

Part I

Threat of North Korea's Nuclear and Cyber Attack

Chapter 1

North Korea's Nuclear and Missile Programs: Marching Forward?

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International headlines this spring leading up to and after the North Korean Party Congress have been filled with reports of Pyongyang's nuclear weapons and missile activities, prompting some experts to ominously but wrongly assert that the young dictator, Kim Jong Un, is now engaged in a nuclear sprint. In fact, all of these activities are the predictable result of years of work. Moreover, North Korea has its own political reasons for advertising these developments, ranging from trumpeting its accomplishments in the run-up to the Party Congress to attempting to reinforce deterrence during a period of transition from a small fragile nuclear force to one that is more robust and survivable. In any case, this effort has proven to be an information bonanza for outside analysts, providing greater insight into the status of North Korea's WMD programs.

More recent developments—Pyongyang's July 6th government statement laying out a new policy that seems open to denuclearization—raise the question once again whether the North is considering the age old question facing all nuclear weapons states, namely “how much is enough.” Some have addressed that issue while others have not. Which path the North will take still remains an open question.

The Status of North Korea's Programs: An Update

Certainly the sheer number of WMD related events during the first half of 2016 gave the impression that North Korea was accelerating the pace of its efforts.

From North Korea's fourth nuclear test in early January 2016 until mid-July, Pyongyang conducted 12 WMD development related activities—ranging from its fourth nuclear detonation, an SLV launch and full-scale missile delivery system tests to tests of new rocket engine motors—that were publicized by its media. However, none of these developments are surprising or shocking. Nor did they for the most part, represent an acceleration of its programs.

Throughout 2015, the US-Korea Institute at Johns Hopkins School of Advanced International Affairs (SAIS) conducted an extensive study “the North Korea Nuclear Future's Project,” that examined publicly available evidence on Pyongyang's programs and looked five years into the future. This study laid out in detail Pyongyang's effort

beginning at least since 2008 and building on previous year's research and development, to put in place the technological foundation for the quantitative and qualitative expansion of both its nuclear and missile forces. The breath of these activities is quite striking and includes: 1) on the nuclear front, tests to prove and develop designs including boosted yield weapons, an expansion of the fissile material infrastructure, and the construction of a new experimental light water reactor, and; 2) on the missile front, modernization of the development, testing and production infrastructure (particularly the Sohae Rocket Launch Center), the further development of delivery systems of intercontinental and regional ranges (such as a road mobile ICBM and submarine-launched ballistic missile) and work on new technologies such as solid-rocket fueled engines.¹

Moreover, an examination of this effort also helped predict the future direction of North Korea's WMD programs as well as many of the developments that took place the first half of this year as these programs moved closer to becoming operational. Manifestations of North Korea's foundation building—for example, its dabbling with building an H-bomb (first presaged in statements made by Pyongyang in 2010), its development of a sea-launched ballistic missile, the upgrading of its solid-rocket and liquid engine technology and the ground testing of a reentry vehicle—can all be traced to efforts during the foundation building period. In addition, they all represent normal technological improvements pursued by any country seeking to build a nuclear arsenal.

Overall, our project's projections for the future of North Korea's nuclear and missile forces to 2020 seem to be on track with a few possible modifications. While our projection for the overall size of North Korea's nuclear weapons inventory, 20-100 bombs, still appears to be on track it now appears that Pyongyang is likely to exceed the low range projection of the size of its nuclear stockpile.² That projection assumed the worst-case scenario for the North in terms of producing fissile material. However, recent developments—for example the North's current plutonium reprocessing campaign—indicate that the program is moving ahead at a pace that will probably allow it to exceed this worst case scenario by 2020. Indeed, a recent study by David Albright, who worked on our project's projections, reaffirmed that these projections are on track.³

Despite the comments of some experts, the pace of activity is also, for the most

¹ Joel S. Wit and Sun Young Ahn, "North Korea's Nuclear Futures: Technology and Strategy," US-Korea Institute at SAIS: Johns Hopkins University, February 2015 (see Executive Summary).

² *Ibid.*

³ David Albright and Serena Kelleher-Vergantini, "Plutonium, Tritium, and Highly Enriched Uranium Production at the Yongbyon Nuclear Site," June 14, 2016, http://isis-online.org/uploads/isis-reports/documents/Pu_HEU_and_tritium_production_at_Yongbyon_June_14_2016_FINAL.pdf

part, consistent with the normal development of these weapons. The view expressed in a recent *New York Times* article that beginning in 2014 there was a “sudden change” in North Korea’s pursuit of WMD systems, particularly its missile delivery systems, is true but that change did not reflect a new emphasis on the nuclear deterrent.⁴ Rather, for the most part, the increased number of systems tested was the result of years of research and development reaching the testing stage. For example, testing of the North’s sea-launched ballistic missile, which began in 2015 and has continued into this year, reflected research and development that probably began in the early 2000s and is consistent with an effort that may field results in the next few years with an operational missile. Moreover, the consistent pace indicates that this system is a priority for the Kim Jong Un regime, for whatever reason whether the leader’s apparent fascination with submarines, the need for a more survivable retaliatory capability or the requirement to counter impending deployments of ballistic missile defense in South Korea.

This program stands in sharp contrast to the development of the Musudan intermediate-range missile that has been reportedly fielded for a few years but only recently has been tested more than once with limited results. It is unclear why Pyongyang started repeatedly testing this missile over the past few months—whether to make a political statement or to improve confidence in its technical capabilities. This could call into question Pyongyang’s intention to field growing numbers of the Musudan over the next five years.⁵

As for stepped up testing of SCUD and Nodong missiles, that may reflect a number of factors. One may be Kim Jong Un’s greater emphasis on more capable, operationally ready military capabilities including a greater level of proficiency among senior officers. In that context, in wartime, North Korea will attack critical targets, such as mobilization and airbases with an initial volley of ballistic missiles. Tests over the past few years may be intended to exercise those capabilities as well as provide practical experience to the launch crews and the fire control and command staffs. In that context, stepped up and volley testing of these systems may also be related to the growing deployments of missile defenses on the peninsula.

⁴ Max Fisher, “Maybe North Korea’s Nuclear Goals Are More Serious Than Once Thought,” *The New York Times*, July 13, 2016, http://www.nytimes.com/2016/07/14/world/asia/maybe-north-koreas-nuclear-goals-arent-a-farce-after-all.html?_r=0

⁵ John Schilling, “A Partial Success for the Musudan,” *38North*, US-Korea Institute at SAIS, Johns Hopkins University, June 23, 2016, <http://38north.org/2016/06/jschilling062316/>; also see John Schilling, “A Partial Success for the Musudan: Addendum,” *38North*, US-Korea Institute at SAIS, Johns Hopkins University, June 28, 2016, <http://38north.org/2016/06/jschilling062816/>

Pyongyang's WMD Pace: Truth in Advertising?

As a number of these WMD technologies emerge from the research and development phase into testing leading to deployment, these activities are naturally more visible to outside observers. (That is certainly the case in the development of nuclear weapons.) Moreover, in some cases, preparations must be made in the development infrastructure that can provide valuable clues as to future intentions. A prime example has been North Korea's months-long construction program beginning in late 2014 to early 2016 to upgrade facilities at the Sohae Rocket Launch Center to handle a larger space launch vehicle. Moreover, Pyongyang has also upgraded its static rocket motor test facility at Sohae as well. While we have yet to see such an SLV except in artist's depictions in Pyongyang museums and know that the North has ambitions to launch new generations of satellites into higher earth orbits, the amount of time and investment in the upgrade almost certainly means the North is moving towards fielding a new larger SLV.⁶

It is also possible to at least surmise from construction activities at the Sinpo naval facility that the North is preparing for the eventual production of new larger submarines, probably to carry the ballistic missile currently under development. Pyongyang has been refurbishing and expanding construction halls at the Sinpo facility since.⁷ When this work is completed, the North will be able to build new submarines that are much larger than the current boat used for test launches. While the finished construction halls could also be used to build other types of submarines, its location near facilities involved in the development of the sea-launched missiles as well as the main docking area for the boat used to test these missiles is an important indicator of their future role.

However, advances in its WMD programs made over the past 7 years also provide the North Korean leadership with the opportunity to showcase its efforts through extensive media coverage with Kim Jong Un front and center at many of these events. That has certainly proven true for SLV launches and tests of the North's sea-launched missile. But he has also been featured prominently at other events that had previously not been spotlighted. These include:

⁶ For example, see Jack Liu, "Sohaе Satellite Launch Facility: Three Year Upgrade Program Likely Near Completion," *38North*, US-Korea Institute at SAIS, Johns Hopkins University, December 9, 2015, <http://38north.org/2015/12/sohae120915/>; also see "Pyongyang's Space Launch in Pictures," *38North*, US-Korea Institute at SAIS, Johns Hopkins University, February 8, 2016, <http://38north.org/2016/02/sohae020816/>

⁷ Joseph S. Bermudez, Jr., "North Korea's Submarine-Launched Ballistic Missile: Continued Progress at the Sinpo South Shipyards," *38North*, US-Korea Institute at SAIS, Johns Hopkins University, May 3, 2016, <http://38north.org/2016/05/sinpo050316/>

- The test of a large solid rocket motor in March 2016 that could in the near-term be used to improve the performance of the Nodong medium-range ballistic missile (MRBM) but in the long-term could serve as a stepping stone to the development of a solid-fuel intercontinental ballistic missile (ICBM). There had been previous signs that the North was working on solid-fuel technology for a number of years but that effort had never been publicized.
- Development of rocket reentry technology for an ICBM also reported in March with Kim supervising a simulation test to verify the thermodynamic structural stability. Once again, the development of reentry vehicle technology should not come as a surprise to outside observers and it is almost certain the North had been working on it for some time now. But the program had never been spotlighted before.
- Testing of the road-mobile Musudan intermediate-range ballistic missile (IRBM) with Kim posing in front of the delivery system with the reentry vehicle removed and talking to various North Korean officials.

Why has Pyongyang been mounting this advertising campaign? First, with the first Party Congress since 1980 scheduled this spring, the campaign was obviously keyed to that event, showcasing North Korea's technological prowess, and perhaps more importantly, the decisive leadership of Kim Jong Un. Second, this advertising can also be seen as a direct response to the large-scale joint US-South Korean military exercises just held across the border, designed to send a clear message to the North in the wake of all its WMD activities as well as to reassure our jittery ally South Korea. The North Koreans almost certainly felt the need to send their own message back, don't mess with us because we have nuclear weapons. Such a motivation may also come into play as the U.S. and South Korea hold another set of joint exercises late this summer.

However, beyond these obvious reasons, there may be another hidden motivation why the North has stepped up its advertising, namely the weakness of its capabilities. Despite the public boasting, North Korea's nuclear deterrent at this moment is still fragile, and perhaps vulnerable to a preemptive attack in time of crisis or war. Pyongyang's stockpile of weapons is small. Its operational delivery systems are large in number but almost entirely dependent on land-based regional range liquid fuel systems—the SCUD and Nodong. The only other missile in the field that could possibly deliver a nuclear weapon is the Musudan but it remains of limited utility. Moreover, the imminent deployment of THAAD ballistic missile defense may further undermine the perception of its WMD

capabilities as a serious threat. In contrast, by 2020, Pyongyang might not only add a large number of nuclear weapons to its inventory but also new delivery systems such as the submarine-based missile and even begin to field a road-mobile ICBM. In short, the North will by 2020 have a real capability to launch nuclear retaliation even if it is attacked first.

Given this state of affairs, logic—as well as the North's normal act as a regional tough guy—dictates that during this transitional period Pyongyang should not only display as much as feasible its current capabilities but also boast of ones it does not yet have in order to make its enemies think twice. Indeed, the North Koreans have practiced such an approach in the past, openly displaying plutonium metal and a new uranium enrichment facility at Yongbyon when it suited their deterrence purposes.

An Analytical Bonanza

Pyongyang's advertising has also proven to be an analytical bonanza, providing greater insight into the status of its nuclear and missile programs. Extensive film footage and still photos showcasing of otherwise secret activities has given outsiders a greater analytical window into Pyongyang's WMD programs. Examples include:

- Pictures of North Korea's submarine-launched ballistic missile test in late April showed a distinct change from previous launches indicating that Pyongyang had switched from a liquid fuel rocket motor to one using solid-fuel. In a previous test in March 2015 the exhaust plume emerging from the nozzle was narrow and translucent developing into a yellow-orange streak of fire and dissipating 20 meters downstream. That picture showed a classic liquid-fuel rocket plume, probably from kerosene. In contrast the pictures from the April test showed a white plume expanded significantly and leaving a trail of light grey smoke, clearly a solid fuel rocket motor exhaust plume. Overall, switching to a solid fuel engine makes technical sense in part because liquid rocket propellants are corrosive and toxic—a bad combination on a submarine—although it may result in a decrease in missile range since liquid propellant engines are lighter and more efficient. The bottom line: the switch represents a significant technological step forward for the North Koreans.⁸

⁸ John Schilling, "A New Submarine-Launched Ballistic Missile for North Korea," *38North*, US-Korea Institute at SAIS, Johns Hopkins University, April 25, 2016, <http://38north.org/2016/04/jschilling042516/>

- Detailed pictures of the successful test of a large solid rocket motor that show, according to one analysis, “a rocket plume with the intensity and color indicating the use of powdered aluminum in the propellant blend, a very powerful but hot-burning additive used in the best performing Western solid-fuel motors.” The test appears to have run about one minute of an engine that could produce 15-20 tons of thrust. Its size and capabilities indicate a possible role for the motor as a more powerful upper stage for the Nodong IRBM and certainly as a stepping-stone for a solid-fuel ICBM.⁹
- An examination of North Korea's recent test of a large liquid rocket motor revealed that North Korea was using a pair of propulsion units from the old Soviet SS-N-6 submarine launched ballistic missile, confirming that the North possessed this technology. The engine uses high-energy propellants that would give the missiles greater range than the North's traditional mix of kerosene and nitric acid. The bottom line is that a North Korean ICBM would have greater range than expected, enabling it to reach the U.S. east coast including New York and Washington D.C. It is possible that if the ground test program continues and is successful flight tests of an ICBM could begin in as little as a year.¹⁰
- An image of Kim Jong Un posing in front of a Musudan missile with the reentry vehicle removed revealed the missile's guidance package and allowing a clear view of specific components and assemblies. The North Koreans have replaced the 40 year-old Russian guidance package (since the Musudan is essentially based on the old Soviet SS-N-6 sea-launched ballistic missile) with a more modern guidance package and have moved the less bulky design from the top of the propellant tank into a more narrow space atop the tank dome. The implications for missile performance remain unclear since it is still unknown how well the package will perform.¹¹

It is hard to believe but until recently, there has been a school of thought among private experts that North Korea's nuclear and missile programs are an elaborate ruse, a Potemkin village built for the benefit of the international community. At the opposite

⁹ John Schilling, “A Solid but Incremental Improvement in North Korea's Missiles,” *38North*, US-Korea Institute at SAIS, Johns Hopkins University, <http://38north.org/2016/03/jschilling032916/>

¹⁰ John Schilling, “North Korea's Large Rocket Engine Test: A Significant Step Forward for Pyongyang's ICBM Program,” *38North*, US-Korea Institute at SAIS, Johns Hopkins University, April 11, 2016, <http://38north.org/2016/04/schilling041116/>

¹¹ Schilling, “A Partial Success for the Musudan: Addendum.”

extreme are those who claim that the recent developments mean North Korea's WMD programs are accelerating and who now sound the alarm. The reality is that this has been a slowly but inexorably growing threat for some time now and it will continue to grow, posing an increasing danger to the United States, our allies in Northeast Asia and the international community.

How Much Is Enough: The China vs. Pakistan Model

A key question concerning the future of North Korea's nuclear and missile programs is one that every emerging nuclear power has faced in the nuclear age, namely "how much is enough." That was certainly the case with the United States during the early years of the Cold War when initial plans for a nuclear arsenal—that called for building tens of thousands of nuclear weapons to be deployed on delivery systems ranging from ballistic missiles to Army jeeps—were driven more by bureaucratic and other factors than a logical examination of national security requirements. Only beginning with the Kennedy administration was a serious attempt begun to look at the nuclear force posture and the requirements for deterring the Soviet Union based on the prevailing US nuclear doctrine.

This has probably also been the case for other nuclear powers. For example, for decades China has followed a nuclear doctrine of limited or minimal deterrence and a small nuclear force that can execute assured retaliation. While that force has modernized over the years in order to continue to maintain this capability, China's overall approach to force building has been governed by this requirement. In short, Beijing has asked and answered the question "how much is enough."¹²

Up until recently, there has been no evidence to suggest that Pyongyang has grappled with this question. Perhaps that has been because the North's effort to build a nuclear deterrent has only recently accelerated after years of putting into place the infrastructure and capabilities to produce weapons and delivery systems. Moreover, at the same time the North appears to have been considering the exact role of these weapons in its national security strategy, refining a nuclear doctrine that fits its unique geopolitical position, surrounded by more powerful hostile countries allied with the world's only superpower, as well as a China that Pyongyang may regard as ultimately less than friendly. Finally, while Pyongyang seems intent on moving forward despite the costs of its nuclear arsenal, economic considerations may at some point come into

¹² Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict* (New Jersey: Princeton University Press), 121-152.

play in decisions about the future of North Korea's deterrent. It is worth noting that Pyongyang's byungjin policy means not that it will move down the tracks of economic and nuclear development forever but that a secure nuclear arsenal will eventually allow Pyongyang to focus increasingly on its economy.

Based on reading the available tealeaves North Korea appears to be facing a basic choice. Put simply, should Pyongyang adopt the Chinese or Pakistani model of nuclear deterrence? On the one hand, the Chinese model of limited deterrence, insuring an assured retaliation capability based on a survivable but fairly small nuclear deterrent, could serve to limit force building programs (just as it has done in China) and would directly address the how much is enough question. On the other hand, North Korea may adopt the Pakistani alternative, the threat of early or even first use against a conventionally superior opponent—in its case India—that may either be massive or gradual (akin to NATO's old doctrine). As a result, Pakistan continues to pursue force-building programs across the entire spectrum of capabilities, including tactical nuclear weapons and delivery systems. Moreover, this approach also requires command and control procedures that delegate authority and allow for the rapid use of nuclear weapons.¹³

Whether that choice will be made is unclear. North Korea's nuclear strategy is a work in progress and difficult to predict. All of the developments over the past 5-10 years—from its force building programs to doctrinal pronouncements—indicate that the North is striving for a policy based on assured retaliation. That approach was reflected in the policy adopted by the Supreme People's Assembly (SPA) in 2013 stating that “[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.”¹⁴

However, there have also been signs that Pyongyang might consider a strategy that goes beyond assured retaliation that includes options for limited initial use of nuclear weapons in order to bolster the credibility of deterrence. The SPA “Law on Consolidating Position of Nuclear Weapons State” expands the role of nuclear weapons beyond deterring high-level attacks to also deter and repel lower levels of aggression using nuclear weapons. It states that “The DPRK shall take practical steps to bolster up nuclear deterrence and nuclear retaliatory strike power both in quality and quantity to cope with the gravity of the escalating danger of hostile forces' aggression and attack.”¹⁵ And at the recent Party

¹³ Narang, 55-93.

¹⁴ Wit and Ahn, 7-14.

¹⁵ *Ibid.*

Congress held in Pyongyang, Kim Jong Un stated that North Korean sovereignty would have to be threatened by “invasive hostile forces with nuclear weapons.” Just what that means is unclear but it could be very similar to Russia’s “escalate to deescalate” concept that allows limited first nuclear strikes against an opponent that has overwhelmed its conventional capabilities.¹⁶

An additional, new factor that may affect North Korea’s calculations concerning how much is enough is the introduction of the THAAD system to the Korean peninsula. One possible response would be to step up the development of systems, such as SLBMs, intended to counteract THAAD as well as deployments of other new missiles. And THAAD may generate new pressures to add to the North’s expanding nuclear stockpile.

While it is of course too soon to tell, it is possible to speculate that Pyongyang’s recent July 6th government statement on denuclearization, which may have been issued for a number of reasons, could also be a signal that the North is starting to grapple with the issue of how much is enough. In that statement, Pyongyang shifts gears on its position by: 1) shifting its definition of denuclearization away from what appeared to be a requirement that other powers give up their weapons to a more narrow realistic definition (at times the North seemed to be hedging its bets), namely denuclearization of the Korean peninsula; 2) placing the definition on unassailable footing by calling this approach the “behest” of Kim Il Sung and Kim Jong Il as well as specifically linking Kim Jong Un to this approach; 3) while insisting the US go first in the sequence events making it clear that the North might be willing to take steps previously rejected whatever those might be; 4) laying out a series of five specific demands that are clearly reminiscent of the 1992 North-South Denuclearization Declaration, four of which the United States has agreed to in principle one time or another; and 5) dropping at least for now its demands for replacing the armistice with a peace treaty and a moratorium on joint exercises although those two items can be expected to reappear in any discussions.¹⁷

Pyongyang’s new proposal is clearly designed to open up running room to restart negotiations on the denuclearization issue for the North and the United States as well as other possible participants. But it may also reflect more basic strategic thinking about how much is enough. The North certainly understands that if negotiations were to

¹⁶ Garth McLennan, “Needle in a Haystack: How North Korea Could Fight a Nuclear War,” *38North*, US-Korea Institute at SAIS, Johns Hopkins University, June 13, 2016.

¹⁷ Robert Carlin, “North Korea Said it is Willing to Talk about Denuclearization... But No One Noticed,” *38North*, US-Korea Institute at SAIS, Johns Hopkins University, July 12, 2016, <http://38north.org/2016/07/rcarlin071216/>

resume, the US denuclearization approach would require an initial freeze followed by a rollback and eventual elimination. Moreover, it also realizes that part of the discussion would focus on potential delivery systems and once again it will face serious demands for limitations. In short, one central result of talks would be increasingly stringent limitations that would have a growing impact on the current nuclear and missile delivery system programs.

Conclusion

It is quite possible that we have reached an important moment in the development of North Korea's nuclear stockpile and missile force, a moment in which the North may well be considering limiting the growth of both. Whether the US and others will recognize this possible opportunity and seek to both clarify and take advantage of it by adopting a strategy for dealing with the North that serves our national interests remains unclear.

Appendix 1: North Korea's Missile and Rocket Motor Tests, 2013-2016

Date	Missile Type	Name
2013-02-10	SRBM (multiple)	KN-02 Toksa (Road-mobile)
2013-03-15	SRBM (2)	KN-02 Toksa (Road-mobile)
Late March–Early April	Suspected rocket engine test	
2013-05-18	SRBM (3)	
2013-05-20	SRBM (2)	KN-02 Toksa (Road-mobile)
2013-08-25–2013-08-30	Suspected long-range rocket engine test	2 nd stg of Unha-3 or 2 nd or 3 rd stg engine for larger rocket
December 2013–Early Jan 2014	Suspected long-range rocket engine test	1 st stg of KN-08 (Road-mobile)
2014-02-27	SRBM (2)	Scud
2014-03-03	SRBM (2)	Scud
2014-03-21	SRBM	
2014-03-26	MRBM (2)	Nodong
March 22–April 3, 2014	Suspected long-range rocket engine test	1 st stg of KN-08 (Road-mobile)
June 10–July 4, 2014	Suspected long-range rocket engine test	1 st stg of KN-08 (Road-mobile)
2014-06-26	SRBM	KN-02 Toksa (Road-mobile)
2014-06-29	SRBM (2)	Scud
2014-07-09	SRBM (2)	Scud

Date	Missile Type	Name
2014-07-13	SRBM (2)	Scud
2014-07-26	SRBM	Scud
Early August	Suspected long-range rocket engine test	1 st stg of KN-08 (Road-mobile)
2014-08-14	SRBM	KN-02 Toksa (Road-mobile)
2014-09-01	SRBM (1)	
2014-09-06	SRBM (3)	
2014-12-21	SLBM	KN-11
2015-01-23	SLBM	KN-11
2015-02-06	SRBM (4)	KN-01
2015-02-08	SRBM (1) Short-range ASM (4)	KN-02 (1), KN-09 (4)
2015-02-20	SRBM	KN-01
2015-03-02	SRBM (2)	Scud
2015-04-02	SRBM	KN-02 Toksa (Road-mobile)
2015-04-03	SRBM (4)	KN-02 Toksa (Road-mobile)
2015-04-07	SRBM (2)	KN
2015-04-22	SLBM	KN-11
2015-05-09	SLBM	KN-11
2015-06-14	Short-range ASM (3)	KN-01
Late July–Mid August 2015	Suspected SLV vertical engine test	
2015-09-01	Short-range ASM (KCNA footage)	KN-01
2015-11-28	SLBM	KN-11
2015-12-21	SLBM	KN-11
2016-02-07	SLV	Unha-4
2016-03-10	SRBM (2)	Scud
2016-03-15	ICBM	Display of KN-08 RV nosecone (Road-mobile)
2016-03-16	SLBM	KN-11
2016-03-18	MRBM	Nodong
2016-03-24	Solid-fuel engine test	–
2016-04-09	Large liquid-fuel engine test for ICBM	
2016-04-15	IRBM	Musudan (Road-mobile)
2016-04-23	SLBM	KN-11
2016-04-28	IRBM	Musudan (Road-mobile)
2016-05-31	IRBM	Musudan (Road-mobile)
2016-06-17	SLV	Unha-4 SLV
2016-06-22	IRBM (2)	Musudan (Road-mobile)
2016-07-09	SLBM	KN-11
2016-07-19	SRBM (2)/MRBM (1)	Scud (2)/Nodong (1)