GWIKS Lecture Series
with
Hong-Je Cho
North Korea Missile Launch: Past, Present and Future

March 19th 2018

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미사일 방어와 한국의 선택
Missile Defense & KOREA
조홍재 지음
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• Korean Peninsula Security Situation
• Background of North Korean Missile Development
• History of North Korean Missile Development
• Analysis on North Korean Missile Technology
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Korean Peninsula Security Situation
Background of North Korean Missile Development

• Survival of Regime
• Press of domestic and sanction of abroad
• Asymmetric strategy
  UAV, Jamming, Cyber, EMP bomb
• Outdated conventional weapons
The air force has some semi-modern fighter jets, like the MiG-29, which was built in the later years of the Soviet Union, but most of its air force is made up of "less capable" jets and even biplanes.
The largest part of the military is the Korean People's Army Ground Force, which includes about 1 million active personnel and millions more civilians who are effectively reservists.

- Heavy artillery lined up along the demilitarized zone that separates North and South Korea, giving it the ability to devastate Seoul, just 30 miles away, if an invasion were to occur.
Origin of Missiles

In 1232 AD the Chinese used rockets against the Mongols who were besieging the city of Kai-fung-fu. An arrow with a tube of gunpowder produced an arrow of flying fire.
History of North Korean Missile Development

North Korea missile launch
It travelled 700 km before landing in the Sea of Japan (East Sea)

Launch site: Kusong

Source: SK govt/Japan govt
*Based on Japan coast guard map © AFP
North Korea expands missile-building facilities

North Korea has significantly expanded a factory known to produce parts of the isolated country’s sanctioned missile programme, according to analysis of recent satellite imagery seen by Reuters.

Sources: Nuclear Threat Initiative; Satellite image by Planet Labs, Inc./Jeffrey Lewis
C. Inton, 22/08/2016
N. Korea fires four missiles into East Sea

N. Korea fires four ballistic missiles into East Sea Monday morning

Dongchang-ri, North Pyongan province

Flew over 1,000 km

Three missiles land in Japan's exclusive economic zone

About 1,300 km

Sea waters between S. Korea and Japan

Exclusive Economic Zone

Japan-based U.S. radar base

Shariki

Akita prefecture

Japan

Tokyo

S. Korea

Pyongyang

Seoul

Ulleungdo

Dokdo
The launch of satellite-carrying Unha rockets is watched closely, since it's the same delivery system as North Korea's Taepodong-2 ballistic missile, which was tested successfully in December 2012.

REUTERS/KCNA
North Korean Ballistic Missile Tests

<table>
<thead>
<tr>
<th></th>
<th>Reagan</th>
<th>Bush</th>
<th>Clinton</th>
<th>Bush</th>
<th>Obama</th>
<th>Trump</th>
</tr>
</thead>
</table>

**KEY**
- 4: number of tests
- : failed test
- ?: success unknown
- : successful test

Source: Middlebury Institute of International Studies
North Korea’s ballistic missile program is one of the most rapidly developing threats to global security. In recent years, an unprecedented pace of missile testing has included new and longer range missiles, sea-launches, and the orbiting of satellites. The most notable of these advances has been North Korea’s development of two new intercontinental ballistic missiles, the Hwasong-14 and -15, which can likely reach the continental United States.

*Not yet flight tested.*
<table>
<thead>
<tr>
<th>Time Period</th>
<th>Event/Development</th>
<th>Details</th>
</tr>
</thead>
</table>
| 70s         | Introduction of Technology | • FROG-5/7('67)  
• Joint development DF-61('76) with China |
| 80s         | Former USSR Scud | • Introduction Soviet Scud-B and MAZ-543 from Egypt('81) |
|             | Reproduction Scud type-B | • Soviet Scud copy  
Range 200-300km, Warhead : 1,000kg  
Initial production('85) |
|             | Improvement Scud type-B | • Range 320-340km, Warhead : 1,000kg, Mass production('87) |
|             | Scud C | • Range 500km, Warhead : 700-800kg, Mass production('91) |
|             | Nodong Missile | • Range 1000-1300km, Warhead : 800-1,000kg  
• Launch test('93) |
|             | Taepodong 1, 2 Long range Missile | • Range 320-340km, Warhead : 1,000kg, Mass production('87)  
• New long range missile (3000-6000km) development('02)  
• Launch test Solid Fueal KN—02('04-'07)  
• Advanced -2 test('09) |
|             | Taepodong 3 Long range Missile | • Three –stage Rocket (10,000km)('12.12) |
|             | Hwangson 14/15 Bukuksong | • Range (13,000km-) |

Figure. Analysis of North Korean Ballistic Missiles.  
(Young Soo Kwon / National Defense Research)
View of International Law on North Korean Missile Launch

_Vilate of UN SCR 1874 Sanction on North Korea_

“..banning any launch using ballistic missile technology”
Analysis on North Korean Missile Technology

- North Korea has more than 800 ballistic missiles, including 600 Scud missiles that can be deployed throughout the country, and 200 working missiles.

- Has more than 150 solid-propelled short-range missiles KN-02 and FROG non-oil rockets.

- Can attack Pyeongtaek's USFK base, Japan, US.
<table>
<thead>
<tr>
<th></th>
<th>Scud-B</th>
<th>Scud-C</th>
<th>Nodong-A</th>
<th>Nodong-B</th>
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<tr>
<td><strong>propellant</strong></td>
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<td>• Fuel TM-185</td>
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<td>• Oxidizer IRFNA</td>
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<td><strong>Clustering</strong></td>
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<td><strong>Guidance</strong></td>
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<td><strong>Separate stage</strong></td>
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<td>Separate Warhead</td>
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<tr>
<td><strong>Range</strong></td>
<td>Copy 280-300km Advanced 320-340km</td>
<td>500km</td>
<td>1,000-1,300km</td>
<td>3,000-4,000km</td>
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<tr>
<td><strong>Reentry</strong></td>
<td></td>
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<td>Reentry Vehicle</td>
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<td><strong>Warhead</strong></td>
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**Figure . Analysis of North Korean Ballistic Missiles .**
(Young Soo Kwon / National Defense Research)
<table>
<thead>
<tr>
<th>Propellant</th>
<th>Taepodong-1</th>
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<th>Taepodong-3</th>
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<td>10,000km-</td>
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<td>On processing</td>
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</tbody>
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**Figure. Analysis of North Korean Ballistic Missiles.**
*(Young Soo Kwon / National Defense Research)*
Figure. Projected evolution of solid propellant Pukguksong-2 IRBM. (Young-Keun Chang / 38 North)
Figure: Family Tree of North Korean Ballistic Missiles.
(Young-Keun Chang / 38 North)
Limitation of North Korean Missile Technology

1. Nuclear warhead miniaturization head up

2. Reentry Vehicle Technology
Comprehensive Assess of North Korean Missile Technology

- Minituariztion nuclear warhead and re-entry vehicle technology
  The launching of ballistic missiles and the expansion of range are considerable, but it seems that they have not yet possessed the technology to mount minituariztion nuclear warhead and re-entry vehicle technology

- Liquid fuel, Solid fuel, Accuracy, Reliability, Guidance System,

- The year 2018 is the 70th anniversary of establishment the North Korean regime, and it is possible that North Korea will launch a missile and nuclear test to commemorate the establishment of the regime (Kim Jong-un reportedly ordered state scientists to develop their largest rocket- Unha-4)

- In particular, there is a possibility that the North will conduct a missile test and nuclear test after inter-Korean summit and a peace mood between North and South Korea.

- Stalling tactics - In order to buy time for avoiding international sanctions, overcome economic difficulties, and development of missiles and nuclear

- North Korea's space launch could be evaluated as a space exploration by packing the missile launch technology as a part of the test for military use as the reason for the peaceful use of space
Prospect (Scenario)

1. Optimistic
   Halt Nuclear experiment and Missile launch
   Sit down negotiation table and open dialogue

2. Skeptical
   Continue development advance nuclear and missile capability
Optimistic Scenario

- Halt Nuclear experiment and Missile launch
  Open dialogue and Sit down negotiation table

  Six Talks

  Monitor
  Verification
  CVID
  Enter International Order
  Arms Control
Skeptical Scenario

• Strengthen sanctions against North Korea - Cooperation with the international community
• Countermeasure against North Korean Missile launch
• Strengthening the ROK-US Alliance
  Strengthening surveillance facilities
  Strengthening military preparedness
• Construct of Information capability, Kill-chain
• Enhancement Defense Space capability
F2T2EA (Find-Fix-Track-Target-Engage-Assess)
KAMD
## KAMD 완성 위한 주요 전력 도입 예상시기

<table>
<thead>
<tr>
<th>구분</th>
<th>전력화 예상시기</th>
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<tbody>
<tr>
<td>무인정찰기</td>
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<td>2018~2019년 4대 도입 예정</td>
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<td>L-SAM(국산 장거리 지대공 미사일)</td>
<td>2022년까지 국내 개발, 2023년부터 양산 계획</td>
</tr>
</tbody>
</table>
Cooperation US - Korea

- SCM 2015
  Approve 4D Operation

Space Agreement
US – Korea
Conclusion

• Open Dialogue and sit down negotiation table
• First right now Stop Nuclear and ballistic missile test
  Lastly Denuclearization of Korean Peninsula
  CVID: Complete, Verifiable and Irreversible Dismantlement
• Build peaceful regime Korean Peninsula and stable security situation
• Contribute stable world security and Peaceful world
• 是故百戰百勝, 非善之善者也；
• 不戰而屈人之兵, 善之善者也。

  • For to win one hundred victories in one hundred battles is not the acme of skill.
  • To subdue the enemy without fighting is the acme of skill.
Thank you for your attention!

Q&A