

DPRK nuclear weapons capability

[Overview]

North Korea is actively developing nuclear weapons and there are varying estimates regarding the size of its warheads. Kristensen and Norris put the figure at 10-20 warheads as of May 2018 (Kristensen, Hans M. & Norris, Robert S. 2018-2). Albright, on the other hand, believes the arsenal to range 13-30 by late 2016. This is based on such assumptions as, of 33kg of plutonium and 175-645kg of weapons-grade uranium in North Korea's possession, 70% converted into nuclear assets (Albright, David 2017). Kile and Kristensen see a graphite-moderated Magnox reactor at Nyeongbyeon producing, at rated power, 6kg of plutonium per annum, equivalent to one warhead (Kile, Shannon N. & Kristensen, Hans M. 2016). Albright, in contrast, says North Korea is increasing its nuclear ordnance at a rate of 3-5 warheads per year, likely resulting in 25-50 by 2020. Furthermore, according to Albright, Nyeongbyeon's light water reactor in operation could even push up the stockpile to 60 (Albright, David 2017).

North Korea has conducted six nuclear weapon tests: October 2006, May 2009, February 2013, January and September 2016 and September 2017. The last of these, a thermonuclear weapon, is estimated to have yielded 200kt. There is no publicly disclosed information suggesting that they have operationally deployed nuclear warheads. Analysis by many non-governmental organizations, however, agrees that North Korean technology is already capable of designing a compact warhead (Kile, Shannon N. & Kristensen, Hans M. 2016). And yet doubts persist as to whether its engineering competence is sophisticated enough to re-enter warheads into the atmosphere with sufficient stability (Wright, David 2017-8).

During this period, North Korea frequently fired ballistic missiles likely capable of carrying nuclear warheads. It has been developing ground-launched ballistic missiles of different ranges: sub-medium-range (1,000-3,000km), medium-range (3,000-5,000km), and ICBM (beyond 5,500km). Some of these are thought to have been deployed.

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● Nuclear warheads	10 ~ 20
Breakdown	
Ground-launched ballistic missile	?
Sea-launched ballistic missile	?

● Nuclear weapons delivery vehicles ^{1), 2)}

Name	Range (km)	Payload (kg)	Deployment year	Remarks
Ground-launched ballistic vehicles				
Scud-ER (Hwasong-9)	> 1,000	500	2016?	3)
Nodong (Hwasong-5)	> 1,200	1,000	1993?	4)
KN-15 (Pukkuksong-2)	> 1,000	?	In development	5)
Musudan (Hwasong-10 / BM-25)	> 3,000	1,000	2017?	6)
KN-17 (Hwasong-12)	3,300~ 4,500	1,000	In development	7)
Taepodong 2 (Paektusan-2, Unha-2, Unha-3)	> 12,000	> 800	2012?	8)
KN-20 (Hwasong-14)	10,400	?	In development	9)
KN-22 (Hwasong-15)	13,000	1,000?	In development	10)
Sea-launched ballistic missile				
KN-11 (Pukkuksong-1)	> 1,000?	?	In development	11)

[Notes]

- The nuclear capabilities of all the North Korean missiles are unclear. Unless otherwise specified the source for the range of nuclear weapons delivery and payload is Kristensen, Hans M. & Norris, Robert S. 2018-1.
- Except a Taepodong-2 missile which is launched from a silo, all ground-based ballistic missile are launched from road-mobile platforms.
- Single-stage, liquid fuel, with an extended range (ER). North Korea is believed to have fired three consecutive missiles on September 5, 2016 (Schiller, Markus & Schmucker, Robert H. 2016). The latest test, dated March 6, 2017, was a near-simultaneous quadruple launch. Three of these, flying at a height of 260km and over 1,000km, landed within Japan's exclusive economic zone (EEZ) (Wright, David 2017-1).
- Single-stage, liquid fuel. The first test launch dates back to 1993 (Kile, Shannon N. & Kristensen, Hans M. 2016). Launch platforms are seen to number 50 or less, with 175-200 vehicles in deployment (NTI 2018). In the recent past, on August 3, 2016, North Korea launched two (Nodong) ballistic missiles. One of these, flying some 1,000km, landed within Japan exclusive economic zone (EEZ) 250km off the coast of Akita Prefecture (the other exploded upon launch). Three more Nodongs were fired on September 3, 2016, striking Japan's EEZ some 200-250km west of Okushiri Island (Defense Ministry of Japan 2017).
- Single-stage, solid fuel. The KN-15 is understood to be a ground-launched variant of the KN-11. Its first test launch took place on February 12, 2017, flying 500km. On May 21 of the same year, North Korea test-launched the KN-15 for a second time (Missile Defense Project 2017).
- Single-stage, liquid fuel, based on the Soviet-manufactured R-27 (SS-N-6, a liquid fuel SLBM) (NTI 2018). Platforms number less than 50. It marked its public debut in a military parade in 2010 (NTI 2018). Six tests were conducted between April and June of 2016 (the first five failing and the last understood to have been partially successful) (NTI 2018).
- Single-stage, liquid fuel. The first test launch, on April 5, 2017, was a failure. On April 16 and 29 of the same year, North Korea continued to fail. Success was finally attained on May 14, with a lofted trajectory, at an altitude of 2,000km and a range of 700km. The missile flew into the Sea of Japan, outside of Japan's exclusive economic zone (EEZ). The flight duration was about 30 minutes. This would have translated into a normal ballistic trajectory of 4,500km (Wright, David 2017-2). On August 28 of the same year, a test launch succeeded at a normal trajectory (550km in altitude and 2,700km in range) (Wright, David 2017-5), scaling outer space above Japan's Tsugaru Strait and striking the Pacific Ocean. A test on September 15 of the same year also succeeded at a normal trajectory (770km in altitude and 2,700km in range) (Wright, David 2017-6), scaling outer space above Japan's Tsugaru Strait and striking the Pacific Ocean.
- Three-stage. Liquid-propellant. The first launch test in 2006 was a failure. It is thought that North Korea attempted test launches of a projectile with the aim of launching an artificial satellite on April 5, 2009 and April 13, 2012, both of which ended in failure. They announced that they had succeeded in launching a satellite on December 12, 2012. The US has identified "some sort of flying object" in orbit. On February 7, 2016, North Korea announced it enjoyed a successful launch of the Kwangmyongsong (KMS) 4, an earth observation satellite.
- Two-stage, liquid fuel. The first test launch, on July 4, 2017, traced a lofted trajectory of 2,800km in altitude and 950km in range, landing within Japan's EEZ. The flight time logged was 39 minutes, equivalent to a normal trajectory of 6,700km (Wright, David 2017-3). This was followed by another test on July 28 with a lofted trajectory (3,700km in altitude and 1,000km in range), again falling in Japan's EEZ. The flight time was 47 minutes, equivalent to a normal trajectory of 10,400km (Wright, David 2017-4).
- Two-stage, liquid propellant. The very first launch, on November 29, 2017, scaled a lofted trajectory of 4,500km in altitude and 960km in range, landing 250km off the west coast of Japan's Aomori Prefecture, within the country's EEZ. An equivalent normal trajectory would have been 13,000km (Wright,

David 2017-7).

- 11) Single-stage, solid propellant, a sea-launched variant of the Musudan (Hwasong-10). An underwater launch into the air is believed to have been conducted in April 2015. According to North Korea, it was launched by a submarine. Two failures are dated May 8 and November 28 of the same year. A similar launch test on December 21 is believed to have been underwater (**Umebayashi, Hiromichi 2016**). The very first SLBM launch from a submarine took place on April 23, 2016, in the waters near Sinpo. The range then attained, 30km, is thought to have been a failure. Similar SLBM tests took place on July 9 and August 24. A third test achieved 500km of flight (**NTI 2018**).

[Source]

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