

## **Deterring North Korea with Non-Nuclear High-Tech Weapons: Building a “3K+” Strategy and Its Applications**

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The Republic of Korea (ROK) Ministry of National Defense (MND) should support and guarantee the process of peaceful and diplomatic denuclearization by providing a perfect deterrence posture that can cope with any contingencies, while being especially cautious so as not to ignite political tensions. For that purpose, strengthening the ROK’s own deterrence capability against the North Korean military threat is becoming more and more important. This is especially true because the North Korean ICBM capability, which is assessed to be completed in a short time, is believed to be able to pose the so-called “decoupling situation” on the Peninsula, by an increasing number of people. Although it is not certain the decoupling may really happen even if the North does finally achieve ICBM capability, this is a problem that cannot be ignored, since more and more people are worrying about it. Several non-nuclear high-tech weapon systems and masterful tactics to apply them in the Korean situation raise the possibility of dramatically strengthening the overall deterrence posture against North Korean threat without any additional nuclear measures. From now on, the ROK MND should formulate a new version of the ROK’s own deterrence strategy against the North, the “3K+” which tries to utilize the new possibilities provided by several conventional high-tech weapons, together with the pre-existing 3K systems (Kill Chain, KAMD, and KMPR). The new strategy should be built more systematically to overwhelm any possible North Korean military ambitions in advance, defeating any and all military capabilities that the North is expected to strive for in the future. As Sun Tzu taught, the highest strategy can frustrate the enemy into surrendering, even without a fight.

**Keywords:** deterring North Korea, non-nuclear high-tech weapons, 3K+ strategy, extended deterrence, nuclear deterrence, ROK–U.S. alliance, decoupling

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## Introduction

Following the Pyeongchang Olympic Games, we are now observing the increasing possibility of the peaceful denuclearization of North Korea. The Republic of Korea (ROK) Ministry of National Defense (MND) should support and guarantee the process of peaceful and diplomatic denuclearization by providing a perfect deterrence posture that can cope with any contingencies, and enforce North Korea into not leaving the negotiation table or returning to military adventurism, while being especially cautious so as not to ignite political tensions between the two Koreas. Considering that denuclearization will take some time, the ROK MND should maintain an effective deterrence posture against the North Korean nuclear and missile threat during that time, with the extended deterrence provided by the United States.

For that purpose, strengthening the ROK's own deterrence capability against the North Korean military threat is becoming more and more important. This is not only because the Moon Jae-in administration stresses "Responsible Defense," which means the ROK will increase its own responsibility to defend the Korean Peninsula,<sup>1</sup> but also because the North Korean ICBM capability, which it declared in late 2017,<sup>2</sup> and which is assessed to be completed in a short time, is believed to be able to pose the so-called "decoupling situation" on the Peninsula, by an increasing number of people.<sup>3</sup>

The decoupling situation implies that even after a North Korean nuclear attack on the ROK and Japan, the United States may not retaliate against the North with its nuclear weapons, since the North threatens to attack cities in the U.S. mainland with its ICBMs.<sup>4</sup> As a matter of fact, it is not certain that the decoupling may really happen even if the North does finally achieve ICBM capability, because of the North's low technology level, and U.S. missile defense systems.<sup>5</sup> However, this is a problem that cannot be ignored, since more and more people are worrying about it, and the deterrence is basically a psychological phenomenon.<sup>6</sup>

There is a danger that calls for stronger extended deterrence, for example, the redeployment of tactical (non-strategic) nuclear weapons or nuclear sharing (if not independent nuclear development) can grow from the ROK's population, unless these worries can be effectively lowered.<sup>7</sup> The 2018 Nuclear Posture Review (NPR) reveals that the United States has no plan to deploy non-strategic nuclear weapons or apply nuclear sharing to the Korean Peninsula, worrying about the possibility of nuclear proliferation in the Northeast Asian region.<sup>8</sup> If the ROK-U.S. alliance finally succeeds in the denuclearization of the North without any of these additional measures mentioned above, it will be a great triumph for the global non-proliferation regime.

Several non-nuclear high-tech weapon systems and masterful tactics to apply them in the Korean situation raise the possibility of dramatically strengthening the overall deterrence posture against the North Korean threat without any additional nuclear measures. Conventional weapons can hardly replace the role of nuclear weapons in deterrence against a nuclear power. However, they can very effectively supplement nuclear weaponry, especially when we consider the narrowness of the Korean theater, and the uniqueness of the North Korean dictatorship.

From now on, the ROK MND should formulate a new version of the ROK's own deterrence strategy against the North, the "3K+" which tries to utilize the new possibilities provided by several conventional high-tech weapons, together with pre-existing 3K systems (Kill Chain, KAMD, and KMPR).<sup>9</sup> Additionally, the new strategy should be built more systematically to overwhelm any possible North Korean military ambitions in advance, defeating any and all military capabilities that the North is expected to strive for in the future. As Sun Tzu taught, the highest strategy can frustrate the enemy into surrendering, even without a fight. We should frustrate North Korea's future vision, making it realize the losing game already begun, in which there is no chance of winning. The strategy will also be a perfect substitute for military options as a solution to the North Korean problem, whose options cannot be accepted by the ROK.

### **The Necessity and Possibility of Nuclear Deterrence by Conventional Weapons**

There is not much known about nuclear deterrence. It is a research subject with inherent limitations, since there are not enough historical cases by which reliable theories can be tested.<sup>10</sup> Additionally, North Korea is one of the least known countries in the world, and nobody can be sure that preexisting theoretical perspectives can be applied to the North, because it is not like Russia and China, which are U.S. peer competitors, and also not like India, Pakistan, and Israel, which are focused only on their regional rivalries. It is a second-tier nuclear adversary that is directly targeting the United States, which constitutes a whole new subject in deterrence theory.<sup>11</sup>

Nuclear weaponry is the most powerful weaponry in the world, so it is perceived to have the strongest deterrence effect. However, since deterrence should be based on not just destructive power, but also its credibility for use in a real situation, nuclear weaponry has its own vulnerability. This is because of the so-called "nuclear taboo," which means the nuclear weapon is only a political weapon, and cannot be used in reality.<sup>12</sup> In addition, extended deterrence has an additional vulnerability, in that the threat perception between the country extending the deterrence power and the country deterred by it cannot be exactly the same. Decoupling is the extreme case of this.

Nevertheless, to ignore the role of nuclear weaponry in the deterrence against another nuclear power is not politically prudent. As not much is known about nuclear deterrence, it will be too risky a choice not to be accepted as rational decision-making by the general public. The extended deterrence provided by the United States should be kept as hard as possible, like it is at present. However, it must be supplemented by high-tech conventional weapons that can be expected to have a powerful deterrence effect.

For a long time, the United States has tried to supplement nuclear deterrence with highly developed conventional weapons systems. This is not only because of U.S. efforts to reduce the role of nuclear weaponry in national security to provide motivation for enhancing the global non-proliferation regime, but also because of the credibility that conventional weapons can add to the entire deterrence architecture. The 2002 Quadrennial Defense Review replaced the traditional nuclear triad (ICBM, SLBM,

and Strategic Bomber), and presented a new one composed of “retaliation based on the combination of nuclear and non-nuclear, missile defense, and R&D foundation.”<sup>13</sup> The 2010 NPR revealed the U.S. government’s will to reduce the role of nuclear weapons and enlarge the role of conventional weaponry, in order to provide strong enough extended deterrence to its allies even under a reduced nuclear role.<sup>14</sup>

The 2018 NPR declared the enlarged role of nuclear power in U.S. national security policy, and the strongest-ever will to maintain a high-powered extended deterrence,<sup>15</sup> although the full U.S. nuclear policy is still not certain, in that the NPR is only a less than 100 page public document. However, it is not certain even if the strengthened extended deterrence in the 2018 NPR is strong enough for the decoupling situation that more and more people believe the North’s ICBM capability will bring. As mentioned above, the redeployment of tactical nuclear weapons or a nuclear sharing system added to the current extended deterrence to the Korean Peninsula may damage the regional or global non-proliferation regime, so the two governments do not want to proceed further with such redeployment or nuclear sharing.<sup>16</sup>

Deterrence can be defined as a psychological process to prevent the enemy from attacking, by making it realize that the benefit it can get from the attack will be lower than the cost the attack will bring. Considering the uniqueness of the Korean Peninsula, it is not impossible to effectively supplement nuclear deterrence with conventional weapons, since it is possible to deny North Korean missile attacks before they are launched, and during flight (by missile defense), and to impose intolerable costs on the North’s key decision makers.

The Korean Peninsula is a relatively small battle theater, while the North is a highly centralized totalitarian regime. As a matter of fact, the Peninsula is already fully packed with deadly conventional weapons, so it is not impossible to use conventional forces to cause major damage in relatively short time. It is also possible to dissuade the North from provocation by effectively targeting the key decision-making group, given the North Korean decision-making structure. Additionally, the possibility dramatically grows when considering the tactical advantages that several new non-nuclear high-tech weapons (NNHWs) can provide, as presented in the next chapter.

## **Deterrence against Nuclear Conflict with NNHWs**

### ***Cyber Weapons***

Cyber attacks can be an effective non-kinetic measure to deter North Korea’s ballistic missile threat. The United States has the world’s best cyber war capabilities, and has been known to conduct actual cyber attacks on the North.<sup>17</sup> For example, in 2014, the Obama administration was reported to order cyber retaliation against North Korea, after the North’s cyber attack on Sony pictures.<sup>18</sup> In 2017, a U.S. cyber attack was believed to cause the North to fail to launch its IRBM.<sup>19</sup> Recently, the Trump administration has ramped up its cyber warfare, as shown in the “bloody nose” operation on North Korea.<sup>20</sup>

However, there is skepticism that cyber attacks on North Korea are not feasible,

Table 1. Identified Current Cyber Weapons

Cyber weapon	Purpose	Notes
Ducu	Attacks systems	-
Flame	Acquires target cpu/ sends target's info to hackers	-
Great Canon	Imposes massive web traffic	-
Mirai	Makes botnets for large-scale network attacks	Use in DDOS attack
Stuxnet	Attacks isolated networks	-
Wiper	Wipes computer hard drives	-

Sources: Stefano Mele, *Cyber-Weapons: Legal and Strategic Aspects*, June 2013, <http://www.strategicstudies.it/wp-content/uploads/2013/07/Machiavelli-Editions-Cyber-Weapons-Legal-and-Strategic-Aspects-V2.0.pdf> (accessed February 16, 2018).

because of their own limitations; the North’s cyber infrastructure has little openness, and it is nearly impossible to penetrate the North’s isolated military and nuclear command systems.<sup>21</sup> To respond to this challenge, some countries have developed cyber weapons to penetrate isolated networks.

Table 1 shows the cyber weapons that have been identified since 2010, and “Stuxnet” is the most well-known cyber weapon to penetrate isolated networks.<sup>22</sup> The United States and Israel used it to attack Iranian nuclear facilities.<sup>23</sup> Cyber warfare technologies are constantly advancing, and increase the possibility of penetrating isolated networks. The ROK should make more efforts to reinforce its cyber warfare capability, including the development of more effective cyber weapons. If the ROK can acquire cyber weapons to attack the North’s isolated network, it could disrupt the North’s Command and Control system of nuclear weapons, and stop the North’s ballistic missile provocations.

However, regarding the unique characteristics of cyber warfare, serious questions arise not from the technology, but from the strategy. Considering its level of information technology, the ROK can quickly acquire lethal cyber weapons, but the ROK should solve the strategic dilemma of cyber warfare. As Martin C. Libicki argues, cyber capability has a limitation for use in deterrence. Deterrence requires strategic communication that makes the enemy acknowledge our capability and willingness. But cyber attacks are essentially single-use weapons, and are diminished in their showing. It can be hard not only to persuade friendly states that a state has such capabilities, when skepticism is in their interest,<sup>24</sup> but also to dissuade the enemy that a state will attack again with the same lethality at the enemy’s next provocation. There is both promise and risk in cyber capability brandishing. Cyber weapons such as Stuxnet enable the ROK to conduct sophisticated operations in cyberspace. But strategic communication for deterrence—for example, brandishing cyber capability—would not work, and if the other elements of deterrence are weak, would be unlikely to make a deterrence posture succeed.<sup>25</sup>

So, the ROK should engage in more efforts to make strategies and tactics to use its cyber weapons, as well as its cyber weapons capability. In particular, the ROK needs to develop the cyber operation concept to deter the North’s nuclear provocation. For one example, ROK can let the North recognize the high lethality of ROK’s cyber capability

by doing one symbolic small scale operation when the North tries to raise military tensions.

### ***The Conventional Global Prompt Strike (CGPS)***

Since the early 2000s, the United States has developed state-of-the-art weapons that are capable of hitting anywhere in the world within an hour. Additionally, the Obama administration did not want to use nuclear weapons, but had to use powerful conventional weapons.<sup>26</sup> The Conventional Prompt Global Strike (CPGS) initiative is the Obama administration's plan to strike anywhere in the world within an hour.<sup>27</sup> Under the CGPS initiative, the U.S. Navy and Air Force had to make the plan and program to renovate their strategic weapons: ICBM, SLBM, and LRCM.

Table 2 shows specific programs under the CGPS initiative. The vehicle design in CGPS is based on the ballistic missile and cruise missile. In the case of the cruise missile design, the CGPS is pursuing a new type of cruise missile with hypersonic speed (Mach 20+). Regarding ballistic missiles, CGPS has a modification plan for existing ballistic missiles (Minuteman III, MX Peacekeeper, and Trident). Ballistic missiles with conventional warheads can be realized in the near future, because the modification of existing ballistic missiles can shorten the time of R&D and acquisition.<sup>28</sup>

The Navy's modified ballistic missile program shows how CGPS works. Under the U.S. Navy's "Conventional Trident Modification (CTM),"<sup>29</sup> the Navy deploys 12 Trident submarines on patrol, each with two missiles equipped to carry four conventional warheads each.<sup>30</sup> Two types of warheads were designed for the CTM program. One

Table 2. The Programs of Conventional Global Prompt Strikes

	Program	Items
Air Force	The FALCON Study	Ballistic Missile Hypersonic Reentry Vehicle (Common Aero Vehicle, CAV)
	Reentry Vehicle Research and Warhead Options	Heavier multiple warheads (up to 8,000 lbs) in ballistic missile and CAV
	Missile Options (Modification of Existing ICBMs)	Modified ICBMs with conventional warhead
	The Conventional Strike Missile	Minotaur 4 launch vehicle
	Hypersonic Test Vehicle	HTV-2 (Mach 20 aerodynamic flight)
	ArcLight	Modified SM block-3
Navy	Reentry Vehicle Research	E2 reentry vehicle (Improved accuracy and bigger size)
	Conventional Trident Modification	Modified Trident SLBM (Carrying conventional warhead)
	Submarine-Launched Intermediate Global Strike	Submarine-Launched Intermediate-Range Ballistic Missile (SLIBM)
Army	Advanced Hypersonic Weapon	Similar to HVT-2 (Shorter range)

Source: Amy F. Woolf, "Conventional Warheads for Long Range Ballistic Missiles: Background and Issues for Congress," *CRS Report for Congress*, RL33067, January 26, 2009.

warhead was designed to destroy or disable soft area targets, using a reentry vehicle loaded with tungsten (a.k.a. flechettes) that rains down on the target, and destroys everything within an area of up to 3,000 square feet. The other was designed to destroy “hardened targets (hardened shelters and underground facilities),”<sup>31</sup> if it was accurate enough to strike very close to the target. To improve accuracy, the navy set up the program of reentry vehicle research. Under the Reentry vehicle research program, the U.S. navy has developed the E2 reentry vehicle.<sup>32</sup>

This CGPS can be a powerful deterrent to North Korea’s use of nuclear weapons, while minimizing the risk of escalating tensions which can be caused by enhanced nuclear deterrence. Because CGPS uses only conventional warheads, it has advantages in terms of crisis management, as compared to extended deterrence using nuclear weapons. It can be an option to alleviate opposition from China and Russia.

However, this CGPS has some limitations. First, the United States would be hesitant to operate the modified ballistic missile on the Peninsula. There is skepticism towards this idea, because firing conventional ballistic missiles causes nuclear alerts in Russia and the PRC, because they do not know what kind of warhead is loaded on the missile in orbit. The Bush administration rejected the idea of a CPGS system, because the administration feared that a conventional ballistic missile would trigger the Russian nuclear-launch warning system, and would potentially provoke a nuclear war.<sup>33</sup>

Second, the Trump administration’s National Security Strategy and Nuclear Posture Review might make it slow to complete the CGPS initiative.<sup>34</sup> The Obama administration pursued a policy of “Eliminating Nuclear Weapons,” and was more positive about replacing existing nuclear weapons with CGPS weapons. However, the Trump administration is concentrating more on enhancing nuclear weapons, while the programs related to conventional warheads could be halted or rejected.

In spite of those shortcomings, CGPS could be chosen as an effective ROK deterrent asset toward North Korea, since it is a far better option than risking the possible damage to the non-proliferation regime by adopting more nuclear deterrents. One additional problem is that it is not sure it can be realized in the short term. However, if the two allies are highly resolved, it can be achieved in a reasonable amount of time. If we can acquire and deploy it in five to ten years, we can frustrate the North’s nuclear ambitions the regime is trying to realize in five to ten years. We can frustrate the North’s future vision with our development plan of the CGPS.

### ***Massive Strike of Ballistic Missiles***

The ROK has no nuclear weapons, and has not appeared to pursue nuclear capability for a while. The ROK has ballistic missile capability, but it cannot be used to deliver nuclear warheads. The U.S. weapons systems, such as the Kinetic Bombardment or CGPS, can be very powerful assets to deter against the North’s nuclear weapons. But it is not clear that their deployment can be realized in the short term. However, the ROK can make a standalone deterrent measure. The ROK can use its ballistic missiles to deter against the North’s nuclear attack, even without nuclear warheads. As Zachary Keck argued, North

Table 3. The ROK's Ballistic Missiles.

Name	Range (km)	Weight of warhead (kg)	Type	Year of deployment
Hyunmoo -1	180	500	Tactical	1986
Hyunmoo-2A	300	2,000	Theater	2006
Hyunmoo-2B	(500–800)	1,000	Theater	2015
Hyunmoo-2C	800	500	Theater	2017
Hyunmoo-4	800	2,000+	Theater	In development

Sources: CSIS, “Missiles of South Korea,” <https://missilethreat.csis.org/country/south-korea> (accessed February 17); and Yeo Jin-suk, “Army Reveals Plan to Develop ‘Frankenmissile’ Targeting NK,” *The Korea Herald*, October 19, 2017, <http://www.koreaherald.com/view.php?ud=20171019000877> (accessed February 16, 2018).

Korea is not the only Korea with killer missiles.<sup>35</sup> Hyunmoo is the ROK's representative ballistic missile and there are six variants of Hyunmoo.

Table 3 shows the current and future ballistic missiles of the ROK. Their ranges are below 800 kilometers. Considering the military threat from the North, the ROK's ballistic missiles do not need a range over 800 kilometers. Hyunmoo-1—based on the U.S. Nike–Hercules SAM—is too old, and is expected to be retired in the near future. The Hyunmoo-2A loads cluster warheads, and can be used to destroy the North's TELs. But the North's TELs are very hard to detect and destroy, due to the shortage of response time. The ROK needs to destroy the North's ballistic missiles before launch, and it is better to destroy them in their hardened shelters in underground storage and bunkers. Most of the North's ballistic missiles are stored in underground storage, and in the event of a military crisis, the North's leadership would hide in underground bunkers. So, the ROK military should have the capability to penetrate the North's underground shelters.

There are some available ideas to penetrating underground shelters. As the CPGS program shows, ballistic missiles can be used to penetrate and destroy hardened targets. If the ROK military forces apply CPGS's idea, Hyunmoos could be used to penetrate the North's hardened shelters. ROK's Hyunmoo-2A and Hyunmoo-4 can be especially dominant options for “penetration.” They can load over 2,000 kilogram warheads. This capacity gives them the potential to deliver heavy warheads to penetrate the North's underground.<sup>36</sup>

Even the 2,000-kilogram warhead may not be enough to penetrate. There is an alternative idea to causing destruction. The “Massive Launching” of Hyunmoos can provide the other solution. When a Hydraulic Hammer breaks a rock, it strikes the rock many times. The massive launching of Hyunmoos works like a hydraulic hammer on a rock. If one or several Hyunmoos with heavy warheads are not enough to penetrate, the ROK forces could launch over hundreds or even thousands of Hyunmoo-2As on the North's underground shelter and bunkers.

To make such a massive launch happen, the ROK forces would need a sufficient number of Hyunmoo-2As or Hyunmoo-4s; and the ROK military should plan to improve the accuracy of Hyunmoos. According to the ROK news report, Hyunmoos would be used for Korea Massive Punishment & Retaliation (KMPR) against North Korea. The KMPR is designed to annihilate Pyongyang with a missile barrage, in the event of a nuclear

attack. The ROK military force plans to increase the number of Hyunmoo 2As, 2Bs and 3s that can simultaneously strike missile bases across North Korea in time of war.<sup>37</sup>

How many missiles are needed for KMPR? The ROK media and military experts provide the number of 2,000.<sup>38</sup> The number of 2,000 missiles may be enough to destroy current targets for Kill Chain and KMPR. However, more missiles will be needed for the ROK to make the other missile application above of destroying the North’s underground targets.

***Strategic Targeting: Counter–Political Leadership.***

Strategic targeting is a very important element in making the 3Ks work properly. But there is a limit to applying existing strategic targeting. As we know, there are two kinds of strategic targeting policies. One is the “counter–value (counter city)” targeting policy. This aims at the enemy’s citizens and industrial complexes. The other kind is the “counterforce” targeting policy, which aims at the enemy’s nuclear missiles, launchers, and command and control installations.<sup>39</sup>

Table 4. The U.S. Strategic Targeting Policy.

Year	Targeting Doctrine	Acquired Destruction	Remarks
1940–1950	Harrow (1947)	20 cities 50% of industrial facilities	The U.S. unilateral nuclear deterrence
	Charioteer (1948)	70 cities or industrial facilities	
	Trojan (1948)	30 cities 60–70% of industrial facilities	
	Dropshot (1949)	200 targets in 100 cities	
	Delta (1950)	134 cities 57–84% of industrial facilities	
1960s	No-cities Strategy (1962)	Counterforces targeting only	Robert McNamara’s plan in the Kennedy administration
	Assured Destruction (1966)	1/3 of total population 2/3 of industrial facilities	-
	Assured Destruction (1967)	1/4 of total population 1/3 of industrial facilities	-
1970s	Targeting Doctrine of Nixon Administration (1975)	70% of war supporting capability	Prohibition of counter population targeting
	Carter Administration (1977–1979)	Re-establishing of counter population targeting	Carter administration rejected the proposal
1980s	Reagan Administration (1982)	300 cities 100,000 of political elites	Destruction of the Soviet’s retaliation capability
1990s–	Flexible Targeting	Adversary’s government and main industrial facilities 100 nuclear warheads are needed	Counter city and population targeting is officially prohibited

Sources: Desmond Ball, “Targeting for Strategic Deterrence,” *Adelphi Papers*, No. 186 (1983): 3–41; and Center for Defense Information, Federation American Scientists, Natural Resources Council and Union of Concerned Scientists, *Toward True Security: A U.S. Nuclear Posture for the Next Decade* (Cambridge, MA: UCS Publication, 2001), 20–22.

Table 4 shows that the United States developed its strategic targeting policy to deter the nuclear forces of the former Soviet Union. Since the Kennedy administration, the United States concentrated more on counterforce targeting policy.<sup>40</sup> Some nuclear experts, such as Keir A. Lieber and Daryl G. Press (and Austin Long and Brendan Green), argue that the United States acquired successful counterforce capability, and counterforce weapons could provide more credible deterrence.<sup>41</sup>

Basically, the ROK military force does not have any kind of counter-value targeting policy, and the 3Ks (Kill Chain, KMPR, and KAMD) are aimed at the North's nuclear and conventional forces. However, advanced counterforce capability can cause negative effects on an adversary such as North Korea. Advanced counterforce capability could make North Korea improve its retaliatory arsenals just to maintain the same level of deterrence,<sup>42</sup> or the threatened North Korea might even consider a preemptive strike to deescalate the conflict (use-it-or-lose-it).<sup>43</sup> This means that the ROK-U.S. alliance would meet the other challenge of an arms race or nuclear exchange, in spite of credible counterforce capability.

If counterforce targeting has the danger of an arms race and the North's preemptive strike, what would be an alternative? Hans M. Kristensen, Robert S. Norris, and Ivan Oelrich point out that the counterforce policy is based on the old strategy of the Cold War era, and could result in a nuclear arms race, or the dilemma of use-it-or-lose-it. They recommend that the United States should publicly abandon a counterforce policy, and adopt new counter-value targeting—targeting infrastructure based on minimal deterrence.<sup>44</sup> Considering the U.S. security situation, the argument of Kristensen, Norris and Oelrich seems reasonable. However, this would not be an effective targeting policy toward North Korea. As we know, North Korea has little valuable infrastructure. Reminiscent of the logic of deterrence, the North's infrastructure is not enough to be a target for deterrence, because the North does not think of its infrastructure as precious. So, the ROK should explore a new target policy to adapt to North Korea.

There is an idea for a new strategic targeting policy for the ROK. Table 4 shows the strategic targeting policy during the Reagan administration. In the 1980s, the Reagan administration adopted the Counter-Political Leadership targeting policy. On February 26, 1982, Ronald Reagan received his first full briefing on U.S. plans for waging nuclear war against the Soviet Union. Reagan would be told that the primary targets for the war plans would be the “nuclear threat, conventional threat, and economic/industrial targets,” but also “leadership,” indicating that Soviet political and military leaders and their offices and bomb shelters would be major targets.<sup>45</sup> In the 1980s, the CIA and DoD estimated the number of political leaders of the Soviet as 110,000 (5,000 political leaders in Moscow; 63,000 local political leaders; 2,000 general managers of the industrial complex; 40,000 other key persons), and evaluated that the shelters where Soviet political leaders would hide in a nuclear crisis were vulnerable to direct nuclear strike.<sup>46</sup>

Could counter-political leadership be a new ROK strategic targeting policy? Political leadership is precious to the North, and counter-political leadership could be a very strong strategic targeting policy. The ROK needs to make an effort to acquire successful counter-political leadership capability. First, intelligence capability is important. The

ROK should have a list of the political leaders of North Korea, and the locations of their office and shelters. Second, the ROK should have strike weapons to destroy shelters, or SOP capability to eliminate political leaders.<sup>47</sup> But, the ROK should consider the possible negative effects of counter-political leadership and North Korea's response. In reality, the ROK may need to keep it secret until the military tension starts to escalate.

### ***Drone Warfare***

Drone warfare could be employed to deter North Korean nuclear threats. The ROKA (ROK Army) has a plan of "the five major game changers" to minimize the damage to ROK citizens and to win the war in the shortest time in the face of North Korea's asymmetric threat.<sup>48</sup> However, the potential usefulness of drone warfare should be explored more in the future ROK strategy.

The success of drone warfare is determined by the completion of tactics and strategies, not the technology of making drones. The operational concept of drone warfare has been developed in some countries, including the United States. For example, John Arquilla and David Ronfelt provided "Swarming" as a new operational concept for drone warfare.<sup>49</sup> Swarming is a tactic to besiege and annihilate the enemy by overwhelming numbers<sup>50</sup> and the number of units—"Small and Many Units"—is very important for successful swarming.<sup>51</sup> Drone warfare with swarming tactics allows one soldier to control a lot of drones and military forces can get an overwhelming amount of power at low cost. Drones will be an attractive alternative to army officers who are under pressure to recruit newcomers and conduct business under budget pressures.<sup>52</sup>

These days the ROKA also plans to organize drone combat units, using various small-sized UAVs and private commercial drones in various missions ranging from reconnaissance to strike operations against key targets. The drone combat unit consists of the Scout Drone Company, which collects information and surveillance scouting and the Attack Drone Company, which strikes the North's ballistic mobile missile launchers.<sup>53</sup>

Although the specific operational concept is not disclosed, the ROK Army could use the drones to respond to North Korean ballistic missiles as follows. First, drones could increase ROK's counterforce intelligence capability. The ROK-U.S. is operating various kinds of reconnaissance assets such as reconnaissance satellites and airplanes. However, the North could avoid ROK-U.S. surveillance by moving Transporter Erector Launchers (TELs) in the time for spy satellites to be out of orbit over the Korean Peninsula or hiding them in a tunnel even while they are in the orbit.

To respond to the North's counter-surveillance activities above, ROK forces are making efforts to increase counterforce intelligence capability against the North's nuclear weapons. ROK military forces are operating UAVs like RQ-101 for that purpose and will acquire strategic reconnaissance UAVs like Global Hawk. However, the ROK needs more drones to respond to the North's nuclear weapon threat and new types of unmanned surveillance drones could be considered.

For example, the ROK could make a new concept of surveillance operations with small and many Ground Sensor Drones (GSD). Smaller-sized UGVs (Unmanned

Ground Vehicle) with 360-degree cameras and audio sensors would be better for the design of the GSD.<sup>54</sup> These GSDs could be delivered by various vehicles such as cluster bombs or cluster warheads. ROK forces could spray over thousands of GSDs around the North's ballistic missile bases or facilities and these GSDs could send visual and audio information on the North's TEL activities and this GSD operation could help to increase ROK's counterforce intelligence capabilities. Furthermore, GSDs (UGVs) have more operational duration time than UAVs because UGVs do not need energy for flight endurance.

Second, the small and many drones could be "smart mines" against the North's missile storage facilities. These smart mine drones could be delivered by various vehicles as cluster bombs, MLRS and Hyunmoo ballistic missiles. Most of the North's ballistic missiles are liquid propelled and their TELs have difficulties maneuvering because of bad road conditions. ROK forces could deploy "smart mine" drones around the North's missile storage to destroy North Korean ballistic missile launchers or delay their launch. This operational concept needs small and many ground drones as smart mines that could be delivered by current ROK missiles or cluster bombs. The design of GSDs above could be used to develop smart mine drones.

Third, small and many drones could be a jamming measure to counter the North's nuclear weapons. Jamming is useful in delaying the North's ballistic missile launches. Ballistic missile launches require electronic equipment as radars for launch and air traffic control. Such electronic equipment is vulnerable to radio interference or noise, and the use of radio interference can seriously hinder North Korea's ballistic missile launches. The United States has military airplanes for electronic countermeasures such as the EC-130H and EF-18G but manned aircraft can be shot down by North Korean fighters, which limits the jamming operations of long-range ballistic missiles in North Korea, which are deeply inland.

Jamming drones can be an alternative to overcome the vulnerability of manned jamming aircraft. Jamming drones have another advantage. The time required for development and deployment can be shortened because existing UAVs or aircraft can be used. The ROK could make jamming drones just by adding jamming equipment to current drones. If ROK forces need faster jamming drones, it could make jamming drones by modifying the retired F-5s or F-4s to UAVs and attaching jamming equipment there.

### ***Electronic Destruction: CHAMP EMP***

As mentioned above, jamming is a powerful means of preventing the North from launching ballistic missiles. The hacking, cyber weapons and jamming drones mentioned above are powerful jamming measures. Hacking and cyber weapons, however, do not work at the desired time and can only be used as single-use weapons because of anti-virus program updates. Jamming drones, which use radio disturbances, also have the disadvantage of preventing North Korea from launching missiles only during drone operation time. North Korea may wait for the jamming drones to withdraw before

resuming preparations for launch. Thus, electronic destruction, rather than temporary disruption such as jamming, can be the most effective means of preventing North Korean ballistic missile launches.

Electro Magnetic Pulse (EMP) is the subject of the greatest research in each country in relation to electronic destruction. Generally, EMP occurs during a nuclear explosion. Thus, nuclear weapons are also the most potent EMP weapon. In the early 2000s, the United States studied scenarios in which North Korea and terrorist groups attacked the United States by using low-yield nuclear warheads such as EMP weapons.<sup>55</sup> Although nuclear devices could be an easier way to developing EMP weapons, there is the problem of sanctions imposed by the international community, including IAEA, and it would not be a viable alternative for Korea. However, EMP can also be generated by means other than nuclear, so the non-nuclear EMP weapon is a major study subject in each country.

Non-nuclear electromagnetic pulse (NNEMP) is an electromagnetic pulse without nuclear explosion. NNEMP devices include a large low-inductance capacitor bank discharged into a single-loop antenna, a microwave generator, and an explosively pumped flux compression generator.<sup>56</sup> The key to a successful NNEMP weapon relies on the minimization of a NNEMP device. The United States made a successful NNEMP device and loaded the device onto its cruise missiles. The Counter-electronics High Power Microwave Advanced Missile Project (CHAMP) is the U.S. Air Force's project of NNEMP weapons. The U.S. Air Force tested NNEMP delivered on the AGM-86 ALCM, but the U.S. NNEMP weapons are expected to be integrated onto a JASSM-ER attached to the F-35 Lightning II or drones. There would be potential delivery systems such as hypersonic cruise missiles or hypersonic drones.<sup>57</sup>

The NNEMP weapon is expected to neutralize North Korea's nuclear weapons through electronic destruction. ROK military forces are also reported to develop NNEMP weapons. Although there are no detailed reports on the progress of NNEMP development, the ROK could have an NNEMP weapons system as follows: first, the NNEMP warhead could be mounted on a Hyunmoo ballistic missile. According to the amendment of the ROK-U.S. Missile guideline, Hyunmoo can install a warhead of about two tons. This means that ROK forces can mount the most powerful NNEMP warheads.<sup>58</sup> In addition, the ballistic missile will reach the North's missile facilities earliest so will be the most responsive systems to them.

Second, NNEMP warheads can be loaded on a cruise missile. It is slower than a ballistic missile and has a light loading capacity, but it can reduce the burden of using the ballistic missile. When using ballistic missiles, they are fast, but are likely to be detected by North Korean or Chinese ballistic missile defense radars. What is more problematic is that North Korea, which does not know the types of warheads loaded on ballistic missiles, is likely to overreact. Cruise missiles are less likely to be detected than ballistic missiles, which can mitigate these risks and neutralize North Korean ballistic missiles.

Third, bomb-type NNEMP weapons can be built and loaded onto jet fighters. This can be the least time-consuming and the lowest cost option. While bomb-type NNEMP weapons delivered by current jet fighters puts fighter pilots at risk, the F-35, the latest

Table 5. Sensitivity, Effect and Cost Imposition of Non-Nuclear High-Tech Weapons Systems

	Sensitivity	Effect	Cost Imposition
Cyber Attack	Low	Low	Low
JAMMING	Medium	Medium	Medium
CGPS (U.S.)	High	High	
Massive Launch of Ballistic Missile	High	High	High
Counter Political Elite	Very High	High	Low
Drone	Medium	Medium	Medium

stealth fighter of the ROKAF (ROK Air Forces), can be an effective delivery system to reduce the risk burden. However, there is a disadvantage when using a fighter in that the response time is longer than when an automatic ballistic missile is used.

All three above could be potent NNEMP weapon options in a short time. A key challenge for NNEMP in Korea is the completion of powerful, small NNEMP warheads and bombs that can be mounted on the missiles and aircraft mentioned above. If the two allies are highly resolved, it can be reduced to a reasonable level.

Table 5 shows the relative political sensitivity, military effectiveness, and cost imposition effects<sup>59</sup> of each non-nuclear high-tech weapons systems and masterful tactics to employ them as mentioned above. The ROK MND should consider these factors when developing the new defense strategy and deterrence architecture against North Korean nuclear and missile threats.

### **Formulating a “3K+” Strategy and Applying it**

The ROK should be prepared for any contingency, even during the time of the diplomatic denuclearization process. This strong deterrence posture and readiness will support and guarantee the process by leaving the North with no room for deviation, although it is also necessary not to try to excessively stimulate the North, by giving it no excuse for it to deviate. A stronger deterrence strategy and posture should be prepared, in readiness for the case where the North withdraws from the negotiation. If strong and effective countermeasures are not prepared as a valid alternative to the military options, in the event top-level diplomacy fails, military tension between the United States and North Korea may escalate out of control in a very short time. The ROK should present an effective deterrence strategy to enforce North Korea to return to the negotiation table, and press China and Russia to cope with tougher sanctions against the North, which can be accepted by the United States as an effective solution to the North Korean problem.

In doing this, the ROK MND should try to make a grand design to overwhelm all North Korean military plans in advance. In past years, the alliance defense policies against North Korean provocations have been limited to the continuation of ad hoc reactions, as opposed to “the big picture,” which looks ahead to future North Korean provocations.<sup>60</sup> The new strategy should be designed to frustrate any North Korean

military ambition and future vision, even before they are fulfilled.

The North is assessed as trying to develop the following military capabilities in sequence or parallel to complete its nuclear deterrence, and militarily dominate the Korean Peninsula from a strategic perspective.<sup>61</sup> First, the North will continue to try to miniaturize and make light-weight nuclear warheads, and to develop mass production of those warheads. It will also try to deploy them in the battlefield, ready to be launched at any moment. Second, the North will make efforts to complete the re-entry techniques of ICBMs, and after that may try to explore many techniques to evade U.S. missile defense systems, including Multiple Independently-Targetable Reentry Vehicles (MIRV).

Third, North Korea will try to increase the number of mobile launchers, and develop Submarine Launching Ballistic Missile (SLBM) technologies to enhance the survivability of its nuclear weapons. If a few of the North's nuclear warheads and launchers can survive even after a ROK-U.S. alliance attack, it may presume to be able to deter the alliance's attack. Fourth, the North is also forecasted to make low-yield, less powerful nuclear weapons, so called tactical (non-strategic) nuclear weapons. Nuclear weaponry is not easy to use in reality, since it is so destructive. Tactical nuclear weaponry with low destructive power has its own advantages in deterring adversaries, because it is better than the more powerful ones from the point of credibility, as one important factor in establishing deterrence power. Tactical nuclear weaponry will give North Korea more operational freedom.

Lastly, the North is predicted to make various conventional weapons, like the Anti-Ship Ballistic Missile (ASBM), to deny and disturb the access of U.S. augmentation forces to the Peninsula in contingency situations. It might be termed the North Korean version of Anti-Access, Area Denial strategy (A2AD). After achieving these capabilities, the North may conduct various types of limited and local provocations, to remind South Korea and the United States how dangerous the Peninsula is, and conduct coercive diplomacy to force negotiations to its advantage.

The ROK's deterrence strategy should be built and designed to deter in advance all of those military capabilities. The ROK should present the timetable of its defense projects to provide proper capabilities to deter any North Korean military threats before they come to reality. There should be a grand design for the ROK's future defense that covers the next 10 years at least, especially concentrating on the ROK's own deterrence capability against North Korea.

The ROK will and should depend on and utilize U.S. extended deterrence to deter against North Korean nuclear threats, until the North is confirmed to be completely denuclearized. However, the ROK should try to build its own deterrence capabilities based on the strategic concept of 3K. The ROK's independent deterrence will be critically important when the North comes closer to ICBM capability, which is believed to weaken the credibility of extended deterrence.

The ROK needs to fully employ the potentiality of several emerging non-nuclear high-tech conventional weapons to build a new grand design for the ROK's own deterrence strategy. Since these new weapons systems provide the possibility of effectively deterring North Korean nuclear threats, they will lower the concerns that

extended deterrence will not function properly against North Korean ICBM capability. If these efforts fail, the possibility cannot be ruled out that strong pressure will be exercised by the ROK population for the redeployment of non-strategic nuclear weapons, or the adoption of nuclear sharing.

The ROK's new deterrence strategy utilizing non-nuclear high-tech conventional weapons in deterring the North Korean nuclear threat can be called a "3K+" strategy, since it will add the adoption of new high-tech conventional weapons, and masterful tactics to use them, to the pre-existing 3K strategy.<sup>62</sup> The United States should fully support the ROK in developing and employing these new weapons systems, because they will contribute to maintaining the global and regional NPT regime.

The ROK MND should present a powerful plan to build an effective deterrence posture, when North Korea threatens to leave the negotiation table and restart military provocations. Even while the denuclearization negotiations are going well, the MND can periodically and cautiously introduce the concept of new high-tech weapons and strategies. As a result, the North will find that the nuclear weapons should be restrained in effect, and the South Korean people will be relieved.

The ROK needs to be cautious during the denuclearization negotiations, in not stimulating the North by excessive military activities. However, when North Korea restarts such provocations, and raises new military threats by introducing new capabilities, the ROK should be able to present a stronger deterrence strategy as an effective countermeasure. The important thing is that the ROK should reveal and introduce new weapons systems and tactics at the right time to maximize psychological effects. The ROK should make a systematic timetable to develop and employ new high-tech weapons systems based on their expected development completion date, and most effective introduction moment to counter the new North Korean military capability.

## **Conclusion**

Deterrence is, in essence, a psychological process. What the most important thing is how to make the enemy believe the deterrence works. The Strategic Defense Initiative, SDI, is the military project that was never completed, but believed to be an important factor in the demise of the Cold War. The Soviet Union was fearful of the SDI, and tried best to stop it in negotiations with the United States for nuclear arms control. It was believed by the Soviet Union that it would make the Union vulnerable when it was completed, and that there would be no way for the Union to overcome it.

We want peace, and all agree that the North Korean problem should be resolved through diplomacy. Even for this purpose, we should be prepared for any contingency, and have the strongest plan for the worst situations, so the North cannot return to military adventurism which is not a good option even for itself. The ROK should also prepare an effective alternative to the military options that may be taken by the United States when diplomacy seems to fail. The ROK does not need to reveal its plan during the time denuclearization negotiations are going well. It should be cautious not to

stimulate the North by being seen as too aggressive. But it needs to make and develop a more systemic and well-organized defense plan and strategy to overwhelm all possible future North Korean military ambitions. Strategy, not fight, wins the war, which is the Cold War still remaining on the Peninsula.

## Notes

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  62. 3K+ strategy will stress the important and usefulness of new high-tech conventional weapons systems and tactics in overall deterrence architecture more than the 3K. It will also be built more systematically to overwhelm any possible North Korean military capability in advance.

## Notes on Contributors

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