



DRONE WARFARE ON THE KOREAN PENINSULA: PARADIGM SHIFT OR PARADIGM RISK?

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Abstract

On several occasions since 2013, crashed North Korean drones have been discovered in strategically significant areas in South Korea. Do North Korean drones represent a threat to Korean security? How is North Korea likely to use drones against South Korea and why? To answer these questions, this paper develops a framework that explains when violent drone-based provocations are more or less likely to occur by drawing on the logic of reputation and the historical pattern of North Korean coercion. It argues that North Korean drones are no cause for panic, but are a potential threat. The paper proposes that drone-based provocations are more likely when: 1) its relations with the United States and South Korea are openly hostile, and 2) the alliance has either a recent history of restraint when challenged with coercion or a recent history of bluffing when challenged. Conversely, North Korean provocations are less likely when: 1) its relations with the United States and South Korea are amicable or 2) its relations with the United States and South Korea are hostile but the alliance has a recent history of standing firm when challenged with coercion. Provocations are motivated by hostile relations, but become possible only when North Korea believes it can conduct them without meaningful consequences. The likelihood of North Korean provocations, therefore, hinges on North Korean perceptions of alliance resolve. The paper concludes that the alliance's approach to North Korea may result in the use of drones to conduct a limited attack on South Korea if a strategy based on this framework is not developed to prevent it. It also recommends the alliance begin work on counter-drone concepts and capabilities to mitigate vulnerabilities and improve the alliance's ability to detect, defend, and counter-attack in this new domain of competition.

Keywords: *Drones, robotics, provocations, reputations, strategy*

Introduction

The Question

On September 15, 2014, a small drone¹ of North Korean origin was discovered near Baengnyong-do in the Yellow Sea.² Several months prior, in March and April 2014, similar North Korean drones were also found in familiar areas of South Korea: the Northwest Islands in the Yellow Sea; Paju, near the Demilitarized Zone (DMZ) north of Seoul; and in the mountainous northeast corridor in South Korea, also near the DMZ.³ All three areas are strategically significant, and at least one of the drones contained recorded images of the Blue House. The year prior, North Korean media reported that Kim Jong-un observed a military exercise during which “super precision drone planes” launched a “precision drone attack” against simulated South Korean targets.⁴ Does North Korea's development and use of drones require a new paradigm for Korean security? Should we be concerned that North Korea has begun incorporating “drones” into its lexicon of threat making? Or, as some analysts have suggested, is the drone threat from Pyongyang “overblown?”⁵

The Argument

Eschewing the extremes of fear on the one hand and outright dismissal on the other, this paper argues that the significance of North Korean drones for questions of strategy and stability will largely depend on U.S. and South Korean policy decisions. Specifically, North Korea is most likely to use drones offensively under two conditions: 1) when relations between North and South are openly hostile, and 2) when the U.S.-ROK alliance has either a history of backing down from provocations of a comparable scale or a history of making empty threats in response to comparable

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past provocations. The likelihood of use also increases if the U.S.-ROK alliance has a suspected or demonstrated operational vulnerability to drones. Conversely, North Korea is least likely to employ drones offensively during either periods of détente or when the U.S.-ROK alliance has developed a history of standing firm in response to comparable provocations. These “predictions” are based on deductive and inductive reasoning, fitting with both the logic of a reputation for resolve in the academic literature and the observable pattern of North Korean violence over time.

Policy Relevance

Although the Korean Peninsula is no stranger to military robotics, no scholar or policymaker has suggested how we should think about the use of unmanned military systems, or how to interpret evidence of its use. The absence of a useful framework for interpreting the investment and employment of “drones” is particularly troubling because there is a risk that North Korea could surprise the U.S.-ROK alliance by using unmanned systems offensively. If policymakers in the United States and South Korea do not understand when undesirable North Korean actions are more or less likely, they will face difficulty formulating a strategy that can preserve stability and prevent such actions in the first place. By outlining the logic of the offensive use of drones, we can improve the ability to coordinate within the U.S.-ROK alliance at the same time that we may be able to take the most responsible courses of action.

The Unfolding Robotics Revolution

The spread of robotics technology globally is increasing to the point that some now declare that the world has entered an “age of robotics,”⁶ and that militaries and civilian economies are undergoing a “robotics revolution.”⁷ The diffusion of military robotics in particular is propelled by a combination of factors, including the potential to perform “dull, dirty, and dangerous” missions that would otherwise expose humans to undesirable conditions,⁸ the potential for cost savings compared with comparable manned systems,⁹ the dual-use nature of robotics technologies and increasing levels of commercial investment, and the possibility of enabling new concepts for employment or operation relative to legacy military weapon systems.¹⁰

Unmanned Aerial Vehicles (UAVs) as one type of robotics technology tend to draw the most attention, and investments in UAVs

represent the leading edge of investments in the robotics sector more broadly. The Teal Group estimates current global spending on UAVs alone at \$6.4 billion, and expects it to increase to more than \$11 billion dollars annually, totaling more than \$91 billion, in the next decade.¹¹

East Asia is poised to emerge as a global leader driving this broader trend in UAV research, development, and acquisition. A recent report indicates that Asian spending on UAV research could reach \$7.7 billion, and that China, Japan, South Korea, Indonesia, and Thailand are expected to make the largest investments.¹² China has produced more than 1,500 mixed-type UAVs as of 2012, and is a leading exporter of UAV technology, alongside the United States and Israel.¹³ Japan, which has invested in commercial-use robotics for decades, has also begun building a sizeable fleet of unmanned helicopters.¹⁴ More meaningful than available investment figures, however, are the declared ambitions of regional actors in the robotics sector. Chinese President Xi Jinping announced in July 2014 that he intends for the Peoples’ Republic of China (PRC) to dominate the global robotics market,¹⁵ precisely one month after Japan’s Prime Minister Abe Shinzo declared his ambition for Japan to lead the region in robotics.¹⁶

Whereas South Korea has been less forthcoming, or at least more muted, in vocalizing a vision for robotics than China and Japan, North Korea has been quite vocal about how it intends to use drones in particular. Indeed, North and South Korea are no less subject to the incentives driving the global robotics trend than China and Japan, and both have a history of finding military applications for the technology.

North Korea has already sent small, crude drones into South Korea for the apparent purpose of collecting intelligence, and the North’s media proclamations signal North Korea’s intention to use drones to swarm tactical military targets in the South with “kamikaze drones.”¹⁷ It may be that North Korea’s adoption of drones for missions traditionally reserved for manned aircraft in other nations’ militaries (that is, intelligence collection and offensive strikes) will revive the decrepit North Korean Air Force, which has been saddled with high maintenance costs and early Soviet era MiG fighters and bombers. And although North Korea likely has the industrial capacity to indigenously produce military-grade drones, the assets captured in South Korea in 2013 and 2014 were revealed to be civilian-manufactured drones made in China,¹⁸ which underscores the ease of configuring cheap, civilian UAV technology for the purpose of military missions.¹⁹ North



Korea's Air Force has been one of the least threatening aspects of its military,²⁰ but that threat picture could shift dramatically if it moves toward fielding the world's first drone-reliant Air Force and the U.S.-ROK alliance does not adapt accordingly.

For its part, in addition to benefiting from U.S. drones, South Korea has begun procuring Global Hawk and developing multiple types of indigenous drones designed for Intelligence, Surveillance, and Reconnaissance (ISR) collection against North Korean targets.²¹ South Korea's arsenal includes at least 100 of the Israeli-made Harpy, a cruise missile categorized as a UAV for its ability to loiter in the air for long periods of time before sensing radar targets and attacking autonomously.²² South Korea has also already employed ground-based robotic systems along the DMZ as machine gun-armed sentries that can autonomously detect and target intruders but requires human permission to fire.²³ There are additional reports of South Korea developing a "devil killer" ground attack drone.²⁴ Plus, for more than a decade, South Korea has operated the indigenously produced RQ-101, a multirole tactical drone capable of supporting battlefield commanders with all-weather imagery, damage assessments, and targeting.²⁵ It is possible that South Korea sees UAVs as little more than a defense industrial market segment that will help the broader national economy and seeks to develop drones indigenously simply for the purpose of export; whether it has more strategic intentions with its diverse drone programs remains to be seen. But irrespective of whether it has in mind a larger vision for its robotics research, development, acquisition, and employment, it is noteworthy that South Korea is not limiting itself to robotics within a single domain or for a single purpose. Nor is it relying only on either the United States or indigenous development; it has already joined a co-development partnership with Israel.²⁶

A Reputational Framework for Drone Provocations

The global "robotics revolution" described in the previous section has long since made its way to the Korean Peninsula, and North Korea in particular seems intent on using simple, low-altitude tactical drones to scout and attack targets in South Korea, though it has not yet done the latter. Nothing about North Korea's adoption of UAV technology itself indicates when it is likely to employ drones for attack purposes. Because war or open conflict would be an obvious condition when North Korea would be likely to use attack drones, this paper focuses on a problem

that is much harder to discern: when North Korea is likely to use drones for lethal provocations.

The Logic of Reputations for Resolve

The deductive approach to this problem draws on the logic of reputations for resolve. Based on Thomas Schelling's articulation, the concept of reputation describes the causal relevance of the past to the future through the perceptions of others, a phenomenon referred to as the "interdependence of commitments"; a state's resolve to prevent some proscribed action at one place and time will influence others' perception of that state's resolve later.²⁷ A generation of scholars invested in research on this concept,²⁸ the logic of which tells us that in an anarchical international system, states lack information about other states' intentions, which leads them to pay particular attention to word and deed as a way to approximate the intentions of others.²⁹

As a result, state A's decision to either stand firm against or back down from state B when challenged is likely to affect state B's perception of state A's resolve subsequently. If state A backs down, state B is most likely to judge that state A lacks resolve to retaliate or risk war in comparable future circumstances, which means state B should believe it could repeat comparable actions in the future without expecting retaliation. For similar reasons, if state A gets caught bluffing, making threats that it is not willing to execute, it may unintentionally reveal not only a lack of resolve, but also a lack of credibility—if it makes threats in the future, state B is less likely to believe them.³⁰ By contrast, if state B stands firm when challenged by demonstrating a willingness to retaliate or risk escalation, state B is most likely to judge that state A will not tolerate similar challenges in the future, which should deter state B from pursuing comparable such actions in the future. Of course, while state B's decision to challenge or provoke is partly informed by reputation, other factors shown to be part of such a calculation include military capabilities and the balance of interests in the issue at stake.³¹

Crucially, however, state B's likelihood of challenging state A repeatedly does not only depend on reputation, capabilities, and interests, but also the enduring relational context. State A's reputation for resolve (or irresoluteness) should affect the likelihood of future challenges only when hostile bilateral relations persist. If state A backs down, therefore, it should not also take belligerent actions that signal hostility. Similarly, if state A stands firm, even if successful in deterring future similar challenges,



the decision to stand firm will likely not be cost free if it simultaneously continues to incite rivalry-like conditions through belligerent or confrontational statements or policies; state B will simply find new ways to express its hostility and challenge state A by exploiting “gray” areas where the opponent’s resolve is less clear. Violent provocations can take many forms, but they can be understood as the result of a persistent context of bilateral hostility while simultaneously taking actions that demonstrate a lack of resolve.

The Pattern of North Korean Provocations

An alternative approach draws on North Korea’s observed history of provocations, which, while too voluminous to cover exhaustively here, reveals a similar causal pattern as the logic of reputations for resolve would expect. On May 17, 1963, for example, North Korea captured a U.S. Army helicopter, held the two crewmembers, and demanded an apology and admission of espionage from the U.S. Government. After several rounds of direct, quiet negotiations between the United States and North Korea, the United States capitulated to North Korea’s demands, signing something called an “overwrite receipt.”³² The “overwrite receipt” method of apology constituted North Korea drafting an embarrassing apology and admission of guilt for the United States to sign. The commander of U.S. Forces Korea (USFK)—who is “dual-hatted” as the commander of United Nations Command in Korea—then signed this apology, not admitting to its contents, but rather as an acknowledgment of its receipt.³³

In January 1968, a more familiar crisis erupted involving the USS *Pueblo*, a U.S. naval intelligence collection vessel. North Korea forcibly captured and held hostage the *Pueblo* and its 81-man crew, and after much debate, the United States decided to concede to North Korea’s demands, which were identical to the demands in the 1963 incident. Less than a year later, when President Nixon came to office in 1969, historians often recall North Korea’s attack on the EC-121 reconnaissance aircraft in April, but less frequently discussed is a North Korean downing of a U.S. helicopter in the DMZ area in August that same year. North Korea again detained the crew and demanded the same terms of apology—through the “overwrite receipt”—that it demanded and received in the 1963 and 1968 incidents. In each of these instances, repeated U.S. concessions incentivized North Korea to simply repeat its actions, expecting that the United States would not retaliate because it had not in the past.

The logical converse also seems to bear out in North Korea’s history. For decades, North Korea launched lethal provocations against the United States, and each time, the United States judged that restraint or concessions were appropriate responses. In August 1976, however, U.S. officials made a different calculation when North Korean soldiers assigned to Panmunjom bludgeoned to death two U.S. soldiers with axe handles. When the U.S. soldiers ignored North Korean warnings against trimming a poplar tree in Panmunjom, North Korean soldiers threatened them with death, and then followed through on the threat. These actions became the trigger for what is now popularly known as the “Panmunjom axe murder” incident.

In response to North Korea’s attack at Panmunjom, the Henry Kissinger-led Washington Special Action Group and President Ford decided to defy North Korea’s warnings against trimming the tree by sending in a team to chop the tree down altogether, in conjunction with a massive show of force and political demands for a North Korean apology. In response, Kim Il-sung issued a personal apology—albeit highly equivocally—for the deaths of the U.S. soldiers and agreed to U.S. demands for the removal of several North Korean guard posts in the Joint Security Area as a measure intended to prevent similar future incidents. The factors involved in Kim Il-sung’s decision to not only allow U.S. and ROK forces to defy the prior threats of North Korean soldiers but also to at least partly capitulate to U.S. demands is more complex than the brief incident narrative provided here.³⁴ Nevertheless, alliance actions in this case did induce fear in North Korea of retaliation and conflict escalation, and that fear did in turn affect Kim Il-sung’s decision to have North Korea respond with conciliation rather than its more typical vitriol.³⁵

Following the Panmunjom crisis, North Korea rarely targeted U.S. soldiers in future violent provocations, though it found other ways to coerce, including through the use of violence, by exploiting circumstances in which either U.S. or South Korean resolve was less well established. By “designing around deterrence,” the problem of provocations not only persisted but became worse in some respects, even though the United States had established its resolve with respect to deliberate, unambiguous violence against its forces. After the Panmunjom crisis, for instance, North Korea began focusing its violent tactics on South Korea and favoring highly asymmetric attacks like terrorist bombings and assassination attempts.³⁶



A crucial necessary condition in each of these instances was overt hostility between North and South Korea, as well as between North Korea and the United States. North Korea issued daily threats in the latter half of the 1960s, and its incidents of military violence in the DMZ area alone increased from 32 incidents in 1964 to as many as 500 incidents by 1967.³⁷ During periods of rapprochement, such as the early 1970s and mid-1990s, such incidents did not occur with nearly such frequency. Thus, we see that it is only in a hostile rivalry context that backing down or standing firm exerts an effect on North Korea’s likelihood of engaging in similar types of violent provocations over time.

The deductive and historically based approaches tell similar stories: when the United States and South Korea backed down when challenged, North Korea was more likely to believe that it could take similar actions again in the future because it judged the U.S.-ROK alliance as lacking the resolve to retaliate or risk escalation. When the alliance stood firm but hostile relations persisted, North Korea was more likely to “design around deterrence” by avoiding the specific kind of provocations that the alliance proscribed while finding a novel method of provocation that it may have believed would stay below the threshold for alliance retaliation.

Anticipating Drone-Based Provocations

The above approaches to understanding provocations in general give us a framework that we can apply to the question of drone-based North Korean provocations. Because North Korea has yet to attack either U.S. or South Korean targets using drones, it represents an area where the alliance has not had the opportunity to establish “red line” proscriptions. This makes drones an optimal means of provocation or coercive violence precisely because, from North Korea’s perspective, it represents a “gray zone” in alliance precedents relating to deterrence. Further, North Korea possesses at least modest drone capabilities, has employed them in military exercises, and has signaled through government-controlled media statements its intent to attack South Korean targets with them.

Whether North Korea repeatedly initiates drone-based provocations on South Korea is thus likely to depend on: 1) the state of relations with North Korea and whether the alliance is pursuing actions that it deems particularly hostile; 2) whether comparable precedents exist; and 3) how the United States and

Table 1: The Likelihood of Drone-Based Provocations: A Reputational Framework*

Relational Context	History of Backing Down when Challenged	History of Standing Firm when Challenged	History of Bluffing when Challenged
Hostile	More Likely	Less Likely	More Likely
Amicable	Less Likely	Less Likely	Less Likely

*Based on responses to drone use over time

South Korea react to early instances of drone use. This suggests a serious problem for U.S. and ROK policymakers seeking to prevent North Korea from ever launching any attacks, whether by drone or other means. The simplified framework below uses ideal-type categories to express how these factors interact to affect the likelihood of North Korean drone use for purposes of coercive violence.

An argument might be made that a general reputation for resolve could somehow be achieved, and that such a generalized reputation could apply to deterring drone-based provocations. Although possible, the problem is that reputation—much like deterrence—depends on context: the more similar the context, the more reliably we can anticipate the effect of reputation. Prior studies have found that the power of reputations has limits, and these limits are not well understood.³⁸ For this reason, we must be cautious about our expectations for reputations for resolve established with respect to one type of provocations to carry over and apply to another type of provocations. There is, however, a possibility that North Korea will draw inferences from U.S. and ROK responses to its non-violent drone use to judge the risk of a violent alliance response. To the extent such logic holds, greater firmness in response to discoveries of North Korean drones in South Korea—even if only for reconnaissance—would be necessary to prevent violent drone-based provocations.

Implications for Strategy and Policy

What does a framework for drone-based provocations suggest for alliance strategy and policy? Technology must be part of the solution; certain unique capabilities are required to counter North Korean drones. But if North Korea’s likelihood of drone-based provocations depends largely on alliance word and deed, as argued above, then the alliance needs a larger strategy to help shape North Korea’s employment of drones and determine its own responses to North Korean drone use.



Counter-Drone Systems and Swarming Concepts

Offsetting North Korean drones through capabilities requires much more thinking about what might be described as “counter-drone” systems and how to optimally use them. Minimally, the alliance needs radars capable of detecting small, low-altitude, low-speed UAVs. The alliance also needs capabilities that can kinetically target such UAVs, and existing capabilities are suboptimal. The cost ratio of cruise missiles to attack UAVs makes them an impractical solution; North Korean UAVs are far less expensive than alliance cruise missiles, which means exchanging fire in this domain favors North Korea. There has also been at least some indication that although North Korean drones can evade radar by flying at very low altitudes, they can also fly above the range of South Korean air defense guns, evading traditional air defenses. Even if conventional air defenses could be calibrated to counter small, crude drones, they would still need standardized operating procedures for dealing with swarms of drones—that is, large numbers of networked UAVs. And while it should be obvious, alliance manned fighter aircraft are also impractical as a counter to North Korean UAVs because of the unfavorable size and cost ratios, in addition to the risk exposure the pilots would face.

The alliance should therefore begin technical discussions regarding how it might develop its own UAVs in networked “swarms” capable of surveillance, defense, and counter-offense. Concepts of employment for unmanned systems represent a vastly underexplored area for military strategy.³⁹ By “chaining,” for example, forces can increase the surveillance distance that UAVs are capable of covering by using teams of UAVs to relay intelligence information from a forward area to a rear area. A swarming shield of many inexpensive UAVs can, in theory, achieve an effect comparable to missile defense interceptors, by creating a virtual wall of drones to intercept missiles. Drones equipped with global positioning satellite jammers and electronic warfare capabilities can disrupt incoming drones with great agility by simply chasing or confronting adversary drones and disrupting them through their proximity. In a conflict, networked swarms of UAVs can potentially perform the job of counter-offense more efficiently than conventional weapons, whether through more accurate targeting of an adversary’s mobile weapons systems or by shifting assigned targets within a UAV swarm in the middle of a mission based on previous target successes and failures. Many concepts may not even require the development of new hardware or middleware. The Naval Postgraduate School’s Consortium for Robotics and Unmanned Systems Education Research, which has been at the forefront of experimenting with swarming algorithms and

“The alliance must be willing to demonstrate that it is willing to do more than deny North Korea the military effects of its drones.”

defense applications of robotics technologies, has made major advances relying on mostly commercial, off-the-shelf technologies—innovation need not imply high-technology, which is why the threat of North Korean drones is immediate.⁴⁰ As the U.S.-ROK alliance develops counters to threatening drones in addition to developing its own, it is imperative that new capabilities remain closely tied with new concepts and scenarios. It would be tragically shortsighted to develop innovative capabilities without considering how such novel hardware can enable new concepts for deterrence and defense.

Strategy, Not “Strategic Patience”

But developing the capability to counter North Korean drones is not by itself likely to deter or dissuade North Korea from launching drone-based provocations, particularly if the unit cost of UAVs are low. The alliance must be willing to demonstrate that it is willing to do more than deny North Korea the military effects of its drones. If the alliance simultaneously antagonizes North Korea with enduring sanctions, military exercises, and veiled threats yet backs down when confronted with acts of violence, then future confrontations are all but inevitable. This dynamic represents the crucial flaw in a policy of “strategic patience” toward North Korea—it assumes that perpetuating hostility with North Korea without being willing to retaliate against provocations is acceptable. Each decision to stand firm against or back down from North Korean coercion cannot be viewed as an independent, unique event because doing so will always favor backing down as a means of controlling escalation. North Korean challenges must be treated as temporally interconnected not simply because the logic of reputation demands it, but because North Korea’s track record with provocations suggests as much.

This should not be automatically interpreted as a call to arms, but rather a call to strategy. Decisions to back down or stand firm must be put in service of a strategy designed to address the underlying hostility that motivates North Korean provocations in the first place. Backing down, for instance, might make sense if



the alliance needs to buy time as part of a broader diplomatic reconciliation strategy on the one hand or preparation for an alliance coercive military campaign on the other. By contrast, standing firm might make sense if alliance strategy is consciously confrontational and the foremost concern is stopping a specific type of provocation—such as by drone—even though doing so may well perpetuate provocations of another type (such as North Korea’s shift from DMZ attacks to terrorist attacks). The reputational framework articulated here can thus support hawkish and dovish strategies alike, but it cannot support persistent antagonism combined with an unwillingness to demonstrate resolve.

Conclusion

Several tentative conclusions may be drawn from the above discussion. First, North Korea’s offensive drone use will likely be limited to periods of outright hostility.

Second, as with its history of provocations, drones constitute a tool available to probe U.S. and South Korean resolve; North Korea will show some discretion in its use—keeping the scope limited so that it avoids retaliation or war—but is more likely to increase frequency or intensity of use if it believes there will be no meaningful consequences of doing so.

Third, as with its history of provocations, North Korea’s violent use of drones is of much greater concern than their “strategic” or non-violent use because of its potential to trigger crises and escalation.

Fourth, North Korea’s Air Force should be monitored carefully for observable changes in its order of battle (composition and geographic distribution) and operational procedures. North Korean special operations forces units might retain some drone capability, but drones provide a unique opportunity for its Air Force to revitalize itself at a uniquely low cost given the poor quality and training of manned alternatives to drones.

Fifth, China and Japan have begun competition in robotics that promises to have strategic significance for militaries in the region; North Korea has so far positioned itself as a beneficiary of this competition, acquiring Chinese-made UAVs to constitute a non-trivial but unknown proportion of its emerging “drone force.” This probably violates the UN sanctions regime already in place against North Korea, but enforcement—or even investigation—may depend almost entirely on Chinese cooperation, which is unlikely to be forthcoming or effective. North Korea has the industrial capacity to not only replicate Chinese drones, but to produce its own indigenously; the type of drones they have sought so far are low-technology and therefore easy to attain. Because drones are already classified internationally as a type of cruise missile, new UN Security Council Resolutions should not be necessary unless China or others protest the inclusion of drones under the extant sanctions regime.

The United States and South Korea must keep pace with this emerging robotics trend and evolving technologies with the potential to threaten alliance interests. North Korean drones in South Korea, KCNA statements about “drone exercises,” and pictures of Kim Jong-un appearing with military drones all constitute signals of North Korea’s intention to incorporate drones into future campaigns of military coercion. This should be taken seriously because it represents a potential vulnerability in alliance capabilities relative to North Korea in the near term, and relative to others in the longer term.

Fortunately, North Korea’s history of provocations suggest that its willingness to coerce is at least partially contingent on the track record of alliance word and deed. If the alliance can agree on an overarching approach that recognizes its decisions have temporal consequences—that is, provocation responses affect whether and how future provocations occur—there is hope that drone-based provocations never become a trend.



Endnotes

- ¹ Although a colloquial term, “drone” is used throughout this paper interchangeably with “unmanned aerial vehicle (UAV).” The spectrum of control for UAVs ranges from fully autonomous (pre-programmed) to remotely piloted (unmanned but controlled by a human operator). North Korea’s drones were reportedly crudely autonomous, flying along a programmed flight path without human intervention.
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- ³⁶ Kim Yong-ho, "North Korea's Use of Terror and Coercive Diplomacy: Looking for Their Circumstantial Variants," *Korean Journal of Defense Analysis* Vol. 14, no. 1, 2002, pp. 45-67.
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- ³⁹ The logical foundations for the nascent concepts referenced below, and others, can be found in Paul Scharre, *The Coming Swarm: The Cost-Imposing Value of Mass* (Washington, DC: Center for a New American Security 2014).
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