

# North Korean ICBM design shows external influence

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North Korea's ballistic missile programme made unprecedented advances during the course of 2017. *Markus Schiller* and *Nick Hansen* examine the new Hwaseong-15 and determine that it is evidence of external support to North Korea's missile development

## Key Points

- Based on the design of the missile and its first-stage engine, *Jane's* assesses that it is highly likely that North Korea made use of external knowledge, technology, or hardware in the development of the Hwaseong-15 ICBM.
- It is likely that this external support was derived from the Soviet-era ballistic missile programme, although *Jane's* cannot determine with any degree of certainty when this transfer took place and from which state.
- The development of the Hwaseong-15 suggests that there are multiple lines of development in North Korea's ballistic missile programme, raising the possibility that there will be further demonstrations of new liquid-propellant-powered systems in 2018.

North Korea celebrated the 70th anniversary of the Korean People's Army with a military parade in Pyongyang on 8 February. Among the systems on display were four Hwaseong-15 intercontinental ballistic missiles (ICBMs). The appearance of the Hwaseong-15 – little more than two months after it was first observed in open sources – marked the conclusion of the parade.



*A montage of screen captures from North Korea's broadcast of the 8 February 2018 Korean People's Army 70th Anniversary Parade showing what appear to be four Hwaseong-15 ICBMs. The missiles' appearance marked the conclusion of the parade. (KCNA/YouTube)*

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The prominence accorded to the Hwaseong-15 is understandable; the first launch of the missile on 29 November 2017 dwarfed all other North Korean ballistic missile achievements up to that point, in terms of its size and in its flight performance.

It capped a year in which North Korea's missile programme made a rapid series of unprecedented leaps. Six seemingly new missile types were launched, starting with the Pukkuksong-2 (South Korean Ministry of National Defense designation KN-15) in February, a missile that appears to be a land-based version of the Pukkuksong-1 (KN-11) submarine-launched ballistic missile (SLBM), and modified variants of the Hwaseong-5 and -6.

More significant was the first public sighting of three new missiles: the Hwaseong-12, -14, and -15 (KN-17, -20, and -22) using liquid-propellant engines not previously observed in North Korean missiles. Significantly, the Hwaseong-14 and -15 missiles appear to have succeeded on their first flight, which is unusual for any new large rocket.



*Three-dimensional modelling based on open-source imagery of the Hwaseong-15 ICBM. (KCNA/Nathan J Hunt/Thegius)*

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After the successful flight of the Hwaseong-15, little more than four months after the debut of the smaller Hwaseong-14, North Korean state media reported that Kim Jong-un had claimed, "Now we have finally realised the great historic cause of completing the state nuclear force, the cause of building a rocket power."

Only a small number of engine tests using higher-energy propellants – such as appears to have been used in the Hwaseong-12, -14, and -15 engines – have been observed in North Korea. In the

absence of a longer test series, it is highly likely that in the development of the Hwaseong-15, North Korea's ballistic missile programme has made use of foreign knowledge, technology, or hardware.

Moreover, the similarities in the design and size of the Hwaseong-15 missile to the Soviet UR-100 family of missiles and the similarity of the Hwaseong-15 first-stage engine to the RD-250 engine leads *Jane's* to assess that it is likely that this external support was related to the Soviet-era missile programme. However, *Jane's* cannot assess with any certainty when this transfer took place and from which state.

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