



North Korea Missile Activity in 2017

February 12, 2017 – Medium Range Ballistic Missile Launch

Missile	Pukguksong-2, also known as the KN-15
Flight	The missile flew ~ 500 km (310 mi) on a lofted trajectory, reaching a height of ~ 550 km (340 mi).
Landed	Sea of Japan
Status	Success

What did we learn?

- This was the first flight test of KN-15, a land-based version of the KN-11.
- The missile uses solid fuel which reduces the preparation time necessary for a launch and the associated fueling infrastructure (trucks and staff) that would increase the detectability of the missile.

March 5, 2017 – Salvo Launch of Medium Range Ballistic Missiles

Missile	Four ballistic missiles launched simultaneously, allegedly a fifth missile failed to launch. The missiles were likely Extended-Range SCUDs.
Flight	The missiles flew ~ 1,000 km (620 mi), and reached an altitude of 260 km (160 mi)
Landed	Sea of Japan, three within Japan's Exclusive Economic Zone
Status	Success

What did we learn?

- Salvo launching ballistic missiles is a tactic for overwhelming an adversary's defense and monitoring systems. North Korea is likely testing its ability to launch such a strike.

March 22, 2017 – Failed Ballistic Missile Launch

Missile	Unknown
Flight	Unknown
Landed	Exploded seconds after launch
Status	Failure

What did we learn?

- Very little about this test is known, other than that a ballistic missile exploded within seconds of launch. There is [another theory](#) that the missile may have exploded before even being launched.

April 5, 2017 – Failed Short Range Ballistic Missile Launch

Missile	Originally deemed a KN-15, but could also be an older extended-range liquid-fueled SCUD.
Flight	Flew about 60 km (40 mi), reaching an altitude of about 190 km (120 mi) (Reportedly “pinwheelled” and spun out of control early into its flight)
Landed	Sea of Japan
Status	Deemed a failure

What did we learn?

- There is a lot of uncertainty surrounding this test. This test was conducted ahead of a meeting between U.S. President Trump and Chinese President Xi, which could explain the launching of an already- operational missile, such as the SCUD, as a way to credibly signal resolve.

April 16, 2017- Failed Medium Range Ballistic Missile Launch

Missile	KN-17
Flight	Failed seconds after launch
Landed	Exploded seconds after launch
Status	Failure

What did we learn?

- The missile appears to be a single stage, liquid-fueled missile. Because it uses liquid fuel, the missile must be fueled shortly before launching, increasing its vulnerability to detection during the process.

April 28, 2017 – Failed Medium Range Ballistic Missile Launch

Missile	Unknown, but presumed KN-17
Flight	Traveled about 35 km (22 mi)
Landed	Exploded seconds after launch
Status	Failure

What did we learn?

- This test was similar to the previous test, both of which are considered failures.

May 13, 2017 – Intermediate Range Ballistic Missile Launch

Missile	Hwasong-12
Flight	Traveled ~ 700 km (430 mi) at very steep trajectory, reaching a peak altitude of ~ 2,100 km (1,300 mi)
Landed	Sea of Japan, ~ 100 km (60 mi) from Russian coast
Status	Success

What did we learn?

- North Korea's flight test of this new intermediate range missile demonstrates a new level of capability. On a less steep trajectory, [estimates](#) indicate the missile could have traveled 4,500 km (2,800 mi), which would place U.S. military installations in Guam within range.
- North Korea also claims it tested a heat shield for its reentry vehicle. But the steep flight path of this test would simulate a shorter, less intense reentry than would be required of an intercontinental ballistic missile.

May 21, 2017 – Medium Range Ballistic Missile Launch

Missile	Pukguksong-2, also known as KN-15 (A land-based version of the submarine launched KN-11)
Flight	Traveled ~ 500 km (300 mi), reaching an altitude of ~ 550 km (350 mi)
Landed	Sea of Japan
Status	Success

What did we learn?

- This launch was a similar test to the February 2017 test of the same missile.
- The missile uses solid fuel which reduces the preparation time necessary for a launch and the associated fueling infrastructure (trucks and staff) that would increase the detectability of the missile.

May 29, 2017 – Short Range Ballistic Missile Launch

Missile	Scud Missile (with guided reentry vehicle) (unconfirmed)
Flight	Traveled around 400 km (250 mi) at a maximum altitude around 120 km (75 mi)
Landed	Sea of Japan
Status	Success

What did we learn?

- North Korea claims the launch demonstrated its ability to launch a guided warhead with “control wings.”

June 8, 2017 – Short Range Anti-Ship Cruise Missile Launches

Missile	Anti-Ship Cruise Missiles (Estimate of 4 missiles fired)
Flight	Traveled around 200 km (125 mi)
Landed	Sea of Japan
Status	Success

What did we learn?

- North Korea is continuing to work towards supplementing its missile capabilities with guided cruise missile.

July 4, 2017 – Intercontinental Ballistic Missile Launch

Missile	Hwasong -14
Flight	Traveled more than 930 km (580 mi), reached an apogee of around 2800 km (1,740 mi), flew for around 40 minutes.
Landed	Sea of Japan
Status	Success

What did we learn?

- This launch represents the reaching of the Intercontinental Ballistic Missile (ICBM) milestone for North Korea. While this launch was flown on a steep trajectory, if flattened out, experts have speculated that the missile could have a range of 6,700 kilometers (4,163 miles).
 - To be classified as an ICBM, a missile must have a minimum range of 5,500 km (3,418 mi).
- At these ranges, the missile could reach Alaska, but not the continental U.S.
- The missile will require further testing before it can be deemed a reliable deterrent. A functional ICBM is only part of what makes a nuclear deterrent. North Korea will also need to perfect the ability to shrink a nuclear warhead to fit on a missile (which North Korea is believed to be working on) and the ability to accurately reenter the Earth's atmosphere and deliver the payload to its designated target, which North Korea has not yet demonstrated.

July 28, 2017 – Intercontinental Ballistic Missile Launch

Missile	Modified Hwasong -14
Flight	Traveled about 1000 km (600 mi), reached an apogee of around 3,700 km (2,300 mi), flew for 47 minutes.
Landed	Sea of Japan
Status	Success

What did we learn?

- This missile flew on a lofted trajectory, like the July 4 test; had it been a standard trajectory, it would have a range of around 10,400 km (2,300 mi).
- This modified version of the previously-tested Hwasong-14 could theoretically, therefore, reach almost all of the continental United States.
- The missile was launched at night, and immediate preparations of the launch site do not appear to have been detected; North Korea is likely seeking to demonstrate the hypothetical difficulty of destroying an ICBM before launch.
- The missile appears to use the same first stage as the July 4 test, but with a larger and more powerful second stage. This fits the general pattern of relentless North Korean efforts to improve ballistic missile technology.
- While the missile could theoretically reach the continental U.S., however, North Korea has yet to demonstrate a miniaturized warhead, survivable re-entry vehicle or effective targeting system, all of which it will need to reliably threaten the U.S.

August 26, 2017 – Short Range Missile Launch

Missile	Three short range missiles launched at 10 minute intervals
Flight	The first and third missiles traveled about 250 km (155 mi); the second exploded shortly after launch
Landed	Sea of Japan
Status	First and third missiles success; second failure

What did we learn?

- For the first time, North Korea used a multiple-tube rocket launcher to fire the missiles. This represents an advance in capabilities.
- These were the first tests since American Secretary of State Rex Tillerson praised North Korea for “showing some level of restraint” after the country went almost a month without testing a missile.
- The launch coincided with the ongoing U.S.-South Korean military exercises, which North Korea typically condemns.

August 28, 2017 – Intermediate Range Ballistic Missile Launch

Missile	Hwasong -12
Flight	Traveled about 2,700 km (1,678 mi), reached an apogee of around 550 km (342 mi), flew for 47 minutes
Landed	Pacific Ocean
Status	Success

What did we learn?

- The missile was launched from near Pyongyang’s international airport, raising the possibility that it was a road-mobile missile launched from an airport runway.
- In the past, North Korea has gone to great lengths to ensure that its missiles don’t overfly nearby countries. However, this missile flew over the northern Japanese island of Hokkaido.
- On previous occasions when North Korean missiles passed over Japan, North Korea claimed that they were civilian missiles [launching satellites](#). Thus far, North Korea has made no pretense that the missile was for civilian purposes.
- The launch coincided with the ongoing U.S.-South Korean military exercises. Although North Korea typically condemns the exercises, firing a missile over Japan represents a new level of provocation.

September 14, 2017 – Intermediate Range Ballistic Missile Launch

Missile	Hwasong -12
Flight	Traveled about 2,300 miles, reached an apogee of approximately 500 miles, flew for approximately 19 minutes
Landed	Pacific Ocean; 1,370 miles east of the Japanese island of Hokkaido
Status	Success

What did we learn?

- As in the previous launch, the missile was launched from near Pyongyang's international airport and overflew Japan.
- According to [news sources](#), U.S. officials were aware of the possibility of an upcoming launch, as they had seen the missile being fueled on the launching pad up to a day before launch.
- The missile traveled further overground than any previous launch, and demonstrated the ability to reach the American air base in Guam.
- South Korea responded by testing a Hyunmoo-2 ballistic missile.

October 28, 2017 – Intermediate Range Ballistic Missile Launch

Missile	Hwasong -15
Flight	Traveled about 590 miles, reached an apogee of approximately 2,800 miles, flew for approximately 53 minutes
Landed	Pacific Ocean, 130 miles west of the Japanese Aomori prefecture
Status	Success

What did we learn?

- The missile was launched during the North Korean night from a new transportation erection launcher, indicating that missiles can likely be launched with little warning and are highly survivable.
- This missile flew on a lofted trajectory, like the July 28 Hwasong-14 test; had it been a standard trajectory, it would have a range of around 8,100 mi, putting East Coast targets in range for the first time (though it is unclear whether they could be reached with the additional weight of a nuclear warhead).
- The Hwasong-15 appears to be a revised Hwasong-14 with a much larger re-entry vehicle that potentially provides room for a larger nuclear warhead or MIRVs.

Sources: U.S. Pacific Command, South Korea Ministry of National Defense, CNN, Reuters, Washington Post, Union for Concerned Scientists, CSIS.