

# Pakistani nuclear weapons capability

## 【Overview】

Pakistan is one of the powers outside the NPT framework that maintains a nuclear arsenal. Conflict with neighboring India over the sovereignty of Kashmir continues, and the possession of nuclear weapons by Pakistan is significant as a countermeasure against India, which has superior conventional forces.

As of March 2021, Pakistan is estimated to possess a total of approximately 165 nuclear warheads (**Kristensen, Hans M. & Korda, Matt 2021**). The number of Pakistan's nuclear warheads is on the rise. There is a range of opinions on the pace at which Pakistan's nuclear warheads is increasing, with one estimate predicting that their number will reach between 220 and 250 in the year 2025 (**Kristensen, Hans M., Norris, Robert S. & Diamond, Julia 2018**).

Pakistan is also enhancing capability to produce fissile material that is required, in turn, to manufacture nuclear weapons. As of early 2020, They had approximately 410 kg of weapons-grade plutonium and 3,900 kg of high enriched uranium (HEU) (**International Panel on Fissile Materials 2021**). Since it takes 12 kg to 18 kg of HEU or 4 kg to 6 kg of plutonium to manufacture a nuclear warhead (though these amounts may differ according to the level of their technology), Pakistan has enough fissile material to make 312 to 428 nuclear warheads. With higher levels of technical sophistication, however, it is possible to obtain a bomb from 2-4kg plutonium (**Union of Concerned Scientists 2009**), in which case the same Israeli stockpile would suggest an arsenal of maximum 530 warheads. Kristensen and Norris suggest that Pakistan has not converted all its fissile material into nuclear warheads, and estimate the number of warheads in conjunction with the intelligence on their nuclear weapons delivery capabilities. It is thought that the warheads are unloaded and in storage at a central storage facility (**Kristensen, Hans M. & Korda, Matt 2021**).

Pakistan is also developing and deploying nuclear-capable means of delivery. It has become apparent that in the course of its development Pakistan has received technical assistance from China and cooperated with Iran and North Korea (**Missile Defense Project 2021**). Currently, Pakistan deploys eight ground-launched ballistic missiles (five short-range, three intermediate range) capable of carrying nuclear warheads and is thought to be developing one more intermediate-range ballistic missiles. Pakistan is also actively developing cruise missiles with nuclear/conventional capability. The ground-launched Babur I (Hatf 7) is already in deployment and tests are repeatedly under way for anti-ground and anti-ship variants. In addition, Pakistan has obtained the nuclear triad through the development of submarine-launched cruise missiles, and is steadily securing second strike (retaliatory) capability.

Among the non-signatories of the NPT, Pakistan is characteristically focused on development of non-strategic (tactical) nuclear weapons. The key motivation for this is Pakistan's desire to counter the Cold Start Doctrine of its neighbor India, a neighbor that maintains an overwhelming superiority in conventional weapons. The CSD fields tank brigades along the Pakistani border for swift counterattack in the event of any Pakistani aggression (**Kristensen, Hans M. & Korda, Matt 2019**). Pakistan's answer is a "full-spectrum deterrence posture" entailing credible "capability to deter all forms of aggressions." One of Pakistan's tactical nuclear weapons, the Nasr (Hatf IX), a tactical ballistic missile, is unique for its very limited 60-70km range. It is considered a tactical asset for use in a battlefield, to deter Indian tanks from invading the country (**Kristensen, Hans M. & Korda, Matt 2019**).

# Pakistani nuclear weapons capability

The numbers that have changed since last year are highlighted in red

Updated: June 1, 2021

- Nuclear warheads **165**

- Nuclear weapons delivery vehicles <sup>1)</sup>

Type / designation	Missile/ bomb	No. of warheads per weapon	No. of warheads	Range (km)	Payloads (kg)	Year first deployed	Remarks
<b>Ground-launched ballistic missile</b>			<b>112</b>				
Abdali (Alias : Hatf 2)	10	1	10	200	200 - 400	2015	2)
Ghaznavi (Alias : Hatf 3)	16	1	16	300	500	2004	3)
Shaheen-1 (Alias : Hatf 4)	16	1	16	750	750-900	2003	4)
Shaheen-1A (Alias : Hatf 4)	?	1	?	900	1,000	2020?	5)
Ghauri (Alias : Hatf 5)	24	1	24	1,250	700 - 1,000	2003	6)
Shaheen-2 (Alias : Hatf 6)	18	1	<b>18</b>	2,000	~1,000	2014	7)
Shaheen-3	(4)	1	(4)	2,750	~700 - 1,000	2022?	8)
Nasr (Alias : Hatf 9)	24	1	24	60- 70	400	2013	9)
Aababeel	?	multiple numbers	?	2,200	?	In development	10)
<b>Ground-launched cruise missile</b>			<b>12</b>				
Babur-1/1A (Alias : Hatf 7)	12	1	12	350	400 - 500	2014	11)
Babur-2/1B	?	1	?	700	?	In development	12)
<b>Submarine-launched cruise missile</b>							
Babur-3	?	1	?	450	?	In development	13)
<b>Airborne bomb</b>			<b>36</b>				
Loading machine : F-16A/B	?	1	<b>?</b>	1,600	4,500	1998	14)
Loading machine : Mirage III/V	36	1	<b>36</b>	2,100	4,000	1998	15)
<b>Air-launched cruise missile</b>			<b>(5)</b>				
Ra'ad (Alias : Hatf 8)	(5)	1	<b>(5)</b>	350	~400	2019?	16)
Ra'ad-2	?	1	?	> 350	~400	?	17)

©RECNA Nuclear Warhead Data Monitoring Team

## 【Notes】

- 1) The source for information on missile / bomb, number of warheads, warheads' yield, range and year of deployment is **Kristensen, Hans M. & Kile, Shannon N. 2020**; payloads is **Schell, Phillip Patton, Kile, Shannon N. & Kristensen, Hans M. 2015**.
- 2) Short-range ballistic missile (SRBM). Road-mobile. Single-stage. Solid-propellant. The yield of the nuclear warhead is 5-12 kilotons. The latest test launch was conducted on February 15, 2013 (**The Nation 2013**).
- 3) Short-range ballistic missile (SRBM). Road-mobile. Single-stage. Solid-propellant. The yield of the nuclear warhead is 5-12 kilotons. The latest test launch was conducted on February 3, 2021(**ISPR 2021-2**).
- 4) Short-range ballistic missile (SPRM). Road-mobile. Solid-propellant. Single-stage. The yield of the nuclear warhead is 5-12 kilotons. Pakistan bases its missiles on the M-II missiles that they imported from China in the early 1990s. The latest test launch was conducted on November 18, 2019(**The Economic Times 2019**).
- 5) The Shaheen IA extended the range of a Shaheen. The yield of the nuclear warhead is 5-12 kilotons. The latest test launch was conducted on March 26, 2021 (**ISPR 2021-4**).
- 6) Pakistan's earliest medium-range ballistic missile capable of carrying nuclear warheads. Road-mobile. Single-stage. Liquid-propellant. The yield of the nuclear warhead is 10-40kilotons. Believed to be a variant of the North Korean Rodong (Nodong). It will likely be replaced by Sheheen upgrades in the future (**Kristensen, Hans M., Norris, Robert S. & Diamond, Julia 2018**). The latest test launch was conducted on October 8, 2018 (**ISPR 2018-2**). An analysis suggests that Ghuari 2 (Hatf 5A) missiles with a range that will be extended the range of the Ghuari to at least 1,800km are under development (**Missile Defense Project 2018-1**).
- 7) Medium-range ballistic missile (MRBM). Two-stage, solid-propellant. The yield of nuclear warhead is 10-40 kiloton. Thought to become the replacement for Ghauri. The latest test launch was conducted on May 23, 2019 (**ISPR 2019-3**).
- 8) Medium-range ballistic missile (MRBM). Two-stage. Solid-propellant. The yield of nuclear warhead is 10-40 kiloton. Some reports allege Pakistan MIRVing the Shaheen-III, in response to improvements in India's missile defense capability (**Missile Defense Project 2019**). The latest test launch was conducted on January 20, 2021 (**ISPR 2021-1**).
- 9) Short-range ballistic missile (SRBM). Single-stage. Road-mobile. Solid-propellant. The yield of nuclear warhead is 5-12 kiloton Limited in yield, but highly accurate in targeting. Fired from a multi-tube box launcher (**Kristensen, Hans M. & Norris, Robert S. 2016**). The range was extended to 70km from 60km in 2017, but, at such a limited range, it is incapable of striking any strategic targets within India. The Nasr, therefore, is believed to be a battlefield weapon, used to prevent border incursions by Indian tank brigades (**Kristensen, Hans M. & Korda, Matt 2019**). To date there have been 15 test launches. the latest being January 24 (**ISPR 2019-1**) and 31 (**ISPR 2019-2**) 2019.
- 10) Medium-range ballistic missile (MRBM). Three-stage. Road-mobile. Solid-propellant. The first test launch was conducted on January 24, 2017. According to the Pakistani Armed Forces' joint public relations department, it is capable of carrying multiple warheads (**ISPR 2017-1**). Some believe this to be a Shaheen III redesign/upgrade (**Gady, Franz-Stefan 2017**). Pakistan's decision to multiply warheads is understood to be a reaction to India's Ballistic Missile Defence Program (**Kristensen, Hans M., Norris, Robert S. & Diamond, Julia 2018**). On March 6, 2018, US DIA Director Lt Gen Robert Ashlet testified before the Senate Armed Services Committee about "South Asia's first MIRV payload" test by Pakistan in January 2017 (**Defense Intelligence Agency 2018**).
- 11) Cruise missile. The yield of warhead is 5-12 kiloton. Its development dates back to the 1990s, in reaction to India's cruise missile development plan (**Missile Defense Project 2018**). The first test launch was conducted on August 2005. The latest test launch was conducted on February 11, 2021 (**ISPR 2021-3**).
- 12) A Babur 1 variant with greater precision—owing to highly advanced aerodynamics and electronics—and an extended range of 700km, to

be used for both ground and naval targets. The yield of nuclear warhead is 5-12 kiloton. The first test launch was conducted on December 14, 2016 (ISPR 2016). The latest test, on March 19, 2020, failed, with the delivery platform crashing minutes after launch (WION 2020). On April 14, 2018, the Babur 1B, another variant of equivalent performance, was test-fired (ISPR 2018-2).

- 13) The range of the submarine-launched Babur 2 is 450 km. The yield of nuclear warhead is 5-12 kiloton. So far, two tests have been conducted, and the latest was on March 29, 2018 (ISPR 2018-1). If Babur 3 is operationalized, Pakistan will acquire a full triad of land-, air- and sea-based nuclear delivery system.
- 14) Equipped with U.S.-made missiles from 1983-87. It is capable of executing nuclear missions, but due to the restrictions in the purchase agreement made with the U.S. that prohibit it from use in nuclear missions it is expected that nuclear missions will be concentrated on Mirage fighter jets (Kristensen, Hans M & Kile, Shannon N. 2020).
- 15) Also used in test launches of the Ra'ad ALCM (Kristensen, Hans M & Kile, Shannon N. 2020). There is one school of thought that the Mirage V have been allotted for bombing missions using free-fall bombs (Kristensen, Hans M & Kile, Shannon N. 2020). The Pakistan Air Force currently owns 160 Mirage fighter jets (of which 120 are fighter bombers), and plans to purchase a further 36 from Egypt (Kristensen, Hans M & Kile, Shannon N. 2020). As a replacement for the aging Dassault Mirage III fleet, Pakistan has acquired the JF-17 (Thunder), which it has jointly developed with China (Kristensen, Hans M & Kile, Shannon N. 2020).
- 16) Air-launched cruise missile. 7 tests have been conducted, and the latest test launch was in 2016 (Kristensen, Hans M. & Kile, Shannon N. 2020). It is capable of stealth mode and precision guidance, according to Pakistani government sources (Kristensen, Hans M. & Norris, Robert S. 2016). The source of information on payload is IHS Jane's 2015-2.
- 17) Air launched cruise missile. This is an improved version of the Ra'ad with an increased range. The Ra'ad II made its first appearance in a military parade on March 23, 2017. The latest test launch was conducted on February 18, 2020 (ISPR 2020). According to the Pakistani government, its range is 600km and it is precision-guided (ISPR 2020).

#### 【Source】

**Defense Intelligence Agency 2018:** "Statement for the Record: Worldwide Threat Assessment," 6 March 2018, [https://www.dia.mil/News/Speeches-and-Testimonies/Article-View/Article/1457815/statement-for-the-record-worldwide-threat-assessment/utm\\_content/buffer03bbe/utm\\_medium/social/utm\\_campaign/buffer/utm\\_content/buffer6e4e7/utm\\_medium/social/utm\\_campaign/buffer/?utm\\_source=twitter.com](https://www.dia.mil/News/Speeches-and-Testimonies/Article-View/Article/1457815/statement-for-the-record-worldwide-threat-assessment/utm_content/buffer03bbe/utm_medium/social/utm_campaign/buffer/utm_content/buffer6e4e7/utm_medium/social/utm_campaign/buffer/?utm_source=twitter.com) (accessed April 9, 2021)

**The Economic Times 2019:** "Pakistan successfully conducts test launch of surface-to-surface ballistic missile," 18 November 2019, <https://economictimes.indiatimes.com/news/defence/pakistan-successfully-conducts-test-launch-of-surface-to-surface-ballistic-missile/articleshow/72107840.cms> (accessed April 9, 2021)

**Gady, Franz-Stefan 2017:** "Pakistan Tests New Ballistic Missile Capable of Carrying Multiple Nuclear Warheads," The Diplomat, 25 January 2017. <https://thediplomat.com/2017/01/pakistan-tests-new-ballistic-missile-capable-of-carrying-multiple-nuclear-warheads/> (accessed April 9, 2021)

**IHS Jane's 2015:** "Hatf-8 (Ra'ad)," Jane's Weapons, Strategic 2015-2016, pp.172-173.

**International Panel on Fissile Materials (IPFM) 2020:** "Fissile material stocks: Pakistan," <http://fissilematerials.org/countries/pakistan.html> (accessed April 8, 2021)

**ISPR 2016:** "Press release PR482/2016-ISPR," 19 January 2016. <https://www.ispr.gov.pk/press-release-detail.php?id=3163> (accessed April 9, 2021)

**ISPR 2017-1:** "Press release PR10/2017-ISPR," 9 January 2017. <https://www.ispr.gov.pk/press-release-detail.php?id=3672> (accessed April 9, 2021)

**ISPR 2017-2:** "Press release PR34/2017-ISPR," 24 January 2017. <https://www.ispr.gov.pk/press-release-detail.php?id=3705> (accessed April 9, 2021)

**ISPR 2018-1:** “Pakistan conducted another successful test fire of indigenously developed Submarine Launched Cruise Missile Babur having a range of 450 kms,” Press release PR125/2018-ISPR,” 29 March 2018. <https://www.ispr.gov.pk/press-release-detail.php?id=4660> (accessed April 9, 2021)

**ISPR 2018-2:** “Pakistan today conducted a successful test of an enhanced range version of the indigenously developed Babur Cruise Missile,” Press release PR142/2018-ISPR,” 14 April 2018. <https://www.ispr.gov.pk/press-release-detail.php?id=4693> (accessed April 30, 2021)

**ISPR 2019-1:** “Pakistan today successfully conducted training launch of short range surface to surface ballistic missile “Nasr” to enhance the operational efficiency of Army Strategic Forces Command besides re-validating the desired technical parameters,” Press release PR-32/2019-ISPR, 24 January 2019. <https://www.ispr.gov.pk/press-release-detail.php?id=5173> (accessed April 30, 2021)

**ISPR 2019-2:** “Pakistan today conducted another successful launch of short range surface to surface ballistic missile “Nasr”,” Press release PR-37/2019-ISPR, 31 January 2019. <https://www.ispr.gov.pk/press-release-detail.php?id=5179> (accessed April 30, 2021)

**ISPR 2019-3:** “Pakistan conducted successful training launch of surface to surface ballistic missile Shaheen-II,” Press release PR-104/2019-ISPR, 23 May 2019, <https://www.ispr.gov.pk/press-release-detail.php?id=5308> (accessed April 30, 2021)

**ISPR 2020:** “Pakistan conducted successful flight test of Air Launched Cruise Missile “Ra’ad-II,” Press release PR-27/2020-ISPR, 18 February 2020, <https://www.ispr.gov.pk/press-release-detail.php?id=5625> (accessed April 30, 2021)

**ISPR 2021-1:** “Pakistan today conducted successful flight test of Shaheen-III surface to surface ballistic missile, having a range of 2750 kilometers,” Press release PR-12/2021-ISPR, 20 January 2021, <https://www.ispr.gov.pk/press-release-detail.php?id=6019> (accessed April 9, 2021)

**ISPR 2021-2:** “Pakistan today conducted a successful training launch of surface to surface ballistic missile Ghaznavi, capable of delivering nuclear and conventional warheads upto a range of 290 kilometers,” Press release PR-19/2021-ISPR, 3 February 2021, <https://www.ispr.gov.pk/press-release-detail.php?id=6035> (accessed April 9, 2021)

**ISPR 2021-3:** “Pakistan today conducted a successful Training Launch of Babur Cruise Missile IA, with a range of 450 kilometers,” Press release PR-24/2021-ISPR, 11 February 2021, <https://www.ispr.gov.pk/press-release-detail.php?id=6043> (accessed April 9, 2021)

**ISPR 2021-4:** “Pakistan today conducted successful flight test of Shaheen-1A surface to surface ballistic missile, having a range of 900 kilometers,” Press release PR-59/2021-ISPR, 26 March 2021, <https://www.ispr.gov.pk/press-release-detail.php?id=6104> (accessed April 9, 2021)

**Kristensen, Hans M. & Kile, Shannon N. 2020:** “Pakistani nuclear forces,” SIPRI Yearbook 2020: Armaments and Disarmament and International Security,” pp.369-374.

**Kristensen, Hans M. & Korda, Matt 2021:** “Status of World Nuclear Forces,” Federation of American Scientists. <https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/> (accessed April 8, 2021)

**Kristensen, Hans M. & Korda, Matt 2019:** “Tactical nuclear weapons, 2019,” Bulletin of the Atomic Scientists, 75:5, 252-261. DOI: 10.1080/00963402.2019.1654273

**Kristensen, Hans M. & Norris, Robert S. 2016:** “Pakistan’s nuclear forces, 2016,” Bulletin of the Atomic Scientists, 72:6, 368-376, DOI: 10.1080/00963402.2016.1241520

**Kristensen, Hans M., Norris, Robert S. & Diamond, Julia 2018:** “Pakistan’s nuclear forces, 2018,” Bulletin of the Atomic Scientists, 74:5, 348-358, DOI: 10.1080/00963402.2018.1507796

**Missile Defense Project 2021,** “Missiles of Pakistan,” Missile Threat, Center for Strategic and International Studies, 14 June 2018, last modified 11 February 2021, <https://missilethreat.csis.org/country/pakistan/> (accessed April 9, 2021)

**Missile Defense Project 2019:** “Shaheen 3,” Missile Threat, Center for Strategic and International Studies, September 16, 2016, last modified January 3, 2019, <https://missilethreat.csis.org/missile/shaheen-3/> (accessed April 30, 2021)

**Missile Defense Project 2018-1:** “Hatf 5,” Missile Threat, Center for Strategic and International Studies, September 16, 2016, last modified June 15, 2018, <https://missilethreat.csis.org/missile/hatf-5/> (accessed April 9, 2021)

**Missile Defense Project 2018-2:** “Hatf 7 “Babur”,” Missile Threat, Center for Strategic and International Studies, September 16, 2016, last modified June 15, 2018, <https://missilethreat.csis.org/missile/hatf-7/> (accessed April 30, 2021)

**The Nation 2013:** “Pakistan test fires Hatf II Abdali missile,” 15 February 2013. <http://www.nation.com.pk/national/15-Feb-2013/pakistan-test-fires-hatf-ii-abdali-missile> (accessed April 30, 2021)

**Schell, Phillip Patton, Kile, Shannon N. & Kristensen, Hans M. 2015:** “Pakistani nuclear forces,” SIPRI Yearbook 2015 Armaments, Disarmament and International Security, Oxford University Press, 2015. pp.502–506.

**Union of Concerned Scientists 2009:** “Weapon Materials Basics (2009),” <http://www.ucsusa.org/nuclear-weapons/nuclear-terrorism/fissile-materials-basics#.WUTTElFpyM8> (accessed April 30, 2021)

**WION 2020:** “Pakistan’s ‘Babur II’ missile suffers second consecutive setback; crashes after two minutes,” 23 March 2020, <https://www.wionews.com/south-asia/pakistans-babur-ii-missile-suffers-second-consecutive-setback-crashes-after-two-minutes-288073> (accessed April 30, 2021)

©RECNA Nuclear Warhead Data Monitoring Team