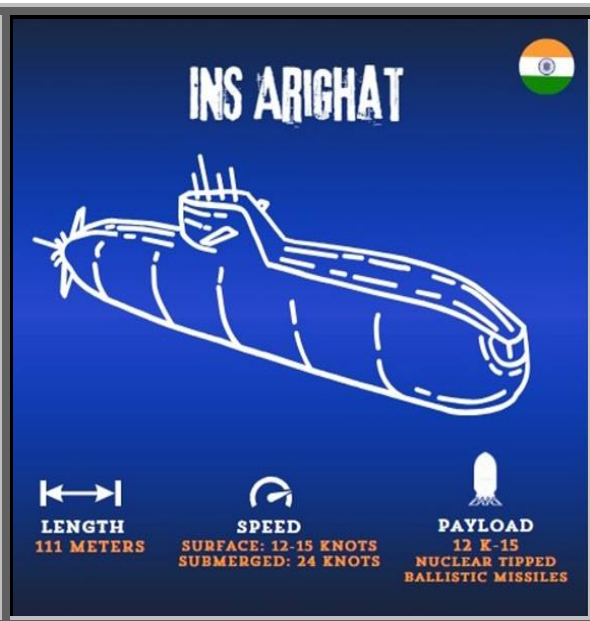
## Commissioning of INS-Arighat: India's Growing Undersea Nuclear Capabilities and its Implications on Deterrence Stability in South Asia

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*(Views expressed in the brief are those of the author, and do not represent those of ISSI)*



India's modernization of its undersea nuclear capabilities is shifting the South Asian arms race to the sea, underscored by the recent commissioning of its second Nuclear-powered Ballistic Missile Submarine (SSBN), INS Arighat. Simultaneously, the government of India has authorized a project to develop six nuclear attack submarines (SSNs), emphasizing India's demonstration of strength and commitment to advancing its undersea nuclear capabilities. The introduction of second-strike capability at sea serves as a significant development in the region's security framework, which has serious implications. Similarly, India's current modernization of undersea nuclear capabilities along with naval buildup is reflective of its aspirations to gain global power status and establish a blue-water fleet. These aspirations, as a result, trigger instability in the Indian Ocean Region (IOR) and impact Pakistan's threat perception, as its main security concerns revolve around India.

Source: Compiled by Author using information from *Times of India* and *Mathrubhumi*.

The INS Arighat, a 6000-tonne submarine built at Visakhapatnam's Ship Building Centre, recently completed extensive trials and upgrades.<sup>1</sup> It was commissioned on August 29, 2024, into the Indian Navy, joining the INS Arihant, India's first SSBN, which was fully operational in 2018.<sup>2</sup> The enhanced features and capabilities of INS Arighat have been developed to strengthen India's undersea nuclear capabilities. It is equipped with advanced technology with a maximum surface speed of 12-15 knots and a submerged speed of up to 24 knots.<sup>3</sup> It features four launch tubes that are capable of holding up to four K-4 Submarine-launched Ballistic Missiles (SLBMs) with a range of approximately 3500 kilometers. It is also equipped to carry 12 K-15 nuclear-tipped ballistic missiles that can strike targets over 750 kilometers.<sup>4</sup>

The 1980s and 1990s witnessed a major push towards the advancement of the Indian submarine force. During this period not only four HDW 1500-class diesel-electric submarines were commissioned from Germany but India also acquired eight Kilo-class diesel-electric submarines from the former Soviet Union.<sup>5</sup> More specifically, the onset of the Indian Navy's utilization of nuclear-powered submarines came with the lease of a nuclear attack submarine, INS Chakra I from Russia in 1988. This allowed the Navy to gain experience in the maintenance and operation of a nuclear submarine.<sup>6</sup> Similarly, the year 2012 witnessed the second lease of a nuclear-powered attack submarine, INS Chakra II, from Russia for a decade. This initiative was taken by the Navy to maintain its capabilities in the underwater domain in the larger Indian Ocean and to support its fleet operations and SSBN fleet.<sup>7</sup> Furthermore, in 2016, the first Indian SSBN, INS Arihant was commissioned, which is capable of carrying 12 K-15 submarine-launched ballistic missiles with an approximate range of 700 kilometers, allowing it to target areas in Southern Pakistan.<sup>8</sup>

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<sup>1</sup> Rajat Pandit, "India 'Fully Ready' to add to fleet 2nd Submarine with Nuclear Tipped Missiles," *The Times of India*, August 11, 2024, <https://timesofindia.indiatimes.com/india/india-fully-ready-to-add-to-fleet-2nd-sub-with-n-tipped-missiles/articleshow/112433199.cms>.

<sup>2</sup> "India Commissions INS Arighat: Know all about Navy's 2<sup>nd</sup> Nuclear Powered Submarine," *The Times of India*, August 29, 2024, <https://timesofindia.indiatimes.com/india/india-commissions-ins-arighat-know-all-about-navys-2nd-nuclear-powered-submarine/articleshow/112900556.cms>

<sup>3</sup> Girish Linganna, "Arihant to Arighat, India's Indigenous Nuclear Submarine Program Advances," *Mathrubhumi*, August 13, 2024, <https://english.mathrubhumi.com/features/specials/arihant-to-arighat-india-indigenous-nuclear-submarine-program-1.9810521>.

<sup>4</sup> Pandit, "India 'fully ready' to add to fleet 2nd submarine with Nuclear Tipped Missiles."

<sup>5</sup> Roby Thomas, "Nuclear Attack Submarines the Elixir for a True Blue-Water Navy," *Journal of Defence Studies* 14, no. 4 (2020): 59-76.

<sup>6</sup> Ibid.

<sup>7</sup> Ibid.

<sup>8</sup> Sufian Ullah, "Analysing India's Naval Development Strategy," *IPRI Journal*, XIX (1) (2019): 99

### Indian Submarines: Overview

NAME	TYPE	COMISSIONED
Sindhugosh (S55)	Diesel electric	2005
Sindhudhvaj (S56)	Diesel electric	2006
Sindhuraj (S57)	Diesel electric	2016
Sindhuratna S59	Diesel electric	2016
Sindhukesari (S60)	Diesel electric	2005
Sindhukirti (S61)	Diesel electric	2006
Sindhuvijay (S62)	Diesel electric	2007
Sindhurashtra (S65)	Diesel electric	2016
Shishumar (S44)	Diesel electric	2016
Shankush (S45)	Diesel electric	2016
Shalki (S46)	Diesel electric	2016
Shankul (S47)	Diesel electric	2016
Chakra (S71)	Nuclear powered	2016
Arihant (S73)	SSBN	2016
Kalvari (S21)	Diesel electric	2019
Khanderi (S22)	Diesel electric	2019
Karanj (S23)	Diesel electric	2021
Vela (S24)	Diesel electric	2021
Vagir (S25)	Diesel electric	2023
Arighat (S3)	SSBN	2024

**Source:** Compiled by Author using information from Nuclear Threat Initiative, Global Defense Insight, and the Indian Ministry of Defence.

It is important to recognize that nuclear reactors and submarines are accident-prone technologies. Introducing ballistic missiles and nuclear warheads to the mix significantly increases the likelihood of catastrophic consequences from any failures in the nuclear ballistic missile submarines.<sup>9</sup> India has experienced several mishaps with its submarines such as Arihant's reactor going critical in 2013<sup>10</sup> and an accident in late 2017, as the rear hatch was left open unintentionally, resulting in flooding in the propulsion chamber and damaging the submarine's propulsion system.<sup>11</sup> In 2017, INS Chakra was also involved in an accident reported to be caused either by a collision at sea or accidental contact while navigating the narrow channel into the naval base at Vishakhapatnam.<sup>12</sup>

The concept that nuclear submarines offer second-strike capability can be traced back to the Cold War when both the United States and the erstwhile Soviet Union initiated the development of nuclear submarines. This ensured that submarines would be capable of launching a retaliatory strike in case

<sup>9</sup> Zia Mian, M. V. Ramana, and A. H. Nayyar. "Nuclear Submarines in South Asia: New Risks and Dangers," *Journal for Peace and Nuclear Disarmament* 2, no. 1 (2019): 184-202.

<sup>10</sup> Rajat Pandit, "Reactor of India's First Indigenous Nuclear Submarine INS Arihant goes 'critical,'" *Times of India*,

<sup>11</sup> Dinakar Peri and Josy Joseph, "INS Arihant left Crippled after 'Accident' 10 Months Ago," *The Hindu*, 8 January 2018, <https://www.thehindu.com/news/national/ins-arihant-left-crippled-after-accident-10-months-ago/article22392049.ece>.

<sup>12</sup> Mian Saifur Rehman, "India's only Nuclear-Powered Submarine Damaged," *The News*, October 6, 2017, <https://www.thenews.com.pk/print/234924-Indias-only-nuclear-powered-submarine-damaged>.

the adversary was successful in destroying land-based nuclear assets through the first strike.<sup>13</sup> Interestingly, Thomas Schelling's account of the importance of stabilizing deterrence highlights that SSBNs could either serve as a strong deterrent by being able to survive and strike back or they could also launch a surprise attack on an adversary's ability to retaliate, acting as a destabilizer.<sup>14</sup>

India's growing prowess in the maritime domain is enhanced by India's naval strategy as it establishes a strong force for strategic coercion.<sup>15</sup> More importantly, the Indian Navy aims to project its power and establish a sea control strategy instead of adopting a defensive posture through a sea denial strategy, hence, a strategic submarine acts as a key element of this sea control strategy.<sup>16</sup> On the other hand, Pakistan strives to maintain an effective nuclear deterrent against India and its threat perceptions are further deepened by the fortification of an Indian nuclear triad. It is dependent upon its nuclear arms to counter increasing Indian conventional military might and the potential first-use of nuclear weapons in situations like the Cold Start doctrine.<sup>17</sup> Likewise, the advancement of undersea nuclear capability does not diminish the challenges for either country and is not expected to positively affect deterrence stability.

To counter India, Pakistan also needs to develop a submarine-based nuclear second-strike capability that could enhance Pakistan's strategic depth and support its first-strike nuclear stand.<sup>18</sup> Although Pakistan recognizes the significance of acquiring a nuclear-powered submarine, it is important to note economic constraints that limit pursuit of this option. Pakistan is largely dependent upon its diesel-powered submarine and dual-use platforms to maintain its second-strike capability. Moreover, Pakistan previously sought to strengthen its second-strike capability and sea-based deterrence by testing its first submarine-launched cruise missile, Babur-III in 2017,<sup>19</sup> designed to be launched from diesel submarines.

Furthermore, the risk of a nuclear conflict is heightened by the presence of nuclear-armed submarines as it introduces new risk pathways. The events that occurred in early 2019 serve as an example of dangerous potential escalation between India and Pakistan. Tensions between the rival states had escalated following a significant Indian naval exercise and an attack in Kashmir. The threat of conflict

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<sup>13</sup> Ghazala Yasmin Jalil, "India's Development of Sea-based Nuclear Capabilities," *Strategic Studies* 38, no. 1 (2018): 34-47.

<sup>14</sup> Thomas C. Schelling, "Reciprocal Measures for Arms Stabilization," *Daedalus* 89, no. 4 (1960):897.

<sup>15</sup> Saima Aman Sial and Tooba Ghaffar, "India's Undersea Nuclear Deterrence Impact on Indian Ocean Region's Strategic Stability," *CISS Insight Journal* 9, no. 1 (2021): P01-32.

<sup>16</sup> Ibid.

<sup>17</sup> Jalil, "India's Development of Sea-based Nuclear Capabilities."

<sup>18</sup> Sahar Abbas Hayat, "Pakistan's Need for a Credible Assured (Nuclear Submarine-based) Second Strike Capability," *India-Pakistan Relations* (2016): 155.

<sup>19</sup> Jalil, "India's Development of Sea-based Nuclear Capabilities."

escalated as India transitioned from a naval exercise to an operational deployment, including a nuclear submarine,<sup>20</sup> as stated by a spokesperson of the Indian Navy, “major combat units of the Indian Navy including the Carrier Battle Group with INS Vikramaditya, nuclear submarines and scores of other ships, submarines, and aircraft swiftly transited from exercise to operational deployment mode.”<sup>21</sup> Therefore, similar high-risk situations could weaken deterrence stability as it increases the likelihood of accidental conflict, mitigating the reliability of deterrence.

The introduction of nuclear submarines, particularly the commissioning of the INS Arighat, and further submarine fleet modernization can significantly weaken regional strategic and deterrence stability. With a past beset by crises and conflicts, the possession of a nuclear submarine while facing a nuclear-armed adversary escalates the likelihood of aggressive strategic operations at sea and jeopardizes the survival of the adversary's strategic forces that lack a strategic second-strike capability.<sup>22</sup> Similarly, the advent of naval capabilities in the South Asian nuclear environment is unlikely to contribute to either arms race stability or crisis stability. It is important to note that an effective second-strike capability can only strengthen strategic stability if both nuclear rivals possess it, as it could mitigate the risk of a surprise attack, hence reinforcing deterrence. Although Pakistan has not yet responded to the recent commissioning of Arighat, based on its insecurity surrounding India, it is understood that it further exacerbates the security dilemma.

Deterrence stability in the South Asian region has always been under threat not only due to India's marine military buildup but more importantly due to India's nuclearization of the Indian Ocean and growing undersea nuclear capabilities. Such developments lead to an arms race in the maritime domain which has the potential to exacerbate tensions, increase insecurities, and most importantly, disturb the regional deterrence dynamics and strategic stability. Given its present constraints, Pakistan is not in a position to afford a costly naval arms race with its hostile neighbor, India. Similarly, as India and Pakistan have a history of hostile relations, accidents of small-scale or miscalculations at sea could ultimately lead to a serious confrontation between the two nuclear-capable rivals. Despite India having a second-strike capability, it could be expected to continue its vertical proliferation in the maritime domain and strive for regional hegemony. This ultimately paves the way for new regional security challenges as it intensifies Pakistan's security concerns, hence compelling Pakistan to engage in a potential arms race.

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<sup>20</sup> Mian, Ramana, and Nayyar, “Nuclear Submarines in South Asia.”

<sup>21</sup> Maninder Dabas, “Navy Deployed Aircraft Carrier INS Vikramaditya, Nuclear Submarine Chakra After Pulwama Attack,” *India Times*, March 18, 2019, <https://www.indiatimes.com/news/india/navy-deployed-aircraft-carrier-ins-vikramaditya-nuclear-submarine-chakra-after-pulwama-attack-363878.html>.

<sup>22</sup> Sial and Tooba, “India's Undersea Nuclear Deterrence.”