

DPRK: Short and Medium Range vs. Long Range Ballistic Missiles

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Presented to PPNT Winter Conference

March 25, 2011

In January, Secretary Gates made headlines by commenting that North Korea was five years away from developing an ICBM that could reach portions of the United States.² The Director of National Intelligence, James Clapper, largely reiterated the comments in his latest "Threat Assessment."³ While various quotes on when North Korea will develop long range missile capabilities are nothing new, the quotes nearly always miss the more immediate and pressing security issue: North Korea's short and medium range missiles.

North Korea's short and medium range missiles are actually the greatest current threat and security risk in the region. Unlike North Korea's long range Taepodong II program, the short and medium range missile programs have successful test records, are deployed in mobile units throughout the country, have established doctrine, and command and control. Any future crisis with North Korea that could potentially lead to the use of its nuclear devices would more than likely utilize the proven and mobile short and medium range missiles, and not the Taepodong II, against South Korea, Japan or U.S. bases in the region, leading to possible large U.S. casualties. Therefore, while policy should, in the long term focus on the Taepodong II, current and medium term policy needs to concentrate on countering North Korea's short and medium missile force.

This essay outlines current North Korean short and medium range missiles, doctrine, and command and control structure. In addition, it compares the short and medium range doctrine to the lack of long range ballistic missile doctrine, the current Taepodong II program, and postulates the rationale for using short and medium range missiles over long range in a crisis. Finally, the essay offers recommendations for policy makers regarding various defenses and diplomatic solutions.

Current SRBM and MRBM Systems and Basing

According South Korea, North Korea has over 1,000 short and medium range missiles divided between Scud Bs, Cs (Hwasong 5, 6), Nodongs, and possibly the new Musudan.⁴ In contrast, experts claim that North Korea does not have any Taepodong I or II, IRBMs and ICBMs deployed.⁵ The DPRK does have

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² Elizabeth Bumiller and David Sanger, "Gates Warns of North Korea Missile Threat to U.S.," *New York Times*, January, 11, 2011.

³ James Clapper, "Testimony for the Record on the Worldwide Threat Assessment of the U.S. Intelligence Community, Senate Armed Services Committee," March 10, 2011.

⁴ "North Korea's Missile Stockpile Jumps to 1,000, South Says," *Global Security Newswire*, March 17, 2010. See also Hyung-Jin Kim, "NKorea has medium-range missiles division: report," Associated Press, March 9, 2010.

⁵ Joseph S. Bermudez, "Going Ballistic: North Korea's Advanced Missile Capabilities," *Jane's Intelligence Review*, March 12, 2009. See also Daniel Pinkston, "The North Korean Ballistic Missile Program," February, 2008.

established doctrines, deployment schedules and chain of command for its short and medium range missiles.

The Hwasong class is North Korea's oldest missiles and makes up a majority of its arsenal with around 600 missiles.⁶ It has a range of 300-320km and 500km for a 1,000kg and 750kg warhead respectively, which puts most of South Korea (RoK) in range. Hwasongs have the same dimensions of the Scud B and C, with a length of 11.3 meters. Production dated back to the early 1980s when North Korea reportedly reversed engineered the missiles from Egyptian and Russian Scud B and C models. Transporter Erector Launchers, TELs, for the Hwasong are the same as Scuds. Hwasong 6 requires modified TELs due to improved propulsion and increased range.

The Nodong class is an updated version of a Scud C, with an increase in range up to 1,000-1,300km and can deliver a 1,000-1,500kg warhead, putting Japan in range. Production for the Nodong started around 1989-1990, with deployment in 1995, and continues to today. Estimates are above 320 missiles.⁷ The Nodong is 15m in length and 1.35m wide. North Korea created new TELs for the Nodong, using 10x10 MAZ chassis.

Missile units compose of the Soviet style system of Scud deployments, with TELs in units, the exact number unknown, but deployed with fuel trucks, communication trucks and reload trucks carrying up to 4 missiles per launcher.⁸

According to Joseph Bermudez of Jane's Intelligence Service and author of the *KPA Journal*, North Korea operates 22-28 missile bases, over half being in the north part of the county, or the strategic rear. North Korea has three types of bases, depending on geographically location. The first type is located near the DMZ and is an underground facility with Scuds/ Hwasong and short range rockets. The KPA, Korea People's Army, would load a Hwasong on a TEL, then drive out of the facility and either immediately launch the missile or head to a prearranged location to fire at either RoK forces or cities or U.S. forces.⁹

The second type of base, in the middle of the country, is mainly underground, but also involves large prearranged launch positions. A battery of TELs would move from the base to a launch position, joined by a technical support team with missiles (Hwasongs or Nodongs), warheads, fuel and cranes to reload the TELs. As the TELs fire their missiles, they move to other prearranged launch positions until their missiles, anywhere from 3-10 depending on the number of reload trailers, are depleted. Much like the Soviet model of Scuds, it takes an estimated 30 minutes to move from the underground base to a deployed area, to load and fire a missile. It takes an additional 45 minutes to reload, fuel, and prepare

⁶ Joseph S. Bermudez, "Going Ballistic: North Korea's Advanced Missile Capabilities," *Jane's Intelligence Review*, March 12, 2009, pp. 3-4. See also Daniel Pinkston, "The North Korean Ballistic Missile Program," February, 2008, p. 47. And International Crisis Group, "North Korea's Nuclear and Missile Programs," *Asia Report N168*, June 18, 2009, p. 8. claims 600 Scuds and 320 Nodong missiles.

⁷ International Crisis Group, "North Korea's Nuclear and Missile Programs," *Asia Report N168*, June 18, 2009, p. 8. claims 600 Scuds and 320 Nodong missiles.

⁸ Joseph S. Bermudez, "Going Ballistic: North Korea's Advanced Missile Capabilities," *Jane's Intelligence Review*, March 12, 2009, p.6.

⁹ *Ibid.* p. 4. See also Daniel Pinkston, "The North Korean Ballistic Missile Program," February, 2008, pp. 46-47, 50-51. His numbers are in the 24 range, but the lists are very similar.

additional missiles. TELs would remain in the field for an estimated total of two to four hours as they deplete their missiles.¹⁰

The third type of base is in the strategic rear or northern part of the country and involves possible Musudan or possible Taepodong missile units. Those units are largely unknown to analysts.

North Korean ballistic missile units break down into divisions, brigades and battalions. Divisions are broken up into the different missile classes, such as Hwasong or Nodong. Brigades and battalions depend on location in the country. Forward deployed, near the DMZ, Hwasong brigades have three to five battalions, a headquarters, staff and missile supply company. Hwasong battalions include 36 missiles and 8 TELs, 1 for launch and each TEL has 3 for reload, similar to Soviet Scuds. Based off of the estimated 600 Hwasong missiles, North Korea has between 3-5 brigades and 16 and 17 total battalions for the Hwasong's 5 and 6.¹¹

Nodong units are most likely broken into divisions and different definitions of brigades and battalions that are unknown according to various reports. But, one could assume it would follow largely the same structure as the Hwasong.

Musudan

According to various media reports out of South Korea, the North is also starting to deploy or at least build the Musudan IRBMs.¹² The much speculated Musudan is believed to have derived from the Soviet SS-N-6 SLBM. First images came last year during the October parade. However, the parade missiles were probably mockups. Range varies depending on different analysis. In its Soviet configuration, range was 2,500-3,200km for a 650kg payload, pushing it to the IRBM category and U.S. forces in Guam at risk at its maximum range. However, as North Korea would have to reconfigure the missile and it may be below that, 2,200-2,400km according to Michael Esselman of IISS.¹³

In addition, the type of engine used, vernier thrusters that use less space and give more punch, the Musudan requires a different type of liquid fuel that is corrosive to the missile parts. As a result, the missile would need deployed in a launch canister, something it does not experience constructing. Currently, it is unknown if North Korea has built such canisters or is starting to build them.

Officially, the missile has not been flight tested like previous missile designs. However, the Unha-2 April 2009 test may have been a test of the Musudan, as it was probably the second stage of the rocket.¹⁴ In addition, according to an anonymous former American General, the North Koreans reportedly test fired the Musudan over China a few years ago.

¹⁰ *Ibid*, p. 5.

¹¹ Author's calculations.

¹² Hyung-Jin Kim, "NKorea has medium-range missiles division: report," Associated Press, March 9, 2010.

¹³ Michael Esselman, "Remarks at Iran Primer II: The Nuclear Controversy," Woodrow Wilson International Center, January, 13, 2011, http://www.wilsoncenter.org/index.cfm?fuseaction=events.event_summary&event_id=645559

¹⁴ David Wright and Theodore Postol, "A Post-launch Examination of the Unha-2," *Bulletin of the Atomic Scientists*, June 29, 2009, <http://www.thebulletin.org/web-edition/features/post-launch-examination-of-the-unha-2>

Being all this, it is difficult to determine the operability of the system. It is possible it is deployed in the northern portion of the country, but it is nearly impossible to verify in the open setting. However, given the potential for longer ranges, and the leap in technology, the Musudan represents a possible new challenge by North Korea in the near future. But, it may not be as threatening as believed due to the North's alteration to the missile body and placement in a canister. If deployed, the missile brings a slightly new capability to North Korea, but not one that radically changes the current balance.

Taepodong I and II and its drawbacks

Currently, North Korea does not have deployed Taepodong I (the missile test fired in 1998) or the Taepodong II. Nor does North Korea have a mobile delivery platform to deliver the systems. The only delivery system method is the launch pad, which is located in now two areas, both in northern North Korea under constant surveillance of South Korea and the U.S.

In addition, North Korea has not mastered solid rocket fuel technology and as a result, all of its missiles are liquid fueled. For the Taepodong I or II, this means days of time to assemble and fuel the missile on the platform. We recently saw some concern over speculation that North Korea was readying the northern launch pad for another Taepodong launch. However, South Korean and American officials quickly dismissed the idea.¹⁵

This is unlikely to change in the short to medium terms. Barring a breakthrough in solid rocket technology or the North's ability to build missile silos, which is beyond the scope of this paper, any launch of its long range missiles, will be liquid fueled and take several days/ weeks to fuel and prepare. In a crisis situation, where possible South Korea or American forces are moving deeper into North Korea, this would not be an attractive option for Kim Jong III. In addition, the North has tested the Taepodong I once, in 1998 and it failed, and the Taepodong II, twice in 2006 and 2009, both with failures. The 2009 failure was the third stage, which was an improvement over the 2006 test.

However, the current system is unreliable and in the near term does not provide confidence that a nuclear payload would reach its target if North Korea chose to launch. In addition, it is unclear if North Korea has the ability to develop a warhead that can withstand the forces of reentry. This all leads to the Taepodong as poor options for North Korea to deploy nuclear weapons in a crisis currently or the near term.

In contrast, the North already has proven effective system to delivery a possible nuclear payload. Hwasong and the Nodong offer two things that the Taepodong cannot, mobility and speed. Mobility in that the delivery systems are mobile, can be hid in conventional missile units, and have a successful track record of evading U.S. "Scud" hunting procedures. Unlike the Taepodong, the Nodong and Hwasong missiles can be loaded, fueled and dispatched to the field in a few hours.

¹⁵ Paul Eckert, "U.S. sees N. Korea provocations but not missile test," Reuters, February 17, 2011, <http://www.reuters.com/article/2011/02/17/us-korea-north-usa-idUSN1715984520110217>

Why the Taepodong II?

If the Taepodong is not the best delivery system for North Korea in a crisis, why then are they continuing to test it? I believe it is for several reasons. The first is it allows for future provocation and other avenues to persuade the other five members of the six party talks back to the negotiating table and change the discussion to their favor. The second reason is to largely test multi stage missiles, more for intermediate ranges or to try and test the Musudan or the Nodong missiles in-flight. The 2009 test demonstrates both reasons.

The April, 2009 test of the Unha 2 SLV/ Taepodong 2 provided the new Obama administration with an immediate test on North Korea. It allowed the North Koreans to establish the tone of the relationship between the two countries. North Korea hoped to establish the upper hand in the restarting of the Six Party talks. However, the Obama administration stood its ground and refused to agree to Six Party talks.

The second item the missile test provided was a test of North Korea's multi stage development. But, it is more applicable for MRBM and IRBMs than ICBMs. This could provide the North with a better opportunity to utilize multi stages, like the Taepodong I, for assaults on South Korea and Japan.

The third item is the 2009 test provided another test for the Musudan missile. It is widely believed now that the second stage of the Unha 2 was a modified Musudan. By testing it, the North Korean's were able to test to propulsion of the Musudan in a vacuum setting and test its range to see if the system did work.

While North Korea ultimately would like to have the ability to fire an ICBM, they are still years away, longer than five years in my view and others from a fully deployable system.¹⁶ However, in the meantime, North Korea is using the threat of tests as posturing and leverage in talks, as well as opportunities to test IRBMs.

Long Range vs. Short Range

In a crisis, in which Kim Jong Il, his son, or a military General, would authorize the use of nuclear weapons, would it be through the Taepodong or the medium range missiles? A thought experiment with both examples may provide a glimpse.

Command of the North Korean arsenal is in the Korean Workers Party (KWP), currently headed by Kim Jong Il. The KWP oversees the Munitions Industry Department, headed by Chon Pyongho.¹⁷ The Korean People's Army (KPA), specifically the Missile Guidance Bureau, oversees day to day operations involving deployment at the missile bases in peacetime.¹⁸

During a crisis, command of the missiles would transfer to Supreme Commander Kim Jong Il, since he is chair of both the KWP and National Defense Commission (NDC) of the KPA. The NDC is a thirteen

¹⁶ David Wright, "Secretary Gates and the North Korean Missile Threat," 38 North, <http://38north.org/2011/01/secretary-gates-and-the-north-korean-missile-threat/>

¹⁷ Jane's Intelligence Strategic Weapons Summary, "North Korea", Jane's Sentinel Security Assessment –China and Northeast Asia ,January 22, 2010, p. 3.

¹⁸ Joseph S. Bermudez, "Going Ballistic: North Korea's Advanced Missile Capabilities," Jane's Intelligence Review, March 12, 2009, p.4. See also Daniel Pinkston, "The North Korean Ballistic Missile Program," February, 2008, p. 55.

member commission that oversees all control over missile and WMD activity at the administrative level. Jong Il would command deployment and sole authority to launch, bypassing the Minister of the People's Armed Forces. Then, Kim Jong Il would order the Missile Guidance Bureau, an independent corps-level unit directly under the command of Kim Jong Il, to mate nuclear weapons to the missiles located estimated near the capital.¹⁹ According to the latest U.S. intelligence reports, North Korea now has the capability to mate nuclear warheads to missiles.²⁰

If commanders decided to deploy nuclear warheads to the missile base where the Taepodong II is stored, workers at the base would have to complete a number of complicated and timely steps. First, workers would have to fully assemble all three stages, and place the payload on top of the missile. Next, they would move the missile from the storage warehouse to the launch pad, erect it, and finally fuel it on the launch pad as quickly as possible. This could take many hours to days depending on complications. With the authority to launch, once the missile is finally fueled, North Korea could fire the Taepodong II at a U.S. city in Hawaii or even San Francisco depending on stage weights, fuel weight, and payload.

However, U.S. and South Korean intelligence have the launch site for the Taepodong II on constant surveillance. During a crisis, one would have to assume that if the U.S. detect that North Korea was fueling a Taepodong II missile, it would scramble fighters, given force deployments in South Korea and Japan, and simply take out the missile in a matter of hours. North Korea would more than likely not have the chance to launch the missile do to U.S. air superiority.

Even if North Korea deployed the Taepodong II in another area of the country, unknown at the time to the U.S. or South Korea, which has a low probability, during a crisis, the U.S. and South Korea would more than likely discover it. While the U.S. and South Korea have been caught by surprise by North Korea several times, the satellite coverage of the country is exceptional. Recent news of possible nuclear, missile test sites and production facilities demonstrate this. Additionally, the large infrastructure needed to launch the missile would alert U.S. and South Korea intelligence to any site.

Assuming that North Korea could fully move the warhead (with a mass close to or over 1,000kg) to the launch facility, assemble the Taepodong II on the launch pad, fuel the missile, and then launch the weapon, it still might not survive the flight. Given its inconsistent test flight record, it is more than likely that the Taepodong II would not reach its target, suffering an error in the 2nd or 3rd stage. North Korea has had only two long range missile test, both failures, and unless it conducts another series of successful tests, it will probably suffer another failure. Assuming the missile actually works, past all three phases, there are too many unknown to determine CEP or even if the payload would survive the flight.

In contrast, during a crisis, short and medium range missiles offer a better response for North Korea. The Hwasong and Nodong systems can deliver a warhead of 750-1,000kg, the rough size of a probable North Korea weapon. The military could also move the warhead to a mobile missile unit in the middle or northern part of the country and more reliably launch the weapons.

¹⁹ Daniel Pinkston, "The North Korean Ballistic Missile Program," February, 2008, pp. 55-56. See also International Crisis Group, "North Korea's Nuclear and Missile Programs," Asia Report N168, June 18, 2009, pp. 12-13.

²⁰ "North Korean Nukes Might Fit on Missiles, Aircraft: U.S." *Global Security Newswire*, March 11, 2011, http://gsn.nti.org/gsn/nw_20110311_8305.php

If North Korea used the short and medium range systems, it could move the payload to a TEL unit. Load the warhead onto the missile, drive the TEL into the countryside, and move to fire the missile against U.S. forces in South Korea, Seoul, or Japan. This option benefits North Korea more as it is harder to detect due to the smaller delivery systems, mobile options, and over 1,000 possible missiles to utilize, and requires perfect U.S. intelligence to counter. In addition, while the target will not be the U.S. homeland, targeting South Korea, Japan and U.S. forces with nuclear weapons is just an attractive option for North Korea as it still punishes the North's greatest enemies and causes many casualties. Finally, unlike the Taepodong II system, the Hwasong and Nodong systems are also highly reliable, with a successful test rate over the last 15-20 years.

Also, while the U.S. and South Korea are aware of a majority of North Korea short and medium range missile bases, they do not know every detail of those bases, nor the number of missiles at each base.²¹ The terrain in the North and sheer number of missile units makes U.S. preemptive action toward North Korea missile bases extremely difficult, near impossible, allowing the North to possibly fire a volley before U.S. strikes.

One concern that North Korea could have is U.S. missile defense systems in the region. However, an easy solution is to concentrate an area of South Korea or Japan with several conventional Nodongs or Hwasongs, which would deplete or nearly deplete the U.S. missile defense system that is or will be in the region.

There is also the Musudan missile, which operational deployment is unknown. It could provide North Korea a more reliable option in the northern portion of the country, as any warhead would have to travel less distance to a Musudan base in the near future. In addition, the system has a longer range than the Nodong, which could hit U.S. forces in the theatre.

Possible U.S. Options

It is unknown if North Korea will favor short and medium range missiles over long range missiles. However, U.S. policymakers need to focus on both options, not just the ICBM threat. Discussions regarding North Korea always focus on the nuclear program or the ICBM threat, not the over 1,000 short and medium range missiles. Much like the end of the Clinton administration, the Obama administration needs to raise the North Korea's overall missile program to the same level as the overall North Korea nuclear program. The Clinton administration's efforts to seek a missile agreement framework with North Korea alongside a nuclear agreement and ending of tensions; may provide a rudimentary framework for current U.S. policymakers.

Whatever framework the Obama administration moves toward engagement with North Korea, whether it is the Six Party Talks, bilateral or trilateral talks, or another option, the overall missile programs needs to be on the agenda on par with the nuclear program, humanitarian issues and resolution of the Korean War. Just as the nuclear program has the ability to destabilize the region, so does the missile system, and not elevating it to the same level as the nuclear program, risks ignoring a vital area of conflict and or cooperation. Elevating North Korea's missile program does not validate it as legitimate, but instead

²¹ Daniel Pinkston, "The North Korean Ballistic Missile Program," February, 2008, p. 47.

offers the Obama administration an avenue to negotiate, at a high level, a possible future reduction of the missile forces as well as CBM with South Korea and Japan. Not elevating it continues the current policy of North Korea growing its missile program.

The U.S. should also consider options for how to reduce or eliminate the North Korean missile program. This can include a basic outline for possible verification options or means of destroying the arsenal, with cases from Libya and Iraq as possible examples and the usage of the UN.

Additional options include active defense systems. The U.S. must increase its regional missile defense systems in South Korea and Japan. This includes PAC-3, THAAD and a possible Phased Adaptive Approach. In addition, the U.S. should seriously consider a strategic trilateral missile defense relationship between itself, South Korea and Japan. Currently, the U.S. operates in a bilateral relationship with South Korea and Japan on missile defense. This needs reformed in order to create a viable missile defense system. Given the current devastation in Japan and its Constitution, it may provide several barriers, in addition to South Korea's long term rivalry of Japan. But, through on going consultations and recognition that only through working together can the three adequately address the North Korean missile threat.

While increasing missile defense systems, the U.S. must also maintain and improve intelligence capabilities, especially related to short and medium range missiles. The U.S., South Korea, and Japan must better coordinate on mapping of North Korean missile units throughout the country, in addition to exercise habits and known deployment schedules. While the U.S. commanders in South Korea already know some of this information, the possible deployment of the Musudan leads to a greater urgency on accurate intelligence.

Diplomacy, missile defense and better intelligence are viable options; but the U.S. must also tighten anti-missile development network, such as the Proliferation Security Initiative, the Missile Control Technology Regime and UN sanctions. North Korean proliferation networks are notoriously complex and excellent at eluding sanctions, PSI and the MTCR. The U.S., allies in the region and the UN need to continue to tighten the technical screws, and slowing the North's ability to import missile technology to improve and expand its missile total. Viable options including strengthening and expanding PSI, reforming the MTCR, and working with Japan and South Korea more on unilateral and bilateral sanctions and interdictions.

Finally, whenever discussing anything related to North Korea, the China question comes into play. Any discussions on dealing with North Korea short, medium and long range missiles much also deal with China and possible means to slow and stop North Korea's missile program. China's reluctance to punish or sanctions North Korea recently are a hindrance to the problem. If the U.S. is to address North Korea's missile inventory, it needs China. China's refusal to join PSI as well as its tacit approval of North Korean trading companies allows North Korea to expand its missiles. The U.S. needs to coordinate with China on confidence building measures to allow pressuring North Korea. This may have to include opening the Six Party Talks or opening another avenue with China, such as decreasing U.S. aid to Taiwan as one example. Either way, without China, any policy on North Korea is doomed to failure.

In summary recommendations include:

- Elevate North Korea's missile program to same level as nuclear program.
- Create regional missile defense network with trilateral relationship between U.S., RoK, and Japan.
- Maintain and improve U.S., South Korean and Japanese intelligence surveillance of North Korea, emphasizing short and medium range missile units deployment and exercises.
- Tighten and improve missile proliferation networks to deny additional resources to North Korea. This includes PSI, MTCR, and aggressively going after proliferation networks.
- Continue to appeal to China to try and pressure North Korea not to utilize its missile inventory.

North Korea's short and medium range missiles pose a real security threat to the region as well as to the U.S. During a crisis, a nuclear exchange is just as likely with short and medium range as long range. While discussions of a North Korean ICBM are valid for the future, policymakers must properly address the short and medium missiles first, in order to reduce the possibility of nuclear war in the region.