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North Korea's Nuclear Strategy and SLBM Development*

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Ⅰ. Introduction

The creation of nuclear weapon was initiated by combining science into politics. This is why a nuclear war is often called as the end of politics. In the movie "The Lord of the Rings," "the one ring" captivates people with its absolute power yet at the same time the ring puts ultimate fears into people's minds. Similarly, from the beginning of its creation the nuclear weapon has been known as the absolute weapon.

The world is terrified with recent North Korea's (hereafter NK) nuclear tests and missile developments. NK surprisingly conducted its 4th and 5th nuclear tests this year, breaking the previous pattern of test cycles. Moreover, since May 2015 when NK first publicized its SLBM development, NK is speeding up with the acquisition of submarine launched ballistic missile (hereafter SLBM) capability. In August 2016, the SLBM fired from its Gorae-class - also known as Sinpo class - submarine flew 500km, showing further advancements in NK's SLBM technology.[1] NK's SLBM is known as Bukkeukseong-1 (Polaris-1, KN-11). Currently only six states in the world, five UN Security Council members and India, possess SLBM capabilities.

NK's development of SLBM brought a huge impact within South Korea since 2015. Along with nuclear tests and other ballistic missile firings, SLBM became one of the most widely discussed issues with regards to security of South Korea. Yet, it seems that even security specialists do not fully understand the key implications of NK's possessing SLBM capability and where NK is heading to. The public discussion mainly centers on the technical information of NK SLBM development; can NK overcome a number of technical barriers; when

1) The 38north.org notes that a missile was launched from the GORAE-class experimental ballistic missile submarine and flew approximately 500km before impacting the East Sea. This was known as the third test of the KN-11 this year alone and the most successful test to date. http://38north.org/2016/08/sinpo082416/ (Accessed Oct.21, 2016).

will NK be able to fully operate SLBM submarines; when NK would be able to put nuclear warheads on SLBM, and so on.

Since the information of NK weapon developments is limited and NK's harsh rhetoric is always questionable, current debates on NK SLBM's technical development status seem reasonable. Nevertheless, it is more important understanding the real implications behind NK's seeking SLBM capability and its intention. Past experiences in NK's nuclear weapons and ballistic missile development indicate that NK has been long planned for SLBM capability. Undoubtedly, repeating successes and failures in test fires will eventually lead NK to the status of 7th SLBM state in the world.[2] The essential question is how NK's SLBM will change the current security balance between NK and the US-ROK alliance, and what should we prepare for this.

A fallacy within South Korea's general perception on NK nuclear weapons is that many simply regard nuclear weapons as one of the several NK's asymmetric capabilities, such as biological/chemical weapons, artilleries, and special-forces. Nuclear means must not be regarded at the same level with conventional asymmetrical weapons.[3] A possession and use of nuclear weapons must be appreciated through one's overall nuclear strategy. Due to its features of mutual destruction, the strategy making of nuclear weapons always center on "deterrence." In case of conventional weapons it is important how to effectively use the capability, yet in nuclear strategy the essence is how not to make one's adversary not to use the weapon. Commander Hunter, the Executive Officer from US Alabama, SSBN, in the movie Crimson Tide (1994), paradoxically pointed out that "In the nuclear world, the true enemy is war itself."

Thus, NK's SLBM must not be regarded simply as another

2) The recent SLBM tests indicate that NK continues to be strongly committed to the long-term development of an operational SLBM and is learning from its previous successes and failures. http://38north.org/2016/08/sinpo082416/ (Accessed Oct. 21, 2016).

3) It is known that NK currently possesses a total of 9,000 artilleries and among them about 700 artilleries are directly targeting Seoul.

asymmetrical weapon – it is not just an additional delivery means to the current ballistic missile system. In Essence, NK's SLBM guarantees the second strike capability which finalizes NK's long-pursued nuclear deterrence strategy against the US-ROK alliance.[4] For a long time, Pyongyang has been brainwashing its people with the threats coming from the US nuclear first attack. Kim Jong Un publicly articulated that SLBM is he's most cherished accomplishment, while regarding ICBM as his father's. This reflects Kim's strong attachment to SLBM development. We need to contemplate more about the political-strategical aspects of SLBM rather than mere technical issues.

Therefore, the rest of the paper mainly deals with following three agenda.

- *The implication of SLBM capabilities and operations within the framework of NK nuclear strategy*
- *The making of ROK Navy's strategy and operational concepts against NK SLBM*
- *The future ROKN force structure and directions for the alliance naval cooperation*

Ⅱ. SLBM and NK's Nuclear Strategy

Security construct in Northeast Asia is getting further complicated in the second nuclear age.[5] The system is often characterized by a

4) Many describe NK's SLBM as "畵龍點睛" with regards to its nuclear deterrence strategy. It means finalizing the picture of a dragon by marking its eye.

5) In his Foreign Affairs article (2000), Bracken summarizes the key characteristics of the second nuclear age, how the influence of Asian countries will affect the world order. "The rise of Asian military power heralds the beginning of a second nuclear age as different from the first, that of the Cold War, as that contest was from World War II. Just as Asia began asserting itself economically in the 1960s and 1970s, it now does so militarily, backed by arms that would make Western interference in Asia far more treacherous and

condition of "interactive complexity."[6] All the players in the region closely share multiple interactions with others in both system as well as state levels. The US and China's hegemonic competition at the highest systemic level, historic animosities among Japan, China, and Korea still mostly define their relations in the regional level despite their economic interdependence and cultural interactions, and then North Korea's frequent military provocations in the peninsula consistently threaten regional peace and stability.

NK's Nuclear weapons bring in more complexities in this security construct. For example, the US-ROK's recent agreement to station US THAAD system in Korean peninsula – to deter NK's missile provocation – brought strong oppositions from both China and Russia. The US need to deter NK's nuclear threats and assure South Korea (and Japan) with its extended deterrence commitments but at the same time US must reassure China (and Russia) that the efforts to deter NK will not harm others strategic interests.[7] In the second nuclear age, especially with

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costly – even in peacetime – than ever before." Paul Bracken, "The Second Nuclear Age," *Foreign Affairs* Vol.79, No.1 (Jan/Feb. 2000). https://www.foreignaffairs.com/articles/asia/2000-01-01/second-nuclear-age (Accessed Oct. 21, 2016).

6) The notion of interactive complexity within NE Asia is explained in Pollack's recent article. Joshua H. Pollack, "The Emergence of an American/Korean Strategic Triangle," *MIIS working paper* (May 1, 2016). https://pacs.einaudi.cornell.edu/sites/pacs/files/Pollack.Revised%20US%20Korean%20strategic%20stability.final.pdf (Accessed Oct. 21, 2016).

7) The terms extended deterrence, assurance, and reassurance are often used interchangeably with regards to explain one's nuclear deterrence strategy towards others, both allies and adversaries. Brooks and Rapp-Hooper differentiates each by following meanings. "Extended deterrence aims to affect the cost calculations of adversaries, specifically dissuading them from attacking a U.S. ally. Assurance is a strategy directed at allies that seeks to convince them of the one's commitment to their defense. Reassurance is a strategy that endeavors to convince adversaries that they are not going to be the target of serious harm. Reassurance may complement extended deterrence, or it may be employed as an entirely distinct strategy. It seeks, in part, to convince an adversary that the military component of extended deterrence is intended to protect the U.S. ally and not to threaten or destabilize the potential aggressor if it refrains from aggression. The target of both extended deterrence and reassurance is an adversary or potential adversary, whereas the target of assurance is an ally. Linton Brooks and Mira Rapp-Hooper," "Extended Deterrence, Assurance, and Reassurance in the Pacific during the Second Nuclear Age," *Strategic Asia 2013-2014* (Oct. 2013). http://nbr.org/publications/element.aspx?id=706 (Accessed Oct. 21, 2016). Also see Jeffrey W. Knopf, "Varieties of

the current regional dynamics surrounding NK nuclear development, it is imperative to understand each other's nuclear strategies.

The basic premise in making nuclear strategy comes from the thinking that the adversary will and must use the nuclear weapons in case of war (or other escalated situations). Barry Posen, studying conventional war and the use of nuclear weapons for a long time, questioned how a nation with nuclear weapons cannot use its nuclear weapons at war.[8] As in the case of India-Pakistan conflicts demonstrates, the self-confidence with final achieving nuclear capabilities brings in additional aggressiveness and further military provocations than before.[9]

Making nuclear strategy stems from the concepts of first and second strike capabilities. The key here is that in order to make a deterrence work the second strike capability -strike capability which survives an enemy's first nuclear attack - is essential. Deterrence only works when two opponent states both possess this second strike capability. During the cold war both the US and the Soviet maintained second strike capabilities with means of nuclear triad; ICBM, strategic bomber, and SLBM. Because of its high survivability the nuclear ballistic missile launched from nuclear-powered submarine was the most certain one among the three. This is why during the Cold War France and Britain were also eager to obtain SLBMs over other means.

Why SLBM?: In terms of a nuclear strategy making, NK's pursuing SLBM capability means that NK is trying to fully secure its second strike capability, which could certainly guarantee deterrence from adversary's possible first attack. This means that the purpose of NK's SLBM is very different from other ballistic missile variants. In essence,

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Assurance," Journal of Strategic Studies 35, No.3 (2012): 378.

8) Barry Posen, Inadvertent Escalation: Conventional War and *Nuclear Risks* (Ithaca: Cornell University Press, 1991).

9) Keir A. Lieber and Daryl G. Press, "The Nukes We Need: Preserving the American Deterrent," *Foreign Affairs* Vol.88, No.6 (Nov/Dec. 2009) https://www.foreignaffairs.com/articles/2009-11-01/nukes-we-need (Accessed Oct. 21, 2016).

ICBMs are intended to provide NK more offensive power in tactical and operational level warfare, while SLBM serves more political and strategic level purposes. Transportable missile launchers in ground, known as TELs (Transporter Erector Launcher)[10] may serve similar purposes of SLBM but they are still vulnerable to first attacks. NK has been so far developing a number of ballistic missiles with different ranges – SRBM, MRBM, IRBM, and ICBM (Figure 1) – and the number will likely to increase until 2020.

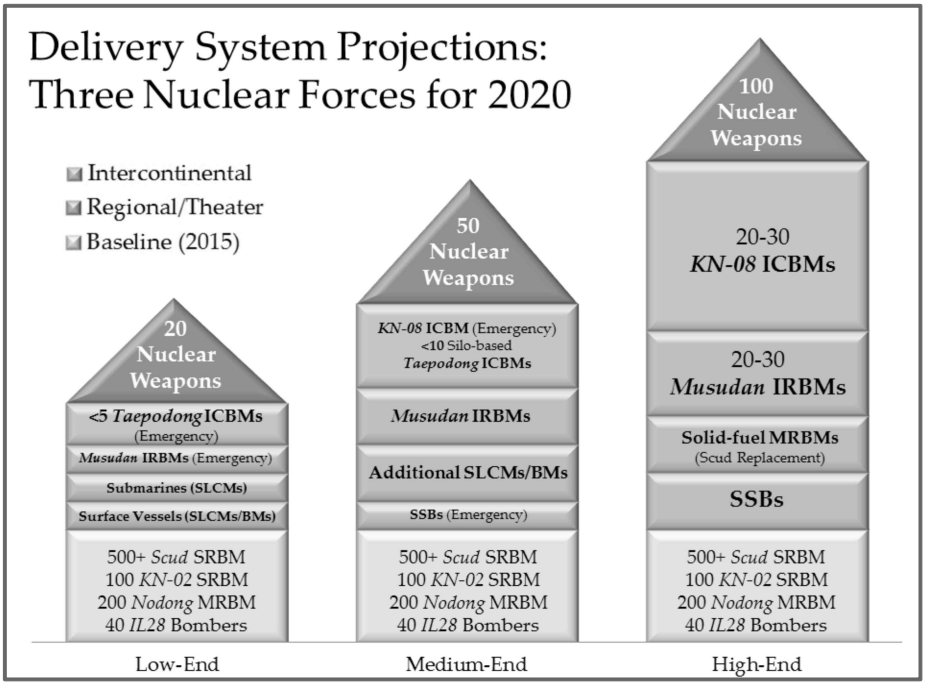

Figure 1. Nuclear Delivery System Projections for 2020 by US-Korea Institute at SAIS.[11]

10) It is known that among 700-800 ballistic missiles NK currently possess, about 100 missiles can be operated using TELs.

11) Joel S. Wit and Sun Young Ahn, "North Korea's Nuclear Futures: Technology and Strategy," *North Korea's Nuclear Future Series,* US-Korea Institute at SAIS (Feb. 2015): 25. Figure 5. Delivery System Projections: Three Nuclear Forces for 2020. http://uskoreainstitute.org/research/special-reports/north-koreas-nuclear-futures-project-technology-and-strategy/ (Accessed Oct. 21, 2016).

In order to guarantee its regime survival, deter formidable US-ROK alliance, and continue military provocations, securing SLBM will do best for fulfilling NK's political and strategic purposes.[12] If NK's second strike capability becomes fully established then it will be difficult for US-ROK to effectively control and confront NK's military provocations. Kim Jong Un understands that no other conventional weapons or even ICBMs can serve this role of winning political and strategical superiority over current US-ROK alliance. Moreover, the possession of SLBM and the second strike capability can bring additional political effects such as decoupling the alliance, increase conflicts within the South Korean society. SLBM is also useful inflicting operational fatigues to South Korean military in peacetime operations. This is why NK SLBM is often called a game changer, somewhat similar to the PLA navy's DF-21D, ASCM, in China-US rivalry.

Also, Kim Jong Un fully understands the lessons from fellow rogue states – Iraq, Libya, and Syria – how failing to go fully nuclear put an end to the regimes. In the 1990s Iraq's possession of chemical weapons were not enough to hinder US attack. In 2007, Israeli preventive airstrike destroyed nuclear reactors under construction in Syria. In 2011, Libya's giving up its WMD programs was followed by US attack. All three cases reinforced Pyongyang's view that this would not happened if they had nuclear weapons and the second strike capability. Moreover, Kim Jong Un badly wants a personal achievement which is separated from his father.

NK Nuclear Strategy, Assuring Retaliation : The foremost goal in NK's nuclear strategy is survival of the Kim family leadership against US-ROK alliance. Internally, NK's nuclear strategy should be helpful

12) Taewoo Kim points out four crucial effects from NK's SLBM within the nuclear dynamics – a halo effect for Kim's regime, an equalizing effect between NK and US-ROK status, nuclear shadow effect over ROK defense, and decoupling effect within US-ROK alliance. Taewoo Kim, "Nuclear-First Politics of Kim Jung Un Regime and South Korea's Deterrence Strategy (in Korean)," *Strategy* 21 39, Vol.19, No. 1 (Spring, 2016): 39.

to eliminate internal threats to the leadership and contribute to economic development of the nation. Also the NK nuclear strategy must consider its goal of reunification through forces. Conventional weapons are not enough to achieve these purposes against powerful US-ROK alliance. Therefore, Kim Jong Un and he's regime is striving for a nuclear deterrence strategy based on a more credible assured retaliation capabilit y.[13] The US-KOREA Institute at SAIS's research project in 2015 on "North Korea's Nuclear Future (NKNF)" presents the evolution of North Korea's nuclear strategies since 1990s.[14]

In the past, NK's nuclear strategy was limited to pure political and diplomatic level. During 1990s NK's nuclear program was mostly used as bargaining purposes. The Agreed Framework in 1994 and the following process of six-party talks demonstrate this. NK was able to earn necessities such as fuel and food utilizing its nuclear program until early 2000. Since the first nuclear test in 2006, NK begin to demonstrate technical advancements in its nuclear programs although they were still very ambiguous in operational capability. The issue was no long developing a nuclear weapon or not, it was about how good it is in size, weight, and fatality. During this period the driving force in nuclear strategy was to catalyze the US and Chinese intermediations during the crises in order to win various political purposes.

Since 2015, the NK's nuclear strategy is evolving into developing survivable strike capabilities targeting not only South Korea but also Japan and US. NK's overall nuclear program has been increasing transparencies in size and diversity of arsenals as well as other operational complexities. Now it is clear that NK is heading towards

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13) Wit and Ahn quotes the NK Supreme People's Assembly (SPA) in 2013: "[Nuclear weapons] serve the purpose of deterring and repelling the aggression and attack of the enemy against the DPRK and dealing deadly retaliatory blows at the strong holds of aggression…" Joel and Ahn, "North Korea's Nuclear Futures: Technology and Strategy," pp.11-12.

14) Shane Smith, "North Korea's Evolving Nuclear Strategy," *North Korea's Nuclear Future Series,* US-Korea Institute at SAIS (Aug. 2015): 18. Table 2. North Korea's Evolving Nuclear Strategy? http://uskoreainstitute.org/wp-content/uploads/2016/02/NKNF_Evolving-Nuclear-Strategy_Smith.pdf (Accessed Oct. 21, 2016).

consolidating the position of nuclear armed state.

NKNF (2015) titled NK's evolving nuclear strategy as "Assured Strategic Retaliation."[15] The strategy is mainly aimed at deterring regime-threatening attacks and coercion. The realization of the strategy critically depends on developing survivable second-strike nuclear forces which can credibly risk adversary's strategic targets, such as Seoul, Tokyo, or even Guam, and impose intolerable costs. This was also China's evolving nuclear strategy against the Soviet and US in the 1970s. For the strategy to work, higher level of transparency is essential since the main goal is to convince adversaries that NK can endure and retaliate back from the possible first attack. This is why NK openly publicized its SLBM development since May 2015 which is very different from other ICBM cases. So far, in other cases, Pyongyang has rarely exposed the videos of test firings. Still, some aspects may remain hidden in order to increase the strategic ambiguity.

NK's assured retaliation capability can guarantee that an outside force cannot coerce regime change unless determining nuclear conflict. For NK, survivability of its nuclear force can be operationalized through several means – geographically disperse nuclear weapons locations, develop multiple types of delivery systems, and secure a sufficiently large inventory of nuclear weapons. It seems that NK is trying to achieve this assured retaliation capability through developing SLBM, because of its high mobility and difficulty in detection.[16]

Although the core of NK's nuclear strategy remains in deterrence, the possibility of "first use" – the most dangerous scenario – must not be overlooked within NK's nuclear strategy.[17] Pyongyang clearly understands

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15) Smith, "North Korea's Evolving Nuclear Strategy," p.18.

16) Van Jackson, "Alliance Military Strategy in the Shadow of North Korea's Nuclear Future," *North Korea's Nuclear Future Series*, US-Korea Institute at SAIS (Sep.2015): 10. http://uskoreainstitute.org/wp-content/uploads/2016/02/NKNF-Jackson-Alliance-0915.pdf (Accessed Oct. 21, 2016).

17) Jackson, "Alliance Military Strategy in the Shadow of North Korea's Nuclear Future," p.10.

a war in the peninsula will likely to cause the end of its regime. However this also means if Pyongyang faces an abrupt regime change situation, it may pursue the route to actually employ nuclear weapons against South Korea and US. It is known as "use-it or lose-it" policy.[18] Therefore, the unexpected desperation may compel NK to attack first, even with current strategy of assured retaliation. This is more likely if things go wrong for Pyongyang such as unexpected internal breakdown or dire external threats to the regime. Kim Jong Un may make a decision that a death with glory is preferable to a shameful defeat.[19]

When NK possesses assured retaliation capability against US-ROK alliance in the future, its nuclear strategy will progress onto war-fighting level. The early use of nuclear weapons in the war will successfully deter US-ROK's strong conventional forces. NK will further develop various types of tactical nuclear weapons which could be utilized in a number of situations during the war. Eventually these will greatly increase NK warfighting capabilities against US-ROK forces.[20]

Ⅲ. North Korea's SLBM Operations: Capabilities and Implications

It is widely known that NK's SLBM will be put into operation within 2 ~ 4 years. However, this does not mean that NK could have stable

18) Keir Lieber and Daryl Press, "Coercive Nuclear Campaigns in the 21st Century: Understanding Adversary Incentives and Options for Nuclear Escalation," Report for the Project for Advanced Systems and Concepts for Countering Weapons of Mass Destruction (Monterey, CA: Naval Postgraduate School, 2013).

19) Robert Carlin and Robert Jervis, "Nuclear North Korea: How Will It Behave," *North Korea's Nuclear Future Series,* US-Korea Institute at SAIS (Oct. 2015): 8. http://uskoreainstitute. org/research/special-reports/nknec_rcarlin_rjervis/ (Accessed Oct. 21, 2016).

20) Joel and Ahn, "North Korea's Nuclear Futures: Technology and Strategy," p.12.

SLBM forces by then. In terms of fully operationalizing SLBM and securing the second strike capability, NK must overcome a number of technological and engineering hurdles.[21] Besides the technological issues, NK need to increase the number of missile cells in the submarine at the same time build more platforms and acquiring these capabilities will take more time.

Nonetheless, considering the political and strategic purpose of SLBM, NK may not pursue a high level of technological stability with its SLBM development. Unlike western standards of test and evaluation which requires high level of reliability and stability in performance, NK may have a far less demanding definition of success in weapon development. Pyongyang will not mind to deploy SLBM submarines into operations even though they have some minor technical problems which could harm crew's safety. Moreover, NK's totalitarian system has advantage in gathering national efforts for a certain weapon development in a relatively short period. For the political and strategical advantage, NK has tendency to put weapons into services which were not fully verified. Pyongyang had already seen that simply opening the videos of SLBM test firings could send strong deterrence signals to others.

NK SLBM Operational Capabilities : There are still a number of limitations for NK to conduct SLBM operations in near future, mainly due to NK's low level of submarine technologies. In general, NK diesel submarines, including the new Gorae-class, have very limited

21) Schilling's recent analysis on SLBM after NK's success of latest SLBM test clearly points out that North Korea's SLBM program may be progressing faster than originally expected. Nonetheless, he notes that there are more things ahead until full deployment of SLBM submarines. He explains Russia's history of SLBM development-a model Pyongyang seems to be following. Russia spent two years and 12 tests after its first successful launch from a submarine, and they still had issues to be fixed. He warns that skipping these tests will sacrifice reliability, and fielding unreliable missiles could result North Korea with a sunken submarine, the only SLBM submarine for now. John Schilling, "North Korea's SLBM Program Progresses, But Still Long Road Ahead," Aug. 26, 2016. http://38north.org/2016/08/slbm082616/ (Accessed Oct. 21, 2016).

operation range and underwater operation capacity. Until NK develops a nuclear-powered submarine or greatly improve underwater operation capability of current diesel submarines - such as AIP - the fundamental constraints of NK diesel submarines will critically affect its SLBM operations. As they get far away from submarine bases, NK submarines face serious problems with C4I capabilities as well as suffer from other combat service support. This is more so because currently NK has only one SLBM submarine. For a near future NK SLBM submarine will be restraint to operate near its bases within the NK waters.

Another issue is the noise level of NK submarines in general. The noise-level of Gorae-class SLBM submarine is unknown but we know that it is modeled after (or use the same body of) the old Soviet Golf-class submarine.[22] Also considering NK's technological level in submarine construction and time constraints for its development, it must have been difficult for NK to improve the noise level. The diesel submarine's greatest advantage is its low noise level compared to nuclear-powered submarines. In sum, NK submarines are very much vulnerable to ASW operations at open sea.

These limitations will significantly influence NK's SLBM operations until NK finally delivers a nuclear-powered submarine. Instead, NK may increase the number of diesel SLBM submarines in a relatively short period using its advantage of totalitarian system. NK knows that they must acquire these additional capabilities in order to effectively operate SLBMs and securing the second-strike capabilities. Considering NK's current situation both options seem unlikely in an adjacent future.

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22) The Soviet Golf-class submarine is known to be 2000 ton and operates for 70 days. Its SS-N-6 SLBM flew 2500km. Reportedly, NK's Gorae-class submarine's characteristics are - length 65.5m, width 6.6m, displacement 1000~1500ton, maximum speed 16kts (surface), operation range 1500nm, crews 30~50. Sukjoon Yoon. "North Korean Submarine-Launched Ballistic Missile and Reaction of Republic of Korea Navy," *Strategy 21* 39, Vol.19, No.1 (Spring 2016): 59.

Hence, for now NK's SLBM operations will be limited to following two missions. First, considering the restraints for open water distant operations, NK's SLBM submarine will maintain close to its bases and hiding close to shores or islands to launch SLBMs. This is similar to the Soviet navy's Bastion strategy during the Cold War, when Soviet submarines operated near its bases and safety zones – Sea of Barents and Sea of Okhotsk – preparing to launch its long-range SLBMs in case of crises. However, diminishing submarines strategic value of survivability in forward operations this mission will significantly reduce the essence of SLBM's deterrence effect.

Second, NK may send SLBM submarine to open waters – even crossing NLL and infiltrate into South Korean navy's operation area at East Sea – risking itself to ROK navy's ASW forces. This may called as a suicide mission for NK SLBM submarine, yet its strategic effect will be much greater than staying within NK waters. In both cases SLBM will target strategic centers within South Korea (or Japan and US) neutralizing South Korea's current missile defense system (and probably future KAMD system). The main purpose is to incur intolerable damage to South Korea and eliminate its will to conduct war against NK.

Implications for ROK Navy and the Alliance : NK's SLBM capability conveys significant implications to various dimensions in South Korea's defense and the alliance military strategy. In political and strategical level, NK's SLBM and second strike capability imply that current military balance in the Korean peninsula can change. So far there has been a balance maintained between either sides of the 38th parallel. The US-ROK's advanced C4ISR+PGM capabilities deterred NK's another invasion to South. Meanwhile NK hold Seoul as a hostage with its forward deployed massive artilleries and missiles. SLBM will provide additional leverage to NK breaking this balance. NK's SLBM and the second strike capability will restrain South Korea's preemptive attacks for self-defense in case of an imminent

danger. This nuclear shadow effect could bring in high-intensity military provocations from Pyongyang, which leaves South Korea with restricted options to respond.

NK' SLBM can threat the fundamental framework of US-ROK's combined defense system against NK's provocation and invasion. What if NK is able to persuade the US public with its intention to attack major cities in US, e.g. L.A. or D.C. This will rapidly deteriorate the US public support for South Korean defense. US congress may not agree to send reinforcements to the Korean theater or even may ask its government to pull out from Korean peninsula. The question is "Could Americans give up L.A. for Paris (or Seoul)?" In this way the NK SLBM can cause serious conflicts to the allies, and Kim Jong Un seems to be fully aware of this psychological impact.

NK's SLBM can shake the foundation of US-ROK alliance relations. It can intensify South Korean publics' growing mistrust for the credibility and effectiveness of US extended deterrence against NK's nuclear weapons. Recent developments in the US presidential campaigns and also South Korean politicians asking for nuclear independent indicate the possibilities of deep fissures in the alliance.[23] NK psychological warfare may cause decoupling in the alliance. Britain and France's possessing nuclear weapons during the Cold War were initiated by both states' distrust in US extended deterrence in the Western Europe, and the national desire for nuclear independency.

In operational and tactical level, NK's SLBM capability could weaken South Korea's K-2 (Kill chain and KAMD) system and the allies' 4D (detect, disrupt, destroy, and defend) operation. Simply put, both K-2 system and 4D operations depend on successfully detecting NK's nuclear missiles at the initial stage, whereas SLBM increases difficulties in

23) Since NK's 5th nuclear test, more than 80% of South Koreans think NK's nuclear test is a grave threat to national security. Also 65% of South Koreans agreed upon developing own nuclear weapons while only 29% disagreed. MBC Opinion Polls. Sep.14. 2016. http://imnews.imbc.com/replay/2016/nwdesk/article/4116757_19842.html (Accessed Oct. 21, 2016).

detection.[24] Thus, NK's SLBM capabilities will force South Korea and the alliance to revise current framework of nuclear defense.

The information of NK SLBM operation will force ROK navy to maintain full operational alert event during the peacetime. Warships and aircrafts such as Aegis destroyers and P-3C will be in fulltime operation at sea, as well as other ASW forces. This will greatly increase ROK navy's operational fatigue at the same time reducing overall force strengths. During Falkland battle, British navy had to consume more than 200 torpedo and depth charges in order to destroy a single Argentine diesel submarine, San Louise. All British naval forces were under ASW operations for over a month to detect San Louise, which failed and in consequence greatly degraded British expeditionary forces operational capacity.[25] The side which has more to lose always put more efforts for defense.

Ⅳ. ROK Navy's Offset Strategy against North Korea's SLBM

Admiral Yi Sun Shin noted that "enemy from sea must be defended at sea." It is important not to forget SLBM's second strike capability comes from the strategic value of its platform. Fortunately, as discussed above, NK submarines still suffer from many limitations.

Since the sinking of ROKS Chon-An in 2010, ROK military strategy evolved into "proactive deterrence." Within the framework of proactive deterrence, ROK military has been advocating to take "prompt, focused, and sufficient" retaliatory actions against NK provocations.[26] This is

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24) ROK military is planning to procure own military surveillance satellite and high-altitude UAVs to reinforce detect capability of its Kill-Chain system.

25) Keunsik Moon, Submarine World (Seoul: Planet Media, 2013). p.190.

26) Sufficient retaliatory action means that in case of NK's military provocation ROK military

designed to significantly raise the cost of NK's small-scale attacks. As a result South Korea is trying to improve precision-strike weapons and other C4ISR+PGMs capabilities.[27] Meanwhile the US and ROK agreed upon "tailed deterrence strategy and combined counter-provocation plan" in 2013 in order to neutralize NK's nuclear leverage.[28] As the NK continues its nuclear development and advances its capabilities, the allies agreed to develop "4D Concept" standing for detect, defend, disrupt, and destroy under the umbrella of US extended deterrence.

ROK Navy's Offset Strategy : ROK Navy's strategy must focus on countering NK's SLBM and thus neutralizing its second strike capability. This will greatly fill in the gaps of current deterrence system. According to Henry Kissinger, deterrence is a product of following three variables; power, the will to use it, and the assessment of these by the potential aggressor.[29] He underscores that deterrence drops to zero when any one variables does, since deterrence is a product of those factors and not a sum." Thomas Schelling emphasizes if deterrence is to work it is crucial to make believers out of rivals, and convincing that one's threats would never go unexecuted. Therefore the power, resolve, and belief are the fundamentals of deterrence.[30]

A state's strategy is influenced by its adversary's strategy because strategy making is always a dual game. In terms of nuclear deterrence

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will retaliate not only the origin of provocation but also the supporting and commanding forces of NK military.

27) Abraham M. Denmark, "Proactive Deterrence: The Challenge of Escalation Control on the Korean Peninsula," *Korea Economic Institute Academic Paper Series* (Dec. 2011). http://www.keia.org/sites/default/files/publications/proactive_deterrence_paper.pdf.

28) The United States and South Korea today agreed to establish "a bilateral strategy for tailored deterrence against … North Korean nuclear weapons and other weapons of mass destruction." Joint Communique, The 45th ROK-U.S. Security Consultative Meeting (Seoul), Oct. 2, 2013. http://archive.defense.gov/news/newsarticle.aspx?id=120896 (Accessed Oct.21, 2016).

29) Henry Kissinger, *The Necessity for Choice: Prospects of American Foreign Policy* (New York: Harper & Brothers, 1961).

30) Thomas C. Schelling, *The Strategy of Conflict* (Cambridge: Harvard University Press, 1981).

and the second strike capability, ROK navy's main role is to offset or countervail NK SLBM's deterrence effect. Particularly, ROK navy's strategy must focus on the capability part of the deterrence elements. When NK recognizes its SLBM operations are no long effective, it will critically affect Kim Jong Un's resolve to use nuclear weapons. Then the NK's second strike capability will lose the belief as a credible deterrence. By taking "assured" out of NK's assured retaliation strategy, the deterrence will eventually collapse.

I propose an offset strategy for ROK Navy to counter NK's SLBM capabilities. Offset strategy originates from the US nuclear deterrence strategies during the Cold War. The first Offset strategy was from the 1950s. President Eisenhower proposed "New Look" to deter the Soviets overwhelming conventional military by developing nuclear forces. The second offset strategy was introduced in 1980s by President Carter. The main idea was to strike the Soviet leadership and other high-value strategic targets before the outbreak of a nuclear war. The third US offset strategy since 2014 is that considering various military challenges and constraints in budgets, the US need to focus more on high-tech preemptive capabilities to maintain the superiority over its adversaries.[31]

The essence of offset strategy is not to completely destroy enemy capabilities but to neutralize the effect of enemy's capabilities. Offset strategy emphasizes to focus on own asymmetrical strengths and enemy's respective weaknesses to overcome the disadvantages in current military relations. In the US case, the strategy has been used to overcome the quantitative disadvantages by focusing more on its strong qualitative values. Among the two types of deterrence - deterrence by punishment and by denial - offset strategy underscores the denial aspect of

31) Elbridge Colby, "Nuclear Weapons in the Third Offset Strategy: Avoiding a Nuclear Blind Spot in the Pentagon's New Initiative," *Beyond Offset Series,* Center for a New American Strategy (Feb. 2015). https://www.cnas.org/publications/reports/nuclear-weapons-in-the-third-offset-strategy-avoiding-a-nuclear-blind-spot-in-the-pentagons-new-initiative (Accessed Oct.21, 2016).

deterrence effects. Deterrence by punishment – harsh rhetoric and other forceful means – is more effective in a short-term, yet in a long-term deterrence by denial works better. The offset strategy exploits enemy's strategic weaknesses by utilizing one's competitive superiority.[32]

Underwater Domain Offensive ASW operations : A strategy must be linked to operational concepts in order for navy to conduct operations and plan for force development. As mentioned above, present 4D concepts and K-2 forces, or even K-3 adding KMPR to Kill-Chain and KAMD, are mostly composed of air and ground forces. In order to offset NK's nuclear deterrence and SLBMs, ROK Navy must take more roles in current deterrence posture.

The US Navy's recent revision of "Cooperative Strategy in 21st century" emphasizes the most important function of navy as guaranteeing "all-domain access."[33] The US navy recently introduced an "Underwater Domain Operating Concept."[34] It is important to note that the US navy defines the underwater space as a domain which needs a specific operational concept. The underwater domain provides special features such as stealth, mobility, and persistence. Sea as a whole must be considered as a strategic maneuvering space for national security.[35]

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32) Robert Martinage, "Toward a New Offset Strategy: Exploiting U.S. Long-Term Advantages to Restore US Global Power Projection Capability," *Strategy & Policy*, Center for Strategic and Budgetary Assessments (2014). http://csbaonline.org/research/publications/toward-a-new-offset-strategy-exploiting-u-s-long-term-advantages-to-restore/publication (Accessed Oct.21, 2016).

33) Jeoffrey Till, "The New US Maritime Strategy: Another View from Outside," *Naval War College Review*, Vol.68, No.4 (Autumn, 2015). US Navy, "A Cooperative Strategy of 21st century Seapower: Forward, Engage, and Ready" (Mar. 2015). In US Navy's CS21R, the seven missions are 1) Defend the homeland, 2) Deter conflict, 3) Respond to crises, 4) Defeat aggression, 5) Protect the maritime commons, 6) Strengthen partnerships, 7) Provide HADR. Five functions are 1) All-domain access, 2) Deterrence, 3) Sea control, 4) Power projection, 6) Maritime security. http://www.navy.mil/local/maritime/150227-CS21R-Final.pdf (Accessed Oct. 21, 2016).

34) The US Navy's UDOC (Undersea Domain Operating Concept) emphasizes deterrence through undersea exploitation – achieving and maintaining undersea superiority. US Navy, "Undersea Domain Operating Concept," Naval Warfare Development Center (Sep.2013).

35) US Navy's NOC (Naval Operations Concept, 2010) explains the navy's overarching concept

Similarly, ROK navy must develop an underwater domain operational concept and use underwater domain as a strategic maneuvering space to deter NK's provocations.

As discussed, SLBM's main mission will be securing NK's second strike capability. There are still many limitations in NK's submarine operations such as restraints in underwater operation time, maintaining communication, logistics and other service supports. ROKN must exploit NK's vulnerabilities in ASW operations with its modern – air, sea, and underwater – ASW forces and accumulated skills / know – hows in ASW operations.

Technically, there are three possible ways to deter NK SLBM operations. First, the US and ROK forces may conduct preemptive attacks on NK SLBM submarine bases before the submarine leaves the port. This will be very difficult as it could bring in unnecessary escalation which some in South Korea and many more in US worries. Second is to conduct effective ASW operations while NK submarine is still under operation. The success will heavily depend on ROK navy's ASW operation capabilities. Third is intercepting NK SLBM after its launch, wherever the location is. If NK increases the number of SLBM cells and also its platforms, the feasibility of intercepting will significantly decrease. For ROK navy to effectively counter NK SLBM, we need to put more efforts on ASW operations.[36]

The US Navy's strategic ASW operations against the Soviet SSBNs during the Cold War provide useful lesson to ROK Navy.[37] The Soviet

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"the sea as maneuver space." US Navy, "Naval Operations Concept: Implementing the Maritime Strategy" (2010). https://www.uscg.mil/history/docs/2010NOC.pdf (Accessed Oct. 21, 2016).

36) Navy's offset strategy can be augmented with many new technologies. James R. Holmes, "Sea Changes: The Future of Nuclear Deterrence," *Bulletin of the Atomic Scientists*, Vol.72, No.4 (2016): 230. http://dx.doi.org/10.1080/00963402.2016.1194060 (Accessed Oct. 21, 2016).

37) Namtae Park and Sangyup Lee, "A Study on US Strategic ASW during the Cold War: US Naval Operations against the Soviet SSBN," *Strategic Studies for Navy working paper* (2016). Norman Polmar and K. J. Moore, Cold War Submarines: The Design and Construction of US and Soviet submarines (Washington DC: Potomac Books, 2005), p.172.

SSBNs were major threat to the US national security during the Cold War. Strategic ASW concept indicates the importance of linking tactical level operational concepts into strategic level purposes.[38] In terms of making strategy, the US navy was able to find the true nature of the problem and made a focused choice to solve the issue. It was strengthening the ASW capabilities. Instead, if US navy focused on developing preemptive strike or missile defense force instead, the deterrence might have not worked as much.[39]

By stationing its SSNs forward near the soviet submarine bases, the Soviet navy was forced to accept Bastion strategy. This gave strategic advantage to the US side. As shown in the classic movie, "The Hunt for the Red October" it is known that US nuclear attack submarines conducted surveillance and tracking missions in front of the enemy waters. This is clearly different from Japan's inflexible submarine operations in the pacific theater during WWII. Japanese submarines were operated strictly with tactical and operational level purposes. Attacking US supply ships were the last in their mission lists. Japanese navy was trapped in doctrinal rigidity and failed to use its submarines more strategically.

The US navy's strategic ASW operations were conducted by multi-dimensional forces. Nuclear powered attack submarines, SSNs, have done the major role underwater. Yet there were also a number of surface ships, satellites and ASW aircraft, and SOSUS (Sound Surveillance System). Multi-dimensional forces brought synergy into Navy's strategic ASW operations. The US navy was able to bring in national support with its strategic ASW operations, because it was crucial in US nuclear deterrence strategy against the Soviet Union.

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38) Lake and Powell defines the term "strategic" as the situation that opponent's choice and decision influences mine. David A. Lake and Robert Powell, *Strategic Choice and International Relations* (Princeton: Princeton University Press, 1999), p.8.

39) ASW and MD are two different fields which require distinct force development processes. The US navy also considered to establish missile intercept system such as "Anti-launch Phase Ballistic Missile Intercept System." However, the initial tests for developing surface to air missiles failed and the US navy focused on ASW from then.

I offer ROK navy to develop concepts of offensive ASW operations in underwater domain.[40] Hitherto ROK navy's ASW operations were mainly defense-oriented. The ROKN First Fleet has been successfully defended East Sea from enemy submarines for last fifty years. Nevertheless, defense oriented ASW operation will not work against the NK's SLBM submarines. That is because up to now the operational goal for NK submarines were to infiltrate into our territory and for us the main purpose was to deny enemy submarine penetration. This is not the case for NK's SLBM submarines. Imagine that there is a report of NK SLBM submarine, or NK submarine intentionally exposed itself, at high seas near Ulung Island or even near Jeju. Instantly the ROK navy will be pressured to put all of its ASW forces at the area and as a result, as British naval forces did with Argentine San Luise during the Falkland war, ROK navy will soon meet its operational limitation. This will provide a perfect opportunity for NK to provoke elsewhere.

Therefore, ROK navy should focus on developing offensive ASW operations in strategic level. This can be only possible when underwater domain is recognized as a critical warfare domain for the national security. The 4D concept and K-2/K-3 systems need to incorporate underwater domain within its conceptual boundary. Eventually the offensive ASW operations will require changes in current operation concepts, doctrines, and force structure. We must not forget the initial limitation of defensive forces.

Ⅴ. ROK Navy's Force Development and Alliance Naval Cooperation

40) Similarly, Sukjoon Yoon points out that ROK navy should develop "comprehensive ASW capabilities" to counter NK SLBM operations. Sukjoon Yoon. "North Korean Submarine-Launched Ballistic missile and Reaction of Republic of Korea Navy," pp.68-70.

So what forces ROK navy should acquire in future and what fields should ally navies put more efforts into? Recently, there are growing demands from South Korean public and some national leaders for ROK navy to equipped with nuclear powered submarines and SM-3 missiles. It is more important to understand why ROK Navy should have these forces and how to use them. It is not desirable to simply believe that having these capabilities will deter NK.

The chicken game in International Relations theory and Cuban Missile Crisis in 1962 clearly exemplify that in the competition against nuclear adversary the defeat means the end of survival. In order to win the chicken game one must not swerve the handle with strong resolve. The time is not our side with regards to NK's nuclear weapons and SLBM development. Pyongyang clearly understands the strategic value of SLBM. NK knows that current limitations in SLBM operations will continue until they possess more SLBM platforms or nuclear-powered submarines. No deterrence will work if NK possesses these capabilities. We must remember what Israel did to Iraq (1981) and Syria (2007) despite the harsh criticism from international society. So far the South Korea's force development was always behind NK. ROK military were always busy with catching up with NK, whenever NK develops new types of asymmetrical weapons. It is time to prepare ahead.

ROK Navy's Force Structure : ROK Navy's future force plan must consider offset strategy and focus on underwater domain operational concepts. Most of all, ROK navy must enhance its ASW capabilities. As discussed, ROK navy's greatest advantage over NK is its ASW capabilities. The ROKN's 1st Fleet in the East Sea has been conducting ASW operations for more than a half century now. ROK navy currently has a number of modern ASW forces, such as ASW aircrafts, KDX-I/II/III destroyers and 209/214 type diesel submarines. Yet the

past ASW experiences and present ASW forces are not sufficient to counter future NK's SLBM submarines.

As the case of the US strategic ASW operations demonstrate, the ROK navy must develop offensive ASW capabilities. The ROK navy must have platforms that can conduct offensive ASW operations such as SSN, ASW aircrafts, SOSUS, and offensive mines. Among all, the most offensive force used in the US strategic ASW operations was nuclear powered attack submarines. ROK navy is improving its submarines with AIP capability. The type-214 AIP submarines can operate maximum two weeks without snorkeling however, this is not enough to conduct offensive ASW operations.

Theoretically with unlimited underwater operational capabilities, SSNs can monitor and track NK SLBM submarine starting from its bases until it attempts to launch SLBM without notice. In this way the nuclear attack submarine will be an essential part of the underwater kill chain system. They will be the most powerful naval deterrent forces against NK's nuclear strategy. In operational level, ROK Navy's operational fatigue due to NK's SLBM operation will greatly reduce. When 70% of NK submarines disappeared in the height of escalation in August 2015, ROK navy was forced to put in most of its assets at sea.

Developing SSN is not an easy task.[41] It will take more than a decade from initial design to final operation. Nevertheless, it is important to think about where NK is heading to with its SLBMs. The final destination of NK's nuclear strategy and regime survival is likely to be putting its own SSBNs into waters. ROK navy's SSN will be true counter-asymmetric and superior force that can pre-occupy future warfare domain.

Offensive operations from SSN provide more benefits to nuclear deterrence strategy. ROK government recently introduced the concept of

41) Some analysts estimate that ROK Navy can get Nuclear-powered submarine as fast as 2024. Dongryong Oh, "South Korea may have SSN by 2024 (in Korean)" *Monthly Chosun,* Oct.10, 2016. http://m.monthly.chosun.com/client/news/viw.asp?ctcd=G&nNewsNumb=201610100029 (Accessed, Oct.23, 2016).

KMPR as the third axis to nuclear deterrence.[42] With regards to KMPR, SSN can be used as useful asset for special operations. Among other means to conduct massive punishment and retaliation operations, special-forces aboard SSN will add a great strategic value.[43] SSN will also reinforce strike capabilities for decapitalization operations within KMPR concept. As a result SSN could strengthen our deterrence capability and at the same time undermine NK's. It will also considerably enhance the jointness in ROK military operations.

Other than SSN, ROK navy must put more efforts to increase numbers of its ASW patrol aircrafts.[44] It is known that in a modern ASW operation, patrol aircrafts are the most useful force to detect and neutralize submarines operating at sea. This is specially the case against the diesel submarines because they are most vulnerable to the ASW aircrafts during snorkeling. This is because ASW aircrafts operate various types of acoustic and non-acoustic sensors - sonobuoys, R/D, IR, SAR, ES, MAD. The SOSUS (Sound Surveillance System) will be a great addition to those platforms in the future. Currently ROK navy's concept of SOSUS stays within harbor defense but the US SOSUS during the Cold War period suggests that it is possible to install SOSUS-like system in the major points in East Sea.[45] The strategic location of

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42) KMPR is a part of South Korea deterrent strategy which emphasizes the punishment aspect of deterrence. It assumes that when NK attacks South with nuclear weapons South will immediately eliminate NK's Kim Jong Un leadership.

43) Considering operational depth in the Korean theater, SSNs can be a useful alternative transportation to helicopters in special operations.

44) Currently ROK Navy has 16 P-3C/P-3CK and planning to get more ASW aircrafts, number and type is not determined yet. It is known that JMSDF operates 80, Russia 33, and China 15 ASW patrol aircrafts. ROK Navy recently procured 4 MOHs (AW-159) and planning to get 8 more.

45) During the Cold War the detection range of US SOSUS passive sonar barriers was about 50nms. It was complemented with SURTASS (Surveillance Towed Array Sonar System) by ASW ships and RDSS (Rapidly Deployable Surveillance System) by aircrafts and submarines. The US Navy established SOSUS network off the U.S. coast as well as at key chokepoints between the Soviet Union and the open ocean. Bryan Clark, *The Emerging Era in Undersea Warfare* (Washington DC: Center for Strategic and Budgetary Assessments, 2015). p.5. http://csbaonline.org/research/publications/undersea-warfare/publication (Accessed, Oct.23, 2016). Holmes introduces future SOSUS-like systems,

Ulnung Islands could be useful in this case. The US navy operated offensive mines during the Cold War as a complement to its ASW forces. ROK navy's new "self-maneuvering mines" will be useful supplement to its offensive ASW forces. These offensive mines can severely limit NK submarines' maneuvering space and freedom of action.

In addition to the US experiences with strategic ASW, the ROK navy must develop unmanned ASW systems together with above discussed platforms. UUVs are known as the most useful ASW platform in the future.[46] For example, the US Navy is already operating unmanned sub-hunter called ACTUV (Anti-Submarine Warfare Continuous Trail Unmanned Vessel) designed to search for submarines at sea as long as three months at a time and it can operate with US Navy's current LCS as a module.[47] Manta developed by Naval Underwater Warfare Center (NUWC) is another useful UUV concept that ROK navy should consider for ASW operations. Manta is an UUV which is designed as a part of a submarine's outer body. When it is attached to the submarine, Manta is used as one of submarine's sensors and weapons, but when detached it can be an independent source of sensor and weapon by itself.[48] In sum, the synergy coming from combining existing platforms with future unmanned platforms will greatly increase the ROK navy's ASW capabilities.

TRAPS (Transformational Reliable Acoustic Path System) and SHARK (Submarine Hold at Risk). TRAPS is a stationary passive sonar node scattered around the deep seafloor listening for the submarines throughout vast areas. SHARK is an unmanned mobile platform equipped with active sonar which is designed to provide enemy submarines' information to ASW forces. Holmes, "Sea Changes: The Future of Nuclear Deterrence," p.230.

46) James Holmes, "The US Navy's Next Super Weapon? Here Come Unmanned Underwater Vehicles." *National Interest,* January 5, 2015. http://nationalinterest.org/feature/the-us-navysnext-super-weapon-here-comes-unmanned-11959. (Accessed, Oct.23, 2016).

47) Christopher p.Cavas, "Unmanned Sub-Hunter to Begin Test Program," Defense News, April 7, 2016. http://www.defensenews.com/story/defense-news/2016/04/07/darpa-actuv-seahunter-test-antisubmarine-warfare-asw-drone-unmannedvigor-portland-onr-naval-research/82744862/ (Accessed, Oct.23, 2016).

48) More information for Manta see http://auvac.org/configurations/view/82 (Accessed, Oct.23, 2016).

As a part of the offset strategy which asks to invest more on its strengths, the ROK navy should focus on developing new ASW technologies. South Korea is one of the leading scientific countries in the world with advanced maritime technology. New technologies will greatly enhance future ASW capabilities. Big data modeling and LF sonars, non-acoustic detections such as lasers and LED will be useful to improve overall ASW capabilities. Advances in fuel cell technologies, improved communication system and common very light weight torpedo will significantly increase the operational capabilities of future submarines.

Other than improving ASW operational capabilities, intercept missiles in Aegis ships will be useful deterrent to NK's SLBM in a near future. The ROK navy's Aegis ships are already proven to be the most useful surveillance asset to detect NK's ballistic missiles among other s.[49] ROK navy currently operate three Aegis destroyers and will have three more within ten years. It is unclear that these Aegis ships will get SM-3 or SM-6 capabilities for now. There are still a number of political and inter-military issues to be solved in order to integrate these missiles into Navy's Aegis system. As we are experiencing with the THAAD case, China and Russia's strong objections are expected too. Moreover, there are conflicts stemming from inter-organizational politics within the military over navy's having SM-3 missiles.[50]

The SM-3 intercept missiles will add a middle course, high-altitude missile defense capability to current KAMD system. The SM-3 missiles in Aegis ships will significantly reduce the confidence in NK's second strike capability. Kim Jong Un knows that if NK's initial surprise missile attacks fail, the US-ROK forces will immediately bring in massive retaliation. Therefore, the regime survival will not be guaranteed. Compared to above discussed ASW capabilities which require a long-term

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49) KAMD is composed of three types of detection system. They are Green Pine ground-based ballistic missile early warning R/D, Peace-Eye airborne early warning and control R/D, and sea-based SPY-ID R/D on Aegis ships.

50) ROK military is also improving and developing ground-based intercept missiles such as M-SAM and L-SAM. However, they are not compatible with Navy's Aegis system.

procuring process, SM-3 intercept missiles can be stationed within relatively a short period. Yet the SM-3 effect will reduce as NK operates more SLBM cells and more SLBM submarines. The deterrence from defensive measures does not last long, thus they are rather complement to offensive measures such as ASW. Nonetheless, the ROK navy must put SM-3 missiles into Aegis system as soon as possible for the short term deterrence.

Directions for the Alliance Naval Cooperation[51]: First of all, the allies must share the threat perception of NK's SLBM and understand NK's purpose in securing the second strike capability. Some insist that NK's nuclear weapons and SLBMs are not as important as NK's ICBMs for US defense.[52] However, already most of US bases in Korea and Japan are vulnerable to NK SLBMs. Besides in a near future the NK SLBM submarines will enhance its operational capabilities. It is true that there are multi-layered missile defense systems established in West pacific area which can intercept NK ICBMs flying towards continental US. This powerful US MD system can be easily nullified, if a single NK SLBM submarine reaches out to Pacific and to the US West Coast. Again, the SLBM submarine is becoming Kim Jong Un's most valuable deterrent force.

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51) It is noteworthy that the recent US-ROK SCM mentioned about the importance of alliance naval cooperation. "The Secretary and the Minister decided to increase U.S.-ROK naval cooperation to respond to increased North Korean maritime provocations, including the submarine-launched ballistic missile (SLBM) test launches. To this end, the Secretary and the Minister committed to consider various cooperation measures to expand the scope and execution of U.S.-ROK naval training events, including combined ballistic missile defense and anti-submarine exercises, and to increase information-sharing through strengthened staff coordination." Joint Communiqu éof the 48th U.S.-ROK Security Consultative Meeting, Washington, D.C., October 20, 2016 http://www.usfk.mil/Media/News/Article/981396/joint-communiqu-of-the-48th-us-rok-security-consultative-meeting/ (Accessed Oct. 23, 2016).

52) It is known that Seoul and Washington share different threat perception on NK's SLBM. Ildo Hwang, "No plans will work against NK (in Korean)" *Shindonga,* Sep. 22, 2016. http://shindonga.donga.com/3/all/13/746877/4 (Accessed, Oct.23, 2016).

Close coordination in ASW operations must be the first in the allies' priority lists. The US must increase the level of alliance intelligence sharing on NK's SLBM activities.[53] It is necessary for the ROK navy to accumulate more information on NK SLBM submarine in order to prepare for its own offensive ASW operations. This also means that both navies must enhance combined ASW operation capabilities. The US navy can be assisted from ROK navy's experiences with ASW operations against NK submarines in the East Sea maritime environment. Also, South Korea gets recent information through many HUMINT sources such as defectors from NK navy. The US nuclear submarines can provide ROK submarines with ASW environment of forward operation areas. This will include operation patterns of NK SLBM submarines and other NK naval activities. This will bring a great synergy the combined ASW capabilities at the same time forcing NK navy to pursue limited SLBM operations.

As noted, ROK navy must value the lessons from US strategic ASW operations against Soviet SSBNs during the Cold War. For ROK navy to obtain nuclear-powered submarines in the future it must develop operational concepts and tactics for operating SSNs. Allies must cooperate for establishing SOSUS system in the East Sea. The ROK navy currently operates limited SOSUS for the harbor defense only. The US navy can provide information on open water SOSUS from their past experiences. The ROK navy needs to put more research and budgetary efforts in this field.

Naval research agencies in both navies should closely coordinate in developing UUVs for ASW operations. The US navy is the leading navy in the field of UUV and ROK navy is beginning to invest more in this field. Recently ROK navy ROV (Remotely Operated Vehicle) successfully

53) Since 2014 the US 7th Fleet and the ROK Navy Fleet Command is operating ASW Cooperation Committee to further enhance allies' interoperability in ASW operations. "US, ROK Navies Strengthen Partnerships through ASW Cooperation," April 27, 2015. http://www.cpf.navy.mil/news.aspx/030536 (Accessed Oct.23, 2016).

recovered the Lynx sunken 1000m underwater during the ROK-US combined naval exercise. Also, ROK navy has been using MDVs (Mine Disposal Vehicle) for its mine warfare operations from a while. For now UUVs may conduct basic surveillance and tracking operations but later on UCUVs will take more part in combat operations. UUVs will be a crucial part of ROK navy's future offensive ASW operations.

The both navies have a long history of conducting various types of combining exercises and operations. ROK navy's unprecedented growth in both manpower and force structure largely owes to US navy's close support and cooperation based on last fifty years of alliance relations. Among others, both navies need to put more efforts in the field of ASW and BMD exercises to further enhance interoperability. For this, the two navies need to share more information on NK's SLBM operational capabilities.

Also two navies should increase interoperability with JMSDF in these fields. JMSDF's capabilities in ASW and BMD are the top level in the world. USN and JMSDF also have a long history of ASW and MD coordination. During the cold war the main role of US-Japan alliance was to deter and block Soviet submarines at Vladivostok to reach out to the West Pacific Ocean. The US- Japan's MD cooperation dates back to the 1990s and today the two share the most integrated MD system in the world. There have been political difficulties in trilateral naval cooperation.[54] Especially, South Korea's deep distrust and historical animosities toward Japan hinder ROK navy's deeper cooperation with JMSDF. Nonetheless, when national security is in peril and NK's

54) Soonkun Oh, "The Development of US-Korea-Japan Trilateral Naval Cooperation in Northeast Asia," a paper presented at the 8th KIMS-CNA Maritime Security Workshop entitled "Evolution of Maritime Security Environment in the Northeast Asia and ROKN-USN Cooperation" held on November 4-5. 2015. In Seoul, Korea. Also see Jung Ho-Sub, "ROK-US-Japan Naval Cooperation in the Korean Peninsula Area: Prospects for Multilateral Security Cooperation," *International Journal of Korean Studies* Vol.16, No.1 (Spring 2013).

nuclear attack is imminent, JMSDF's ASW and MD assets will be a great help to reinforce US-ROK defense capabilities.

Lastly, the US navy can back up ROK navy's effort to improve its Aegis capabilities. Political and budgetary obstacles remain for ROK navy to put SM-3 missiles in its current and future Aegis destroyers. The US navy can support conveying the logic of multi-layered defense complementing current KAMD system. After South Korea decides the put SM-3 missiles into Aegis system, the US navy can help ROK navy by sharing operating experiences and supporting technological issues.

Ⅵ. Conclusion

Henry Stimson, US Secretary of Defense in 1945, announced the US possession of the nuclear weapon "Royal Straight Flush." Kim Jong Un seems to think NK SLBM as his Royal Straight Flush within the NE Asian poker game. In order to win the game the players must understand opponent's game strategy. In order to deal with NK's SLBM we must first understand NK's nuclear strategy and the role of SLBM within the strategy. Pyongyang knows that SLBM is the most credible second strike capability guaranteeing Kim Jong Un regime's survival from its adversaries. Pyongyang is likely to put full efforts to improve SLBM operational capabilities by increasing the number of cells and platforms.

ROK navy's strategy against NK SLBM should be based on offset strategy and it should develop an operational concept of offensive ASW in underwater domain. Offset strategy highlights to overcome current disadvantages with fully utilizing one's relative strengths on enemy's relative weaknesses. The lessons from US strategic ASW operations against Soviet SSBNs tell us that the US navy took an important role in nuclear deterrence by successfully linking its ASW operations into

strategic and political level. Similarly the ROK navy must develop offensive ASW operational concepts which could to deter NK's nuclear strategy in the national security level.

Therefore, The ROK navy's future force development should focus more on enhancing ASW capabilities against NK submarines. Although ROK navy has much experience in ASW operations in the East Sea and operates modern destroyers and ASW aircrafts, they are insufficient to deter future NK SLBM submarines. The most effective offensive ASW force in US strategic ASW was nuclear-powered submarine. Recent political debate on ROK navy's procuring SSN is beyond the interest of this paper. The ROK navy has been operating the most advanced diesel submarines for 25 years now and I think we are ready to build and operate SSNs. Yet, this is more the matter of political will. Other than SSN, ASW patrol aircrafts and SOSUS system will be useful. UUVs and advanced ASW technologies such as LF and multi-static sonars and non-acoustic detections will greatly improve ROK navy's ASW operations.

The area of ASW and MD coordination must be at the top of priority lists within the alliance naval cooperation. The US navy can provide useful information to ROK navy concerning NK SLBM activities including its experiences with ASW environments of forward operating areas. ROK navy also has fluent experiences of ASW operations in the East Sea. In the field of UUVs in underwater operations, the ROK Navy has much to learn from US experiences. Most of all, the ROK Navy need to utilize existing US and Japanese alliance framework. The US and Japanese navies' ASW and MD capability and their infrastructure will be invaluable asset in case of NK's imminent nuclear threat to South Korea. Despite difficulties in the political level, the ROK navy should put more efforts toward trilateral naval cooperation preparing for the national crisis situation.

The modern naval history confirms that all powerful states wanted and eventually possessed SLBM capabilities due to its strategic value in nuclear deterrence. All navies must understand its strategic role in

nuclear deterrence and national defense. In the year of 2016, the NK's SLBM is abruptly changing the military balance in the Korean peninsula as it became a clear and present danger to South Korea's national security. Unfortunately, with regards to NK's nuclear development and SLBM capabilities, the time is not on our side. Nation's security depends on close coordination and cooperation between the two navies.

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요 약

북한 SLBM 개발과 핵전략 : 해군력 건설 방향과 한미 해군협력

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북한의 SLBM 위협이 대한민국 안보에 미치는 영향에 대해 그동안 많은 논의가 있어 왔지만, 북의 잠수함에서 발사하는 탄도미사일이 보유한 진정한 위협에 대한 인식은 아직도 부족한 듯하다. 그 이유는 대부분의 논의가 북 SLBM 기술의 성숙도와 완성시기 등 기술적 수준에 관심이 치우쳐져 있기 때문이다. 핵전략과 억제전략의 관점에서 본다면 북한의 SLBM 개발은 한미동맹의 제1격에 대한 완벽한 제2격 능력 보유에 그 핵심이 있다. 즉 향후 개발될 북한의 SLBM은 평양 김정은 정권의 생존을 보장할 직접적이고 핵심적인 전력이 될 것이다. 이는 궁극적으로 한미 군사동맹과 북한의 현 군사력 균형을 깨뜨리고 앞으로 북의 군사도발 가능성을 더욱 높이는 결과를 가지고 올 것이다. 북의 핵전략은 현재 확증보복(assured retaliation) 단계로 발전하고 있으며, 결국에는 전쟁에 사용될 전술적 핵무기 능력(war-fighting capability)을 갖게 될 것이다.

이에 대한민국 해군은 우리의 강점을 활용하여 적의 약점을 공략할 수 있는 상쇄전략(offset strategy)을 개발하여야 한다. 북한의 현 제한된 잠수함 기술력과 대잠작전 능력을 고려할 때 한국해군은 수중영역에서의 공세적 대잠전(offensive ASW) 개념을 보다 발전시켜야만 할 것이다. 이는 미 해군이 냉전기간 중 소련해군 핵추진전략잠수함(SSBN) 대응을 위해 발전시킨 전략대잠전(strategic ASW) 개념에서 교훈을 얻을 수 있다. 미 해군은 소련 해군의 SSBN 을 억제하기 위해 공세적인 전략대잠전을 수행했고 그 결과 소련해군은 자국의 연안에서 벗어나지 못하는 요새전략(bastion strategy)를 추구할 수밖

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에 없었다. 당시 미 해군의 전략대잠전은 공격잠수함(SSN), 대잠초계기, 수중탐지체계(SOSUS), 공격기뢰 등의 전력으로 구성되었다.

따라서 북한 SLBM에 대한 한국해군의 전략개념은 북의 핵전략(제2격능력)을 억제하는 방향으로 정립되어야 하며, 이를 위한 해군력 건설은 대잠전 능력 강화에 초점을 맞추어야 한다. 우리 해군은 장기적으로 핵추진잠수함을 비롯하여 성능이 향상된 대잠초계기, 한반도 해역을 중심으로 한 미 해군의 SOSUS와 유사한 수중탐지장비 그리고 장시간 수중작전이 가능한 무인잠수정(UUV)을 도입해야만 한다. 단기적으로는 현재 추진되고 있는 KAMD 체계에 SM-3를 보유한 이지스함을 포함시켜, 북 SLBM에 대한 요격능력을 강화해야 할 것이다. 한미동맹은 북 핵전략의 핵심전력인 SLBM 개발에 대한 위협인식을 공유해야만 하다. 작전적 수준에서는 양국 해군 간 대잠전 및 대유도탄전 작전운용성 증대에 우선순위를 두고, 기존의 한미 간 연합작전능력 강화뿐 아니라 위기시를 대비하여 미일 간 구축되어 있는 대잠전 및 대유도탄전 능력도 활용할 필요가 있을 것이다.

핵심어: SLBM, 확증보복, 핵추진전략잠수함, 요새전략, 대잠전, 이지스함

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