A NEW ERA IN U.S.-RUSSIAN STRATEGIC STABILITY

How Changing Geopolitics and Emerging Technologies are Reshaping Pathways to Crisis and Conflict

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01 CHAPTER

Introduction

For more than two decades following the end of the Cold War, military conflict between the United States and Russia seemed highly implausible. While relations were sometimes rocky, few if any imagined that any disagreements between Washington and Moscow carried much risk of escalation to a serious crisis, let alone war. Even amid the Kosovo crisis of the late 1990s, only a few Russians – and fewer Americans – took seriously the possibility of bilateral disputes turning into conflict. Indeed, both the George W. Bush and Barack Obama administrations, each in their own way, attempted to "reset" relations with Russia and replace stagnating ties with positive-sum arrangements.

In the aftermath of Russia's seizure of Crimea and its infiltration of "little green men" into eastern Ukraine starting in 2014, however, the U.S.-Russian relationship deteriorated substantially. In response, and in addition to imposing economic sanctions on Russia, the United States and NATO have strengthened their military posture in Europe to deter Russian aggression. Russia has responded by ramping up overflights of Allied nations as well as aggressively harassing U.S. and Allied naval vessels. Additionally, Russia sharpened both its rhetoric and military posture in Europe, and it deployed forces into Syria to fight alongside Bashar al-Assad's regime in Damascus.

Most recently, the U.S. intelligence community concluded in January 2017 that "Russian President Vladimir Putin ordered an influence campaign in 2016 aimed at the U.S. election."[1] In response, the outgoing Obama administration expelled some 35 Russian diplomats, closed down two Russian compounds, and imposed sanctions on nine Russian individuals and organizations including the FSB and GRU intelligence services. Russian hackers reportedly have targeted other recent Western democratic elections, including the 2017 presidential contest in France.[2]

With the inauguration of U.S. President Donald Trump in 2017, there have been some signs of the potential for improved relations – but also signs of increased tensions as the U.S. Congress passed substantial additional sanctions on Russian entities in retaliation for Russian "hacking" of the U.S. Presidential election. Moscow retaliated by ordering a reduction of U.S. diplomatic staff and seizing U.S. diplomatic compounds in Russia. As of the time of this report, there is tremendous uncertainty – and not a small amount of risk – regarding the future of U.S.-Russian relations.

Even as various developments have heightened tensions between the United States and Russia, fundamental changes in the military-technological landscape are offering both sides new opportunities for advancing military capabilities – while also posing

U.S. President Donald J. Trump shakes hands with Russian President Vladimir Putin at the G20 summit in July 2017. Trump has made clear his willingness to improve U.S.-Russian relations, though exactly how he would so do remains to be determined. (Getty)

new escalatory risks and threatening to erode strategic stability between the two nations. Because of the extensive dependence on information technology within both nations' militaries, and likely perceptions of lower risk for the use of "non-kinetic" nonlethal attacks, there are growing incentives on both sides for early use of cyber capabilities in particular and, potentially in coming years, counter-space ones as well. These and other technologies also are impacting the stability of the strategic nuclear balance. For decades, the stability of the U.S.-Russian nuclear balance has rested on a firm understanding that both sides have assured nuclear second-strike capabilities. In this situation, neither side can realistically conduct a disarming first strike of the other side's nuclear forces. The development and integration into military postures of an array of new technologies, however – especially in the cyber, space and counter-space, precision strike, and missile defense fields – may call this confidence into question in the coming years.

> ## As of the time of this report, there is tremendous uncertainty – and not a small amount of risk – regarding the future of U.S.-Russian relations.

The parallel changes in U.S.-Russian political relations and the military-technological landscape are fundamentally reshaping the ways in which a U.S.-Russian crisis and conflict likely would unfold. Neither side has yet internalized these overlapping geopolitical and technological changes. When they do, it is likely that each will take different and potentially conflicting lessons from them. As a result, risks could significantly increase the potential of a dispute leading to crisis, of a crisis leading to war, and of a war escalating rapidly.

It is useful to analyze these issues, and potential mitigating steps, around three distinct, albeit related, types of pathways.

Pathway Type #1 – The Future Course of U.S.-Russian Relations

Although American analysts of strategic stability generally focus on technologies and force exchange calculations, Russian strategic thinkers rightly note that the overall state of U.S.-Russian relations substantially influences the pace of strategic arms development, the likelihood of crisis and conflict, and the likelihood of preventable or accidental escalation due to poor communications and worst-case assumptions. In this report, we survey the recent past, current state, and potential future course for U.S.-Russian relations in the coming years.[3] The future course of bilateral relations will have a significant impact on the likelihood of a U.S.-Russian crisis, and in the event of it, on the ability of both sides to find acceptable political solutions without resorting to armed conflict.

Pathway Type #2 – Potential Slippery Slopes of Escalation During Crisis and Conflict

This second pathway type considers the potential for rapid escalation in a crisis, and in the early stages of conflict, due to growing incentives for U.S. and Russian leaders to employ "non-kinetic" capabilities early and extensively. Both the U.S. and Russian militaries rely heavily and increasingly on information technology and space systems. Cyber and counter-space attacks as a first move at the outset of a conflict could provide military advantage and political leverage without necessarily resulting in casualties; moreover, opportunities to strike at these systems may be fleeting. As a result, both sides are likely to increasingly possess strong incentives to use cyber and counter-space capabilities early in a conflict to gain advantage. This emerging situation could greatly increase the risks of stumbling into conflict due to accident or inadvertence. It also is conceivable that other states and even non-state actors may undertake attacks, particularly in the cyber domain, that lead to inadvertent U.S.-Russia escalation. This report considers the impact of these increased pressures for rapid escalation of crisis and conflict, evaluating the most salient scenarios for intentional or inadvertent conflict involving potential "slippery slopes."[4]

Pathway Type #3 – The U.S.-Russian Arms Competition and its Impact on Strategic Stability

This third and final type of pathway is fundamentally about the potential for the development and deployment of new military capabilities to undermine strategic stability. Both the United States and Russia are recapitalizing their nuclear delivery systems. With some exceptions (e.g., an increased Russian reliance on multiple-warhead ICBMs), these new systems do not appear likely to significantly undermine strategic stability as they are largely replacements for existing systems. However, the deployment of increasingly advanced cyber, space, missile defense, long-range conventional strike, and autonomous systems has the potential to threaten both sides' nuclear retaliatory strike capabilities, particularly their command and control apparatuses. This report considers how these developments may have an impact on strategic stability in the coming years.[5]

These three types of pathways are intertwined and related in fundamental ways. Deteriorating political relations between the United States and Russia (pathway #1) heighten the likelihood of crisis or conflict, thereby bringing into play the potential slippery slopes of escalation. Similarly, heightened pressures to escalate with "non-kinetic" capabilities during crisis or early in conflict (pathway #2) may increase fears of major war, thereby elevating nuclear risks and heightening the potential dangers of strategic instability.

In developing this pathways framework, we have benefited greatly from American and Russian colleagues who participated in workshops and meetings.[6] We also built on earlier analytical work; of particular relevance is the edited volume titled *Hawks, Doves, and Owls*, written more than thirty years ago, which defined and evaluated potential U.S.-Soviet nuclear conflict scenarios.[7]

In conducting research for this report, our discussions with American and Russian strategic analysts have confirmed that thinking in terms of these three types of pathways is intuitive and easy to grasp. Applying the "pathways" metaphor to develop policy alternatives is similarly intuitive and, we believe, useful – e.g., developing "rules of the road" for the use of cyber and space weapons, and creating "off-ramps" from crisis or conflict. While this framework will not change American and Russian national interests or the will to pursue them, it may help facilitate productive engagement over time and help make positive, stabilizing policy outcomes more likely as similar discussions did during the Cold War.

This report addresses each of the three types of pathways, laying out the key aspects of each. Within each section, we first offer an assessment of the current situation, then consider relevant geopolitical and technological trends, and finally outline alternative scenarios along each pathway that can help guide the development and evaluation of policy options.

This project, including this report, is intended to establish a framework that government officials and outside experts can use to grapple with these difficult but crucial issues and help guide the development and prioritization of unilateral, bilateral, and multilateral measures. Our aim in this first report is to define the nature of the problem in a compelling way. This will be followed by a second paper that employs this framework to identify steps that could reduce the risks of severe crisis or armed conflict between the United States and Russia. This second paper will focus particularly on ways to reduce the chances that conflict escalates to nuclear war, and will offer a series of concrete recommendations for policymakers.

02 CHAPTER

Pathway Type #1

THE FUTURE COURSE OF U.S.-RUSSIAN RELATIONS

substantial tension exists between Russia and the United States, along with its European allies, over a range of political, economic, and military issues. These increased tensions have led to a growing sense that conflict is possible.[8]

Although there were certainly periods of tension between the United States and Russia in the 1990s and early to mid-2000s, such as over the Kosovo intervention of 1999, relations generally were relatively stable. Serious disagreements over issues such as NATO expansion and the U.S. deployment of ballistic missile defenses in Europe strained ties but remained largely below the surface. This began to change in the late 2000s. A preliminary indication was Russian President Vladimir Putin's caustic speech about the United States and the West at the Munich Security Conference in 2007, followed more substantially by the Georgia war of 2008.

Relations appeared to restabilize somewhat during the "reset" period of the early Obama administration and the presidency in Russia of Dmitry Medvedev, but the return to office of Putin in 2012 augured a return to deteriorating relations. Putin has repeatedly made overt claims that the United States is pursuing a strategy of containment, and that the U.S.-led security order in Europe is aimed toward weakening Russia.[9] The Ukraine crisis of early 2014, Russia's seizure of Crimea, and the outbreak of a Russian-backed insurgency in eastern Ukraine, represented a marked break. U.S.-Russia tensions were exacerbated by Moscow's dramatic military intervention in Syria, aimed at shoring up Assad's rule amid pressure from opposition forces – forces directly supported, in some cases, by the United States.

Today, while areas of common interest remain over issues such as counterterrorism and nonproliferation, relations between Washington and Moscow over the past several years have been tense at best and hostile at worst. At the end of the Obama administration public views in both countries reflected this perspective: A 2016 Gallup poll found that 65 percent of Americans hold an unfavorable view of Russia, while recent polls show an even higher percentage of Russians – 80 percent – had an unfavorable view of the United States.[10]

Since the election of President Trump, public views on both sides have shifted significantly. A June 2017 Pew Research poll found that the percentage of the Russian public that believed the American president would do the right thing in global affairs had increased dramatically from 11 percent at the end of the Obama administration, to 53 percent during the early months of the Trump administration.[11] A Gallup poll taken in early 2017 showed nearly a doubling of positive American views regarding President Putin, from 13 percent in 2015 to 22 percent in 2017.[12]

President Trump entered office holding out the promise of better ties with Moscow, and invited a relaxation of tensions. Yet amid congressional opposition, investigations into his campaign's possible ties to Russia, and the explicit skepticism of some of his own cabinet members, the president's overtures thus far have not resulted in any sea change. Sanctions remain in place, differences on key issues like Syria remain profound, and the United States continues to take steps to reassure NATO allies unnerved by Russia's recent provocations. While the near-term trajectory of the administration's approach both to European allies and Russia remains uncertain, it seems clear that the bilateral relationship will continue to be marred by significant tension and distrust.

The View from Moscow
Russia sees the United States and NATO as the leading challenges to its interests and security, especially since 2012.[13] Indeed, in its late 2014 revision to its military doctrine, Moscow labeled the Alliance as the chief "danger" or "risk" to Russian security.[14] Russian officials sometimes assert that the United States is intent on establishing global hegemony and therefore is unwilling to tolerate a strong and independent Russia that enjoys its own sphere of influence.[15] This perception of American foreign policy underpins the view held by many in Moscow that the goal of U.S., NATO, and even EU activity on Russia's periphery is designed to prevent Moscow's ascendance to regional leadership, and to deny it the deference, especially in what it views as its "near abroad," which Russian leaders believe it merits. Another driver may be the acute, historical sense of Russian insecurity, particularly in its "near abroad," and the concomitant desire to have compliant or destabilized states (that are not able to align with an adversary) near its borders.

Of particular concern, according to the Russian perspective, has been the West's work to integrate former Soviet republics into European and transatlantic politico-economic and security institutions such as the European Union and NATO and the promotion of political reform and democratization throughout the region.[16] The West's emphasis on the transformation of former Soviet governments and societies into more philo-Western ones is perceived in the Kremlin as a threat to Russian security and interests. Indeed, Putin has referred to the 1990s as the decade in which the transatlantic partners took advantage of a weak and vulnerable Russia; now that his country is strong, Putin says, such exploitation will cease.[17]

In Moscow's view, "color revolutions" are not organic domestic movements led by democratic activists but rather coup d'états supported and funded by the West.[18] Indeed, the vitriol Putin directed at former Secretary of State Hillary Clinton reportedly had roots in his belief that she instigated unrest during Russia's parliamentary elections in 2011.[19] From the Kremlin's viewpoint, the conflict in Ukraine is a result of Western expansionism, and Moscow's intervention is designed to prevent the "Europeanization" of a key Russian neighbor.[20]

Russian fear of Western-sponsored color revolutions is coupled with a widespread view in Russian leadership circles that the United States and many in the West are seeking to undermine the political integrity of the Russian state, a view fortified in their minds by the Western reaction to Putin's reemergence as president in 2012. Russian analysts assert that the United States and NATO have used a wide variety of political, diplomatic, and economic tools to penetrate and disrupt Russian society.[21] It has responded by ejecting USAID and shuttering scores of nongovernmental organizations.[22]

Moscow's alienation from the West has led it to adopt a considerably more confrontational tone than in previous years. In parallel, Russia has improved the capabilities and readiness of its military, and through snap exercises including nuclear deployments, it has attempted to demonstrate that it retains a potent military force capable of defending its interests and deterring the threat it perceives from the West. Russia has made clear that it regards the further expansion of Western institutions into its "near abroad" as highly provocative, and appears to be seeking to make this message credible through a more assertive rhetorical style, more aggressive military operations, economic coercion and inducements, and information operations in the Euro-Atlantic area.[23]

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Echoing concerns expressed by some in the 1990s about the United States acting as a "hyper power" in the international system, the Russian government has made clear its view that Russia must serve as a counterbalance to the United States.[24] This perspective does not rule out cooperation on issues of mutual interest, such as the Joint Comprehensive Plan of Action (the Iran nuclear deal). But barring substantial changes in the coming years, significant friction is likely, with crisis and even conflict possible. While the longer term is less clear, Russian decisionmakers appear to believe that relations with the United States, and more broadly the West, are likely to be negative for some time. Indeed, despite the Trump administration's initial warmth, Putin recently was asked about the state of U.S.-Russian relations since Trump's accession to office. He responded: "We could say that at the working level, the degree of trust has dropped, especially in the military area. It has not improved and has probably worsened."[25]

The View from Washington and Europe

The view among most policymakers and experts in Washington and Europe has been, unsurprisingly, quite different from the one widely held in Moscow. From the perspective of most in Washington, Moscow appears to be focused on restoring not only the power of the Russian military, but also the nation's influence in its traditional areas of influence or dominance.[26] The Russian leadership seems determined to regain some degree of suzerainty in its self-declared "near abroad," and seeks a buffer zone of compliant or client states to block the further expansion of European political institutions and NATO. Most Western governments characterize Russia as a revanchist power, unsatisfied with the current political-strategic status quo in its "near abroad," and desirous of a traditional sphere of power at a time when most in the United States and Europe reject such a model of international order.[27] They accuse it of violating

Vladimir Putin has decried what he characterizes as U.S. attempts to weaken the Russian state. He simultaneously has worked to strengthen Russia's political-military position to counter the perceived American threat. (Russian Government)

NATO Secretary General Jens Stoltenberg has been a vocal proponent of enhanced deterrent and defensive measures to protect the Alliance's eastern flank, even as he has supported calls for NATO-Russian dialogue. (NATO)

international law and long-standing norms by committing armed aggression against Ukraine, changing borders in Europe through violence, violating arms control obligations, and seeking to undermine democratic elections and systems across the West.

Russia's investment in modernizing its armed forces, its military exercises and activities, and the intensification of bellicose rhetoric from the Kremlin, have led to a significantly greater concern about Russia in both the United States and the North Atlantic Alliance as a whole. While there have been efforts to de-escalate the Ukraine conflict and to find areas of potential reconciliation with Moscow, overall there has been a marked shift in the perception of Russia in the United States across the political spectrum.[28]

U.S. national security officials have been particularly candid in their concerns about Russia's military capability and behavior. Secretary of Defense James Mattis told the Senate Armed Services Committee that Russia is "an adversary in key areas" and that he considers the "principal threats to start with Russia."[29] Mattis' remarks echoed a warning sounded in 2016 by General Joseph Dunford, chairman of the Joint Chiefs of Staff, who listed Russia as the United States' primary threat in the near term.[30] More recently, U.S. ambassador to the United Nations Nikki Haley has said, "We should never trust Russia," and others have sounded similar warnings.[31] While views across Europe tend to vary more, perceptions of Russia have deteriorated and hardened in Europe as well.[32]

In light of these concerns, the United States and NATO as a whole have taken pains to reaffirm and strengthen their commitment to the effective defense of newer member states in Eastern Europe, particularly the Baltic states. Accordingly, the United States and its allies have undertaken a number of initiatives, including the U.S. European Reassurance Initiative (ERI) and the development of a NATO Very High Readiness Joint Task Force, both aimed at strengthening NATO's posture in the region. Of particular significance, in July 2016 the Alliance announced at its Warsaw Summit that it would deploy four multinational battalions to reinforce NATO's presence in the Baltic states and eastern Poland.[33] The allies also have engaged in a much franker and more open discussion about NATO's central role in deterring and, if necessary, defeating a Russian attack.

U.S. concerns about Russia are not limited to military threats in Europe and the North Atlantic. Many Americans expressed deep concern at Russian interference in the 2016 U.S. presidential election. The hacker (or group of hackers) called Guccifer 2.0 penetrated the Democratic National Committee and Democratic Congressional Campaign Committee, releasing troves of emails through WikiLeaks. Though the Russian government strongly denied responsibility for these hacks, the U.S. intelligence community has stated that it "is confident that the Russian Government directed the recent compromises of e-mails from U.S. persons and institutions, including from U.S. political organizations."[34] Putin has recently acknowledged that the hacks may have been the work of patriotic Russians unaffiliated with the Kremlin.[35] In addition to Russian cyber-intrusions and the dissemination of stolen

A U.S.-led multinational battle group takes up position in Poland as part of NATO's Enhanced Forward Presence. A total of four multinational battle groups are stationed in Estonia, Latvia, Lithuania, and Poland, on a rotational basis, to fortify the Alliance's eastern border. (NATO/Flickr)

documents, Moscow also spread disinformation over social media and broadcast propaganda through its media outlets. This combined attempt to disrupt a core exercise of American democracy brought home to many U.S. political leaders the gravity of the Russian challenge, the paucity of easy ways to change Russian behavior, and the potential for increased confrontation.

The Trump administration's early overtures injected greater uncertainty into the U.S.-Russia relationship. Trump repeatedly declined to accept fully the intelligence community's assessment that Russia was behind the election meddling, and his administration reportedly weighed lifting Obama-era sanctions on Russia.[36] The President and other members of his administration spoke openly about bilateral cooperation in the fight against the Islamic State, and, in a signal of changing attitudes, Trump met with Russian Foreign Minister Sergey Lavrov in the Oval Office.

President Putin initially welcomed Trump's election, characterizing him as a "smart man" and saying that Russia was "ready to cooperate with the new American administration."[37] Putin's remarks reflected a broader sentiment among senior Russian officials who welcomed Trump's surprise election and described him, in a not-so-subtle contrast with both President Obama and candidate Clinton, as someone with whom they could do business. In the waning days of his presidency, Obama expelled 35 Russian diplomats suspected of spying, in retaliation for Russian attempts to disrupt the 2016 election. Though Moscow was widely expected to retaliate in kind, Putin refrained, dismissing Obama's action as irrelevant to the possibilities inherent in the era that would begin after a new president took office.

President Trump welcomes Russian Foreign Minister Sergey Lavrov to the Oval Office in May 2017. Lavrov's visit was seen by many as a sign of warming relations between the Trump administration and its Russian counterpart. (The White House)

Relations took a turn for the worse, however, in July 2017. The U.S. Congress passed a round of additional sanctions in response to Russian election interference.[38] Moscow retaliated by seizing U.S. diplomatic compounds and facilities. President Putin also ordered a dramatic reduction in staff at U.S. diplomatic facilities in Russia.[39] At the same time, many in the United States remain suspicious of the Trump administration's past ties to Russia. These suspicions were intensified by the resignation of National Security Advisor Michael Flynn, who had repeated contacts with Russia's ambassador in Washington, as well as disclosures that the FBI is conducting an investigation of the Trump campaign's possible contacts with Russia. Given the shifting politics of Russia policy in Washington, a "grand bargain" with Moscow seems to become ever more distant.

Alternative Future Courses for U.S.-Russian Relations

The election of Donald Trump initially seemed to offer the possibility of a new "reset" of sorts with Russia. During his campaign, Trump expressed admiration for Putin's strong leadership style and made a point to disagree with several Obama administration policies. He stated that "NATO could be obsolete because . . . they do not focus on terror."[40] He made clear that a Trump administration would not attempt to undermine the regime of Syrian President Assad, and would look to work with Russia in the Middle East, noting: "As far as Syria, if Putin wants to go and knock the hell out of ISIS, I am all for it, 100 percent . . . ."[41] And Trump suggested that if elected president, he would consider accepting Russia's annexation of Crimea.[42]

Instead, the U.S. administration's position on these issues has appeared to harden in the months since his inauguration. President Trump recently said that NATO is "no longer obsolete," though he has left lingering questions about his administration's commitment to it by declining to embrace Article V during a speech in Brussels.[43] Trump and key members of his administration have indicated further that Assad's departure from office would be a necessary step toward ending the Syrian civil war.[44] And they have lambasted Russia's support for the Syrian dictator.[45] The administration also has distanced itself from previous suggestions that it would accept Russia's annexation of Crimea.[46]

Moreover, despite his more favorable views toward Russia, some policies articulated by candidate Trump in the presidential campaign, if implemented, could increase tensions between the United States and Russia. One example is his administration's desire for a harder

line with Iran and to push back against its malign activities in the Middle East. Iran is most active and most malign in Syria, where it also is allied with Russia. Trump also has withdrawn from the Paris climate deal and been ambivalent about whether sustaining the New START Treaty will be an administration priority.

In broad terms, there are at least three possible alternative futures for the course of U.S.-Russian relations short of outright conflict: a rapprochement that includes significant compromises on both sides; a devolution into Cold War–like intensified military competition and confrontation; and a middle path of managed competition with elements of cooperation.

STRATEGIC RAPPROCHEMENT

The case for a rapprochement between the United States and Russia is straightforward: the two nations share a range of important common interests. Both would like to see the Islamic State defeated, limit North Korea's nuclear and missile programs and prevent Iran from gaining nuclear weapons. Moreover, some have argued, a rapprochement with Russia would posture the United States better to deal with a rising China – both by adding a partner on the U.S. side and (in light of growing Russian and Chinese economic, political, and military cooperation) taking one away from the Chinese side. More broadly, the United States and Russia have existential interests in avoiding major war with each other, and particularly nuclear war. Rapprochement could, in theory at least, reduce the likelihood of crisis and conflict and allow additional steps to bolster strategic stability.

In order to pursue a rapprochement with Russia, the United States would need to take a number of steps

Russian-Chinese relations have seen steady improvement over the past several years. Some American observers suggest that U.S.-Russian rapprochement could help to drive a wedge between Beijing and Moscow. (Russian Government)

Russia and the United States share a range of important common interests.

relating to Europe, including removing joint economic sanctions, discontinuing U.S. troop rotations to Europe (including the U.S.-led NATO battalion deployed to Poland), expressing de facto acceptance of Russia's annexation of Crimea as well as a Russian sphere of influence that includes at least Belarus, Ukraine, Georgia, and Moldova, and making a de facto or explicit commitment not to expand NATO farther eastward. The rationale for such a move would be a variant of realism: Russia believes it has vital interests in what it considers its "near abroad," and the United States would not be rational to go to war with Russia over its meddling in its neighbors' affairs, unless such meddling were with a NATO ally and serious enough (e.g., a massive cyber attack) to trigger an Article V scenario. In essence, a policy of strategic rapprochement would rest on the calculation that Russian intervention in its "near abroad" may be abhorrent to Americans, but that deterring or defeating its activity would risk the United States more than it could plausibly benefit.

INTENSIFIED MILITARY COMPETITION AND CONFRONTATION

The case for Washington to take a hard-line approach to Moscow is also straightforward. Under President Putin, Russia has taken an increasingly hard-line approach to the United States and its NATO allies. Russia's behavior appears motivated in large part by its desire to avoid being taken advantage of by the West, as it would define such a scenario. To wit, Putin has described the collapse of the Soviet Union as "the greatest geopolitical catastrophe of the 20th century" and condemned American "imperialist ambitions."[47]

Russia's seizure of Crimea and support for separatist forces in Ukraine, nuclear saber-rattling, and increasingly bellicose rhetoric and menacing behavior regarding its former possessions to the west and south have persuaded many in the region and beyond that Moscow is prepared to employ force to pursue its strategic objectives. The weight of this assessment is bolstered by Moscow's invasion of Georgia and occupation of its territories, the seizure and annexation of Crimea, the deployment of Russian conventional forces into eastern Ukraine, the military's shelling of Ukrainian positions from the Russian side of the border, the extensive employment of Russian-aligned hybrid elements (such

A group of unmarked soldiers marches in Crimea in 2014. NATO member states in Eastern Europe are concerned that Russia may use "little green men" or other hybrid elements to violate their sovereignty. (Anton Holoborodko)

as the much-discussed "little green men"), and reports of a Russian-backed coup attempt in Montenegro.[48] Countries including the Baltic states, Poland, and Romania in NATO, and Georgia and Ukraine outside of it, are concerned that they could become the victims of Russian military assault (or, in the case of Ukraine and Georgia, further assault).[49] Indeed, many in these countries already regard themselves as being in a hybrid war with Russia or at the least under harassment and political attack by Moscow.[50]

Each of the past two U.S. administrations has attempted a reset with Russia. Notwithstanding some successes including the New START Treaty, the last 16 years have demonstrated to most American observers that President Putin desires a new Cold War, and that he relies on tensions with the West for sustained domestic political support. In this view, Russia's meddling in the most recent U.S. presidential election, its documented cyber-intrusions into U.S. critical infrastructure including the electrical grid, and its continued use of "fake news" and propaganda to attempt to influence events in the United States and Europe all demonstrate the continuing dangers posed by Russian behavior. The corollary is that stronger deterrent messages and actions are required.

MANAGED COMPETITION

In the eyes of its advocates, managed competition provides the "Goldilocks" approach to U.S.-Russian relations. From this standpoint, intensified military competition smacks of Cold War anachronism while strategic rapprochement is both too warm and too risky.

Moreover, the prospect of successive U.S. administrations flip-flopping between these bipolar approaches would result in a lack of clarity and consistency, thereby increasing the risk of both Russian adventurism and inadvertent conflict.

At the same time, proponents of managed competition argue that while Russia's demographic and economic challenges suggest long-term decline, it remains a significant military power with the will and ability to influence in Eurasia and beyond. As a result, the United States must take Russia seriously as a major power.

This position further implicitly assumes that there is no realistic prospect of near-term amelioration. Even if Russia's posture were driven solely by the views of its leader, Putin is set to serve as President of the Russian Federation until 2018, at which point the Russian constitution allows him to run for reelection and serve

> **Russia remains a significant military power with the will and ability to influence in Eurasia and beyond.**

until 2024 (assuming a six-year presidential term).[51] Moreover, any plausible replacements for Putin, such as Dmitry Rogozin or Sergei Ivanov, appear unlikely to pursue a more conciliatory policy toward the United States and the West. Russia's policy turn appears to have deep roots in the Russian security and political establishment, and even among the populace more broadly.

Russian Tupolev Tu-160 strategic bombers fly over Moscow. The United States and Russia together control about 90 percent of the world's nuclear weapons. (Andrey Belenko)

Severely strained relations between the United States and Russia – nations that together possess some 90 percent of the world's nuclear weapons – pose a number of specific risks. First, with increased tensions comes a heightened probability of crisis and conflict over regional disputes, including both NATO and non-NATO countries in Europe, and Syria in the Middle East. In addition, non-regional disputes could escalate, such as tit-for-tat responses to cyber-intrusions and mutual perceptions of domestic meddling by the other side.

Second, the inherent tensions between nation-states pursuing conflicting agendas are exacerbated when publics and elites on both sides are inclined to take a worst-case interpretation of the other's actions and motives. To the extent that senior officials see the relationship as zero sum, risks are likely to increase further, with a greater likelihood of misperception, miscommunication, and miscalculation that could lead to inadvertent escalation. Amplifying these risks is the reality that for both sides, domestic politics on each side can make "seeing the other side's perspective" and seeking compromise seem politically risky.

A belief that the other side is inappropriately meddling in one's domestic politics, and even attempting to undermine one's government and internal processes, enormously increases the perception of threat and the likelihood of inadvertent conflict. Each side is likely to be prepared to take strong actions to respond to a perceived external threat (e.g., U.S. support of color revolutions and expansion of NATO from the Russian perspective; Russian intimidation and "hybrid warfare" against its neighbors from the American perspective). But each side is likely to feel justified or even obliged to take decisive actions to protect its internal security and form of government.

Third, risks arising from competing regional objectives and mutually perceived domestic meddling will be exacerbated if there is a dearth of reliable channels of communication to seek resolution of issues short of the threat or use of force, or to de-escalate any conflict that begins either intentionally or inadvertently. Failures of signaling and communication could significantly increase the risks of a small crisis expanding to a large crisis, of a large crisis leading to war, and of war escalating.

Our Assessment

Although a long-term rapprochement cannot be ruled out and indeed is a valuable (very) long-term goal, striving for such an outcome or even another attempted "reset" (or "re-reset") in the near term likely would lead rapidly to disappointment and damaged relations. There is a premium, indeed an imperative, for realism. This reality does not eliminate room for the pursuit of common interests on issues such as nuclear non-proliferation, counterterrorism, and counternarcotics.[52] Yet the fundamental reality is that for the foreseeable future both the United States and Russia must act on the understanding that there is a real potential for political disputes to lead to crisis, and for crisis to lead to conflict. At the same time, both must recognize and act on the fact that neither has an interest in war breaking out inadvertently or by accident.

> **The fundamental reality is that for the foreseeable future both the United States and Russia must act on the understanding that there is a real potential for political disputes to lead to crisis, and for crisis to lead to conflict.**

There are other downsides to a U.S.-Russian rapprochement. If rapprochement turned to partnership, it would threaten the integrity of NATO, given deep European skepticism of Russian intentions. If Russia is willing to undertake cyber attacks, withhold gas supplies as a strategic weapon, and meddle in the internal elections of NATO nations when the Alliance is strong, why would it cease doing so when there is a weak or nonexistent NATO Alliance? Such a course amounts to a risky bet: that appeasing Moscow would elicit better Russian behavior in Europe rather than increase its sense of opportunity to press an advantage.
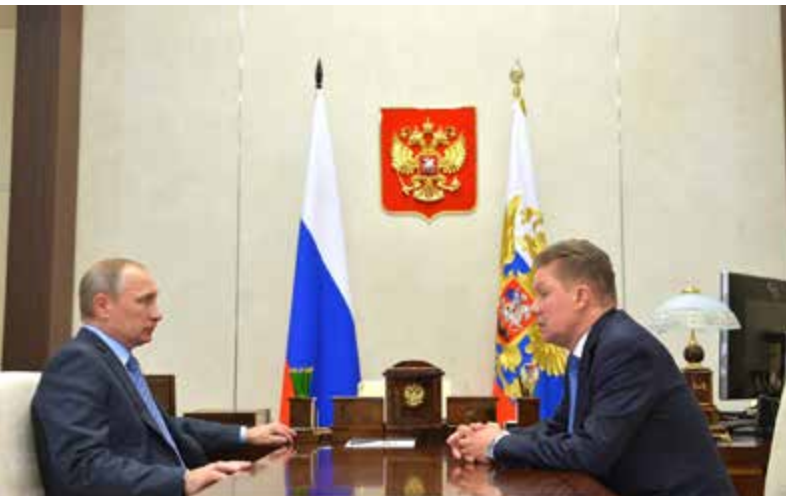
The positive case for a rapprochement also is unclear. While the notion of enlisting Russia in the fight against ISIS, for instance, has notional appeal, on further examination it is seriously wanting. The reality is that Russia has little to offer in the fight against ISIS; the United States and its partners don't lack for munitions or airpower, or face intelligence shortages that could be made up by Moscow. Russia has directed its military efforts in Syria mostly at attacking civilians and the non-ISIS opposition to Assad; even if it were to redirect its military efforts at ISIS, it is difficult to envision what Washington could wisely trade for that marginal addition to the fight.

Similarly, the idea of using Russia to balance a long-term Chinese threat has a certain conceptual ring, and this strategic inversion of the Nixon-Kissinger geopolitical play indeed has captured the imagination of some. The logic, however, begins to break down upon examination: Russia adds little to China's power today and would add little to America's in any joint standoff against China.

While the case for strategic rapprochement falters on the crucible of realism, the case for sustained confrontation falters on the crucible of prudence. For the foreseeable future, Russia's nuclear capabilities will provide it the ability to destroy the United States as a functioning society. As distasteful as "working with" Russia may appear, the alternative of full-throated confrontation would pose unacceptable and unnecessary risks to the United States.

That said, one should not brim over with unbridled optimism. Russian leaders, acting as if their country is in strategic competition with the United States, are engaged in continuing efforts to undermine America's alliances, democratic processes, and global role. A change in this strategic approach appears highly unlikely, and as a result U.S.-Russia competition is the likeliest path short of outright confrontation. With growing economic and demographic problems, Russian leaders have strong political incentives to boost their popularity by intervening regionally on the ground and globally in cyberspace, and these incentives are likely to grow rather than shrink.

Re-re-reset is thus not going to happen, unless the United States cedes its interests to Russia. At the other extreme, a highly confrontational approach is the most viable within U.S. domestic politics. The challenge is charting a balanced path ahead that recognizes the real competition and potential for conflict, while allowing for prudent cooperation and improvement in the relationship where possible.

Vladimir Putin meets with Gazprom CEO Alexei Miller. The Kremlin has repeatedly sought to use its natural gas supplies as an instrument of foreign policy. (Russian Government)

03 CHAPTER

Pathway Type #2

AN INCREASINGLY SLIPPERY SLOPE TOWARD RAPID ESCALATION

The United States' efforts to extend and sustain its conventional military advantages are leading both to the pursuit of new capabilities – through the initiatives associated with the Third Offset Strategy, for instance – and to new approaches to doctrine and planning such as the U.S. Joint Concept for Access and Maneuver in the Global Commons, which could intensify pressures on escalation management.[53] The United States judges that it needs to maintain this edge to continue to effectively and credibly extend deterrence to Eastern Europe (and the Western Pacific). Yet this effort, as essential as it is, also invariably may exacerbate anxieties in Russia about the capabilities of U.S. and NATO forces.[54]

At the same time, Russia has made considerable strides in improving its own conventional forces since their nadir during the post–Cold War period. Russia has invested heavily in a core force capable of waging war effectively under high-intensity conditions. While Russian armed forces still face a number of significant constraints and exhibit an uneven level of capability, the Russian military boasts a highly capable core that could combat NATO forces, at least for a limited period of time, in scenarios closer to Russia's borders. Russia also has invested in its precision strike, cyber, counter-space, electronic warfare, and other high-tech capabilities, giving it substantial ability to strike at NATO and U.S. targets farther from Russia's borders.

The above-noted advances in non-nuclear as well as nuclear strategic capabilities, and the way they interact, will have a significant impact on the prospects of "slippery slopes" of rapid escalation from crisis to conflict. They will do so singly, but it is particularly their interactions in the context of crisis and early conflict that is of concern. This is especially likely as the actual nature, scope, and consequence of the use of such novel technologies may not be clearly anticipated or understood, compounding the already severe "fog of war."

More specifically, as these technologies reach maturity, there will be particularly strong incentives to use "non-kinetic" and nonlethal capabilities early in a conflict. This is because the effectiveness of such capabilities (particularly in cyberspace) may be time-limited and fleeting.

Structural Incentives for Rapid Escalation in Cyberspace and Outer Space
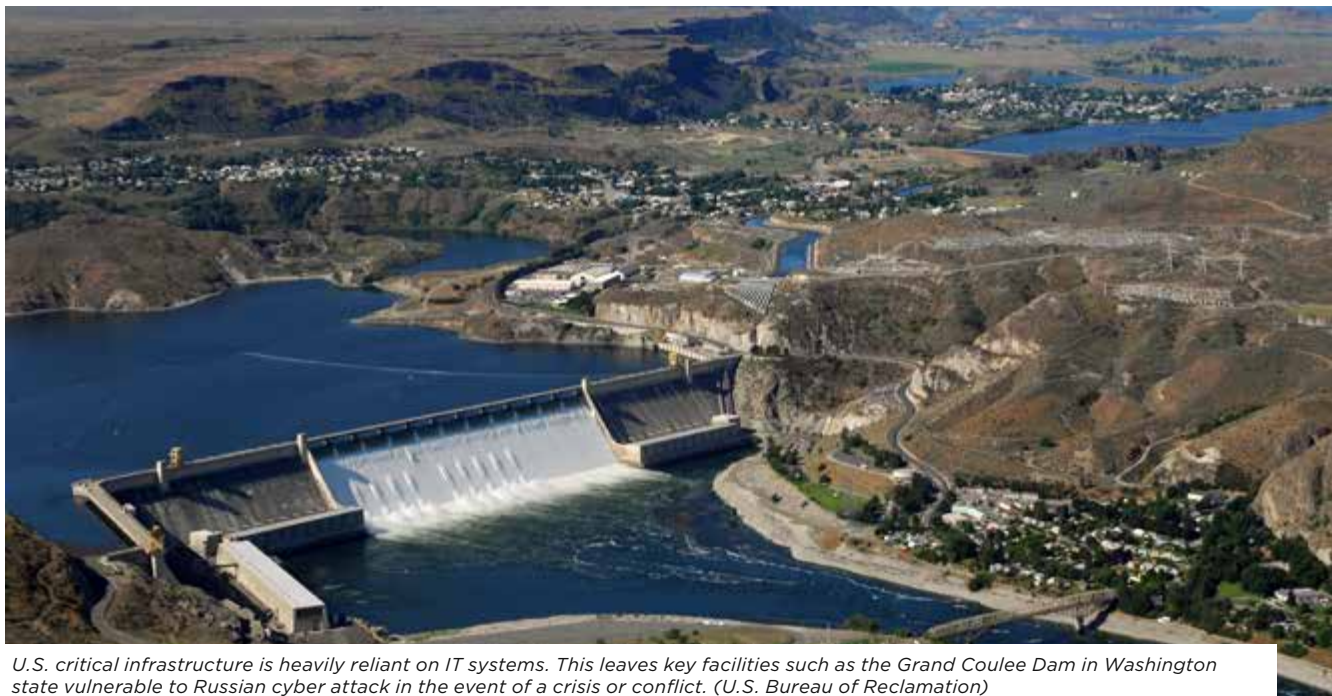
Cyberspace and outer space offer the attacker a very attractive combination: the potential for high impact on the other side's military, with the potential for limited, or even no, direct casualties. Yet the military impact could be high, because both the U.S. and Russian militaries depend (although not equally) on information technology and space assets for intelligence collection and dissemination and for command, control, and communications. As a result, there are likely to be strong incentives on each side to use these capabilities in large doses early in a major conflict to gain coercive and military advantage – and to attempt to prevent the other side from gaining such advantage.

CYBERSPACE

Over the past several decades, albeit to differing degrees, the U.S. and Russian economies and militaries have become increasingly dependent on networked information technology (IT). Just as modern automobiles depend on as many as 100 computer chips, modern military equipment ranging from tactical vehicles and munitions to strategic nuclear delivery systems and nuclear command, control, and communications systems, depend profoundly on IT. Moreover, many military functions depend on private sector assets, including electricity and water supply networks that are themselves reliant on IT systems (and often far less secured than military systems), making these elements of critical infrastructure attractive targets as well.

Within the past several years, both the United States and Russia have embarked on ambitious programs to develop and enhance their offensive cyber capabilities. Because of the frailty of cyber weapons – once a weapon is revealed in detail, the adversary can fashion effective defenses – there has been and will remain a tremendous premium on secrecy regarding both states' efforts to improve and expand their cyber tool kits. Thus, there is much uncertainty regarding each side's capabilities. However, a sense of the potential scale of cyber weapons' impact was provided in a 2013 Defense Science Board report:

> The benefits to an attacker using cyber exploits are potentially spectacular. Should the United States find itself in a full-scale conflict with a peer adversary, attacks would be expected to include denial of service, data corruption, supply chain corruption, traitorous insiders, kinetic, and related non-kinetic attacks at all altitudes from underwater to space.

U.S. critical infrastructure is heavily reliant on IT systems. This leaves key facilities such as the Grand Coulee Dam in Washington state vulnerable to Russian cyber attack in the event of a crisis or conflict. (U.S. Bureau of Reclamation)

U.S. guns, missiles, and bombs may not fire, or may be directed against our own troops. Resupply, including food, water, ammunition, and fuel may not arrive when or where needed. Military commanders may rapidly lose trust in the information and ability to control U.S. systems and forces.[55]

The incentive to use cyber weapons during a crisis or early in a conflict are therefore significant, due to the very nature of the weapons themselves. Combatants may worry that an adversary will take measures to reduce its cyber vulnerability, providing reason to strike early while the window to do so effectively appears open. Moreover, in contrast with kinetic weapons, cyber weapons can be nonlethal, not physically destructive, and reversible. This means that major powers could believe it less escalatory to conduct cyber attacks rather than kinetic ones, though, given the states of uncertainty and vulnerability governing activity in this domain, it is not assured that this would be the case. In addition, despite reported advances in U.S. capabilities for attributing cyber attacks, high-confidence attribution may require time-consuming analysis of intelligence and forensic data. A state may attempt to gain advantage by undertaking masked cyber attacks at the outset of a conflict to sow confusion and delay decisionmaking by the adversary.

Both the United States and Russia are reported to have highly skilled offensive cyber cadres. Some of Russia's cyber capabilities have been demonstrated in actual operations, including against Estonia in 2007, Ukraine in 2014, and the United States in 2016.[56] In addition, the diffusion of offensive cyber capabilities to smaller powers and even non-state actors raises new and concerning prospects for inadvertent conflict and escalation. Specifically, other nations, terrorist groups, and "netizen" activists may take it upon themselves to provoke a conflict – for instance, by conducting a "false flag" cyber operation designed to trigger a crisis. Once a conflict has begun, they may use their own capabilities to expand the scope or scale of the conflict, thereby potentially forcing state participants up the escalation ladder. These possibilities intensify the potential for "catalytic escalation," whereby third parties may seek to foment or intensify a crisis or conflict between the United States and Russia.

OUTER SPACE

Both the United States and Russia have inherent anti-satellite (ASAT) capabilities in their ballistic missile defense interceptors. The United States demonstrated these capabilities in Operation Burnt Frost in 2008, when it used an SM-3 theater missile interceptor to destroy a satellite carrying over 1,000 pounds of a hazardous propellant, which was in a decaying orbit.[57] Russia reportedly conducted a non-destructive ASAT test in December 2016, using the PL-19 Nudol strategic missile defense interceptor in a fly-by demonstration shot.[58]

Space has long been a domain used by militaries. In recent years, however, the United States has considerably

deepened its reliance on space for the full range of military activities. Russia has taken note and has begun developing more substantial counter-space capabilities of varying types.[59] As U.S. defense leaders have made clear, the United States will need to continue to leverage space for its warfighting and intelligence purposes, just as it becomes a far more contested domain in light of Russian (and others') counter-space capabilities.

Particularly important in this context is the fact that space may be a classically unstable domain in that it appears highly offense-dominant under current technological and deployment conditions. Given U.S. reliance on space, Russia may have strong incentives to strike early in a conflict – or even during a deep crisis – in order to disable or weaken U.S. space contributions to effective power projection, before the United States can take steps to defend against such capabilities. This is particularly important because the United States relies on its space architecture for crucial nuclear command, control, and communications; missile early warning; and other strategic-related functions. Such functions are not necessarily clearly disaggregated from conventional warfighting functions in the U.S. space architecture. There is therefore a high potential for rapid escalation to the strategic

The United States used an SM-3 theater missile interceptor to destroy an errant American satellite during Operation Burnt Frost in 2008. The Russian Federation has tested its own anti-satellite weapons as well. (U.S. Navy)

level should war carry into space, as it appears likely it would in the event of U.S.-Russian conflict.

Escalation Scenarios

Five specific new dynamics could lead to rapid and unintended escalation. First, each side would have strong incentive to go early and extensively in cyber and space attacks on military assets. Second, attacks in cyberspace and/or outer space intended to be limited to military systems could cascade to affect critical civilian infrastructure (e.g., electricity grids). Third, attacks intended to target non-nuclear systems (including but not limited to cyber and space attacks) could inadvertently impinge on nuclear systems, and be misread as a much more escalatory move. Fourth, understanding these dynamics, one side could feel "use or lose" pressures so that it must use its cyber and space capabilities preemptively. And fifth, there could be inadvertent escalation due either to misattributed attack or a third-party false flag operation. Each of these dynamics and related scenarios are discussed below.

EARLY LARGE-SCALE CYBER AND SPACE ATTACKS

Emerging military capabilities, especially offensive cyberspace and counter-space weapons, have tremendous potential to create a slippery slope toward rapid escalation once the United States and Russia find themselves in crisis or conflict. Each side may well believe that it could gain military advantage and political leverage in a deep crisis or early in conflict by degrading the other side's military through non-kinetic and non-lethal attacks. On the other side of the coin, an actor that fears its military capabilities may be substantially undermined by early cyber and space attacks will lean toward even earlier use of cyber and counter-space – and indeed the full range of military capabilities – before they are degraded.

As was the case in the Cold War, the most plausible scenario for U.S. and Russian military forces to engage in large-scale combat is in Europe. It is worth considering first how even a very limited attack or incident could set both sides on a slippery slope to rapid escalation. If armed conflict looks at all likely, both sides would have overwhelming incentives to go early with offensive cyber and counter-space capabilities to negate the other side's military capabilities or advantages. If these early cyber and space attacks succeed, it could result in huge military and coercive advantage for the attacker – with few or even no direct casualties. It may appear very unlikely that the attacked side would retaliate strongly in response to some damaged computers and some malfunctioning

satellites in outer space. Moreover, if the attacks fail to have the desired effect, the other side may not even notice. Large-scale cyber and space attacks – preferably before a kinetic conflict even starts – therefore may appear a low-risk, high-payoff move for both sides.

LIMITED CYBER AND SPACE ATTACKS WITH CASCADING EFFECTS ON CIVIL SOCIETY

With each side having emplaced cyber implants to disrupt or destroy the other side's military systems and critical infrastructure – including war-supporting infrastructure as well as purely civilian infrastructure, a small spark in cyberspace could rapidly escalate. The spark could come from an intentional cyber attack that had unintended cascading effects, or from proxies or false flag attacks.

Thus, cyber and space attacks intended to be highly discriminative against military targets may cascade to affect critical infrastructure essential to the broader society and economy. If this occurred, an attack intended to be precise and limited to military targets instead could result in the widespread loss of electrical power, water, or other essential services, with resulting economic disruption and potential loss of life. The attacked side could feel compelled to respond at least in kind.

Alternatively, a tit-for-tat cycle may occur, as one side may believe it could gain coercive advantage by intentionally demonstrating its ability to hold at risk the other side's critical infrastructure through cyber, counter-space, and perhaps sabotage attacks. There is debate within the expert community as to whether cyber

> **Cyber and space attacks intended to be highly discriminative against military targets may cascade to affect critical infrastructure essential to the broader society and economy.**

attacks alone could have devastating effects, but it does appear likely that combined cyber and precision attacks on critical infrastructure could devastate an economy and society. Whether such attacks escalated through a gradual tit-for-tat or more rapid counterpunching, such counter-value strikes could lead to major conflict and potentially nuclear war.

INTENDED CONVENTIONAL ATTACKS WITH IMPACTS ON NUCLEAR SYSTEMS

Some assets in outer space support both conventional and nuclear missions, and both theater and strategic missions. For example, space-based infrared systems (SBIRs) support both early warning of ballistic launch against the United States as well as theater missile defense against non-nuclear SCUDs. In addition, many terrestrial elements of U.S. command, control, and communications, as well as long-range strike systems, are dual-use, and there may be co-location of conventional and nuclear systems by one or both sides. Cyber or counter-space attacks on these systems therefore could implicate nuclear systems, raising the potential for inadvertent escalation. For instance, a counter-space attack on a U.S. satellite responsible for both providing C3 for U.S. conventional forces engaged in a regional contingency with Russian forces *and* U.S. strategic forces could be construed as implicating the latter, and thus provoke a larger response than an attack solely on a satellite servicing U.S. conventional forces.

USE-OR-LOSE DYNAMICS: EARLY ATTACKS AND EARLY DELEGATION

To the extent that an attacker's initial cyber and space attacks are successful in negating some of the other side's military, the attacked side could fear that it must use or it will lose its remaining military strike capabilities, especially important ones. In addition, nuclear forces use IT and space assets for warning and communications. As a result, a cyber and space attack could put nuclear use-or-lose considerations into play early in a crisis.

To the extent that the attacker's initial cyber and space attacks were successful in negating a portion of the other side's military, the attacked side would fear further debilitating attacks, and could fear that it must use or lose its strategic-level attack capabilities, including not only cyber and space, but potentially long-range strike capabilities. In the extreme, if the attacker in fact succeeded in dramatically delaying, disrupting, and degrading the other side's non-nuclear forces, the side that was attacked may feel its conventional capabilities so weakened that it would consider the use of nuclear weapons.[60] That is, if one side's cyber and space attacks sufficiently negated the other side's non-nuclear capabilities – while leaving its nuclear forces intact and usable – the attacked side could believe it had to choose between conceding defeat in the (non-nuclear) conflict or initiating a nuclear response. The increased role Russia has placed in recent years on its nuclear arsenal make this possibility a particular concern.

Because of the prospect that this kind of cycle of escalation involving cyberspace and outer space – and the terrestrial domain – might move quite rapidly, each side may be tempted to delegate authority for the use of at least some weapons systems to human subordinates and/or to autonomous systems. For instance, while the United States has established policies requiring a "human in the loop" for any decision involving the use of military force, in light of the advantages of decisionmaking "at the speed of light," it is possible that both sides may lean more in the future toward delegation to autonomous systems. Such delegation decisions could help to control conflict but also might exacerbate and accelerate escalation, particularly accidental or inadvertent escalation, by mechanically ratcheting up responses. Needless to say, such automated decisionmaking would be particularly consequential if included at the nuclear level.

It is increasingly possible not only that inadvertent escalation could occur as outlined above, but that the onset of conflict itself might be inadvertent. The first two examples below are largely a by-product of the changed geopolitical environment exacerbated by emerging technologies, while the final two examples are due specifically to the impact of emerging new military capabilities.

A cyber and space attack could put nuclear use-or-lose considerations into play early in a crisis.

Automated incidents in the air and at sea. The potential for air and maritime incidents leading to escalation was evident in the April 2016 Baltic Sea incident, where Russian Su-24 aircraft "buzzed" the USS *Donald Cook* and a ship-to-aircraft and/or aircraft-to-ship strike was suddenly very possible. There is today a real danger of air and maritime incidents that could cascade into broader conflict. Emerging technologies could exacerbate such incidents, for example, through the interaction of partially or fully autonomous self-defense systems.

Accidental or unauthorized cyber attacks. If Russia continues to aggressively target U.S. critical infrastructure for potential cyber attack (as former Director of National Intelligence James Clapper reported was the case in 2016 and 2017 testimony to Congress),[61] and if the United States does the same, whether for intelligence collection or attack preparation or both, there will be some prospect of either inadvertent or unauthorized employment of cyber weapons. Although no such inadvertent event appears to have occurred to date, the risks may rise substantially over time if each side expands its accesses in an attempt to ensure it "keeps up" to sustain deterrence and warfighting potential, and particularly to the extent either side augments its military capabilities by using private sector or "proxy" entities (as it appears Russia may have done in the Guccifer 2.0 hacks relating to the 2016 U.S. elections). In the context of a severe crisis, one subgroup within a nation could decide to accelerate the path to war by executing a cyber attack.

Accidental or unauthorized attacks in outer space. It would seem logical and likely that the command of any offensive space assets would be quite tightly held, but it is possible that defenses to space attacks and certain kinds of offensive space capabilities, especially once conflict has commenced, could be delegated or automated.

Erroneous automated cyber, space, and/or other strikes. In light of such automation, misidentification of targets, incorrect intelligence, and even simple error could lead to attacks on strategic assets, which could drive escalation.

MISATTRIBUTED "SELF ATTACK" OR THIRD-PARTY ACTIONS

An additional possibility is that chance errors in a key system, in the midst of crisis, such as an internal fault in a side's command and control system or one induced by natural causes (e.g., an electrical surge), are construed by the opponent to be an intentional act by the other side. This could lead to a more dramatic and escalatory response. This kind of dynamic also could emerge due to deliberate actions by third parties, including sub-national actors. These kinds of players could employ emerging new capabilities through a false flag operation, duping one or both of the sides into thinking that an attack was the fault of the other, thereby driving the United States or Russia to respond by attacking the other.

Troubling Years Ahead

The possibility of escalation to large-scale war stemming, even inadvertently, from lower order conflicts or tensions has long been appreciated in the U.S.-Russia context. The contention here, however, is that the development of technology, its integration into military postures and doctrines on both sides, and the often unanticipated ways in which such integrations may interact, are together heightening the possibility of inadvertent, rapid, and dramatic escalation in the event of crisis or conflict between the United States and Russia. This therefore forms an increasingly salient pathway for understanding the potential for such conflict and a worthy focus of policy initiative on both sides and jointly, as appropriate.

Furthermore, China's rise as a great power – with a military likely to have advanced cyber, counter-space, and other capabilities – may result in additional potential "third party" pathways. If the United States and China engaged in a major conflict, even if Russia were not directly involved in any way, Moscow's interests could well be affected. For example, if Chinese cyber and space attacks degraded U.S. command and control and space assets, it could impact the stability of the U.S.-Russian strategic balance. Alternatively, if the United States lost a significant fraction of its conventional warfighting capability (including platforms and munitions) and decided to lean harder on nuclear weapons vis-à-vis Russia, it could affect the prospects for conventional and nuclear conflict with China.

04 CHAPTER

Pathway Type #3

ON THE ROAD TO STRATEGIC INSTABILITY?

Any conflict, indeed any severe crisis, between the United States and Russia invariably would unfold under the "nuclear shadow" cast by the large nuclear arsenals of the two sides. Because of well-grounded concerns on both sides that a major military conflict could escalate to implicate the nuclear forces of the two sides, for generations policymakers have sought to promote "strategic stability" between the two nations.[62]

For the last 60 years, the stability of the U.S.-Russian (previously U.S.-Soviet) nuclear balance has been based on each side's confidence that it could absorb even an all-out nuclear first strike by the other side and then unleash a devastating nuclear second strike. As Albert Wohlstetter wrote in "The Delicate Balance of Terror" in 1958, "To deter an attack means being able to strike back in spite of it. It means, in other words, a capability to strike second."[63] Over recent decades, both sides have undertaken massive investments to ensure that they sustained a secure second-strike capability, including deployments of highly survivable delivery systems – in particular nuclear-powered ballistic missile submarines (SSBNs) for the United States, and mobile missiles for Russia – and resilient nuclear command and control.

Over the decades of the Cold War, two main alternatives to this balance of terror, or Mutual Assured Destruction (MAD), were proposed: a shift to defense dominance, as articulated in President Ronald Reagan's March 23, 1983, Strategic Defense Initiative speech, and the mutual and global abolition of nuclear weapons, as also articulated by President Reagan at the 1986 Reykjavik Summit with Soviet President Mikhail Gorbachev. Because of the massive destructive potential of nuclear weapons, meaning that even limited

of a number of actors (China, India, Pakistan, and North Korea) are growing. Whatever one's wishes, for the foreseeable future nuclear weapons show no prospect of meeting either part of President Reagan's goal to make them "impotent and obsolete."

Thus, for the indefinite future, the United States and Russia must accept MAD or mutual vulnerability as a basis for the stability of their strategic nuclear deterrence relationship. This does not mean that stability is guaranteed – far from it. Nuclear deployments – and perhaps even more so emerging cyber, counter-space, missile defense, and non-nuclear strike systems – have the potential to undermine strategic stability. As these military capabilities are developed further, each side is likely to have growing fears that the other side might use these capabilities (with or without also using nuclear weapons) in a first strike to attempt to negate its nuclear second-strike capabilities.[64]

U.S.-Russian Strategic Stability in Today's MAD World

Assessing strategic stability today requires considering both the balance of strategic nuclear weapons and the balance of additional non-nuclear capabilities that the United States and Russia could bring to bear in a major war.

Today, the United States deploys a large percentage of its strategic warheads on highly survivable strategic missile submarines; at all times, several of these vessels are at sea and ready to receive orders to launch a devastating strike that Russia would be powerless to stop. The United States also possesses 400 fixed-silo intercontinental ballistic missiles (ICBMs) that would be extremely difficult for Russian missiles to compre-

> ## "To deter an attack means being able to strike back in spite of it. It means, in other words, a capability to strike second."
> **—ALBERT WOHLSTETTER, "THE DELICATE BALANCE OF TERROR," (RAND, 1958)**

penetration of an adversary's defenses renders the value of such an approach effectively nugatory, and the extreme challenges of near-perfect missile and air defense against a capable and adaptive adversary, defense dominance has not been and will not be technically possible for the foreseeable future. Neither will the elimination of all nuclear weapons be possible for the foreseeable future; there is no sign of the global political will to impose (or accept) the elimination of all nuclear arms and essentially unlimited inspections in all nuclear-capable nations; to the contrary, the nuclear arsenals

hensively destroy, as well as a force of 60 dual-capable strategic bombers that could be dispersed and placed on a more survivable alert status if needed. The United States also maintains dual-capable fighter-bombers capable of delivering nuclear gravity bombs. At the same time, the United States continues to maintain capabilities to ensure the requisite command and control and early-warning apparatus to provide warning of any attack and enable the National Command Authority to communicate launch orders to the force. Accordingly, there are no serious concerns about the U.S. ability today to

launch a devastating nuclear retaliatory strike against Russia (or any other state), even in the aftermath of an all-out attack.

Russia also retains a triad of strategic delivery systems capable of delivering many hundreds of second-strike warheads against the United States. Russia deploys ICBMs both in fixed-silo and (when dispersed) highly survivable mobile configurations, strategic missile submarines, and bombers capable of delivering air-launched cruise missiles. In addition, and unlike the United States, Russia has nuclear-tipped sea-launched cruise missiles that it could launch from its otherwise conventionally oriented attack submarines. Like the United States, Moscow also possesses a capable nuclear command and control system as well as some capacity for early warning of an adversary attack.[65]

Under the New START Treaty, which entered into force for a ten-year period in February 2011, the United States and Russia agreed to three main limits: no more than 700 deployed strategic delivery systems (ICBMs, SLBMs, and nuclear-capable bombers); no more than 800 deployed plus non-deployed strategic delivery systems; and no more than 1,550 accountable deployed strategic weapons. Under the treaty, each nuclear-capable bomber counts as only one warhead irrespective of the number of gravity bombs and air-launched cruise missiles it may carry. In addition, non-deployed nuclear weapons are not limited, and each side has the ability to "upload" at least hundreds of additional warheads on ICBMs and SLBMs should it decide to withdraw from the treaty. The table below shows a recent estimate of the numbers of deployed and non-deployed U.S. and Russian delivery systems and warheads.

In today's strategically stable situation, neither side can realistically see an opportunity to limit damage to itself to a sufficiently meaningful degree by conducting a first strike against the other side's strategic nuclear forces. Even if it chose to "ride out" an attack and not launch its ICBMs, the United States would have many hundreds of surviving SLBM weapons (plus weapons on any alert bombers) with which to respond. Similarly, even if it chose to "ride out" an attack and not launch its silo-based ICBMs, Russia would have several hundred warheads on mobile ICBMs (plus weapons on any bombers).

And today, neither side has a reasonable basis for fearing that it is highly vulnerable to a disarming strike, and so neither side should feel "use or lose" pressures. In a strategically stable situation such as today's, one side or the other still could choose to use nuclear weapons to attempt to gain military advantage and/or to send a political signal. But neither side should believe it has an opportunity to disarm the other side, and thus neither side should feel impelled to launch a nuclear attack because of fears of being so disarmed.

Thus, bearing in mind that a preemptive disarming strike would need to be nearly perfect to meaningfully limit damage to the attacker, the U.S.-Russian strategic balance today is quite stable.[66] Both sides have the power to wreak unprecedented destruction on the other through the employment of nuclear weapons even in the face of a determined effort by the other to preempt and/or defend against it. Absent a fundamental transformation in the military-technological balance between the two states, enabled by the development and integration of novel military capabilities, this high degree of strategic stability is set to persist for the foreseeable future. Such a fundamental transformation of military capabilities, however, may already be under way.

Comparison of U.S. and Russian Strategic Nuclear Forces

	UNITED STATES	RUSSIA
ICBM Warheads	800	1,076
ICBMs	400	316
SLBM Warheads	1,984	768
SLBMs	248	176
SSBNs	14	11
ALCMs/Gravity Bombs	1,038	616
Strategic Bombers	60	68

Sources: Hans M. Kristensen and Robert S. Norris, "Russian nuclear forces, 2017," *Bulletin of the Atomic Scientists*, 73 no. 2 (2017), 115–126; Hans M. Kristensen and Robert S. Norris, "United States nuclear forces, 2017," *Bulletin of the Atomic Scientists*, 73 no. 1 (2017), 48–57; and U.S. Navy, "Fleet Ballistic Missile Submarines – SSBN," www.navy.mil/navydata/fact_display. asp?cid=4100&tid=200&ct=4.

A Shifting Military-Technological Landscape

The United States and Russia both are developing and deploying new, and in key respects disruptive, military technologies across multiple domains, technologies that will have significant implications for the stability of the strategic balance. New cyber, space/counter-space, missile defense, conventional strike, and (intertwined with the preceding) autonomous military systems have the potential to change the way both nations seek to deter, posture for, and in the worst case fight conventional wars. Indeed, so fundamental are these changes for the nature of armed conflict that some prominent defense analysts and officials judge that a new "military-technological" environment or "warfighting regime" is emerging, one characterized by increased reliance on new technologies, including unmanned and autonomous systems.[67]

At this point in time it is uncertain how far each side will go in the deployment of these emerging capabilities. However, the Russian government has expressed deep concern that the combination of emerging ballistic missile defense and prompt global strike capabilities could allow the United States to launch a disarming attack against Russian nuclear forces and then use its missile defenses to "mop up" a ragged Russian retaliation.[68] The United States has responded that its current and planned national missile defense systems are designed to defeat a North Korean or Iranian attack, not a Russian one, and that in any event neither current nor planned U.S. missile defenses have the size, technical capability, or survivability to defeat a determined Russian nuclear attack. But serious concern remains in Moscow, including about the possibility that U.S. deployments will increase in the future.

Other technological developments will increase first-mover incentives as well. This will particularly be the case with respect to cyber and counter-space capabilities, which are often more fragile and fleeting – and also of great importance to prevailing on the modern battlefield, especially for the United States. The United States relies on space for the full range of its military functions; thus, early disruption of such systems would be highly lucrative for Russia. Yet the disruption of some space-based systems could impede early warning of attack and communications from the National Command Authority to strategic forces. Meanwhile, cyber capabilities that may be fleeting in value could be used to interrupt the flow of forces and command, control, and communications among deployed forces. Yet, as former Secretary of the Navy Richard Danzig has noted, for example, cyber intrusions into nuclear or nuclear-related systems including command and control could send deeply destabilizing signals.[69]

The United States relies on space-based assets such as the Defense Support Program satellite, depicted here, for nuclear early warning and command and control. Russia – and the United States, for that matter – may be faced with strong incentives to strike enemy satellites early in a crisis or conflict. (U.S. Air Force)

The stability challenge will be particularly acute with respect to NC3 systems – the brain and backbone of a state's second-strike capability.[70] NC3 is particularly problematic because national leaderships and chains of command by their nature are likely to be more limited in number and less resilient than platforms themselves. Leaderships generally wish to reserve the power of decision for use of nuclear forces, but this means that the number of targets – or C3 links to those targets – can be attacked more plausibly than the full panoply of an adversary's nuclear platforms. An attacker might hope that severing or disrupting this C3 chain could sufficiently impede or interrupt an opponent's strategic forces, and thus provide a window to impose its will.[71] Russia repeatedly has expressed significant concerns about the survivability of its command and control architecture in light of U.S. strike capabilities.[72] Meanwhile, there are growing concerns on the American side about the survivability and reliability of its own dated nuclear command and control architecture,, and as Russia deploys a number of kinetic and non-kinetic strike systems, it is feared they could jeopardize the U.S. NC3 system.[73]

These concerns on both sides are growing in light of both the apparent trends, and the very significant uncertainties associated with future developments in cyber,

counter-space, and prompt conventional strike capabilities.[74] Fears of cyber attacks on NC3, for instance, could lead to responses in the space domain to get ahead of any such vulnerabilities, and even to preparations for such less deliberate or hastier use of nuclear weapons. And autonomous systems may be relied on more as fears of the vulnerability of NC3 and early warning grow in the face of evolving cyber, space/counter-space, and conventional strike capabilities. Russia already is known to have relied – and possibly to still rely – on its Perimeter (or "Dead Hand") automated retaliatory assurance system.[75] Yet such systems could react to false positives or malfunction, with potentially disastrous consequences.

> **Although there is no doubt a strategic element in Moscow's expressions of fear, since they can have the effect of retarding or complicating U.S. military advances, Russia appears to genuinely fear the potential U.S. ability to launch a decapitating or disarming strike.**

Concerns about the survivability of a viable retaliatory capability are likely to be more pronounced in Russia, which already has expressed a profound fear that the United States is capable of creating and exploiting new technologies in ways that would neutralize Moscow's ability to survive a preemptive attack and launch a meaningful nuclear retaliatory strike.[76] Despite persistent efforts in recent years, the United States has not been successful in persuading Moscow that it does not have nor will it plausibly have such a capability. Although there is no doubt a strategic element in Moscow's expressions of fear, since they can have the effect of retarding or complicating U.S. military advances, Russia appears to genuinely fear the potential U.S. ability to launch a decapitating or disarming strike. Systems such as Russia's apparent nuclear-armed torpedo, its hypersonic glide weapon launched atop an SS-19 booster, and discussions of a new rail-mobile ICBM all indicate that Moscow is sufficiently concerned about the survivability of its second-strike capability to want to invest in systems whose appeal lies in their ability either to survive a U.S. first strike or to penetrate American missile defenses.[77]

At the same time, American officials and analysts are becoming increasingly sensitive to the implications Russia's own precision strike, cyber and non-kinetic, and counter-space capabilities could have on the U.S. retaliatory capability, less concerning the survivability of the delivery platforms than on nuclear command, control, and communications and intelligence, surveillance, and reconnaissance (ISR) systems. These concerns are considerably more muted than Russia's, but nonetheless real and likely to grow.

Considering Emerging Threats to Mutually Assured Destruction

In considering the implications of these developments for strategic stability, there are two fundamental differences between missile defense and conventional prompt global strike capabilities, on the one hand, and cyber and space capabilities, on the other. First, the very strong incentives for early use of cyber and space assets do not apply to missile defense (which would be used only in response to an attack) and conventional prompt global strike capabilities (which would involve destruction of property and likely loss of life, likely against the other side's homeland, thus raising the bar for employment). Therefore, while cyber and space capabilities are fundamental to considering early escalation dynamics and slippery slopes (pathway type #2), missile defenses and conventional prompt global strike are principally relevant to strategic stability (pathway type #3).

Second, unlike offensive cyber and many counter-space capabilities, each side can know the basic parameters, including overall numbers and general capabilities, of the other side's missile defenses and conventional prompt global strike capabilities without reducing the effectiveness of these systems. Cyber capabilities in particular, however, are likely to be much less effective if even their general outlines are known to the other side. Thus, there can be substantially less uncertainty regarding each side's missile defense and conventional strike capabilities than is the case for offensive cyber and counter-space capabilities, so that mutual or bilateral transparency measures to provide assurances that these capabilities are not undermining strategic stability are at least possible in principle. This is considerably less true of cyber, however. Space and counter-space represent a kind of middle ground.

MISSILE DEFENSES

As of the present, neither the United States nor Russia has sufficiently capable or extensive missile defense or air defense systems to deny the other side from being

North Korea successfully test-fires an intercontinental ballistic missile. U.S. national missile defenses are designed to protect the U.S. homeland from a limited missile attack by North Korea or Iran – not to obviate Russian or Chinese nuclear deterrents. (Getty)

able to conduct a devastating nuclear attack, including in a second strike. The United States has no national air defense system against bombers and cruise missiles, and its national missile defense system has only 44 interceptors, far too few to negate a Russian second strike that could include many hundreds of missile warheads and bombs. Moreover, U.S. national missile defenses are oriented against North Korea and as a hedge against future Iranian capabilities, and so are likely in any event to be incapable of intercepting Russian warheads with advanced countermeasures.

Russia has approximately 84 national missile defense interceptors ringing Moscow, reportedly armed with nuclear warheads and so plausibly able to defeat some U.S. ballistic missile warheads targeted on Moscow. Unlike the United States, Russia does have an extensive national air defense system, but it would be overwhelmed (and likely actively suppressed using both ballistic and cruise missiles) even by a U.S. second strike.

There are three possible future developments in missile defenses that could undermine strategic stability.

1. The deployment of large numbers of kinetic kill or nuclear tipped interceptors that have the potential capability (based on criteria such as velocity at burnout and sensor capability) to engage ICBMs and SLBMs. The United States is on a path to deploy hundreds of SM-3 IIA interceptors on ships, which could be brought close to the United States and theoretically support a late-midcourse defense against

Russian ICBMs. The Russians are deploying increasingly advanced S-400 interceptors and developing S-500 interceptors in substantial numbers. The ability of each side's interceptors to engage strategic missiles will depend first on their location (the interceptors need to be close to the defending side's homeland), and second on whether their off-board and on-board sensors would be defeated by countermeasures, as would likely be the case today.

2. The deployment of space-based kinetic kill interceptors. The United States has considered deploying space-based interceptors in the past, because in aggregate they would have the potential for global coverage, and if deployed in substantial numbers and combined with appropriate sensors they could be effective against relatively sophisticated threats. The fundamental challenge with space-based missile defense interceptors is that it is difficult to envision a stable situation in which both sides had such deployments, because such interceptors likely would be even better at engaging each other (and other satellites) than engaging more complex nuclear warheads with sophisticated countermeasures.

3. Both the United States and Russia have worked for decades on directed energy systems for missile defenses, but with little operational significance. Indeed, the United States briefly deployed the Airborne Laser for tactical ballistic missile defense until concluding that its limited power and low

The Boeing YAL-1 Airborne Laser Testbed was an early testing platform for a directed energy-based tactical ballistic missile defense system. The advent of sustainable and survivable directed-energy ballistic missile defenses could complicate strategic stability. (U.S. Missile Defense Agency)

survivability would make it operationally ineffective in a conflict. Advances in solid state lasers, however, make it appear more plausible than ever before that over the next two to three decades airborne or space-based multi-megawatt lasers could be deployed. Because of the curvature of the earth, airborne lasers would need to get relatively close to their target missiles to be effective, which would make them potentially vulnerable to disruption and destruction. Space-based lasers would have the advantage of constant dwell time, and a constellation could always have capability in place. However, space-based systems also would be a lucrative target for ASAT attack, in part because they would be highly capable ASATs in their own right.

LONG-RANGE NON-NUCLEAR STRIKE

Non-nuclear long-range strike capabilities today do not change the stability picture. Neither side has deployed conventional prompt global strike capabilities – either conventional weapons on long-range ballistic missiles or hypersonic cruise missiles – that could realistically threaten to disarm an opponent's strategic deterrent or decapitate its NC3. Although both sides deploy conventional cruise missiles in significant numbers, such systems have a long time of flight that would allow the attacked side hours of warning time to launch its ICBMs, and moreover are unlikely to have the combination of accuracy and payload to destroy ICBMs in their silos

(despite Russian concerns). Moreover, even if such a strike were possible, the United States would retain hundreds of nuclear weapons on board SSBNs at sea, and Russia would retain hundreds of nuclear weapons at sea and on its mobile missiles.

The principal stability concern today relating to long-range strike is the possibility of a submarine-launched cruise missile attack by one side against the other side's national leadership. This is a particular concern for the United States, because of the proximity of Washington to the Atlantic Ocean, the limited U.S. ability to detect and

> **The principal stability concern today relating to long-range strike is the possibility of a submarine-launched cruise missile attack by one side against the other side's national leadership.**

engage cruise missile attacks against the homeland, and the broadly understood reality that the U.S. president has sole authority to direct the employment of nuclear weapons (although there is of course a robust succession plan in the event of the President's death or incapacitation). The parallel concern in Moscow is that Russian air defense early warning radars could fail to detect a

Russian Akula cruise missile–capable submarines have been seen off the East Coast of the United States. (Ilya Kurganov)

substantial cruise missile attack on leadership early enough to deflect it.

The sea-launched cruise missile threat to Washington is not new and it is not hypothetical; Russian Akula cruise missile–capable submarines have been spotted off the U.S. East Coast.[78] Because such an attack would be extraordinarily escalatory, however, and even if "successful" would only delay and not negate a U.S. nuclear response, it would seem remotely plausible only in the context of a large-scale attack on U.S. nuclear forces. In such a scenario, Russia would attempt to decapitate the U.S. political leadership, preventing the President from directing ICBMs to launch under attack and allowing U.S. ICBMs and non-alert bombers to be destroyed with conventional and/or nuclear strike. Even in this extreme scenario, if U.S. SSBNs are still highly survivable – as we believe strongly to be the case today – then for all its effort Russia would face retaliation by hundreds of nuclear warheads.

This said, however, non-nuclear precision strike appears likely to become an increasingly severe problem over time. This stems from two concerns. First and more immediately, there is concern that the launch of a conventional prompt global strike (CPGS) missile could be mistaken for the launch of a nuclear-tipped missile, and induce the side fearing attack to launch nuclear-tipped missiles in response. This was a key concern relating to the Conventional Trident Modification. This concern also has been addressed through proposed confidence building measures, including by separating CPGS bases from nuclear weapons or platform bases.

A second and more significant fear is that, while CPGS today remains a developmental program, ultimately the United States and Russia could develop and deploy sufficient numbers of highly capable prompt global strike systems to imperil the strategic nuclear deterrent of the other side. Many nuclear delivery platforms, such as road- and rail-based ICBM launchers, could readily be destroyed by conventional forces if they could be effectively targeted. Moreover, future CPGS systems, some Russian and other analysts believe, ultimately could be capable of destroying even more defended targets, such as hardened ICBM silos or command installations. Furthermore, if CPGS could perform most of a disarming strike, the lesser use of nuclear weapons, especially against targets like silos usually in uninhabited areas, could lower the bar to such employment. Missile defense systems could "mop up" residual second-strike forces. Russian officials and analysts have presented this scenario as a significant concern.

COUNTER-SPACE

Space systems are intimately connected to strategic stability given their relevance to nuclear operations, particularly for the United States. The United States relies on satellites for missile early warning, particularly via the SBIRS constellation, and for secure communications with nuclear forces (advanced extremely high frequency). Attacks on systems in space therefore could implicate important and potentially crucial nuclear-related systems, for instance by shortening decision or warning times or by reducing confidence in or interrupting the ability to communicate with nuclear forces.

Although it is challenging to assess the impact of counter-space capabilities on the strategic nuclear balance, there are no unclassified reports of deployed dedicated ASAT systems on either side, and so it appears today that both the United States and Russia today may have relatively limited ASAT capabilities (although it both sides might be able to use ballistic missile defense interceptors to attack satellites in low earth orbit). It therefore appears highly unlikely that either side could have confidence that it could negate the other side's early

> **Counter-space capabilities and risks are likely to grow in the future.**

warning or secure communications satellite constellations, let alone do so rapidly, under current conditions. Moreover, even if it were able to disrupt or destroy key elements of the other side's space architecture, each side has ground-based radars to support early warning and substantial terrestrial and/or airborne communications to support secure communications. Therefore, at least for the present there seems little prospect that either side

could substantially impact the other side's second-strike capabilities through counter-space attacks – whether alone or in combination with nuclear and non-nuclear strike systems.

That said, any attack on space assets could have severe escalatory potential. And both counter-space capabilities and risks are likely to grow in the future. First, future ballistic missile defense systems may have significant anti-satellite capabilities; of particular concern would be space-based interceptors or directed energy (e.g., laser) systems that could be both highly capable ASATs and attractive targets for the other side.

Second, in the absence of any agreed framework for stability in space, either side may decide in the future to deploy dedicated ASAT capabilities, terrestrial and/or in outer space. Moreover, because of the possibility of clandestine development and deployment of some types of counter-space systems, each side may fear the worst from the other side, and pursue not only defensive capabilities but offensive systems as a result. Considering also the potential for China to pursue ASAT capabilities, the coming decades hold a real possibility for an aggressive if largely clandestine and highly uncertain arms competition in outer space.

CYBER

Cyber weapons have the potential not only for tactical and operational impact, but significant strategic effects, in two senses. First cyber weapons might be used against nuclear weapons, delivery systems, and command and control. Second, cyber weapons have the potential to impose large-scale damage and disruption to civilian critical infrastructure. Both U.S. and Russian strategic planners have forthrightly noted this reality.[79]

Cyber developments bode equally poorly for crisis stability. The vulnerability of both U.S. and Russian military forces to cyber attack generates classic "first use" pressures. In other words, in the event of a crisis, knowing how vulnerable it is to a potential impending cyber attack, each side is incentivized to use its cyber-vulnerable capabilities first or lose them. The implications of this logic are not limited to the cyber domain.

Indeed, advances in offensive cyber capabilities may exacerbate each side's fears about the vulnerability of its nuclear deterrent to the other side's potential preemptive attack. Russian officials currently argue that the United States could use a combination of conventional strike force and ballistic missile defenses to neutralize their nuclear deterrent. Cyber capabilities have the potential to offer both sides an additional "left of launch" option for preemptive strike. In a future

crisis in which one side believed that the other was able and willing to stage such an attack, it could perceive itself as having extremely little time to make a decision and might employ cyber capabilities preemptively or more extensively than otherwise might be the case (or might employ additional capabilities out of fear of the other side's cyber capabilities).

Of all emerging capability areas, however, the impact of cyber on strategic stability is perhaps the most challenging to assess, due to two fundamental layers of uncertainty. First, most if not all offensive cyber capabilities would need to be kept secret from the other side to be effective; otherwise the penetrated side could remedy or work around the known vulnerability. Second, even if one side had succeeded in gaining access and implanting malware, bogus hardware, and the like through cyber penetration operations, massive uncertainty would remain for the potential attacker regarding how well its cyber exploits might work in practice and the scope and extent of its consequences. On the one hand, might the other side already have discovered and quietly remedied the problem? On the other hand, might an intended precise cyber attack on military systems have cascading effects so that the cyber attack spreads beyond its intended target to affect (for example) civilian critical infrastructure? These concerns could be especially significant if the attacks affected nuclear-related systems such as NC3, early warning, and even platforms themselves.

The vulnerability of both U.S. and Russian military forces to cyber attack generates classic "first use" pressures.

Some of today's uncertainty may be resolved over time, as each side pays increasing attention to examining (and, as needed, modifying to make even more secure and redundant) its nuclear-related systems. It appears that work remains, however, at least in the United States. A January 2013 report by the Defense Science Board (DSB) noted that "most of the [U.S. nuclear] systems have not been assessed (end-to-end) against a [top tier] cyber attack to understand possible weak spots."[80]

Notwithstanding the extensive uncertainty regarding cyber vulnerabilities, given the diversity and redundancy inherent in U.S. and Russian nuclear delivery systems, warheads, and NC3, it does appear reasonable to conclude that it is highly unlikely that either side today has confidence (or reason to have confidence) that

its current cyber capabilities could substantially boost confidence in a first strike or substantially undermine the other side's confidence in its second-strike capabilities.

For example, if a cyber attack on nuclear command and control could delay the other side from giving an order to execute a nuclear strike for 30 minutes, it potentially could negate the other side's ability to launch its ICBMs under attack, increasing the risk to such ICBMs and narrowing the potential options for the victim side's leadership. If such a strike could prevent alerting forces for dispersal for the same period, meanwhile, such a cyber attack also could allow a limited number of attacking warheads (and potentially non-nuclear ones) to destroy strategic bombers on the ground, strategic submarines at pierside, and mobile missiles in garrison before they were able to flush. The net effect of such hypothetical cyber capabilities is to increase further the reliance of each side on its day-to-day alert forces, in the U.S. case SSBNs at sea and ICBMs, and in the Russian case SSBNs at sea and silo-based and field-deployed mobile ICBMs.

AUTONOMOUS SYSTEMS AND BIG DATA

For decades, U.S. defense analysts have assumed that American SSBNs were invulnerable to detection, tracking, and destruction by antisubmarine warfare units. As a result, the United States places 70 percent of its accountable warheads under the New START Treaty on submarines. Similarly, for decades it has been assumed that mobile missiles, which Russia has acquired in large numbers, would be essentially invulnerable once deployed to the field. Mobile missiles can be dispersed

over broad areas, and be hidden in complex terrain such as forests. The American experience in "Scud hunting" during Operation Desert Storm in 1991 – not a single Iraqi missile destroyed despite many hundreds of air sorties in a highly permissive air environment – is often cited as a case in point.

However, just as the accuracy of ICBM warheads improved over a period of years sufficient to put once effectively secure silo-based ICBMs at risk, it is possible that the most secure elements of both sides' strategic forces – SSBNs for the United States and mobile ICBMs for Russia – may become vulnerable over the coming decades. Finding either SSBNs or mobile ICBMs when deployed can be likened to finding a needle in a haystack. Yet both sides have advanced their capabilities for antisubmarine warfare and time-critical targeting over time, and have strong incentives to continue to do so given the value of both antisubmarine warfare and time-critical targeting in conventional conflict.

Moreover, the advent of big data analytics is offering new possibilities for rapidly sorting through many very large haystacks to find a few needles. Based on the advances in computing as per Moore's Law, computing power has increased by a factor of roughly 20,000 since the 1991 Gulf War; by 2030, the computing power will have increased by a factor of approximately 5 million relative to 1991. Indeed, some U.S. defense analysts have noted emerging technologies – including highly autonomous advanced data processors and unmanned aerial vehicles – could enable effective targeting of mobile missiles in the future.[81]

The sea leg of the U.S. nuclear triad is made up of ballistic missile submarines (SSBNs) like the USS Rhode Island (SSBN-740). The United States depends on the survivability of these assets to assure its nuclear second-strike capability. (U.S. Navy)

Ultimately, it is exceptionally difficult to assess the plausibility of strategic antisubmarine warfare and the ability to target mobile ICBMs in an unclassified paper. The revealed preferences of the two states, however, are highly suggestive about their assessments of how manageable the threats to strategic missile submarines and mobile ICBMs are. The United States is proceeding with its *Columbia*-class replacement SSBN, which will continue to serve as the backbone of the U.S. strategic deterrent, indicating that the United States does not regard threats to its strategic missile submarines in the coming generation as unmanageable.[82] Meanwhile, Russia is continuing to develop and deploy both new SSBNs and mobile ICBMs, indicating that it also views threats to such systems

The Russian Federation uses highly survivable mobile ICBMs to assure its own nuclear second-strike capability. Emerging autonomous military systems, however, may allow Russia's adversaries to more reliably find, track, and target these systems, thereby endangering their deterrent effect. (Vitaly V. Kuzmin)

as plausibly manageable. One of the reasons for this is the difficulty of locating SSBNs and mobile ICBMs. More difficult, however, is completing the "kill chain" (find, fix, track, target, and engage) against such systems. It is one thing to locate a system, for instance in the middle of the Atlantic Ocean or the Siberian forest. It is another thing to be able to deliver a sufficiently destructive and accurate weapon against the targeted system before it is able to fire or conceal itself.

Looking forward, it is likely that the measure-countermeasure interaction between offensive strike capabilities, including ISR and tracking on the one hand and defensive and survival capabilities on the other, will continue both in undersea warfare and for time-critical targeting of mobile missiles without a fundamental shift in the basic strategic reality of the nuclear era. That is, while defense may become more practicable than it is today, it seems unlikely that technology and organizational capability will shift so dramatically that a very high degree of defense dominance could emerge. That said, there remains a good deal of uncertainty with respect to this estimate. With the advent and rapid advancement of big data analytics and other technologies, it remains possible that one side or the other will have a breakthrough in antisubmarine warfare and/or time-critical targeting of mobile missiles that could have dramatic implications for the strategic balance.

Should such a breakthrough occur, it is important to note a key difference between the situation for SSBNs

and for mobile ICBMs. Although any attacks on the other side's forces would be fraught with risk of further escalation, attacks on at-sea SSBNs would not involve attacking the other side's homeland, as would be the case with attacks on mobile ICBMs. Sinking a half dozen SSBNs each with 150 sailors on board, while clearly a risky act of war, may seem far less risky than even a small-scale attack on the other side's homeland, especially given that any significant conventional conflict presumably would involve attacks on each side's attack submarines. Moreover, submarines can be attacked effectively without recourse to nuclear weapons.

> **The advent of big data analytics is offering new possibilities for rapidly sorting through many very large haystacks to find a few needles.**

Strategic (In)Stability Scenarios in Tomorrow's World of Non-Nuclear Strategic Counterforce
For many decades, the strategic balance between the United States and Russia has been analyzed in significant part through exchange analysis. This analysis has focused on highly rigorous assessments of the forces each side would retain after absorbing a first strike,

with assessments considering day-to-day, generated, and other such postures. The fundamental question asked in these analyses has been the same for both states: whether either would retain sufficient surviving forces in the wake of the other side's strike to impose unacceptable costs on the attacker. For decades, it has been clear that both the United States and Russia enjoy a very robust second-strike capability due to the size, survivability, and sophistication of their respective forces. Thus, under the current levels established by the New START Treaty, even in the worst-case scenario, the attacked side still could expect to be able to launch hundreds of warheads in response even to a surprise-attack first strike.

The preceding analysis points to growing challenges to U.S.-Russian strategic stability in the coming 10 to 20 years. Although it will remain important to assess the "nuclear balance" in its own right as in decades past, the core stability problem in the U.S.-Russian context in the coming years stems from advances in non-nuclear capabilities. These could enable strategic counterforce in a number of ways that could provide one side strategic leverage, in particular by reducing the role of and reliance on highly destructive and "taboo" nuclear weapons in an attempt to neutralize an opponent's second-strike capability and/or leadership structure.

NON-NUCLEAR COUNTERFORCE STRIKE WITH MISSILE DEFENSE MOP-UP

One potential future scenario involves conventional prompt global strike (CPGS) forces, perhaps used in concert with a reduced number of nuclear weapons to conduct an attempted disarming first strike. The attacker would then "mop up" surviving adversary missiles with missile defenses – which would be expected to work much better against a substantially degraded retaliation.

Both Russian and Chinese national security officials have emphasized their concern about the prospect of this kind of scenario in the future.[83] The emergence and hardening of these fears could induce Russia to shift its strike posture "to the left" or pre-delegate or automate launch authority, since Moscow might fear that delaying decisionmaking or insisting on centralized control would render it vulnerable. Such moves would generate profound stability issues, both on their face but also because Russia might readily misconstrue the "American way of war" involving extensive precision strikes including against command and control nodes with the conventional-nuclear first strike it most fears.

KINETIC AND NON-KINETIC COUNTER-NUCLEAR C3 STRIKES

Rather than focusing initially on the other side's deployed nuclear forces, an attacker might employ CPGS and/or non-nuclear cruise missiles to target the other side's leadership and nuclear command, control, and communications (NC3). Even if such an attack failed to prevent the other side from launching a nuclear counter-strike, it might disrupt the other side from launching its ICBMs and other systems long enough to make them vulnerable to nuclear and/or non-nuclear follow-on strikes.

Cyber and space/counter-space capabilities could be used to augment the effectiveness of a nuclear or non-nuclear counterforce strike to degrade, deny, or destroy the adversary's retaliatory capabilities. In particular, cyber intrusions could be employed to disrupt an opponent's NC3 and thereby prevent a nuclear launch. While it would be very challenging to hold down an opponent in this way forever, even a 30-minute delay could block an opponent from launching under attack, which would allow the attacker to target the victim's silo-based and non-generated mobile ICBMs, SSBNs in port, and bombers with a mix of conventional and, if necessary, nuclear strike assets. Fixed systems could be attacked based on traditional ISR methods, while dispersed mobile systems might be struck based on novel detection and tracking methods.

CYBER TOOLS AND BIG DATA ANALYTICS TO TARGET OTHERWISE HIGHLY SURVIVABLE SYSTEMS

As offensive cyber and big data analytics advance in the future, it is theoretically possible that an attacker could attempt to hack the other side's command and control to force its mobile or concealed systems to "light up" as beacons – and thereby allow precise targeting. Further, the attacker could use broader advances in signal processing and big data analytics to counter the other side's most survivable systems. In such a scenario, after employing CPGS and cyber capabilities, supported by strikes enabled by big data analytics, the attacker could rely on missile defenses to mop up any ragged retaliation.

JUMPING INADVERTENTLY FROM THEATER NON-NUCLEAR TO STRATEGIC NUCLEAR CONFLICT

Emerging non-nuclear capabilities also could generate pressures toward nuclear escalation even without an attacking side seeking to disarm or decapitate the other. Beyond the possibility of conventional prompt global strike missiles in flight being misconstrued as a nuclear

attack, as just discussed, there are other scenarios in which misperceptions could trigger nuclear conflict.

For instance, one side might use long-range, prompt conventional strike, cyber, and/or counter-space capabilities as part of a tactical/theater level attack on the other side's military, which the other side could interpret as an attack on or prelude to such an attack on its strategic nuclear forces and/or C3. In addition, one side could misperceive incoming platforms or weapons as nuclear when they are not. Such was a major concern with the Conventional Trident Modification proposal, which would have placed non-nuclear warheads on perhaps ten Trident II D-5 missiles. Former Secretary of Defense William Perry and others have raised an analogous concern with respect to nuclear-tipped cruise missiles in the U.S. arsenal (similar stability concerns presumably obtain relating to the extensive Russian arsenal). In a world in which one side greatly fears the other's first-strike capabilities, it may then pre-delegate or automate launch authority in the event of a cutoff of guidance from a nation's leadership; such was the purpose of the Soviet "Perimeter" or "Dead Hand" system, which various Russian interlocutors have reported was real.

> **It is conceivable that both sides may conclude that, even though they could not actually fully disarm their opponent, preemption may be the least unattractive choice.**

In this likelier scenario, both sides are extremely uncertain about the other side's capabilities, and both may fear that the other side is pursuing a "splendid" first-strike capability (i.e., a surprise attack that destroys or disables most of the adversary's nuclear arsenal). As tensions rise, fears of being preempted increase the incentives to attack first and thereby limit damage. Going first may result in severe retaliation, but going second is perceived as notably worse. Once a crisis has started and one thinks war is highly likely or inevitable, it may make sense to strike before the other side can mobilize adequately or degrade one's own forces. Russians have made explicit that they regard limited preemption as a potential strategy for short-circuiting U.S./NATO mobilization and organizing for general war, which would presumably go against Moscow.[84]

In this path, it is conceivable that both sides may conclude that, even though they could not actually fully disarm their opponent, preemption may be the least unattractive choice; that is, however terrible a nuclear conflict may be, it would be substantially less terrible for the side that moved first. Such a scenario therefore could generate a cycle of mutually reinforcing fears amid crisis that could lead the actors to pursue preemption. Time constraints on decisionmaking due to a real or perceived first-strike advantage also would affect decisionmaking.

05 CHAPTER

Conclusion

The United States and Russia have reentered a period of serious tensions that shows no sign of abating. Relations between the two sides appear likely to remain tense, if not hostile, at least through the medium term, and may involve considerable turbulence. Bluntly put, serious disagreement and even outright conflict are possible.

Exacerbating this geopolitical reality, emerging new military capabilities – cyber, space, missile defense, long-range strike, and (cutting through all) autonomous systems – are increasing uncertainties associated with strategic stability and creating potential slippery slopes of escalation. Unless measures are taken to cushion the consequences of these military trends, conflict may become more probable and escalation more dramatic and severe than they need to be – all in an era when both crisis and conflict are more plausible than they were just ten years ago.

This report has sought to put a spotlight on this increasingly severe problem, and to provide a framework for understanding what is happening and organizing these insights, their implications, and what might be done to deal with them. In this new era of increased complexity and volatility, U.S. strategy will need to be guided by the principle of managed competition. This, in turn, will require Washington to develop and deploy disruptive technologies while simultaneously attempting to lay the foundations for reciprocal restraint with Russia.

How precisely to undertake such tasks will be the subject of a subsequent report. That next report will provide concrete recommendations for actions that Washington and Moscow should pursue, both individually and jointly, to avoid crises turning into conflicts, conflicts into major wars, and major wars into apocalyptic ones.

The first step toward reducing the possibility of crisis or conflict – and the costs of them should they ensue – is recognizing the transformations that undermine stability in the U.S.-Russian relationship. The analysis contained in the present report is aimed at limning those transformations, and at setting the stage for possible ways to reduce the dangers they portend.

Endnotes

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4. In our follow-on report, we will ask: What steps might the United States and Russia take both unilaterally and bilaterally to mitigate these pressures toward essentially inadvertent escalation, for instance by establishing "rules of the road," "off-ramps," and other measures to reduce the chances of sliding rapidly from crisis to conflict?

5. In our follow-on report, we will ask: What should both sides do (and avoid doing) in the coming years both unilaterally and bilaterally to promote rather than detract from a strategic stability relationship from which they both derive benefits?

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