DEFENSE INTELLIGENCE AGENCY



NORTH KOREA
MILITARY POWER

A GROWING REGIONAL *and* GLOBAL THREAT

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2021

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Cover image, Pukguksong-2 medium-range ballistic missile paraded in Pyongyang. Source: AFP

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PREFACE

In September 1981, Secretary of Defense Caspar Weinberger asked the Defense Intelligence Agency to produce an unclassified overview of the Soviet Union's military strength. The purpose was to provide America's leaders, the national security community, and the public a comprehensive and accurate view of the threat. The result: the first edition of *Soviet Military Power*. DIA produced over 250,000 copies, and it soon became an annual publication that was translated into eight languages and distributed around the world. In many cases, this report conveyed the scope and breadth of Soviet military strength to U.S. policymakers and the public for the first time. DIA also produced similar documents describing North Korean military strength in 1991 and 1995.

In 2017, DIA began to produce a series of unclassified Defense Intelligence overviews of major foreign military challenges facing the United States. This volume provides details on North Korea's defense and military goals, strategy, plans and intentions; the organization, structure, and capabilities of its military to supporting those goals; and the enabling infrastructure and industrial base. This product and other reports in the series are intended to inform our public, leaders and troops, the national security community, and partner nations about the challenges we face in the 21st century.

From North Korean Leader Kim Jong Un's Remarks at the 8th Workers' Party Congress, Released 9 January 2021

"Building the national nuclear force was a strategic and predominant goal. The status of our state as a nuclear weapons state…enabled it to bolster its powerful and reliable strategic deterrent for coping with any threat by providing a perfect nuclear shield. New, cutting edge weapons systems were [also] developed one after another … making our state's superiority in military technology irreversible and putting its war deterrent and capability of fighting war on the highest level."[1]

North Korea is one of the most militarized countries in the world and remains a critical security challenge for the United States, our Northeast Asian allies, and the international community. The Kim regime has seen itself as free to take destabilizing actions to advance its political goals, including attacks on South Korea, development of nuclear weapons and ballistic missiles, proliferation of weapons, and cyberattacks against civilian infrastructure worldwide. Compounding this challenge, the closed nature of the regime makes gathering facts about North Korea's military extremely difficult.

Just over twenty years ago, North Korea appeared to be on the brink of national collapse. Economic assistance from former patrons in the Soviet Union disappeared; society was confronted with the death in 1994 of regime founder Kim Il Sung—revered as a deity by his people—and a 3-year famine killed almost a million people. Many experts in academia and the Intelligence Community predicted that North Korea would never see the 21st century. Yet today, North Korea not only endures under a third-generation Kim family leader, it has become a growing menace to the United States and our allies in the region.

Kim Jong Un has pressed his nation down the path to develop nuclear weapons and combine them with ballistic missiles that can reach South Korea, Japan, and the United States. He has implemented a rapid, ambitious missile development and flight-testing program to refine these capabilities and improve their reliability. His vision of a North Korea that can directly hold the United States at risk, and thereby deter Washington and compel it into policy decisions beneficial to Pyongyang, is clear and is plainly articulated as a goal in authoritative North Korean rhetoric.

Equally dangerous, North Korea continues to maintain one of the world's largest conventional militaries that directly threatens South Korea. The North can launch a high-intensity, short-duration attack on the South with thousands of artillery and rocket systems. This option could cause thousands of casualties and massive disruption to a regional economic hub. Kim Jong Un's emphasis on improving military training and investment in new weapon systems highlights the overriding priority the regime puts on its military capabilities.

In 2018, at the historic first summit between Kim Jong Un and the President of the United States, North Korea pledged to work with the United States to accomplish what it described as "the denuclearization of the Korean Peninsula", and committed to other measures to reduce tensions and achieve "a lasting and stable peace regime." In the following years, North Korea tested multiple new missiles that threaten South Korea and U.S. forces stationed there, displayed a new potentially more capable ICBM and new weapons for its conventional force. Additionally, there continues to be activity at North Korea's nuclear sites. These actions indicate that North Korea will continue to be a challenge for the United States in the coming years. This report, is a baseline examination of North Korea and its core military capabilities, and is intended to help us better understand the current threat Pyongyang poses to the United States and its allies.



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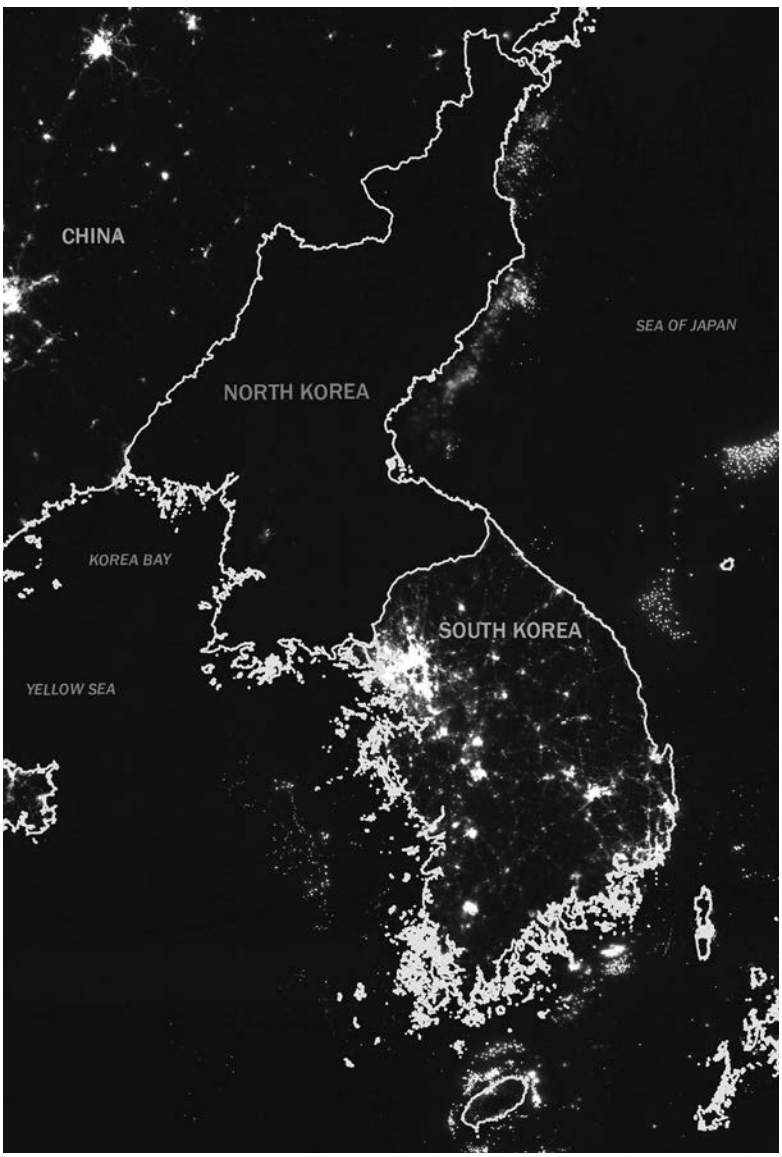
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Satellite view of the Korean Peninsula at night, 2020. Visible light emissions from North Korea continue to be extremely sparse, reflecting limited availability of electricity to most of the country outside the capital, Pyongyang, and the leadership's fundamental decision to invest a large portion of North Korea's resources into building military power.

Image Source: NASA



Image Source: AFP

Kim Il Sung, North Korea's first leader. Kim founded the Korean People's Army in 1948 with support and equipment from the Soviet Union.

Introduction/Historical Overview

The evolution of the Korean People's Army (KPA) from a regional military to an aspiring nuclear force with intercontinental strike capabilities is the result of decades of commitment to two consistent missions given to the military by the Kim family regime: preserve the North Korean state's independent existence against any external power, and provide the means for North Korea to dominate the Korean Peninsula. Over the course of its existence, the KPA has seen both the decline of some core strengths and the evolution of new capabilities, but it has retained these central roles. Although expanded in scope, the new capabilities North Korea's military is developing are consistent with its founding objectives. They are intended to hold the United States at bay while preserving the capacity to inflict sufficient damage on the South, such that both countries have no choice but to respect the North's sovereignty and treat it as an equal.[2]

North Korea's military poses two direct, overlapping challenges to the United States and its allies: a conventional force consisting mostly of artillery and infantry that can attack South Korea with little advance warning, and a ballis-

tic missile arsenal, intended to be armed with nuclear weapons, that is capable of reaching bases and cities in South Korea and Japan, and the U.S. homeland.[3] Although the conventional threat to the South has evolved slowly over several decades, the rapid pace of development and testing in the nuclear and missile programs between 2012 and 2017 has brought this second possibility closer to reality faster than most international observers had anticipated. These capabilities create growing risk of a military flashpoint in Northeast Asia that could quickly escalate off the Korean Peninsula, possibly across the Pacific Ocean to U.S. soil.

Origins and Combat History of the KPA, 1948–1953

The KPA was founded in 1948 as an infantry-centric force established to provide Kim Il Sung—the Soviet-backed North Korean leader who rose to power after the peninsula was divided in 1945—a means to defend his new regime, provide a platform to indoctrinate his people, and allow him to achieve dominance over the entire Korean Peninsula. Most of the KPA's original equipment, support infrastructure, and training was provided by the Soviet Union. Kim founded the KPA on a mix of Soviet strategic and Chinese tactical influences, deriving doctrine and military thought from Marxism-Leninism and interpreting it for a Korean audience.[4]

In 1950, Kim launched a general invasion of South Korea with the intention of reunifying the peninsula under Pyongyang's rule. The KPA drove South Korean and U.S. forces to the southern tip of the peninsula in a matter of weeks. Operating under a United Nations Command (UNC) established by Security Council Resolution 84, forces and support personnel from over a dozen countries reversed the KPA's advance and drove it back to the Yalu River, which divides North Korea from China. Chinese forces then intervened on North Korea's behalf, leading to an eventual stalemate at the 38th parallel—today's Demilitarized Zone (DMZ). The Korean War remains the only sustained conflict in which the KPA participated as a major belligerent. North Korea suffered an estimated 1.5 million soldiers and civilians killed in the war and endured devastating damage from aerial bombing and ground assault.[5] These losses deeply influenced North Korean strategic thinking and military and defense planning, resonating into the present day. Although hostilities were suspended with an Armistice Agreement in 1953, no peace treaty was signed, and the peninsula technically remains in a state of war.



U.S. aerial bombing over Wonsan Harbor during the Korean War. North Korea suffered massive industrial damage in combat with United Nations Command forces from 1950 to 1953.

Image Source: Shutterstock

The Post–Korean War KPA, 1953–1991

Rebuilding after the Korean War, North Korea had shifted its military strategy by the 1960s to a Maoist-style war of attrition, hoping to undermine the government in Seoul through covert infiltration, assassinations, and attempts to foster Communist insurgencies.[6,7] During this period, Kim embarked on a program to modernize the KPA and posture it to defend in depth against any foreign aggressor. In December 1962, Kim Il Sung espoused the Four Military Guidelines: arm the entire population, fortify the entire country, train the entire army as a "Cadre Force" (meaning all soldiers capable of establishing and training military units), and modernize weaponry, doctrine, and tactics under the principle of self-reliance in national defense.[8,9] Early North Korean interest in nuclear technology, which dates to the 1950s, reached a practical stage during this period; a Soviet-supplied research reactor went online in 1967, and a domestically-designed reactor began operating in 1986.

In the 1970s and 1980s, the North Korean regime accelerated and redirected KPA modernization initiatives toward reestablishing offensive conventional warfare capabilities. In an August 1976 Korean Workers' Party journal, an article entitled "Scientific Features of Modern War and Factors of Victory" kicked off a rare internal debate on military doctrine by stressing the importance of economic development and the impact of new weapons on military strategy. The author argued that the quality of arms and the level of military technology define the characteristics of war. The primacy of conventional warfare again became doctrine. This article laid down several concepts that continued to influence North Korean operational doctrine through the 1990s and into the 21st century; particularly influential was an emphasis on operational and tactical mobility, deep-strike capabilities, and use of the subterranean domain throughout the depth of the battlefield.[10] Although these tenets remain central to North Korean military doctrine, the ability of the state to sustain forcewide modernization began to decline in the late 1980s.



Kim Jong Il, right, became leader in 1994 after the death of Kim Il Sung, left. The younger Kim set North Korea on course to further its nuclear and missile programs.

Image Source: AFP

Shift to Asymmetric Capabilities, 1991–Present

With the loss of direct Soviet and Chinese military-to-military support in the early 1990s, the beginning of a major economic decline, and the famine in the late 1990s, accompanied by advances in U.S. and South Korean military capabilities, North Korea became less and less likely to prevail in a conventional war on the peninsula. Under new North Korean leader Kim Jong Il, the KPA emphasized asymmetric capabilities, such as special operations forces, chemical and biological weapons, and long-range artillery postured against the predominantly civilian population in Seoul, and renewed its emphasis on developing a nuclear strike capability. Also during this period, Kim publicized the Songun ideology—"Military First" politics —a public reaffirmation of the KPA's centrality to the regime. Under this philosophy, the military became one of the dominant institutions in North Korean society.[11]

By the 1990s, North Korea was making strides in ballistic missile development. In 1993 the North flight-tested a new, Scud-derived medium-range ballistic missile, the No Dong, and in 1998 North Korea attempted to launch a satellite using a prototype multistage rocket that could support the development of longer-range ballistic missiles.[12,13] North Korea continued to operate a nuclear reactor at Yongbyon during this period, fueling concerns that Pyongyang could extract plutonium for use in nuclear weapons.[14] These developments spurred international efforts to constrain the growth of the North Korean nuclear and ballistic missile programs, first through a bilateral Agreed Framework between North Korea and the United States and later through a multilateral Six-Party Talks process also involving South Korea, Japan, China, and Russia. For a time, Kim Jong Il cooperated with some of these initiatives, temporarily suspending missile testing and nuclear activities and submitting to some degree of international monitoring in exchange for economic incentives and security assurances.[15]

"Military First" Politics

North Korea's "Military First," or *Songun*, philosophy established the military as the most important North Korean institution and a means to solve social, economic, and political problems.[16,17] Although some North Korean accounts date its origins to the 1930s, when Kim Il Sung led an anti-Japanese guerrilla movement, *Songun* was not formally introduced until after Kim Il Sung's death in 1994. Kim Jong Il established the ideology in part because the military served as a better power base for him than the Korean Workers' Party did.[18] Military First has resulted in a larger role for the KPA in social and economic projects, including large-scale infrastructure development and agriculture.[19] Although the ideology persists, Kim Jong Un has reinvigorated the status of the Korean Workers' Party during his rule.

By the mid-2000s, Kim Jong Il had decided to put the North on a path to a nuclear breakout. His primary motivations were apprehension about U.S. military intentions after the 9/11 attacks and major operations in Afghanistan and Iraq, a continually worsening military imbalance on the peninsula, and failure to obtain anticipated energy assistance and other economic concessions from international negotiations. In 2006, he resumed ballistic missile testing, renewed satellite launch attempts using larger multistage rockets, and carried out North Korea's first nuclear test.[20] Additional ballistic missile flight tests and a second nuclear test followed in 2009.[21] Since then, despite intense international pressure and daunting technological challenges, North Korea has unambiguously linked its national security strategy, interests, and identity to becoming a nuclear power with intercontinental reach. These concepts are now enshrined in North Korea's law, doctrine, and constitution.[22]



Kim Jong Un has rapidly accelerated development of nuclear weapons and long-range ballistic missiles since assuming power in 2011.

Image Source: KCNA VIA KNS/AFP

Kim Jong Il died in 2011. His youngest son, Kim Jong Un, succeeded to leadership at age 27 and accelerated the pace of development of both nuclear weapons and ballistic missiles. By mid-2017, the new leader had overseen four underground nuclear tests (for a total of six since 2006) with higher yields than previous tests and had debuted and flight-tested more than half a dozen new ballistic missiles of varying ranges, including a submarine-launched ballistic missile, two types of mobile intermediate-range ballistic missiles, and the first tested North Korean intercontinental ballistic missiles capable of reaching the United States.[23,24,25]

Kim Jong Un has also focused his attention on the KPA's conventional capabilities. From 2011-2017 Kim kept up a steady pace of public engagements with military units to emphasize the KPA's centrality to the North Korean regime, and has directed improvements in the realism and complexity of military training. To that end, Kim presided over high-profile artillery firepower exercises, Air Force pilot competitions, and special forces raid training on mock-ups of the South Korean presidential residence.[26, 27]

In April 2018, Kim began prioritizing diplomatic engagement likely in an effort to encourage sanctions relief. At the same time, North Korea introduced new weapons systems in a September 2018 military parade featuring conventional forces.

During the first half of 2019, Kim gradually resumed efforts to highlight military capabilities, likely signaling his frustration over the lack of progress on diplomatic initiatives. He has resumed publicizing military visits and weapons launches, and in October 2020 and January 2021 military parades displayed multiple new missiles, including a larger ICBM.

Since Kim Jong Un took power, North Korea has introduced a few new conventional systems and equipment sets across all its military services, including new tanks, artillery rockets, and unmanned aerial vehicles, most of which have been displayed in military parades linked to important North Korean holidays and observances.[28] The extent to which some new equipment has been integrated into the force is unclear, but these observations suggest a continuing KPA emphasis on modernizing strike weaponry, improving surveillance and reconnaissance capabilities, and broadening the regime's options for raids or other special forces operations in South Korea.

The North Korean military, once considered a threat that would be confined to the 20th century, has never abandoned its ambition of dominating the peninsula and, if possible, reunifying it under Pyongyang's rule. The KPA currently lacks the operational capability to forcibly reunify the Korean Peninsula, as attempted in 1950, but Kim's forces are developing capabilities that will provide a wider range of asymmetric options to menace and deter his regional adversaries, quickly escalate any conflict off the peninsula, and severely complicate the environment for military operations in the region.



North Korean soldiers stand atop armored vehicles during September 2018 military parade.

Image Source: AFP



Image Source: AFP

North Korean military event in Pyongyang. The North remains one of the world's most militarized societies.

National Military Overview

The Korean People's Army at a Glance

Services: Ground Forces, Air Force, Navy, Special Operations, Strategic Force (ballistic missiles)

Personnel: Over 1.3 million (plus approximately 7 million paramilitary, reservists and body-guard command personnel)

Recruit base: Universal conscription

Equipment profile: Primarily Soviet-era systems; some newer systems in each service

Core strength: Massed artillery threat to South Korea, Special Operations, underground facilities, defensive fortifications

Developing strengths: Strategic ballistic missiles and nuclear weapons

Key vulnerabilities: Logistics for sustained combat operations

Threat Perceptions

North Korea's perception that the outside world is inherently hostile drives the North's security strategy and pursuit of specific military developments. This perception is informed by a history of invasion and subjugation by stronger powers stretching back centuries and, in the 20th century, by the 1910–45 Japanese occupation and the externally enforced division of the Korean Peninsula at the end of World War II.[29] The Kim family dynasty has exploited this history to craft a totalitarian political culture that is defined by resistance to outside powers and that invests the Kim family with unique, unquestionable authority to protect the Korean people from external threats. To respond to this existential threat, North Korea's leaders believe they must develop the military capabilities to hold external aggressors at bay and preserve the North's sovereignty and independence. These essential themes have been constant across all three Kim dynasty leaders, with the North's capabilities evolving over time to meet different manifestations of the perceived threat.

The North views the United States as its primary and immediate external security threat. This perception is strongly rooted in the U.S. role during the Korean War, the U.S. military presence on the peninsula since the armistice, and the leading role Washington has played in attempting to modify Pyongyang's behavior and constrain its nuclear ambitions. South Korea and Japan are treated as extensions of U.S. aggression. The North also perceives a strong and longer-term ideological threat from South Korea because Seoul's different economic and political systems represent an alternative—and, to Pyongyang, unacceptable—way of life for the historically unified Korean people. Advances in South Korean and Japanese military capabilities over the last two decades have also clarified a major and growing gap between the North's military power and that of its neighbors.

China and Russia have historically been allies, partners, and patrons of the North Korean state, but, despite broader diplomatic outreach since 2018, Pyongyang tends to show little trust in either country. The North fears absorption or preemption by a much more powerful China and probably wants to preserve its political independence from Beijing even at the risk of alienating Chinese leadership. Pyongyang probably sees Russia as a relatively less important partner in the region.

The Kim regime is driven by fears of threats to its power from internal sources as well. Kim Il Sung endured a period of factionalism before consolidating absolute rule over the North in the late 1950s; this experience taught him to place a priority on eradicating all political, economic, and social influences that might threaten his ideological control of the population. Over decades, this manifested as a series of overlapping internal security measures and societal controls designed to ensure absolute loyalty to the leader. Political control over the military was particularly critical, and it remains a major priority for the Kim Jong Un regime.[30]

One of the greatest perceived threats to North Korea's ideological control and internal stability is the growing influence of what the regime sees as politically corrosive outside information, including through foreign media exposure and

the importing of entertainment programming that depicts daily life in South Korea.[31] This trend has grown as the regime's capability to provide basic goods and services to the population in the provinces outside Pyongyang has steeply declined, driving an increase in market activity that has coincided with broader availability of cell phones. Since the 2000s, North Korea has attempted various military and security efforts to monitor and deal with unsanctioned activity but has been forced to accept a degree of risk posed by the influx of outside media.[32]

National Security Strategy

North Korea's national security strategy has two main objectives: ensure the Kim regime's long-term security, which the leadership defines as North Korea remaining a sovereign, independent country ruled by the Kim family, and retaining the capability to exercise dominant influence over the Korean Peninsula. Since the mid-2000s, the North's strategy to achieve these goals has been to prioritize the development of nuclear weapons and ballistic missiles to deliver nuclear weapons to increasingly distant ranges while maintaining a conventional military capable of inflicting enormous damage on South Korea. Kim Jong Un expanded the nuclear and missile programs in an effort to develop a survivable nuclear weapon delivery capability that the regime could use, in theory, to respond to any external attack. Pyongyang's goal is to maintain a credible nuclear capability, which it believes will deter any external attack. It also seeks to use its nuclear and conventional military capabilities to compel South Korea and the United States into policy decisions that are beneficial to North Korea. As part of his strategy, Kim Jong Un has publicly emphasized the ability of North Korean nuclear-armed ballistic missiles to strike the United States and regional U.S. allies in an attempt to intimidate international audiences.



Kim Jong Un takes personal interest in developing KPA capabilities and is often portrayed in state media directing exercises and observing training.

Image Source: AFP/KCNA VIA KNS

From North Korean Leader Kim Jong Un's Remarks at 5th Party Plenary Session, Released 1 January 2020

"This is a great victory… strategic weapon systems planned by the party are coming into our grasp one by one… Such leaps in cutting-edge national defense science make our military and technological advantage irreversible, accelerate the increase of our national strengths to the maximum, heighten our ability to control surrounding political situations, and give our enemies an immense and overwhelming strike of anxiety and fear."[33]

Targeting U.S. Forces

Historically, North Korea used military action against both South Korean and U.S. targets after the 1953 Armistice Agreement halted the Korean War. Pyongyang targeted U.S. forces in several high-profile incidents, including the seizure of the USS *Pueblo* in international waters in 1968 and the shootdown of a U.S. reconnaissance plane in international airspace in 1969. Pyongyang has largely avoided the deliberate targeting of U.S. personnel since the late 1970s and has concentrated its limited-objective attacks on South Korean personnel, except in a 1994 incident when a U.S. Army helicopter was shot down, killing one crewmember, after it accidentally strayed into North Korean airspace.



South Korean corvette *Cheonan*, which was sunk by a North Korean torpedo in March 2010, pictured here on a salvage barge.

Image Source: AFP

The North also has traditionally used periodic, limited-scope military actions to pressure South Korea and to underscore the fragility of the armistice, which it seeks to replace with a peace treaty on its terms. During the 1960s and 1970s, these actions took the form of aggressive skirmishes along the DMZ and overt attempts to assassinate South Korean leaders, including the South Korean president, with special forces raids and terrorist tactics.[34] In recent years the North has confined aggression against the South to targeted engagements in the disputed Northwest Islands area. Confrontations between patrol craft and other incidents along the Northern Limit Line have claimed more than 50 South Korean lives since 1999.[35] In 2010, North Korea attacked and sank a South Korean corvette, the *Cheonan*, killing 46 sailors, and bombarded a South Korean Marine Corps installation on Yeonpyeong Island, resulting in 2 military and 2 civilian deaths.[36,37]

No comparable attack on the South has yet occurred under Kim Jong Un's rule, but North Korea's willingness to strike South Korea with lethal force endures. In August 2015 a landmine detonated in the DMZ and wounded two South Korean soldiers, kicking off a monthlong



In 2010, North Korea bombarded Yeonpyeong Island along the northwestern maritime border with South Korea, the first kinetic strike on South Korean–occupied territory in decades.

Image Source: AFP

confrontation with the South that ultimately led to artillery fire along the border. Escalation to a wider conflict was possible although averted in this instance.[38]

Political Stability

Kim Jong Un views political stability as essential to safeguarding his rule, a perception inherited from his father and grandfather. No North Korean leader has tolerated the emergence of a competing political system or a lack of loyalty among regime elites. To maintain stability and control, the state retains a pervasive internal security apparatus consisting of multiple agencies and departments with overlapping areas of responsibility and broad powers to monitor all North Korean citizens for criminal and subversive behavior. North Koreans are also encouraged to report on one another at the local level through a "neighborhood watch" system called *inminban*. Citizens found to have transgressed can be interned in a massive system of state-run prison camps, where they are subjected to abusive conditions.[39]

Kim has used purges and executions to eliminate perceived threats to his authority and compel loyalty from subordinates. His perception of a threat may be driven in part by sensitivity to questions about whether the young Kim was capable of taking full leadership of North Korea after his father's death, and it also seems intended to invoke memories of Kim Il Sung, whose image and methods Kim Jong Un has sought to emulate. Most prominently, Kim publicly removed his uncle, Chang Song-taek, from the position of vice chairman of the National Defense Commission in December 2013 and had him executed for alleged crimes against the state.[40] In the military, Kim has repeatedly reshuffled personnel in key defense positions and demoted senior officers in rank. The result is a system that appears largely stable from the outside, with elites motivated by fear and co-opted with privilege to preserve the Kim regime.[41]

Despite renewed emphasis on ideological indoctrination and strengthened border controls, North Koreans continue to defect abroad. Most escape into China and, if they are able to elude authorities and find work, eventually make their way to South Korea by way of Southeast Asia.[42] In 2020, 229 North Korean defectors arrived in South Korea, a notable drop from 1,047 in 2019, which is probably because North Korea closed its borders to prevent COVID-19 transmission. The defection rate has declined from a high of 2,914 people in 2009, probably owing to strengthened security along the North Korea-China border.[43] A small number of higher-profile North Koreans defect—notably, in 2016, including the deputy chief of mission to the embassy in London—but

this trend does not yet seem to have broadened to the point where Kim considers it a major threat.[44]

External Relations

North Korea's external relationships do not appear to significantly contribute to its defense establishment or boost military readiness. International sanctions against North Korea contribute to potential partners' lack of interest in expanding ties.

In the first years of his rule, Kim Jong Un made few efforts to engage foreign counterparts. However, starting in 2018 he began an international outreach effort, travelling abroad for the first time as leader of North Korea to meet the leaders of China, South Korea, the United States, and Russia. He likely believes these efforts are necessary to obtain sanctions relief.

Pyongyang's only formal defense agreement is with China: the 1961 Sino–North Korean Treaty of Friendship, Cooperation, and Mutual Assistance. This agreement obliges each signatory to render military assistance in defense of the other if one is attacked,[45] but direct military-to-military engagement between Pyongyang and Beijing has been suspended for years. Diplomatic relations between both countries worsened after North Korea's nuclear and missile tests accelerated. In 2017, China instituted new import restrictions intended to affect the North Korean economy and continued to call for North Korea to cease its nuclear and ballistic missile test activities. Kim Jong Un visited China and met with President Xi Jinping in March, May, and June of 2018, and in January 2019, indicating a desire to nurture relations. Xi made his first visit to North Korea in June 2019.[46]



Kim Jong Un meets with Chinese President Xi Jinping in Beijing on 8 January 2019.

Image Source: AFP PHOTO/KCNA VIA KNS

Russia, which provided substantial military assistance and equipment to North Korea during the Soviet era, has largely curtailed its defense relationship with North Korea. Since UNSC sanctions in August 2017, however, some economic and diplomatic engagement with Russia has taken place. In October 2017, a state-owned Russian company began to provide a second internet connection to North Korea, reducing Pyongyang's dependence on China.[47] Kim Jong Un met with Russian President Vladimir Putin for the first time in April 2019 as part of Kim's effort to diversify diplomatic and economic ties and further reduce economic dependence on China. The two discussed diplomatic and commercial opportunities, although no official agreements were announced.[48] Thus far, these overtures have led to minimal improvements in relations given North Korea's perception of Russia's pressure to denuclearize and failure to provide significant economic and military concessions.

North Korea views Japan and South Korea as adversaries but maintains lines of communication with both countries. North Korea met with a Japanese delegation in 2016 to discuss

an ongoing dispute over the disposition of Japanese nationals abducted by North Korea during the late 1970s and early 1980s. The North and South held two summits in 2018, and have intermittently held high-level talks at Panmunjom in the DMZ to tamp down tensions in inter-Korean relations. In September 2018, the Koreas signed the Comprehensive Military Agreement, which calls on both sides to take measures to prevent accidental military clashes. After an initial push to carry out the agreement, progress stalled and in June 2020 North Korea demolished a liaison office and threatened to reverse military actions taken thus far.[49,50,51]

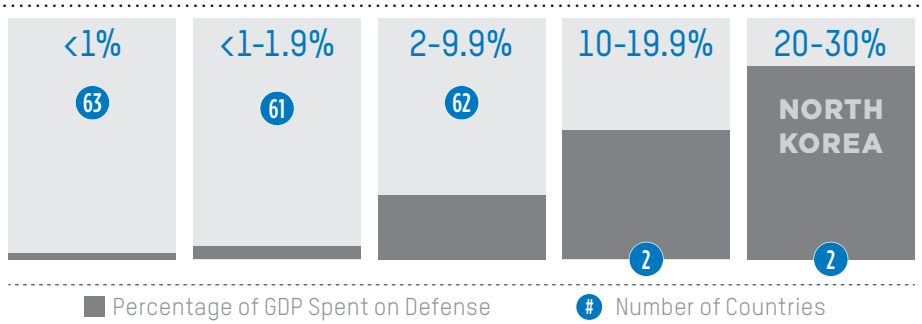
Defense Budget

Although the regime does not publish exact economic figures, estimates are based on trends in observed economic activity. As such, North Korea's economy shrank by about 4 percent in 2018 because of UNSC sanctions. In 2019, North Korea's economy grew slightly, but likely contracted in 2020 because of trade disruptions due to the COVID-19 pandemic.[52] Coal, other minerals, and clothing account for almost 70 percent of Pyongyang's nonmilitary foreign trade, according to the International Trade Centre, but are currently banned as North Korean exports by UNSC sanctions imposed in 2017.[53]

Defense spending is a regime priority. Spending estimates range from $7 billion to $11 billion; 20–30 percent of North Korea's GDP is allocated to the military.[54] This level of commitment makes North Korea the highest spending nation in the world for defense as a percentage of GDP. Pyongyang has probably increased defense spending during the past decade and likely will continue devoting a large portion of its GDP to national defense through at least 2021.[55] A detailed breakdown of North Korean military spending by categories such as personnel, procurement, or operations and maintenance is unavailable. Pyongyang has mustered sufficient funds, most likely by shifting priorities, to finance foreign procurement and domestic development and production for testing missile systems and nuclear weapons. Nonmonetary resources, including raw materials and electrical power, are also prioritized for use in military projects.[56]

National Defense Burden Comparison, 2020 Global Baseline

1707-13888



Military Doctrine and Strategy

Perceptions of Modern Conflict

North Korea understands that the character of war has changed since its last sustained combat experience in 1953 and sees its military as largely unprepared to engage in modern warfare. Pyongyang probably assesses its force as a whole cannot prevail in combat against the United States, given U.S. forces' overwhelming advantages in power projection, strategic air superiority, and precision-guided standoff strike capability. This perception has been informed by North Korea's monitoring of U.S. operations in the 1991 Gulf War, the 1999 Kosovo air campaign, campaigns in Afghanistan and Iraq, and U.S.-led air operations in Libya in 2011 and Syria since 2014. The North also is a keen observer of South Korean military capabilities and probably judges it is at a qualitative disadvantage against its neighbor.[57,58,59]

North Korean defense planning, therefore, has adapted to deter direct U.S. military intervention by signaling that the cost of such intervention would be unacceptably high to the United States even if North Korea ultimately lost the engagement. In the last few years, this effort to shape adversary deterrence calculations has centered on developing and publicizing a survivable nuclear-armed ballistic missile force. Should deterrence fail, North Korea would seek to maximize its defensive advantages—including inhospitable terrain, widespread use of underground facilities, and a population conditioned from birth to resist foreign invaders—to raise the cost of taking and holding North Korean territory.

Some investments in specific North Korean military capabilities are intended to improve the odds of North Korean success in a modern conflict. However, these efforts are generally isolated to a few areas and would not, in Pyongyang's estimation, confer overwhelming advantage on the KPA in a modern conflict against the United States and South Korea.

Military and Security Leadership

Kim Jong Un is the supreme commander of the KPA, in addition to his position as head of all governmental, political, and security institutions in the country. He holds the rank of marshal in the KPA and was appointed a four-star general before his succession, although he is not known to have any actual military experience. In North Korea's unitary leadership structure, Kim is the ultimate authority for all defense and national security decisions, including operational planning and execution, procurement and acquisition, and strategy and doctrine. As the first secretary of the Korean Workers' Party, he establishes policy and guidance for North Korea's military and implements party policy through key national-level organizations.[60,61] As the party's Central Military Commission chairman and the State Affairs Commission chairman, Kim controls all military and defense-related policy, with broad authority to consolidate political, military, and state powers during both wartime and peacetime.[62]

Kim Jong Un's Leadership Priorities

Born in 1983, Kim Jong Un was the youngest of Kim Jong Il's three sons. Kim Jong Il formally introduced Kim Jong Un as his successor in 2009, bypassing his older sons, Kim Jong Nam and Kim Jong Chol. Little is known about Kim's life before his succession to leadership in 2011.

Kim's priorities as leader of North Korea have been to solidify the state's nuclear capability and make rapid strides toward achieving a ballistic missile arsenal capable of threatening the United States while attempting to modernize the economy – a "dual line" policy called *Byungjin* in the North. Although economic development is a priority, Kim is willing to endure financial losses in order to advance other goals; North Korean nuclear and missile tests continue to result in UN sanctions, and, in 2016, a rocket launch prompted South Korea to close the Kaesong Industrial Complex, which provided the regime about $100 million a year through cash remittances.

In relations with the United States, Kim initially responded to Washington's demands that he abandon his nuclear aspirations by accelerating the program's development and by issuing specific threats to attack the United States. In 2018, Kim demonstrated a willingness to participate in talks on denuclearization. However, since 2019 he has demonstrated his intent to continue bolstering North Korea's military deterrent by developing and testing new missiles and developing new military equipment for the conventional force.



Kim Jong Un at a military parade, April 2017. Kim has directed improvements to each KPA service's capabilities.

Image Source: AFP/KCNA VIA KNS



General Staff Department Chief Vice Marshal Pak Chong-chon with Kim Jong Un.

Image Source: Rodong Sinmun



Vice Marshall Kwon Yong-chin, General Political Bureau .

Image Source: Uriminjokkkiri

Through the General Political Bureau, North Korea maintains a separate political command and control apparatus to ensure military loyalty to the Kim regime and implementation of party guidance. The bureau leads all political and ideological training, monitors morale and personal lives, guides servicemen's political lives, and disseminates propaganda for the military in order to maintain military loyalty to the regime. The director of the General Political Bureau usually serves as a key adviser to Kim Jong Un. Vice Marshall Kwon Yong-chin was appointed head of the General Political Bureau in January 2021.[63,64,65]

Operational control of North Korea's armed forces resides in the General Staff Department, which reports directly to Kim Jong Un.[66] The department as a whole aggregates and operationally commands all military service headquarters, functional and combat commands, and military communications, and it evaluates the overall training and readiness of the North Korean military. Vice Marshal Pak Chong-chon was appointed as the General Staff Department head in September 2019, and is one of Kim's principal military advisers.[67]

The Ministry of National Defense (MND) is responsible for administrative control of the military and external relations with foreign militaries. MND manages the manpower and resource needs of North Korea's conventional armed forces and special operations forces. In the past MND-controlled companies were involved in earning foreign currency through exports and domestic distribution, though this activity has probably been reduced by international sanctions.[68] As of July 2021, Colonel General Kim Chong-kwan has been removed from his position as MND chief and his replacement was not announced. The MND minister is positioned primarily to manage defense acquisitions, resourcing and financing allocations for all North Korean armed forces.[69]

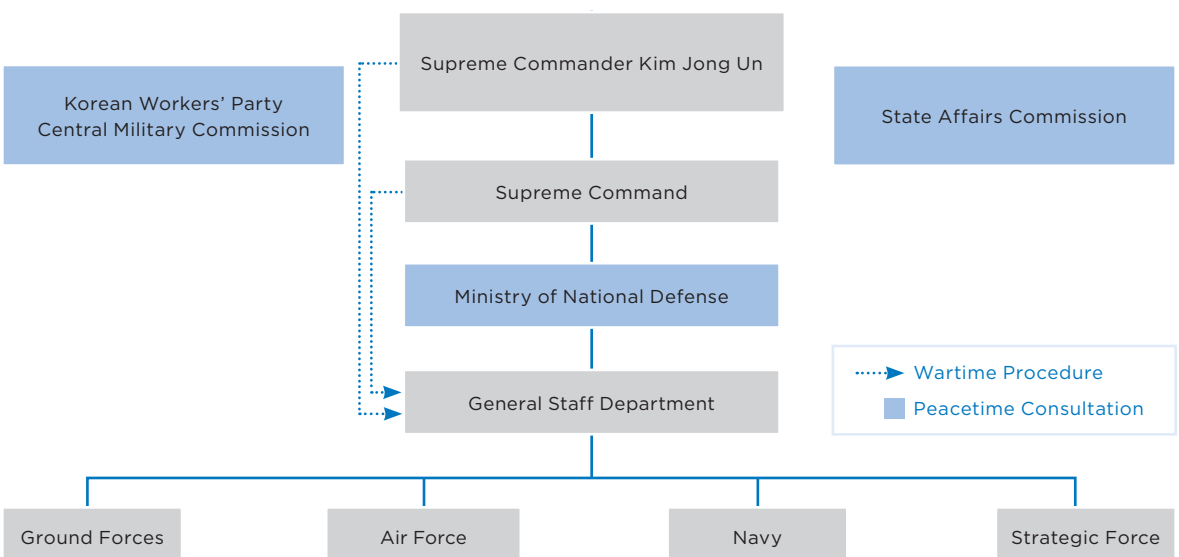
National Military Command and Control

As the KPA supreme commander and central decisionmaker in North Korea, Kim Jong Un is the linchpin of KPA command and control. Kim exercises command and control over all corps-level military organizations, including ground, air, naval, and ballistic missile forces.[70] The General Staff Department maintains overall control of all North Korean military forces and is charged with turning the supreme commander's directives into operational military orders.[71]

North Korean Military Command and Control

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Supreme Commander Kim Jong Un operates as the absolute decisionmaker of North Korea's armed forces. The Supreme Command would disseminate any order from Kim to North Korea's armed forces, including its ballistic missile corps, the Strategic Force. As the Korean Workers' Party Central Military Commission (CMC) chairman and the State Affairs Commission (SAC) chairman, Kim controls all military and defense-related policy.





Kim Jong Un exercises personal command and control over North Korea's nuclear, ballistic missile, and conventional military forces. In this 2013 image released by North Korean state media, a map of notional missile strikes on the United States is the backdrop to Kim signing a "firepower strike plan."

Image Source: AFP

During wartime, Kim Jong Un would exercise overall control of preparations, mobilization, and operations. The Supreme Command functions as both the highest ranking advisory board to Kim on all state and military affairs and as the organization charged with converting the supreme commander's strategies into actual wartime directives. The Supreme Command would comprise senior officers from the General Staff Department, Ministry of National Defense, and other key national-level organizations.[72]

Nuclear Command and Control

Kim Jong Un has established through public policy statements and legislation that he is the sole release authority for North Korean nuclear weapons use against any adversary. In 2013, North Korea revised its national constitution and passed a law on nuclear use, which stated that nuclear weapons could not be used without an express order from the supreme commander.[73] Kim has personally authorized North Korea's nuclear tests, most recently in September 2017. North Korean state-sponsored media published the order with his signature after the test occurred.[74] Other North Korean public media releases have emphasized Kim's singular role in authorizing missile force alerts and the signing of a "firepower strike plan," ostensibly for nuclear attack on the United States.[75]

Core North Korean Military Capabilities

Nuclear Weapons and Ballistic Missiles

North Korea has aspired to become a nuclear weapons power for decades. Although the nuclear program's foundation dates to the 1950s, Pyongyang started making its most significant progress toward developing a nuclear weapons capability after withdrawing from the Treaty on the Nonproliferation of Nuclear Weapons in 2002, citing increasing alarm over U.S. military activities abroad and dissatisfaction with the pace at which international economic aid, promised in past nuclear negotiations, was arriving. The North began testing nuclear devices underground in 2006. North Korea discloses very few details about its nuclear weapons inventory and force structure.

Program History and Pathway to Weapon Development

North Korean nuclear research began in the late 1950s through cooperation agreements with the Soviet Union. The North's first research reactor began operating in 1967, and Pyongyang later built a nuclear reactor at Yongbyon with an electrical power rating of 5 megawatts electrical (MWe). This reactor began operating in 1986 and was capable of producing about 6 kilograms of plutonium per year. Later that year, high-explosives testing and a reprocessing plant to separate plutonium from the reactor's spent fuel were detected. Construction of additional reactors—a 50-MWe reactor at Yongbyon and a 200-MWe reactor at Taechon—provided additional indications of a larger-scale nuclear program.[76]

North Korea joined the Nonproliferation Treaty in 1985, but inspections only started 7 years later under the treaty's safeguards regime, inviting questions about the North's



Reactor at the Yongbyon Nuclear Research Complex. North Korea has acknowledged both plutonium reprocessing and uranium enrichment activities at this installation. Activities at Yongbyon sites continue.

Image Source: Wikimedia Commons

North Korean Nuclear and Rocket Launch Facilities

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North Korea's launch installations have supported ground test and launches of multi-stage rockets, nominally for putting satellites in orbit. These activities provided a test bed for long-range ballistic missile technology, and support the development of ICBMs now in the North Korean inventory. Recent activities at the Pyongsan Uranium Concentration Plant have also been reported.[77]





Kim Jong Un examines a mock nuclear warhead displayed in front of a ballistic missile.

Image Source: KCNA VIA KNS/AFP

plutonium production. In 1994, North Korea pledged to freeze and eventually dismantle its plutonium programs under the Agreed Framework with the United States. At that time, a number of sources estimated that Pyongyang had separated enough plutonium for one or two nuclear weapons. North Korea allowed the International Atomic Energy Agency to place seals on spent fuel from the Yongbyon reactor and to undertake remote monitoring and onsite inspections at its nuclear facilities.[78]

In 2002, negotiators from the United States confronted North Korea with evidence of a clandestine uranium enrichment program, a claim that North Korean officials publicly denied. Disagreement over the North's establishment of a uranium enrichment program led to the breakdown of the Agreed Framework. The United States reached agreement with members of the Korean Economic Development Organization and stopped shipment of heavy fuel oil to North Korea, whose response was removing the international monitors and seals at the Yongbyon facility and restarting its plutonium production infrastructure.[79]

North Korea has demonstrated the capability to produce kilogram quantities of plutonium for nuclear weapons and has claimed to possess the ability to produce enriched uranium for nuclear weapons. The North disclosed a uranium enrichment plant to an unofficial U.S. delegation in late 2010 and claimed it was intended to produce enriched uranium to fuel a light-water reactor.[80]

The North began underground nuclear testing in 2006 and used early tests to both validate device designs and to send a political signal that it was advancing its nuclear capability. By September 2017 North Korea had conducted six nuclear tests: one each in 2006, 2009, and 2013; two in 2016; and one in September 2017, according to seismic detections and public claims by North Korean media.[81,82] Successive tests have demonstrated generally higher explosive yields, according to seismic data.[83] The September 2017 test generated a much larger seismic signature than had previous events, and North Korea claimed this was a test of a "hydrogen bomb" intended for use on an intercontinental ballistic missile (ICBM).[84] North Korea has exclusively used the underground nuclear test facility in the vicinity of Punggye for its nuclear tests. In May 2018, North Korea disabled some parts of the Punggye test site, announcing that it no longer needed to conduct nuclear tests. However, Pyongyang retains a stockpile of nuclear weapons minimizing the impact of this development.

Ballistic Missile Force

North Korea established a Strategic Force (previously known as the Strategic Rocket Forces) in 2012 and has described this organization as a nuclear-armed ballistic missile force. The Strategic Force includes units operating short-range (SRBM), medium-range (MRBM), intermediate-range (IRBM) ballistic missiles, and ICBMs, each of which North Korea has stated represents a nuclear-capable system class. In 2016, the North claimed a Scud class SRBM launch had tested nuclear weapon components in a mock attack against a South Korean port.[85] Pyongyang has occasionally hinted at the possibility of other nuclear-capable units, for instance, by marching infantry troops carrying backpacks emblazoned with the nuclear symbol in a 2013 military parade.[86]

The North's ballistic missile force is structured around multiple regional and intercontinental target sets. The Strategic Force operates Scud class missiles that can range South Korea, some extended-range variants of the Scud that can reach Japan, and the No Dong MRBM, which can reach Japan. This force also is responsible for the Hwasong-12 IRBM, which was designed to range Guam; and the Hwasong-14 ICBM, capable of reaching the continental United States. [87]

North Korea revealed its first road mobile ICBM in a 2012 military parade. In 2015, it began flight-testing a submarine-launched ballistic missile (SLBM), the Pukguksong-1. Subsequently, the North conducted an initial flight of a new solid-propellant MRBM, the Pukguksong-2 and a new IRBM, the Hwasong-12, which appears to be a replacement for the Musudan



Hwasong-14 ICBM on a road-mobile transporter-erector-launcher prior to launch, July 2017.

Image Source: KCNA VIA KNS/AFP

IRBM. North Korea conducted multiple flight tests of the Hwasong-12, including flight tests in August and September 2017 over northern Japan, ultimately reaching a range of approximately 3,700 kilometers, its longest-range direct trajectory ballistic missile flight tests to date.[88,89]

North Korea conducted an inaugural launch of its ICBM class system, the Hwasong-14 on 4 July 2017 and again on 28 July 2017. It then launched a second type of ICBM, the larger Hwasong-15 on 28 November 2017.[90]



Hwasong-15 ICBM on its mobile launcher, November 2017.

Image Source: KCNA VIA KNS/AFP

During an April 2017 parade, North Korea showcased a modified ICBM launcher with a launch canister, as well as a new mobile-erector-launcher with a launch canister. Road-mobile launch canisters are typically associated with solid-propellant missiles. Actual missiles for the launch canisters were not displayed. The North also paraded a new Scud variant with a modified warhead, probably a maneuverable reentry vehicle.[91] North Korea's February 2018 military parade included one new short-range ballistic missile, which was arrayed in pairs on four-axle trucks. North Korea began testing a version of this solid-propellant missile in May 2019.[92] Between 2019-2021, North Korea launched a total of four new types of SRBMs.

North Korea also possesses space launch vehicles (SLV) which could reach the continental United States if configured as ICBMs.[93] These systems use ballistic missile technology, and



A TD-2/Unha-3 space launch vehicle preparing for launch, April 2012. Satellite launches contribute valuable data to the ballistic missile program.

Image Source: AFP



North Korea conducted this second Hwasong-14 ICBM flight test on 28 July 2017.

Image Source: KCNA VIA KNS/AFP

space launches provide North Korea with valuable data applicable to the development of long-range, multi-stage ballistic missiles.[94] North Korea's Taepo Dong 2 (TD-2), called Unha-3 in the North, has been under development since at least the early 2000s. Its first flight test attempt, in 2006, failed; subsequent launches in 2009 and April 2012 also failed. In December 2012 and February 2016, the North successfully launched an object into low Earth orbit with the TD-2.[95]

The 4 July 2017 Hwasong-14 launch was North Korea's first ICBM flight test. The Hwasong-14 was launched almost straight up to an unusu-

Ballistic Missile Inventory[96]

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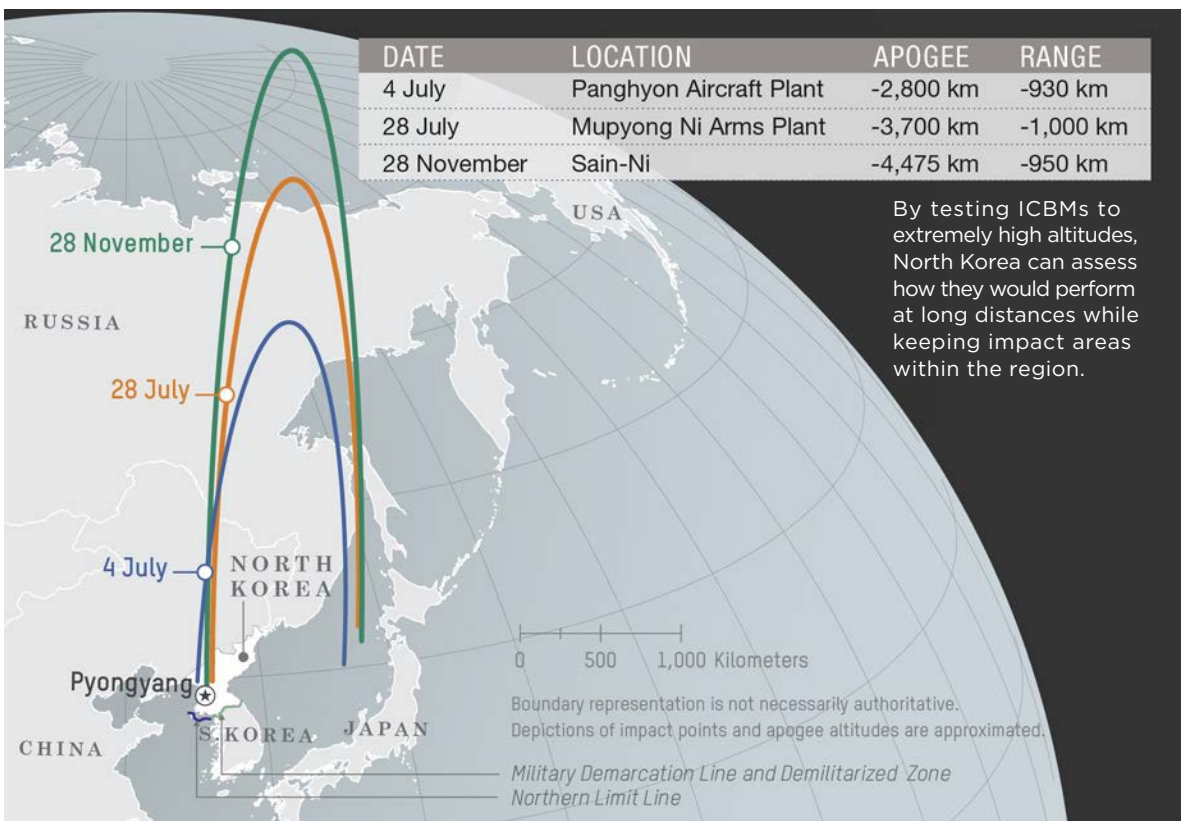
Systems	Number of Launchers	Propellant	Deployment Mode	Maximum Range (km)
SCUD B/C (SRBM)	Fewer than 100	Liquid	Road-Mobile	300–500
SCUD ER (SRBM)	Undetermined	Liquid	Road-Mobile	1,000
Unnamed SRBM variants (Launched 2019)	Undetermined	Solid	Road-Mobile	380–600+
No Dong (MRBM)	Fewer than 100	Liquid	Road-Mobile	1,200+
Hwasong-10 (Musudan IRBM)	Fewer than 50	Liquid	Road-Mobile	3,000+
Hwasong-12 (IRBM)	Undetermined	Liquid	Road-Mobile	4,500
Pukguksong-1 (SLBM)	At least 1 submarine	Solid	Submarine	1,000+
Pukguksong-3 (SLBM)	Undetermined	Solid	Submarine	1,000+
Pukguksong-4 (SLBM)	Undetermined	Solid	Submarine	Unknown
Pukguksong-5 (SLBM)	Undetermined	Solid	Submarine	Unknown
Pukguksong-2 (MRBM)	Undetermined	Solid	Road-Mobile	1,000
Hwasong-14 (ICBM)	Undetermined	Liquid	Road-Mobile	10,000+
Hwasong-15 (ICBM)	Undetermined	Liquid	Road-Mobile	12,000+
Unnamed ICBM (Paraded 2015)	Undetermined	Liquid	Road-Mobile	Intercontinental
Unnamed Larger ICBM (Paraded In 2020)	Undetermined	Liquid	Road-Mobile	Intercontinental

- Hwasong and Pukguksong designators are based on published North Korean names.
- All ranges are approximate.

ally high altitude of approximately 2,800 kilometers above the Earth before impacting into the Sea of Japan.[97] On 28 July, North Korea tested the Hwasong-14 to an even higher loft than achieved on 4 July. The lofted-launch technique enables the North to model how far the missile could travel without overflying another country and without a full-range flight test. In its tested configuration the Hwasong-14 ICBM is capable of reaching North America if flown on a direct trajectory based on the vertical distance traveled by the missiles during the July 2017 flight tests.[98] North Korea flight tested another new ICBM – identified as the Hwasong-15 - in a lofted trajectory at an apogee of 4,475 kilometers on 28 November 2017. These ICBM flight tests mark significant milestones in North Korea's ballistic missile development process—the first flight tests of missiles which can reach the United States.[99,100]

North Korea's ICBM Flight-test Trajectories, 2017

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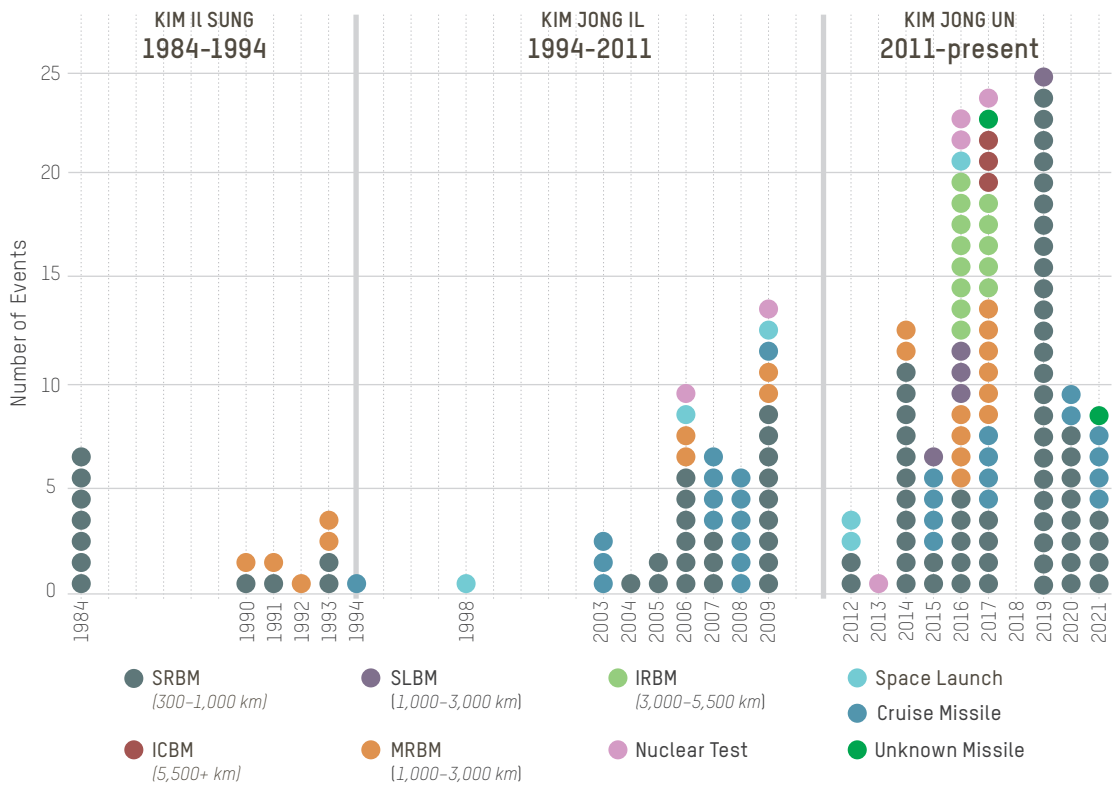


Nuclear Deterrence Strategy and Use Doctrine

The steady development of road-mobile ICBMs, IRBMs, and SLBMs highlights Pyongyang's intention to build a survivable, reliable nuclear delivery capability.[101] This developing capability has been accompanied by high-level statements, the first of which was issued in 2013, in which North Korea stated it would use nuclear weapons to respond to an invasion and may use them to prevent an attack. Together, these developments suggest the potential for nuclear weapons to be used at any stage of conflict when the North believes itself in regime-ending danger.[102,103,104] The point at which North Korean leadership would perceive this threat is unclear, as are specific regime plans for nuclear use.

North Korea Missile Launches and Nuclear Tests[105]

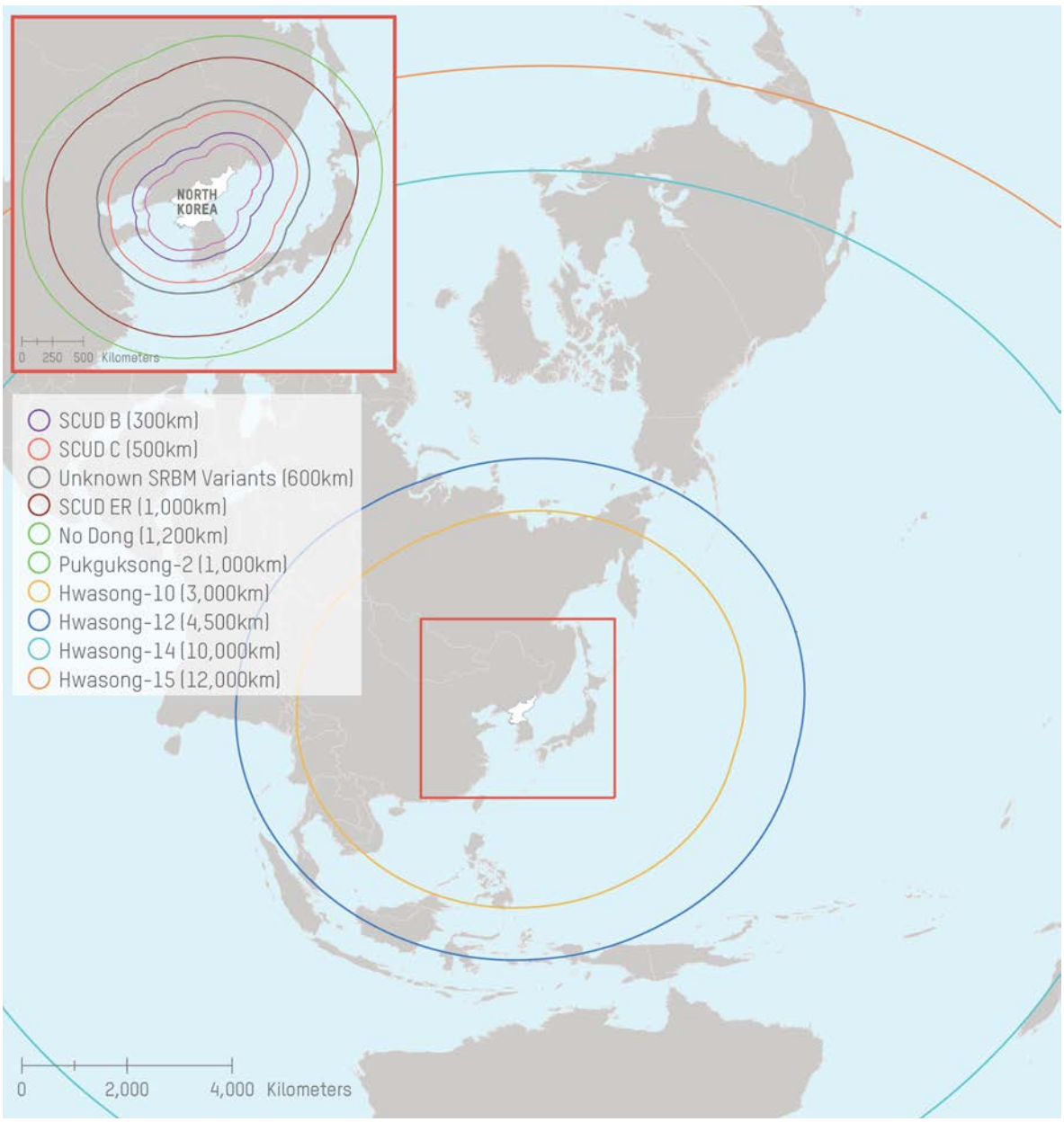
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Accounts for full flight tests only. Does not include partial tests of missile subsystems, such as static engine firings or cold-launch ejection tests, tests of air defense systems, close-range ballistic missiles (CRBMs), short-range rockets, or artillery firings. Updated as of September 2021.

North Korean Ballistic Missile Ranges

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Biological and Chemical Weapons

North Korea has a longstanding biological warfare (BW) capability; additionally its biotechnology infrastructure could be redirected to support a BW program.[106] The North is a signatory to the Biological and Toxins Weapons Convention (BWC) but has yet to declare any relevant developments and has failed to provide a BWC confidence-building measure declaration since 1990.[107,108,109] Pyongyang may consider the use of biological weapons during wartime or as a clandestine attack option.

North Korea has a chemical warfare (CW) program that could comprise up to several thousand metric tons of chemical warfare agents, and the capability to produce nerve, blister, blood, and choking agents.[110] North Korea is not a party to the Chemical Weapons Convention. North Korea probably could employ CW agents by modifying a variety of conventional munitions, including artillery and ballistic missiles, along with unconventional, targeted methods. For example, North Korea was responsible for the assassination of Kim Jong Un's half-brother in Malaysia using the nerve agent VX.[111] An Indonesian woman and a Vietnamese woman were tried for the murder; four North Koreans were charged but fled the country before arrest.

Offensive Conventional Systems

North Korea's conventional military consists of the ground, air, naval, and special operations forces. Each is limited to operations on or around the Korean Peninsula and poses a direct threat to South Korea and to U.S. forces based in South Korea. Neither the Air Force nor the Navy can operate at long distances off-peninsula or project power outside the region. North Korea's conventional strike capability is concentrated primarily in massed fire from KPA artillery forces, Special Operations Forces (SOF), and, less effective, fixed-wing attack by fighters and bombers.

KPA Ground Forces operate thousands of long-range artillery and rocket systems along the entire length of the DMZ. These weapons include close-range mortars, guns, and multiple rocket launcher systems (MRLs) trained on South Korean military forces deployed north of Seoul, and longer-range self-propelled guns, rockets, and CRBMs that can reach Seoul and some points



Long-range artillery guns in mass firing position for training exercise.

Image Source: KCNA VIA KNS/AFP

North Korean Artillery and Rocket Threat to South Korea

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south of the capital. Collectively, this capability holds South Korean citizens and a large number of U.S. and South Korean military installations at risk.[112] The North could use this capability to inflict severe damage and heavy casualties on the South with little warning.

North Korean SOF are designed for rapid offensive operations, infiltration, and limited attack against vulnerable targets in South Korea. Operating in specialized units, SOF personnel are among the most highly trained, well-equipped, best-fed, and highly motivated forces in the KPA. Recently, North Korea has emphasized SOF unit training with particular focus on improving their capability to raid key government installations in the South.

The North Korean Air Force can fly strike missions against targets in South Korea with fighters and bombers; its most capable platforms are the MiG-29 Fulcrum fighter and the MiG-23 Flogger fighter, although these would have considerable difficulty overcoming South Korea's more modern air forces and air defenses. Several North Korean unmanned aerial vehicles (UAVs) have been sighted over South Korea since 2014; models that crashed and were examined by the South Korean government had been configured for surveillance and reconnaissance, but the North could arm future UAVs.[113]

National Defense

Defending the North Korean homeland against external attack is a foundational KPA mission, constituting a major share of effort for KPA ground, air and air defense, and naval units. The criticality of homeland defense as a KPA mission was demonstrated during the Korean War. Although North Korea enjoys considerable geographic advantages for defense—including mountainous terrain, coastal mudflats, and long seasons of poor weather—aerial bombardment by the United States and other nations in the UN Command force devastated all of North Korea's major cities and urban areas during the Korean War. The North responded by constructing dense fortifications and multilayered air and coastal defense systems, embracing new electronic warfare technologies as they became available in order to foil U.S. precision-guided weapon systems, and burying most of its key military command and control nodes and critical equipment in deep, hardened underground facilities (UGFs).

Underground Facilities

North Korea's UGF program is the largest and most fortified in the world, estimated to consist of thousands of UGFs and bunkers designed to withstand U.S. bunker-buster bombs.[114,115] The UGF program's primary function is to protect and conceal regime leaders, weapons of mass destruction, ballistic missiles, warfighting stores, and elements of military forces and defense industries. In 1963, Kim Il Sung publicly announced, "The entire nation must be made into a fortress. We must dig into the ground to protect ourselves."[116] The size and sophistication of these facilities range from small tunnels, only large enough to accom-



Entryway to a South Korean tunnel dug to interdict a secret North Korean infiltration tunnel under the DMZ. In addition to constructing sophisticated underground facilities for military use, North Korea may have built more than twenty infiltration tunnels for surreptitious KPA entry into South Korea, four of which were discovered between 1974 and 1990.

Image Source: Wikimedia Commons

modate personnel or a few vehicles, to large, complex UGFs for command and control, missiles, and other strategic assets. North Korea maintains a road network under Pyongyang to protect and conceal Kim Jong Un and senior leaders during a crisis, which improves conditions for sustainment of the regime and may embolden Kim to take more belligerent action if he perceives he is safe from counterattack.[117]

North Korea has adapted the use of deception in its defenses after observing U.S. conflicts in the Vietnam War, Kosovo, and both Iraq Wars. North Korea could use UGFs and mountainous topography to fortify its military installations and for concealment and defense during a conflict, probably hoping to strain U.S. resources and raise the cost of combat operations on the peninsula. North Korea will continue to improve and construct hardened bunkers and underground facilities to protect its forces.[118]

Air Defense

North Korea maintains a dense network of integrated air defense systems (IADS), providing overlapping, redundant coverage of Pyongyang, the DMZ, both coasts, and its strategic infrastructure. North Korean air defenses comprise primarily fixed, but transportable strategic surface-to-air missile (SAM) sites, some mobile tactical SAM systems, antiaircraft artillery (AAA) positions, and man-portable air defense systems (MANPADS). North Korea's IADS make good use of camouflage, concealment, and deception procedures and underground facilities to protect against attack. North Korea occasionally conducts field deployment training of air and air defense assets to improve wartime survivability. North Korean fighter aircraft are also capable of basic air defense operations.

North Korean airspace is divided into four air divisions, and each air division headquarters is responsible for the defense of its assigned region.[119] Although Air Force Headquarters remains the final authority on engaging hostile forces, during wartime the various air defense divisions probably will operate autonomously within their assigned regions. North Korea has a large number of aging early warning and intercept radars that provide basic detection of large aircraft at long distances to support the defense of its airspace.

Coastal Defense

North Korean coastal defense is maintained by the North Korean Navy, which operates radars, defense artillery and missile sites, and command and control nodes complemented by smaller patrol craft, mines, and attack, coastal, and midget-type submarines; and Air Force-operated aircraft. Defense radars and underground facilities on both coasts support coastal defense artillery and coastal defense cruise missile sites.

The Navy is divided into East and West Coast Fleets, each operating a variety of patrol craft, torpedo boats, and guided-missile patrol vessels that carry a variety of antiship cruise missiles, torpedoes, and guns. North Korean Navy patrol craft mostly operate in immediate coastal waters.

The North Koreans have a credible minelaying capability. Numerous small surface ships are capable of delivering mines to impede military and civilian shipping. Mines would be used to defend against amphibious assaults, provide seaward flank protection for land forces, and defend strategic ports. Defensive mines would be monitored by coastal observation teams and radar, and they would be supported by well-emplaced artillery and missile batteries, making approaching and mine clearing operations extremely hazardous.

Electronic Warfare

North Korea views electronic warfare as an essential tool in countering the threat posed by advanced Western weapon systems and precision-guided munitions, and critical to denying and disrupting enemy command and control, targeting, and intelligence gathering efforts. North Korea has operated GPS jammers near the DMZ, at times interfering with navigation systems onboard commercial aircraft flying in the area.[120]

Space/Counterspace

North Korea can be expected to try to deny an adversary use of space during a conflict; ample evidence is available to Pyongyang in open sources describing the general U.S. reliance on space-based assets to support joint operations and intelligence collection. The North's nonkinetic counterspace capabilities include GPS and satellite communication jamming, which have been tested on multiple occasions in the past decade. Possession of ballistic missiles and space launch vehicles that can reach orbit theoretically suggests the North could attempt to disrupt orbiting satellites in a conflict.

North Korea's space program is administered by a state-run civilian agency, the National Aerospace Development Administration.[121] The North maintains a space launch complex on the west coast, the Sohae Satellite Launching Station, and associated space tracking facilities in Pyongyang, both of which supported satellite launch cycles in 2012 and 2016. An older space launch site on the east coast has not been used for a launch since 2009. Although North Korea has placed two satellites in orbit and has articulated further space ambitions, its program also enables it to test technology used in ballistic missiles.[122]

Cyberspace

North Korea views its offensive cyberspace capabilities, including computer network attack, as a cost-effective and deniable tool that it can employ with little risk of reprisal. Pyongyang's cyberspace capabilities support military operations and national security goals by providing the Kim regime a way to influence and intimidate its adversaries and collect information on them. In light of the numerous sanctions targeting North Korea, cyberspace capabilities also provide the regime with a means to generate currency that circumvents international controls.[123]

Computer Network Attack and Intimidation

North Korea was linked to a 2014 cyber-intrusion into Sony Pictures Entertainment networks undertaken by a group called Hidden Cobra, previously referred to as Lazarus Group and Guardians of the Peace.[124] The attack followed North Korean demands that Sony cancel the release of a film depicting the assassination of Kim Jong Un and resulted in data deletion and shutdown of employee network access.[125] The FBI stated that there was sufficient evidence to attribute the attack to North Korea.

In December 2017, the U.S. Government linked North Korea to the May 2017 WannaCry computer worm attack, which affected over 250,000 computers in over 150 countries. This attack disrupted critical computer systems across the world, including Great Britain's National Health Service.[126]

Cyber-Enabled Propaganda

North Korea has also used its cyberspace resources for political purposes and to spread propaganda on South Korean networks. South Korea has reported that the North hacked various websites to post pro-North opinions.[127]

Select North Korean Cyberspace Units 1707-13888

Institution/Unit	Mission and Activities
Central Party Investigative Group	Technical education and training
Unification Bureau Operations Department	Cyber-psychological warfare, organizational espionage
204th Unit (Unification Bureau Operations Department)	Psychological operations, incitement of disorder in South Korea
Number 91 Office	Offensive cyberspace operations

Intelligence Collection

North Korea has used the Internet since the 1990s to stay abreast of international developments, but with its growing cyberspace capabilities Pyongyang is now gaining access to secured information. In late 2016, South Korea's Cyber Command was reportedly hacked by North Korean cyberactors. The intranet server of the Cyber Command was contaminated with malware. The South also found that some military documents, including confidential information, had been hacked, according to a South Korean Ministry of National Defense official. In a subsequent cyberspace operation in 2017, the North allegedly exfiltrated classified war plans, according to a South Korean legislator.[128,129] In addition, North Korea is reportedly actively engaged in cyberspace infiltration into the United States and European countries for the purpose of exfiltrating technical data important to solving technological problems with miniaturizing nuclear weapons and perfecting its ballistic missiles.[130]

Currency Generation

North Korea is broadly suspected of using cyberspace means to steal money from financial institutions worldwide. North Korean hackers use overseas infrastructure to achieve their goals for the regime while also masking their attribution. The North's cyberactors also operate from overseas locations to generate currency illegally while maintaining legal means of revenue generation on the surface.[131]

The 2016 theft of $80 million from the Bank of Bangladesh has been attributed to North Korea. Several international cybersecurity firms have conducted research and documented similar North Korean cybercrime operations resulting in thefts from more than 100 global banks using a combination of malware tools and harvested user credentials, including in the Philippines, Vietnam, and Poland and others.[132]

In addition to cyber-enabled theft, North Korean hackers engage in global fraud, blackmail, online gambling, and other cyberactivities to create profits. These activities together are estimated to generate an annual revenue of $860 million, some portion of which probably supports military activities. Given the increased sanctions against North Korea as a result of nuclear and missile activities, Pyongyang will continue turning to cybercrime as a means to generate currency to fund its weapon programs while sidestepping international efforts to freeze the regime's funding.[133]

Denial and Deception

Denial and deception (D&D) is fundamental to North Korean military operations. The KPA makes extensive use of D&D methods and materials to conceal its readiness and enhance survivability of its forces. North Korea probably understands the United States' and its allies' intelligence, surveillance, and reconnaissance capabilities and is able to take measures to counter collection activities, including scheduling activities to occur at night or under cloud cover, using mountainous topography for terrain masking, and hiding equipment in

UGFs. The KPA also uses camouflage netting and paints, equipment decoys, false signals emitters, and smoke and obscurants.[134,135,136] North Korea dedicates a substantial portion of its D&D resources to concealing activities associated with its nuclear and ballistic missile programs, conducting many activities in UGFs.[137]

Logistics and Sustainment

Although doctrinal planning requires the KPA to maintain 6 months of supply in all resource categories to sustain defensive combat operations, North Korea may have sufficient supplies for only 2 to 3 months.[138,139] Subsistence supplies could last up to 3 months, and ammunition could last slightly longer.[140] Inadequate availability of fuel and transportation assets, poor maintenance of ground lines of communication, and insufficient training all constrain North Korea's ability to sustain large-scale conventional offensive operations.[141,142,143,144]

North Korea's transportation infrastructure is in poor condition; it has damaged roads, resource availability constraints, and difficult terrain.[145,146] Many roads are unpaved gravel or dirt surfaces and lack consistent mainte-



The Sino-Korean Friendship Bridge provides North Korea an important transportation link to China.

Image Source: Shutterstock



Junior KPA soldier at attention during a military event in Pyongyang. The KPA is a platform for ideological indoctrination and internal social control in addition to its offensive and defensive missions.

Image Source: Shutterstock

nance.[147] Although these features are a defensive advantage in case of invasion, they also hamper KPA mobility in the offense. North Korea has fortified key maneuver corridors along the coasts, the DMZ, areas surrounding Pyongyang, and roads adjacent to the North Korea–China border.[148,149,150,151] These roads provide access and mobility to some of North Korea's supplies that are stockpiled in UGFs bordering the DMZ.[152,153] Railroads also provide critical links between major cities within the country and connect to Chinese and Russian rail lines despite having similar inconsistent maintenance.[154] The military is likely to use the railway network to reposition forces and supplies to sustain operations.[155,156]

Human Capital

Over 1.3 million people out of North Korea's population of approximately 25 million serve in the KPA, making North Korea's military the fourth largest in the world. As many as 20 per-

cent of North Korean males between the ages of 16 and 54 are in the military at a given time and possibly up to 30 percent of males between the ages of 18 and 27, not counting the reserves or paramilitary units. The active-duty forces account for at least 6 percent of the population and at least 12 percent of the male population. With universal conscription and long-term service, the KPA serves as a key socialization mechanism for the state and a pathway to Korean Workers' Party membership.[157]

The bulk strength of the KPA is made up of conscripts serving a 10-year enlistment period. North Korea drafts women, although shorter enlistments are available to females and to personnel in specialty fields. Most KPA personnel spend their entire conscription period with the same unit in the same location, often using and training on the same equipment for a full decade. Conscripts who are selected for university-level education are eligible to serve their enlistment after graduation and may serve a shorter time in the military.

Historically, KPA servicemembers were afforded better rations than the general population, but this trend has declined precipitously since the mid-1990s, and most KPA conscripts now are subject to the same deprivation as the general population outside Pyongyang.[158] Former KPA servicemembers who have defected to the South describe malnutrition and harsh service conditions. Because of North Korea's chronic food insecurity, military personnel are periodically diverted away from standard duties to plant or harvest crops.[159]

Over the next few decades, the effects of the 1994-97 famine will continue to affect the population that constitutes the majority of the KPA reserve manpower pool. North Korean children born in the 1990s suffered malnutrition, which resulted in declining physical development, stunted growth, and mental underdevelopment.[160] This trend suggests that some number of KPA conscripts in the reserves will function at lower levels of effectiveness due to mental and physical impairments.[161,162]

The COVID-19 pandemic probably is having a disruptive impact on the North Korean population. North Korea has reported suspected COVID-19 cases, but has not officially reported any confirmed cases.[163] Nonetheless, COVID-19 has exacerbated North Korea's already weak economy and despite continued denials of any domestic cases, Pyongyang has implemented border closures, quarantines, lockdowns, and steep reductions in trade to prevent the spread of the virus. North Korea's military has probably experienced some degradation in unit proficiency, but can conduct most functions if ordered. How COVID-19 will ultimately affect North Korean civilians, military personnel, or leadership is unclear.

Outlook: Targeted Investments in Select Military Capabilities

Kim Jong Un has set North Korea's military on a path to expand its capabilities across multiple domains in the coming years. Kim has placed a priority on the development and demonstration of weapons that provide North Korea the means to strike distant adversaries—including the United States—with nuclear weapons, improve the KPA's capability to strike key targets in South Korea at increasing distances from the DMZ, and further fortify North Korea against external attack or invasion.

These operational goals reflect an overarching security strategy focused on deterrence and coercion; Kim appears to judge that he can prevent the United States from taking action against North Korea if he demonstrates a viable nuclear weapon deliverable on a reliable long-range ballistic missile. Moreover, Kim will continue to bolster his conventional military's offensive and defensive capabilities to raise the cost of a conflict if deterrence should fail and to expand his options to threaten South Korea and locally based U.S. forces. Even absent WMD capabilities, these conventional capabilities continue to pose a constant threat to South Korea, Japan, and U.S. forces in the region.

Breaking from the fast pace of missile and nuclear testing in 2016-2017, North Korea pursued diplomatic outreach in 2018 and early 2019, and declared its support for the denuclearization of the Korean Peninsula. It has not conducted any nuclear tests since 2017, and has reversibly dismantled portions of its WMD infrastructure. However, we continue to observe activity, at Yongbyon and elsewhere, inconsistent with full denuclearization. North Korea began flight testing new SRBMs and an SLBM in mid-2019. In an October 2020 military parade, North Korea revealed a new larger ICBM, probably designed to deliver multiple warheads. North Korea retains its WMD capabilities, and it is unlikely to give up all of its WMD stockpiles, delivery systems, and production capabilities. North Korean leaders view nuclear arms as critical to regime survival.

Unless it agrees to, and follows through with, full denuclearization, including the scrapping of delivery systems, North Korea will likely grow and advance all of the following military sectors:

Land Based Ballistic Missiles. In 2018, North Korea stated that it would abide by a missile launch moratorium during dialogue with the United States; however, it conducted multiple launches of new solid-propellant SRBM variants beginning in May 2019. Even if additional flight tests of longer range systems do not occur in the near term, Pyongyang will probably focus on training and improving its missile forces which are increasingly central to North Korea's deterrence strategy. North Korea also will work to improve its newer solid-propellant ballistic missiles - solid fueled missiles can be made ready for launch more quickly than liquid fueled missiles.

It is possible we could see a test of a long range missile over the next year.

Submarine-Launched Ballistic Missiles. North Korea's debut of an SLBM in 2015 opened a new potential area of operations for the North Korean Navy. It tested another new SLBM, the Pukguksong-3, in October 2019 and paraded a new Pukguksong-4 in 2020 and a Pukguksong-5 in 2021. This capability is likely to grow slowly because constructing and deploying new submarines requires a lengthy, resource-intensive manufacturing process.

Nuclear Weapons. Integrating a nuclear weapon with a ballistic missile and enabling that nuclear-armed missile to function reliably as a system is North Korea's ultimate operational goal. Further underground nuclear tests to validate weapon capabilities are possible if North Korea reconstitutes its nuclear test site or establishes a new one.

Long-Range Artillery. North Korea's development of longer range and precision-guided MRLs will continue, and these systems will be deployed with the Ground Forces to multiply the artillery threat to Seoul and points south of Seoul.

Special Operations Forces. The North's efforts to train SOF for operations in South Korea will continue and will be used for propaganda purposes as well as practical unit training. The North may seek to build proficiencies in infiltration techniques and raids against South Korean government facilities.

Unmanned Aerial Vehicles. North Korea has demonstrated a capacity to field multiple classes of UAVs and fly them into South Korean airspace undetected, although several of these UAVs have malfunctioned and crashed. The North probably sees future intelligence gathering roles for its UAVs and may look into arming UAVs to supplement the Air Force's ground-attack capabilities.

Cyberspace Capabilities. North Korea will continue to target U.S. and allied networks in the government, military, and private sectors. Pyongyang will focus hacking efforts on targets that offer opportunities to steal useful information and deny or disrupt our use of computer networks. Cyber-enabled theft and currency-generating activities also will continue, and the North's hacking techniques may become more sophisticated.

Limited Resources Hamper Development in Other Sectors. North Korea lacks the capacity to invest significant resources in new, more capable systems across the entire force. Elements of North Korean military power that do not receive this level of leadership attention, such as the Air Force or the surface Navy, will remain capable of executing their core missions, but their readiness and capability will probably remain static or erode over time. Critical deficiencies and shortfalls in North Korea's transportation infrastructure and military supply base are likely to persist, limiting the KPA's mobility on the offensive and preventing it from sustaining a major advance into South Korea.

Sanctions placed on North Korea have probably limited the amount of resources it has to implement military modernization on its own. North Korea will continue to use diplomatic engagement, counterpressure against the sanctions regime, and direct sanctions evasion to try to mitigate some of the effects of the sanctions. North Korea may calculate that China and Russia will eventually distance themselves from the U.S. policy of strict sanctions enforcement as each seeks to increase its leverage in the region.

APPENDIX A: Strategic Force

North Korea's Strategic Force operates the regime's ballistic missiles. The service's mission is nuclear and conventional ballistic missile strike against targets inside and outside the region. Kim Jong Un has prioritized the development of new Strategic Force-operated missile systems and has directed more launches of older missiles, suggesting this service could become one of North Korea's more capable military arms if training and development are sustained and pursued consistently forcewide.

The Strategic Force is a service-level entity on par with the North Korean Air and Air Defense Command or Navy; it is probably subordinated directly to the General Staff Department and is only one step removed from Kim's personal command. The Strategic Force enjoys a high public profile and is credited with numerous key advances in North Korean ballistic missile capabilities. Kim has, according to North Korean state media, issued orders to the Strategic Force on multiple occasions directing it



Kim Jong Un inspects a Hwasong-12 IRBM prior to flight-testing. Tests to improve the reliability of ballistic missiles have been increased and publicized under Kim Jong Un.

Image Source: KCNA VIA KNS/AFP

to increase its alert status and prepare for missile strike operations against U.S. bases in the Western Pacific and against the United States directly.[164]

North Korea's ballistic missile units control a wide selection of SRBMs, MRBMs, IRBMs, and ICBMs.[165] It is unclear what operational role, if any, the Strategic Force has with respect to North Korea's developmental submarine-launched ballistic missile (SLBM). North Korean state media has shown testing of a ballistic missile with a precision-control guidance system and has alluded to a possible antiship role for North Korea's ballistic missile units.[166]

The strength of the Strategic Force is estimated at 10,000 personnel. The service controls over 200 road-mobile ballistic missile launchers.[167] In a missile deployment or strike scenario, mobile launchers permit North Korea to mobilize systems out of garrisons and conceal them while launch preparations are under way. Since 2014, the Strategic Force has undertaken multiple mobilization and launch exercises apparently designed to train on these tactics, techniques, and procedures, and North Korean media has described some missile launch events as testing nuclear components.[168] Kim has personally overseen land- and sea-based ballistic missile testing and publicized the achievements through photos and video, reflecting his personal interest in this service's development.

North Korea's ballistic missile force is one of the most rapidly modernizing elements of the national military. Several new ballistic missile systems and associated equipment were publicly debuted in 2017 through flight testing and a military parade; those systems that are deployed operationally will almost certainly be operated by the Strategic Force. Also in 2017, tracked ballistic missile launchers were observed for the first time.[169] In 2018, North Korea paraded a never before seen SRBM that appears similar to the Russian solid-propellant Iskander missile system. It tested this and three other new types of SRBMs multiple times since 2019.[170,171] The Strategic Force also continues to operate several missiles that date to the 1980s–1990s, including Scud class SRBMs and the No Dong MRBMs. Continued flight tests on these systems from 2015-2017—as well as North Korean press statements highlighting the role they play in current nuclear attack plans—suggest that North Korea remains interested in improving the performance of these older missiles and validating the proficiency of their launch crews.



Scud class SRBM on new tracked launcher, paraded in Pyongyang in April 2017.

Image Source: 2017 DIBMAC Report

APPENDIX B: Ground Forces

KPA Ground Forces—armor, infantry, and artillery—remain the core of North Korea's military power and the primary means by which Pyongyang threatens Seoul. The KPA ground units comprise 10 regular corps, 2 mechanized corps, 1 armored division, 4 mechanized divisions, and 1 artillery division plus numerous combat, combat support, and combat service support brigades and regiments. The Ground Forces number about 1,000,000 active-duty soldiers, and another 150,000 are assigned to reserve units.[172,173,174,175,176] With a large artillery and infantry force forward-deployed, the KPA Ground Force can mount an attack on South Korean and U.S. forces with little or no warning. Although the KPA may meet initial success, its maneuver and sustainment problems, stemming from resource shortages, probably would limit its ability to maintain the momentum of an attack, unless it receives outside support.

Ground Forces are subordinate to the General Staff Department. The force is infantry heavy and is supported by significant artillery and armored/mechanized forces. The forward corps and the armored, mechanized, and artillery units operate the most modern ground equipment in the KPA inventory. The rear corps are a mix of regular and reserve forces with older equipment. The KPA is oriented to a conflict along the DMZ, with over 70 percent of the force deployed south of Pyongyang.[177]

In addition to the regular and reserve forces, the KPA has an extensive paramilitary organization that assists in providing rear-area security and manpower to replace combat losses. These forces are organized into the Worker Peasant Red Guard (WPRG) and Red Youth Guard (RYG).[178] These organizations are present at all levels of government (province, county, ward) and are under the control of the Korean Workers' Party in peacetime but revert to military control during crisis or war. The WPRG and RYG have about 6 million personnel (approximately 25 percent of the North Korean population).[179]

The KPA artillery and armored force mainly comprises North Korean–produced copies of Soviet-era equipment. It is largely based on old technology but is reliable and easy to maintain. The artillery force includes a large number of conventional towed and self-propelled systems and long-range 170-mm guns and 240-mm multiple rocket launchers.[180]

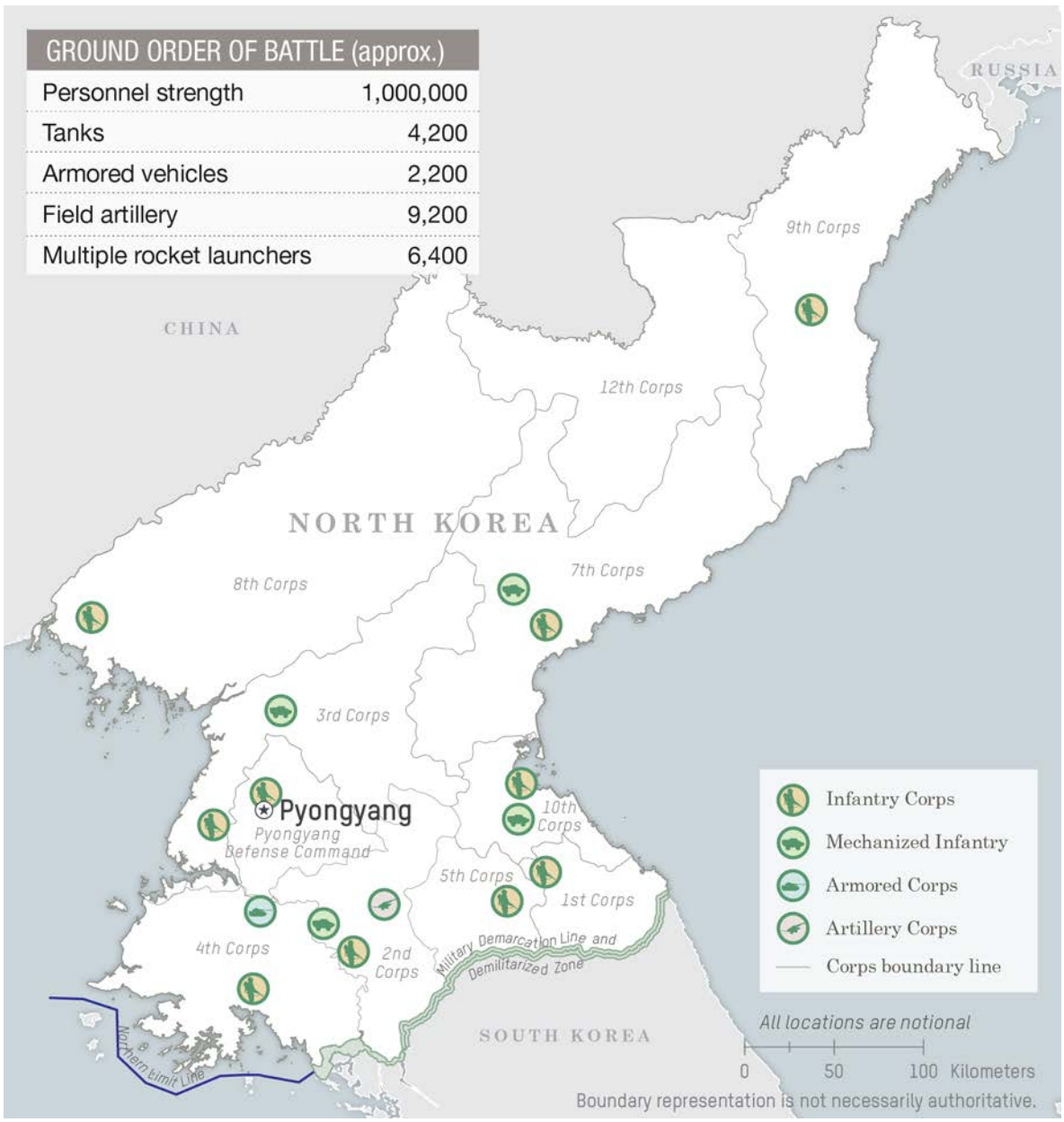


New 300-mm MRL CRBM in live fire exercise, 2016.

Image Source: KCNA VIA KNS/AFP

Major Ground Units[181,182]

1707-13887



KPA Ground Forces modernization is slow and incremental, but Kim has dedicated some new systems to ground units. North Korea debuted a new main battle tank in a military parade in 2010, and the KPA has conducted multiple tests of the new 300-mm MRL CRBM since 2014. The 300-mm MRL CRBM is an advanced MRL system configured to fire up to eight 300-mm guided, rocket-propelled munitions per launcher. Presumably it will be deployed with artillery units. The system will extend the range of KPA firepower well south of Seoul and could be sufficiently accurate for precision targeting against key South Korean and U.S. military installations on the peninsula.[183] Additionally, in September 2018 North Korea paraded a new self-propelled artillery system and a new six-wheeled, eight canister tactical guided missile system, most likely an anti-tank guided or surface-to-air missile. North Korea probably tested this new tactical guided missile system in April 2019.[184,185] *[For more details on modernization, see Appendix H.]*

North Korean strategy, doctrine, and tactics for ground operations have remained fairly consistent since the 1950s. In the event of a massed attack against South Korea, the North would use heavy concentrations of infantry and armor supported by artillery to break through and attempt to destroy forces defending along the DMZ, and advance rapidly down the entire peninsula. These operations would be coordinated closely with the opening of a second front comprising special operations forces (SOF) units conducting raids and disruptive attacks in the South Korean rear area. The KPA Ground Forces are capable of defending against and deterring a land invasion from the South. The KPA would initially focus on infantry and light infantry operations supported by large volumes of artillery fire support, but would default to guerrilla-style operations targeting rear areas and logistics if invading forces progressed beyond the DMZ. KPA doctrine puts great emphasis on fighting under arduous conditions, at night, in the mountains, and during inclement weather. KPA tactics are heavily influenced by Kim Il Sung's anti-Japanese guerrilla activity, which emphasized the value of small-unit fighting. The modern KPA emphasizes small and large units attacking an objective simultaneously, such as SOF or light infantry attacking the objective from the rear or flank while heavy infantry supported with artillery assaults from the front and flanks.[186]

APPENDIX C: Air and Air Defense Forces

The North Korean Air Force is primarily responsible for defending North Korea's airspace and territorial integrity. Its other missions include tactical air support to KPA Ground Forces, insertion of SOF, transportation and logistics support, wartime strikes against targets in South Korea, and intelligence, surveillance, and reconnaissance. The Air Force is capable of defending North Korean airspace, with aircraft and ground-based systems but would struggle to penetrate South Korean air defenses in an attack role.

North Korean air and air defense forces are organized into four air divisions (each responsible for a sector of the country) that control surface-to-air missiles (SAMs), antiaircraft artillery (AAA), and air surveillance assets. The forces also control transport units and two airborne sniper brigades as well as various support elements. The air divisions control combat and transport aircraft and helicopters that operate from a large number of airfields.

The air and air defense forces have about 110,000 personnel and control over 900 combat aircraft, over 300 transport aircraft, and 300 helicopters. The more modern aircraft are concentrated in and around Pyongyang, and the SAMs and AAA provide perimeter security for the country and the capital in particular. The capital has one of the most dense concentrations of AAA in the world.[187]



Russian MiG-29C. The North Korean model of this 1980s-era fighter is the newest aircraft in the North Korean Air Force inventory.

Image Source: AFP

The Air Force's most capable combat aircraft are its few MiG-29 Fulcrum fighters procured from the Soviet Union in the late 1980s, its MiG-23 Flogger interceptors, its Su-25 Frogfoot ground-attack aircraft, and its Il-28 Beagle bombers. The majority of its aircraft are much older and less capable; the Air Force is one of the only air forces in the world that still operates MiG-21s, MiG-19s, MiG-17s, and MiG-15s. The Air Force also maintains a large fleet of An-2 Colt aircraft, first produced in the 1940s, which are single-engine 10-passenger biplanes probably tasked with inserting SOF into South Korea but are also capable of supporting simple air-to-ground strike missions. The Air Force is rounded out with other Soviet-era transport aircraft, including helicopters that would be used for troop transport and limited ground attack.[188]

The most common North Korean ground-based air defense artillery threat to aircraft (helicopters and fixed-wing aircraft) and unmanned aerial systems is very likely manually directed AAA and man-portable air defense systems (MANPADS). Manually directed systems will have limited ability to engage smaller targets, such as UAVs, in addition to poor ability to engage all targets at night and in inclement weather.

Major Air Units[189]

1707-13887



KPA ground-based AAA probably will rely heavily on medium-caliber (30-mm to 57-mm) AAA guns. Medium-caliber AAA guns maximize firepower (a combination of rate of fire and kinetic energy) by offering some of the highest rates of fire while being large enough to have sufficient terminal ballistics and lethality characteristics. The KPA also fields numerous 14.5-mm antiaircraft machineguns and domestically produced MANPADS (SA-7, SA-14, and SA-16). North Korea operates a variety of SAMs, mostly Soviet-era systems, including the SA-2, SA-3, SA-5, and SA-13.[190]

Flight time for North Korean pilots reportedly is severely restricted to as few as 15–25 hours per year. Flight hours this low probably stem from fuel shortages and may reflect concern over the upkeep and maintenance of the North's aging aircraft.[191] Under these conditions, North Korean pilots most likely focus their training on simple pilot proficiency and the maintenance of basic aeronautical skills. The pilots of more advanced fighter aircraft probably fly more frequently, maintaining a higher degree of proficiency and at times participating in aerobatic competitions and demonstrations during public air shows. In September 2016, North Korea hosted its first advertised International Friendship Air Festival, at Kalma Airfield in Wonsan, where a variety of pilot drills were held and aircraft were displayed for the public.[192]

North Korea has probably modernized select older air defense systems in addition to introducing some newer systems. During a 2010 military parade, North Korea first displayed a new mobile SAM launcher and accompanying radar that externally resembled the Russian S-300 and Chinese HQ-9; this system was most recently tested in 2017.[193] The North is also developing or procuring a variety of UAVs, some of which have been used for reconnaissance missions over South Korea and which could be equipped with rudimentary armaments.[194] North Korea is probably pursuing larger UAVs for a variety of military missions.



The SA-5 surface-to-air missile is North Korea's longest-range SAM.

Image Source: Shutterstock



North Korean reconnaissance drone, recovered after crashing in South Korea. Several UAV models have been sighted in South Korean airspace.

Image Source: AFP/SOUTH KOREAN DEFENCE MINISTRY

APPENDIX D: Navy

The North Korean Navy is the smallest of the KPA's three conventional force services, with about 60,000 personnel. The Navy's primary mission is to defend North Korea's coastline and territorial waters from attack and to protect the approaches to North Korea's main ports. The Navy is also responsible for SOF insertion, coastal surveillance, and the protection and control of fisheries operations. In wartime, the Navy will focus on antisurface warfare, mine warfare, and interdicting sea lines of communication to hinder the United States and UNC's ability to flow forces into the theater.[195] North Korea's Navy would be constrained to a largely defensive role in a conflict, and it would face significant challenges attempting to operate against South Korea or the United States.



North Korean Navy Romeo-class diesel-electric attack submarine, 2014. Kim Jong Un is aboard for an inspection.

Image Source: KCNA VIA KNS/AFP

Major Naval Units[196]

1707-13887



North Korea's Navy is primarily a coastal force. It maintains one of the world's largest submarine forces and operates a large fleet of air-cushioned hovercraft and conventional landing craft to support amphibious operations and SOF insertion. The force is divided into East and West Coast Fleets, with each operating a variety of patrol craft, guided-missile patrol boats, submarines, and landing craft.[197]

North Korea has about 70 diesel-electric attack, coastal, and midget class submarines in service divided between both coasts. Many of the North's submarines are of older design and have limited endurance; however, they are sufficiently capable of using torpedoes and mines to threaten merchant ships and U.S. and allied navies operating near the Korean Peninsula. Determined to expand its undersea and deterrent capabilities, North Korea launched a new ballistic missile submarine with a single launch tube in 2015 and began flight-testing SLBMs the same year. North Korea is expected to continue SLBM development and expand its naval deterrent unless it proceeds with denuclearization. Finally, North Korea is likely to introduce other new submarines into its force.[198,199,200,201]

The Navy's surface ship order of battle comprises mostly small patrol craft that carry a variety of antiship cruise missiles, torpedoes, and naval guns. The Navy also operates a large fleet of air-cushioned hovercraft and conventional landing craft to support amphibious operations and SOF insertion.[202] The Navy uses a variety of torpedoes, including straight-running and wake-homing torpedoes, that can be launched from submarines and some surface ships. An international investigation concluded that North Korea used a wake-homing torpedo known as CHT-02D to sink the South Korean corvette Cheonan in March 2010.[203,204]



Pukguksong-1 SLBM launch, April 2016 (left). North Korea's SLBM progressed rapidly from ejection tests to short-range flight test, later followed by a launch of Pukguksong-3 in 2019 (right).

Image Source: KCNA VIA KNS/AFP and AFP PHOTOS/KCNA

North Korea has a history of mine warfare being instrumental to its coastal defense strategy. During the Korean War, North Korea's naval forces were able to mine Wonsan Harbor and, as a result, successfully prevented a U.S. amphibious landing from cutting off retreating North Korean ground forces. Therefore, mines probably remain a key element of North Korea's maritime defense strategy.[205] The Navy may also attempt offensive mining of South Korean ports.

The most dramatic new development in the North Korean naval force was the debut of a ballistic missile–capable submarine and its associated SLBM, the Pukguksong-1 (translated as Polaris-1). According to North Korean press statements, the SLBM will be cold-launched and solid-fueled, will carry a nuclear warhead, and is intended to be launched from ballistic missile submarines. North Korea conducted multiple flight tests of the developmental SLBM in 2016 and displayed it in a military parade in 2017.[206] North Korea tested a second SLBM, called Pukguksong-3, in October 2019. A ballistic missile strike role would be wholly new for the Navy, which may not yet have a final plan for how to incorporate this new mission into existing doctrine and plans. North Korea's Navy also tested antiship cruise missiles in 2017.[207]



North Korean Navy patrol boat on guard in waters off the Mt. Kumgang international tourist zone, 2011.

Image Source: AFP

APPENDIX E: Special Operations Forces

North Korea's special operations forces (SOF) are designed to infiltrate South Korea and attack targets in the rear area, and to defend against foreign attacks on North Korea. SOF members operate in specialized units, including reconnaissance, airborne and seaborne insertion, and commando squads.[208] Core SOF doctrine emphasizes speed of movement and surprise attack to accomplish the mission. SOF personnel may be airlifted by helicopters and fixed-wing aircraft (and possibly Civil Air Administration transports), moved by surface ships or submarines, or travel on foot over land or via suspected cross-DMZ tunnels to attack high-value targets, such as command and control nodes, airbases, and ports. North Korean SOF are highly trained and well-equipped in comparison to other units, and, if successfully infiltrated into the South, would be capable of disruptive attacks in the rear area.

SOF personnel are present at all echelons of the KPA (from brigade and division to corps) as well as the strategic-level 11th Corps, which controls a number of SOF brigades for strategic missions, including creating a "second front" in the rear area that disrupts and distracts from the main fight along the frontlines. SOF light infantry, sniper, and reconnaissance elements and air and naval SOF elements are present in many infantry divisions and the forward corps.

The various SOF units comprise over 200,000 personnel organized into brigades of 3,000–5,000 members and separate regiments and battalions of varying strength (these personnel are accounted for in KPA manpower figures). North Korean SOF units are provided with the best available equipment, including weapons, explosives, incendiaries, chemical and biological agents, parachutes, aircraft, and communications equipment. Compared with the equipment of other worldwide SOF units, North Korea's equipment is rudimentary, and North Korean SOF probably lacks such sophisticated items as burst communications equipment, advanced signal-processing equipment, and specialized explosives. State media photos from two training exercises revealed purported North Korean SOF using newly identified equipment, including helical magazines, improved ballistic helmets, night-vision devices, and body armor, but fielding of this equipment to operational units cannot be verified.[209]



KPA special operations forces parade in Pyongyang, 2017. New optical equipment and firearms are displayed.

Image Source: KCNA VIA KNS/AFP

Strategic SOF units support national objectives with reconnaissance and raid missions. Specifically, these units develop targeting information, report South Korean civilian and military actions, and conduct poststrike assessments. Typical missions would involve the location and sabotage or destruction of national-level artillery; airfields; storage facilities; air defense locations; and command, control, communications, and intelligence (C3I) assets in South Korean rear areas. In addition, strategic units also may kidnap or assassinate key South Korean or U.S. personnel.



South Korean naval personnel recover a damaged North Korean semisubmersible craft in the sea south of Jinhae, South Korea, 1999. North Korean SOF utilize such vessels to infiltrate agents into the South.

Image Source: AFP

Infiltration of enemy territory—possibly before a war begins—is a key KPA SOF mission. SOF can be infiltrated by air using the An-2, which can support this operation by paradrop or by landing on a highway to debark personnel. Maritime infiltration can be accomplished by cushioned hovercraft, which could deliver over 7,000 SOF personnel to each of South Korea's coastlines, and by submarines, including Romeo class diesel-electric submarines and specially outfitted Sango class submarines, which are designed solely for coastal infiltration.[210,211]

Operational SOF units support corps objectives with light infantry and reconnaissance missions. In wartime light infantry units will target critical terrain and command-and-control assets, delay South Korean, U.S., and UNC reserve forces, and attack division (and higher) command posts. In addition, these units ascertain enemy intentions, develop targeting information for ballistic missiles and long-range artillery, conduct poststrike assessments, and determine locations of South Korean, U.S., and UNC reserve forces. Tactical SOF units support maneuver division and brigade objectives with light infantry operations. Light infantry units attack brigade and division command posts, capture key terrain to assist in maneuvering divisions and brigades, and destroy South Korean, U.S., and UNC reserve forces. The organic reconnaissance company of the maneu-

ver unit performs tactical reconnaissance. The reconnaissance company and light infantry battalion develop targets for destruction. These targets include air defense sites, force concentrations, artillery positions, and C3I assets.

Doctrinally, North Korean SOF units train in unconventional warfare following the tenets laid out by Kim Il Sung in various training and doctrine manuals. Defensively, the North Korean SOF serves as North Korea's primary counter-SOF force, guarding key sites against possible targeting by enemy SOF during wartime. Because of the importance that the regime places on North Korea's SOF capability, SOF members often receive more frequent training of a much higher quality than regular KPA infantry receive.[212]



Air-cushioned landing craft used for SOF infiltration, shown in training exercises publicized by North Korean state media.

Image Source: KCNA VIA KNS/AFP

APPENDIX F: Reserve and Paramilitary Forces

The KPA has an extensive reserve structure built around numerous Reserve Military Training Units (RMTUs). These units primarily comprise infantry divisions and brigades and artillery brigades and regiments. The RMTUs' role is to maintain North Koreans' basic soldier skills and proficiencies should citizens need to augment the active-duty forces during a crisis. The majority of the RMTUs are in the rear corps, but some are also in the forward corps. In a conflict scenario, RMTUs and other paramilitary groups are trained to function as insurgents and defend their homeland against external attackers.

North Korea also has an extensive paramilitary structure that includes the Worker Peasant Red Guard (WPRG) and Red Youth Guard (RYG) under party/civilian control in peacetime and organized into regiments and battalions. These paramilitary units are usually mobilized



Soldiers in the Worker Peasant Red Guard paramilitary train for concealment and defense operations, 2013.

Image Source: KCNA VIA KNS/AFP

for domestic projects, such as road building and agricultural support. The corps-sized Bodyguard Command (with multiple brigade units) provides regime protection forces outside the KPA's control. Finally, engineering and logistic units provide numerous services often associated with the private and government sectors in other nations but that are under party and government control in North Korea, including agricultural support and road maintenance.[213]

The RMTU elements comprise up to 600,000 personnel, but few are on active duty at any one time. The WPRG and RYG comprise up to 5 million personnel and 1 million personnel, respectively. They comprise about 25 percent of the entire population but are seldom mobilized in any significant number. The Bodyguard Command and other militarized elements add an additional 300,000 personnel to the overall strength of the paramilitary force and are actively engaged in their roles at all times.

RMTUs are routinely activated in small numbers during the KPA's summer and winter training activities. RMTUs augment local active-duty forces in force security, counter-SOF operations, movement of logistics, etc. The RMTUs' training during either training cycle generally reflects KPA training in basic soldier skills and small-unit combat skills.

North Korean reserve military personnel are issued uniforms for wartime use and for training with active units and are equipped with individual weapons, including handgrenades and rocket-propelled grenades. Reserve soldiers are most likely to be armed with older variants of Kalashnikov-model (Type 58/68) rifles. Most reserve units have wartime reserve caches of weapons, food, and supplies near their wartime areas of operation.

The WPRG is organized into elements that vary in size and serve locally in each village, town, factory, and enterprise. The WPRG and the RYG conduct combat and political training as preparation for an all-people resistance war to defend their provinces, counties, and hometowns as required to defend the North as part of an impregnable fortress. Physically qualified nonexempt North Koreans are assigned to a reserve military unit upon release from KPA active duty. Male reservists serve with an assigned unit until they are 60 years old.

APPENDIX G: Intelligence Services

North Korea has four primary intelligence and counterintelligence services: the Reconnaissance General Bureau, the Ministry of State Security, the United Front Department of the Korean Workers' Party, and the Cultural Exchange Bureau, which was formerly known as the 225th Department. North Korean intelligence and security services collect political, military, economic, and technical information through open sources, human intelligence, cyberspace capabilities, and signals intelligence capabilities. North Korea's primary intelligence collection targets are South Korea, the United States, and Japan.[214] The North's intelligence services have also conducted operations against these countries, including the abduction of Japanese citizens in the 1970s and 1980s.

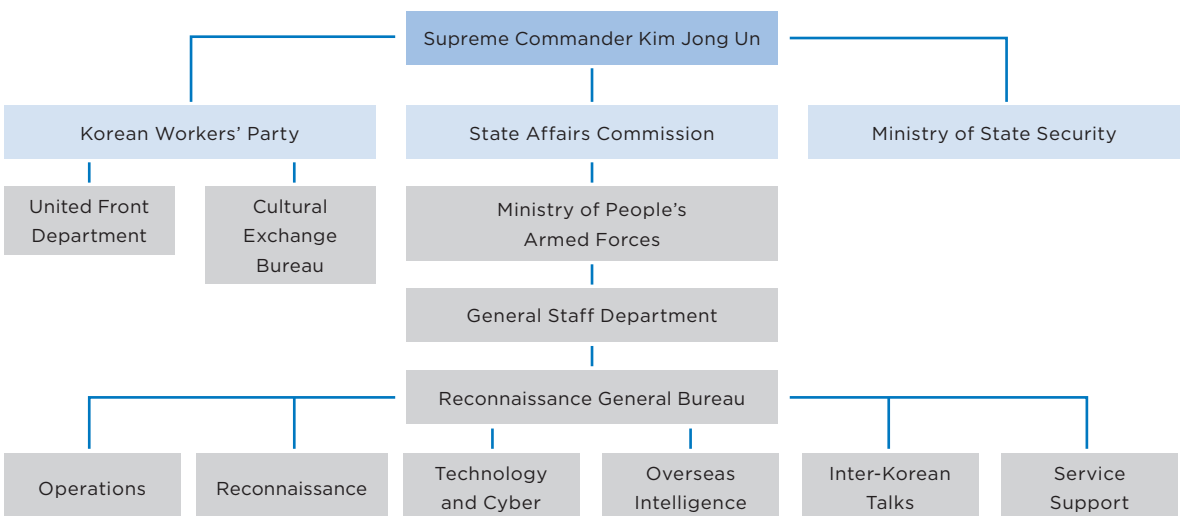
Reconnaissance General Bureau

The Reconnaissance General Bureau (RGB) is North Korea's premier military intelligence service, responsible for collection, analysis, and clandestine operations.[215, 216] The RGB was established in 2009 during a reorganization of North Korea's intelligence services, which transferred three intelligence agencies from the Korean Workers' Party and consolidated them under the National Defense Commission (disestablished and replaced by the State Affairs Commission in 2016).[217] Administratively, the RGB is subordinate to the KPA General Staff Department.[218]

The RGB consists of six bureaus with compartmented functions, including operations, recon-

North Korean Intelligence Services

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naissance, technology and cyberspace functions, overseas intelligence, inter-Korean talks, and service support.[219] The RGB and its predecessor organizations have been tied to a number of foreign kidnappings, assassinations, state-sponsored terror attacks, cyberoperations, and infiltration operations.[220] The RGB also oversees businesses in foreign countries, which are used as fronts for espionage, currency generation, cyberoperations, weapon sales, goods procurement, and other illicit activities.[221, 222]

RGB personnel are highly trained, attending an intelligence academy where operatives receive instruction in firearms and explosives, martial arts, underwater diving, and other activities before becoming operational.[223] The RGB also recruits and co-opts foreign nationals to gather intelligence and execute operations in foreign countries.

Ministry of State Security

The Ministry of State Security (MSS) is North Korea's primary counterintelligence organization, tasked with operating North Korean prison camps, investigating cases of domestic espionage, repatriating defectors, and conducting overseas counterespionage activities in North Korea's foreign missions.[224] The MSS is an autonomous agency of the North Korean government, reporting directly to Kim Jong Un.[225] Jong Kyong-thaek was appointed the Minister of State Security as of October 2017.[226]

The MSS executes its counterintelligence mission abroad as well as domestically and has been implicated in widespread human rights violations.[227, 228] The MSS investigates political crimes and manages North Korea's political prison camps, where prisoners are subject to extrajudicial punishments, brutal treatment, poor conditions, and summary executions.[229] The MSS also enforces censorship laws related to foreign media and monitors the populace and foreign citizens in North Korea through technical surveillance, communications monitoring, recruited citizens, and random inspections.[230] The MSS deploys agents globally—often under diplomatic cover in embassies and UN posts—to monitor North Korean personnel working overseas and to repatriate North Koreans. The MSS has increased its presence abroad because of North Korean defections in recent years.[231]

United Front Department

The United Front Department (UFD) is North Korea's primary civilian intelligence agency, propaganda office, and policymaking entity for inter-Korean relations and dialogue.[232] The UFD is directly subordinate to the Korean Workers' Party.[233] The UFD overtly attempts to establish pro-North Korean groups in South Korea, such as the Korean Asia-Pacific Committee and the Ethnic Reconciliation Council.[234]

Cultural Exchange Bureau

The Cultural Exchange Bureau (CEB) is responsible for running agents in South Korea to establish underground political parties focused on fomenting unrest, revolution, or pro-DPRK views. The CEB also conducts clandestine influence operations.[235, 236]

North Korean Intelligence Services' Covert and Clandestine Operations

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- **2021**
- **2020** — Conducted cyber espionage against United States and other foreign government entities.
- **2019** — Conducted cyber espionage against United States and other foreign government entities.
- **2018** — Conducted cyber espionage against United States and other foreign government entities.
- **2017** — Feb - Murder of Kim Jong Nam, Kim Jong Un's half-brother, in Malaysia.
  May - WannaCry ransomware attacks.
- **2016** — Nov - Hack of world banking system; $81 million stolen from Bangladeshi bank reserves through SWIFT.
- **2015**
- **2014** — 3 Nov - Hack of Sony Pictures; destroyed 70 percent of firm's computers, compromised employee PII and internal emails, resulted in delay of movie release.
- **2013** — 20 Apr - DarkSeoul cyberattack executed by North Korea; malware rendered tens of thousands of computers in South Korea's financial and media sectors inoperable.
- **2012**
- **2011** — Sep - Attempted assassination of defector Park Sang-hak by North Korean agent.
- **2010**
- **2009** — Jun - Denial-of-service attacks against U.S. and South Korean government telecommunications services led by RGB's Lab 110 unit.
  Attempted assassination of North Korean defector Hwang Jang-yop.
- **2008**
- **2007**
- **2006**
- **2005**
- **2004** — North Korea hacking of South Korean and U.S. Defense Department networks.
- **2003**
- **2002**
- **2001**
- **2000**
- **1999**
- **1998** — Jun - North Korean midget submarine captured by South Korea on probable spy mission; all four North Korean agents onboard committed suicide after killing five sailors from the sub's crew.
- **1997** — Feb - Defector from extended Kim family, Lee Han-yong, assassinated outside his apartment building in Bundang, South Korea.
- **1996** — Sep - North Korean submarine on espionage mission infiltrated South Korean territory; 24 North Koreans killed, 13 South Koreans killed, 1 North Korean missing, 1 North Korean captured.
  Assassination of South Korean diplomat Choi Duk-keun in Vladivostok, Russia, by poison.
- **1995**
- **1994**
- **1993**
- **1992**
- **1991**
- **1990**
- **1989**
- **1988**
- **1987** — 29 Nov - Bombing of Korean Air Flight 858 between Baghdad and Seoul by two North Korean agents; all 115 people onboard killed.
- **1986**
- **1985**
- **1984**
- **1983** — 9 Oct - Attempted assassination of South Korean President Chun Doo-Hwan in mausoleum bombing in Rangoon; 21 killed including 18 South Koreans.
- **1982**
- **1981**
- **1980**
- **1979**
- **1978** — Jan & June - Kidnapping of South Korean actress Choi Eun-hee and producer Shin Sang-ok from Hong Kong.
- **1977**
- **1976**
- **1975**
- **1974** — 15 Aug - Second assassination attempt on South Korean President Park Chung-hee in South Korea. Park's wife, Yuk Young-soo, was inadvertently killed in the attack.
- **1973**
- **1972**
- **1971**
- **1970**
- **1969** — 11 Dec - North Korean agent hijacks domestic Korean Airlines Flight YS-11; holds passengers and crew hostage; 39 passengers later released, 11 kept in North Korea.
- **1968** — 21 Jan - Failed raid on South Korea's Blue House in an attempt to assassinate South Korean President Park Chung-hee; South Korean and U.S. military personnel killed in the incident.

APPENDIX H: Defense Industry and the Energy Sector

North Korea places a high priority on its defense-industrial base because it produces the military hardware that Pyongyang views as essential to maintaining national security.[237] North Korean government support for the defense industry comes at the expense of the country's civilian economy; while portions of the nonmilitary industrial base have become outdated and fallen into disrepair, key defense industries have continued to operate and modernize.[238] North Korean defense factories produce a diverse array of military hardware, including small arms, a full range of munitions, light armored vehicles, tanks, naval ships and submarines, and advanced missile systems.[239] Production priorities have shifted over the decades from a focus on large quantities of ground forces equipment in the 1960s–1990s to the development of more capable missile systems.[240]

Although North Korea continues to pursue the ideal of self-reliance in weapon system development and production, it still requires materials and technology purchased on the open market abroad to improve domestic production capabilities and weapon system effectiveness. Pyongyang is attempting to upgrade select elements of its large arsenal of mostly outdated weapons and will continue to focus its limited production resources on force modernization, emphasizing strategic deterrence and defensive and asymmetric attack capabilities to counter the technological superiority of South Korean and U.S. forces.[241] North Korea will produce limited amounts of improved equipment in the naval, aviation, and ground arms sectors, based on regime prioritization and resource availability.

Ballistic Missile Sector

In support of the growing regime-directed requirements to develop a nuclear-armed ballistic missile force capable of threatening the United States and the region, Pyongyang developed multiple longer-range liquid-propellant systems.[242,243] North Korea is also testing new solid-propellant systems, an MRBM, an SLBM, and multiple SRBMs.[244,245] In addition, the country probably has several hundred SRBMs and MRBMs in its inventory, based on 1950s legacy Scud liquid-propellant technology.[246]

ICBMs

In July 2017, North Korea conducted its first two launches of an ICBM class system, testing the liquid-propellant Hwasong-14, which is capable of reaching the United States.[247,248] A follow-on flight-test of another new ICBM, Hwasong-15, occurred in November 2017. North Korea has displayed two other developmental liquid-propellant ICBMs that have yet to be flight-tested. In April 2012 and July 2013, North Korea paraded six three-stage Hwasong-13 ICBMs on eight-axle transporter-erector-launchers (TELs). In October 2015, Pyongyang paraded four previously unseen



North Korea featured a new ICBM in its October 2020 military parade.

Image Source: AFP PHOTO/KCNA

two-stage liquid-propellant ICBMs on the same eight-axle TELs used in 2012 and 2013; North Korea has not announced a name for this system.[249,250,251,252,253] Then, in October 2020, North Korea paraded 4 new larger ICBMs on 11-axle TELs; these missiles have not yet been tested.

SLBMs

North Korea has developed and produced its first SLBM system and a submarine launch platform, the single-launch-tube Gorae ballistic missile submarine and the Pukguksong-1 missile, which was originally a liquid-propellant–fueled system but was replaced with a solid-fueled missile system. Solid fuel has a number of benefits, including being more stable and easier to handle, store, and transport. The medium-range Pukguksong-1 has been ejection-tested numerous times from both a land-based ejection stand and a seagoing ejection test barge. These tests culminated in an August 2016 launch in which the missile flew about 500 kilometers. North Korea reached this milestone after only 3 years of ejection tests and flight tests, which demonstrates a fast-paced missile development program.[254,255] North Korea tested a second medium-range SLBM, Pukguksong-3 in 2019. Since then North Korea paraded 2 new SLBMs, the Pukguksong-4 in October 2020 and the Pukguksong-5 in January 2021. Pyongyang has not tested these new missiles or indicated which submarine will employ them. Improvements and expansion at Sinpo Shipyard indicate that North Korea may produce a larger submarine with the capability to carry and fire more than one missile at a time.[256, 257]



New untested SLBM, October 2020.

Image Source: AFP PHOTO/KCNA

IRBMs

North Korea has two developmental liquid-propellant IRBM systems, the Musudan and the Hwasong-12. The Musudan was first displayed in a 2010 parade but was not flight-tested until 2016; seven of the eight tests ended in failure because missiles exploded on takeoff or early in flight.[258] The Hwasong-12 was first displayed in an April 2017 military parade and flight-tested



Hwasong-12 IRBM.

Image Source: AFP



North Korea launching a new type of SRBM; July 2019.

Image Source: Rodong Sinmun

in mid-May 2017.[259] The Hwasong-12 has a demonstrated range of over 3,700 kilometers, sufficient to reach Guam.[260,261]

SRBMs and MRBMs

North Korea's SRBMs are the foundation of Pyongyang's ballistic missile program. SRBMs are a proven capability that provides Pyongyang a reliable platform for testing and developing longer-range systems while holding at risk the United States and its allies on the Korean Peninsula and in Japan. North Korea probably has hundreds of Scud-based SRBMs and Scud-derived No Dong MRBMs that were developed and initially deployed during the mid-1980s to early 1990s. North Korea continues to develop new SRBM systems, including a liquid propellant SRBM on a new tracked TEL paraded in April 2017 and a SRBM similar to the Russian solid-propellant Iskander missile system paraded in 2018. North Korea tested a version of this missile and two other new SRBMs multiple times since May 2019.[262,263,264,265] In October 2020, North Korea paraded 52 solid propellant SRBMs on 6 different wheeled and tracked TEL chassis. North Korea introduced yet another SRBM at its January 2021 parade. It conducted the first test of this missile in March 2021. Additionally, in September 2021 North Korea tested a new rail-based launcher for an SRBM .

Pyongyang is developing a solid-propellant MRBM known as the Pukguksong-2, a land-based version of the developmental Pukguksong-1 SLBM. This is the largest known solid-propellant system produced by North Korea. The Pukguksong-2 was flight-tested in February and May of 2017 and is carried on a tracked TEL.[266]

Other Missile Developments

In its October 2020 military parade, Pyongyang displayed a new missile system mounting four previously unseen canisters on towed two-axle trailer launchers pulled by a three-axle cab-over-engine truck. This system is likely a cruise missile, possibly a land-attack variant of North Korea's anti-ship cruise missile. In September 2021, North Korea tested LACMs from a 5 can-



Kim Jong Un tours submarine construction hall; July 2019.

Image Source: Rodong Sinmun

ister TEL that had carried probable SRBMs in the October and January parades.

In an April 2017 military parade, Pyongyang displayed two previously unseen containerized ballistic missile systems, although actual airframes were not observed. The first system consisted of a capped launch tube mounted on an eight-axle TEL. The second system also had a capped launch tube, though slightly shorter than the first, mounted on a four-axle trailer pulled by a three-axle cab-over-engine truck.[267]

Naval Sector

North Korea's naval industry can produce vessels to support a coastal force which today comprises primarily aging patrol craft (that carry a variety of antiship cruise missiles, torpedoes, and guns) and a few large corvette-sized vessels. In addition, Pyongyang has built a large fleet of air-cushioned hovercraft and conventional landing craft to support amphibious operations and SOF insertion. Construction of surface ships during the past 5 years has concentrated on a small number of modern, higher speed designs for patrol boats and corvettes with minimal

surface-to-surface and surface-to-air missile capability. Naval shipyards are on both the east and west coasts, but because of insufficient resources they usually produce infrequently. The naval industry is able to maintain a portion of the North Korean Navy fleet with regular repair and maintenance capabilities, but many vessels remain pierside or in nonoperational condition.[268] Submarine production efforts are focused at the Sinpo Shipyard on the east coast.

Aviation and Air Defense Sector

North Korea's aviation industry is capable of assembling light, single-engine airplanes, such as the Cessna 172, and small-to-medium UAVs. In the 1980s and 1990s, the industry was able to assemble fixed-wing aircraft and helicopters from partially completed kits supplied by Russia, China, and other countries, but that capability has since waned. North Korea is unable to produce modern jet fighters and engines, instead relying on cannibalization and the purchase of spare parts from overseas markets to maintain its dated forces.[269]

North Korea has recently been flying small-to-medium–sized photoreconnaissance UAVs with autonomous GPS-waypoint navigation capabilities over the DMZ into South Korean territory. These UAVs are based on commercial Chinese designs; some systems are produced in China and purchased on the open market, and others are produced in North Korea using imported components. North Korea has built larger UAVs, including target drones and training simulators and probably attack drones. Most of these larger systems are based on older models procured from Russia and China, with the exception of a jet-powered UAV based on the U.S. MQM-107D Streaker system that probably was acquired from Middle Eastern sources.[270]

Ground Arms Sector

The majority of North Korean ground forces are equipped with 1950s–1970s Russian and Chinese light and medium tanks, armored personnel carriers, and towed and self-propelled artillery, or North Korean–developed versions of this legacy equipment. Since at least 2010, North Korea has produced only limited quantities of improved ground forces equipment, including an upgraded main battle tank, and the 300-mm MRL CRBM. In development since at least 2013, this CRBM system is equipped with two rocket pods carrying a total of eight guided rounds; the pods are mounted on a three-axle Chinese-origin truck chassis.[271, 272]



Long-range self-propelled artillery piece, one of thousands of such guns capable of striking Seoul.

Image Source: KCNA VIA KNS/AFP

In August 2010, North Korean news media aired video footage of the regime's new main battle tank. The tank has features similar to the Russian T-72, which would provide improved performance over Pyongyang's Chonma-ho family of tanks that is based on the Russian T-62. The tank probably is in service with only one armored unit in the Army.[273]

In a September 2018 military parade, Pyongyang displayed a new tracked, self-propelled artillery gun and a tactical guided missile system, most likely an anti-tank guided or surface-to-air missile, mounted on a six-wheeled armored chassis. It is unknown if either of these systems is currently deployed with the KPA.[274]



New main battle tank, paraded in 2020.

Image Source: AFP PHOTO/KCNA

In October 2020, North Korea paraded several new systems that showcased North Korea's continued defense industrial activity to diversify and modernize its military force, in spite of strict sanctions. These included a new tank design that had flat armor panels around the turret and seven road-wheels; previous tanks only had six. It also paraded never-before-seen light armored vehicles with gun turrets and anti-tank and anti-aircraft missiles. These new systems are not yet fielded.

The Energy Sector

North Korea's oil and gas sector remains in a state of disrepair because of sanctions and years of neglect. The country has no oil and natural gas production and relies on crude oil imports from China to meet demand.[275] Pyongyang officially imports a small amount of refined petroleum products from China and Russia.[276] Although North Korea reportedly has some oil and gas reserves offshore as well as on land, the country does not have the technical expertise to explore or develop these resources.[277,278] China exports about 10,000 barrels per day (b/d) of crude oil by pipeline to North Korea's only operating refinery, in Paengma Ri (29,000-b/d capacity).

North Korea's other refinery, in Sonbong (45,000-b/d capacity), was constructed to process Russian and Middle Eastern crude oil imports. It has been shut down since the late 1990s because of the breakdown in the Six-Party Talks on nuclear disarmament and because of payment issues.[279]

North Korea gives priority to the military over the civilian population when it comes to providing access to refined petroleum products. Since 2018, the United States and its allies observed North Korean maritime vessels using illicit at-sea, ship-to-ship transfers of petroleum from third-country tankers to acquire additional refined petroleum as a way to mitigate the

effects of UNSC sanctions.[280] These ship-to-ship transfers stabilized North Korea's fuel supplies and prices, though acute shortages still affect civilian industry and military operations.[281]

North Korea's electric power sector cannot meet the country's demand for electricity due to decades of overuse, poor maintenance, and equipment shortages. Since the early 1990s, North Korea has experienced frequent blackouts and has the third-lowest electric power consumption per capita among East Asian and Pacific countries.[282,283] In his 2019 New Year Address Kim Jong Un identified increasing electricity generation as one of the most important goals for improving the North Korean economy.[284] North Korea is exploring ways to use wind and solar energy for electricity generation to reduce its reliance on oil imports and vulnerability to international sanctions. North Korea and China jointly operate four hydroelectric power plants on the Yalu River that accounted for 16 to 17 percent of North Korea's total electricity production in 2013.[285]

APPENDIX I: Arms Sales

North Korea has exported conventional arms and ballistic missiles for several decades. Despite the implementation of UN Security Council Resolutions (UNSCRs) 1718,[286] 1874,[287] 2087,[288] 2094,[289] 2270,[290] 2321,[291] and 2356,[292] which prohibit North Korea from selling weapons and providing related technical training, Pyongyang continues to market, sell, and deliver weapons-related goods and services. Weapon sales are an important source of foreign currency for North Korea's weapons programs, and thus, Pyongyang is unlikely to cease export activity despite UN Security Council sanctions,[293] increased international efforts to interdict North Korea's weapons-related exports, and the implementation of Executive Order 13382, under which designated WMD proliferators' access to the United States and global financial systems is targeted.

Global concern about North Korea's proliferation activities continues to mount, leading some countries, such as Namibia, to halt new purchases from Pyongyang and leading other nations to take action to prevent arms-related deliveries.[294,295] Although some of its weapons transfer attempts have been interdicted by the international community, North Korea very likely will continue to attempt arms shipments via new and increasingly complex routes.

North Korea uses a worldwide network to facilitate arms sales activities and has had a core, but now dwindling, group of customers that include Iran, Syria, and Uganda. Other customers, such as Sudan, have recently agreed to end arms cooperation with Pyongyang.[296,297] North Korea has transferred ballistic missile–related equipment, components, materials, and technical assistance to countries in Africa, Asia, and the Middle East. Conventional weapons sales have included ammunition, small arms, radars, and SAMs as well as related repairs, technical support services, and military equipment production facilities.[298,299] In late 2009, North Korea was implicated in the attempted sale of rocket-propelled grenades and other weapons to Iran or possibly to Hizballah when Thailand interdicted and seized a cargo plane laden with arms.[300] In 2013, a North Korean ship, the Chong Chon Gang, was held by Panamanian authorities as it attempted to transit the Panama Canal laden with 240 tons of military equipment, including a MiG-21 fighter aircraft, concealed under a licit cargo shipment of sugar. North Korea claimed that it was repairing the equipment for Cuba.[301]

In addition to Iran and Syria, past clients for North Korea's ballistic missiles and associated technology have included Egypt, Iraq, Libya, Pakistan, and Yemen.[302] Burma has begun distancing itself from North Korea, but concerns remain regarding lingering arms trade ties between the two countries.[303]

North Korea uses various methods to circumvent UNSCRs,[304] including falsifying end-user certificates,[305] mislabeling crates,[306] sending cargo through multiple front companies and intermediaries,[307] and using air cargo for deliveries of high-value and sensitive arms exports.[308]

North Korea has demonstrated a willingness to proliferate nuclear technology.[309] Using the proliferation network of Pakistani nuclear scientist A.Q. Khan,[310] in early 2001, North Korea provided Muamar Qadafi's Libya with

uranium hexafluoride[311] – the form of uranium used in the uranium enrichment process to produce fuel for nuclear reactors and nuclear weapons. This material was removed in 2004 by the United States and United Kingdom under the terms of an agreement to eliminate Libya's nuclear weapons program.[312,313] North Korea also provided Syria with nuclear reactor technology until 2007.[314, 315]

North Korea's Conventional Weapons and Missile-Related Customers, 2002-2020

1707-13887



North Korea is a viable alternative for those countries that cannot obtain military equipment from other suppliers because of sanctions or severe budgetary constraints. North Korean military sales to Iraq predate Operation IRAQI FREEDOM.

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ACRONYMS

AAA	Anti-aircraft artillery
BWC	Biological Weapons Convention
BW	Biological weapons
CMC	Central Military Commission
CRBM	Close-range ballistic missile
CW	Chemical weapons
C3I	Command, control, communications, and intelligence
D&D	Denial and deception
DMZ	Demilitarized Zone
GDP	Gross Domestic Product
GPS	Global Positioning System
ICBM	Intercontinental ballistic missile
IRBM	Intermediate-range ballistic missile
KPA	Korean People's Army
MANPADS	Man-portable air defense system
MND	Ministry of National Defense
MRBM	Medium-range ballistic missile
MRLS	Multiple rocket launcher system
MSS	Ministry of State Security
MWe	Megawatts electrical
RGB	Reconnaissance General Bureau
RMTU	Reserve Military Training Unit
RYG	Red Youth Guard
SAC	State Affairs Commission
SAM	Surface-to-air missile
SLBM	Submarine-launched ballistic missile
SLV	Space launch vehicle
SOF	Special Operations Forces
SRBM	Short-range ballistic missile
TEL	Transporter-erector-launcher
UAV	Unmanned aerial vehicle
UGF	Underground facility
UN	United Nations
UNSCR	United Nations Security Council Resolution
WPRG	Worker Peasant Red Guard

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