



NARROWING THE U.S.-CHINA GAP ON MISSILE DEFENSE

HOW TO HELP FORESTALL A NUCLEAR ARMS RACE

TONG ZHAO





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INTERNATIONAL PEACE

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ABBREVIATIONS

ASAT	anti-satellite (weapons)
EPAA	European Phased Adaptive Approach
GBI(s)	Ground-Based Interceptor(s)
GMD	Ground-based Midcourse Defense
ICBM(s)	intercontinental ballistic missile(s)
IRBM(s)	intermediate-range ballistic missile(s)
LACM(s)	land-attack cruise missile(s)
MDR	Missile Defense Review report
MIRV(s)	multiple independent reentry vehicle(s)
MRBM(s)	medium-range ballistic missile(s)
NFU	no first use (of nuclear weapons)
NPR	Nuclear Posture Review report
PLA	People's Liberation Army
ROK	Republic of Korea
SLBM(S)	submarine-launched ballistic missile(s)
SRBM(S)	short-range ballistic missile(s)
SSBN	ship submersible ballistic nuclear (nuclear ballistic missile submarine)
THAAD	Terminal High Altitude Area Defense

SUMMARY

THE ONGOING DISPUTE over the impact of U.S. missile defense on China presents a major and growing challenge to the U.S.-China security relationship. If Beijing's concerns are left unaddressed, they will likely fuel more intensive Chinese efforts to modernize its nuclear forces and other strategic capabilities. Amid rising great power competition, this dispute and its consequences could severely undermine bilateral strategic stability. Finger pointing has done no good, as the perception gap between the two countries over the motivations behind U.S. missile defense is genuine and deeply rooted.

What have not been as thoroughly examined are the sources of the perception gap and practical ways to bridge it. Significant ambiguities on both sides over their respective technical capabilities and policy deliberations are a main cause of this perception gap. This report identifies three main sets of ambiguities and analyzes how and why they have arisen, so as to provide actionable recommendations on both cooperative and unilateral ways the two countries can tackle them.

The Sources of U.S. and Chinese Ambiguities

The ambiguities that have prompted this missile defense dispute arise from the vagaries of the security concerns that China has cited, a lack of technical clarity about certain U.S. missile defense capabilities and the doctrinal uses and strategic intentions for which they are employed, and uncertainties surrounding Beijing's inchoate response to U.S. missile defense.

First, it is worth considering how China's concerns about U.S. missile defense are ambiguous. Expressed Chinese views send a confusing message about why, and to what extent, U.S. missile defense capabilities imperil Chinese interests. There are three main elements to this ambiguity. For one thing, over the past few decades, it is unclear what role missile defense has played in causing China's heightened anxiety about the credibility of its nuclear deterrent compared with other internal and external factors. For another thing, China has lumped its concerns about its long-range nuclear deterrent together with a wide range of other nuclear and non-nuclear security interests that it believes U.S. missile defense undermines, a conflation that obscures actual key Chinese concerns. Finally, it is hard to distinguish Chinese concerns about the specific military impact of certain missile defense systems from broader concerns about the potential geopolitical implications for the U.S.-led alliance system and the geostrategic landscape of East Asia.

Second, certain U.S. missile defense capabilities and policies are ambiguous in terms of how much they are intended to threaten China and how capable they are of doing so. There are five main aspects to this ambiguity. For starters, Chinese perceptions of inconsistencies in U.S. stated policies create suspicions in Beijing about Washington's real intentions. It is also unclear to China whether the self-restraint in existing U.S. missile defense policy vis-à-vis China is due to benign strategic intent or economic and technical infeasibility. Beyond that, Beijing seeks to understand whether or to what extent the deployment of U.S. strategic missile defense systems against North Korean intercontinental ballistic missiles (ICBMs) gives the United States an advantage against Chinese ICBMs.

There are other considerations at play as well. Technological advances may make it increasingly likely that theater missile defense will contribute to strategic missile defense capabilities, further blurring the line between the two. Moreover, the main targets and employment scenarios of the theater-level missile defense capabilities of the United States and its allies are ambiguous: are they mostly aimed at thwarting North Korean missiles or Chinese ones, conventional missiles or nuclear ones? This ambiguity contributes to different expectations of how such capabilities will likely be expanded in the future. Lastly, certain missile defense technologies and U.S. development policies raise Chinese misgivings that U.S. missile defense will obtain growing offensive capabilities and that the future development and employment of such capabilities may be oriented toward an increasingly offensive doctrine.

Third, the Chinese response to U.S. missile defense programs is ambiguous. It is not clear how focused Beijing's response is on countering specific military threats posed by U.S. defense capabilities as opposed to serving other and more aggressive Chinese security and political goals. There is little in-depth internal discussion in China to define and understand what would constitute sufficient countervailing capabilities. Prominent Chinese experts have proposed counterstrategies, including, in particular, the so-called system penetration or system confrontation approach, which calls for the development of countervailing

technologies across the board to systematically exploit U.S. vulnerabilities. Such counterstrategies may appear to U.S. observers to be overly offensive and may seem to imply, correctly or wrongly, an aspiration to engage in comprehensive military competition.

A Road Map to Start Dispelling Distrust

To study and raise awareness of the existence and consequences of these ambiguities could be the first step toward morphing superficial U.S.-China discussions involving the usual talking points into a substantive and effective dialogue. Some ambiguities may not be fully resolvable, due to entrenched geopolitical perspectives, the impact of third parties, and technical and geographical constraints. Yet recognizing that such ambiguities exist and that there are practical challenges to eliminating them might, in itself, mitigate worst-case thinking to some extent.

There are other steps that both sides can take, individually and jointly. China should apply a well-defined and consistent methodology to internal evaluations of external threats. Beijing also needs to discuss in more detail and shed greater light on the underlying assumptions that inform its calculations of what constitute sufficient nuclear retaliation and countervailing capabilities against missile defense. Last of all, the Chinese government ought to clarify the role of its theater-range nuclear missiles.

For its part, the United States should show willingness to study the technical and operational feasibility of drawing clearer distinctions between strategic and theater missile defense systems and between capabilities aimed at North Korea and those affecting China. Washington should also strive to help the Chinese policy community better understand U.S. domestic debates on missile defense policy (at the unclassified level). In addition, the U.S. government ought to consider forging a mutual understanding on no first use of nuclear weapons with China, a commitment that would help address a key Chinese concern that missile defense could better equip the United States to execute a nuclear first strike.

Beyond these individual steps, there is much China and the United States can do together. The two countries should jointly study how existing and emerging technologies can cause inherent ambiguities about objectives and capabilities, help one another develop nuanced understandings of each other's domestic policy debates and deliberations, and conduct joint substantive research to address genuine technical disagreements using open-source data.

Moreover, Beijing and Washington ought to do more to prevent ambiguous evidence from reinforcing misinterpretations of each other's intentions and instead work together to evaluate North Korea's nuclear and missiles capabilities and the potential threats they pose to regional stability. Finally, the two sides should build toward the kinds of confidence-building measures that marked successful episodes of Cold War-era U.S.-Soviet arms control cooperation despite a lack of strategic trust. In that spirit, Beijing and Washington should

strengthen their political will to support substantive and sustained U.S.-China engagement involving both policy and technical experts to contain the impact of the missile defense dispute on the bilateral relationship.

If left unaddressed, this issue would continue fueling China's anxiety about its nuclear deterrent and seriously disrupting the stability of the bilateral nuclear relationship. At a time when the world's existing arms control institutions are falling apart and there are public voices within China calling for massive Chinese nuclear expansion, the need to manage the missile defense dispute and its broader security consequences is becoming all the more urgent.¹

INTRODUCTION

A CONSIDERABLE PERCEPTION GAP has surfaced between the United States and China over the U.S. development and deployment of missile defense systems over the last few decades. In recent years, this perception gap has become a central feature of the bilateral security relationship. It is poised to have an increasingly significant impact on strategic and political ties between the two major powers.

Washington feels that its official statements have made clear that its strategic missile defense systems aim only to counter threats from “rogue states”—Iran and North Korea in particular—and not to neutralize the strategic nuclear deterrents of China or Russia.² Beijing, however, suspects that Washington harbors an unannounced long-term plan to eventually acquire the missile defense capability to intercept any nuclear missiles that China would be able to fire in retaliation after a hypothetical U.S. nuclear attack. Some Chinese analysts have advanced a series of claims that, by encircling China with a “chain of missile defense,”³ the United States seeks to establish “absolute security,”⁴ attain military hegemony,⁵ and/or undermine “China’s peaceful rise.”⁶

A considerable perception gap has surfaced between the United States and China over the U.S. development and deployment of missile defense systems.

Chinese military and civilian experts and senior decisionmakers alike have concerns about U.S. missile defense systems that are deeply held, genuinely felt, and widely shared.⁷ In particular, President Xi Jinping, after taking office in 2012, has repeatedly criticized U.S.

missile defenses. He has said, for example, that “the U.S. development of strategic missile defense and its deployment in various regions and in outer space” is creating a “severe negative impact to the global and regional strategic balance, security, and stability.”⁸

China’s concerns gravitate particularly to U.S. strategic missile defenses. It is worth noting that strategic (also called homeland or national) missile defense systems are designed to protect a country’s homeland from long-range missile strikes, whereas theater (also known as regional or tactical) missile defense systems are meant to protect regional targets from theater-range missile attacks. From China’s perspective, the most direct threat comes from U.S. strategic missile defense systems, particularly the Ground-Based Midcourse Defense (GMD) system that, Beijing worries, could intercept Chinese intercontinental ballistic missiles (ICBMs) using U.S. interceptors based in Alaska and California. This is troubling to Chinese policymakers because their ICBMs would constitute the most important means of initiating nuclear retaliation against the U.S. homeland in the event of a U.S. nuclear first strike.

Beijing also worries that U.S. regional missile defense systems deployed close to China threaten the country’s key security interests.⁹ Xi himself has argued that U.S. regional missile defense systems, such as the Terminal High Altitude Area Defense (THAAD) system, “severely harm . . . Chinese national strategic security interests.”¹⁰ In recent decades, the United States has sent various advanced interceptors and radars to Guam and other locations in Australia, Japan, South Korea, and Taiwan, either as independent U.S. deployments or as military exports to allies and partners. Examples include Standard Missile interceptors on ships as well as the interceptors and the X-band AN/TPY-2 radars of the THAAD system. From the perspective of Chinese officials and experts, these deployments appear to be a coordinated U.S. effort to install missile defense capabilities on China’s doorstep, with the goal of undermining Chinese regional missiles and potentially even Beijing’s strategic deterrent.

Technological advances that could render U.S. capabilities even more lethal only deepen China’s misgivings. The United States now has plans to introduce more capable systems, such as the new Long Range Discrimination Radar and the Pacific Discriminating Radar, and to export Aegis Ashore systems to the region. The U.S. government is engaged in exploring cutting-edge technologies such as airborne and space-based boost-phase interceptors as well as directed energy weapons. These endeavors help justify the worst Chinese concerns that the United States is indeed seeking to develop, step by step, an overwhelming strategic capability and that China is only seeing the tip of the iceberg.

Where Ambiguity Comes From

The resulting perception gap between China and the United States stems from multiple factors. One key set of contributors, which are understudied in the existing literature, are the ambiguities regarding the capabilities and policies of both countries. These ambiguities arise from a lack of clarity in the two states’ expressed threat perceptions, policy objectives,

and actual capabilities, all of which cause them to misinterpret each other's intentions. Such ambiguities and perceptual differences are having an increasingly salient impact on the bilateral strategic relationship and regional stability.

Drawing on both policy and technical literature and both English and Chinese sources, this report identifies and analyzes three main sources of ambiguity that contribute to this problem. First, expressed Chinese views send a confusing message about why, and to what extent, U.S. missile defenses threaten Chinese interests. Second, U.S. missile defense capabilities and policies are ambiguous in terms of the extent to which they are intended to and are capable of threatening China. And, third, the Chinese response to U.S. missile defense programs is ambiguous with regard to how much it is focused solely on countering U.S. missile defense systems as opposed to serving other Chinese military and political goals.¹¹

These ambiguities arise from a lack of clarity in the two states' expressed threat perceptions, policy objectives, and actual capabilities, all of which cause them to misinterpret each other's intentions.

First, despite the apparent consensus in China that U.S. missile defense seriously imperils China's strategic security interests, there is a lack of clarity about precisely why and how that is the case. Chinese officials generally do not explain in detail how China assesses the relative threat that U.S. missile defense systems pose to China's strategic nuclear deterrent compared to its regional nuclear deterrent, or whether Beijing worries more about the weakening of its conventional missile strike capability or its nuclear deterrent. The accounts of Chinese analysts can often appear to be inconsistent if not inherently contradictory, and some are technically unsound. For U.S. policymakers, the resulting ambiguity casts uncertainties over which thinking represents China's official position and which concerns drive Chinese decisionmaking. This ambiguity has not been thoroughly analyzed and, in fact, Chinese experts themselves do not appear to have fully recognized it. But it creates one important layer of misunderstanding between China and the United States.

Second, U.S. missile defense policies also exhibit considerable ambiguities. For instance, the United States has declared that its strategic missile defenses are not designed to undermine China's nuclear deterrent. But Washington has not explained how China should distinguish U.S. regional missile defense capabilities from strategic missile defense capabilities or differentiate U.S. strategic missile defenses directed against North Korea from those capable of countering Chinese strategic missiles. Such ambiguities are an important source of Chinese suspicion, but they have yet to be discussed at length in bilateral dialogues.

Finally, because of the depth of concern in China about U.S. missile defense programs, domestic Chinese advocates who are pushing the government to invest in across-the-board countervailing missile defense capabilities have an easy sell. These capabilities include new

penetrating missile technologies; sophisticated midcourse countermeasures; precision-strike capabilities for conducting preemptive strikes against key missile defense components; and electronic warfare, cyber, and counterspace technologies that could target missile defense systems' command, control, and communications networks.

Yet, from the U.S. perspective, such massive Chinese investments create ambiguities about Beijing's own true intentions. Questions arise about whether China's nuclear modernization program is driven by new external threats, such as those posed by U.S. missile defenses, or by a more aggressive Chinese nuclear strategy or greater geopolitical ambitions. Such Chinese investments also raise doubts in the United States about whether countervailing missile defense capabilities other than nuclear modernization efforts are really a response to U.S. missile defense programs or whether they are instead a disguised Chinese effort to comprehensively advance China's offensive capabilities. The resulting uncertainty widens the perception gap between the two countries' security establishments.

A Foray Into Confidence Building on Missile Defense

This perception gap cannot be allowed to fester untended. To leave these ambiguities un-

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addressed would put the bilateral relationship and regional stability at greater risk. The United States and its East Asian allies (especially Japan and South Korea) are highly likely to continue building up their missile defense capabilities in the Asia-Pacific region, not least because the nuclear threat posed by North Korea will not disappear anytime soon. If the U.S. and Chinese governments fail to convene

an effective dialogue on missile defense, serious disputes will become more frequent and consequential. A recent notable example is the U.S. deployment of a THAAD system in South Korea (or the Republic of Korea [ROK]) in 2016, which caused serious disruptions to both China–South Korea ties and U.S.–China relations.

But intentions are in the eye of the beholder. Both the United States and China genuinely see themselves as pursuing purely defensive objectives in this decades-long dispute over missile defense. The resulting security dilemma, in which each side interprets the other's defensive actions as offensive, can only be mitigated if the two countries acknowledge the perception gap between them and begin addressing it. Closely studying these ambiguities and their consequences could be the first step toward making superficial U.S.–China missile defense discussions a more substantive and effective form of dialogue.

It bears mentioning that missile defense systems are not the only source of ambiguities in the U.S.–China nuclear relationship. The increasing entanglement of nuclear and non-nuclear technologies and systems is another related matter, among others.¹² U.S. early-warning satellites, for example, are designed to detect an incoming nuclear strike and can

also better equip regional missile defenses to intercept Chinese non-nuclear missiles. If China were to attack such satellites to defeat U.S. regional missile defense systems, the United States might misinterpret such a strike as preparations for a Chinese nuclear strike, creating a risk of inadvertent escalation.

As the overall U.S.-China relationship reaches a watershed juncture, some success in clarifying such ambiguities on missile defense would help prevent this perception gap from causing both sides to view the broader bilateral relationship even more in terms of security competition. Joint efforts to handle their differences would give government officials and experts on both sides evidence that long-standing distrust can be managed and that a new Cold War is not inevitable. Such cooperation might even serve as a useful template for mitigating other bilateral security problems too.

CHAPTER 1

HOW (AND HOW SERIOUSLY) DOES U.S. MISSILE DEFENSE THREATEN CHINA?

CHINA HAS NOT ALWAYS MADE THE CASE against U.S. missile defense as clearly as it could. One significant source of ambiguities is the sometimes unclear ways that Chinese experts describe precisely how U.S. missile defense systems undermine Chinese security interests. This is true even though Chinese experts long have emphasized the severity of the potential threat that U.S. missile defense systems pose. Professor Wu Riqiang, a Chinese nuclear expert at Renmin University, stated in 2019 that “for the foreseeable future, the biggest challenge confronting China’s nuclear deterrent will be US missile defense systems.”¹³ But a deeper look at the existing Chinese literature reveals a lack of research and much lingering uncertainty on how exactly U.S. missile defense programs affect China’s security, including its nuclear deterrent. This aspect of the ambiguity plaguing the United States and China on missile defense has at least three main elements.

China has not always made the case against U.S. missile defense as clearly as it could.

First, over the past few decades, China seems to have felt a more urgent need to make its nuclear deterrent more credible and effective, yet it is unclear what factors have caused this heightened anxiety and what role missile defense plays, compared with other internal and external factors.

Second, it is not evident which concerns Chinese policymakers see as the most pressing. Chinese experts have highlighted many ways in which U.S. missile defense could undermine China’s security interests, including by impacting its nuclear deterrent, conventional

attack capabilities, and airspace security, among others. Yet it is unclear how Chinese military planners rank the relative severity of these different aspects of the perceived threat. Even in the most openly discussed risk to China's nuclear deterrent, there is considerable ambiguity over the specific crisis scenarios that may trigger Chinese concerns. For example, given the United States' more advanced theater-level missile defense capabilities (compared with its homeland missile defense systems), does China worry more about the impact of U.S. missile defense systems on its regional nuclear deterrent or its strategic nuclear deterrent? Publicly available Chinese domestic discussions do not provide clear answers.

Third, it is hard for the United States to assess how much of China's severe opposition and strong response to U.S. missile defense is a result of specific security concerns over such systems themselves as opposed to broader geopolitical considerations. This is an important distinction because the two types of concerns require different mitigating measures. Specific security concerns may be resolvable at the technical and operational level by readjusting certain postures of military deployment and employment, whereas addressing geopolitical concerns would require effective confidence-building at the political level to reassure each other of their respective strategic intentions.

WHY DOES CHINA FEAR ITS NUCLEAR DETERRENT IS VULNERABLE?

Chinese experts like Wu generally believe U.S. missile defense presents a serious, if not the most serious, threat to the credibility of China's nuclear deterrent.¹⁴ Yet it is less clear where this general belief comes from and how credible the evidence backing it is, as the openly available Chinese literature on this topic is very limited. Curiously, Beijing's confidence in the sufficiency of its nuclear deterrent may not have significantly improved over the last thirty-five years, despite a multifold increase in China's nuclear capabilities, in relative terms, compared with those of the United States (its main rival). Why has China not become more self-assured as its capabilities have matured? And how much does missile defense account for these apparent inconsistencies?

Interestingly enough, China's threshold for a suitable nuclear deterrent appears to have been lower decades ago. Based on a comprehensive review of the history of China's nuclear development, Wu concluded that China believed it had acquired an effective nuclear deterrent by the mid-1980s; at that time, its "threshold of effective deterrence" was still "surprisingly low,"¹⁵ as Beijing relied on a few silo-based, liquid-fueled DF-5 missiles for strategic deterrence.¹⁶ Experts generally believe that China possessed about 240 nuclear weapons in total during this period, whereas its two primary security rivals—the United States and the Soviet Union—had more than 23,000 and 39,000 nuclear weapons, respectively, at this time.¹⁷

It is striking to contrast those numbers with the present. Today, according to the most widely cited open-source figures, China's nuclear arsenal has grown moderately to about

320 nuclear weapons; at the same time, the U.S. and Russian active arsenals have plummeted to about 3,800 and 4,312 weapons, respectively. During this same period, the United States has become China's main rival.¹⁸ Additionally, China today has a total of roughly 116 ICBMs and submarine-launched ballistic missiles (SLBMs) that could strike the U.S. homeland (some of these missiles can each be armed with multiple warheads), compared with the only twenty or so single-warhead DF-5 ICBMs Beijing wielded before the mid-2000s.¹⁹

Beyond a quantitative increase, Beijing's current nuclear weapons are also several generations more advanced than those of the mid-1980s. While U.S. intelligence, surveillance, and reconnaissance technologies have grown more sophisticated and may have increased Washington's preemptive strike potential (a topic that will be further discussed later), China's nuclear weapon systems have improved constantly and significantly due to decades of modernization efforts. Taking all these factors into consideration, many people would expect China to be much more confident in its nuclear deterrent today than it used to be.

In practice, however, in the few open discussions that have taken place, Chinese officials and experts do not seem to be any less concerned now than they were in the mid-1980s; some of them even appear to feel that the task of improving China's nuclear deterrent has become even more urgent.²⁰

By contrast, some U.S. experts have cast doubt on China's lingering qualms about its nuclear deterrent, or at least attempted to point out apparent inconsistencies. They have expressed skepticism that improved U.S. missile defense programs could outweigh the vastly reduced size gap between the United States' and China's nuclear arsenals, especially in light of Chinese efforts to qualitatively modernize its nuclear weapons.²¹ These U.S. experts suspect that internal factors—such as China's assessment of what capabilities are needed to deter a nuclear attack—may be an important contributor to China's changing threat perceptions. According to interviews by Fiona S. Cunningham and M. Taylor Fravel, for example, some Chinese experts have indicated that “China's criteria for the certainty of retaliation has changed over time.”²²

Wu's research shows that, although China lacked an assured nuclear deterrent in the mid-1980s, Chinese leaders believed then that uncertainty in the minds of the country's enemies about whether they could totally prevent Chinese nuclear retaliation would sufficiently deter foes from launching a nuclear attack against China. If this characterization of Chinese leaders' beliefs at the time is correct (and many Chinese experts indeed seem to agree it is), then those views contrast sharply with contemporary Chinese leaders' unwillingness to rely on an uncertain retaliatory capability and their efforts to gain an assured deterrent, or at least make its deterrence capability less uncertain.

Geopolitical prestige could perhaps explain this shift in part. The reason for this change in Chinese leaders' views has not been explained publicly, but it is possible that the country's

conception of itself is evolving. As China increasingly self-identifies as a rising great power, it would not be surprising if it also aspires to better guarantee its security with a more certain nuclear retaliatory capability. For instance, China's paramount leaders in recent decades—including Deng Xiaoping, Jiang Zemin, Hu Jintao, and Xi—have all connected China's nuclear forces with its great power status.²³ Most recently, Xi has emphasized the role of the People's Liberation Army (PLA) Rocket Force (formerly known as the Second Artillery) as the “cornerstone of China's strategic deterrent” and the “strategic underpinning of China's great power status.”²⁴

China could also have military reasons for pursuing a more reliable nuclear deterrent. After following U.S. nuclear strategy deliberations for decades, China's nuclear policymakers may have decided to seek a more credible and sophisticated means of nuclear retaliation than simply striking back at an enemy with all available nuclear weapons after being struck first. Chinese military planners today may want to make sure that China's nuclear retaliation would be fine-tuned to achieve preplanned military and political objectives. Success would involve carefully selecting targets according to their military and political significance, as well as developing specific strike plans, which would entail coordinating the launch times and locations of various numbers of missiles under different conflict scenarios.

According to John Lewis and Xue Litai, the PLA started to develop more sophisticated nuclear war plans in the mid-1980s. At an unspecified later time, the PLA's nuclear retaliation plan consisted of hundreds of nuclear strike options from which decisionmakers could choose.²⁵ As China's strategy for the contingencies of nuclear retaliation has grown more sophisticated, it is likely that military planners desire a greater number of survivable nuclear weapons so they can give decisionmakers more options.

China's military also operates under fewer budget constraints than it did in the past. Beijing's growing requirements for nuclear sufficiency may be related, at least partially, to the greater financial and technological resources now at its disposal. The far more modest standards for a nuclear deterrent that Chinese leaders of the past espoused may have been partly a reflection of their prioritization of economic development and other areas during that era. With more abundant resources today, it should not be surprising if Chinese leaders now feel the need for greater certainty, given how critical strategic deterrence is for the country's security.

Another relevant factor is that Beijing's threat perceptions have changed since the 1980s. Chinese leaders' perceptions of how strong of a nuclear deterrent the country needs may also be a function of how threatening China perceives its security rivals to be. The most widely cited quantitative research on China's relationships with the United States and the Soviet Union/Russia, conducted by Yan Xuetong and his team at Tsinghua University,²⁶ shows that when China's nuclear weapons development program was progressing most rapidly in the 1960s, both these diplomatic relationships were at historical low points. But, by the mid-1980s, Beijing's ties with both Washington and Moscow had significantly

improved, potentially prompting Chinese leaders at the time to decide to deploy a small nuclear arsenal.

Events in Tiananmen Square in 1989 abruptly ended a relatively warm period in U.S.-China relations. And, in the decades since, China's security concerns about the United States have continued to grow, partly as a result of major crises including the Taiwan Strait crisis of 1995–1996, the U.S. attack on the Chinese embassy in Belgrade in 1999, and the military incident concerning a U.S. EP-3 surveillance plane that was forced to land in Hainan after colliding with a Chinese aircraft in 2001. By mid-2018 (the end point of Yan's research), the bilateral relationship had become much worse than at any other time since the early 1970s—even before the normalization of U.S.-China relations. This negative trend has only accelerated since mid-2018.

As diplomatic ties have grown more contentious, a range of external factors, including changes in the United States' nuclear policies and posture, has also caused China to become more concerned about the vulnerability of its nuclear deterrent. One important development occurred in 1992 when the U.S. military reincorporated China into its nuclear war planning as a potential target, after having removed it from the list in 1982.²⁷

The shrinking size of the U.S. nuclear arsenal has done little to allay China's fears. Even though Washington has downsized its nuclear arsenal since the peak of the Cold War, Beijing may believe that the United States' first strike threat against China has actually increased since then. Why would that be when the U.S. nuclear arsenal today is only about 12 percent of its peak Cold War–era size in the 1960s of more than 31,200 warheads?²⁸

After all, the overall numbers have come down considerably. The United States currently deploys 400 silo-based Minuteman III ICBMs with a single warhead on each missile. By contrast, in the mid-1980s, the U.S. military deployed more than 1,000 ICBMs with multiple warheads on each missile.²⁹ The United States has also reduced its stock of deployed SLBMs from more than 600 in the mid-1980s to 240 today.³⁰ Nevertheless, to many Chinese experts, these dramatic reductions have not lessened the nuclear threat to China: they claim, notionally, that rather than being able to wipe out China's nuclear forces one hundred times over, the United States can still do it ten times over.³¹ Moreover, China appears to assess that U.S. ICBMs and SLBMs have become more accurate and lethal,³² making them a greater counterforce threat.

As U.S. counterforce capabilities have evolved, Chinese policymakers and experts have also perceived changes in the United States' willingness to use nuclear weapons against China. For example, Chinese experts are suspicious of U.S. President Donald Trump and his administration's policy of developing low-yield nuclear weapons, as outlined in the 2018 Nuclear Posture Review (NPR) report.³³ Beijing sees this decision as the most recent evidence that the United States seeks not only to advance its nuclear warfighting capability but also to deliberately lower the threshold for nuclear use, a U.S. choice driven by the

suspected intention of being able “to conduct a preemptive strike.”³⁴ Chinese experts often warn that the nuclear taboo may have eroded since the end of Cold War; if so, this development could further embolden the United States to attempt counterforce strikes.³⁵

Developments in non-nuclear technologies have also significantly heightened Chinese concerns about the counterforce threat that the U.S. military poses. Improvements in U.S. intelligence, surveillance, and reconnaissance capabilities, including remote sensing and data processing, could greatly enhance the United States’ capacity to conduct counterforce strikes.³⁶ Chinese experts often raise this concern, which may also have contributed to China’s massive investment in the underground Great Wall Project—an extensive tunnel network for protecting Chinese nuclear forces.³⁷ Advanced U.S. conventional precision strike weapons further exacerbate Chinese qualms. If employed in conjunction with U.S. nuclear capabilities, these weapons could make a U.S. counterforce strike against China’s nuclear forces and their supporting infrastructure more likely to succeed.³⁸

In conjunction with these other factors, U.S. missile defense systems are an integral part of these Chinese concerns. After all, the United States could seek to intercept whatever remnants of China’s small nuclear arsenal survived an initial U.S. counterforce strike. The U.S. Strategic Defense Initiative in the 1980s first made China wary about this issue. Then president George W. Bush and his administration’s withdrawal from the Anti-Ballistic Missile Treaty in 2002 severely exacerbated Chinese concerns. Since then, Chinese academics and government officials alike have widely expressed fears about U.S. missile defense programs.

Ultimately, due to the lack of official documentation about China’s nuclear decisionmaking, it is difficult to understand precisely why China feels necessary to further strengthen its nuclear deterrent. Several questions remain unanswered. What is the balance between internal factors, some of which Chinese experts do not appear to have widely recognized or discussed, and external factors? Among the external factors, how important is China’s general threat perception toward its main security rival compared to that rival’s specific nuclear policies? And, among such policies, how much of an effect does the U.S. development of missile defense systems have on China’s nuclear posture? For U.S. officials and experts, these questions create ambiguity and highlight yet another question: Even if the United States could completely address China’s concerns about U.S. missile defense, how much would that change China’s overall perception that its nuclear deterrent is insufficient and needs to be strengthened?

WHICH U.S. MISSILE DEFENSE CAPABILITIES CONCERN CHINA MOST?

The serious concerns that Chinese scholars have widely expressed about U.S. missile defense have been more general than concrete. They have not provided detailed public analysis of

what threats U.S. missile defense systems might pose, which Chinese nuclear capabilities would be threatened, and under which conflict scenarios such problems would arise.

Beijing's nuclear deterrent is a major facet of these calculations. For example, Chinese experts generally focus on the case of Chinese nuclear retaliation against the U.S. homeland after a hypothetical, large-scale U.S. nuclear first strike. But, in the real world, because neither party wishes to start a large-scale nuclear war out of the blue, a U.S.-China nuclear exchange is more likely to take place (at least initially) at the regional/theater level, perhaps as a result of an escalating conventional conflict over key interests along the First Island Chain. This series of archipelagos off the East Asian continental mainland includes the main islands of Japan, the Ryukyu Islands, Taiwan, and the northern Philippines. The First Island Chain encircles some of the key disputed territories that China claims, including the Diaoyu/Senkaku Islands, Taiwan, and the South China Sea, where armed conflicts involving China are most likely to start. Yet Chinese experts have not publicly discussed the impact of U.S. missile defense on the prospect of regional nuclear exchanges in areas near the First Island Chain.

The serious concerns that Chinese scholars have widely expressed about U.S. missile defense have been more general than concrete.

Yet these nuclear qualms often get thrown in with other conventional military considerations. Relevant Chinese literature also voices concerns about the effects of U.S. missile defense systems on China's conventional military capabilities and on other Chinese security interests. (Chinese experts fear, for instance, that U.S. missile defense could be used to monitor Chinese aircraft movements.) But because these discussions of various threats are often conflated, it becomes difficult to know how significantly U.S. missile defense capabilities contribute to each specific Chinese concern.

To tease out these complexities, it is important to identify and analyze each Chinese concern individually and contextualize which scenarios each of them could arise in. Because China has adopted a no-first-use (NFU) doctrine, in all of the scenarios in which nuclear weapons are used, it is assumed that the United States initiates nuclear use. Despite U.S. suspicions about the credibility of China's NFU policy, Chinese officials and experts generally regard it as ironclad.³⁹ Since the goal of this analysis is to shed light on China's threat perceptions, it focuses on scenarios that are realistic from a Chinese perspective. The analysis reveals significant ambiguities in China's understanding about the nature of the missile defense threat, which constitute an important barrier to constructive bilateral dialogues.

Threats to China's Second-Strike Capability Against the U.S. Homeland

Especially prominent are Chinese fears that U.S. missile defense systems could threaten Beijing's capacity to respond to a U.S. nuclear first strike with a retaliatory counterstrike against the U.S. homeland.⁴⁰ But Chinese discussions about this complex concern are still overly general. Even in a highly simplified model, if the United States were to use nuclear weapons first and China were to decide to strike back against the U.S. homeland, there are four basic scenarios to consider, depending on the scales of the initial (hypothetical) U.S. strike and of China's desired retaliation (see figure 1). Yet Chinese experts have not discussed these specific scenarios in depth.

Figure 1. How U.S. Missile Defense Would Impact Chinese Nuclear Retaliation

	ALL-OUT CHINESE RETALIATION	LIMITED CHINESE RETALIATION
U.S. COMPREHENSIVE COUNTERFORCE FIRST STRIKE	SCENARIO A MEDIUM IMPACT	SCENARIO B HIGH IMPACT
U.S. LIMITED NUCLEAR USE	SCENARIO C LOW IMPACT	SCENARIO D HIGH IMPACT

Scenario A. In the first of these scenarios, Washington would launch a full nuclear first strike and China's response would be unrestrained retaliation. If the United States concluded that China were on the verge of using nuclear weapons during an extreme military crisis, Washington might decide to launch a counterforce first strike to try to preemptively disarm Beijing. Chinese analysts are concerned that such a strike would destroy a significant portion of China's long-range nuclear forces. More than that, they fear that if Beijing decided to launch an all-out retaliatory strike, U.S. strategic missile defense systems could perhaps intercept many, if not all, of the surviving ICBMs and SLBMs it would fire at the U.S. homeland.

Two important issues are usually left unaddressed in most discussions of this scenario, but both are highly relevant to assessing the impact of U.S. missile defense. First, how much damage could an initial U.S. counterforce strike on China's nuclear forces do? The answer might vary depending on issues such as the extent of the U.S. first strike, whether Chinese road-mobile ICBMs were dispersed when the attack occurred, and whether China was postured to and attempted to retaliate while under attack (that is, if Beijing were to start striking back while the U.S. first strike was still under way). In any case, the more Chinese missiles that were to survive such an attack, the more likely that Chinese retaliatory strikes could penetrate U.S. defenses.

Second, what is the Chinese standard for imposing unacceptable damage on the United States in a nuclear counterstrike? That is, how many nuclear warheads does China believe, at a minimum, it would need to threaten to successfully deliver to the U.S. homeland to deter a U.S. first strike in the first place? The more warheads that Beijing would need to hit U.S. soil to achieve deterrence, the greater the challenge that U.S. missile defense systems pose. Few Chinese leaders have publicly hazarded a guess. Then Chinese leader Mao Zedong reportedly commented in the mid-1960s that the threatened retaliatory delivery of several—even six—Chinese atomic bombs would suffice to deter anyone from attacking China. But since then, there has been no hint of an official answer.⁴¹

Some Chinese scholars have speculated on this topic, but it appears that they have reached no general agreement. They assume—without official confirmation—that China has a countervalue targeting posture, which means its nuclear weapons would focus on soft targets like population and industrial centers, as opposed to better protected military installations. Under such conditions, some scholars believe that one guaranteed nuclear warhead would be sufficient to cause unacceptable damage.⁴² Others have given a range of answers, suggesting “more than one,” “at least ten,” or even much bigger numbers.⁴³ It is unclear whether Chinese decisionmakers have a clear criterion in mind.

Additionally, Beijing's retaliation strategy makes a difference since it can be adjusted in hopes of minimizing the impact of missile defense. For example, China could plan for its surviving weapons to all reach their target (or targets) at around the same time but from different directions, seeking to overwhelm U.S. missile defense systems.

Ultimately, an informed attempt to gauge the threat that U.S. missile defense systems pose to China's deterrent would be impossible unless these points are clarified and are factored into the discussion. Admittedly, no other nuclear-armed state talks openly about every element of its nuclear policies, including its assessments of weapon survivability, definition of unacceptable damage, or specific retaliation strategies. But China has not shown that its evaluation of the missile defense threat is based on consistent technical or otherwise objective criteria.

Chinese experts have not thoroughly analyzed and discussed these issues, at least publicly. Such analysis would help ensure that Chinese decisionmaking is based on a sound, objective understanding of the impact of U.S. missile defense. It is important to discuss these issues openly and thoroughly, although the final decisions would not necessarily have to be made public if deemed too sensitive. For the United States, knowing that China's threat perceptions are not driven by conscious and subconscious exaggerations or by political and ideological bias would help build confidence for constructive dialogue. But that is not the only scenario that must be considered.

Scenario B. Alternatively, China could respond to a sweeping U.S. nuclear first strike in a limited fashion instead of all-out retaliation. If an initial U.S. counterforce strike destroyed a significant portion of China's long-range nuclear forces, Beijing might decide to launch a limited form of nuclear retaliation against the U.S. homeland. Such a restrained response might not be China's preferred option but neither would it be all that unlikely. Such a response would better equip Chinese leaders to manage further escalation, compared to all-out nuclear retaliation, by preserving some Chinese nuclear weapons as a further deterrent against a subsequent U.S. response to the Chinese retaliatory strike.

In this instance, the impact of U.S. missile defense systems would be greater than in scenario A. If Beijing were to decide to retaliate with far fewer missiles, more U.S. interceptors could be aimed at each incoming Chinese missile, and they would be more likely to take down the Chinese missiles before they reached their targets. Under the circumstances, China should be particularly concerned that U.S. missile defense could preclude Beijing from opting for this important retaliation option. But so far this contingency has prompted surprisingly little discussion, even among scholars, raising questions about the depth and limits of China's discussions on these issues.

Scenario C. Another possible contingency is that the United States could launch a limited nuclear attack on China during a military crisis, prompting Beijing to decide to launch all-out nuclear retaliation against the U.S. homeland. Such a hypothetical U.S. strike might occur during a serious conventional war with China and would be intended to deter Beijing from further escalation, or it might result from a (mis)judgment that China were about to launch a limited nuclear strike. This type of U.S. strike could involve a single warning shot or a small number of nuclear weapons.

All-out Chinese retaliation would be a possible response according to the country's nuclear doctrine, which emphasizes the need to meet any nuclear attacks with retaliation that would cause unbearable consequences for the original attacker.⁴⁴ This policy aims at enhancing Chinese deterrence, but it also creates ambiguity about how China would realistically respond to a rival's limited nuclear attack. If Beijing were to retaliate without restraint, the majority of its long-range ballistic missiles would still be available for use, severely complicating the task of U.S. missile defense systems. The impact of U.S. missile

defense on China's retaliatory capability would, therefore, be relatively low, compared with the other scenarios.

Scenario D. Alternatively, China might opt for a limited nuclear response to a limited U.S. strike. In this case, Beijing would still have a significant number of surviving long-range missiles, but—because its counterattack would be limited in such a situation—it could be harder for them to penetrate U.S. missile defense systems. In other words, the impact of U.S. strategic missile defense on China's nuclear retaliation would be relatively high.

Clearly, then, the potential impact of U.S. missile defense systems on China's nuclear retaliatory capability against the U.S. homeland would vary considerably depending on the scenario. Yet Chinese public discussions tend to focus heavily on the first scenario—all-out retaliation in response to a U.S. first strike. These conversations have not thoroughly examined the other possibilities, some of which are more likely to occur under real-world conditions. Moreover, in two of the other scenarios—those in which China would respond in a limited way—the potential impact of U.S. missile defense systems could be more severe.

The impact of U.S. theater missile defense systems on China's ability to attack regional U.S. targets could prove to be a more realistic threat.

These dynamics have implications for the United States too. As China's nuclear strategy develops and becomes more focused on the problem of escalation management, Beijing may see limited nuclear retaliation as an increasingly attractive option. However, if China realizes that U.S. missile defense capabilities would likely prove more effective at intercepting limited retaliatory strikes, Beijing may feel pressured to resort to massive or all-out retaliation. This negative potential impact on escalation control should provide another incentive for the United States and China to work to mitigate their dispute over missile defense.

Threats to China's Second-Strike Capability Against U.S. Regional Targets

Although the threat that U.S. strategic missile defense poses to China's ability to strike back with nuclear weapons against the U.S. homeland has drawn the most attention, it is not the only threat. In fact, the impact of U.S. theater missile defense systems on China's ability to attack regional U.S. targets could prove to be a more realistic threat.

Map 1. China's Second-Strike Capability Against U.S. Regional Targets



NOTE: The approximate missile ranges are based on publicly available U.S. official documents and relevant open-source research. The nuclear capability of the CJ-20 has not been confirmed.

China has deployed various types of theater-level nuclear forces. The targets probably include U.S. military bases in East Asia and its overseas territory of Guam. According to U.S. defense and intelligence agencies,⁴⁵ China has deployed DF-21 medium-range ballistic missiles (MRBMs), some of which are nuclear-capable, and dual-capable DF-26 intermediate-range ballistic missiles (IRBMs). It is possible, though unlikely, that Beijing has also fielded a nuclear version of DF-15 short-range ballistic missiles (SRBMs).⁴⁶ One or two types of Chinese cruise missiles may also be nuclear-capable.⁴⁷ For example, the CJ-20 air-launched land-attack cruise missile (LACM) has a reported range of 1,500–2,000 kilometers,⁴⁸ which would allow it to reach Guam and beyond if launched from China's H-6 bomber.

A nuclear exchange between the United States and China most likely would result from a serious conventional conflict over core security interests. Such a conflict is most likely to start with a dispute over territory within or along the First Island Chain. If the United States were to attack Chinese regional forces with nuclear weapons, Beijing might respond against U.S. regional targets to try to avoid all-out escalation.

If that happened, U.S. theater missile defense systems in the Asia-Pacific could affect China's ability to respond appropriately to a U.S. nuclear attack. Four basic attack-retaliation scenarios, similar to those for strategic nuclear exchanges outlined above, could arise. The United States might choose to launch a comprehensive counterforce first strike or a limited strike against China's theater-level nuclear forces. China, meanwhile, might choose either to retaliate against U.S. regional targets with all its surviving theater-level nuclear weapons or to strike back in a limited way with fewer theater-level nuclear weapons.

The relative impact of U.S. theater missile defense systems across the four scenarios would be similar to the strategic outcomes illustrated in figure 1. Once again, the effects would be greatest if China sought to respond with limited strikes. With that said, one important difference is that U.S. theater missile defense systems have performed significantly better in testing than U.S. strategic missile defense systems, so the former may be more effective. This indicates that the impact of U.S. theater missile defense capabilities on China's ability to engage in regional nuclear retaliation may be more significant than the impact of U.S. strategic missile defense systems on China's ability to strike the U.S. homeland.

Despite these considerations, Chinese experts have not discussed the relationship between U.S. theater missile defense systems and China's regional nuclear retaliatory capabilities very much. The lack of such discussion is surprising given that a regional U.S.-China nuclear exchange may be more likely to happen than (or at least occur earlier than) a strategic-level exchange.

There are several possible reasons for this omission. First, while it may recognize that its regional nuclear deterrent would be more threatened than its strategic deterrent, Beijing may not want to voice this concern openly to avoid drawing attention to specific details about its nuclear thinking and planning. Specifically, Chinese nuclear retaliation against U.S.

military bases in allied countries may contradict Beijing's negative security assurances to non-nuclear weapons states (that China would not use or threaten to use nuclear weapons against them).⁴⁹

A second possible explanation is that the Chinese government understands the threat to its regional nuclear deterrent but does not think the issue is important enough to discuss publicly. It is a traditional Chinese view that nuclear war cannot be controlled or limited; once a nuclear conflict starts, it would be difficult to avoid all-out escalation.⁵⁰ This view would militate against paying much attention to managing escalation in a regional nuclear conflict.⁵¹ In any case, it appears that Chinese experts have been largely preoccupied with understanding strategic nuclear exchanges and simply have not systematically studied regional exchanges. If that is true, this again would reveal the need for Chinese experts to conduct thorough, substantive research on the regional impact of missile defense.

Threats to China's Conventional Missile Strike Capabilities

Yet another ambiguity pertains to the impact of U.S. theater missile defense on China's conventional missile strike capabilities. Some Chinese experts express serious misgivings on this score, and many of them tend to believe that a nuclear conflict with the United

Chinese experts may believe that U.S. missile defense systems would have a greater impact on Chinese conventional (rather than nuclear) capabilities.

States is very unlikely.⁵² That being the case, Chinese experts may believe that U.S. missile defense systems would have a greater impact on Chinese conventional (rather than nuclear) capabilities.⁵³ The United States' open acknowledgment that it seeks to undermine Chinese conventional missiles as opposed to Beijing's nuclear second-strike capabilities may heighten these threat perceptions.⁵⁴ After all,

China deploys far more conventional than nuclear missiles. In addition to dual-capable DF-26 IRBMs, Beijing possesses approximately 150–450 conventional MRBMs and about 750–1,500 SRBMs.⁵⁵ China also “fields approximately 270–540 ground-launched LACMs for standoff precision strikes.”⁵⁶

This is not a trivial point because Beijing's conventional missiles are foundational to its national security. Because China lacks advanced air and naval capabilities, compared to the United States and its allies, it has little choice but to rely heavily on any asymmetric advantages it can derive from its land-based conventional missile forces.⁵⁷ Accordingly, these conventional missiles are critically important for defending China's perceived security interests. They would play a key role in winning possible military conflicts with Taiwan, Japan, and other actors with territorial claims in the South China Sea, as well as in deterring military intervention by external players, particularly the United States.

The concerns Chinese experts have expressed on this front are general: if U.S. theater missile defense capabilities undermine China's conventional deterrent, the United States and its allies and partners would arguably be "emboldened."⁵⁸ Specifically, these experts worry that if Japan and Taiwan are protected from Chinese conventional missile strikes, they may take unacceptably aggressive political positions in important disputes with China, thus forcing Beijing to respond militarily. Similarly, in the event of a crisis, being shielded from Chinese conventional weapons may make these actors more likely to conduct preemptive military attacks.⁵⁹ In practice, whether regional U.S. allies or partners would behave more aggressively as a result of their cooperation with the United States on theater missile defense is questionable, given that China is widening its conventional military edge over these actors.

Nonetheless, many Chinese strategists think that resolving disputes over Taiwan and territory in the South and East China Seas will require China to acquire sufficient regional military superiority over the United States and its allies. Such superiority would entail that Beijing could deter the United States from intervening militarily and force other regional players to accept Chinese leaders' terms. While China generally believes that time is on its side in securing these key interests, the development and deployment of U.S. theater missile defense systems could cast doubt on and seriously disrupt such plans.

But this general concern lacks detailed, open-source analysis and evidence of the exact impact of U.S. theater missile defense systems on China's conventional strike capabilities. It is difficult to determine, therefore, if Beijing regards this threat as more consequential than the threat to its nuclear deterrent. At the same time, this concern still contributes significantly to China's overall threat perception toward U.S. missile defense systems.

Threats to Other Chinese Security Interests

Finally, many Chinese experts worry that the increasingly advanced missile defense radars that the United States and its allies and partners have deployed in the Asia-Pacific gravely threaten China's airspace security. The general logic of their argument is that those radars can look deeply into Chinese territory and therefore help the United States obtain better situational awareness of military and civilian activities in Chinese airspace.

For example, Chinese military and civilian experts have argued that the AN/TPY-2 radar associated with the THAAD missile defense system deployed in South Korea puts Chinese security interests at risk. They argue that the United States could use it to "obtain information on all airspace activities in Eastern China and Eastern Russia in real time," "including the takeoffs and landings of all military and civilian aircrafts"; based on this logic, it would "significantly enhance U.S. military capabilities in East Asia and [around] the world."⁶⁰ Some analysts go even further and claim that the THAAD radar is able to "see the hinterlands of China and Russia and even . . . Central Asia."⁶¹ With the United States and its partners likely to introduce even more advanced, longer-range, and more discriminating

radars, such as the Long Range Discrimination Radar, to this region in the future, Chinese concerns are likely to grow.

For several reasons, such concerns are technically flawed. First, the range of the AN/TPY-2 radar in South Korea is too short to detect relatively small targets (such as missile warheads) over the hinterlands of China and Russia, let alone Central Asia.⁶² Second, due to the curvature of the earth, radars for theater missile defense systems generally cannot monitor aircraft movements in even eastern China, let alone further afield. Over-the-horizon radars could do so to some extent, but the United States has not deployed such radars in the Asia-Pacific. Third, even if the AN/TPY-2 radar in South Korea could observe some Chinese airspace activities over certain parts of China, there is no evidence that this would provide much better surveillance than the United States' and its allies' existing sensor networks, which include satellites and air-defense radars on various existing military platforms.

It is possible that these misunderstandings are caused, at least in part, by growing Chinese nationalism, such as in the case of the THAAD dispute, which may make technical experts unwilling to publicly or privately challenge mainstream popular views. Whatever the cause, more rigorous analysis on this issue would help clarify some of the existing ambiguity about the actual impact of U.S. missile defense systems.

IS CHINA WORRIED ABOUT CONCRETE MILITARY THREATS OR GEOPOLITICS?

Many Chinese experts take it for granted that the United States is intent on harming China, and some of them insist that the strategic and geopolitical implications of U.S. missile defenses are more important than their technical military impact. After all, not all Chinese experts agree that U.S. missile defense poses a serious and direct military threat to China. Some senior experts, such as Zou Zhibo at the Chinese Academy of Social Sciences, have concluded that these missile defense systems have important technical limitations and significant vulnerabilities that China could exploit (by, for example, attacking their radars and command-and-control systems preemptively).⁶³ Still, experts like Zou believe that the strategic and geopolitical implications of U.S. missile defense shed light on the United States' true intentions and could still have a profound impact (by enhancing U.S. regional alliances) despite any technical limitations. Zou, for instance, argues that “we should not overestimate the real military effectiveness of them, otherwise we would overlook the real strategic intentions behind the missile defense systems.”⁶⁴

Such conflation of technical and strategic concerns creates ambiguity and confusion. Specifically, it can be unclear whether China's opposition to any given missile defense deployment by its rivals is driven by specific military concerns or by more amorphous geopolitical qualms. Technically grounded military objections are likely easier to tackle than

geopolitical misgivings, which relate to the deep strategic distrust between China and the United States. This form of ambiguity was on full display during the THAAD dispute of 2016. This dispute left the United States and South Korea unsure whether China's opposition is primarily driven by technical concerns that the AN/TPY-2 radar could potentially track Chinese ICBMs or by vaguer geopolitical concerns, including the strengthening of the U.S.-ROK alliance.

In geostrategic terms, China is concerned that missile defense cooperation between the United States and its allies could strengthen the U.S. alliance system in East Asia. China's 2017 national defense white paper, for example, states Beijing's opposition to countries who use missile defense to "build Cold War style military alliance[s]." ⁶⁵ At present, key U.S. allies—including Australia, Japan, and South Korea—purchase and operate U.S. missile defense systems. ⁶⁶ The United States also deploys its own interceptors and radars in the region.

To maximize the effectiveness of these various systems, the United States and its allies and partners have sought to make them more interoperable and integrate them into a networked missile defense architecture for "common protection, deterrence and assurance." ⁶⁷ Chinese experts worry that these efforts will predispose the allies toward greater overall military integration. They could, in the words of one scholar, have a "self-reinforcing snowballing effect" on enhancing the U.S. alliance system. ⁶⁸

For many Chinese experts, the U.S. alliance system in the Asia-Pacific is driven by a "Cold War mentality" of containment and confrontation that represents a fundamental threat to regional stability. ⁶⁹ Therefore such experts view any activities that could strengthen these alliances with the utmost concern. These experts are especially alarmed because they believe that U.S. missile defense cooperation with Japan and South Korea not only helps upgrade the U.S.-Japan and U.S.-ROK bilateral relationships but also will catalyze the formation of a trilateral U.S.-Japan-ROK alliance, a possibility that China strongly opposes. They worry that U.S. efforts to integrate allied systems at the operational level—connecting sensors, sharing data, and making command-and-control systems interoperable—will inevitably lead the partners to create a joint missile defense network and thus lay a technical foundation for a multilateral alliance. ⁷⁰

Missile defense deployments, some Chinese experts suspect, will help the United States tighten leverage over its allies in other ways.

Missile defense deployments, some Chinese experts suspect, will help the United States tighten leverage over its allies in other ways. According to this view, the United States uses such deployments to deliberately exacerbate tensions between its allies and countries like China, Russia, and North Korea; the idea is that Washington aims to provoke military reactions from these rivals to make its allies more inclined to strengthen their alliances with the

United States and discourage them from becoming more autonomous.⁷¹ Interestingly, this view seems to be most popular among Chinese generalists who study foreign policy and security issues. By contrast, Chinese scholars with specific expertise in U.S.-China nuclear relations seem to be more skeptical of such claims.⁷²

Another Chinese concern is that the United States is investing in research and development on missile defense to widen its lead in cutting-edge technologies over China, thus leaving Beijing less capable of competing geopolitically over the long run. Many Chinese experts believe that missile defense systems rely on a unique set of technological advances that provides considerable positive spillover effects with other military and civilian applications. They point to the Strategic Defense Initiative in the 1980s and conclude that U.S. investments during that period played an important role in securing the United States' lead in various important areas, including computers, lasers, microelectronics, new materials, and aerospace technologies.⁷³

This concern, though, is less pressing than other concerns about missile defense. Given its relatively high economic growth rate, China is well positioned to engage in a long-term competition with the United States over advanced technology. That said, China's strategic community has not thoroughly examined whether or to what extent the United States' development of missile defense systems has been motivated by the pursuit of a general technological edge. There also has been little analysis about whether investments in missile defense programs are uniquely useful for this purpose.

It is telling, perhaps, that Chinese experts have identified a wide range of other military technologies, including hypersonic and nuclear weapons, as also being particularly useful for advancing a country's overall technological competitiveness.⁷⁴ Without robust comparative analysis, it remains unclear how much such general arguments reflect true understandings about the strategic implications of these technological sectors as opposed to the parochial interests of different stakeholders in the Chinese defense industry competing for shares of government investment.

Finally, Chinese analysts often sound warnings that the United States seeks to use missile defense to overburden China and force Beijing into a costly arms race.⁷⁵ Chinese experts claim that the United States used the Strategic Defense Initiative to draw the Soviet Union into an arms race that ultimately contributed to the Soviet collapse.⁷⁶ They now worry that China is so concerned about its missile capabilities that it will make major investments to ensure their effectiveness against U.S. targets if there is even uncertainty about the threat that U.S. missile defense systems pose. These experts also predict arms races with Japan and Taiwan, depending on what missile defense capabilities they acquire from the United States.⁷⁷

This concern reveals another ambiguity in Chinese thinking about missile defense: its view of the offense-defense balance. Those who worry that the United States seeks to deliberately stoke an arms race seem to believe this competition is defense dominant—meaning that

it would be more expensive for China to build missiles than for the United States to build interceptors. By contrast, other experts argue that the easiest and cheapest way to defeat missile defense systems is to build up offensive capabilities.⁷⁸ According to the latter view, it would be self-defeating for the United States to deliberately draw itself into an arms race by building missile defense systems. These contrasting views show that Chinese experts have reached no clear consensus on U.S. motivations for deploying missile defenses.

To sum up, China's threat perceptions about U.S. missile defense center on three main elements of ambiguity: to what extent U.S. missile defense contributes to China's perceived need to strengthen its nuclear deterrent; how China's threat perceptions vary across conflict scenarios; and to what extent China can distinguish its concerns of specific technical military threats from vaguer and more abstract geopolitical misgivings. Chinese strategists must discuss these matters more thoroughly. A clearer understanding of these issues is necessary for the United States and China to hold a constructive dialogue on missile defense.

CHAPTER 2

WHAT ARE THE AIMS OF U.S. MISSILE DEFENSE?

BUT CHINA'S SOMETIMES VAGUE MISGIVINGS about U.S. missile defense are not the only source of ambiguity fueling the two countries' dispute. Given Chinese concerns about the motivations behind U.S. missile defense programs, it is worthwhile to examine Washington's objectives more closely.

U.S. missile defense policy has maintained a lot of continuity over the last few decades.⁷⁹ Various U.S. administrations have sought to protect the United States and its allies from missile threats emanating from so-called rogue states, while also trying to assure Russia and China about U.S. strategic intentions. The U.S. government's 2019 Missile Defense Review (MDR) report repeats the long-standing policy that U.S. homeland missile defense is intended to "protect against possible missile attacks on the homeland posed by the long-range missile arsenals of rogue states, defined today as North Korea and Iran."⁸⁰ In the event of a conflict, the MDR report states that the United States would seek to "defend, to the extent feasible, against a ballistic missile attack upon the U.S. homeland from any source." But the document also implies that U.S. homeland missile defense systems are not scaled to deal with Chinese or Russian strategic missile attacks. According to the report, the "United States relies on **nuclear deterrence** [emphasis added] to address the large and more sophisticated Russian and Chinese intercontinental ballistic missile capabilities."

But Beijing remains uneasy about certain ambiguities in the U.S. stance on missile defense. China is concerned that the United States, citing the evolving nature of potential "rogue missile threats," has continued to reject "any limitation or constraint on the development or deployment of missile defense capabilities needed to protect the homeland."⁸¹ From a

Chinese perspective, key elements of U.S. capabilities, policies, and future plans for missile defense create serious ambiguities regarding the objectives of its programs. This lack of clarity is one of the most important sources of China's deep distrust of U.S. intentions, and this ambiguity leads Beijing to suspect that, in reality, Washington's objectives are more ambitious than its proclaimed goals. Specifically, U.S. capabilities and policies give rise to five main elements of ambiguity that contribute to the perception gap between Beijing and Washington.

IS U.S. STRATEGIC MISSILE DEFENSE AIMED AT CHINA?

China remains genuinely skeptical that U.S. missile defense systems are not ultimately intended to undermine its nuclear deterrent. Repeated U.S. claims to the contrary, including in the 2010 MDR report and the 2019 MDR report, have done little to dispel those fears.⁸² Trump's speech at the rollout of the 2019 MDR report—which most Chinese experts believe was prepared ahead of time and not given off the cuff—suggested that the United States may have a more ambitious unstated missile defense policy than the one set out in the report.⁸³ He claimed, for example, that the U.S. military seeks “to ensure that we can detect and destroy any missile launched against the United States—anywhere, anytime, anyplace.”

Inconsistencies among U.S. official statements do not reassure Beijing but instead heighten Chinese concerns that the MDR report set out a politically correct version of a secretive and more ambitious U.S. missile defense policy. Comments from U.S. lawmakers and experts calling for the United States to defend its homeland against large-scale Russian and Chinese missile strikes add to Beijing's suspicions.⁸⁴ In light of such comments, some Chinese experts believed, even before the 2019 MDR report was released, that the United States might officially seek to undermine China's and Russia's nuclear deterrents.⁸⁵ Chinese analysts now believe that this objective was absent from the MDR report not because the U.S. government does not harbor this objective but because it lacks an internal consensus. Consequently, they still suspect that there is still serious interest in U.S. policy circles in moving in that direction.

Many Chinese strategists suspect that the costs and difficulties of such an endeavor are the main roadblock. They assume the United States has not yet sought to develop strategic missile defense systems against Russia or China not because Washington does not want to but because it cannot afford to—due to the prohibitively high economic costs and formidable technological challenges.⁸⁶ For example, the administration of former president Barack Obama, which was relatively moderate on missile defense, stated in the 2010 MDR report that the U.S. homeland missile defense system “does not have the capacity to cope with large scale Russian or Chinese missile attacks.”⁸⁷

Chinese experts take such statements as a U.S. acknowledgment of the (undesirable) reality that its existing capabilities are insufficient, not evidence of limited U.S. intentions. They

suspect that U.S. homeland missile defense systems are focused on the more manageable task of countering North Korean and Iranian long-range missiles only because the United States is more confident it can handle these rogue states' relatively few and less sophisticated missiles. Hardly any Chinese experts seem to doubt that, if the United States felt it could acquire effective strategic defenses against China, it would do so.

If the U.S.-China strategic rivalry continues to grow, Beijing worries Washington might become increasingly motivated to seek such a capability. As Wu Riqiang predicts, “the U.S. development of missile defense probably seeks to achieve two goals: it would first use North Korea as the excuse to quietly develop missile defense technologies and integrate different systems; after the technologies become mature it would then enlarge the scope of deployment to neutralize the Chinese and even the Russian nuclear retaliation capabilities.”⁸⁸ More and more Chinese experts may embrace this view, as they have become convinced that the United States seeks to maintain hegemony by comprehensively trying to suppress and contain China.⁸⁹

The open-ended nature of the most ambitious U.S. missile defense programs in development does little to defuse this ambiguity over long-term U.S. strategic intentions.⁹⁰ The renewed interest in the 2019 MDR report in space-based interceptors is a case in point. The potentially huge scale and expense of this U.S. program leads Chinese military experts to see it as part of the “U.S. big power competition strategy,”⁹¹ not as an attempt to counter the limited threats that rogue states pose.

Chinese strategists also worry that U.S. defense planners may seek to use missile defense to keep foes from wielding emerging military technologies like hypersonic missiles. The MDR report also outlined the goal of developing “defensive architectures to defeat hypersonic threats,”⁹² without stating which types of hypersonic threats the United States intends to counteract. Although some countries are developing regional-range hypersonic weapons probably for conventional strikes, longer-range hypersonic systems will have some role to play in delivering nuclear warheads over intercontinental distances, including Russia's Avangard boost-glide system.

Beijing worries that U.S. homeland missile defense may aim to foil any possible Chinese pursuit of hypersonic missiles to bolster its nuclear second-strike capability. Chinese experts have claimed that the most important benefit of hypersonic weapons is the unique ways they can penetrate ballistic missile defense systems—an indication that China may plan to eventually develop intercontinental, nuclear-armed hypersonic systems.⁹³ Given that the United States has not clarified its long-term goals for defending against hypersonic weapons, Beijing may suspect that Washington aims to deny China this option.

More importantly, more advanced U.S. strategic missile defense of this kind would not merely threaten the hypersonic missiles China may seek to wield someday. Because hypersonic weapons are generally believed to be more technically challenging to intercept than

ballistic missiles, China may worry that a U.S. missile defense system capable of intercepting intercontinental-range hypersonic missiles would pose a greater threat to regular Chinese ICBMs than traditional U.S. missile defense systems.

But what it would take to intercept hypersonic weapons may be more complex than is generally understood. Nuclear expert James Acton, for example, has argued that intercepting boost-glide weapons—an important type of hypersonic weapons—in their terminal phase of flight, which would enable “point defense” of relatively small geographic areas, may be technically feasible. By contrast, seeking to protect a much wider swath of territory with “area defenses” would require intercepting incoming missiles during mid-course flight—a much more formidable task.⁹⁴

A U.S. point defense strategy may prove less destabilizing, but some Chinese experts may not fully grasp the difference. If the U.S. military embraces this view and focuses on developing and deploying point defenses to protect a few key military and political targets against hypersonic weapons, the threat to Beijing’s strategic nuclear deterrent should be limited. In that case, China would still be able to retaliate against many unprotected population centers and industrial targets across the U.S. homeland. But most Chinese policy experts appear to be unaware of such technical distinctions, and they may read the U.S. plan to defend against hypersonic missiles as an ambitious declaration of Washington’s intent to try to eliminate all future long-range missile threats to the U.S. homeland. Moreover, the United States’ interest in being able to track missiles at every stage of their flight combined with its exploration of space-based interceptors make Chinese experts worry that Washington is vigorously seeking boost-phase intercept capabilities—an approach that could simultaneously undermine both ICBMs and boost-glide vehicles.⁹⁵

COULD U.S. STRATEGIC MISSILE DEFENSE AIMED AT NORTH KOREA BE USED TO TARGET CHINA?

Another lingering question is whether U.S. strategic missile defense is designed chiefly or solely to counter the arsenals of rogue states like North Korea or those of major powers like China. Chinese experts point to the United States’ rejection of limits on its missile defense programs as evidence that its true goals are more ambitious than warding off Iranian and North Korean long-range missiles.⁹⁶ Chinese analysts generally assume that the United States could take measures to make its missile defense capabilities less threatening to China, but that it has chosen not to do so.

But this is not wholly a question of U.S. intentions. It could be very technically challenging, if not impossible, for the United States to build a homeland missile defense system of a scope and scale that could defend against North Korean long-range missiles but not threaten China’s nuclear deterrent. The ambiguities imposed by such structural constraints are an important source of the U.S.-China perception gap.

The United States deploys forty-four ground-based interceptors (GBI) in Alaska and California.⁹⁷ The U.S. military appears to work from the assumption that four interceptors would need to be fired at each incoming ICBM to try to increase the probability of a successful intercept.⁹⁸ This number indicates that, today, the United States may be able to intercept eleven North Korean ICBMs, a figure that is similar to the estimated size of North Korea's current ICBM stockpile.⁹⁹ In other words, the United States appears to premise the posture of its missile defense systems on the assumption that North Korea might fire all of its ICBMs prior to any U.S. attempt to destroy them preemptively. U.S. plans to field more GBIs as the North Korean stockpile gets larger underscore this impression.¹⁰⁰

This arsenal of U.S. interceptors could pose a similar threat to China's larger ICBM force if a U.S. first strike markedly reduced their numbers. U.S. experts Hans Kristensen and Matt Korda estimate that, as of 2019, China has about sixty-eight launchers for three types of ICBMs that can reach the U.S. homeland—the DF-5, DF-31A, and DF-31AG.¹⁰¹ The introduction of the new DF-41 ICBM, likely in the near future, may add to this number, but it would not dramatically change the equation. But those numbers notwithstanding, if China were to absorb a U.S. first strike, the size of its surviving ICBM force could be very similar to—if not smaller than—North Korea's ICBM stockpile. As a result, the same homeland missile defense capabilities that the United States deems adequate to deal with a North Korean first strike are likely to appear to Beijing as capable of undermining its second-strike capabilities if Washington were to launch a disarming first strike.

The geographical proximity of China and North Korea heightens this ambiguity. North Korean and Chinese ICBMs headed toward the United States would fly along similar trajectories, so missile defense systems positioned to deal with the former may also be able to intercept the latter. Indeed, Wu has concluded that “all missile defense systems that aim to counter North Korea would have the capabilities to counter Chinese strategic missiles.”¹⁰²

Some U.S. experts and officials have tried to assuage Chinese concerns by arguing that China deploys much more advanced evasive countermeasures on its ICBMs than North Korea does. For example, Lieutenant General Ronald Kadish, then director of the Ballistic Missile Defense Organization, implied in 2000 that U.S. missile defense systems could defeat the basic countermeasures used by North Korea and other states then believed to be pursuing a rudimentary ICBM capability. But he went on to suggest that U.S. missile defense could not thwart the more sophisticated countermeasures employed by Russia or China, so neither Moscow nor Beijing (he said) had reason to worry about the survivability of their strategic deterrents.¹⁰³

But that could easily change as North Korea's arsenal matures. The rapid development of North Korea's ICBM program suggests that Pyongyang is likely to invest heavily in advanced countermeasures.¹⁰⁴ Moreover, some U.S. experts worry that even if North Korea could not independently develop its own advanced countermeasures, it might be able to

purchase or steal them from other more advanced powers with more sophisticated missile programs.¹⁰⁵ As a result, U.S. missile defense planners may still have strong incentives to design their defense systems to deal with advanced countermeasures, potentially undermining U.S. attempts to assure China about its second-strike capability.

One potentially less threatening alternative that U.S. experts have proposed would be for the United States to use boost-phase missile defense systems with short interception ranges to counter ICBMs launched from small countries, such as North Korea, without endangering Chinese or Russian ICBMs that are usually deployed hundreds of kilometers inland from their borders. Such systems could be surface-based, aircraft-based, or drone-based.¹⁰⁶ The 2019 MDR report, for example, seeks to explore the option of mounting a boost-phase interceptor on F-35 aircraft. Proposed air-based, boost-phase defense systems usually have interception ranges of around 700–900 kilometers against ICBMs with burn times longer than 250 seconds, if timely and adequate cueing data on the targets is available.¹⁰⁷ If deployed near North Korea, such systems would indeed pose very little threat to China's ICBM forces.

But these shorter-range missile defense systems could pose other complications to China's second-strike capabilities. For instance, such systems could be threatening to Chinese SLBMs, especially if China's nuclear-armed submarines (SSBNs) are deployed within designated bastions in Chinese coastal waters.¹⁰⁸ In fact, such missile defenses could even be threatening if China's SSBNs are deployed in the open ocean. Because Chinese SSBNs seem to be relatively noisy,¹⁰⁹ the United States may be able to detect and track them or at least identify their general operation area, giving Washington the option of deploying air-based defense systems to attempt to intercept Chinese SLBM launches during a crisis. These complications underscore that even if the United States wanted to build missile defenses against North Korea that were distinguishable from those necessary for combating China (and there is so far little evidence that it has such a desire), doing so could be very challenging, if not entirely impossible.

To compound the problem further, Chinese and U.S. experts tend to have different assessments of North Korea's nuclear and missile capabilities. Especially when it comes to North Korea's ICBM program, which directly threatens the U.S. homeland, U.S. experts tend to treat the threat very seriously even if North Korean technologies are not 100 percent proven.¹¹⁰ In comparison, Chinese experts often set a higher bar for judging whether North Korea's capabilities constitute a realistic threat. For instance, Chinese experts have indicated that North Korea seems to still be further away from achieving a realistic ICBM threat than the United States perceives until Pyongyang masters a reliable reentry vehicle, one of the most difficult parts of an ICBM program.¹¹¹ Such divergent views of how imminently North Korea will become a nuclear threat to the United States also contribute to Beijing and Washington's disagreement over how justifiable the U.S. strategic missile defense program is.

DOES U.S. THEATER MISSILE DEFENSE HAVE STRATEGIC IMPLICATIONS?

On paper, U.S. policy tacitly distinguishes between the purposes of strategic and theater missile defense, but that line may be more blurred than policy documents acknowledge. The 2019 MDR report proclaims the goal of building “robust regional missile defense for U.S. forces abroad, allies, and partners against all potential adversaries,” thus emphasizing that all Chinese theater missiles are legitimate targets. Yet the document also implies that theater defense systems are not intended to defend against Chinese strategic missiles as the “United States relies on nuclear deterrence” to counter the Chinese ICBM threat.¹¹²

In practice, however, certain ambiguities between theater and strategic missile defense make it harder than such policies acknowledge to differentiate the two. This problem is not a new one. The United States and Russia tried repeatedly during the tenure of former president Bill Clinton to build a common understanding for distinguishing theater and national missile defense systems. They reached some initial agreement over theater-level interceptors with low burnout speeds (below 3 kilometers/second). Such low burnout speeds render interceptors unable to strike longer-range, faster-moving targets. But the two sides ultimately could not agree on the impact of so-called upper-tier theater missile defense systems (with burnout speeds of between 3 kilometers/second and 7 kilometers/second) on strategic missiles.¹¹³ This attempt to demarcate the distinction was abandoned in the early 2000s, and the U.S. government continued developing and deploying theater missile defense systems in East Asia and elsewhere.

Yet, from a Chinese perspective, even interceptors with low burnout speeds can have strategic implications. If such interceptors are targeted at ICBMs in their final phase of flight, then they can be used effectively for point defense. If enough are deployed, then large areas can be defended.¹¹⁴ For example, Chinese experts from the China Academy of Engineering Physics—the organization responsible for building and maintaining China’s nuclear weapons—concluded that a THAAD-like theater interceptor would be approximately as effective against a theater missile as it would be against an ICBM in their respective terminal phases of flight, even without highly accurate cueing information.¹¹⁵

In a similar vein, a study by U.S. experts concluded that, to make a theater system truly incapable of intercepting strategic targets, the burnout speed of its interceptors would have to be significantly below 2.6 kilometers/second.¹¹⁶ Yet current U.S. theater interceptors have much higher burnout speeds. SM-3 Block IIA interceptors, for example, reportedly have a burnout speed of around 5 kilometers/second.¹¹⁷ The United States may be able to protect

On paper, U.S. policy tacitly distinguishes between the purposes of strategic and theater missile defense, but that line may be more blurred than policy documents acknowledge.

its entire homeland with an affordable number of such high-speed theater interceptors, especially if they are deployed on ships and can be relocated close to the U.S. homeland during crises.

These inherent technical ambiguities make the gap between theater and strategic missile defense even more narrow. This is especially true as the United States enhances its sensor network so that it can provide more timely and accurate cueing data for missile interceptors. The earlier an interceptor can be launched, the further it can fly before interception and the larger the area it can defend—an area known as its footprint.¹¹⁸ Better cueing data and an earlier launch of a theater interceptor can make up for its relatively slow speed and make its performance closer to that of a strategic interceptor.

It is unclear how good current U.S. sensors are at providing suitable cueing data for regional interceptors, but the United States is finetuning these capabilities and will likely be able to in the future. The legacy Defense Support Program's early-warning satellites do not provide accurate enough tracking data to enable the launch of an interceptor. Newer Space-Based Infrared System satellites are more capable, but it is unclear whether they are good enough to generate a firing solution for an interceptor by themselves.¹¹⁹ Large, ground-based early-warning radars for ballistic missiles can provide extremely accurate tracking data, but their detection range is limited by the curvature of the earth, and none of them are located all that close to North Korea or Iran. But the gradual deployment of forward-based radar systems, such as the AN/TPY-2 radars in Japan and South Korea, may help to fill this gap, at least to some extent.

In addition, the United States appears set to significantly enhance its detection and tracking capabilities over time. Most importantly, there is strong domestic support in the country for building highly capable space-based sensors. The Pentagon has formulated plans to build two new discrimination radars in the Pacific. It also seeks to enhance sensor capabilities on mobile platforms, such as advanced fighter jets (including the F-35), unmanned aerial vehicles, and ships (including through the next-generation AN/SPY-6 radar). What is more, the United States is working to connect different sensor platforms to share information more efficiently. Such an integrated network would enable theater interceptors to be launched using cueing information acquired from remote sensors, thus making these interceptors potentially more effective against ICBMs.

Theater missile defense systems, in addition to their potential to intercept ICBMs directly, could also make indirect contributions to strategic missile defense. In particular, forward-deployed sensors could help resolve what U.S. experts generally regard as the biggest challenge facing mid-course interception: discriminating warheads from enemy countermeasures, including chaff and decoys.¹²⁰ Chinese experts have calculated that ICBMs launched from inland China toward the United States would be visible during their initial ascent phase (immediately after the completion of the phase of powered flight) to the power-

ful South Korea–based AN/TPY-2 radar, which would be able to monitor the launch of warheads and countermeasures.¹²¹ As a result, these experts have concluded that this radar could assist with discrimination and be used to cue GBIs based in Alaska, making them better positioned to intercept Chinese ICBMs.

Likewise, many of the same experts believe that forward-deployed radars could be used during peacetime to monitor and gather intelligence on Chinese missile tests, including information on Chinese countermeasures. Over time, such information could help the United States better conduct warhead discrimination and thus enhance its strategic missile defense capabilities.¹²²

These concerns are understandable, though the specific technical arguments on which they are based should be more seriously examined and debated. For instance, subsequent research suggests that the claimed capabilities of the AN/TPY-2 radar in South Korea are likely based on an incorrect understanding of the technical requirements for warhead discrimination; as a result, this radar is likely to be less effective at discrimination than some Chinese experts fear.¹²³ Research by the U.S. Army Science Board also indicates that warhead discrimination actually requires radars to have very high sensitivity and resolution to “detect [a target’s] microdynamics.”¹²⁴ There is no evidence that the AN/TPY-2 radar can do so.

In political terms, the United States’ interest in assuring China about the limits of its theater missile defense’s capabilities vis-à-vis strategic targets is also declining, after previous and repeated efforts by the Obama administration especially to assuage Russian concerns on the same issue have failed over the past decade. Obama administration officials replaced the Bush administration’s plan to set up a third site for GBI deployment in Europe with a more modest plan called the European Phased Adaptive Approach (EPAA), and they later decided to cancel phase four of the EPAA, which had envisioned the development and deployment of a more powerful SM-3 interceptor than the current U.S. plan. Unfortunately, these goodwill efforts did not blunt Russian criticism of U.S. missile defense policy and thus made some U.S. policymakers skeptical of the value of future efforts to reassure Russia or China by taking the trouble to limit U.S. theater missile defense capabilities.¹²⁵

The potential overlap between U.S. theater and strategic missile defense underscores the need to better understand the purpose of U.S. and allied theater missile defense.

WHAT IS THE ACTUAL PURPOSE OF U.S. THEATER MISSILE DEFENSE?

The potential overlap between U.S. theater and strategic missile defense underscores the need to better understand the purpose of U.S. and allied theater missile defense. The United States explicitly seeks to defend itself and allies like Australia, Japan, and South Korea against

all regional missile threats, whether nuclear or non-nuclear, including those from China. The policy of U.S. allies is more ambiguous, in terms of the intended target(s) of their missile defense. That said, the defense white papers of Japan, at least, repeatedly highlight the ability of China's missile forces to attack Japan's mainland and offshore islands.¹²⁶

China views such theater missile defense systems as an important security threat, but this threat is ambiguous in at least two ways. First, are these defenses primarily designed to combat North Korea or do they focus more on dealing with China's much more capable theater-level missile force? Second, in the case of countering Chinese missiles, are U.S. defense capabilities designed to intercept Chinese conventional missiles distinguishable from U.S. defense systems aiming at undermining China's regional nuclear strike capabilities? China, presumably, may view the latter type of defenses as a greater strategic threat.

The geography of East Asia does not help dispel such Chinese concerns. After all, missile defense systems in Japan, South Korea, and U.S.-controlled Guam intended to intercept North Korean missiles would also be able to intercept, to some degree, incoming Chinese missiles against similar targets, depending on their exact trajectories. Base 65 of the PLA Rocket Force (formerly known as Base 51 of the Second Artillery), for example, is headquartered in Shenyang in northeastern China and commands several brigades of regional missiles reportedly located near the border with North Korea.¹²⁷ If these missiles were launched against targets in Japan or South Korea, they could have trajectories similar to North Korean missiles launched against the same targets. As a result, China may be inclined to interpret current and future deployments of U.S. and allied missile defense systems targeting North Korea as actually targeting China. This tendency may become more pronounced as the U.S.-China strategic rivalry worsens.

Instead of seeking to mitigate this ambiguity, the United States may be trying to take advantage of it. Some U.S. officials and experts believe that theater missile defense systems can provide the country with diplomatic leverage over China. Specifically, senior U.S. officials have sought to use China's concern about the THAAD deployment—by threatening to step up the deployment in South Korea—as a way to make China impose more sanctions on North Korea.¹²⁸ But this strategy is likely to backfire as Beijing views it as an implicit U.S. acknowledgment of the threat its missile defense systems pose to China, reinforcing preexisting Chinese suspicions about the objectives of U.S. missile defense.

Another ambiguity concerns the level of threat that U.S. theater missile defense presents to nuclear and conventional Chinese missile forces. The United States and its allies are locked into an ongoing offense-defense competition with China in conventional military terms. And it is fair game for each player to try to shift the conventional balance in its own favor. But U.S. and allied theater missile defense systems may, in China's view, also be intended to deny Beijing the ability to engage in nuclear retaliation against regional targets.¹²⁹ Because China's regional nuclear deterrent may, as discussed above, be more relevant than its strate-

gic nuclear deterrent to defending its key national interests in the Asia-Pacific, Beijing may be less tolerant of the development of U.S. and allied theater missile defense systems if it sees them as more than just a conventional concern.

This ambiguity could be irresolvable. For at least two reasons, the United States and its allies cannot develop theater missile defense systems that can counter only China's conventional theater missiles and not its regional nuclear missiles. By rough estimates, China has deployed only dozens of nuclear-capable medium- and intermediate-range ballistic missiles,¹³⁰ but it has fielded more than 1,000 theater conventional missiles.¹³¹ If the United States and its allies ultimately gain the ability to defend against a large-scale Chinese strike with conventional missiles, they would also be able to intercept a much smaller wave of nuclear missiles. If China's conventional theater missile force continues to outgrow its nuclear arsenal, this problem will become even more severe. In this sense, missile defense threatens China's ability to employ nuclear retaliation regionally more than its capacity to employ nuclear retaliation against the U.S. homeland.

Missile defense threatens China's ability to employ nuclear retaliation regionally more than its capacity to employ nuclear retaliation against the U.S. homeland.

Further, if Beijing's strategy for responding to a limited nuclear attack on China or Chinese forces involves limited regional nuclear retaliation, the targets would likely be U.S. military targets, especially U.S. military bases—as opposed to purely civilian population centers in Japan or other U.S. allies—so as to limit any further escalation.¹³² It is generally believed, however, that China's conventional missiles target the same U.S. military bases, as their mission is to threaten key operational and logistical nodes of the U.S. regional military network. Due to this overlap, U.S. missile defense systems capable of defending these targets from conventional missiles would have an inherent ability to defend them from nuclear attacks too.

IS U.S. MISSILE DEFENSE ACTUALLY OFFENSIVE?

The troubling possibility that technological advances and research and development trends could make U.S. missile defense suitable for more offensive purposes further alarms Chinese experts. From a Chinese perspective, U.S. missile defense systems appear to be becoming increasingly offense-oriented, despite U.S. insistence that they are defensive. The potential for such defenses to enable offensive action has long been recognized—indeed, for much of the 1960s and 1970s, the United States was the main proponent of this theory.¹³³ Essentially, a state that is well-defended by missile defense systems may be emboldened to launch preemptive attacks on an adversary's missile forces because its defenses could inter-

cept any surviving missiles launched in retaliation. Moreover, if those defenses are limited—that is, if they can defeat a small-scale attack but not a large-scale one—the incentives for the state to preempt and ensure that an adversary cannot launch a large-scale attack can be particularly strong.

This ambiguity between offensive and defensive capabilities is being compounded by two trends in contemporary U.S. doctrine and technological advances. First, the United States is seeking to broaden the concept of missile defense to include both non-nuclear preemptive attack capabilities and defensive intercept capabilities. The former preemptive kind, colloquially known as left-of-launch attack operations, are intended to “neutralize offensive missile threats prior to launch” through kinetic strikes or nonkinetic means—such as directed energy weapons, cyber interference, and electronic warfare.¹³⁴ Likewise, the United States seeks to build an Integrated Air and Missile Defense system that similarly embraces the concept of melding offensive and defensive capabilities into one “comprehensive joint and combined force,”¹³⁵ so as to synchronize elements such as global missile defense and global strike that employ “all means to produce both lethal and nonlethal effects.”¹³⁶ For China, the U.S. emphasis on integrating offensive and defensive capabilities indicates an increasingly aggressive approach to missile defense and a more offensive-minded military posture generally.

Second, China believes the United States is growing more interested in developing and deploying dual-capable and/or multi-mission systems. (After all, some missile defense systems can inherently be used for more than one mission.) Some interceptors, for example, can be adapted for use as land-attack or anti-satellite (ASAT) weapons.¹³⁷ Indeed, even some Chinese technical experts believe that dual-capable or multi-mission missiles represent a potential future trend in missile development.¹³⁸ As for the U.S. military, the 2019 MDR report and senior Defense Department officials have shown growing interest in space-based interceptors. But Chinese experts view them as possessing significant offensive potential beyond traditional missile defense, including for counterspace and land-attack missions. In an interview published by the official newspaper of the Chinese Ministry of Science and Technology, one senior expert from the Beijing Institute of Space Science and Technology Information concludes future U.S. space-based interceptors will be a “big killer” weapon intended to conduct offensive attacks on ground-based targets from space.¹³⁹

The United States may believe that Chinese experts misinterpret U.S. intentions in developing missile defense systems. But some U.S. activities only seem to validate such Chinese experts’ convictions. Perhaps most notably, the United States shot down one of its own satellites with an SM-3 interceptor in 2008. More recently, the SM-6 missile was reportedly described by the Missile Defense Agency as the “Swiss-Army knife of missiles,” being capable of conducting air defense, missile defense, and anti-surface warfare.¹⁴⁰ Similarly, most Chinese experts share their Russian counterparts’ assessment that the Mk-41 launch-

ers deployed in Europe, ostensibly for missile defense as part of the Aegis Ashore program, also can launch offensive missiles, such as land-attack Tomahawk cruise missiles.¹⁴¹

Some U.S. experts even urge the United States to build more multi-mission systems. Proposals include co-locating offensive and defensive capabilities; integrating missiles and interceptors into the same multiple launcher; using the SM-6 interceptor for land-attack; and equipping the SM-3 interceptor to function as a medium-range ballistic missile for anti-ship or land-attack missions.¹⁴² Although these suggestions come from U.S. scholars, Chinese experts generally believe that they likely reflect U.S. government thinking and future trends in U.S. policy. Such integrated capabilities could increase a weapon's military effectiveness and operational flexibility, but doing so would further muddy distinctions between offensive and defensive weapons and would exacerbate Chinese concerns that missile defense cooperation between the United States and its allies, particularly Japan, could contribute to the allies' offensive missile attack capabilities.¹⁴³

To fully understand the sources of Chinese suspicions over U.S. missile defense objectives is challenging. But Chinese concerns about ambiguities pertaining to U.S. capabilities and policies are clearly genuine. In particular, uncertainties about the purpose of U.S. theater missile defense systems is likely to further complicate regional security dynamics in East Asia and potentially fuel an arms race of theater-range offensive missile systems. The potential for U.S. strategic missile defense to counter both North Korean and Chinese ICBMs is an issue worth studying jointly and could be a topic for substantive U.S.-China security dialogues. The issue of U.S. theater missile defense potentially contributing to strategic missile defense capabilities also warrants joint examination and candid discussions. These issues, due to their technical nature, tend to be less politicized and could perhaps jumpstart an effective dialogue.

CHAPTER 3

HOW IS CHINA RESPONDING TO U.S. MISSILE DEFENSE?

JUST IN CASE dedicated U.S. and/or joint efforts to effectively mitigate Chinese concerns about missile defense fall short, Beijing in parallel has strived to craft policy responses of its own. Some of those responses could inject additional ambiguities into how its rivals think about the missile defense dispute. So far, China has put political pressure on the United States and its allies, forged deeper defense cooperation with Russia, and spearheaded diplomatic efforts to ban the placement of weapons in outer space, among other steps. Most importantly, Beijing has taken a wide range of military countermeasures to help offset U.S. missile defense.

Chinese experts often cite the threat from U.S. missile defense systems as one of the most important justifications for their country's nuclear modernization programs.¹⁴⁴ While foreign

analysts generally acknowledge a possible connection between U.S. missile defense and China's efforts to modernize its nuclear arsenal and related military capabilities, they also appear unconvinced that the former is the primary driving force behind the latter. Their skepticism is not surprising. The way Beijing develops and implements its strategy to overcome U.S. missile defense may create ambiguities surrounding China's nuclear modernization and, indeed, the overall evolution of its military. This lack of clarity helps reinforce hawkish views within the U.S. domestic debate about the revisionist nature of China's military rise.

Some of those responses could inject additional ambiguities into how its rivals think about the missile defense dispute.

IS CHINA'S NUCLEAR MODERNIZATION REALLY DRIVEN BY U.S. MISSILE DEFENSE?

Two factors make it difficult for the United States to understand the drivers behind China's nuclear modernization. First is the aforementioned lack of clarity in Chinese thinking on which aspects of the country's nuclear deterrent are threatened by which U.S. missile defense systems under various scenarios, and there is no agreed-on methodology for evaluating the scale and scope of the threat. Second and relatedly, there is no in-depth discussion about or clear methodology for gauging how much nuclear modernization is necessary to address the perceived threat and which capabilities should be enhanced. As a result, while China may believe it is responding reasonably to a very concrete threat, from a foreign perspective, things look very different. To many overseas analysts, Chinese experts and policymakers have only loosely defined the missile defense threat they are seeking to counter, and they do not seem to have adopted clear performance metrics to closely assess the effectiveness

of possible Chinese responses. Without such guidance, U.S. experts may fear that Chinese nuclear modernization would risk proceeding without clear parameters or limits.

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Unless their purposes are defined with clarity and discipline, China's nuclear modernization programs could easily become unconstrained.

The country's modernization approach leaves plenty of room for parochial and bureaucratic interests to wield significant influence. Almost all nuclear modernization programs can be justified as ways to mitigate the threat of missile defense, regardless of how credibly they would actually bolster Beijing's nuclear second-strike capability.

There are a host of examples, and this list is hardly exhaustive. To cite a few, SSBNs can launch ballistic missiles from unpredictable locations and along less defended attack trajectories, air-launched ballistic missiles can help evade boost-phase missile defense systems,¹⁴⁵ and nuclear-armed cruise missiles fired from bombers can fly low enough that current U.S. ballistic missile defense systems cannot intercept them.¹⁴⁶ Similarly, land-based ballistic missiles deployed inland are generally out of range of localized boost-phase interceptors, multiple independent reentry vehicles (MIRVs) can saturate enemy defenses, and hypersonic vehicles can evade mid-course interceptors and cannot generally be tracked by existing radars. To be sure, some of these programs are useful for bolstering China's second-strike capabilities. But if China's primary concern is U.S. missile defense, many of these programs are not necessarily the most cost-effective way to counter U.S. ballistic missile defense systems.

Looking forward, as China seeks to field a robust nuclear triad that includes land-, air-, and sea-based nuclear weapons, bureaucratic interests could become an even stronger

driver of modernization programs. Almost all the PLA's major military services will have important stakes in the nuclear sector.¹⁴⁷ If China continues to make increasingly substantial investments in the military and the defense industry, this competition could become even more pronounced.

From a U.S. perspective, these dynamics create ambiguities about China's motivations. U.S. observers worry that China is seeking a larger, more diversified nuclear force more for coercive purposes than as a defensive reaction to U.S. missile defense. The director of the Defense Intelligence Agency and the chairman of the Senate Foreign Relations Committee have recently claimed that China is likely to at least double the size of its nuclear stockpile over the next decade.¹⁴⁸ While Defense Intelligence Agency predictions often turn out to overestimate the growth in China's nuclear stockpiles, this most recent assessment is significant. It indicates that some quarters of the U.S. strategic community believe that China will expand its nuclear arsenal regardless of developments in U.S. missile defense capabilities.

Specifically, U.S. experts worry that China's deployment of DF-21 and DF-26 missiles will enhance its ability to conduct theater-level nuclear strikes. The fear is that such capabilities may enable Beijing to use nuclear weapons in more tailored ways and make Chinese leaders more inclined to escalate past the nuclear threshold during military crises.¹⁴⁹ China's fielding of multiple warheads on various strategic nuclear delivery systems—silo-based DF-5 ICBMs, road-mobile DF-41 ICBMs, and possibly rail-mobile ICBMs and SLBMs in the future—may appear to the United States as a step toward a more aggressive nuclear posture that goes beyond a doctrine of minimum deterrence. China's reported development of nuclear-capable, air-launched ballistic missiles and nuclear-capable cruise missiles also may raise U.S. concerns that Beijing has a growing interest in tactical nuclear warfighting capabilities. These new weapons could threaten U.S. allies in Asia, target forward-deployed U.S. troops and military bases, and reach U.S. overseas territories. Unless China can convincingly link such modernization programs to concerns over missile defense, the United States is likely to remain suspicious that these programs are driven by other motivations.

IS CHINA SPOILING FOR A COMPREHENSIVE MILITARY COMPETITION?

It does not help matters that there is no in-depth, publicly available Chinese research on what constitutes an adequate counterstrategy against U.S. missile defense. It appears that Chinese concerns about missile defense have driven the country to cast a wide net and explore all possible types of counteracting capabilities. Indeed, many Chinese experts emphasize that there is no single way to address the threat.

Instead, many of them argue that an approach called both “system penetration” (体系突破) or “system confrontation” (体系对抗) is the right course of action.¹⁵⁰ (In most discus-

sions, these two terms are used interchangeably.) The basic premise is that, rather than focusing narrowly on enhancing missiles to defeat rival interceptors alone, the broader goal should be to find and exploit vulnerabilities associated with all the components of a missile defense system (including sensors, interceptors, and command, control, and communications networks).

Practically speaking, Chinese experts argue that the task of making its missiles more penetrable themselves requires a country to improve its technological capabilities across a wide range of scientific and engineering domains. The relevant technologies include stealth capabilities, electromagnetic interference (deployed directly on missiles to disrupt enemy radars), decoys and penetration aids, MIRVs, trajectory shaping (to enhance maneuverability), anti-nuclear reinforcement (to make missiles and/or warheads more resistant to nuclear radiation), anti-laser reinforcement (to make missiles and/or warheads less susceptible to lasers), and others.¹⁵¹

More importantly, beyond efforts to make China's own missiles more survivable, system penetration also involves developing kinetic and nonkinetic methods of suppressing, interfering with, or destroying all the key subsystems of a missile defense network. For instance, various types of ASAT weapons are needed to counter space-based sensors and communications systems. In addition, anti-radiation missiles and microwave weapons can be employed to attack radars, while ballistic and cruise missiles can conduct preemptive strikes on interceptors and their supporting facilities. Counterspace, cyber, and electronic warfare capabilities can target rival command, control, and communications systems.¹⁵²

This strategy assumes that, because the development of missile defense has been “systemized” and its deployment “globalized,”¹⁵³ the development of countervailing capabilities needs to be similarly systemic and technologically comprehensive. As one senior expert at the PLA Rocket Force University of Engineering emphasizes, “The confrontation between missile penetration and anti-missile [capabilities] is no longer a single form of technical confrontation, but is manifested as a systemic confrontation between the attacking party and the defending party. Therefore, the focus should be on the construction of a *system* [emphasis added] of missile penetration capabilities.”¹⁵⁴

Because such matters are highly secretive, it is uncertain whether Chinese government and military officials have adopted this strategy as official policy. That said, the way that highly respected, senior Chinese experts have promoted this stance seems to suggest that such countermeasures would hold at least some degree of influence in official policy deliberations.

One key consideration is that the system penetration approach would make it hard to gauge China's primary intentions. Setting aside the question of to what extent the Chinese government has officially embraced a system penetration strategy, the problem with this approach is that it looks overly offensive. It requires the development of advanced offensive military

capabilities in many important technological areas, making it difficult for the United States and its allies to determine the extent to which such comprehensive efforts are driven by the specific desire to counter missile defense systems as opposed to the more aggressive goal of acquiring broader offensive military advantages.¹⁵⁵

Other countries, for example, view China's development of various ASAT weapons as an aggressive attempt to undermine all types of military and civilian operations involving space. Similarly, other regional countries could see Beijing's position that it is necessary to strengthen existing preemptive strike capabilities against missile defense assets as a Chinese excuse to acquire military strike capabilities, potentially for a wide range of coercive objectives. In these ways, the system penetration strategy appears to be a disproportionate response to the problem it seeks to address.

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System penetration also implies an aspiration to compete with a stronger enemy in technological areas where Beijing does not necessarily possess an advantage. This paradigm requires China to become and stay competitive in certain technological areas in which the United States has traditionally enjoyed superiority, such as stealth, electromagnetic interference, sensors, precision-strike weaponry, and offensive cyber capabilities.

This approach would appear to be a departure from China's long-standing strategy of asymmetric competition—focusing on a few areas where China can obtain advantages in more cost-effective ways than an enemy could. Here, ambiguity arises due to the lack of discussion in the Chinese literature about whether system penetration is essentially tantamount to a strategy of comprehensive or systematic military competition with the United States.

It may be difficult for U.S. analysts and officials to discern the relationship between the two. On the one hand, Chinese experts could genuinely believe that the system penetration approach is the only effective way to counter U.S. missile defenses, despite its seeming resemblance to a policy predicated on comprehensive military competition. On the other hand, it is also possible that Beijing's choice reflects a broader motivation to conduct and eventually win a comprehensive military competition with the United States.

These uncertainties about intentions are manifested in various ways. For example, China may have multiple motivations for developing ASAT capabilities. The perceived need to undermine U.S. missile defense systems could be just one of them—though it is an important one. It remains possible that the PLA has already adopted the concept of system warfare to deal with the U.S. military in general and that the need to counter missile defense only provides an additional justification. In short, it is unclear whether China's interest in system penetration primarily reflects its concerns over missile defense or loftier ambitions of com-

peting with the United States more broadly. In the latter case, the United States may feel it should be particularly alert to China's long-term strategic intent.

Even apart from Chinese intentions, a system penetration approach could pose other unintentional and unforeseen risks. Some proposed countervailing capabilities justified under the system penetration approach might create acute ambiguities in a crisis or conflict, increasing the risk of inadvertent escalation. Such risks would arise in the event of attacks on missile defense systems and/or their components that serve different functions.

For example, consider the PAVE PAWS radar system that Taiwan introduced from the United States, a system that plays an important role in detecting Chinese conventional missile strikes against Taiwan. But, as James Acton points out, this radar can also significantly contribute to existing U.S. early-warning capabilities against Chinese ICBMs and SLBMs. This potential overlap in capabilities is quite significant in part because, according to a senior Taiwanese lawmaker, Taiwan shares this radar data with the United States.¹⁵⁶

If this radar indeed plays a double role, a Chinese preemptive attack against it during a conflict between the United States and China could introduce escalation risks. Such a Chinese attack may aim at undermining Taiwan's early-warning capabilities against Chinese conventional strikes, but the United States may suspect the attack seeks to undermine its early-warning capabilities against a strategic strike by Chinese ICBMs and SLBMs. Especially if such an attack were to happen when China appeared to face defeat during a crucial conventional conflict over Taiwan, U.S. concerns about an imminent nuclear attack on its homeland might lead U.S. decisionmakers to consider launching a preemptive strike on China's strategic nuclear forces. It is unclear whether Chinese and U.S. strategists are fully cognizant of such risks.

In short, China's response to U.S. missile defense may raise concerns about its strategic intentions due to two sets of ambiguities. One is how closely China's various nuclear modernization programs are indeed connected to its desire to address the missile defense threat. The other is whether the system penetration strategy proposed by Chinese experts is a focused endeavor to counter U.S. missile defense or whether it actually reflects a more ambitious goal to win a comprehensive military competition with the United States. It would be beneficial for China's own interests to examine and debate these issues internally; it is also necessary to clarify these ambiguities for a constructive bilateral dialogue on missile defense to take place.

CHAPTER 4

IS THERE A BETTER WAY FORWARD?

GIVEN THE PRECARIOUS STATE of U.S.-China relations and the lack of basic trust between the two sides, deep, far-reaching cooperative measures to resolve this long-standing dispute over missile defense likely are not realistic. Even simple, reciprocal transparency measures on missile defense capabilities and policy plans appear to be a challenging prospect under current conditions. Meanwhile, it does not appear plausible that the United States and China could undertake more ambitious confidence-building measures, such as establishing joint missile defense data fusion centers, as some have proposed.¹⁵⁷ Arms control measures, such as limits on the number or capabilities of missile defense interceptors or radars, as China and Russia have advocated, appear even less realistic.

What, then, can be done? Even if the two countries cannot fully avoid the larger security dilemma, completely end strategic competition, or wholly settle basic questions about future strategic intentions, they can still take steps to ameliorate this apparent impasse. The first step toward cooperation is to acknowledge and thoroughly study the manifold ambiguities surrounding the missile defense dispute. Mitigating these ambiguities will not be easy, and the task will become even more difficult in the future if the bilateral strategic rivalry continues to grow. That said, precisely

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because a new Cold War is becoming an ever more realistic prospect, redressing the ambiguities that underlie this dispute could prevent it from further fueling hostility and perhaps even help put the strategic relationship on more stable footing.

By the same token, it is possible that, after serious and sincere efforts to address this issue, U.S. and Chinese officials and analysts may conclude that the ambiguities may not be fully resolvable. But if the two sides can at least agree that some ambiguities are hard to resolve due to technical or geographical realities, this can still help build better mutual understanding and mitigate worst-case thinking about each other's strategic intentions. The steps outlined below are designed to move the two countries in this more modest and realistic direction.

What China Can Do

To begin with, China must dispel ambiguities about its misgivings on U.S. missile defense. Before the United States and its allies can address China's concerns over missile defense, Beijing needs to clarify what precisely it is concerned about. Is China primarily alarmed about its nuclear deterrent or is it equally worried about its conventional deterrent and attack capabilities, which are critical to defending its perceived core interests in possible regional conflicts? In the case of nuclear deterrence, does China worry mostly about its ability to conduct all-out nuclear retaliation, as most experts have focused on, or about scenarios involving more limited nuclear use? Does China believe its nuclear deterrent is mostly affected by U.S. strategic (intercontinental) or regional missile defense systems? China needs to have clear answers to these questions for its misgivings to be understood.

China also needs a clear, consistent standard for gauging the sufficiency of its nuclear deterrent.

China also needs a clear, consistent standard for gauging the sufficiency of its nuclear deterrent. To put things simply, China has to define how many warheads it believes it must deliver to the U.S. homeland to achieve

strategic nuclear deterrence and how many warheads it must deliver to regional targets to deter a regional nuclear conflict. China would not need to reveal exact numbers externally; rather, a clear definition would provide a consistent standard against which Chinese strategists could plan nuclear modernization efforts.

Relatedly, China needs a clear way of evaluating the impact of a possible U.S. first strike coupled with missile defense capabilities. Current public discussions about the effects of a U.S. first strike on China's nuclear forces are superficial and abstract.¹⁵⁸ These conversations suggest that China has neither developed nor systematically implemented a suitable methodology. Chinese experts disagree over such fundamental issues as whether advances in U.S. surveillance and reconnaissance capabilities over recent decades have meaningfully enhanced the United States' ability to track and threaten Chinese mobile missiles.¹⁵⁹ These

disagreements may reflect a lack of rigorous research by experts, which prevents concrete, detailed internal discussions about sizing China's nuclear arsenal.

In a similar vein, China should develop clear criteria on how effectively missile defense must perform to pose a realistic threat to its deterrent. In some U.S. research on the potential impact of U.S. missile defense on near-peers' nuclear forces, it was assumed that missile defense would pose a realistic threat if it can “block 20 percent or more of an opponent's ballistic-missile retaliation on generated alert.”¹⁶⁰ Clear criteria, even if undisclosed, help to avoid exaggerated threat perceptions. For the same purpose, it is no less important to ensure that technical evaluations of the effectiveness of U.S. missile defense systems go through rigorous peer review. Such oversight can help identify and correct misunderstandings about key technical capabilities of U.S. missile defense programs, which are not rare in the existing literature. More open discussions and public debates on the efficacy of U.S. systems do not risk divulging sensitive Chinese military information and can be very helpful for developing balanced understandings on key technical issues that can inform both internal policy deliberations and dialogues with the United States.

Furthermore, China needs to be more transparent about how its nuclear modernization efforts are proportionate to the objective threat posed by missile defense. If China has a clear definition for the sufficiency of its nuclear deterrent and a clear methodology for evaluating the effects of a U.S. first strike and missile defense, it should then be able to scale its nuclear modernization program accordingly. Transparency about the assumptions underlying this program would help assuage foreign concerns that China's nuclear modernization is driven by a more expansionist, aggressive agenda than the modest goal of preserving deterrence. At bilateral and multilateral dialogues, for instance, China's efforts to promote the image of a transparent and restrained nuclear power can focus more on explaining these underlying assumptions and calculations so as to help the international community better examine the connection between foreign powers' missile defense and Chinese nuclear modernization. If China can assure other countries of its peaceful intent, it would have a greater chance of gathering international support for constraining the development of missile defense.

Top Chinese decisionmakers can help check the influence of domestic parochial interests and limit group-think by highlighting the importance of a proportionate response to missile defense and by having the political will to implement that vision. As China has invested even more in its military and defense industry over the past several decades, parochial bureaucratic interests are becoming more important in determining policy outcomes, and various domestic stakeholders have a growing interest in overestimating external threats. Chinese scholars, unlike their foreign counterparts, have not paid much attention to how a state's military-industrial complex can influence defense policy and military procurement decisions in ways that ultimately undermine the state's security. As a result, few Chinese security analysts are raising potential concerns about the prevalence of worst-case thinking

on such issues. The Chinese security community needs to change this by having transparent internal discussions on the issues identified above.

Additionally, China should clarify the role of its theater nuclear missiles. Chinese strategists must have considered more sophisticated options than all-out nuclear retaliation in response to any rival nuclear attack. Without knowing what role theater nuclear forces play in such options—and how Beijing understands external threats to those forces—it is impossible for China and the United States and its regional allies to have a meaningful discussion about how theater missile defense systems could affect Beijing’s nuclear deterrent and whether measures can be taken to mitigate their impact.

China’s future defense white papers can consider shedding more light on this issue. In this respect, the 2018 U.S. NPR report could be something of a general model (although China does not necessarily agree with the U.S. observation and evidence in this particular case): the NPR report clearly explained why the U.S. government is concerned that its theater nuclear forces are inadequate given its beliefs that Russia might use nuclear weapons in a limited way early in a conflict and that Moscow is developing new types of tactical weapons to support this doctrine. By extension, China’s clarification could also help other countries better evaluate the credibility of its NFU policy, reduce their concerns about the nuclear threat Beijing poses (which, in turn, may reduce investments in missile defense), and mitigate the risks of inadvertent escalation in a crisis.

What the United States Can Do

Mitigate U.S.-China differences on countering North Korean nuclear weapons. U.S. concerns about North Korea’s nuclear and missile programs remain key drivers of the development and deployment of U.S. strategic missile defense systems designed to thwart enemy missiles launched from East Asia. But U.S. decisionmakers should be aware that the ambiguity over whether U.S. strategic missile defense capabilities are aimed at North Korea or China itself contributes significantly to Beijing’s worst-case assumptions about U.S. intent. Moreover, ongoing improvements to North Korea’s nuclear and missile capabilities will likely drive the United States to augment its strategic missile defense systems, further intensifying the security trilemma between Beijing, Pyongyang, and Washington.¹⁶¹

At the operational level, the United States may feel it needs a high degree of confidence that even if North Korea launched every one of its ICBMs in a surprise attack, U.S. missile defense systems could intercept all of them. But U.S. policymakers should recall that Chinese strategists worry that such U.S. missile defense systems could neutralize China’s surviving nuclear weapons after a U.S. first strike, a concern heightened by China’s geographic proximity to North Korea.

Despite hopes that the United States and China would find a way to cooperate more to try to convince North Korea to denuclearize, Chinese and U.S. geostrategic interests are

increasingly diverging amid their heightened strategic rivalry, making such coordination more difficult to achieve. As a first step to mitigate such challenges, the United States and China should jointly evaluate North Korea's nuclear and missiles capabilities and the potential threats they pose to other countries and regional stability, so as to narrow or at least shed light on the gap between Chinese experts' generally more sanguine and U.S. experts' typically more pessimistic assessments.¹⁶² U.S. allies, such as South Korea, can help convene and moderate such joint evaluations, giving China a stronger incentive to participate.

A U.S. NFU commitment could help. The United States could help mitigate this dilemma by adopting an NFU policy toward China, or, less formally, by forging a private understanding with China on NFU. This would effectively address China's fear of a U.S. first strike, thus substantially reducing the potential impact of U.S. missile defense on China's nuclear deterrent and making it much easier for Washington to assure Beijing that U.S. missile defense systems cannot undermine its nuclear deterrent. China's own NFU policy and its long-standing call for other nuclear powers to adopt such a policy means that even a U.S. declaratory policy of NFU would help address Chinese concerns about the risks of a preemptive U.S. nuclear strike. Despite the long internal debate within the United States about NFU, the potentially huge benefit of bringing Beijing and Washington closer to resolving their missile defense dispute should give one important reason for the United States to seriously consider adopting this policy toward China.

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Examine the technical feasibility of distinguishing certain missile defense systems. While a U.S. NFU declaration toward China would be valuable, it would not solve every type of ambiguity. For example, the ambiguity over whether U.S. theater missile defense capabilities could contribute to strategic defense would persist. Differentiating theater and strategic missile defense systems is already difficult, and technological trends—such as the development and networking of more advanced sensors—are making this task even more burdensome. But serious efforts aimed at mitigating these challenges can still be helpful, including (for example) studies to understand the technical and operational feasibility of drawing distinctions between theater and strategic systems. The United States can consider inviting Chinese experts to participate in such studies at the unclassified level. Even a joint understanding and acknowledgment of the technical ambiguities and especially the challenges of addressing them might somewhat help mitigate worst-case thinking. Similarly, the United States should conduct studies to examine the technical and operational feasibility of constructing an effective strategic missile defense system against North Korean ICBMs without undermining Chinese second-strike capabilities. U.S. experts should find ways to engage Chinese counterparts in

this process, as such collaboration can demonstrate U.S. willingness to address Chinese concerns and be a good confidence-building measure in itself.

What Both Sides Can Do Together

Contain any broader security spillover effects. The most urgent task for both countries is to keep their dispute over missile defense from spilling over into other military domains or fueling a broader strategic and military competition. U.S. missile defense systems motivate China to consider a system penetration strategy; build up its nuclear forces; and develop alternative means of delivery, such as hypersonic vehicles, strategic bombers, air-launched ballistic missiles, and SLBMs.¹⁶³ If China does implement the system penetration strategy, that would further push Washington and Beijing into a comprehensive military competition.

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Deepen dialogues and exchanges between experts. To keep the tail from wagging the dog, so to speak, both countries' expert communities need to develop much more in-depth, nuanced understandings of each other's internal policy deliberations. Chinese experts who are aware of the diversity and complexity of relevant U.S. domestic debates and of how U.S. domestic politics can sometimes be a greater driver of U.S. missile defense policymaking than calculations of long-term security interests tend to be more sympathetic than their peers to the idea that the U.S.-China missile defense dispute is a security dilemma. Such experts appear less likely than others to believe that U.S. policies on missile defense aim at undermining Beijing's nuclear deterrent or other key security interests.¹⁶⁴ Consequently, it may be useful for both countries' experts to strive to describe and explain, in an unclassified manner, their respective domestic debates about nuclear and missile defense policy. This approach could help develop nuanced understandings about each other's policy, reduce misunderstandings caused by lingering ambiguities, and gradually cultivate greater sensitivity to the security dilemma at hand.

Ambiguities about intentions are sometimes caused by genuine disagreements over technical issues. In the case of the THAAD dispute, for example, technical experts from the two countries have genuinely divergent views about the technical capabilities of the THAAD system, especially the AN/TPY-2 radar. Yet, unfortunately, they have failed to jointly explore the origins of their disagreements or seek out a common understanding. As a result, Chinese officials believe the United States deployed this system to South Korea to undermine China's strategic security interests and that Washington simply pretends that the system does not harm China. U.S. officials, by contrast, believe that China knows full well that the system does not pose a serious threat to it and that Beijing's arguments to the contrary

are intended to help it achieve other geopolitical goals, such as driving a wedge between the United States and its South Korean ally.¹⁶⁵

This experience shows that the two countries' technical experts need to engage each other in substantive, in-depth dialogues, exchanges, and joint research. Such joint research and exchanges based on open-source information can, without disclosing classified information, help narrow perception gaps. Due to the highly technical nature of missile defense, Chinese technical experts wield unusually important influence in shaping the views of the country's top political leaders and decisionmakers on such issues. Such in-depth exchanges, therefore, can be particularly helpful for informing, guiding, and navigating relevant national and bilateral policy debates constructively. That said, such efforts are most effective if they occur early in a potential policy dispute. After political leaders have already formed their views, it becomes more difficult to reshape them based on technical analysis.

Remember the lessons of Cold War engagement. Beijing and Washington must demonstrate sufficient political will to establish and sustain technical and operational exchanges. U.S. decisionmakers are frustrated that Chinese interlocutors sometimes seem to prefer complaining about malign U.S. intentions instead of engaging in substantive dialogues to help clarify matters. They feel their long-term efforts to engage Russia on missile defense have been futile and their repeated efforts to talk to China have been met with closed door after closed door. For China, seemingly unsuccessful U.S.-Russian engagement reinforces suspicions that if a nuclear power as strong as Russia could not make the United States seriously address its concerns, Beijing may have little hope of convincing Washington to limit its missile defense programs to accommodate Chinese interests.

Yet these historical lessons are not completely correct. During U.S.-Russian engagement, Washington did make important changes to its missile defense plans, partly to address Russian concerns. Examples include the Obama administration's decision to abandon plans to build a third GBI deployment site in Poland and to cancel the fourth phase of the EPAA by not developing advanced SM-3 IIB interceptors.

Chinese leaders should draw confidence from this history: engagement with the United States can produce meaningful results, and Beijing does have a chance to influence U.S. missile defense policy through substantive talks. But China's lack of experience in holding official bilateral talks on missile defense and its self-perceived sense of inferiority about its capabilities in this highly technical domain may add to its hesitation. For U.S. decisionmakers, it is necessary to help address Beijing's lack of confidence by being more willing to respond to Chinese policy concerns. Unlike the nuclear parity between Washington and Moscow, the asymmetric nuclear relationship between Washington and Beijing means that it may make sense for Washington to drop strict requirements on equality or reciprocity with Beijing when it comes to information sharing, transparency, and other mutual commitments during visits and dialogues, at least initially.

Keep security concerns from becoming a self-fulfilling prophecy. Chinese and U.S. political leaders and policy experts need to be particularly vigilant that ambiguous evidence does not lead to self-reinforcing interpretations of the other side's intent. This danger is especially pernicious because some Chinese and U.S. experts have fallen prey to circular logic on such questions. For example, since 2007, many Chinese policy experts have argued that—because official U.S. documents, including the Defense Department's Quadrennial Defense Reviews, have characterized China as having “the greatest potential to compete militarily with the United States”—China is justified in interpreting U.S. military capabilities, including missile defense systems, as intended to “contain” China.¹⁶⁶ At the same time, Chinese policy experts often argue that the perceived threat from U.S. missile defenses is evidence of broader U.S. strategic hostility toward China.¹⁶⁷ Such circular reasoning is also observable in the United States. Some U.S. experts, for example, argue that China's nuclear modernization will lead it to adopt a more aggressive nuclear posture and become more geopolitically ambitious.¹⁶⁸ Others argue that China's more aggressive strategic objectives drive Chinese nuclear modernization.¹⁶⁹ Accepting both arguments as correct could reinforce existing pessimistic interpretations of China's intent.

This set of recommendations seeks to move U.S.-China discussions on missile defense beyond superficial talking points and address ambiguities involving U.S. and Chinese capabilities and policies. China and the United States can pursue some of these efforts unilaterally, and the others can be discussed, explored, and promoted jointly at track 1.5 or even track 1 dialogues. But all of them need to be built on a deeper understanding of the impact of ambiguities in the U.S.-China dispute over missile defense.

Efforts along these lines are necessary to contain further escalation of this dispute and prevent it from continuing to destabilize the bilateral security relationship and disrupt the security order in the Asia-Pacific. At a time when concerns that the United States could potentially deny China a credible nuclear deterrent are already driving an unprecedented domestic debate in China about whether it needs to massively build up its nuclear forces,¹⁷⁰ the two countries urgently need to ensure that their missile defense dispute does not further fuel a disastrous nuclear arms race and a full-blown military rivalry.

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