



**OPEN NUCLEAR
NETWORK**

a program of One Earth Future

Viewbook of DPRK Missiles

Prepared by ONN

7 October 2020



OPEN NUCLEAR NETWORK

a program of One Earth Future

This is a viewbook prepared in anticipation of a military parade likely to be held on or around 10 October 2020 by the DPRK in celebration of the 75th anniversary of the founding of the Workers' Party of Korea.

The main focus of this viewbook is on the DPRK's ballistic missile systems, but it also includes some heavy artillery pieces and air defense systems that have been presented during previous parades.



OPEN NUCLEAR NETWORK

a program of One Earth Future

1. Short- to Medium-Range Ballistic Missiles

- **Liquid Fuel**
 - Hwasong-5 and Hwasong-6
 - Precision-guided Hwasong-6
 - Scud-ER
 - Hwasong-7
- **Solid Fuel**
 - KN02
 - KN23
 - KN24
 - Pukguksong-1
 - Pukguksong-2
 - Pukguksong-3

2. Intermediate-Range Ballistic Missiles

- Hwasong-10
- Hwasong-12

3. Intercontinental-Range Ballistic Missiles

- Hwasong-13
- Hwasong-14
- Hwasong-15

4. Other Weapon Systems

- **Missile canisters exhibited in previous parades**
- **Long-range multiple rocket launchers**
 - 240 mm multiple rocket launcher
 - KN09
 - KN25
- **Air defense weapon systems**
 - KN06



**OPEN NUCLEAR
NETWORK**

a program of One Earth Future

1. Short- to Medium-Range Ballistic Missiles

HWASONG-5 AND HWASONG-6



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Short- to Medium-Range Ballistic Missile

Liquid Fuel



Hwasong-6 at a parade on 10 October 2015

Source: ONN

DESIGNATIONS Hwasong-5 and Hwasong-6

RANGE Short-range

VEHICLE MAZ-543 (Soviet four-axis off-road truck)

FIRST KNOWN TEST 1984

The Hwasong-5 and Hwasong-6 are the 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 and are considered to be nuclear-capable. 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 ‘3 단계 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



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Short- to Medium-Range Ballistic Missile

Liquid Fuel



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

DESIGNATIONS	Official designation unknown; Referred to as “KN18” by the United States
RANGE	Short-range
VEHICLE	Tracked chassis
FIRST KNOWN TEST	2017

This variant of the Hwasong-6 has a precision guided warhead and was first publicly tested on 29 May 2017. Unlike typical Scud missiles, the warhead separates from the missile body after engine burnout and, aided by onboard satellite positioning systems, finetunes its trajectory to carry out a precision strike. It is unknown if this type is in production or if it is intended to have a nuclear strike role.

SCUD-ER (SCUD-EXTENDED RANGE)

Short- to Medium-Range Ballistic Missile

Liquid Fuel



OPEN NUCLEAR
NETWORK
a program of One Earth Future



*Four Scud-ERs on MAZ-543 launchers during an exercise, 6 March 2017
Source: KCTV*

DESIGNATIONS Official designation unknown (possibly Hwasong-9, but cannot be confirmed);
Referred to as “KN04” by the United States

RANGE Medium-range

VEHICLE MAZ 543 truck (four axes)

FIRST KNOWN TEST Possibly in the 2000s

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

HWASONG-7

Short- to Medium-Range Ballistic Missile

Liquid Fuel



OPEN NUCLEAR
NETWORK
a program of One Earth Future



Hwasong-7 at a parade on 10 October 2015
Source: ONN

DESIGNATIONS	Hwasong-7; Referred to as “Rodong/Nodong” or “KN-SS-2” by the United States
RANGE	Medium-range
VEHICLE	MAZ 543 truck (five axes, locally modified)
FIRST KNOWN TEST	1993

This was the DPRK’s first medium-range ballistic missile. It is nuclear capable and 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 ‘3 단계 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>

KN02



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Short- to Medium-Range Ballistic Missile

Solid Fuel



*KN02 at a parade on 10 October 2010
Source: KCNA*

DESIGNATIONS

Official designation unknown (possibly Hwasong-11, but cannot be confirmed);
Referred to as “KN02” or “Toksa” by the United States

RANGE

Short-range

VEHICLE

MAZ-630308 commercial truck (locally modified)

FIRST KNOWN TEST

Uncertain;
the first test was reported by State media to have taken place in 2014, but the image used in that report was a heavily edited photograph

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

KN23



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Short- to Medium-Range Ballistic Missile

Solid Fuel



*KN23 at a parade on 8 February 2018
Source: Sogwang*



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

DESIGNATIONS

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

RANGE

Short-range

VEHICLE

Four-axis truck used in the 2018 parade differs from the truck shown in launch reports. The system also has a tracked chassis.

FIRST KNOWN TEST

2019

The KN23 bears a close resemblance to the Russian 9K723/Iskander and has demonstrated accuracy during test firings targeting a small island off the DPRK’s eastern coast. It is possibly nuclear capable and has a quasi-ballistic trajectory that makes it harder to intercept. Four tests involving 8 missiles have reportedly been carried out between May and August 2019.

KN24



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Short- to Medium-Range Ballistic Missile

Solid Fuel



*KN24 launch test, reported to have taken place on 21 March 2020
Source: KCTV*

DESIGNATIONS

Official designation unknown; described as a “tactical guided weapon” and a “Juche projectile of Korean style” by DPRK State media; Referred to as “KN24” by the United States

RANGE Short-range

VEHICLE Tracked chassis

FIRST KNOWN TEST 2019

The KN24 was tested three times between 10 August and March 2020 with a total of six missiles fired. Its development status is unknown, but it is presumed to be deployed soon. It is possibly nuclear capable and has a quasi-ballistic trajectory that makes it harder to intercept.

PUKGUKSONG-1



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Short- to Medium-Range Ballistic Missile

Solid Fuel



*Pukguksong-1 on a display truck shown at a parade on 15 April 2017
Source: KCTV*

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

RANGE Medium-range

VEHICLE Sinpo-class experimental submarine

FIRST KNOWN TEST 2016

Two-stage, solid-fuel 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. It is considered to be nuclear capable.

PUKGUKSONG-2



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Short- to Medium-Range Ballistic Missile

Solid Fuel



*Pukguksong-2 shown at a parade on 15 April 2017
Source: Sogwang*

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

RANGE Medium-range

VEHICLE Tracked chassis

FIRST KNOWN TEST 2017

The Pukguksong-2 is a land-based variant of the Pukguksong-1. A two-stage solid-fuel medium-range ballistic missile, it was tested twice in 2017. The tracked chassis allows for off-road mobility and may increase chances of survivability.

PUKGUKSONG-3



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Short- to Medium-Range Ballistic Missile

Solid Fuel



*Pukguksong-3 ejection test, reported to have taken place on 2 October 2019
Source: KCTV*



*Construction of a new ballistic missile submarine at Sinpo Shipyard
Source: KCTV*

DESIGNATIONS	Pukguksong-3; Referred to as “KN26” by the United States
RANGE	Medium-range
VEHICLE	Presumably intended for a missile submarine converted from a Chinese type-033/Romeo class submarine
FIRST KNOWN TEST	2019

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



**OPEN NUCLEAR
NETWORK**

a program of One Earth Future

2. Intermediate-Range Ballistic Missiles

HWASONG-10

Intermediate-Range Ballistic Missile

Liquid Fuel



OPEN NUCLEAR
NETWORK
a program of One Earth Future



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

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

RANGE Intermediate-range

VEHICLE MAZ-547 (six axes) , which was used to carry the Hwasong-12 in 2017

FIRST KNOWN TEST 2016

Single-stage intermediate-range ballistic missile with liquid propellant. After a string of failures in 2016, the project is likely to have been cancelled in favor of the Hwasong-12.

HWASONG-12



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Intermediate-Range Ballistic Missile

Liquid Fuel



Hwasong-12 shown in a parade on 15 April 2017
Source: Sogwang

DESIGNATIONS	Hwasong-12; Referred to as “KN17” by the United States
RANGE	Intermediate-range
VEHICLE	MAZ-547 (six axes)
FIRST KNOWN TEST	2017

Single-stage intermediate-range ballistic missile with liquid propellant. The missile was successfully flight tested three times in 2017. It is nuclear-capable.



**OPEN NUCLEAR
NETWORK**

a program of One Earth Future

3. Intercontinental-Range Ballistic Missiles

HWASONG-13



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Intercontinental-Range Ballistic Missile

Liquid Fuel



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. Source: KCTV



Hwasong-13 Mod 2 on a WS51200 truck in a parade on 10 October 2015. Mod 2 is a two-stage design. Source: ONN

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

RANGE Intercontinental-range

VEHICLE WS51200

FIRST KNOWN TEST No confirmed tests, possibly abandoned

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

HWASONG-14



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Intercontinental-Range Ballistic Missile

Liquid Fuel



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



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

DESIGNATIONS	Hwasong-14; Referred to as “KN20” by the United States
RANGE	Intercontinental-range
VEHICLE	WS51200 (eight axes)
FIRST KNOWN TEST	2017

Two-stage, liquid propellant 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 the Hwasong-15. The DPRK is believed to have six WS51200 trucks imported from China.*

* S/2013/337, United Nations Security Council, page 27, available at: <https://www.undocs.org/S/2013/337>

HWASONG-15



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Intercontinental-Range Ballistic Missile

Liquid Fuel



Hwasong-15 shown on a 9-axis modification of the WS51200 on 8 February 2018

Source: Sogwang

DESIGNATIONS Hwasong-15;
Referred to as “KN22” by the United State

RANGE Intercontinental-range

VEHICLE WS51200, modified to have an additional (9th) axis

FIRST KNOWN TEST 2017

The Hwasong-15 is a two-stage, liquid-propellant mobile ICBM. It uses the same engine technology as the Hwasong-12 and Hwasong-14 for its first stage. The second stage is presumed to have a new unknown engine. The Hwasong-15 was only flight tested once, on 29 November 2017. Official DPRK reports claim that the new system can carry a “super-large heavy warhead which is capable of striking the whole mainland of the US.”



**OPEN NUCLEAR
NETWORK**

a program of One Earth Future

4. Other Weapon Systems

MISSILE CANISTERS EXIBITED IN PREVIOUS PARADES



Other Weapon Systems



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



*Missile model 2 shown at a parade on 15 April 2017
Source: 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 second missile model (shown on right) utilized the WS51200 truck, which was later used to carry and launch the Hwasong-14 and subsequently modified to accommodate the larger Hwasong-15.

240 MM MULTIPLE ROCKET LAUNCHER



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Long-Range Multiple Rocket Launchers

Solid Fuel



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

Source: ONN

DESIGNATIONS 240 mm multiple rocket launcher

VEHICLE Commercial trucks

FIRST KNOWN TEST In the 1980s

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.



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

Source: ONN

KN09



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Long-Range Multiple Rocket Launchers

Solid Fuel



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

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

VEHICLE Commercial HOWO truck

FIRST KNOWN TEST Presumed to have taken place in 2013

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



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Long-Range Multiple Rocket Launchers

Solid Fuel



KN25 in a November 2019 test
Source: KCTV



KN25 in a March 2020 test
Source: KCNA

DESIGNATIONS Official designation unknown;
Referred to as “KN25” by the United States

VEHICLE Truck and tracked chassis

FIRST KNOWN TEST 2019

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



OPEN NUCLEAR
NETWORK
a program of One Earth Future

Air Defense Weapon System

Solid Fuel



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

DESIGNATIONS

Official designation unknown;
Referred to as “KN06” by the United States

VEHICLE

Commercial trucks

FIRST KNOWN TEST

2016



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

Surface-to-air missile system that 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 defense missile systems.

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 source information which enables them to make the best decisions in the face of escalating conflict.

Laura ROCKWOOD	Director	LRockwood@oneearthfuture.org
Melissa HANHAM	Deputy Director	MHanham@oneearthfuture.org
Katsuhisa FURUKAWA	Senior Analyst	KFurukawa@oneearthfuture.org
Clayton BESAW	Senior Analyst	CBesaw@oneearthfuture.org
Veronika BEDENKO	Analyst	VBedenko@oneearthfuture.org
Matthew FRANK	Analyst	MFrank@oneearthfuture.org
Jaewoo SHIN	Analyst	JShin@oneearthfuture.org
Tianran XU	Analyst	TXu@oneearthfuture.org
Marion LINGER	Office Coordinator	MLinger@oneearthfuture.org