

Indian nuclear weapons capability

[Overview]

As of May 2018, India is estimated to possess a total of ~130 nuclear warheads. Kristensen and Korda, looking at the same breakdown below but adding up some unknowns, estimate India's nuclear arsenal to consist of 130-140 warheads as of May 2019. Here, however, all unknowns are counted as zero, and the number of nuclear warheads is estimated to be approximately 130. India's nuclear weapon is believed to be plutonium-based (Kile, Shannon N. & Kristensen, Hans M. 2018). As of late 2016, India possessed approximately 580 kg of weapons-grade plutonium (IPFM 2018). Given that 4-6 kg of plutonium is needed to manufacture a nuclear bomb (although this is influenced by the level of technology), this amount is the equivalent of 97-145 nuclear warheads. With higher levels of technical sophistication, however, it is possible to obtain a bomb from 2-4kg plutonium, in which case the same Indian stockpile would suggest an arsenal of 145-290 warheads (Union of Concerned Scientists 2004). The warheads are not deployed, and they are viewed as being held in a central depository (Kristensen, Hans M. & Norris, Robert S. 2015). India possesses about six tons of reactor-grade plutonium, in addition to weapons-grade plutonium cited above (IPFM 2018).

India, like the U.S. and Russia, is aiming to build a three pillar system of nuclear weapons. India is strengthening and modernizing its nuclear capability. The background is its strained relationship with Pakistan but it has been pointed out that, in recent years, China deterrence is gaining focus. India's nuclear capability consists of five types of ground-launched ballistic missile, one sea-launched ballistic missile type, and two types of aircraft. There are also at least four more types of ballistic missiles in development (one ground-launched, two sea-launched and one air-launched). One of them, Agni-5, has a range approximating the ICBM trajectory and Agni-6 is expected to have a longer reach. According to India's naval program, it will build a fleet of four Indian-manufactured nuclear ballistic missiles. The first vessel, Arihant, was believed to be commissioned in August 2016 (Kristensen, Hans M. & Korda, Matt 2018). INS Arighat, the second Arihant-class submarine, is expected to be commissioned in 2020-21, and third and fourth vessels are now under construction. (Kile, Shannon N. & Kristensen, Hans M. 2018).

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● Nuclear warheads

~130

● Nuclear weapons delivery vehicles ¹⁾

Type / designation	Missile/bomb	No. of warheads per weapon	No. of warheads	Range (km)	Payloads (kg)	Year first deployed	Remarks	
Ground-launched ballistic missile			~60				2)	
Prithvi – 2	~24	1	~24	350	500	2003	3)	
Agni – 1	~20	1	~20	700 +	1,000	2007	4)	
Agni – 2	~8	1	~8	2,000 +	1,000	2011	5)	
Agni – 3	~8	1	~8	3,200 +	1,500	2014 ?	6)	
Agni – 4	?	?	?	3,500 +	1,000	2018 ?	7)	
Agni – 5	?	?	?	5,200 +	1,000	In development (2020)	8), 9)	
SLBM			2-14					
Dhanush		1	4	400	500	2013	10)	
Sagarika (K-15/B-05)	(12)	1	(12)	700	500-600	In development	11)	
K-4	(4)	?	(4)	~ 3,000	?	In development	12)	
Airborne weapons			~48				13)	
Loading machine : Mirage 2000H (Vajra)		~32	1	~32	1,850	6,300	1985	14)
Loading machine : Jaguar 1S/1B (Shamsher)		~16	1	~16	1,400	4,760	1981	15)
Air-launched cruise missile								
Nirbhay	?	?	?	(>700)	?	In development	16)	

[Notes]

- 1) The source for information on missile / bomb, No. of warheads per weapon, range, and year first deployed is Kristensen, Hans M. & Korda, Matt 2018. The source for information on payloads is Kile, Shannon N. & Kristensen, Hans M. 2015.
- 2) In June 2013, the DRDO announced that the Prithvi 1 (150km range) will be retired and DRDO will replace it with a new missile, the Prahaar (150km range, solid fuel). Prahaar is reportedly capable of carrying nuclear warheads (Missile Threat 2018-1).
- 3) Single-stage. Liquid-propellant. Road-mobile. The yield of the nuclear warhead is 12kt. The recent test launches were conducted on February 6 (Rout, Kumar Hemant 2018-1) and February 21, 2018 (first night time test; Rout, Kumar Hemant 2018-3).
- 4) Single-stage. Solid-propellant. Road-mobile. The yield of the nuclear warhead is 40kt. Operational in 2007 and deployed with 334th Missile Group (Kile, Shannon N. & Kristensen, Hans M. 2014). The latest test launch was conducted on February 6, 2018 (The Times of India, 2018-1).
- 5) A modified variant of the Agni-I. Single-stage. Solid-propellant. Road-mobile. The yield of the nuclear warhead is 40kt. The latest test launch was conducted on February 20, 2018 (Rout, Kumar Hemant 2018-2).
- 6) Two-stage. Solid-propellant. Rail-mobile. (Single-stage, Road-mobile, according to some documentation.) The yield of nuclear warhead is 40kt. The latest test launch was conducted on April 27, 2017 (The New Indian Express 2017).
- 7) Two-stage. Solid-propellant. Road · Rail -mobile. (Road-mobile, according to some documentation.) The yield of nuclear warhead is 40kt. The latest test launch was conducted on December 23, 2018 (NDTV 2018).
- 8) Three-stage. Solid-propellant. Rail-mobile. The yield of nuclear warhead is 40kt. The first test launch was conducted on April 19, 2012. The latest test launch was conducted on December 12, 2018 (The Economic Times 2018). Unlike other types in the Agni series, the Agni-5 is cased, for quicker response, in a newly developed mobile canister (launch tube), from which it is fired. While many reports allude to Indian plans to MIR the Agni-5, Kristensen and Norris discount the scenario (Kristensen, Hans M. & Korda, Matt 2018).
- 9) The Agni-6, an ICBM with an extended range, is believed to be in development (Kristensen, Hans M. & Korda, Matt, 2018). The U.S. Air Force's National Air and Space Intelligence Center sees the Agni-6 to be in design phase and estimates its strike range at 6,000km (National Air and Space Intelligence Center 2017).
- 10) Single-stage. Liquid-propellant. The yield of nuclear warhead is 12kt. The naval version of the Prithvi-2. It is launched from Sukanya-class offshore patrol vessels. Each ship carries two Dhanush missiles. The latest test launch was conducted on February 23, 2018 (The Times of India 2018-2).
- 11) Two-stage. Solid-propellant. The yield of nuclear warhead is 12kt. Some reports allege INS Arighat is capable of carrying 24 K-15 missiles but this is unconfirmed (Kile, Shannon N. & Kristensen, Hans M. 2018). The latest test launch was conducted on January 27, 2013 (Mallikarjun, Y. & Subramanian, T. S. 2013). It will be deployed on Arihant-class submarines. Arihant nuclear submarine can carry 12 K-15 missiles (Kristensen, Hans M. & Korda, Matt 2018). The ground-launched model of the K-15 is called the Shourya, and it may attain nuclear capability (Missile Threat 2018-2). Shourya was successfully test launched for the third time on September 23, 2011 (Subramanian, T. S. & Mallikarjun, Y. 2011).
- 12) Two-stage. Solid-propellant. A launch test on March 22, 2016, was a success (Gady, Franz-Stefan 2016), only to be followed by a failure on December 17, 2017 (The Print 2017). The Arihant nuclear submarine can carry four K-4 missiles (Kristensen, Hans M. & Korda, Matt 2018). INS Arighat and newer vessels are believed to be capable of carrying eight missiles (Kile, Shannon N. & Kristensen Hans M. 2018). There are reports on the ongoing development of a K-5 variant with

a 5,000km range. India's Defence Research and Development Organisation (DRDO) has announced plans to develop the range-extended K-6 missile. (Kile, Shannon N. & Kristensen, Hans M. 2018).

- 13) Other fighter-bombers (including the Su-30MKI) are believed to have a secondary role in delivering nuclear missions.
- 14) No. 1 Squadron and No. 7 Squadron (possibly 9) of 40 Wing are deployed at Maharajpur Air Force Station, and 1 or 2 Squadron is thought to have a nuclear mission (Kristensen, Hans M. & Korda, Matt 2018). Upgrades continue, with the latest model known as the Mirage 2000 I.
- 15) Out of four squadrons (a total of 76 aircraft), two are considered to have nuclear missions (Kristensen, Hans M. & Korda, Matt 2018).
- 16) Nirbhay, an air-launched cruise missile in development (700-1,000km range, 450kg payload), is suspected of nuclear capability. Tests since 2013 continued to fail, with the fifth finally succeeding on November 8, 2017 (Pandit, Rajat, 2017). The latest Nirbhay test is dated April 15, 2019. (Gady, Franz-Stefan 2019).

[Source]

The Economic Times 2018: "India test fires nuclear capable Agni-5 missile, 2nd test in six months," 12 December 2018, <https://economictimes.indiatimes.com/news/defence/india-test-fires-nuclear-capable-agni-5-missile-2nd-test-in-six-months/articleshow/67023684.cms> (accessed April 12, 2019)

Gady, Franz-Stefan 2016: "India Successfully Tests New Ballistic Missile," The Diplomat, 22 March 2016, <http://thediplomat.com/2016/03/india-successfully-tests-new-ballistic-missile/> (accessed April 13, 2019)

Gady, Franz-Stefan 2019: "India Test Fires Nuclear-Capable Nirbhay Cruise Missile," The Diplomat, 15 April 2019, <https://thediplomat.com/2019/04/india-test-fires-nuclear-capable-nirbhay-cruise-missile/> (accessed May 8, 2019)

IPFM (International Panel on Fissile Materials) 2018: "Fissile material stocks: India," <http://fissilematerials.org/countries/india.html> (accessed April 13, 2019)

Kile, Shannon N. & Kristensen, Hans M. 2015: "Indian nuclear forces," SIPRI Yearbook 2015 Armaments, Disarmament and International Security, Oxford University Press 2015, pp.496-501.

Kile, Shannon N. & Kristensen, Hans M. 2018: "Indian nuclear forces," SIPRI Yearbook 2018 Armaments, Disarmament and International Security, Oxford University Press 2018, pp.267-272.

Kristensen, Hans M. & Korda, Matt 2018: "Indian nuclear forces, 2018," *Bulletin of the Atomic Scientists*, vol. 74, no. 6, pp.361-366.

Kristensen, Hans M. & Korda, Matt 2019: "Status of World Nuclear Forces," Federation of American Scientists. <http://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/> (accessed May 8, 2019)

Mallikarjun, Y. & Subramanian, T. S. 2013: 'India successfully test-fires underwater missile', The Hindu, 27 Jan. 2013. <http://www.thehindu.com/news/national/india-successfully-test-fires-underwater-missile/article4350553.ece> (accessed April 13, 2019)

Missile Threat 2018-1: "Prahaar," <https://missilethreat.csis.org/missile/prahaar/> (accessed May 28, 2018)

Missile Threat 2018-2: "Sagarika/Shaurya," <https://missilethreat.csis.org/missile/sagarika-shaurya/> (accessed April 13, 2019)

The National Air and Space Intelligence Center 2017: Ballistic and Cruise Missile Threat," June 2017. <https://www.nasica.af.mil/About-Us/Fact-Sheets/Article/1235024/2017-ballistic-and-cruise-missile-threat-report/> (accessed April 13, 2019)

NDTV 2018: "India Successfully Test-Fires Nuclear-Capable Agni-IV Missile," 23 December 2018. <https://www.ndtv.com/india-news/india-successfully-test-fires-nuclear-capable-agni-iv-missile-1966895> (accessed April 12, 2019)

The New Indian Express 2017: "India successfully test fires nuclear capable Agni-III missile off Odisha coast," 27 April 2017, <http://www.newindianexpress.com/nation/2017/apr/27/india-successfully-test-fires-nuclear-capable-agni-iii-missile-off-odisha-coast-1598412.html> (accessed April 13, 2019)

Pandit, Rajat 2017: "India successfully tests its first nuclear-capable cruise missile," The Times of India, 8 November 2017, <https://timesofindia.indiatimes.com/india/india-successfully-tests-its-first-nuclear-capable-cruise-missile/articleshow/61550465.cms> (accessed April 12, 2019)

The Print 2017: "Setback for Indian missile programme: Two failures in a week, submarine version stuck," 24 December 2017, <https://theprint.in/report/setback-for-indian-missile-programme-two-failures-in-a-week-submarine-version-stuck/24671/> (accessed April 13, 2019)

Rout, Hemant K. 2018-1: "Indian army test fires surface-to-surface Prithvi-II missile signalling its operational readiness," The New Indian Express, 7 February 2018, <http://www.newindianexpress.com/nation/2018/feb/07/indian-army-test-fires-surface-to-surface-prithvi-ii-missile-signalling-its-operational-readiness-1769758.html> (accessed April 13, 2019)

Rout, Hemant K. 2018-2: "India successfully test fires nuclear capable Agni-II missile off Odisha coast," The New Indian Express, 20 February 2018, <http://www.newindianexpress.com/nation/2018/feb/20/india-successfully-test-fires-nuclear-capable-agni-ii-missile-off-odisha-coast-1776110.html> (accessed April 13, 2019)

Rout, Hemant K. 2018-3: "First night trial of nuke capable ballistic missile Prithvi-II successfully conducted in Odisha," The New Indian Express, 21 February 2018, <http://www.newindianexpress.com/nation/2018/feb/21/first-night-trial-of-nuke-capable-ballistic-missile-prithvi-ii-successfully-conducted-in-odisha-1776889.html> (accessed April 13, 2019)

The Times of India 2018-1: "India successfully test-fires nuclear capable Agni-1," 6 February 2018, <https://timesofindia.indiatimes.com/india/india-successfully-test-fires-nuclear-capable-agni-1/articleshow/62801316.cms> (accessed April 13, 2019)

The Times of India 2018-2: "'Dhanush' ballistic missile successfully test-fired," 23 February 2018, <https://timesofindia.indiatimes.com/india/dhanush-ballistic-missile-successfully-test-fired/articleshow/63043606.cms> (accessed April 13, 2019)

Union of Concerned Scientists 2004: "Weapon Materials Basics (2009)," <http://www.ucsusa.org/nuclear-weapons/nuclear-terrorism/fissile-materials-basics#.WUTTEIFpyM8> (accessed April 13, 2019)