

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**).

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

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- Nuclear warheads **165**
- 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			112				
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	18	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)
Ground-launched cruise missile			12				
Babur-1/1A (Alias : Hatf 7)	12	1	12	350	400 - 500	2014	11)
Babur-2/1B	?	1	?	700	?	In development	12)
Submarine-launched cruise missile							
Babur-3	?	1	?	450	?	In development	13)
Airborne bomb			36				
Loading machine : F-16A/B	?	1	?	1,600	4,500	1998	14)
Loading machine : Mirage III/V	36	1	36	2,100	4,000	1998	15)
Air-launched cruise missile			(5)				
Ra'ad (Alias : Hatf 8)	(5)	1	(5)	350	~400	2019?	16)
Ra'ad-2	?	1	?	> 350	~400	?	17)

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【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】

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