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This viewbook has been prepared in anticipation of a forthcoming DPRK *military parade*, which will likely be held either in celebration of the 110th anniversary of the birth of Kim Il-sung or the 90th founding anniversary of the Korean People's Army.

While the main focus of this viewbook is on the DPRK's *ballistic missiles*, it also includes *cruise missiles*, *heavy artillery* and *air defence systems* that are relevant to the DPRK's conventional and nuclear capabilities.

DPRK Military Parade Viewbook

Prepared by ONN

21 April 2022



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- Short- and Medium-Range Ballistic Missiles
- Intermediate-Range Ballistic Missiles
- Intercontinental Ballistic Missiles
- Other Weapon Systems



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1. Short- and Medium-Range Ballistic Missiles (below 3000 km range)

HWASONG-5 AND HWASONG-6



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Liquid propellant



*Hwasong-6 at a parade on 10 October 2015.
Image: ONN*

DESIGNATIONS: Hwasong-5 and Hwasong-6

RANGE: Short-range (~300 and ~500 km, respectively)

VEHICLE: MAZ-543 (Soviet 4 axles off-road truck)

FIRST KNOWN TEST: 1984

NUCLEAR CAPABLE: Yes

- The Hwasong-5 and Hwasong-6 are DPRK variants of the Soviet-era Scud-B and Scud-C.
- There are only minor visual differences between the Hwasong-5 and Hwasong-6.
- They were first tested in the 1980s.
- The ROK estimates that the DPRK possesses around 500-600 such missiles.*

* "S. Korea's military to greatly increase Hyunmoo missiles," Yonhap News Agency, 14 August 2016, available at: <https://en.yna.co.kr/view/AEN20160814001300315>; "북한 전역에 '3단계 전략 미사일 벨트' 운용" [Operation of a Three-Stage Strategic Missile Belt Across North Korea], KBS News, 26 December 2012, available at: <http://mn.kbs.co.kr/news/view.do?ncd=2587807>

PRECISION-GUIDED HWASONG-6



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Liquid propellant



*Hwasong-6 with a precision guided warhead, 15 April 2017
Image: Sogwang (DPRK state media)*

DESIGNATIONS: Official designation unknown;
referred to as “KN18” by the United States

RANGE: Short-range (~450 km)

VEHICLE: Tracked chassis

FIRST KNOWN TEST: 2017

NUCLEAR CAPABLE: Realistic possibility

- This version of the Hwasong-6 has a precision-guided warhead.
- It was first publicly tested on 29 May 2017.
- The warhead separates from the missile body after engine burnout.
- The warhead finetunes its trajectory to carry out a precision strike.
- It is unknown whether this type is in production.

SCUD-ER (SCUD-EXTENDED RANGE)



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Liquid propellant



*Four Scud-ERs are launched during an exercise on 6 March 2017
Image: KCTV*

DESIGNATIONS: Official designation unknown (possibly Hwasong-9); referred to as “KN04” by the United States

RANGE: Medium-range (~1000 km)

VEHICLE: MAZ-543 truck (4 axles)

FIRST KNOWN TEST: Possibly in the 2000s

NUCLEAR CAPABLE: Likely

- This advanced variant of the Hwasong-6 has a wider, longer and lighter body to store more propellant.
- It has a warhead that separates after engine burnout.
- A separable warhead improves the stability of the trajectory and reduces radar signature.

HWASONG-7



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Liquid propellant



*Hwasong-7 at a parade on 10 October 2015.
Image: ONN*

DESIGNATIONS: Hwasong-7;
commonly referred to outside of the DPRK as
“Rodong/Nodong”

RANGE: Medium-range (~1300 km)

VEHICLE: MAZ-543 truck (5 axles, locally modified)

FIRST KNOWN TEST: Around 1993

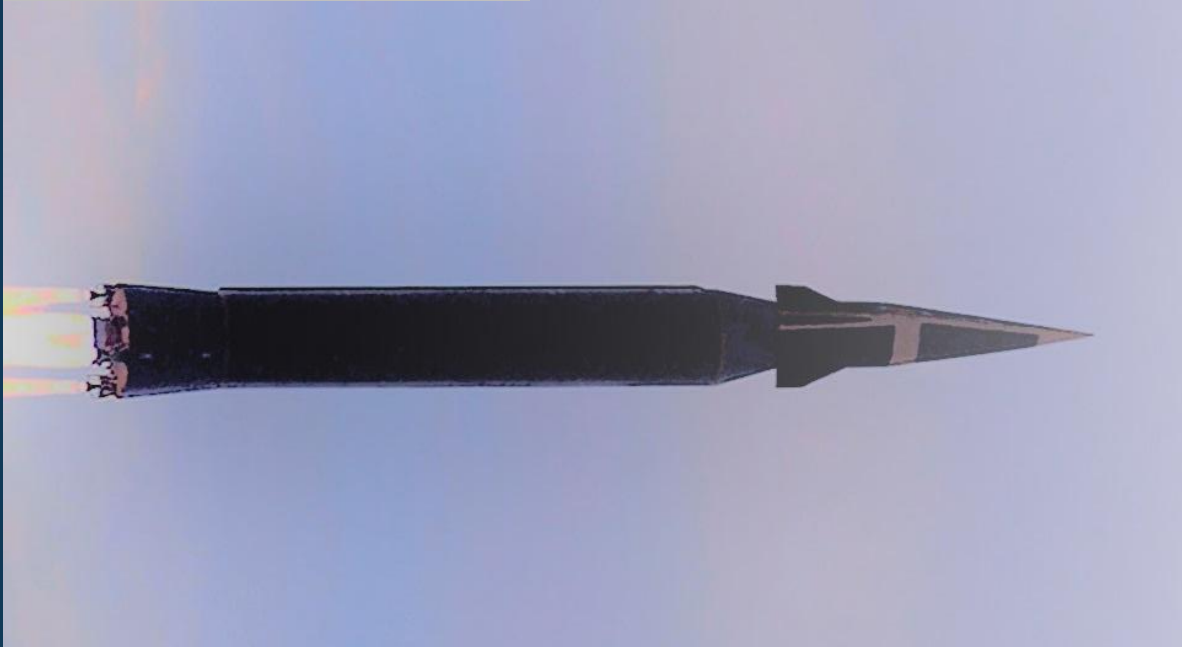
NUCLEAR CAPABLE: Yes

- This is the DPRK’s first medium-range ballistic missile.
- It is powered by a larger engine that uses Scud-level technology but produces roughly twice the thrust.
- The ROK estimates that the DPRK possesses around 200-300 such missiles.*

* “S. Korea’s military to greatly increase Hyunmoo missiles,” Yonhap News Agency, 14 August 2016, available at: <https://en.yna.co.kr/view/AEN20160814001300315>; “북한 전역에 ‘3단계 전략 미사일 벨트’ 운용” [Operation of a Three-Stage Strategic Missile Belt Across North Korea], KBS News, 26 December 2012, available at: <http://mn.kbs.co.kr/news/view.do?ncd=2587807>

HWASONG-8

Liquid propellant



*Rotated and enhanced view of the Hwasong-8.
Image: KCNA*

DESIGNATIONS: Hwasong-8

RANGE: Medium-range

VEHICLE: MAZ-547 truck (6 axles)

FIRST KNOWN TEST: 2021

NUCLEAR CAPABLE: Likely

- The Hwasong-8 is based on the Hwasong-12 intermediate-range ballistic missile.
- It carries a hypersonic glide vehicle (HGV) as its warhead.
- It was only tested once, on 14 September 2021. During this test, the HGV reportedly only reached a top speed of Mach 3.*

* Yoo Hyun-min, "북한 극초음속 미사일, 초기단계로 배치에 상당시간 소요" [North Korea's hypersonic missiles are in an early stage and take considerable amount of time to deploy], Yonhap News Agency, 29 September 2021, available at: <https://www.yna.co.kr/view/AKR20210929099551504>

Another hypersonic missile



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Liquid propellant



Rotated and enhanced view of the Hwasong-8. Image: KCNA

DESIGNATIONS: Official designation unknown

RANGE: Medium-range

VEHICLE: MAZ-547 truck (6 axles)

FIRST KNOWN TEST: 2022

NUCLEAR CAPABLE: Likely

- This hypersonic missile is also based on the Hwasong-12 intermediate-range ballistic missile.
- It carries a hypersonic glide vehicle (HGV) as its warhead.
- It was tested twice, on 5 and 11 January 2022. During the 11 January 2022 test, the HGV reached a top speed of Mach 10.*

* Song Sang-ho, N. Korea's improved ballistic missile traveled at Mach 10: JCS, Yonhap News Agency, 11 January 2022, available at: <https://en.yna.co.kr/view/AEN20220111001057325>



Solid propellant



KN02 at a parade on 10 October 2010.
Image: KCNA

DESIGNATIONS: Official designation unknown;
referred to as “KN02” by the United States

RANGE: Short-range

VEHICLE: MAZ-630308 commercial truck (locally modified)

FIRST KNOWN TEST: Uncertain; The first test reported by State media
took place in 2014, but the image used in that report
was a heavily edited photograph.

NUCLEAR CAPABLE: Realistic possibility

- This is alleged to be the DPRK's first solid-propellant ballistic missile based on the Soviet-era OTR-21 Tochka.
- Its development status is unknown.

KN23



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Solid propellant



KN23 first shown at a parade on 8 February 2018. Image: Sogwang



Pre-launch image of the KN23 from a reported test on 25 July 2019. Image: KCTV



A submarine-launched ballistic missile, possibly based on the KN-23, is launched in October 2021. Image: KCNA

DESIGNATIONS: Official designation unknown; described as a “tactical guided weapon” by DPRK State media; referred as “KN23” by the United States

RANGE: Short-range (~600 km)

VEHICLE: 4 axles truck used in the 2018 parade differs from the truck shown in the launch reports. The system also has a tracked chassis.

FIRST KNOWN TEST: 2019

NUCLEAR CAPABLE: Likely

- The KN23 bears a close resemblance to the Russian 9K723/Iskander.
- It has an aero-ballistic trajectory that makes it harder to intercept.
- A submarine-launched version was tested in October 2021.
- The missile was also launched from railcars in September 2021 and January 2022.

Hwasong-11나



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Solid propellant



KN24 launch test, reported to have taken place on 21 March 2020.
Image: KCTV

DESIGNATIONS: Official designation revealed as Hwasongpho-11나;* referred to as “KN24” by the United States

RANGE: Short-range (~400 km)

VEHICLE: Tracked chassis

FIRST KNOWN TEST: 2019

NUCLEAR CAPABLE: Likely

- It has an aeroballistic trajectory that makes it harder to intercept.
- The DPRK claims that the Hwasong-11나 has entered mass production.**

* “Hwasong” means “Mars” and “Pho” means “artillery.” The DPRK has used the term “Hwasongpho” only in the case of the Hwasongpho-11나 and the Hwasongpho-17.

** “Test-fire of Tactical Guided Missiles Held,” KCNA, 18 January 2022

Short-range ballistic missile with “2.5 tons warhead”



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Solid propellant



Launch of the ballistic missile with “2.5 tons warhead” in March 2021.
Image: KCTV

DESIGNATIONS: Official designation unknown

RANGE: Short-range (~600 km)

VEHICLE: 5 axles truck

FIRST KNOWN TEST: 2021

NUCLEAR CAPABLE: Likely

- This larger short-range ballistic missile is built on the basis of the KN-23 and KN-24 (Hwasong-11나).
- The DPRK claims that the missile has a warhead of 2.5 tons. Several member States of the UN Security Council assessed that the mass of 2.5 tons may refer to the entire weight of the missile after burnout.*
- It has an aeroballistic trajectory that makes it harder to intercept.

* UN Panel of Experts report S/2021/777

New short-range ballistic missile



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Test launch of the new short-range ballistic missile on 16 April 2022. Four missiles are carried by what appears to be a 3-axle truck.

Image: KCTV

DESIGNATIONS: Official designation unknown

RANGE: Short-range (possibly less than 200 km)

VEHICLE: 3 axles truck

FIRST KNOWN TEST: April 2022

NUCLEAR CAPABLE: Likely

- Its general structure is similar to that of the KN-23, Hwasong-11나 (KN-24) and the larger short-range ballistic missile with a claimed warhead weight of 2.5 tons
- DPRK claimed that “the new type tactical guided weapon system [...] is of great significance in drastically improving the firepower of the frontline long-range artillery units and enhancing the efficiency in the operation of tactical nukes of the DPRK and diversification of their firepower missions.”

* “Respected Comrade Kim Jong Un Observes Test-fire of New-type Tactical Guided Weapon,” KCNA, 17 April 2022, available at: <http://kcna.kp/en/article/q/ef857f3a6a119b3cd07e76774404678c.kcmsf>.

PUKGUKSONG-1



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Solid propellant



*Pukguksong-1 SLBM.
Image: KCTV*

DESIGNATIONS: Pukguksong-1;
referred to as “KN11” by the United States

RANGE: Medium-range (~1300 km)

VEHICLE: Sinpo class experimental submarine

FIRST KNOWN TEST: 2016

NUCLEAR CAPABLE: Yes

- This is a two-stage, submarine-launched ballistic missile (SLBM).
- A complete test (from ejection to reentry) was carried out in August 2016 on a lofted trajectory. There have been no tests since then.

PUKGUKSONG-2



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Solid propellant



Pukguksong-2 shown at a parade on 15 April 2017. Image: Sogwang

DESIGNATIONS: Pukguksong-2;
referred to as “KN15” by the United States

RANGE: Medium-range (~1300 km)

VEHICLE: Tracked chassis

FIRST KNOWN TEST: 2017

NUCLEAR CAPABLE: Yes

- The Pukguksong-2 is a land-based variant of the Pukguksong-1.
- It was flight tested twice in 2017.

PUKGUKSONG-3



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Solid propellant



*Pukguksong-3 flight test
on 2 October 2019
Image: KCTV*



*A presumed ballistic missile
submarine converted from a
Chinese Type 033 class
submarine at Sinpo South
Shipyards
Image: KCTV*

DESIGNATIONS: Pukguksong-3;
referred to as "KN26" by the United States

RANGE: Medium-range (~2000 km)

VEHICLE: Presumably intended for a ballistic missile
submarine

FIRST KNOWN TEST: 2019

NUCLEAR CAPABLE: Yes

- This is a two-stage, submarine-launched ballistic missile (SLBM), test fired only once, in 2019.
- There have been no tests since then and its current development status is unknown.
- It has yet to be presented at a military parade.

PUKGUKSONG-4 ㄸ

Solid propellant



*The Pukguksong-4 was first showcased during the 10 October 2020 military parade.
Image: KCTV*

DESIGNATIONS: Pukguksong-4 ㄸ

RANGE: Possibly medium-range

VEHICLE: Presumably intended for a ballistic missile submarine

FIRST KNOWN TEST: Untested

NUCLEAR CAPABLE: Yes

- It is a two-stage, submarine-launched ballistic missile (SLBM).
- It has not been flight tested.

PUKGUKSONG-5ㄸ



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Solid propellant



*The Pukguksong-5 was first showcased in a military parade in January 2021.
Image: KCNA*

DESIGNATIONS: Pukguksong-5ㄸ

RANGE: Possibly medium-range

VEHICLE: Presumably intended for a ballistic missile submarine

FIRST KNOWN TEST: Untested

NUCLEAR CAPABLE: Yes

- It is a two-stage, submarine-launched ballistic missile (SLBM).
- It seems to be a further development of the Pukguksong-4ㄸ.
- It has not been flight tested.



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2. Intermediate-Range Ballistic Missiles (3000 - 5500 km range)

HWASONG-10



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Liquid propellant



*Hwasong-10 shown at a parade on 10 October 2015.
Image: ONN*

DESIGNATIONS: Hwasong-10;
commonly referred to as “Musudan” or “BM-25”

RANGE: Intermediate-range

VEHICLE: MAZ-547 (6 axles) , which was used to carry the
Hwasong-12 in 2017

FIRST KNOWN TEST: 2016

NUCLEAR CAPABLE: Yes

- This is a single-stage intermediate-range ballistic missile (IRBM) with liquid propellant based on Soviet-era R-27 SLBM.
- After a string of failures in 2016, the project is likely to have been cancelled in favour of the Hwasong-12.

HWASONG-12



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Liquid propellant



*Hwasong-12 shown in a parade on 15 April 2017.
Image: Sogwang*

DESIGNATIONS: Hwasong-12;
referred to as “KN17” by the United States

RANGE: Intermediate-range (over 3500 km)

VEHICLE: MAZ-547 (6 axles)

FIRST KNOWN TEST: 2017

NUCLEAR CAPABLE: Yes

- This is a single-stage intermediate-range ballistic missile.
- The missile was successfully flight tested three times in 2017 and once in January 2022.
- The DPRK claimed in 2022 that the missile had entered mass production.*

* “Test fire of Hwasong-12 type Ground to Ground Intermediate and Long-range Ballistic Missile held,” KCNA, 31 January 2022



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3. Intercontinental Ballistic Missiles (beyond 5500 km range)

HWASONG-13



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Liquid propellant



*Hwasong-13 Mod 1 on a WS51200 truck shown at a parade on 15 April 2012. Mod 1 is a three-stage, liquid propellant design.
Image: KCTV*



*Hwasong-13 Mod 2 on a WS51200 truck shown at a parade on 10 October 2015. Mod 2 is a two-stage design.
Image: ONN*

DESIGNATIONS: Hwasong-13; referred to as “KN08” and “KN14” by the United States

RANGE: Intercontinental-range

VEHICLE: WS51200 truck (8 axles)

FIRST KNOWN TEST: Unknown/untested

NUCLEAR CAPABLE: Yes

- The two configurations of the Hwasong-13 ICBM heavily relied on the engine technologies of the Hwasong-10.
- They are likely to have been abandoned in favour of the Hwasong-14, the Hwasong-15 and the Hwasong-17 ICBMs.

HWASONG-14



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Liquid propellant



*Hwasong-14 on display in a parade on 15 April 2017
This is only a display trailer, not a launching vehicle. Image: Sogwang*



*Hwasong-14 on a WS51200 truck prior to a launch test
on 4 July 2017. Image: KCNA*

DESIGNATIONS: Hwasong-14;
referred to as “KN20” by the United States

RANGE: Intercontinental-range

VEHICLE: WS51200 truck (8 axles)

FIRST KNOWN TEST: 2017

NUCLEAR CAPABLE: Yes

- This is a relatively small, two-stage ICBM.
- It is based on the Hwasong-12 with a small liquid engine added to power the second stage.
- WS51200 trucks were shown to carry it during its only two reported tests in 2017 before the trucks were modified to carry larger ICBMs.

HWASONG-15



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Liquid propellant



*Hwasong-15 shown on a 9 axes modification of the WS51200 on 8 February 2018
Image: Sogwang*

DESIGNATIONS: Hwasong-15;
referred to as “KN22” by the United States

RANGE: Intercontinental-range

VEHICLE: WS51200 truck, modified to have an additional (9th)
axle

FIRST KNOWN TEST: 2017

NUCLEAR CAPABLE: Yes

- The Hwasong-15 is a two-stage, mobile ICBM.
- It shares engine technology with the Hwasong-12 IRBM and the Hwasong-14 ICBM.
- The second stage is presumed to have a new unknown engine.
- The Hwasong-15 was flight tested in November 2017 and possibly in March 2022.*

* “N. Korea seems to have fired Hwasong-15 ICBM last week, S. Korea’s military tells lawmakers,” Yonhap News Agency, 29 March 2022, available at: <https://en.yna.co.kr/view/AEN20220329008052325>

HWASONG-17

Liquid propellant



Lift-off of Hwasong-17.
Image: KCTV

DESIGNATIONS: Hwasongpho-17*

RANGE: Intercontinental-range

VEHICLE: WS51200 truck, modified to have 11 axles

FIRST KNOWN TEST: 2022

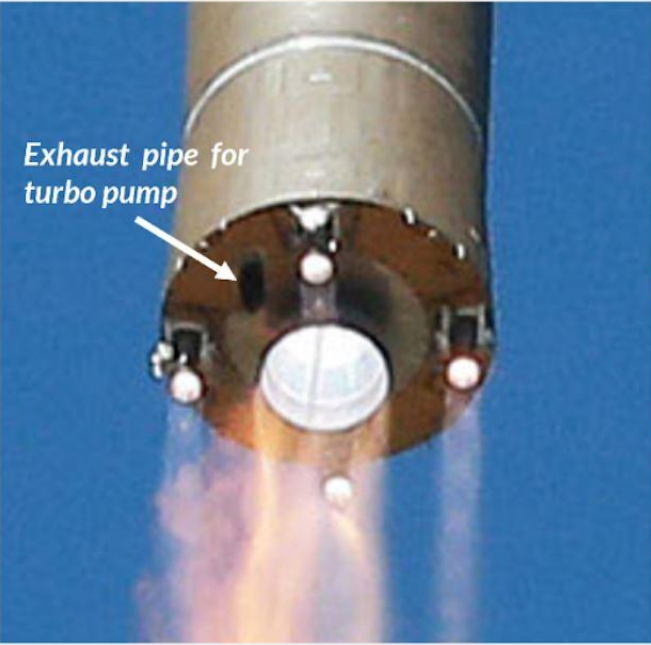
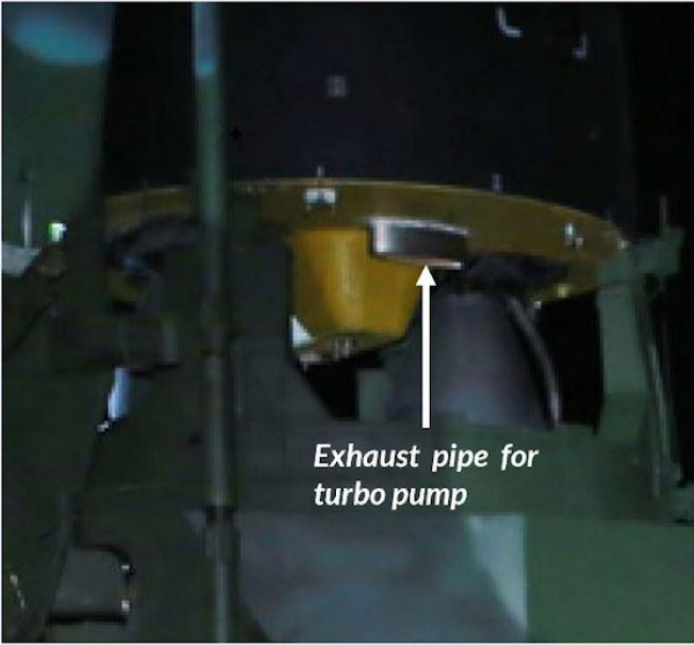


NUCLEAR CAPABLE: Yes

- This is a very large road-mobile ICBM powered by a pair of first stage engines of the Hwasong-15.
- It was first showcased during a military parade on 10 October 2020.
- It was possibly test fired in late February and March 2022.**

* “Hwasong” means “Mars” and “Pho” means “artillery.” The DPRK has used the term “Hwasongpho” only in the case of the Hwasongpho-11 and the Hwasongpho-17.

** “Test-fire of Tactical Guided Missiles Held,” KCNA, 18 January 2022; “N. Korea seems to have fired Hwasong-15 ICBM last week, S. Korea's military tells lawmakers,” Yonhap News Agency, 29 March 2022, available at: <https://en.yna.co.kr/view/AEN20220329008052325>; “Statement by Pentagon Press Secretary John Kirby on Recent DPRK Missile Tests,” US DoD, 10 March 2022, available at: <https://www.defense.gov/News/Releases/Release/Article/2963053/statement-by-pentagon-press-secretary-john-kirby-on-recent-dprk-missile-tests/>



HWASONG-12 IRBM* /-14 ICBM	HWASONG-15 ICBM	HWASONG-17 ICBM
 <p>Exhaust pipe for turbo pump</p>	 <p>Exhaust pipe for turbo pump</p>	 <p>One of the two exhaust pipes for turbo pumps</p>
<ul style="list-style-type: none">• One engine with one main combustion chamber and four smaller, movable combustion chambers;• Turbo pump working at ~60% capacity.	<ul style="list-style-type: none">• One dual chamber engine with two movable main combustion chambers;• Turbo pump working at ~100% capacity.	<ul style="list-style-type: none">• Two dual chamber engines with four movable main combustion chambers;• Two turbo pumps working at ~100% capacity.
<p>* and hypersonic missiles based on Hwasong-12</p>  <p>OPEN NUCLEAR NETWORK <i>a programme of One Earth Future</i></p>		

Technological lineage of the new generation of Hwasong strategic ballistic missiles.
Images: KCNA, KCTV



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4. Other Weapon Systems

MISSILE CANISTERS EXHIBITED IN PREVIOUS PARADES



*Missile model 1 shown at a parade on 15 April 2017.
The same trailer was also used to showcase the Hwasong-14
Image: Sogwang*



*Missile model 2 shown at a parade on 15 April 2017
Image: KCTV*

Two missile models with large canisters were displayed in a parade in April 2017. It is uncertain whether the two models represent real projects. There is speculation that they indicate intermediate- and intercontinental-range solid-fuel ballistic missile projects. The missile model shown on the right utilized the WS51200 truck, which was later used to carry and launch the Hwasong-14, Hwasong-15 and Hwasong-17 ICBMs.

LAND-ATTACK CRUISE MISSILE



Long-range cruise missile test conducted in January 2022.

Image: KCNA

DESIGNATIONS: Official designation unknown

RANGE: Over 1500 km

VEHICLE: Commercial truck and trailer

FIRST KNOWN TEST: 2021

NUCLEAR CAPABLE: Realistic possibility

- It was flight tested in September 2021.
- A modified version was tested in January 2022.

POSSIBLE LAND-ATTACK CRUISE MISSILE



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*A possible long-range cruise missile concept showcased in a military parade on 10 October 2020.
Image: KCNA*

DESIGNATIONS: Official designation unknown

VEHICLE: Commercial truck and trailer

FIRST KNOWN TEST: Unknown/untested

NUCLEAR CAPABLE: Realistic possibility

240 MM MULTIPLE ROCKET LAUNCHER



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240 mm multiple rocket launcher in a parade on 10 October 2015

Image: ONN



Official name plate on the system reads "240 mm multiple rocket launcher (22)"

Image: ONN

DESIGNATIONS: 240 mm multiple rocket launcher

RANGE: ~70 km

VEHICLE: Commercial truck

FIRST KNOWN TEST: In the 1980s

NUCLEAR CAPABLE: No

- This artillery is the DPRK's first multiple rocket launcher that can directly hit the greater Seoul area.
- Similar types of launchers with fewer tubes are also in service.

KN09 MULTIPLE ROCKET LAUNCHER



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*KN09 multiple rocket launcher shown in a parade on 10 October 2015
Image: ONN*

DESIGNATIONS: Official designation unknown;
referred to as “KN09” by the United States

RANGE: Over 200 km

VEHICLE: Commercial truck

FIRST KNOWN TEST: Presumed to have taken place in 2013

NUCLEAR CAPABLE: No

- The KN09 guided multiple rocket launcher is presumed to have transitioned from testing to deployment in 2018.
- The system was first shown at a parade on 10 October 2015.

KN25 MULTIPLE ROCKET LAUNCHER



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Solid propellant



*KN25 in a November 2019 test
Image: KCTV*



*KN25 in a March 2020 test
Image: KCNA*

DESIGNATIONS: Official designation unknown;
referred to by DPRK state media as “super-large
calibre multiple launch rocket system”;
referred to as “KN25” by the United States

RANGE ~380 km

VEHICLE: Truck and tracked chassis

FIRST KNOWN TEST: 2019

NUCLEAR CAPABLE: Realistic possibility

- The KN25 multiple rocket launchers have used both wheeled and tracked chassis.
- With a diameter of ~600 mm, the system might be nuclear capable.
- Though it is commonly referred to as a multiple rocket launcher system, the rockets are de facto ballistic missiles.

KN06 SURFACE TO AIR MISSILE



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Solid propellant



*Launcher with 3 missiles displayed on 10 October 2015
Image: ONN*

DESIGNATIONS: Official designation unknown; referred to as “KN06” by the United States

VEHICLE: Commercial truck

FIRST KNOWN TEST: 2016

NUCLEAR CAPABLE: No



*KN06's fire control radar displayed in a parade on 10 October 2015
Image: ONN*

- This surface-to-air missile system was announced as operational following a reported test on 28 May 2017.
- The system bears a resemblance to early types of the Soviet S-300 air defence missile systems.

NEW SURFACE TO AIR MISSILE



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Solid propellant



DESIGNATIONS: Official designation unknown

VEHICLE: Commercial truck and trailer

FIRST KNOWN TEST: 2021

NUCLEAR CAPABLE: No

- The new missile was publicly test fired in September 2021.
- The missiles seem to have two versions of boosters.

Left: Launch of the new surface to air missile. Right: Two new surface to air missiles on display. As shown by the cable raceways (in yellow and orange boxes), the booster of one missile is longer than that of the other (longer part marked in orange box).

Images: KCNA

SHORT RANGE SURFACE TO AIR MISSILE

Solid propellant



Short range surface to air missile system at a parade on 20 October 2020
Image: KCNA

DESIGNATIONS: Official designation unknown

VEHICLE: Commercial truck and trailer

FIRST KNOWN TEST: Unknown/untested

NUCLEAR CAPABLE: No

- The configuration is similar to Russian “TOR” surface to air missile system.
- It was first showcased in a parade in October 2020.
- The missiles are supposed to be vertically stored and ejected into the air upon launch.

OPEN NUCLEAR NETWORK

opennuclear.org

One Earth Future's Open Nuclear Network programme is a non-aligned, non-governmental entity that seeks to increase security for all States by ensuring that nuclear decision makers have access to high quality, shareable open Image information which enables them to make the best decisions in the face of escalating conflict.

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