Recent Missile & Nuclear Development of North Korea

July 2022

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.*
- *On the other hand, new trends have been observed in recent years. 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. In particular, North Korea is diversifying their launch modes to include rail-launched and submarine-launched types developed based on SRBM A capable of flying with irregular trajectory. In this way, North Korea has been striving to expand more actual warfighting-oriented SRBM capabilities.*
- *In recent years, North Korea has also sought to operationalize its long-range cruise missiles, and on April 17, 2022, announced that it had launched a "new-type tactical guided weapon," claiming it strengthens "the efficiency in the operation of tactical nukes of the DPRK." 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.*
- *These military activities in North Korea pose grave and imminent threats to Japan's security and significantly undermine the peace and security of the region and the international community. North Korea has repeatedly launched missiles at an extremely high frequency and in new ways and made successive reference to strengthening its nuclear capabilities, still maintaining its stance to continue developing nuclear and ballistic missiles. Not only that, there is also the possibility it will engage in further provocative action, the trend has been growing in recent years.*


(Image："*Rodong Sinmun*")

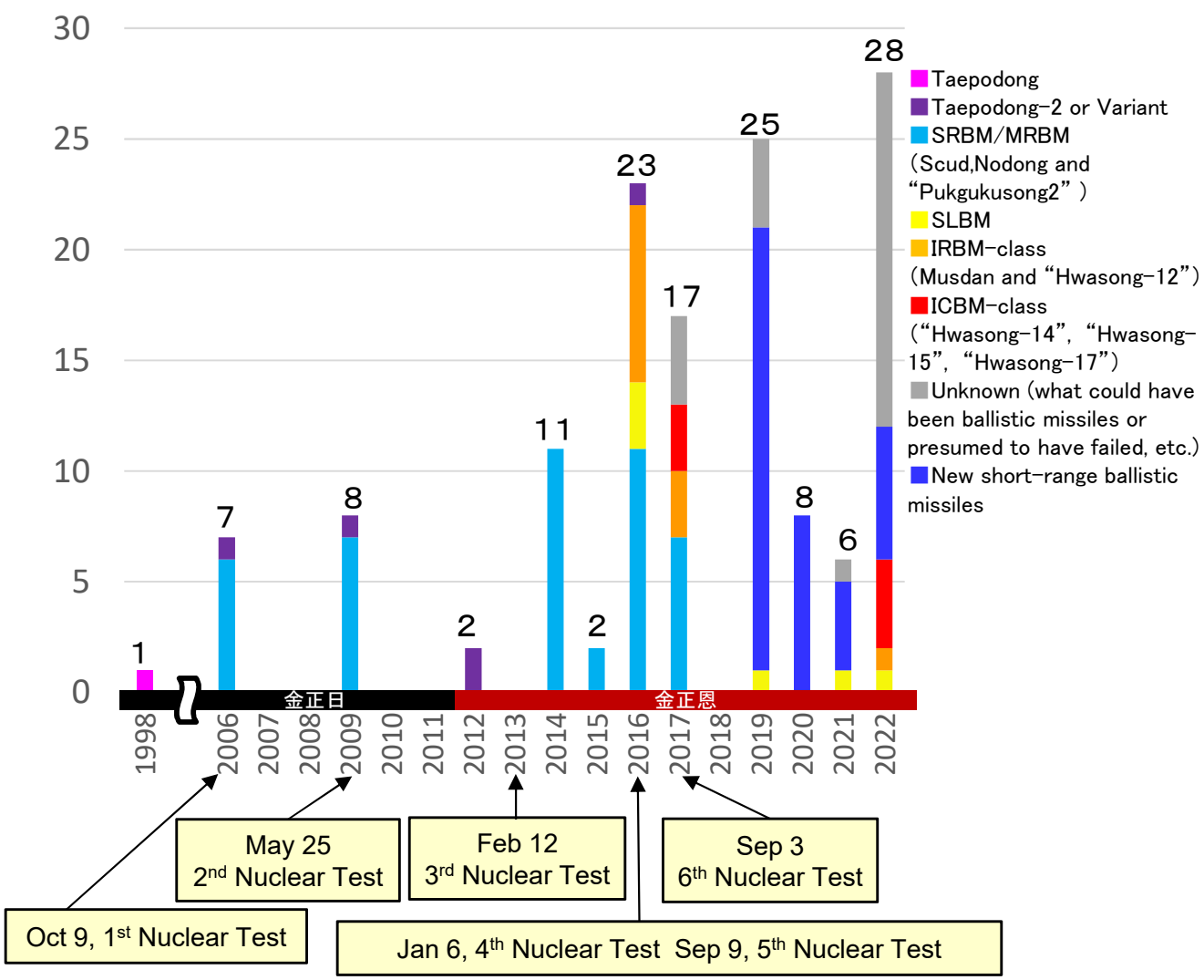
Announcement by North Korea at the 8th Congress of the KWP（2021.1）

- Further strengthen the defense capability both in quality and quantity.
- Further strengthen the nuclear war deterrent while building up the most powerful military strength
- Raise the defense science and technology to a higher level
- Develop cutting-edge tactical nuclear weapons including medium to long range cruise missiles
- Develop HGV warheads, MIRVs, solid fuel propelled ICBMs, nuclear propelled submarine(s), military reconnaissance satellite(s), reconnaissance drones, etc.

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
Kim Il Sun 	1993	Unknown	—
Kim Jong-il 	1994 to 2011	16 (Launched in 1998,2006, and 2009)	2
Kim Jong-un 	2012 to present	**122**	**4**

(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 6th 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 5th nuclear test on Sept 9, 2016, North Korea announced that it was the first successful test explosion of a nuclear warhead, and after the 6th 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 successfully miniaturized nuclear weapons to fit ballistic missile warheads.

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

（Image：KCNA HP）

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

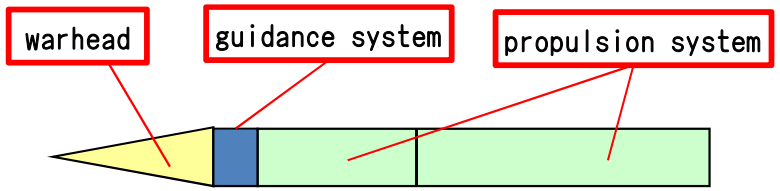
* As for the payload of ballistic missiles held by North Korea, it is pointed out that that of Nodong is 700~1,200kg and that of Scud ER is 300kg. (Jane's)

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

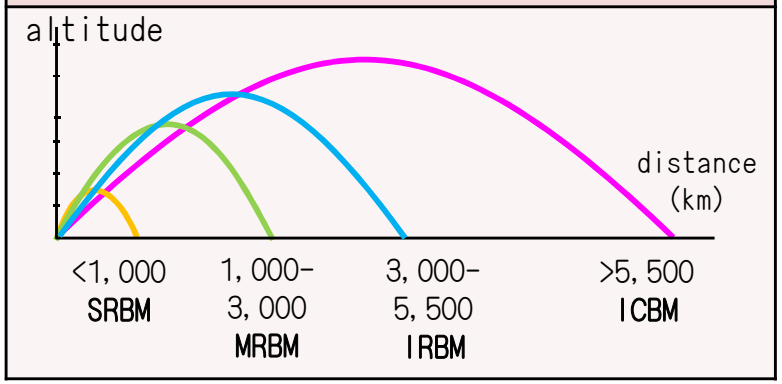


(ex: two-stage construction)

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



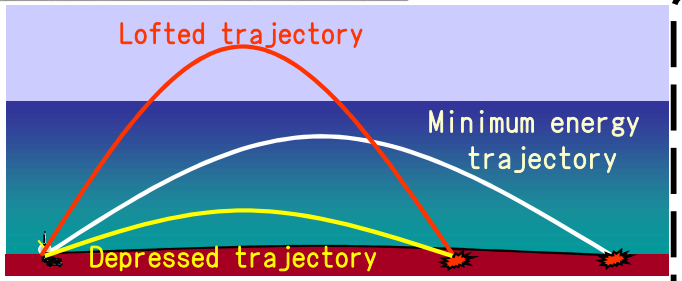
※Category is based on Ballistic & Cruise Missile Threat. (created by National Air and Space Intelligence Center) on the US Missile Defense Agency's Homepage.

Difference between ballistic missiles and cruise missiles

Ballistic Missiles	Cruise Missiles
• A ballistic missile is a rocket engine-propelled missile that flies on a parabolic trajectory. It is capable of attacking distant targets. • Fly at high speed.	• Basically a jet engine propelled guided missile similar to an aircraft. • It is possible to fly at low altitude. • They can reroute during flight and are highly accurate.

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**

Recent Trends of North Korea's Ballistic Missile Development (Overview)

- *North Korea has conducted a variety of ballistic missile launches. In particular, since May 2019, North Korea has 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 is diversifying their launch modes to include rail-launched and submarine-launched types. In this way, North Korea has been striving to expand more actual warfighting-oriented SRBM capabilities.*
- *At the Congress of the KWP held in January 2021, Chairman Kim indicated a stance of further enhancing nuclear and missile capabilities and continuously improving North Korea's military power. He referred to the advancement of nuclear technology, including the development of "tactical nuclear weapons," and preemptive and retaliatory nuclear strike capabilities, as well as development of "hypersonic gliding flight warheads" and so on. 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 this time. It is expected to continue to focus efforts on the development of various missiles and other weapons in line with this plan.*
- *Since September of the same year, North Korea has repeatedly launched ballistic missiles flying with irregular trajectories, a missile it calls a "hypersonic missile," and a new type of submarine-launched ballistic missile (SLBM). In addition, since entering into 2022, North Korea has resumed launches of intermediate-range ballistic missile (IRBM)-class and longer-range ballistic missiles, which it had not done since 2018. After launching new type of ICBM-class ballistic missile, it stated that it would strengthen its nuclear capabilities and develop further means of attack.*
- *Thus, North Korea is proceeding with ballistic missile development at an extremely rapid pace and is relentlessly pursuing increasingly complex and diverse modes of attack. These enhancements in its capabilities make early detection of the signs of a launch and the interception of the missiles more difficult, thereby posing new challenges for the collecting information , early warning, and interception postures of relevant states , including Japan.*


SRBM A
(Range: Approx. 600km)


SRBM B
(Range: Approx. 400km)


SRBM C
(Range: Approx. 400km)


New type SRBM
(Range: Approx. 600km)


SRBM (launched from rail-mobile launcher)
(Range: Approx. 750km)


"Hwasong-8"
(referred to by NK)


New type ballistic missile
(referred to as a "hypersonic missile" by NK)


ICBM-class "Hwasong-17"
(Range: 15,000km or more)

Recent Trends of North Korea's Ballistic Missile Development (1)

①Advancement of long-range ballistic missiles' technological reliability

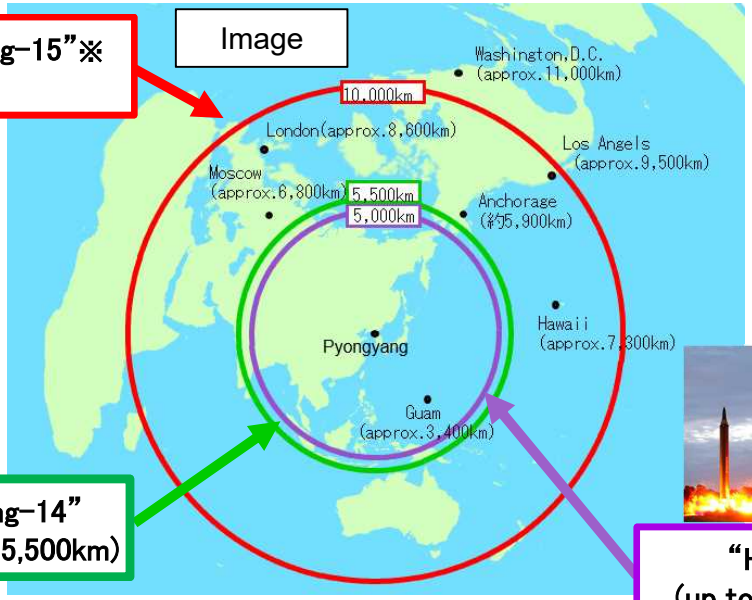
(Image:"*DPRK Today*", KCNA HP)

【Note】Words in apostrophes are NK's Names

Taepodong-2 Variant, "Hwasong-15"※
(approx. more than 10,000km)

※Depends on the weight of warheads etc.

"Hwasong-14"
(more than 5,500km)



Since 2022, North Korea has also launched new ICBM-class "Hwasong-17."

✔The firing range for "Hwasong-17" can reach 15,000 km or more, depending on the warhead's weight etc.When hypothetically calculating a distance of 15,000 km from Pyongyang, the trajectory can include the whole African continent and part of the South American continent.

"Hwasong-12"
(up to approx. 5,000km)

⇒Should NK make further progress in the development, including the acquiring of reentry technologies related to long range ballistic missiles, it may come to have a one-sided understanding that it has secured a strategic deterrence against the U.S. It could lead to an increase and escalation of military provocations by NK.

②Improvement of accuracy, operational capabilities and continuous fire capabilities for saturation attack

- North Korea has been launched from unprecedented locations, in the early morning and late hours of the night using TELs, often in multiple numbers.(Since 2014)
  ⇒This indicates that North Korea is capable of launch from any place and at any time.
- Simultaneous launch:3 Scud ERs(September 2016), 4 Scud ERs(March 2017). In recent years, NK has conducted target practice combining SRBMs with various types of artillery.
  ⇒Intention of enhancing its actual operational capabilities.
- Scud-Modified(May 2017) has also been noted that this missile is equipped with a maneuverable re-entry vehicle (MaRV). NK also has launched from different locations, and pursued specific target.(Since May 2019)
  ⇒NK is aiming to enhance the accuracy of attack.
- The launch interval of two SRBMs was less than 1 minute (November 2019, etc.)
  ⇒Intention of enhancing its continuous fire capabilities.

Recent Trends of North Korea's Ballistic Missile Development (2)

(Image:"*DPRK Today*", KCNA HP)

③Improvement of surprise attack capability by enhancing secrecy and instantaneity

- Using a TEL or submarine, a ballistic missile can be launched from any point, making it difficult to detect signs of a launch in advance. In addition, since September 2021, North Korea has conducted launch drills of ballistic missiles from rail-mobile launcher called "the railway-borne missile system".
- Generally, solid fuel-propelled ballistic missiles are not only relatively easier to store and handle, but are also preloaded with solid fuel. Therefore, in comparison to liquid fuel-propelled missiles, they can be launched instantly, and the signs of their launch are more difficult to detect. Furthermore, they can be reloaded more quickly. In this respect, they are considered to be superior militarily.

⇒ North Korea appears to be seeking to improve its ability to conduct surprise attacks by enhancing secrecy and instantaneity to make it difficult to detect signs of a launch.

Launch site/TEL, Submarine and Rail-mobile

Vulnerable to attack from outside

Disguise as freight car and concealment in tunnel
⇒ **Difficult to be detected**

Mobile; Possible to launch from arbitrary spot
⇒ **Difficult to be detected**

Rail-mobile launcher

Transporter-Erector-Launcher (TEL)

Submarine

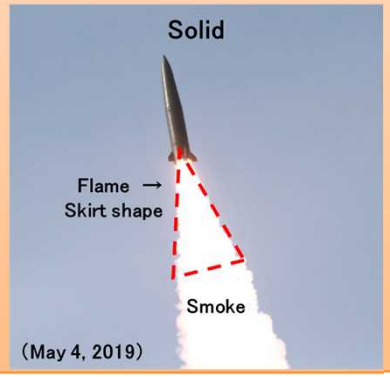
Undersea launch
⇒ **Difficult to be detected**

Solid fuel/Liquid fuel

There are 2 sorts of ballistic missile fuel; **Solid** and **Liquid**.

- ☐ **Solid fuel**
  - ✓ Stable and easy to store
  - ✓ It is possible to be pre-loaded and ideal for mobile missiles
  - ◆ Difficult to control thrust
- ☐ **Liquid fuel**
  - ✓ Easy to control thrust
  - ◆ Difficult to handle and store long time
  - ◆ Take time to load the fuel

【ref】Difference between Solid fuel and Liquid fuel



Recent Trends of North Korea's Ballistic Missile Development (3)

(Image：KCNA HP, CSIS Missile Threat)

④ Low altitude and Irregular trajectory

- SRBM A（May, July and August 2019 and January 2022）
- SRBM B（August 2019, March 2020 and January 2022）
- SRBM launched from rail-mobile launcher（September 2021 and January 2022）
- The new type of SLBM （October 2021 and May 2022） etc.

⇒ They are presumed to be able to fly at lower altitudes than conventional ballistic missiles and with irregular trajectories. Furthermore, North Korea has launched what it calls "hypersonic missile" since September 2021. The prevailing view is that such missiles are designed to breach missile defense networks.

SRBM A

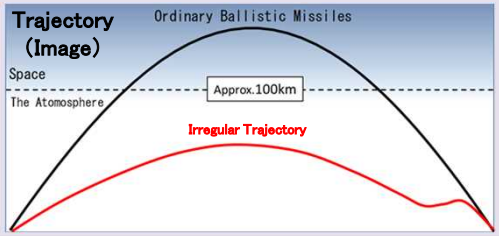
SRBM B

SRBM（launched from rail-mobile launcher）

The new type of SLBM

Irregular trajectory

○ North Korea announced "specific features of the low-altitude gliding and leaping flight orbit … which would be hard to intercept" etc.



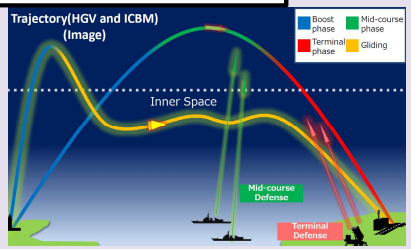
【ref】Russian "Iskander"

(※) Iskander controls the attitude by moving the tail assembly, allowing maneuvering during flight.

Avoidance measures that Iskander seems to take

(1) Boost phase maneuvering
(2) Depressed trajectory
(3) A low radar cross-section body desing and material construction
(4) Terminal phase maneuvering （Jane's）

"Hypersonic missile"



Image："*Rodong Sinmun*" (2021.9.29)

○ The United States, China, and Russia are developing hypersonic weapons, including Hypersonic Glide Vehicles (HGVs) and Hypersonic Cruise Missiles (HCMs).

○ It is suggested that hypersonic weapons would fly in lower orbits than ballistic missiles at hypersonic speed above Mach 5 for a longer period of time and have high maneuverability, which makes it difficult to be detected and intercepted.

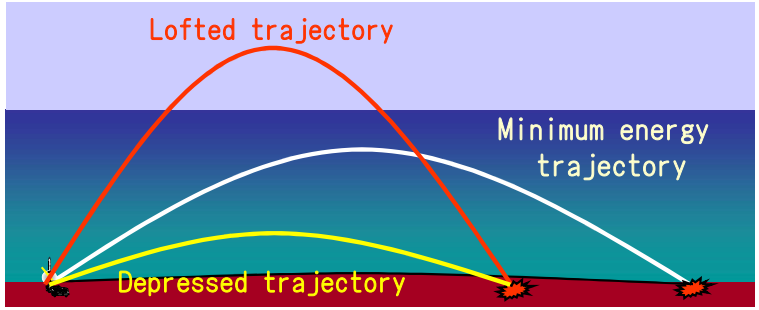
○ North Korea declared development and introduction of "hypersonic gliding flight warheads" at the Korean Workers' party Congress in January 2021 and launched what it calls "hypersonic missile" in September.

Recent Trends of North Korea's Ballistic Missile Development (4)

⑤Diversification of launch forms

- Launch with a "lofted trajectory" (Since 2016) ⇒ In general, it is more difficult to intercept
- IRBM and ICBMs could hit Japan depending on launching angle (lofted)

Image published by North Korea
(May 15, 2017, next day of the launch of new type ballistic missile [presumed], "Hwasong-12")
(Image：captured from the video on "*DPRK Today*" HP)

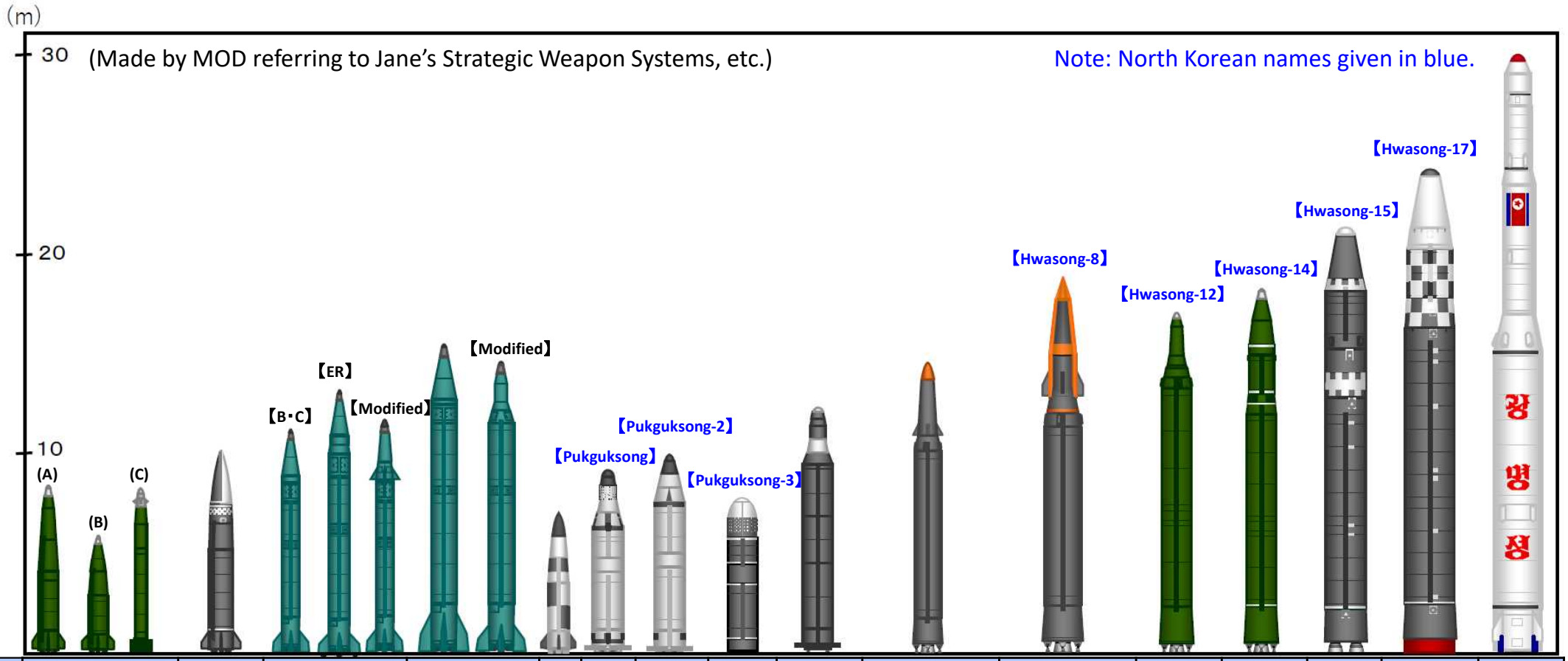


◆ Although the Government of Japan does not evaluate the launch as a lofted trajectory, **the following two launches** were referred to as "high-angle launch" by North Korea in its announcement after the launches.
- On August 24, 2016 : SLBM"Pukguksong" (flew approx. 500km)
- On February 12, 2017 : Ballistic Missile Modified from the SLBM for ground launch "Pukguksong-2" (flew approx. 500km)

◆ The Government of Japan evaluated the "Pukguksong-2" launch (On May 21, 2017, flew approx. 500km) as "on somewhat higher trajectories than normal," but N K did not announce it as a "high-angle launch."

ICBM-class "Hwasong-15"	**On November 29, 2017** Reached an altitude substantially exceeding 4,000km and flew for approx. 53 minutes.
ICBM-class "Hwasong-14"	**①On July 4, 2017** Reached an altitude substantially exceeding 2,500km and flew for approx. 40 minutes. **②On July 28, 2017** Reached an altitude substantially exceeding 3,500km and flew for approx. 45 minutes.
IRBM-class "Hwasong-12"	**①On May 14, 2017** Reached an altitude exceeding 2,000km and flew for approx. 30 minutes. **②On January 30, 2022** Reached an altitude approx. 2,000km and flew for approx. 30 minutes.
IRBM-class "Musudan"	**On June 22, 2016** Reached an altitude exceeding 1,000km (2nd launched one)
SLBM "Pukguksong-3"	**On October 2, 2019** Reached an maximum altitude 900km and flew for approx. 17 minutes.
New ICBM-class "Hwasong-17"	**①On February 27, 2022** Reached an altitude approx. 600km. **②On March 5, 2022** Reached an altitude approx. 550km. **③On March 24, 2022** Reached an altitude exceeding 6,000km and flew for approx. 71 minutes.
The ballistic missile	**On May 4, 2022** Reached an altitude approx. 800km.
ICBM-class	**On May 25, 2022** Reached an altitude approx. 550km.

North Korea's Ballistic Missiles and Other Missiles



	New type SRBM (A)/(B)/(C)	New type short-range ballistic missile	Scud B/C/ER/Modified	Nodong/Modified	New type SLBM	SLBM	SLBM modified for ground launch	SLBM	Musudan	Ballistic Missile Referred to as "Hypersonic Missile"	(Possible) Ballistic Missile Referred to as "Hypersonic Missile "	IRBM-class	ICBM-class	ICBM-class	ICBM-class	Taepodong-2 variant
Range	Approx. 600 km/400 km/400km*1	Approx. 600 km*1	Approx. 300 km/500 km/1,000km / Under analysis	Approx. 1,300 km/1,500 km	Approx. 600 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	10,000 km or more*3	15,000 km or more*3	10,000 km or more
Fuel/ Stage	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	Submarine	Submarine	TEL	Submarine	TEL	TEL	—	TEL	TEL	TEL	TEL	Launch site

* 1 Ranges of new type SRBM (A)/(B)/(C), new type short-range ballistic missile , and new type SLBM 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. Another time of launch on January 11 of the same year, it was believed that the flight distance may have been less than 700 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.

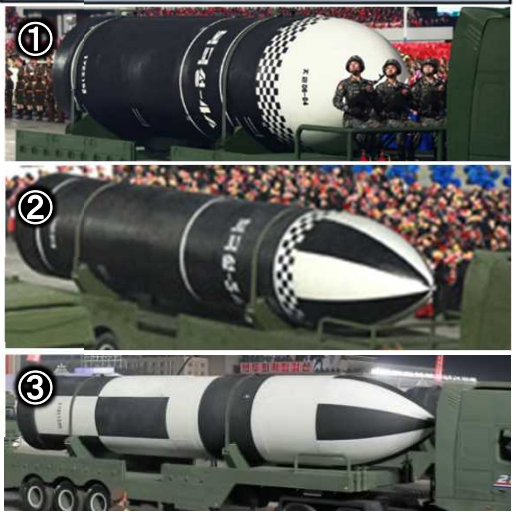
Trends of North Korea's Ballistic Missile Development etc.

(Image：KCNA HP, "*Rodong Sinmun*")

	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. 600km*	More than 1,000km
Fuel	Solid			
Operation Platform	Submarine			TEL

* Range of "New Type SLBM" is actual value on 19th October 2021 and 7th May 2022.

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.

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

* 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

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.

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

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

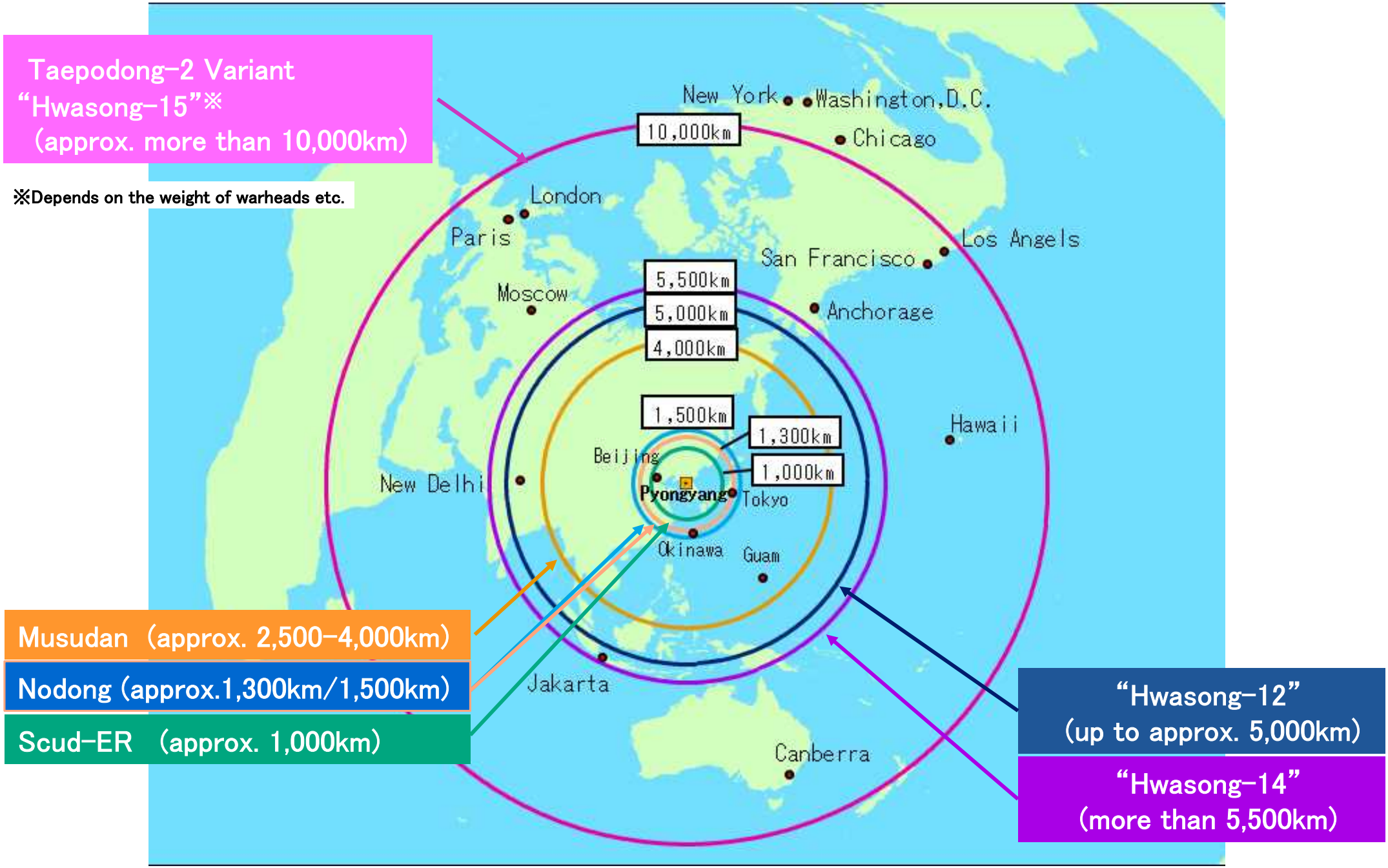
Midget Submarines

SANGO/SANGO Ⅱ class	YONO class	YUGO class
		

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

（Image：JANES）

Range of North Korea's Ballistic Missiles



Note1 : The figure above shows a rough image of the distance each missile can reach from Pyongyang for the sake of convenience.
Note2 : Quotation marks indicate the names used by North Korea.
Note3 : The firing range for ICBM-class ballistic missile "Hwasong-17" can reach 15,000 km or more, depending on the warhead's weight etc. When hypothetically calculating a distance of 15,000 km from Pyongyang, the trajectory can include the whole African continent and part of the South American continent.

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

Nuclear test | Launch of ballistic missile

Date	Provocation	Location	Type of missile*	Flying distance etc.
01.06.16	Conducted 4th 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 2nd 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	1st: Approx. 100km (max) 2nd: 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	1st: Approx. 400km 3th: Approx. 500km
08.03.16	Launched two ballistic missiles	Near Ullyul (west coast)	Nodong	Approx. 1,000km (1st 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 5th 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 | Launch of ballistic missile

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 6th 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

Launch of ballistic missile

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

* Words in apostrophes are North Korea's Names

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

Launch of ballistic missile

【2020】

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

【2021】

Date	Provocation	Location	Type of missile	Flying distance etc.
03.25.21	Launched two ballistic missiles	Near Sondok	New type short range ballistic missile	Approx. 600km
09.15.21	Launched two ballistic missiles	Inland of North Korea	Short Range Ballistic Missile	Approx. 750km
09.28.21	Launched a possible ballistic missile	Inland of North Korea	Possible Ballistic Missile	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

Launch of ballistic missile

Date	Provocation	Location	Type of missile*	Flying distance etc.
01.05.22	Launched a ballistic missile	Inland of NK	New type Ballistic Missile	Approx. 500km(*)
01.11.22	Launched a ballistic missile	Inland of NK	Ballistic Missile	—
01.14.22	Launched two ballistic missiles	Northwest part of NK	Short Range Ballistic Missile	Approx. 400km(*)
01.17.22	Launched two ballistic missiles	Western part of NK	Short Range Ballistic Missile	Approx. 300km(*)
01.27.22	Launched two ballistic missiles	Eastern part of NK	Short Range Ballistic Missile	—
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	Ballistic Missile	—
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	Ballistic Missile	Approx. 500km
05.07.22	Launched a ballistic missile	Near east coast of NK	SLBM	Approx. 600km
05.12.22	Launched three ballistic missiles	Near west coast of NK	Ballistic Missile	Approx. 350km(*)
05.25.22	Launched two ballistic missiles	Near west coast of NK	ICBM-class Ballistic Missile and Ballistic Missile	ICBM-class : Approx. 300km 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.	Ballistic Missile	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.

* Words in apostrophes are North Korea's Names

(*) In case of launch with a nominal trajectory