

# Recent Missile & Nuclear Development of North Korea

August 2023

Japan Ministry of Defense

# Recognition concerning North Korea's Capabilities of Nuclear Weapons and Ballistic Missiles

- North Korea's ultimate goal is allegedly *the maintenance of the existing regime*. North Korea is believed to consider that *having its own nuclear deterrence is essential* to counter the modern conventional forces of the U.S. and South Korea, as well as the threat from the U.S., which includes nuclear weapon. To this end, North Korea is *advancing the development of ballistic missiles as the means of nuclear delivery, in addition to the nuclear weapon itself*.
- In addition, given the technological maturity obtained through a series of nuclear tests, North Korea is assessed to have already miniaturized nuclear weapons to fit ballistic missile warheads and at least *possesses the capability to launch an attack on Japan with a ballistic missile such as Nodong and Scud fitted with the nuclear warhead*, while it is unclear about longer-range missile.
- It also referred to *the development of "tactical nuclear weapons,"* improving its hit rate on targets within a 15,000 km range and its *"preemptive and retaliatory nuclear strike capabilities,"* as its future goals. *North Korea continues strengthening its nuclear capabilities*.
- Moreover, new trends have been observed. Since May 2019, North Korea has also repeatedly launched *new types of short-range ballistic missiles (SRBMs) capable of flying at low altitudes with irregular trajectories* and other missiles. North Korea is believed to be planning to rapidly improve its related technology and operational capabilities. North Korea intends to make identification of signs of launch, detection and interception difficult by launching them from various platforms such as Transporter-Erector-Launchers (TEL), submarines and railway cars. In this way, North Korea has been striving to *expand more actual warfighting-oriented missile capabilities*.
- Furthermore, North Korea has also sought to operationalize its *long-range cruise missiles* and to realize *hypersonic missiles* and *solid fuel-propelled ICBMs*, etc. North Korea has repeatedly disclosed that a plan called the *"five-year plan for the development of the defence science and the weapon system"* was presented at the Congress of the KWP in January 2021. It is expected to *continue to focus efforts on the development of various missiles and other weapons in line with this plan*.
- The background for North Korea's series of development and launches may be that, in addition to acquiring nuclear deterrent capabilities through the possession of nuclear weapons and long-range ballistic missiles for the maintenance and survival of the regime, North Korea aims to *acquire the means to be able to respond in armed conflict that could occur between itself and the United States and ROK forces in which conventional forces or tactical nuclear weapons are used, and to take an initiative to manage the situation at every stage of escalation*.
- North Korea has announced that it will never abandon its nuclear weapons and has repeatedly launched missiles at an unprecedented high frequency. In this way, North Korea still maintains its stance to continue developing nuclear and ballistic missiles. In addition, *there is also the possibility it will engage in further provocative action*. Such North Korea's military activities pose an even more grave and imminent threat to Japan's national security than ever before.



(Image: "Rodong Sinmun")

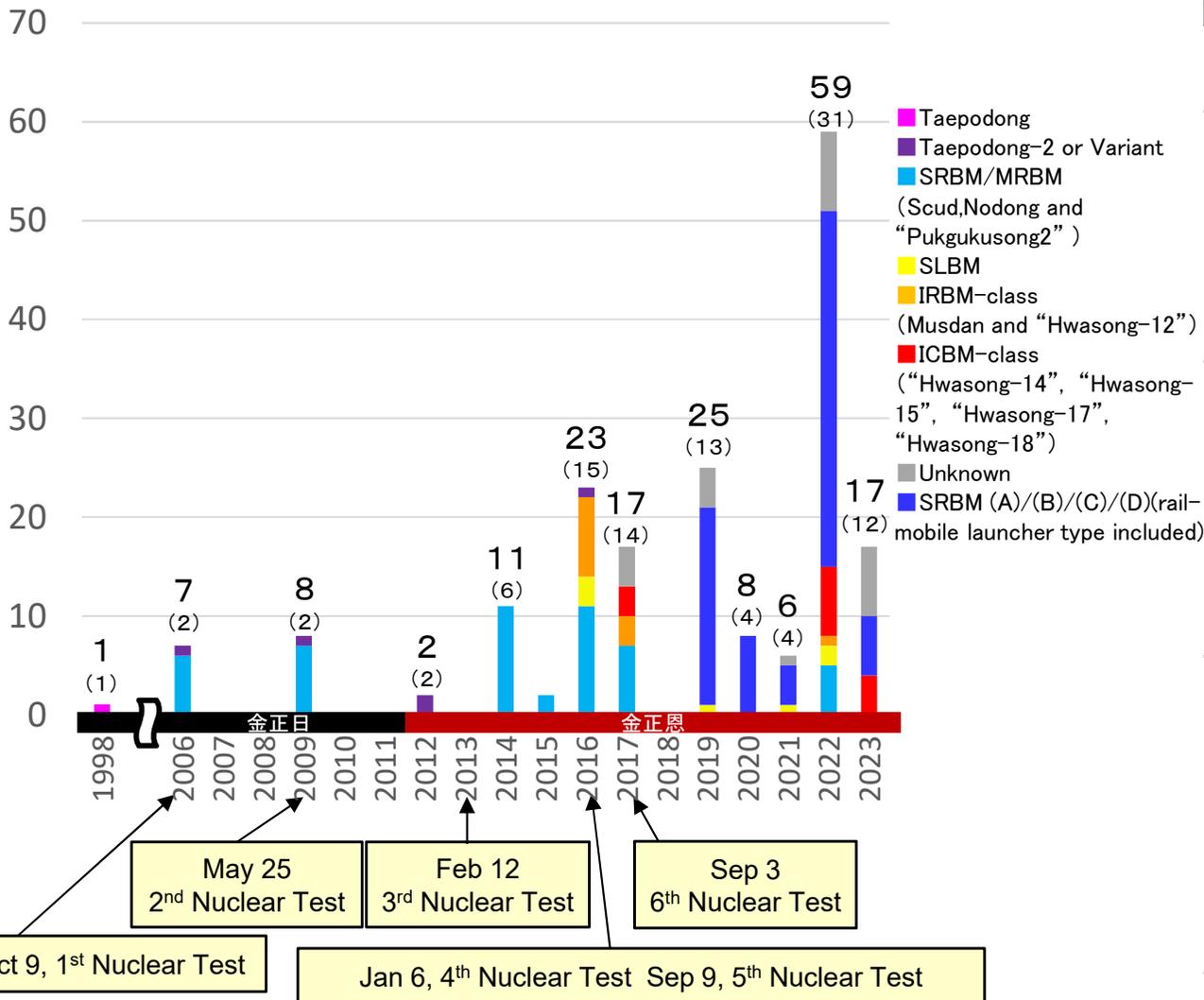
## The military goals presented by Chairman Kim Jong-un at the 8th Congress of the KWP (January 2021)

- Further advancement of nuclear technology
- Further development of smaller and lighter nuclear weapons for tactical uses
- Continuous promotion of the production of super-sized nuclear warheads
- Advancement of nuclear preemptive and retaliatory strike capabilities by further improving the accuracy rate of striking any strategic targets within a range of 15,000 km with pinpoint accuracy
- Development and introduction of "hypersonic gliding flight warheads" within a short time period
- Promotion of underwater and land-based solid fuel-propelled intercontinental ballistic missile development projects
- Possession of nuclear-powered submarines and underwater-launched nuclear strategic weapons
- Operation of military reconnaissance satellites in the near future
- Development of various reconnaissance means, including unmanned reconnaissance aircraft capable of reconnoitering up to 500km deep into the front

# Nuclear Tests and Ballistic Missile Launches by North Korea(Overview)

- From 2016 to 2017, North Korea has conducted **3** nuclear tests and launched as many as **40** ballistic missiles.
- Especially in the latter half of 2017, it repeatedly launched **long-range** ballistic missiles, including **new types**.
- Since May 2019, it repeatedly launched new types of **short-range ballistic missiles capable of flying at low altitudes with irregular trajectories**.
- Since September 2021, it successively launched **what it calls "hypersonic missile"** and **a new type of submarine-launched ballistic missile(SLBM) presumed to fly with irregular trajectory**, etc. and is diversifying their launch modes to include rail-launched and submarine-launched types. In addition, since 2022, North Korea has repeatedly launched missiles –including **ICBM-class ballistic missiles- at an unprecedented high frequency**, unilaterally escalating its provocations against international community.

**Nuclear Tests and Ballistic Missile Launches by North Korea**



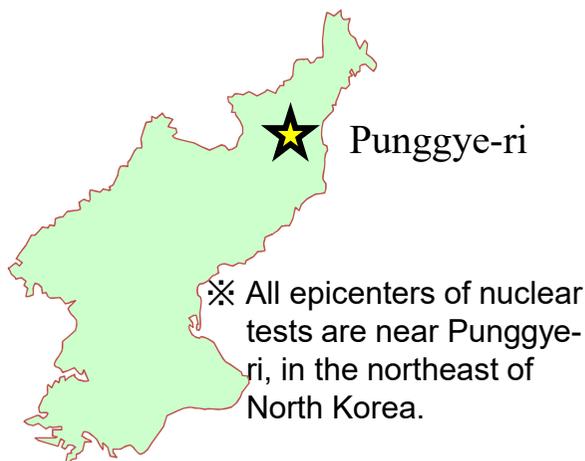
**Number of Nuclear Tests and Ballistic Missile Launches by North Korea**

Leader	Year	Missile Launches	Nuclear Tests
<b>Kim Il Sun</b> 	1993	Unknown	—
<b>Kim Jong-il</b> 	1994 to 2011	16 (Launched in 1998, 2006, and 2009)	2
<b>Kim Jong-un</b> 	2012 to present	<b>170</b>	<b>4</b>

(Image : ROK Ministry of Unification North Korea Information Portal)

# Nuclear Development of North Korea

## Nuclear Tests by North Korea



Larger yield than those of the past five tests

	Oct 2006	May 2009	Feb 2013	Jan 2016	Sep 2016	Sep 2017
Size of earthquake (released by CTBTO)	M4.1	M4.52	M4.9	M4.85	M5.1	M6.1
Estimated yield	Approx. 0.5-1kt	Approx. 2-3kt	Approx. 6-7kt	Approx. 6-7kt	Approx. 11-12kt	Approx. 160kt

【Ref】 Hiroshima: approx. 15kt(Uranium) Nagasaki: approx. 21kt(Plutonium)

## H-bomb acquisition

○ After the 6<sup>th</sup> nuclear test on Sept 3, 2017, North Korea announced that it **successfully carried out a test of H-bomb.**

➔ **It is difficult to deny the possibility that North Korea conducted a H-bomb test according to the estimated yield.**

## Miniaturization/ Warhead acquisition

○ After the 5<sup>th</sup> nuclear test on Sept 9, 2016, North Korea announced that it was **the first successful test explosion of a nuclear warhead**, and after the 6<sup>th</sup> nuclear test it announced that it **successfully carried out a test of H-bomb for ICBM.**

➔ **Considering technical maturity, North Korea is assessed to have already miniaturized nuclear weapons to fit ballistic missile warheads and possess the capability to launch an attack on Japan with a ballistic missile such as Nodong and Scud ER fitted with the nuclear warhead.**



Kim Jong-un inspects an object that North Korea claims to be a "H-bomb" to be loaded into new ICBM

# Period and number of tests required for nuclear weapons states to miniaturize nuclear weapons

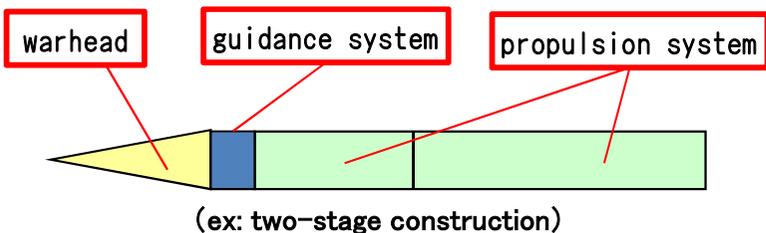
	First time	1 year	2 years	3 years	4 years	5 years	6 years	7 years	
<b>U S</b> 	1945/7/16 (21Kt) Mk-3 weight:4.67t diameter:152cm						1951/4/2 1(47Kt) Mk-5(TX-5D) weight:1.37t diameter:111cm		
		<b>12 tests (6 years)</b> (except for drop in Hiroshima and Nagasaki)							
former Soviet Union 	1949/8/29 (22Kt) RDS-1 weight:4.7t (presumed)						1953/8/23 (28Kt) RDS-4 weight:1.4t(presumed)		
		<b>4 tests (4 years)</b>							
<b>U K</b> 	1952/10/3 (25Kt) Blue Danube weight:4.5t diameter:155cm						1956/9/27 (15Kt) Red Beard weight:0.9t diameter:91cm		
		<b>5 tests (4 years)</b>							
<b>France</b> 	1960/2/13 (65Kt)			1962/5/1 (40Kt) AN-11 weight:1.5t					
		<b>5 tests (2 years)</b>							
<b>China</b> 	1964/10/16 (22Kt)			1966/10/27 (12Kt) DF-2 warhead weight:1.5t					
		<b>3 tests (2 years)</b>							

\* As for the payload of ballistic missiles held by North Korea, it is pointed out that that of Nodong is 700~1,200kg and that of Scud ER is 300kg. (Jane's)

# About Ballistic Missiles

- A **ballistic missile** is a rocket engine-propelled missile that flies on a parabolic trajectory. It is capable of attacking distant targets. It can be used as a **means of delivering WMDs, such as nuclear, biological, and chemical weapons.**
- As such, **effectively countering it requires a highly accurate interceptor missile system.**

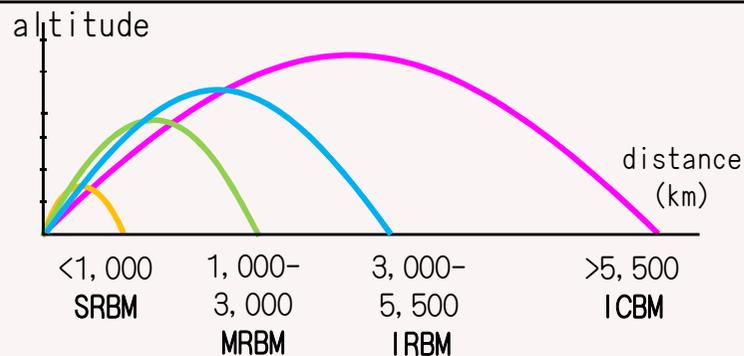
## Component of an ordinary ballistic missile



## Category of ballistic missiles

Description	Range
Short Range Ballistic Missile, SRBM	Under approx. 1,000 km or less
Medium Range Ballistic Missile, MRBM	Approx. 1,000 to under approx. 3,000 km
Intermediate Range Ballistic Missile, IRBM	Approx. 3,000 to under approx. 5,500 km
Inter-Continental Ballistic Missile, ICBM	Approx. 5,500 km or more

## Flight image of ballistic missiles for each category

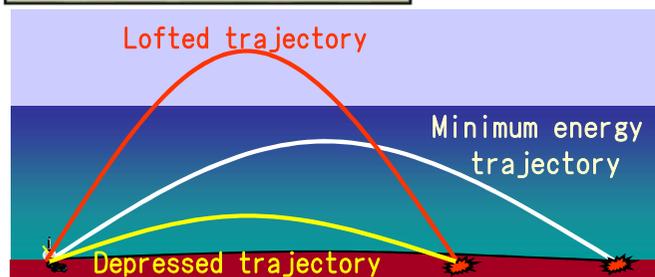


## Difference between ballistic missiles and cruise missiles

Ballistic Missiles	Cruise Missiles
<ul style="list-style-type: none"> <li>• A ballistic missile is a rocket engine-propelled missile that flies on a parabolic trajectory. It is capable of attacking distant targets.</li> <li>• Fly at high speed.</li> </ul>	<ul style="list-style-type: none"> <li>• Basically a jet engine propelled guided missile similar to an aircraft.</li> <li>• It is possible to fly at low altitude.</li> <li>• They can reroute during flight and are highly accurate.</li> </ul>

## Various trajectory

It is possible to take several flight trajectories by control after launch.



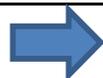
- **Minimum energy trajectory:** The most effective flight pattern
- **Lofted trajectory:** Compared to the minimum energy trajectory, it is difficult to deal with the missile launched on a lofted trajectory due to the high altitude and the fall at a high depression angle.
- **Depressed trajectory:** Compared to the minimum energy trajectory, missiles fly at high speeds with low altitude, so it is necessary to intercept them in a short time.

## Difficulties in ballistic missile interception

It is necessary to intercept them in a very short time.

It is necessary to accurately guide and control an intercepting missile up to a high altitude and to make it hit a ballistic missile directly in order to reliably intercept.

It is necessary to reliably detect and track small and fast target.



**A highly accurate interceptor missile system is required**

※Category is based on Ballistic & Cruise Missile Threat. (created by National Air and Space Intelligence Center) on the US Missile Defense Agency's Homepage.

# Recent Trends of North Korea's Ballistic Missile Development

- **Missile-related technologies**: Enhancement of **launch secrecy and instantaneity**, and **capability to breach BMD** for more practical technology acquisition/Development of **new type of ICBM-class** ballistic missile
- **Missile operational capabilities**: Enhancement of capabilities such as **saturation attacks** through simultaneous launches, launches at very short intervals, and launches from different locations to a specific target

## Missile-related technologies

### Enhancement of launch secrecy and instantaneity

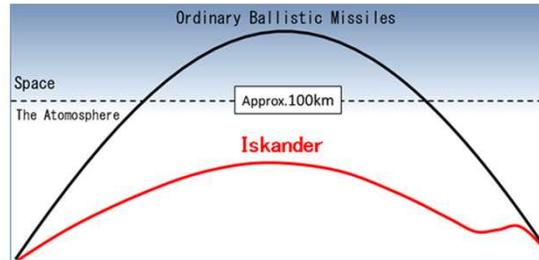


- ◆ Launches from **various platforms**
- ◆ Launching **from any point** and **hiding**
- ◆ **Solid fuel** for ballistic missiles

⇒ Pursuit of **secrecy and instantaneity of launch**

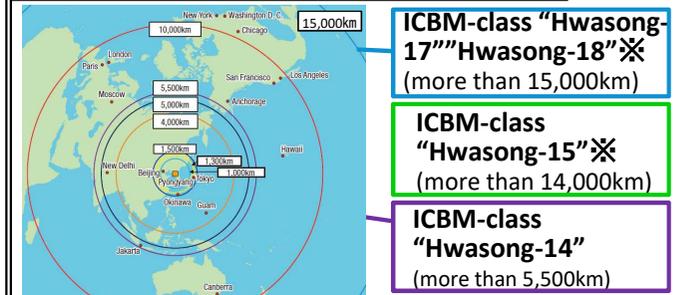
### Enhancement of capability to breach BMD

- ◆ BMs flying at **lower altitudes** and with **irregular trajectories**
- ◆ Development of **“hypersonic gliding flight warheads”**



⇒ Seeking to **make it difficult to intercept and breach BMD**

### Development of Long-Range BMs



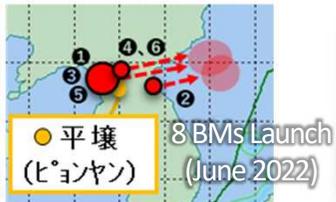
\*Depends on weight of the warhead, etc.  
◆ **“Hwasong-15”'s maximum range is more than 14,000km (launched from Pyongyang), which includes the whole U.S. territory.**

⇒ Concern for NK to may misrecognize that it has secured **a strategic deterrence against the U.S.**

⇒ Risk of **escalation of provocations** by NK

## Missile operational capabilities

- ◆ Simultaneous launches of multiple missiles



4 BMs Launch (March 2017)

8 BMs Launch (June 2022)



- ◆ Launches at very short intervals in less than 1 minute



SRBM (November 2019)

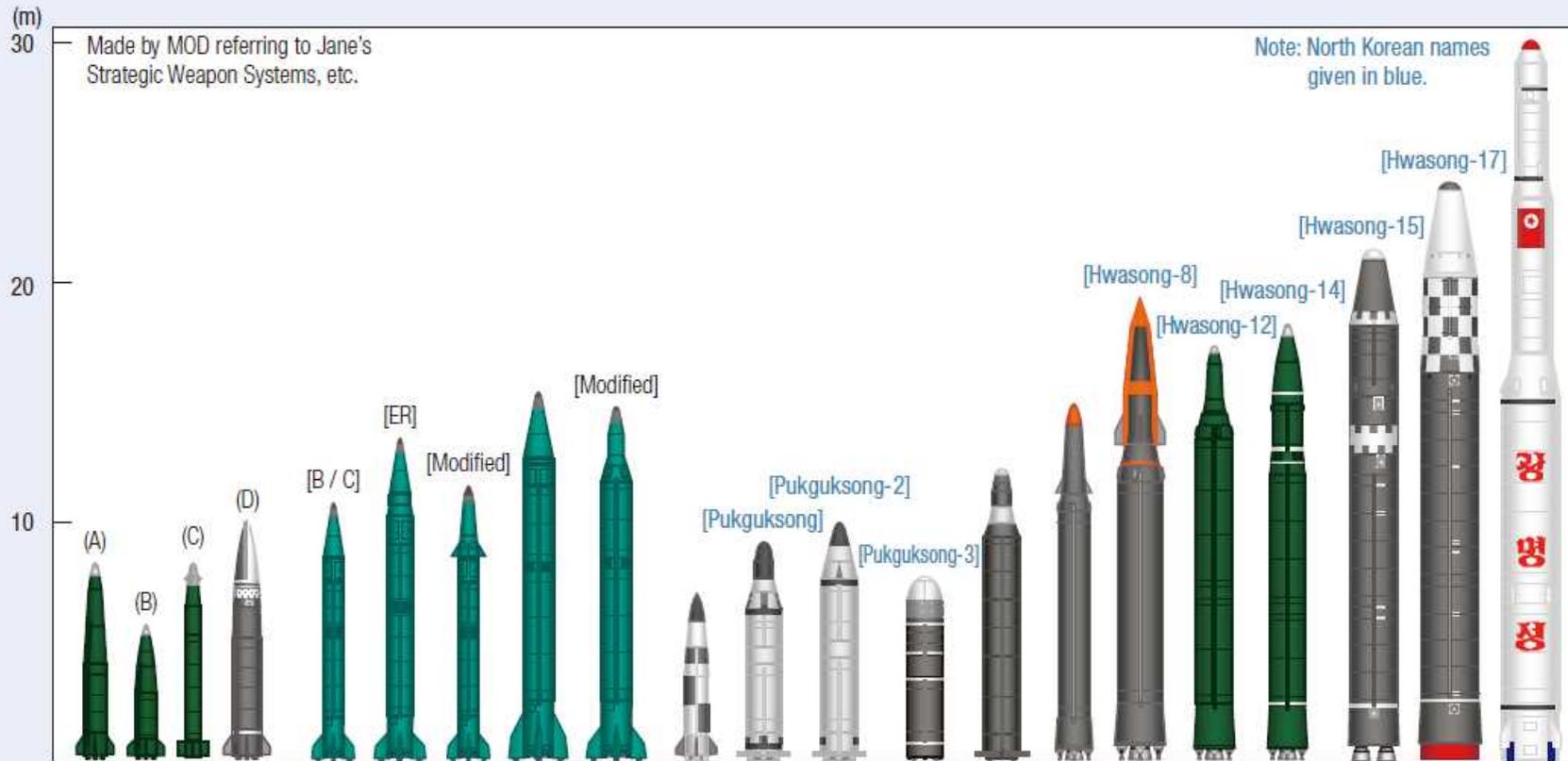
- ◆ Launches from different locations to a specific target



Landing on a specific target (August 2019)

⇒ Pursuing enhancement of **practical missile operational capabilities** such as **saturation attacks**

# North Korea's Ballistic Missiles and Other Missiles



	SRBM (A) / (B) / (C) / (D)				Scud B, C, ER, Modified		Nodong Modified	New type SLBM	SLBM	SLBM modified for ground launch	SLBM	Musudan	Ballistic Missiles Referred to as "Hypersonic Missiles"	(Possible) Ballistic Missiles Referred to as "Hypersonic Missiles"	IRBM-class	ICBM-class	ICBM-class	ICBM-class	Taepodong-2 variant
Range	Approx. 800 km / Approx. 400 km / Approx. 400 km / Approx. 750km*1				Approx. 300 km / Approx. 500 km / Approx. 1,000km / Under analysis		Approx. 1,300 km / Approx. 1,500 km	Approx. 650 km*1	1,000 km or more	1,000 km or more	Approx. 2,000 km	Approx. 2,500-4,000 km	—*2	—	Approx. 5,000 km	5,500 km or more	14,000 km or more*3	15,000 km or more*3	10,000 km or more
Fuel/ stage	Solid / 1	Solid / 1	Solid / 1	Solid / 1	Liquid / 1		Liquid / 1	Solid / 1	Solid / 2	Solid / 2	Solid / 2	Liquid / 1	Liquid / 1	Liquid / 1	Liquid / 1	Liquid / 2	Liquid / 2	Liquid / 2	Liquid / 3
Operation platform	TEL	TEL	TEL	TEL	TEL		TEL	Submarines	Submarines	TEL	Submarines	TEL	TEL	—	TEL	TEL	TEL	TEL	Launch site

※1 Ranges of SRBM(A)·(B)·(C)·(D) and new type SLBMs are the largest ones achieved.

※2 At the time of launch on January 5, 2022, the ballistic missile referred to as a "Hypersonic Missile" flew about 500 km if it were launched with a normal ballistic trajectory. It is also believed that the flight distance may have been longer than this, but analysis is currently being conducted.

※3 Depends on weight of the warhead, etc.

# Major missiles that NK has been developing and possessing in recent years(1)

(Sources: "Rodong Sinmun", etc.)

	SRBM (A)	SRBM (B)	SRBM (C)	SRBM (D)	SRBM (launched from rail-mobile launcher)
					
Name by NK	"new type of tactical guided weapon"	"new weapon" "tactical guided weapon"	"super-large multiple rocket launcher"	"new-type tactical guided missile"	—
Cases of launches	11 times 2019: 5/4, 5/9, 7/25, 8/6 2022: 1/27, 6/5, 10/1, 10/6, 10/14 2023: 3/19, 3/27	5 times 2019: 8/10, 8/16 2020: 3/21 2022: 1/17, 6/5	17 times 2019: 8/24, 9/10, 10/31, 11/28 2020: 3/2, 3/9, 3/29 2022: 5/12, 6/5, 9/29, 10/6, 10/9, 11/3, 11/17, 12/31 2023: 1/1, 2/20	2 times (2021: 3/25 2022: 9/28)	2 times (2021: 9/15 2022: 1/14)
Range	Approx. 800km	Approx. 400km	Approx. 400km	Possibly up to approx. 750km	Approx. 750km
Fuel	Solid				
Operation platform	TEL				North Korea announced "railway-borne missile"
Remarks	<ul style="list-style-type: none"> <li>Without canister</li> <li>In terms of the shape, the missile has a similarity to that of the Russian SRBM "Iskander."</li> <li>It is presumed that the missile is able to fly at a lower altitude than conventional ballistic missile with an irregular trajectory.</li> </ul>	<ul style="list-style-type: none"> <li>Square canister</li> <li>In terms of the shape, the missile has a similarity to that of the U.S. "ATACMS."</li> <li>It is presumed that the missile is able to fly at a lower altitude than conventional ballistic missile with an irregular trajectory.</li> </ul>	<ul style="list-style-type: none"> <li>Cylindrical canister</li> <li>Some of the intervals between launches were estimated less than 1 minute.</li> <li>The missile flies at an altitude of approximately 100 km or less.</li> </ul>	<ul style="list-style-type: none"> <li>North Korea referred to as "a weapon system whose warhead weight has been improved to be 2.5t with the use of tactical guided missile that was already developed."</li> <li>It is presumed that the missile is able to fly at a lower altitude than conventional ballistic missile with an irregular trajectory.</li> </ul>	<ul style="list-style-type: none"> <li>In terms of the shape, the missile has a similarity to that of the SRBM (A).</li> <li>North Korea referred to as "the railway-borne system deployed for action."</li> <li>It is presumed that the missile is able to fly at a lower altitude than conventional ballistic missile with an irregular trajectory.</li> </ul>

Note: Ranges are the largest ones achieved.

# Major missiles that NK has been developing and possessing in recent years(2)

(Sources: "Rodong Sinmun", etc.)

	Intermediate-Range Ballistic Missile (IRBM) class	Intercontinental Ballistic Missile (ICBM) class	Intercontinental Ballistic Missile (ICBM) class	Intercontinental Ballistic Missile (ICBM) class
				
Name by NK	"Hwasong-12"	"Hwasong-15"	"Hwasong-17"	"Hwasong-18"
Cases of launches	<p>4 times</p> <p>(2017: 5/14, 8/29, 9/15)</p> <p>2022: 1/30</p>	<p>2 time</p> <p>(2017: 11/29)</p> <p>2023: 2/18</p>	<p>8 times</p> <p>(2022: 2/27, 3/5, 3/24, 5/4, 5/25, 11/3, 11/18)</p> <p>2023: 3/16</p>	<p>2 times</p> <p>(2023: 4/13, 7/12)</p>
Range	Approx. 5,000km	14,000km or more(※)	15,000km or more (※)	15,000km or more(※)
Fuel	Liquid	Liquid	Liquid	Solid
Operation platform	TEL	TEL	TEL	TEL
Remarks	<ul style="list-style-type: none"> <li>On August 29 and September 15, 2017, each missiles flew over Japan's territory. They flew about 2,700km and 3,700km each other.</li> </ul>	<ul style="list-style-type: none"> <li>NK announced "the state nuclear force completed" after the first launch on November 29, 2017.</li> <li>NK announced after the launch on February 18, 2023 that the General Missile Bureau oversaw the "launch exercise"</li> <li>9-axle TEL</li> </ul>	<ul style="list-style-type: none"> <li>first appeared at the military parade on October 10, 2020.</li> <li>NK announced the launches on February 27 and March 5, 2022 as a "test-fire for 'reconnaissance satellite development'".</li> <li>NK announced the launches on November 18, 2022 and March 16, 2023 as "(ICBM) test-fire" and "launch training." respectively.</li> <li>larger than the "Hwasong-15," it is pointed out that this missile is intended to be equipped with a larger warhead or multiple warheads.</li> <li>the 11-axle TEL with the largest number of wheels in the world, pointed out as being made in North Korea</li> </ul>	<ul style="list-style-type: none"> <li>first appeared at the military parade on February 8, 2023.</li> <li>NK announced the launch on April 13, 2023 as its "first test-fire".</li> <li>NK announced the launch on July 12, 2023 as "test-fire for further validating the technological and operational reliability".</li> <li>this missile is possibly sold fuel-propelled, ejected by a "cold launch system", judging from the size of TEL (with canister), missiles and launch method.</li> <li>9-axle TEL</li> </ul>

(※) The range depends on weight of the warhead, etc.

# Major missiles that NK has been developing and possessing in recent years(3)

(Sources: "Rodong Sinmun", etc.)

	Ballistic missile (possible)	New type ballistic missile	SLBM	New type SLBM
				
北朝鮮の 呼称	“Hwasong-8”	“Hypersonic missile”	“Pukguksong-3”	“New type submarine-launched ballistic missile”
発射事例	1 time (2021:9/28)	2 times (2022:1/5, 1/11)	1 time (2019:10/2)	〔 3 times 2021:10/19 2022:5/7, 9/25 〕
射程	—	Approx. 700km or more(※)	Approx. 2,000km	Approx. 650km(※)
推進方式	—	—	Solid	Solid
運用	—	TEL	Submarine * There is possibility of launch from underwater launch test equipment	GORAE class submarine
備考	<ul style="list-style-type: none"> <li>NK referred to as “hypersonic missile Hwasong-8”</li> </ul>	<ul style="list-style-type: none"> <li>On January 11, the missile may have flown at a maximum altitude of about 50km and at a maximum speed of approximately Mach 10 with an irregular trajectory that included horizontal maneuvers.</li> <li>NK referred to as “hypersonic missile” and announced that it “made glide jump flight” and “long turning maneuver.”</li> </ul>	<ul style="list-style-type: none"> <li>It has been pointed out that North Korea is building new or refurbished submarines.</li> </ul>	<ul style="list-style-type: none"> <li>In terms of the shape, the missile has a similarity to that of the SRBM (A).</li> <li>It is presumed that the missile is able to fly at a lower altitude (approx. 50km at highest) with an irregular trajectory.</li> <li>NK announced “a lot of developed operational guiding technologies are introduced, including side maneuvers and glide jump flight”</li> <li>it is presumed that the launch on September 25, 2022 was from inland, using an underwater launch test equipment.</li> </ul>

(※) Ranges are the largest ones achieved.

# Major missiles that NK has been developing and possessing in recent years(4)

(Sources: "Rodong Sinmun", etc.)

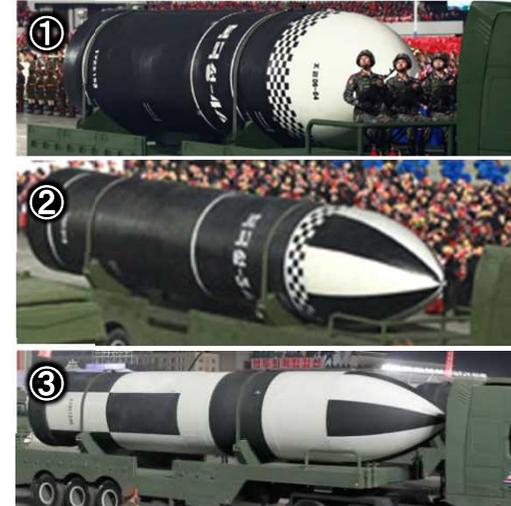
	Cruise missile	Cruise missile	Cruise missile
			
Name by NK	"Strategic Cruise Missile 'Hwasal-1'" (23.3.22)	"Strategic Cruise Missile 'Hwasal-2'" (23.3.22)	"Strategic Cruise Missile"
Cases of launches	2021: 9/11, 9/12(※) 2022: 10/12(※) 2023: 3/22(※) (they have similar shape)	2022: 1/25(※) 2023: 2/23, 3/22(※) (they have similar shape)	2023: 3/12(※)
Range	Approx. 2,000km(※) (22.10.12)	Approx. 2,000km(※) (23.2.23)	Approx. 1,500km(※)
Fuel	—	—	—
Operation platform	TEL(※)	TEL(※)	Submarine(※)
Remarks	<ul style="list-style-type: none"> <li>• NK announced as a "test-fire of newly developed long-range cruise missile" on September 2022, revealing that the missile had flown for about two hours and hit a target 1,500 km away.</li> <li>• NK referred to as "the long-range strategic cruise missiles deployed at the units of the KPA for the operation of tactical nukes," and announced that they hit the target 2,000km away.</li> <li>• NK announced it conducted a launch training relevant to "tactical nuclear attack tasks" on March 2023.</li> </ul>	<ul style="list-style-type: none"> <li>• NK announced as a "test-fire for updating long-range cruise missile system" on January 2022, revealing that the missile had flown for about 32 minutes and hit a target 1,800 km away.</li> <li>• NK announced as a "test-fire for the Strategic Cruise Missile 'Hwasal-2'" on February 2023, revealing that the missile had flown for about 2h 50 min and hit a target 2,000 km away.</li> <li>• NK announced it conducted a launch training relevant to "tactical nuclear attack tasks" on March 2023.</li> </ul>	<ul style="list-style-type: none"> <li>• NK announced as a "test-fire of strategic cruise missile from underwater", revealing that the missile had flown for about 2hours and hit a target 1,500km away.</li> </ul>

(※) According to North Korea's announcement.

# Trends of North Korea's Ballistic Missile Development etc.

(Image: KCNA HP, "Rodong Sinmun")

## New SLBMs (Possible)



It appeared in the military parade on 10th October 2020(1), 14th January 2021(2), 25th April 2022(3). North Korea introduced them as "Underwater strategic ballistic missile." SLBM(1) was labeled "Pukguksong-4," SLBM(2) was labeled "Pukguksong-5" respectively.

	SLBM			Modified for ground launch
North Korea's Name	"Pukguksong"	"Pukguksong-3"	"New Type SLBM"	"Pukguksong-2"
				
Range	More than 1,000km	Approx. 2,000km	Approx. 650km*	More than 1,000km
Fuel	Solid			
Operation Platform	Submarine			TEL

Note: Range of "New Type SLBM" is the largest one achieved.

## Launch cases

	Presumed type of missiles	Number of launches	Location	Flight distance	Operational Platform
2016.04.23	"Pukguksong"	1	Off the coast of Sinpo	Approx. 30km (ROK Joint Chiefs of Staff)	GORAE class submarine
2016.07.09	"Pukguksong"	1	Off the coast of Sinpo	A few kilometers (ROK media reports)	GORAE class submarine
2016.08.24	"Pukguksong"	1	Near Sinpo	Approx. 500km	GORAE class submarine
2017.02.12	"Pukguksong-2"	1	Near Kusong	Approx. 500km	TEL
2017.05.21	"Pukguksong-2"	1	Near Pukchang	Approx. 500km	TEL
2019.10.02	"Pukguksong-3"	1	Near Wonsan	Approx. 450km	* There is possibility of launch from underwater launch test equipment
2021.10.19	"New Type SLBM"	1	Near Sinpo	Approx. 600km	GORAE class submarine
2022.5.7	"New Type SLBM"	1	Near Sinpo	Approx. 600km	GORAE class submarine
2022.9.25	"New Type SLBM"	1	Inland of North Korea	Approx. 650km	* Potentially launched from an underwater launch test equipment

\* In addition, on May 9, 2015, North Korea announced that it had succeeded in a test launch of an SLBM. On January 8, 2016, it released footage that appeared to be an different SLBM test launch from the one unveiled in May 2015.

# North Korea's submarines

(sources: Jane's Fighting Ships 2021-2022, Media reports etc.)

- North Korea possesses **one submarine that can launch a ballistic missile(GORAE class)**. It is reported that the submarine can carry one SLBM.
- In addition, it is also pointed out that North Korea **seeks to develop a larger submarine**. For example, North Korean media announced that Chairman Kim Jong-Un inspected "**Newly Built Submarine**"(July 2019) and it is pointed out that this submarine is being built in Sinpo as a modified ROMEO class submarine and can carry three SLBMs.
- It is deemed that **North Korea intends to diversify its ballistic missile attack capabilities and improve survivability** through developing the SLBM and a new submarine to carry it.

## GORAE class/ROMEO class

\*SSB: ballistic missile submarine(CPR)  
SS: submarine, general

## Image published by North Korea(2019/7/23)



(Image: captured from the video on "DPRK Today" HP)

## Midget Submarines

SANGO/SANGO II class	YONO class	YUGO class
		

\*These are used for infiltration and transportation of the special operation forces.

(Image: JANES)

Name

GORAE class SSB

ROMEO class SS

Image



Number of possession

1

24

Displacement

1,500t dived

1,830t dived

Speed

10knots dived

13knots dived

Weapons

SLBM, Torpedoes

Torpedoes, Mines (in lieu of torpedoes)

Complement

70

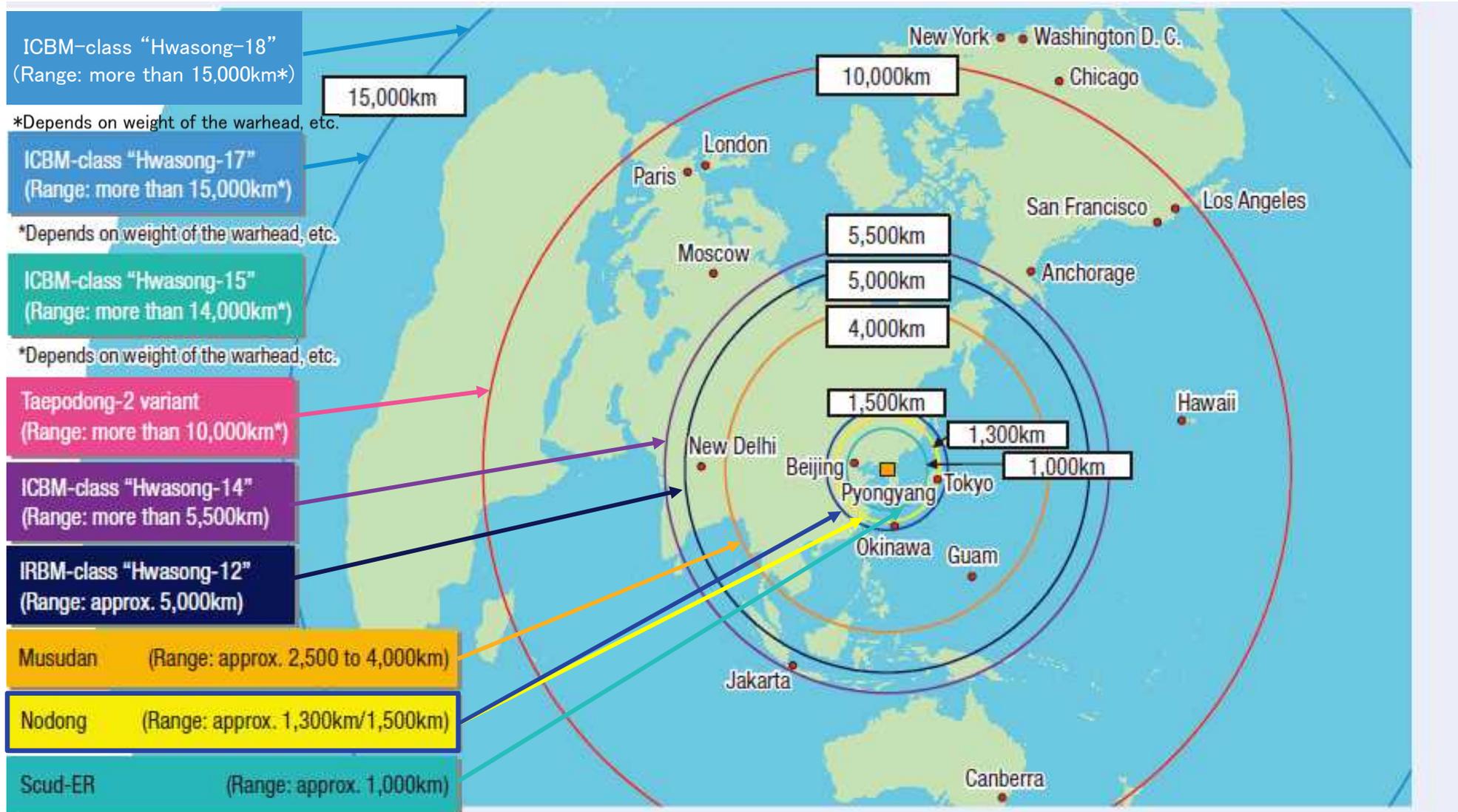
54

Note

A platform to launch SLBMs. It is reported that it was launched in March 2014.

Attack submarine. Import from China and production in North Korea began in 1970s.

# Range of North Korea's Ballistic Missiles



Note 1: For simplicity, the distance from Pyongyang is displayed in concentric circles as an image.

Note 2: Quotation marks indicate the names used by North Korea.

# North Korea's Nuclear Tests and Ballistic Missile Launches in 2016

  Nuclear test

Date	Provocation	Location	Type of missile*	Flying distance etc.
01.06.16	Conducted 4 <sup>th</sup> nuclear test	Punggye-ri		
02.07.16	Launched a ballistic missile disguised as a "satellite"	Tongch'ang-ri	Taepodong-2 variant	Approx. 2,500km (= Fall point of 2 <sup>nd</sup> stage)
03.10.16	Launched two ballistic missiles	Near Nampo (west coast)	Scud	Approx. 500km
03.18.16	Launched a ballistic missile	Near Sukchon (west coast)	Nodong	Approx. 800km
04.15.16	Launched a ballistic missile	East coast	Musudan [indicated]	Unknown; Failure [presumed]
04.23.16	Launched a ballistic missile	Off the coast of Sinpo	SLBM, "Pukguksong"	Approx. 30km (according to South Korea's JCS)
04.28.16	Launched two ballistic missiles	Wonsan	Musudan	Unknown; Failure [presumed]
05.31.16	Launched a ballistic missile	Wonsan	Musudan [possible]	Unknown; Failure [presumed]
06.22.16	Launched two ballistic missiles	Wonsan	Musudan	1 <sup>st</sup> : Approx. 100km (max) 2 <sup>nd</sup> : Approx. 400km
07.09.16	Launched a ballistic missile	Off the coast of Sinpo	SLBM, "Pukguksong"	Several km (according to South Korea's news)
07.19.16	Launched three ballistic missiles	Near Hwangju (west coast)	Scud and Nodong	1 <sup>st</sup> : Approx. 400km 3 <sup>th</sup> : Approx. 500km
08.03.16	Launched two ballistic missiles	Near Ulliyul (west coast)	Nodong	Approx. 1,000km (1 <sup>st</sup> was exploded just after firing)
08.24.16	Launched a ballistic missile	Near Sinpo	SLBM, "Pukguksong"	Approx. 500km
09.05.16	Launched three ballistic missiles	Near Hwangju (west coast)	Scud-ER	Approx. 1,000km
09.09.16	Conducted 5 <sup>th</sup> nuclear test	Punggye-ri		
10.15.16	Launched a ballistic missile	Near Kusong (west coast)	Musudan	Unknown; Failure [presumed]
10.20.16	Launched a ballistic missile	Near Kusong (west coast)	Musudan	Unknown; Failure [presumed]

\* Words in apostrophes are North Korea's Names

# North Korea's Nuclear Tests and Ballistic Missile Launches in 2017

  Nuclear test

Date	Provocation	Location	Type of missile*	Flying distance etc.
02.12.17	Launched a ballistic missile	Near Kusong (west coast)	Ground-launched ballistic missile modified from SLBM, "Pukguksong-2"	Approx. 500km
03.06.17	Launched four ballistic missiles	Near Tongch'ang-ri (west coast)	Scud-ER	Approx. 1,000km
03.22.17	Launched a ballistic missile	Near Wonsan	Under analysis	Exploded within seconds of launch; Failure [presumed]
04.05.17	Launched a ballistic missile	Near Sinpo	Under analysis	Approx. 60km
04.16.17	Launched a ballistic missile	Near Sinpo	Under analysis	Blew up almost immediately; Failure [presumed]
04.29.17	Launched a ballistic missile	Near Pukchang	Under analysis	Approx. 50km; Fell into the inland area of North Korea; Failure [presumed]
05.14.17	Launched a ballistic missile	Near Kusong (west coast)	IRBM-class ballistic missile, "Hwasong-12"	Approx. 800km
05.21.17	Launched a ballistic missile	Near Pukchang	Ground-launched ballistic missile modified from SLBM, "Pukguksong-2"	Approx. 500km
05.29.17	Launched a ballistic missile	Near Wonsan	Ballistic missile modified from Scud missile	Approx. 400km
07.04.17	Launched a ballistic missile	Near Kusong (west coast)	ICBM-class ballistic missile, "Hwasong-14"	Approx. 900km
07.28.17	Launched a ballistic missile	Near Mupyong-ni	ICBM-class ballistic missile, "Hwasong-14"	Approx. 1,000km
08.29.17	Launched a ballistic missile	Near Sunan	IRBM-class ballistic missile, "Hwasong-12"	Approx. 2,700km
09.03.17	Conducted 6 <sup>th</sup> nuclear test	Punggye-ri		
09.15.17	Launched a ballistic missile	Near Sunan	IRBM-class ballistic missile, "Hwasong-12"	Approx. 3,700km
11.29.17	Launched a ballistic missile	Near Pyongsong	ICBM-class ballistic missile, "Hwasong-15"	Approx. 1,000km

\* Words in apostrophes are North Korea's Names

# North Korea's Nuclear Tests and Ballistic Missile Launches in 2019

Date	Provocation	Location	Type of missile*	Flying distance etc.
05.04.19	Launched two ballistic missiles	Hodo Peninsula	Short Range Ballistic Missile (A)	Approx. 500km at maximum
05.09.19	Launched two ballistic missiles	Near Kusong (west coast)	Short Range Ballistic Missile (A)	Approx. 400km Approx. 250km
07.25.19	Launched two ballistic missiles	Hodo Peninsula	Short Range Ballistic Missile (A)	Approx. 600km
07.31.19	Launched two ballistic missiles [possible]	Near Wonsan	- [Short Range]	Approx. 250km
08.02.19	Launched two ballistic missiles [possible]	Near Yonghung	- [Short Range]	Approx. 250km
08.06.19	Launched two ballistic missiles	Near Kwail	Short Range Ballistic Missile (A)	Approx. 450km
08.10.19	Launched two ballistic missiles	Near Hamhung	Short Range Ballistic Missile (B)	Approx. 400km
08.16.19	Launched two ballistic missiles	Near Tongchon	Short Range Ballistic Missile (B)	Approx. 250km
08.24.19	Launched two ballistic missiles	Near Sondok	Short Range Ballistic Missile (C)	Approx. 350 to 400km
09.10.19	Launched two ballistic missiles	Near Kaechon	Short Range Ballistic Missile (C)	Approx. 300 to 350km
10.02.19	Launched a ballistic missile	Near Wonsan	SLBM, "Pukguksong-3"	Approx. 450km
10.31.19	Launched two ballistic missiles	Near Suncheon	Short Range Ballistic Missile (C)	Approx. 350 to 400km
11.28.19	Launched two ballistic missiles	Near Yonpo	Short Range Ballistic Missile (C)	Approx. 380km

\* Words in apostrophes are North Korea's Names

# North Korea's Nuclear Tests and Ballistic Missile Launches in 2020 and 2021

## 【2020】

Date	Provocation	Location	Type of missile	Flying distance etc.
03.02.20	Launched two ballistic missiles	Near Wonsan	Short Range Ballistic Missile (C)	Approx. 240km
03.09.20	Launched two ballistic missiles	Near Sondok	Short Range Ballistic Missile (C)	Approx. 200km at maximum
03.21.20	Launched two ballistic missiles	Near Soncheon	Short Range Ballistic Missile (B)	Approx. 400km
03.29.20	Launched two ballistic missiles	Near Wonsan	Short Range Ballistic Missile (C)	Approx. 250km

## 【2021】

Date	Provocation	Location	Type of missile	Flying distance etc.
03.25.21	Launched two ballistic missiles	Near Sondok	Short Range Ballistic Missile (D)	Approx. 600km
09.15.21	Launched two ballistic missiles	Inland of North Korea	Short Range Ballistic Missile (rail-mobile)	Approx. 750km
09.28.21	Launched a ballistic missile [possible]	Inland of North Korea	-	Under analysis
10.19.21	Launched a ballistic missile	Near Sinpo	New type of SLBM	Approx. 600km

# North Korea's Nuclear Tests and Ballistic Missile Launches in 2022(1)

Date	Provocation	Location	Type of missile*	Flying distance etc.
01.05.22	Launched a ballistic missile	Inland of NK	-	Approx. 500km(*)
01.11.22	Launched a ballistic missile	Inland of NK	-	—
01.14.22	Launched two ballistic missiles	Northwest part of NK	Short Range Ballistic Missile (rail-mobile)	Approx. 400km(*)
01.17.22	Launched two ballistic missiles	Western part of NK	Short Range Ballistic Missile (B)	Approx. 300km(*)
01.27.22	Launched two ballistic missiles	Eastern part of NK	Short Range Ballistic Missile (A)	—
01.30.22	Launched a ballistic missile	Inland of NK	IRBM-class Ballistic Missile, "Hwasong-12"	Approx. 800km
02.27.22	Launched a ballistic missile	Outside of Pyongyang	ICBM-class Ballistic Missile, "Hwasong-17"	Approx. 300km
03.05.22	Launched a ballistic missile	Outside of Pyongyang	ICBM-class Ballistic Missile, "Hwasong-17"	Approx. 300km
03.16.22	Launched a ballistic missile	Outside of Pyongyang	-	—
03.24.22	Launched a ballistic missile	Outside of Pyongyang	ICBM-class Ballistic Missile, "Hwasong-17"	Approx. 1,100km
05.04.22	Launched a ballistic missile	Near west coast of NK	ICBM-class Ballistic Missile, "Hwasong-17"	Approx. 500km
05.07.22	Launched a ballistic missile	Near Sinpo	New type SLBM	Approx. 600km
05.12.22	Launched three ballistic missiles	Near west coast of NK	Short Range Ballistic Missile (C)	Approx. 350km(*)
05.25.22	Launched two ballistic missiles	Near west coast of NK	ICBM-class Ballistic Missile, "Hwasong-17" and Short Range Ballistic Missile (possibly A or D)	ICBM-class : Approx. 300km Short Range Ballistic Missile : Approx. 750km
06.05.22	Launched eight ballistic missiles	Missile(1) : Near west coast Missile(2) : Near east coast Missile(3) : Near west coast Missile(4) : Inland of NK Missile(5) : Near west coast Missile(6) : Inland of NK *In addition to the six missiles above, two other ballistic missiles were launched.	Short Range Ballistic Missile (including A, B and C)	Missile(1) : Approx. 350km Missile(2) : Approx. 300km Missile(3) : Approx. 400km Missile(4) : Approx. 350km Missile(5) : Approx. 400km Missile(6) : Approx. 300km *In addition to the six missiles above, two other ballistic missiles were launched. They flew over a short distance at an extremely low altitude.

(\*) In case of launch with a nominal trajectory

# North Korea's Nuclear Tests and Ballistic Missile Launches in 2022(2)

Date	Provocation	Location	Type of missile*	Flying distance etc.
09.25.22	Launched a ballistic missile	Inland of NK	New Type SLBM	Approx. 650km
09.28.22	Launched two ballistic missiles	Near west coast of NK	Short Range Ballistic Missile (D)	Missile(1): Approx. 350km Missile(2): Approx. 300km
09.29.22	Launched two ballistic missiles	Near west coast of NK	Short Range Ballistic Missile (C)	Approx. 300km
10.01.22	Launched two ballistic missiles	Near west coast of NK	Short Range Ballistic Missile (A)	Missile(1): Approx. 400km Missile(2): Approx. 350km
10.04.22	Launched a ballistic missile	Inland of NK	- (longer than IRBM)	Approx. 4,600km
10.06.22	Launched two ballistic missiles	Inland of NK	Short Range Ballistic Missile (C, A)	Missile(1): Approx. 350km Missile(2): Approx. 800km
10.09.22	Launched two ballistic missiles	Near east coast of NK	Short Range Ballistic Missile (C)	Approx. 350km
10.14.22	Launched a ballistic missile	Outside of Pyongyang	Short Range Ballistic Missile (A)	Approx. 650km
11.02.22	Launched at least two ballistic missiles	Near east coast of NK	-	Approx. 150km/Approx. 200km
	Launched at least one possible ballistic missile	Near east coast of NK	-	—
11.03.22	Launched at least three ballistic missiles	Missile(1): ICBM-class): Near west coast of NK Missile(2-3): Inland of NK	ICBM-class Ballistic Missile, "Hwasong-17" and Short Range Ballistic Missile (C)	Missile(1): Approx. 750km Missile(2-3): Approx. 350km
	Launched three ballistic missiles	Inland of NK	Scud C	Approx. 500km
11.09.22	Launched a ballistic missile	Near west coast of NK	Short Range Ballistic Missile (possibly A or D)	Approx. 250km
11.17.22	Launched a ballistic missile	Near east coast of NK	Short Range Ballistic Missile (C)	—
11.18.22	Launched a ballistic missile	Outside of Pyongyang	ICBM-class Ballistic Missile, "Hwasong-17"	—
12.18.22	Launched two ballistic missiles	Tongch'ang-ri region	Ballistic Missile (possibly based on scud-ER)	Approx. 500km
12.23.22	Launched a ballistic missile	Outside of Pyongyang	-	Approx. 300km
12.31.22	Launched three ballistic missiles	Outside of Pyongyang	Short Range Ballistic Missile (C)	Approx. 350km

\* Words in apostrophes are North Korea's Names

# 北朝鮮による核実験・弾道ミサイル発射事案（2023年）

日付	挑発の概要	場所	弾種（「」は北朝鮮の呼称）	飛翔距離
01.01.23	Launched a ballistic missile	Near west coast of NK	Short Range Ballistic Missile (C)	Approx. 350km
02.18.23	Launched a ballistic missile	Outside of Pyongyang	ICBM-class Ballistic Missile, "Hwasong-15"	Approx. 1,000km
02.20.23	Launched two ballistic missiles	Near west coast of NK	Short Range Ballistic Missile (C)	Missile(1): Approx. 400km Missile(2): Approx.. 350km
03.16.23	Launched a ballistic missile	Outside of Pyongyang	ICBM-class Ballistic Missile, "Hwasong-17"	Approx. 1,000km
03.19.23	Launched a ballistic missile	Near west coast of NK	Short Range Ballistic Missile (A)	Approx. 800km
03.27.23	Launched two ballistic missiles	Near west coast of NK	Short Range Ballistic Missile (A)	Approx. 350km
04.13.23	Launched a ballistic missile	Outside of Pyongyang	ICBM-class Ballistic Missile, "Hwasong-18"	Approx. 1,000km
05.31.23	Launch using ballistic missile technology aimed at launching a satellite	Tongch'ang-ri region	-	- (disappeared above Yellow Sea. Aimed at launching a satellite and failed)
06.15.23	Launched at least two ballistic missiles	Near west coast of NK	- (Short Range)	Missile(1): Approx. 850km Missile(2): Approx. 900km
07.12.23	Launched a ballistic missile	Outside of Pyongyang	ICBM-class Ballistic Missile, "Hwasong-18"	Approx. 1,000km
07.19.23	Launched two ballistic missiles	Near west coast of NK	-	Missile(1): Approx. 550km Missile(2): Approx. 600km
07.24.23	Launched two ballistic missiles	Inland of NK	- (Short Range)	Missile(1): Approx. 350km Missile(2): Approx. 400km