



TECHNOLOGY  
FOR  
GLOBAL  
SECURITY

# DPRK'S NC3 SYSTEM

## TECHNOLOGY FOR GLOBAL SECURITY SPECIAL REPORT



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**DPRK'S NC3 SYSTEM**  
**DR. MYEONGGUK CHEON**  
**JUNE 6, 2019**

**I. INTRODUCTION**

In this essay, Dr. Myeongguk Cheon describes what is known about North Korea's NC3 system. He concludes: "Regarding the DPRK'S NC3 system, however, many questions remain unanswered, even though it is clearly identified who has the final approval authority and what forces operates delivery systems for the employment of nuclear weapons."

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**II. TECHNOLOGY FOR GLOBAL SECURITY SPECIAL REPORT**  
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**SUMMARY**

Although North Korea has declared completion of national nuclear power and is expanding its nuclear forces qualitatively and quantitatively, there is increased interest about the command and control system of its nuclear force. However, there is nothing officially declared about North Korea's command and control of its nuclear forces. Civilian research on this topic is also limited. Hence, it is difficult to make a clear assessment of whether North Korea is building a nuclear command, control, and communications system, (NC3) system or has already completed one.

Thus far, North Korea seems to have taken two meaningful actions related to their NC3 system. One, relevant laws were made. Two, the military organization was renewed. So called "nuclear weapons state law" legislated in 2013 includes who has the final authority to declare nuclear weapons use. It clearly says the Highest Commander of DPRK's Forces, Kim Jong-Un, shall exclusively exercise the final approval authority for its nuclear weapon employment. Regarding military organization renewal, North Korea changed its Strategic Rocket Command to the Strategic Forces Command in 2014 and said that all missile forces were integrated and missile launch systems automated and command systems unified, which would ultimately help implement Kim Jong-Un's directions. The DPRK's intention on the establishment of the Strategic Forces Command likely seems for the employment of nuclear weapons. Regarding DPRK's NC3 system, however, many questions remain unclear yet, even though who has the final approval authority and what forces operates delivery systems for the employment of nuclear weapons are clearly identified.

**Introduction**

Legislation of the "nuclear weapons state law" in 2013 and creation of the Strategic Forces Command in 2014 implies that North Korea built the institutional foundation to become a nuclear weapons state and created a systemic foundation for nuclear force operation.

North Korea is one of the last countries to succeed in developing nuclear weapons. It has facilities that produce plutonium and highly enriched uranium and seems to have succeeded in developing atomic bomb, thermonuclear bomb, and ICBMs.

In May 2005, North Korea's Ministry of Finance (MOF) spokesperson declared for the first time that it had nuclear weapons and conducted its first nuclear test in October 2006. The explosion yield from this first test showed that its nuclear technology was not yet reliable.

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North Korea continued to demonstrate enhanced nuclear weapons technology in 2009 and 2013. In 2016, it revealed through its fifth nuclear test that it had developed nuclear weapons that could be utilized tactically. In September 2017, North Korea succeeded in testing its thermonuclear device.

The successful testing of the Hwasung-15, an ICBM, in November 2017 was monumental in that it meant North Korea had finalized its nuclear power construction. The development of thermonuclear weapons and the successful development of ICBMs ended the international community's cynical and skeptical assessment of North Korea's nuclear and missile technology, leading them to reconsider and change their North Korea policy.

After the successful testing of the Hwasung-15 in November 2017, Kim Jong-Un declared the completion of national nuclear power and through its New Year's address, directed the mass production and deployment of nuclear warheads and strategic rockets as the next task. In order to implement these directives, the nuclear material production facilities in Yongbyun and ballistic missile production facilities near Pyongyang seem to be highly active. Kim Jong-Un demonstrated willingness to denuclearize during the Inter-Korean Summit in April 2018 and the US-DPRK Summit in June 2018 and several high-level meetings were held as a consequence. However, no real progress is being made in terms of denuclearization, and, most likely, North Korea will become a de facto nuclear state.

Although North Korea has declared completion of national nuclear power and is expanding its nuclear forces qualitatively and quantitatively, there is increased interest about the command and control system of its nuclear force. Generally, states that have succeeded in developing nuclear weapons and build appropriate systems to manage and operate nuclear weapons as well as oversee their deployment. North Korea is expected to build such management and command and control systems. There are several reasons why. During peacetime, there is a need to prevent haphazard use of nuclear weapons through safe storage of nuclear warheads and orderly management and to keep them in the best of conditions. During wartime, there is a need to maintain effective and reliable nuclear posture.

However, there is nothing officially declared about North Korea's command and control of its nuclear forces. Civilian research on this topic is also limited. Hence, it is difficult to make a clear assessment of whether North Korea is building a NC3 system or has already completed one. Regardless of Kim Jong-Un's New Year address that included the message that "there is a nuclear button on my desk... one must beware this is not a threat but a reality," it is unclear whether this indicates the completion of a NC3 system.

Thus far, North Korea seems to have taken two meaningful actions related to the issue at hand. One, relevant laws were made. Two, the military organization was renewed. Relevant laws: In

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April 2013, the supreme people's assembly adopted the law, "the reinforcement of self-defense, nuclear weapons status." The contents include the legitimacy of nuclear weapons development, the role of nuclear weapons, nuclear force reinforcement, the final authority to declare nuclear weapons use, negative security guarantees for non-nuclear states, safe management of nuclear weapons and adherence to such regulations, storage and management systems and order construction to prevent illegal leaks of nuclear weapons, nuclear technology and nuclear material, international cooperation for nuclear non-proliferation and safe management, international efforts to build a society free from nuclear weapons, nuclear arms control, and so forth.<sup>1</sup>

This law was legislated after North Korea's third nuclear test in February 2013, which indicated that North Korea evaluated the test as a success and focused on putting nuclear warheads in to power from then onwards. Also, North Korea seems to have wanted to declare itself as a responsible nuclear weapons state to both domestic and international audiences.

Military organization renewal: In 2014, North Korea changed its Strategic Rocket Command to the Strategic Forces Command. On March 5<sup>th</sup> that year, North Korea revealed for the first time that it had created the Strategic Forces Commands through the statement of its spokesperson. The system was changed in a way that all missile forces were integrated and missile launch systems automated and command systems unified, which would ultimately help implement Kim Jong-Un's directions.<sup>2</sup>

Legislation of the "nuclear weapons state law" in 2013 and creation of the Strategic Forces Command in 2014 shows that North Korea built the institutional foundation to become a nuclear weapons state and created a systemic foundation for nuclear force operation.

Accordingly, this paper seeks to estimate North Korea's NC3 system related to nuclear force operations.

### **Historical origins of the NC3 system and how these have changed over the time of ownership of nuclear weapons**

North Korea's successful nuclear development and building of nuclear forces is a recent phenomenon and, thus, does not have a long history. While it conducted two nuclear tests in October 2006 and May 2009, respectively, its technical aspects did not receive much attention due to low explosive yield. After the third nuclear test in February 2013, North Korea showed potential to put nuclear warheads into force by demonstrating significant levels of explosive yield compared to the previous tests.

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<sup>1</sup> See Appendix A. Nuclear State Law "On Further Strengthening the Status of a Self-Defensive Nuclear State."

<sup>2</sup> *Yonhap News*, "DPRK, Integrated and Automated Ballistic Missile Forces... Carrying out promptly KIM Jong-Un's Order", October 12, 2014.

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Immediately after the third test, the Supreme People's Assembly legislated the "nuclear weapons state law" in April 2013 and declared the legitimacy of nuclear weapons development, the role of nuclear weapons, and so forth. This seems to have been done in preparation to deal with the various political, diplomatic, military, and social issues that follow field deployment.

Article 4 of the "nuclear weapons state law" mentions that when deterrence fails and nuclear weapons are to be used, "it can only be used by the final command of the Highest Commander." Hence, the law is the first official document and legal foundation to stipulate the command and control system for DPRK's nuclear forces.

However, no document seems to articulate the specific chain of command or communications system in regard to nuclear forces, or the delegation of command and control authority in case of emergency. Additional measures should have taken place after 2013; however none have been reported. The Strategic Forces Command created in 2014 seems to have benchmarked the military organization of major nuclear states with Kim Jong-Un's nuclear force operation in mind. No official document that endows such authority to the Strategic Forces Command has been found. Yet, comments by the spokesperson for the Strategic Forces Command and North Korean media reports allude to this.

On March 7, 2017, the DPRK's central news agency reported that the ballistic launch exercises held on March 6<sup>th</sup> were aimed to evaluate the warhead employment procedures of the Strategic Forces Command's Hwaseong Artillery and ability to conduct speedy operations. This implied that the mandate of the Strategic Forces included operating nuclear warheads, and that procedures to evaluate exercises and ability to conduct speedy operations were in place. In August 2017, the spokesperson for DPRK's Strategic Command mentioned that an attack against Guam using Hwasung-12(IRBM) will be undertaken at a random time and instantaneously by the order of Kim Jong-Un. This showed that the Strategic Forces Command were to follow Kim's orders.

### **Technical system of NC3, including legacy, and dual-use (shared with non-nuclear)**

It is unclear whether North Korea has built a NC3 system that technically supports Kim Jong-Un's absolute control authority over the nuclear forces. However, there is reason to think that such system has been completed or at least is under construction. The fact that the 2013 "nuclear weapons state law" endows final admission authority to Jong-Un and that he issued directions to relevant institutions to enact follow-up actions offers some evidence. Besides, even if such system is in place, North Korea will not reveal it for fear of being attacked.

The North Korea military is known to have tried to build a C3 system that can technically support the command and control of the Highest Commander since the Kim Jong-II era. Nevertheless, according to the statements of defectors who were once DPRK people's army

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officers, the use of an automated C3 system based on computer is yet limited. It seems that DPRK Joint Chiefs of Staff and Corps-level commands use a computer-based C3 system, but lower echelons do not have such a system. Main means for the command and control of the DPRK's military consist of telephony, radio, and couriers, and the most common is telephony. For telephony, cable and fiber optic cable are available but cable is more widely used. Underground fiber optic cable is known to be used for connectivity between the forward deployed echelons and the Joint Chiefs of Staff. Based on the defectors' statement that they had never exercised with an automated C3 system during their military service, the use of an automated C3 system seems to be still limited.

Underground fiber optic cable is likely used for the connectivity from the Highest Command to missile and warhead storage bases and from bases to dispatch sites for transporter erector launchers (TELs). If North Korea military has already been using it for its conventional C3 system, then sharing it with its NC3 system would be natural. If not, North Korea is expected to adopt it for its NC3 system installation. Of course, other means like radio or courier could be employed as a backup for contingency.

If there is no prior delegation of fire authority, some delivery options such as surface and submarine vessels could be unlikely used for warhead delivery systems due to the restriction of communication. If one assumes that the Highest Commander specifies a target and an attack time in advance, those options could be considered for nuclear employment although it would be a great challenge to cancel the mission order. This kind of C2 restriction could often be utilized by an irrational leader for brinkmanship and thus for rendering his opponent difficult to properly counter.

Several missile units of DPRK's Strategic Forces have been likely designated for warhead delivery mission and communication lines connecting the Highest Command with those units that have been likely installed with fiber optic cable. The final admission of the Highest Commander could be transmitted through the lines along with a cord to activate a warhead. Given the different chain of command between the nuclear forces and conventional forces, it is likely that a new, independent NC3 system has been built. Particularly, to prevent unauthorized use of nuclear forces and only approve use by the final command of the Highest Commander, a separate NC3 system seems desirable. In addition, considering potential cyber and electronic attacks by South Korea and the US, a modernized NC3 system that guarantees survival is likely to have been built.

### **Positive and negative controls, whether organizational or technical**

NC3 system may include the approval of nuclear weapon use, the spread and delivery of order, authority related to the implementation of order and the employment of nuclear weapon, organization, communication networks, and alert system. Among those, a key component is who

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exercises authority for the final approval of nuclear weapon use.<sup>3</sup> Regarding the type of authority exercise, it could be categorized in two types and depends on the strategic priority of a country that possesses and employs nuclear weapons. Assertive type is when a country gives the authority to the highest political leader only. On the other hand, delegative type is when a country allows others to exercise the authority under a certain condition.<sup>4</sup>

Regarding the command and control of nuclear forces, DPRK's "nuclear weapons state law" shows that nuclear weapons can only be used by the final order from the Highest Commander of DPRK's forces. It could imply that DPRK does not allow any commander to order the use of nuclear weapons. "Nuclear weapons state law" does not show any article related to the delegation of authority for nuclear weapons employment. It seems that Kim Jong-Un gives a final order for the launch of a nuclear missile. He does not delegate others his authority. Such a command and control system implies that Kim Jong-Un does not fully trust his military commanders. Kim Jong-Un purges or replaces many high-level officials and military commanders during his power succession in order to strengthen his position since he inherited the power from his father, Kim Jong-Il. Most of officials and military commanders appointed by his father had been replaced by those appointed by Kim Jong-Un. Kim Jong-Un has been trying to rough ride military commanders and high-level officials through frequent and surprising purges and layoffs.

On the other hand, Ham (2009) had speculated that DPRK could have a possibility that adopts a delegative type for the command and control of its nuclear forces when it gets threatened by ROK-US first attack and it acquires sufficient warheads and delivery systems. It seems a reasonable option that could offset ROK-US conventional superiority and enhance the credibility of DPRK's nuclear deterrence strategy. He, however, had predicted that DPRK would not adopt such a delegative system in peacetime in order not to allow unapproved use of nuclear weapons. The establishment of an assertive nuclear command and control system by Kim Jong-Un could be desirable because it could reduce the likelihood of unauthorized or unintended use. Such an assertive system helps make the management of nuclear arsenal easier in peacetime and assures that nuclear weapons are employed only for the predetermined purpose. With such an assertive system, it is highly likely that warheads and delivery means are managed separately. Because, if both are under the control of a certain military commander, there is some risk that the commander could use a nuclear weapon by his own decision and the power of the commander could increase unnecessarily. Regarding this matter, Lee (2017) asserts that the Central Military Committee of DPRK Labor's party takes care of warheads in peacetime, and, when the Highest

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3 HAM Hyeong-Pil, "North Korea's thinking on nuclear strategy and its dilemmas," *The Quarterly Journal of Defense Policy Studies* Vol.25, No.2 (Summer 2009), 114.

4 Peter D. Feaver, "Command and Control in Emerging Nuclear Nations," *International Security*, Vol.17, No.3 (Winter 1992/3), 168-170.

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Commander(Kim Jong-Un) decides to use a nuclear weapon in wartime, it is transferred to the military.<sup>5</sup> In detail, a special institute under the direct control of the Central Military Committee stores and manages warheads, and when a decision to employ nuclear weapons is made, warheads could be transferred to a special unit such as a nuclear ordnance squadron, and then the special unit convoys and mounts warheads on the ballistic missiles of the Strategic Forces. Finally, by the order of the Highest Commander (Kim Jong-Un) the nuclear missile is launched. Lee's assertion seems reasonable when considering the characteristics of DPRK's regime that the authority of Labor's party is beyond that of the military.

Although the DPRK's system relies on direct command and control over its nuclear forces by the Highest Commander and the separative management system of nuclear warheads contributes to enhancing the stability of warhead management and reducing the risk of unintended use of nuclear weapons, it also has challenges.

First, it is difficult to make a timely decision when the Highest Commander is suddenly dead or some technical problem occurs in the communication networks connecting the Highest Commander to a missile unit. Furthermore, DPRK's military leaderships could be high on the targeting list of ROK-US combined forces in wartime. Also, the powerful capability of ROK-US ally's electronic warfare could pose a major challenge to the communication between the Highest commander and the Strategic Forces. Under such circumstances, it might be a challenge to assure the authority of the Highest Commander for nuclear employment.

Another issue of the separative warhead management system is that a rapid nuclear response is uneasy in a wartime that requires a fast and well-organized nuclear employment. While a nuclear ordnance squadron is transferring warheads to a missile unit, various unfavorable situations could happen such as accidents, ambush, and seizure.

Lastly, in the case that a functional problem is discovered on a warhead, it could be difficult to identify who is responsible. Institutes/units involved in managing, monitoring, delivering, mounting, and launching could blame each other for the problem.

DPRK could likely prepare a contingency plan describing who has the authority of the command and control over its nuclear forces and how to exercise it when Kim Jong-Un cannot exercise his authority.

Regarding convincing candidates who would succeed Kim Jong-Un, Lee (2017) pointed out Kim Seol-Song, elder sister of Kim Jong-Un, and Kim Yeo-Jung, younger sister of Kim Jong-Un. Kim Jong-Un does not trust anybody but his family. In that sense, two sisters who have been

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<sup>5</sup> LEE, Yun-Gul, "The Status of DPRK's Nuclear/Missile Development and C2 System in KIM Jong-Un's Era," Sejong Policy Briefing No.2017-04(March 6, 2017).

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deeply involved in DPRK's internal politics since Kim Jong-Il died are considered as trustful members of Kim's family. Kim Jong-Un could select one of two sisters as his successor.

### Organizational structure

Kim Jong-Un, the highest DPRK's leader, is commanding and controlling DPRK's forces with several titles, including the chairman of National Affairs Committee, the Highest Commander of DPRK's Forces, and the chairman of Labor Party's Central Military Committee.

Figure 1 shows that the organizational chart of DPRK's forces.<sup>6</sup> The Highest Commander directly controls 'Political Bureau\_(PB)', 'Joint Chiefs of Staff\_(JCS)', 'Ministry of

People's Forces\_(MOP)'. The JCS is in charge of planning and implementing a war by the order of the highest commander. Ground forces, navy, and air forces operate according to the command of the chairman of JCS. Corps and divisions of ground forces and operational commands of navy and air forces carry out their mission based on the OPLAN of JCS.

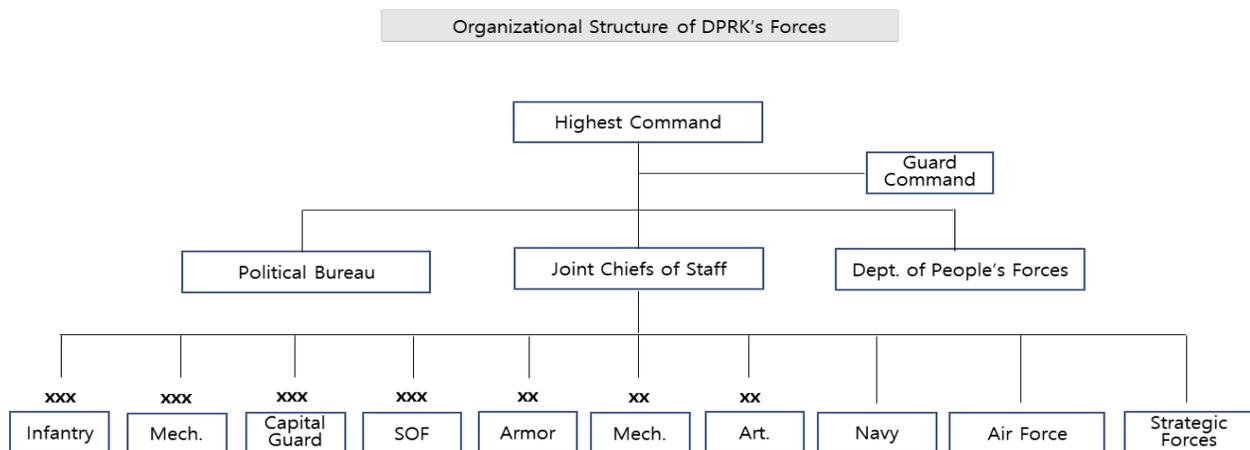


Figure 1. Organizational Structure of DPRK's Forces

'Political Bureau' is responsible for the Labor party's organizational and ideological tasks in the DPRK's forces. Ministry of People's Forces represents DPRK's forces externally and in charge of international military affairs, logistics, and finance.

Strategic Forces Command has been known as operating nuclear weapons and ballistic missiles. It has been established in 2014 based on the Strategic Rocket Command that had been in charge of the employment of ballistic missiles. The Strategic Rocket Command before 2014 was known to have a SRBM brigade with scud missiles, a MRBM brigade with Nodong missiles, and an IRBM brigade with Musudan missiles, but it has been reorganized and expanded as the Strategic

<sup>6</sup> Ministry of National Defense, *2016 Defense White Paper* (Seoul: Ministry of National Defense, 2016), 23.

Forces Command was created in 2014. It is presumed that all units related to the employment of nuclear forces have been integrated into the Strategic Forces Command.

The subunits of Strategic Forces carry out their mission by the chain of command, the Highest Commander—the chairman of JCS—the commander of Strategic Forces, when they employ conventional and chem-bio warheads. On the other hand, when employing nuclear warheads, they probably follow the direct command and control of the Highest Commander, Kim Jong-Un. Figure 2 shows a probable organizational chart that shows warheads management in peacetime and warhead transfer and chain of nuclear command in wartime. Blue arrows show a probable warhead transfer flow when a decision on nuclear employment is made and dotted rectangles mean author’s expectation with insufficient information.

Assembled warheads are stored, monitored, and managed under the control of the Central Military Committee of Labor’s party in peacetime. When the Highest Commander gives an order to employ unclear weapons, a special unit like “nuclear ordnance squadron” receives warheads from the institute under the control of the Central Military Committee and convoys warheads to missile units and mounts them on the missiles with warhead delivery mission.

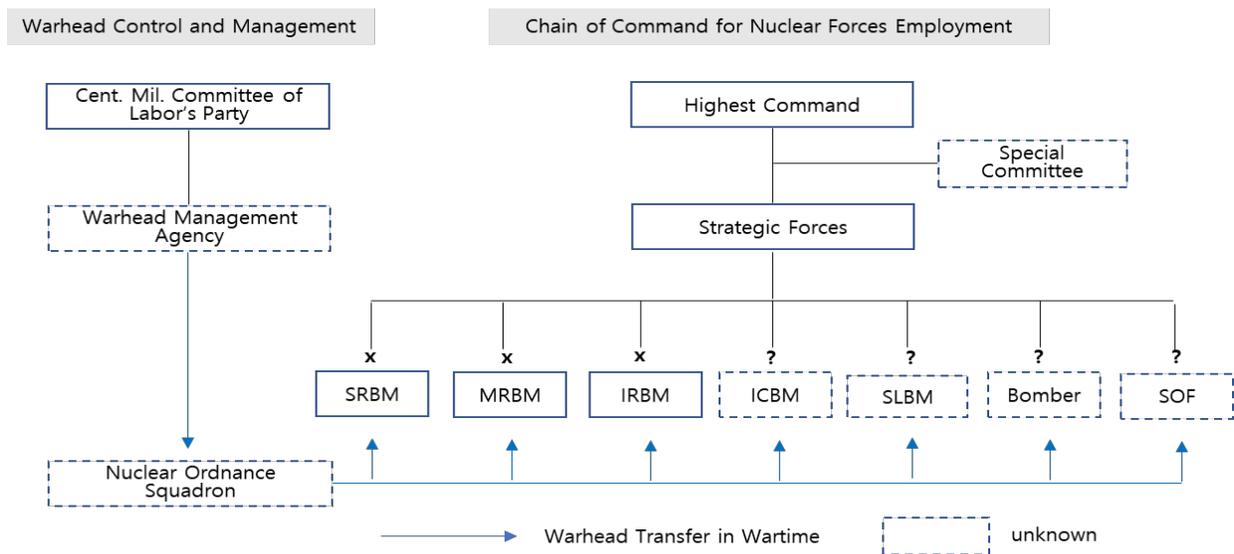


Figure 2. Warhead Control and Management System and Chain of Command for Nuclear Forces Employment (DPRK)

When the preparation of a nuclear missile is completed, the Highest Commander would issue a final order to launch it based on the recommendation from a special committee, and then the final order would be delivered to the missile unit of Strategic Forces. Regarding the special committee to the highest commander, Lee (2017) presumes that the committee consists of Kim

Jong-Un's two sisters and several high-level officials and suggests that Kim Jong-Un will receive their recommendations on the employment of nuclear weapons.

Since Kim Jong-Un is the highest political leader, to control the management of warheads in peacetime as well as the highest military commander to issue a final order of nuclear missile employment in wartime, he can exercise an exclusive control over DPRK's nuclear forces whether in peacetime or wartime.

### **Cultural imperatives**

DPRK's regime has been maintaining the dictatorship of the Labor party since 1948 and the Labor party has been keeping the sole leadership system represented by Kim's family, so called 'Baekdu-blood' family. The highest leader exercises all powers. There has not been any history of the division of powers. This is a long strategy that Kim's family has kept in order to maintain their autocracy power. Systems of surveillance blockade any kind of opposition from the party, cabinet, and military against the highest political leader. Frequent and sudden replacement of high-level officials is a governing tactic to block opponents from forming factions and make them show their loyalty to the highest leader only. Most of military training and maneuvering can be performed only by the approval of the Highest Commander. Under such system, it seems quite natural that the Highest Commander exclusively owns the command and control over nuclear forces, which has huge destructive power. Considering the characteristics of DPRK's regime, it also looks very reasonable that a separative management system is adopted for its nuclear forces in peacetime. Since DPRK endows absolute power to Kim Jong-Un and he does not trust, it is too risky for Kim Jong-Un to put both warheads and missiles under the control of the military or the party.

### **Formal NC3 definition used in legislation, regulation, by the military or high command, and formal specification of NC3 mission and goals**

There is no known law or regulation defining the NC3 system of DPRK's nuclear forces. No known official document explains the mission and objectives of DPRK's NC3 system.

### **Legal framework that defines the country's NC3 system; any legislation pertaining to NC3**

The primary framework is the DPRK's state law adopted in 2012, the text of which follows below. Nuclear Weapons State Law — "The Reinforcement of Self-Defense, Nuclear Weapons Status"

(Art.1) DPRK's nuclear weapons are justifiable defensive measures to inevitably counter hostile policies and nuclear threats which have been constantly raised by the United States.

(Art.2) Until the global denuclearization is accomplished, DPRK's nuclear forces shall deter and defeat attacks and invasions across the country and retaliate against a stronghold of invasions.

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(Art.3) Preparing against the danger of attacks and invasions by the hostile forces, DPRK shall take measures to qualitatively reinforce the nuclear deterrent and nuclear retaliatory capability.

(Art.4) In case that the hostile nuclear weapon states attack or invade the republic, DPRK's nuclear weapons shall be used only by the final order of the Highest Commander of DPRK's Forces in order to repel and retaliate against the attack.

(Art.5) DPRK shall not use nuclear weapons against and threaten non-nuclear-weapon states as long as they do not engage in the attack that opposes DPRK.

(Art.6) DPRK shall strictly achieve compliance with safe management of nuclear weapons and guarantee stability of nuclear tests.

(Art.7) DPRK shall establish orders to assure that nuclear weapons, technology, and materials will not be leaked or stolen illegally.

(Art.8) As the hostile relations with nuclear weapons states are resolved, the republic shall participate in international efforts for nuclear non-proliferation and to manage nuclear materials safely.

(Art.9) DPRK shall mitigate risks of a nuclear war, fight for the world without nuclear weapons, oppose nuclear arms race, and support international efforts on nuclear disarmament.

(Art.10) Appropriate authorities shall prepare practical measures to enforce these articles.

### **How the country's system interacts with other national and multilateral NC3 systems**

Whether DPRK has interactions with any other country related to its nuclear forces including NC3 system is not known, but the probability would be very low. Neither China nor Russia which are considered as DPRK's friendly neighbors acknowledges that DPRK's nuclear weapons are subject to the UNSC resolutions and thus should be removed eventually.

### **III. ENDNOTES**

### **IV. TECHNOLOGY FOR GLOBAL SECURITY INVITES YOUR RESPONSE**

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