North Korea said this week it had successfully test-fired a new type of medium- to long-range ballistic missile. The test came more than a month after North Korea's leader Kim Jong Un stated in 2016:

We conducted the first H-bomb test, test-firing of various means of strike and nuclear warhead test successfully to cope with the imperialists' nuclear war threats… briskly developed state-of-the-art military hardware, and entered the final stage of preparation for the test launch of intercontinental ballistic missile.

What Kim Jong Un means by "intercontinental" is anyone's guess. Presumably "inter" means some other continent than the Eurasian continent, assuming such a missile is fired from land in North Korea.

Not long after, a US Pacific Command announcement led specialists to suspect North Korea might be planning to fire a long-range missile over the top of first Japan and then Hawaii. This was viewed as barely credible, however, because to date, North Korea has not demonstrated anything resembling a long-range missile capability.

So was the missile tested by North Korea on 12 February intercontinental? Was it a new missile? And is it something to worry about?

## Was it an ICBM?

An intercontinental ballistic missile (ICBM) travels at least 5100 km away from its firing point. It has two or more stages that fire separately, and carries one or more re-entry vehicles containing nuclear warheads that plunge back to earth at about 8 to 10 km per second.

The Intermediate Nuclear Forces treaty between the former Soviet Union, now Russia, and the United States defined "intermediate" as a missile with a range between 1,000 and 5500 km. This means anything with a greater range than 5500 km is considered by convention to be "long

range."

To reach parts of Alaska and the Aleutian Islands, the nearest continent to North Korea, a North Korean missile must fly between 4900 (Aleutians) to 5100 (Alaska) km. That is, it could do so in less than 5500 km, so Kim wasn't setting the bar very high with his January statement. Most US and Russian ICBMs can hit targets more than 10,000 km away.

The most recent test was launched from a land-based mobile transporter with an arm that raises the missile to the firing angle ("erector" - no kidding). This missile used solid propellant. Most North Korean missile firings in this range were liquid fuelled, which takes many hours to prepare.

North Korea said the missile was new , naming it the Pukguksong-2. But it appears identical to the KN-11 submarine-launched missile (Pukguksong-1) tested twice to date. The Pukguksong-2 seems to have taken the solid propellant developed for the submarine launch and applied it to a land-fired version of the same missile.

The missile was launched more or less vertically from far northwestern North Korea and splashed down in coastal waters east of the country in the East Sea of Korea (Sea of Japan).

Fired in anger, and fully developed, this missile could have a range of roughly 1000 to 1200 km when carrying a nuclear warhead and fired with a normal rather than a near vertical trajectory. This is far short of a Kim's January promise of an "intercontinental" missile range.

But it is far enough to hit Japan, South Korea, China, and Russia – as well as anything on the oceans surrounding South Korea, such as an aircraft carrier.

## Why is it alarming?

Missile powers like the United States conduct scores of development tests before they actually field the missile as part of their operational nuclear forces. One test does not mean such a force can be fielded with confidence or that it is reliable.

The missile did not blow up on the ground or in the air, however, as with many past North Korean missile tests. So they are learning by doing.

It's important to note that the successful application of the KN-11 propellant in a land-based missile would enable North Korea to field a far more credible and operational mobile land-based missile force. This could move around and hide in caves, then "pop-up" to fire when ordered.

The missile seems identical to one tested twice before.

The second important implication of this test is that the submarine version is also likely to be tested again soon. When that is fielded, it will be able to deploy missiles aboard submarines in the West Sea of Korea, known to most people as the Yellow Sea.

This part of the ocean is shallow and very difficult to track submarines due to its poor and confused acoustics. American anti-ballistic missile and radar system called THAAD is to be deployed soon in South Korea. But these are not capable of tracking missiles coming from many angles offshore, which means Kim Jong Un will have simply gone around the THAAD if he ends up deploying missiles in the Yellow Sea.

## What now?

How long will it take for North Korea to develop medium-range, land-based and submarine-based, solid-propellant missiles that can hit anywhere in South Korea – or aircraft carrier battle groups sailing offshore? Nobody knows for sure, but a reasonable guess is three to five years, or longer. An operating ICBM would take much longer.

Naturally the medium-range missile prospect worries anyone in range – Japan, Russia, China, and above all, South Korea. South Koreans take solace any attack on them would lead to the annihilation of Kim's regime by the US and the South Korean military. But they also worry it could suffer an existential blow in the course of retaliating for a North Korean strike or being caught in the crossfire of an inadvertent nuclear war.

Three days before the North Korean test, the United States fired a Minuteman 3 missile from Vandenberg California to Kwajalein Atoll in the Western Pacific, 6700 km away. This was the same type of test the US
delayed in April 2013

because it might have been misinterpreted by North Korea as an attack.

Two days after the North Korean test, the US fired a US Trident missile test from a submarine offshore Vandenberg to the same test site.

It's not likely Kim's February 12 test was a response to the fear one of these tests was a sneak attack on him. More likely, Kim's test was timed to coincide with the Trump-Abe meeting .

But unlike the North Korean missiles that have been declared illegal by the UN Security Council, there's nothing illegal about American missile tests. They are intended to reinforce American nuclear threats to its adversaries, including North Korea.

Achieving consistency as to whom can threaten whom with nuclear annihilation is apparently a hobgoblin in the minds of small powers. Readers can make up their own minds.

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